TECHNICAL DATA SHEET

No. RADIO 81

ORIGIN: Radio Engineering

MODELS T2-69 and 03-8K

The above mentioned models use B.S.R. UA50 mechanisms. The following production changes have been made:-

1. The four rubber mounting bushes (as supplied by B.S.R.) were replaced by three springs, E.M.I. Part No. 840-1001, (deleting the rear left mounting point).
2. Printed Circuit Board - R28 and R42 were changed to 47K ohms ±10%.
3. Chassis - C22 and C31 were changed to 470pF.
   1 Megohm resistors were deleted from wipers of volume controls to earth.

Production has been changed from the following Serial Numbers:-

03-8K after Serial No. 5200
T2-69 after Serial No. 2850.

Should it be desired to modify a receiver now in the field, for increased audio gain and increased bass response, the above mentioned modifications are recommended. It is not necessary to change C22 and C31 to 470pF (on the chassis), as these changes are minor production changes.

NO. RADIO 82

ORIGIN: Radio Engineering

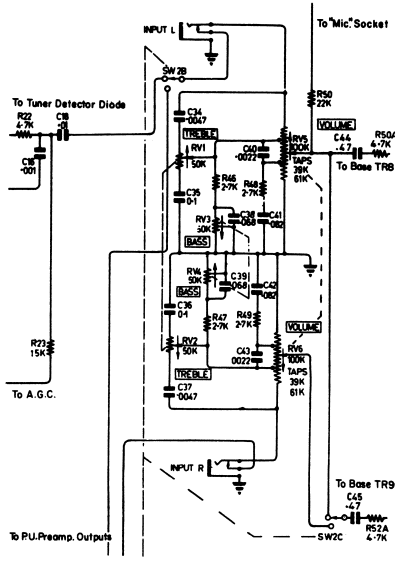
CHASSIS TYPE T3

Changes have been made to the above chassis to increase both volume and treble boost on radio. These changes have no effect on gram operation and are as follows - (See also circuit diagram).

Eliminate network R25, R26, C20 taking C18 directly to SW2B. Connect C32 direct to "input right" switching jack; connect SW2C centre contact to C45, front (radio position) contact to wiper of RV5, rear (gram position) contact to wiper of RV6.

Although not indicated in initial printing of the Operating Instructions for models using this chassis (T3-45 and T3-46), "Input R" jack now operates on "Gram" only, "Input L" and "Mic" feed both amplifiers on "Radio" position.

Factory changes occurred after S/N3253. Chassis prior to this need not be changed.



ORIGIN: Radio Engineering

MODEL T3-45 AND T3-46

Electrical Interference on T3 Audio Amplifiers

Where interference from electrical appliances, particularly at minimum volume, is evident in T3 audio amplifier installations prior to Serial No. 1400, the following modifications are suggested:

(1) Insert series resistors of 4.7K ohms between the volume controls and input coupling condensers of the main audio board, placing the body of each resistor on top of the respective input condenser, using a short pigtail connection to the input tag

(2) Earth the common (negative) terminal at the P.U. input socket to its metal skirt.

(3) Bypass the common (negative) terminal at the L.S. output socket to its metal skirt via a ceramic condenser of approximately 0.01 mfd. (This maintains "one point" earthing at hum frequency).

CHASSIS TYPES T1 AND T3

Improving Performance of T1 and T3 Tuners on External Aerial

Where locality dictates the use of an external aerial on T1 and T3 tuners, the following changes to the aerial coupling will improve rejection of spurious responses and interference from fluorescent lamps etc.:

Close wind two turns of 7/010 over tuned winding, commencing ¼" from start (earth) of tuned winding, in the same direction as the base winding. Connect start to common earth tag, finish to that side of the aerial loading coil which was previously connected to the base winding.

In extreme cases a condenser of 200pF (or larger) from aerial terminal to earth, will assist in rejection of unwanted signals.

Change effective: After Serial No. 1400

NO: Radio 84

Origin: Radio Engineering

T3, T7 and Y1 Radio Chassis

Production of the above mentioned chassis will, from this date, incorporate changes to reduce the problem of distortion arising in the radio detector when high modulation levels are transmitted. The changes are as follows:-

Resistors:	R20 (22K) has been deleted
	R7 (470 ohms) and R21 (1.5K) have been replaced by links
	R10 (18K) has been changed to 10K ± 10% ½W (E.M.I. Part No. 740-0082)
	R13 (1K) has been changed to 390 ohms ± 10% ½W (E.M.I. Part No. 740-0002)
	R22 (10K) has been changed to 33K ± 10% ½W (E.M.I. Part No. 740-0242)
Capacitor:	C14 (.047uF) has been deleted.
Diode:	MR2 (OA90) has been changed to AB1101 (E.M.I. Part No. 932-2601)

Should this problem, which is sometimes evidenced by rattles in loudspeaker reproduction, occur in the field, receivers may be modified as above.

Coincident with this change, the AX1101 transistor (circuit reference TR1) has been replaced by a SE1010 transistor (E.M.I. Part No. 932-2681), to make a minor improvement in the radio signal to noise performance.

Change effective: T3 after Serial No. 10215 (approximately)
T7 after Serial No. 1026 (approximately)
Y1 after Serial No. 488 (approximately)

SPECIFICATIONS (continued)

SEMI-CONDUCTORS:

SE1001 (Silicon NPN)—Frequency Changer
SE1001 (Silicon NPN)—1st IF Amplifier
SE1001 (Silicon NPN)—2nd IF Amplifier
2 SE4010 (Silicon NPN)—Audio Pre-Amplifiers / Equalisers
2 SE4002 (Silicon NPN)—Audio High Pass Filters
2 SE4002 (Silicon NPN)—Audio Amplifiers

SEMI-CONDUCTORS (continued)

2 SE6002 (Silicon NPN)—Audio Drivers
4 AY8103 (Silicon NPN)—Push-Pull Audio Output (2 matched pairs)
0A90 (Germanium Diode)—Signal Detector and AGC
0A90 (Germanium Diode)—Auxiliary AGC
2 AS25 (Silicon Diode)—Power Rectifiers
4 AB1102 (Silicon Diode)—Bias Stabilising Diodes

DIMENSIONS:

Model T3-45	Width	48"	50"
	Height (including 7½" legs)	26¼"	20"
	Depth	14¾"	17"
Model T3-46 Main Unit	Width	18"	24"
	Height (including 9" legs)	18"	28"
	Depth	19"	22"
Speaker Cabinets	Width	15"	
	Height	22"	
	Depth	10"	

(Model T3-46 dimensions: including speaker cabinets)

WEIGHT:

Model T3-45	Gross	94 lb.
	Nett	80 lb.
Model T3-46	Gross	88 lb.
	Nett	72 lb.

SERVICE NOTES

Transistors can be permanently damaged by excessive external heat, or by heat generated within the circuit by excessive current flow. When servicing this equipment, the following precautions should be observed:

Supply polarity should never be reversed. Never remove or replace a transistor or circuit component without first switching off the power.

When soldering transistor leads, use a small iron. Solder as rapidly as possible, keeping the iron well clear of the transistor body. The use of a 240-volt soldering iron should be avoided, as leakage and capacitance effects can destroy a transistor. To avoid this problem, a low-voltage iron with a step-down transformer should be used.

To unsolder multi-terminal components (IF transformers, etc.), it is best to apply heat simultaneously to all terminals, using a special iron tip. If a normal tip is used, apply the iron to each soldered joint in turn, and brush away the solder with a stiff brush.

Disconnect transistors before making circuit checks with an ohm meter. Failure to do so will give misleading results and the transistors may be damaged by excessive conduction caused by the ohm meter battery. Check polarity of the ohm meter leads; electrolytic capacitors may be damaged if the ohm meter battery voltage is applied in reverse polarity.

When taking voltage measurements, avoid accidental short-circuits by the voltmeter probes.

Fault-finding can be carried out in the usual manner, keeping in mind that a transistor failure is unlikely.

When using a signal generator, a DC blocking capacitor should be used in the live lead to prevent disturbance of the transistor DC circuits.

Before connecting the generator, adjust its attenuator for minimum output. Signal generators designed for vacuum tube circuits can often deliver more signal than a transistor can safely handle.

The output must be correctly loaded with 15 ohms during these tests. If the output load is reduced below the correct value, the maximum dissipation of the output transistors will be exceeded at medium and high output levels.

DISMANTLING—Model T3-45

Remove the power plug from the mains supply socket. Raise the lids at each end of the cabinet. Place a piece of felt or similar material on top of the cabinet. Unscrew the two top chassis fixing screws, one at each end of the escutcheon. Loosen the two bottom screws, withdraw the chassis, and place it on the felt. The chassis is freed by removing the aerial, pickup, power and speaker cables.

DISMANTLING—Model T3-46

Remove the power plug from the mains supply socket. Raise the lid of the cabinet. Unscrew the two chassis fixing screws which are located underneath the cabinet. The chassis can now be lifted out and freed by removing the aerial, pickup, power and speaker cables.

ALIGNMENT PROCEDURE

In any case where a component replacement has been made in either IF or RF circuits of the receiver, all circuits should be re-aligned. IF alignment should always precede RF alignment. An output meter, having a resistance of at least 250 ohms, is connected across the voice coil of one of the speakers.

In carrying out the following operations, it is important that the input to the receiver from the signal generator be kept low and progressively reduced as the circuits are brought into line, in order that overloading shall be avoided.

Note:

(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 detune the circuit, after the pressure is released.

IF ALIGNMENT

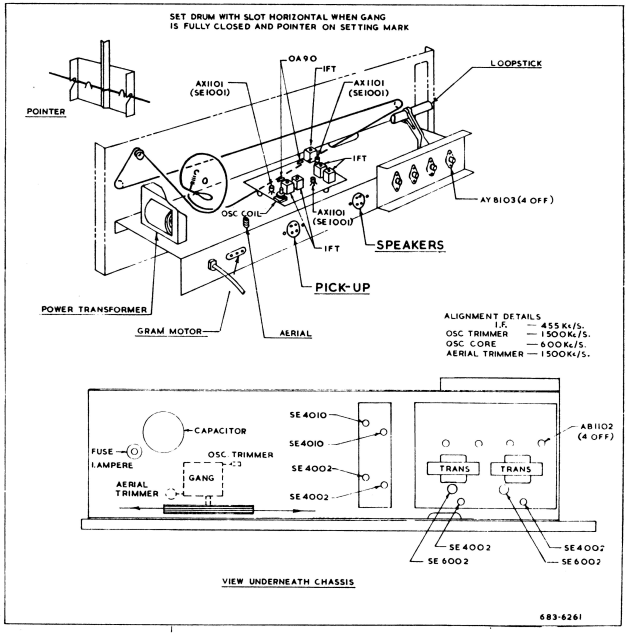
(1) Set the signal generator to 455 Kc/s, with 30% modulation at 400 c/s. Turn the receiver volume control to maximum and set the tuning control to the LF end of the band.

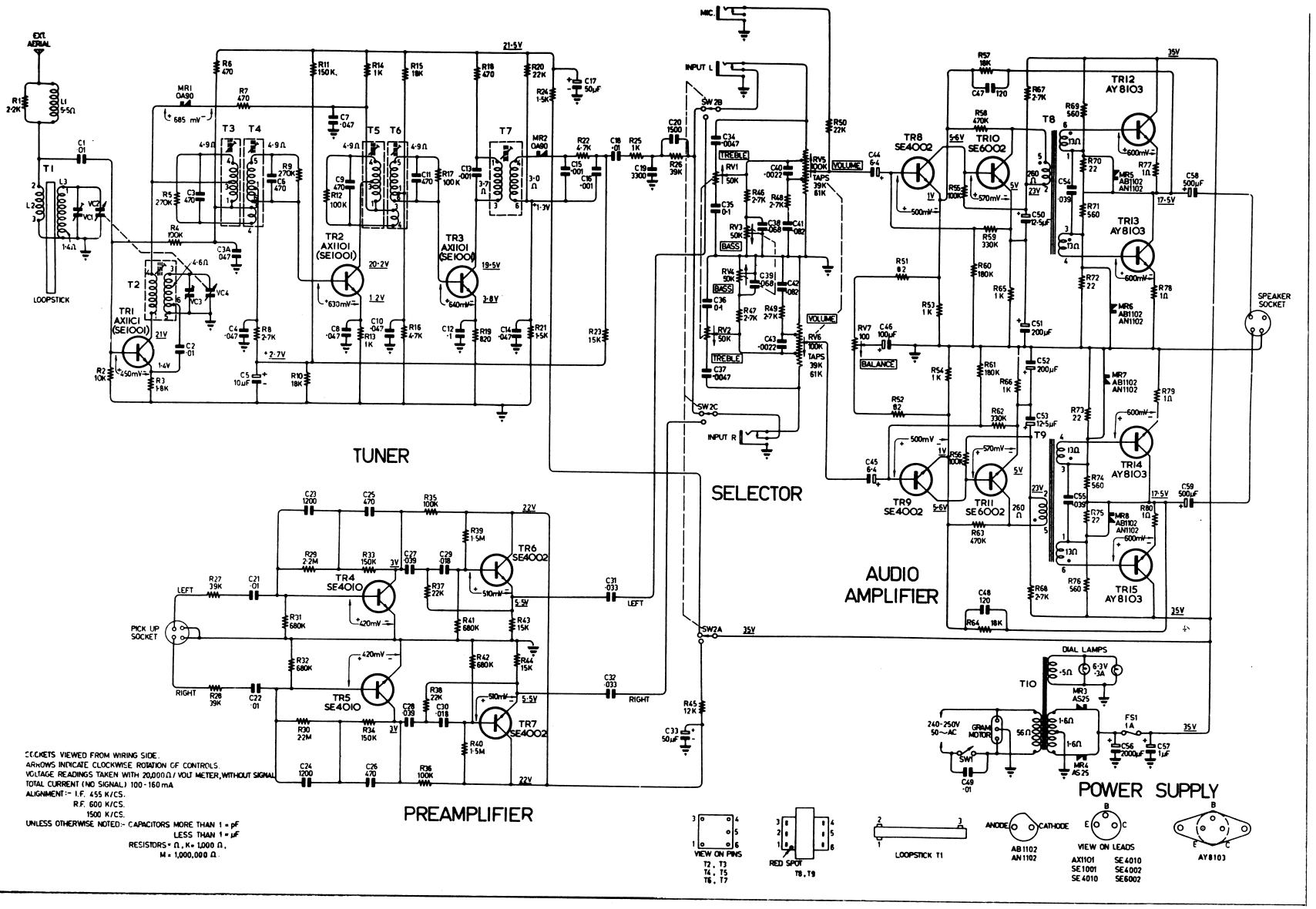
(2) Detune the five cores of the IF transformers by screwing them well out.

(3) Inject the signal from the generator, via a 0.1 uF capacitor, into the base of TR3. Adjust the core of T7 for maximum reading on the output meter.

(4) Inject the signal into the base of TR2. Adjust the cores of T5 and T6 for maximum reading on the output meter.

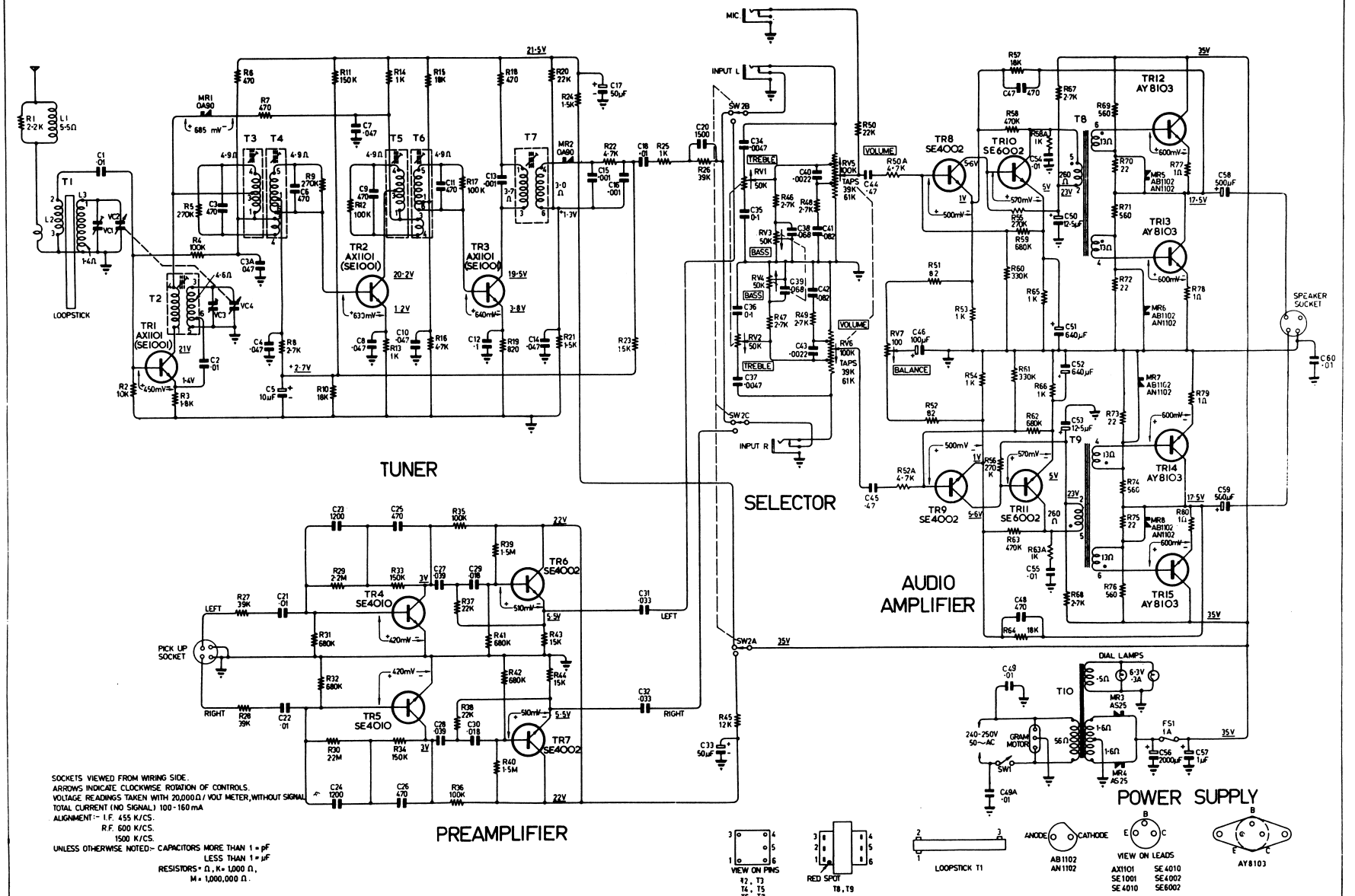
(5) Inject the signal into the base of TR1. Adjust the cores of T3 and T4 for maximum reading on the output meter.



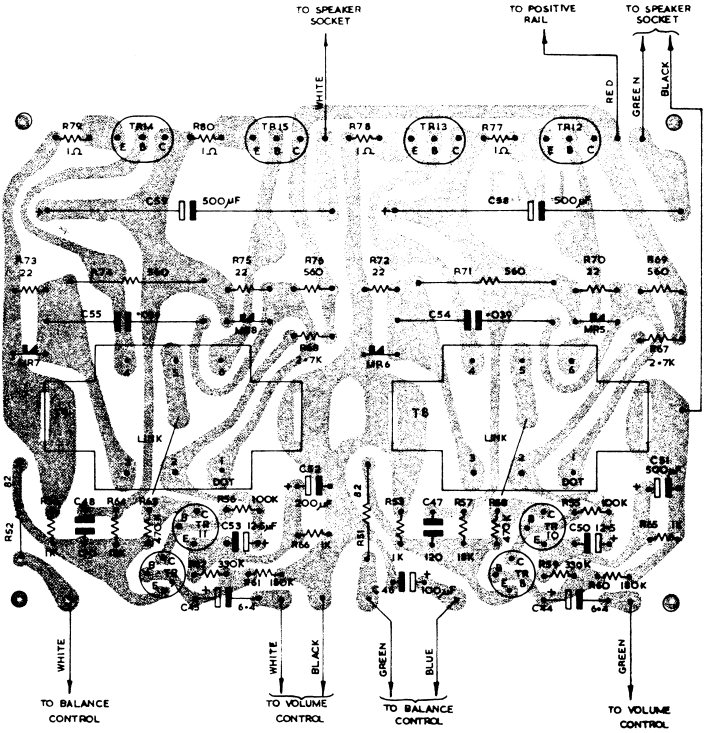


SOCKETS VIEWED FROM WIRING SIDE.
ARROWS INDICATE CLOCKWISE ROTATION OF CONTROLS.
VOLTAGE READINGS TAKEN WITH 20,000 Ω / VOLT METER, WITHOUT SIGNAL
TOTAL CURRENT (NO SIGNAL) 100 - 160 mA
ALIGNMENT:- I.F. 455 K/CS.
R.F. 600 K/CS.
1500 K/CS.
UNLESS OTHERWISE NOTED:- CAPACITORS MORE THAN 1 = pF
LESS THAN 1 = μF
RESISTORS = Ω, K = 1,000 Ω,
M = 1,000,000 Ω.

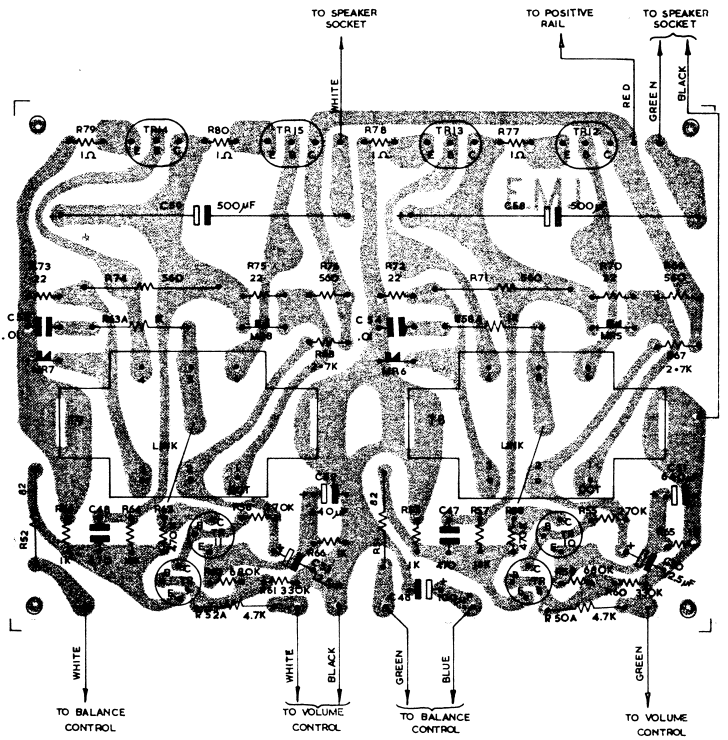
ORIGINAL CRICUIT DIAGRAM (FOR CHASSIS PRIOR TO SERIAL NO. 1400 APPROX.).



MODIFIED CIRCUIT DIAGRAM (FOR CHASSIS AFTER SERIAL NO. 1400, APPROX.)



AUDIO AMPLIFIER — VIEW FROM COPPER SIDE.
(For chassis prior to Serial No. 1400, approx.)



AUDIO AMPLIFIER — VIEW FROM COPPER SIDE.
(For chassis after Serial No. 1400, approx.)

H48. b H.M.V. T3-45 & T3-46

RF ALIGNMENT

(1) With the controls set as for IF alignment, connect signal generator output via a standard dummy aerial to the aerial lead and chassis of the receiver.

(2) Check that the pointers coincide with the setting lines at the left of the dial scale, when the gang capacitor is fully enmeshed. Correct if necessary.

(3) Set the signal generator to 600 Kc/s.

(4) Turn tuning control until the pointer is exactly over the 600 Kc/s calibration mark. Adjust the core in T2 for maximum reading on the output meter.

(5) Set signal generator to 1500 Kc/s.

(6) Turn tuning control until the pointer is exactly over the 1500 Kc/s calibration mark. Adjust VC4 and VC2 for maximum reading on the output meter.

(7) Repeat operations (3) to (6) for optimum alignment.

IMPROVING PERFORMANCE OF T1 AND T3 TUNERS ON EXTERNAL AERIAL

Modifications have been made at the factory to completed chassis after Serial No. 1400 (approx.), and the following is suggested for chassis in the field, i.e., chassis prior to Serial No. 1400. Where locality dictates the use of an external aerial, the following changes will improve rejection of spurious responses and interference from fluorescent lamps, etc.

Close wind two turns of 7/010 over tuned winding, commencing $\frac{3}{4}$" from start (earth) of tuned winding, in the same direction as the base winding. Connect start to common earth tag, finish to that side of the aerial loading coil which was previously connected to the base winding.

In extreme cases, a condenser of 200pF (or larger) from aerial terminal to earth will assist in rejection of unwanted signals.

ELECTRICAL INTERFERENCE ON T3 AUDIO AMPLIFIERS

With completed chassis in the field, i.e., chassis prior to Serial No. 1400, the following modifications will rectify this interference on audio amplifiers.

(1) Insert series resistors of 4.7K ohms between the volume controls and input coupling condensers of the main audio board, placing the body of each resistor on top of the respective input condenser, using a short pigtail connection to the input tag.

(2) Earth the common (negative) terminal at the P.U. input socket to its metal skirt.

(3) Bypass the common (negative) terminal at the L.S. output socket to its metal skirt via a ceramic condenser of approximately 0.01 mfd. (This maintains "one point" earthing at hum frequency).

With completed chassis from Serial No. 1400, changes have been made on T3 audio amplifiers. The reasons for these changes are:

(a) To reduce electrical interference. (As per 1, 2 and 3, above).

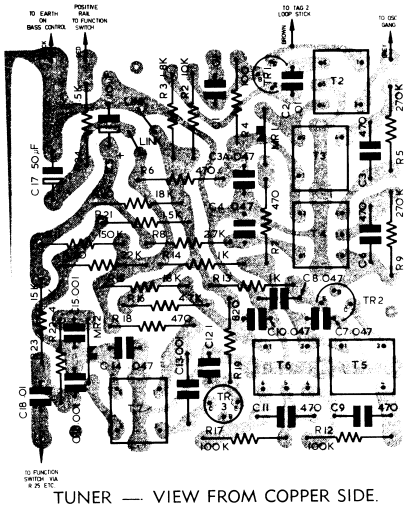
(b) To decrease noise of TR8 and TR9. (Resistance value changes).

(c) To improve recovery of the amplifier after overload. (Changes to input and bypass condensers).

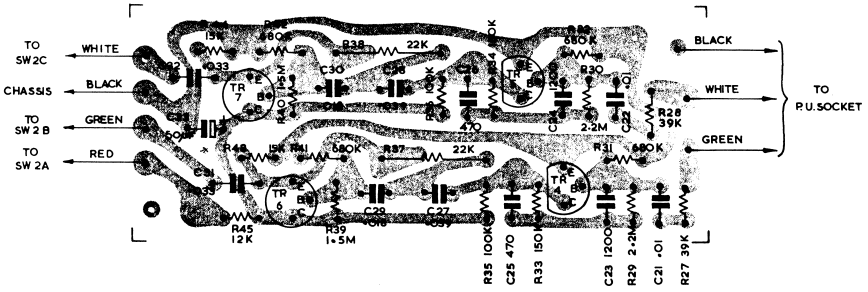
(d) To improve high frequency stability. (Changes to C47, C48 and an added series network to collector).

The insertion of 0.01 polyester condensers from both mains input connections to earth, minimises mains interference pickup on radio.

The modified circuit and Parts List have been included in this Service Manual, and apply to chassis after Serial No. 1400.



TUNER — VIEW FROM COPPER SIDE.



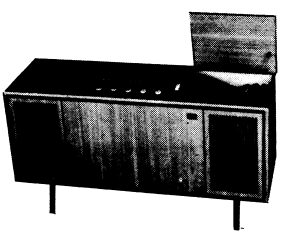
PRE-AMPLIFIER—VIEW FROM COPPER SIDE

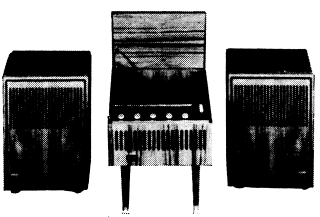
H48.

SERVICE MANUAL

15-TRANSISTOR STEREOPHONIC RADIOGRAMS
SINGLE UNIT MODEL T3-45
THREE-PIECE MODEL T3-46

"HIS MASTER'S VOICE"





SPECIFICATIONS

POWER SUPPLY:
240-250 volts, A.C., 50 c/s.

CONSUMPTION:
Radio: No Signal ..... 9 Watts
Radio: 6 Watts per Channel ..... 29 Watts
Gram: 6 Watts per Channel ..... 38 Watts

FREQUENCY RANGE:
520-1650 Kc/s.

INTERMEDIATE FREQUENCY:
455 Kc/s.

POWER OUTPUT:
6 Watts, each channel (sine wave)

OUTPUT IMPEDANCE:
15 ohms at 400 c/s.

LOUDSPEAKERS:
2 x 8" Magnavox type 8WR (twin cone)

RECORD CHANGER:
Garrard 4-speed, Type 3000.

PICKUP:
Sonotone Type 9TA Ceramic Cartridge

STYLI:
Sonotone Type N9TADS.
Diamond Stereo and Microgroove, 0.7 mil tip.
Sapphire, 78 rpm, 2.5 mil tip.

DIAL LAMPS:
6.3 volts, 0.3 amp.

ADDITIONAL FACILITIES:

Jack—Microphone Input
Jack—Input, Left Channel
Jack—Input, Right Channel
Jack—Output, Left Channel
Jack—Output, Right Channel
Terminals for extension speaker (T3-45 only).

October, 1966.