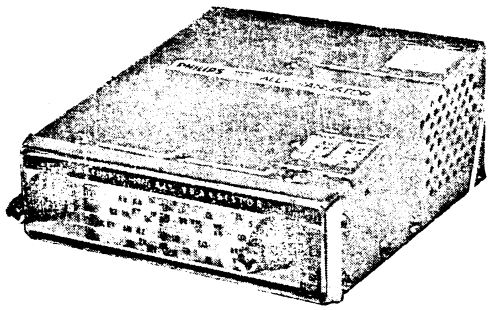
# PHILIPS CAR RADIO

## MODEL 770



### SPECIFICATIONS

(Subject to alteration without notice)

| | |
|---|---|
| Power Supply | 6 or 12V Car Battery |
| Tuning Range | 530-1620 k/cs |
| Tuning Type | Permeability |
| Intermediate Frequency | 455 kc/s |
| Battery Consumption | 0.77 Amps. (6V), 0.468 Amps. (12V) |
| Aerial | Telescopic, Type M512 top mtg., or M513 side mtg. |

### TRANSISTOR EQUIPMENT AND VOLTAGE/CURRENT ANALYSIS

| Transistor Function | Transistor No. | Transistor Type | Collector Volts | Collector mA | Base Volts | Emitter Volts |
|---|---|---|---|---|---|---|
| Frequency Converter | TR1 | OC44 | 6.3 | 0.45 | 1.11 | 0.99 |
| Oscillator | TR2 | OC44 | 4.4 | 0.45 | 1.11 | 0.99 |
| 1st I.F. Amplifier | TR3 | OC45 | 6.1 | 0.85 | 1.87 | 1.7 |
| 2nd I.F. Amplifier | TR4 | OC45 | 6.0 | 1.0 | 1.17 | 1.0 |
| 1st Audio Amplifier | TR5 | OC75 | 5.9 | 0.92 | 2.38 | 2.28 |
| 2nd Audio Amplifier | TR6 | OC72 | 6.8 | 5.8 | 1.0 | 0.88 |
| Power Amplifier | TR7 | OC16G | (6V) 5.7<br>(12V) 11.5 | 670<br>348 | 0.5<br>0.4 | 0<br>0 |
| A.V.C. | D1 | OA79 | Germanium diode | | | |
| Demodulator | D2 | OA79 | Germanium diode | | | |
| Dial Lamp | V11 | 7994N | 7.2V, 0.1A bayonet | | | |

Voltages measured with a vacuum tube voltmeter.

**POLARITY AND VOLTAGE ADJUSTMENT.**

This receiver is designed to operate from a 6 or 12 volt car battery installation, incorporating either a negative or positive polarity earthing system. Production receivers are adjusted for the 12 volt positive earth system, but facility for re-adjustment to suit individual conditions without removal of receiver cover is provided beneath the voltage and polarity change-over inspection plates. Details of change-over procedure are shown as an inset to the circuit diagram.

**PRE-SET BIAS ADJUSTMENT.**

Variable resistor R33, which is chassis mounted on rear sub chassis, provides for adjustment of bias applied to TR7. Two moving arm adjustments provide for correct settings on both 6 and 12 volt supplies. Set the volume control to the minimum position and adjust R33 as follows:—

The chassis layout diagram is shown as an inset to the circuit diagram.

For 6V operation—Adjust the moving arm (grey lead) nearest sub chassis to achieve a TR7 collector current of 0.67 amps.

For 12V operation—Adjust the moving arm (yellow lead) furthest from sub chassis to achieve a TR7 collector current of 0.348 amps.

A safety link for the protection of TR7 is incorporated in the speaker plug. For convenience, a speaker plug with link removed and leads substituted, can be assembled; this will facilitate insertion of a meter into TR7 collector circuit without the necessity to unsolder leads. The speaker must be in circuit during operation of receiver otherwise damage to TR7 may occur.

NOTE: When checking the current of TR7 a warm up period of approximately five minutes is required.

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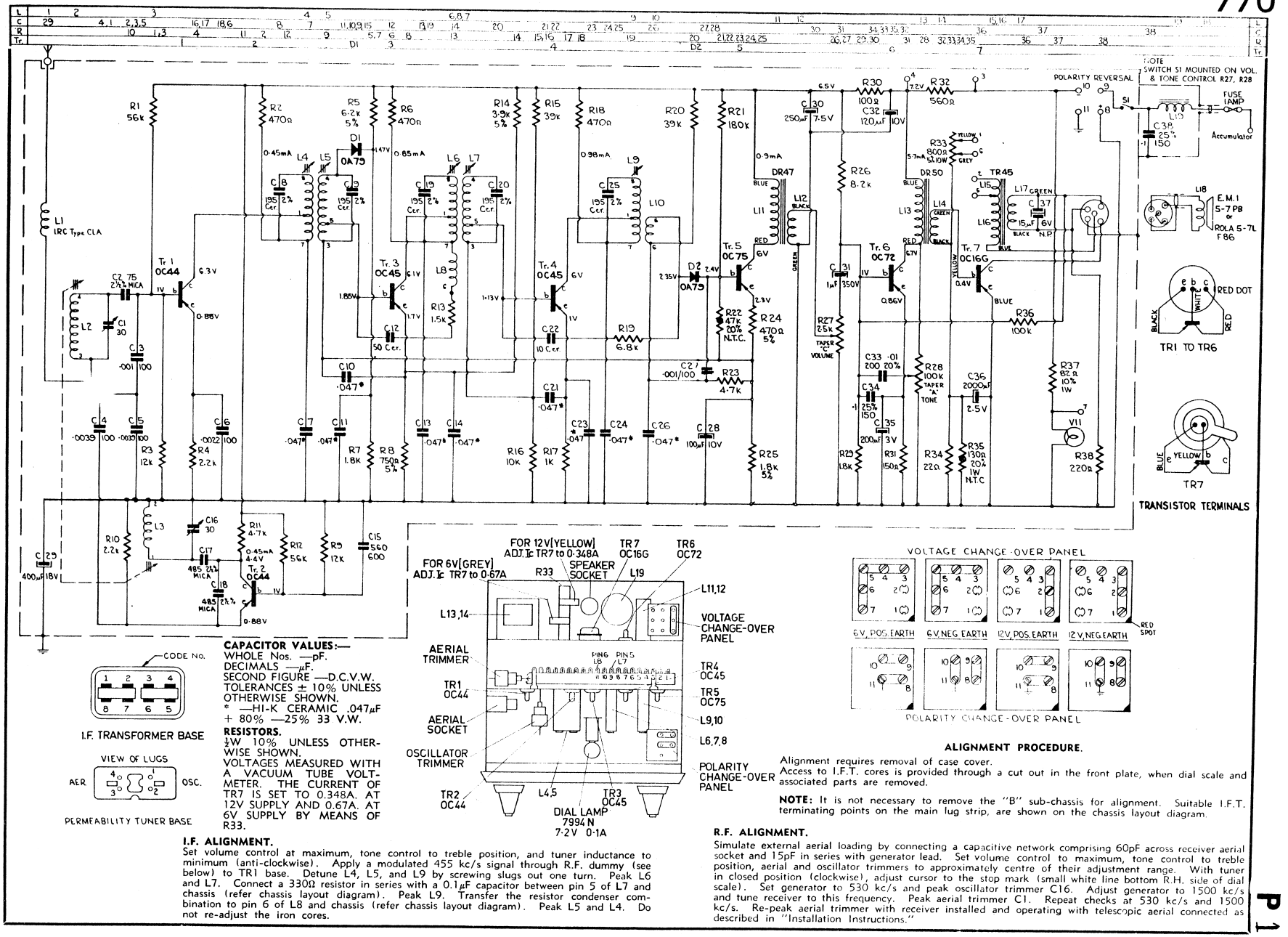






**CAPACITOR VALUES:—**
WHOLE Nos. —pF.
DECIMALS —µF.
SECOND FIGURE —D.C.V.W.
TOLERANCES ± 10% UNLESS OTHERWISE SHOWN.
* —HI-K CERAMIC .047µF + 80% —25% 33 V.W.

**RESISTORS.**
½W 10% UNLESS OTHERWISE SHOWN.
VOLTAGES MEASURED WITH A VACUUM TUBE VOLTMETER. THE CURRENT OF TR7 IS SET TO 0.348A. AT 12V SUPPLY AND 0.67A. AT 6V SUPPLY BY MEANS OF R33.







**ALIGNMENT PROCEDURE.**

Alignment requires removal of case cover.
Access to I.F.T. cores is provided through a cut out in the front plate, when dial scale and associated parts are removed.

**NOTE:** It is not necessary to remove the "B" sub-chassis for alignment. Suitable I.F.T. terminating points on the main lug strip, are shown on the chassis layout diagram.

**I.F. ALIGNMENT.**

Set volume control at maximum, tone control to treble position, and tuner inductance to minimum (anti-clockwise). Apply a modulated 455 kc/s signal through R.F. dummy (see below) to TR1 base. Detune L4, L5, and L9 by screwing slugs out one turn. Peak L6 and L7. Connect a 330Ω resistor in series with a 0.1µF capacitor between pin 5 of L7 and chassis (refer chassis layout diagram). Peak L9. Transfer the resistor condenser combination to pin 6 of L8 and chassis (refer chassis layout diagram). Peak L5 and L4. Do not re-adjust the iron cores.

**R.F. ALIGNMENT.**

Simulate external aerial loading by connecting a capacitive network comprising 60pF across receiver aerial socket and 15pF in series with generator lead. Set volume control to maximum, tone control to treble position, aerial and oscillator trimmers to approximately centre of their adjustment range. With tuner in closed position (clockwise), adjust cursor to the stop mark (small white line bottom R.H. side of dial scale). Set generator to 530 kc/s and peak oscillator trimmer C16. Adjust generator to 1500 kc/s and tune receiver to this frequency. Peak aerial trimmer C1. Repeat checks at 530 kc/s and 1500 kc/s. Re-peak aerial trimmer with receiver installed and operating with telescopic aerial connected as described in "Installation Instructions."

P1

## CHASSIS COVER REMOVAL AND REPLACEMENT.

To gain access to the chassis, remove each of the case cover screws, consisting of:—

Thirteen (13) $\frac{3}{16}$"W x $\frac{1}{4}$" countersunk head (2 top, 2 rear, 5 L.H.S., 4 R.H.S.).

Five (5) $\frac{5}{32}$" W x $\frac{1}{4}$" countersunk head (1 L.H.S. 1 R.H.S., 1 rear, 2 top front).

Recover all countersunk washers.

Initially ease cover from front of receiver and raise upward and backward. Replacement is a reversal of removal procedure.

Check all screws for tightness prior to receiver installation.

## CHASSIS LAYOUT, ACCESSIBILITY AND COMPONENT REPLACEMENT.

The receiver chassis is of semi-unit construction, consisting of two physically isolated but electrically interdependent sections comprising (A) the H.F., I.F., audio amplifier chassis and front panel components; and (B) the audio output and associated interstage components.

Where service to or replacement of a normally inaccesssible component is required, the separation of the "B" chassis from the remainder of the receiver will facilitate ease of service. Removal of 6 screws from the base plate will allow chassis "B" to be raised slightly and pivoted through 90°, while ensuring that the flexible leads are not subjected to severe strain. It is not necessary to release L19 from its position as it is screwed to the "B" chassis; the coil mounting bracket passing through a cut-out in the base plate when "B" chassis is removed. The receiver will operate satisfactorily with chassis separated.

With the removal of dial window, dial scale escutcheon and diffusion plate, access is gained through cut out in front plate to the I.F.T. trimming cores.

For the removal of the permeability tuner, separate the "B" chassis (as above) and remove 3 screws securing "A" chassis to base plate, release dial cord, drum and 4 screws mounting tuner to sub chassis. Raise sub chassis (tuner end) sufficiently high enough to allow release of tuner.

To replace potentiometers R27/R28, remove knobs (push fitted), release 2 screws securing potentiometer mounting bracket to base plate. Completely remove screw (potentiometer side) retaining front plate to base plate and loosen counterpart on opposite side. Slide the potentiometer bracket back as far as possible, at the same time pivot the front plate outward until potentiometer spindle is released from the mounting bush. It is not necessary to remove the dial cord as it will remain in position during the operation. Removal of hexagonal nut will release potentiometer from bracket.

When refitting, ensure free rotation of spindle in mounting bush; slotted holes in base plate provide for adjustment of mounting bracket in respect to front plate.

## SPEAKER REPLACEMENT.

In the advent of speaker replacement or utilisation of an existing non standard speaker for this receiver, inspection of the voice coil terminations should be made. Continuity must not exist between voice coil and speaker frame. Should an earth strip exist then it must be removed.

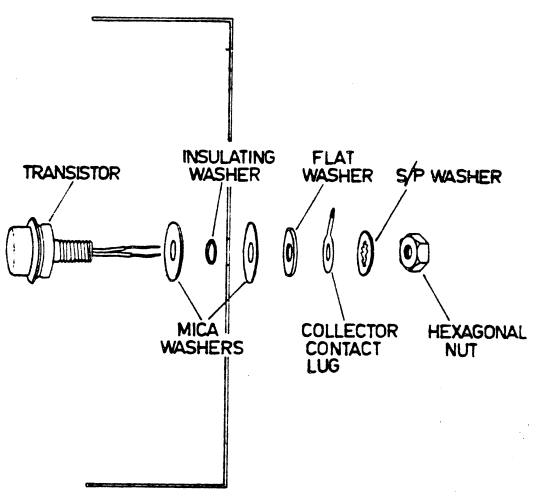
NOTE: The voice coil of the speaker must not be earthed.

## MOUNTING OC16G (TR7).

A very important point to observe before attempting installation of the OC16G, is to ensure that the transistor and associated mounting washers are completely free of small particles of dust, filings, etc. This also applies to the transistor mounting heat sink on the sub chassis. The exploded diagram below details the assembly procedure.

Both sides of the mica insulating washers are smeared with Shell Barbatia No. 4 grease before assembly. A $\frac{5}{16}$" box spanner is most suitable for tightening the hexagonal nut, but care must be exercised to ensure that the transistor is not permitted to rotate as tension is applied to the securing nut.

When completely assembled, a resistance check between collector and chassis is advisable, to ensure isolation of the former.




*Modification introduced following publication of circuit diagram:-*

*Capacitor C6 repositioned between TR1 emitter and junction of R2 and C7.*

## SHORT CIRCUIT PREVENTATIVE MEASURES:

Insertion of a piece of insulating board, between case side and polarity change-over panel, prevents possible short circuiting of the high tension, if a longer than specified mounting screw is used.

## OTHER ELECTRICAL CHANGES:

The following precautionary measures have been incorporated to reduce the possibility of TR7 collector/emitter breakdown. These changes are designed to reduce the maximum negative voltage swing at the collector. Details are :-

Reverse connections of L14. Green lead to C36 and the black lead to TR7 base.

Reverse connections of L17. Green lead to R38 and the black lead to R36.

R 26 : 8.2 kΩ ± 10% ½W reduced to 6.8 kΩ ± 10% ½W.

R 32 : 560Ω ± 10% ½W reduced to 470Ω ± 10% ½W.

This modification was introduced at serial number 17,601.

## CASE COVER SCREWS:

Qty. 13 1/8" W x 1/4" (chassis cover) increased to Qty. 16.
Qty. 5 5/32" W x 1/4" (chassis cover) deleted.
Qty. 2 3/16" W x 3/8" hex. head slotted (receiver installation bracket to cover) added.

## BINDING KNOBS:

Insertion of a rubber spacer, between the volume and tone control knobs was incorporated to prevent binding of same. Details are :-

Spacer rubber A4.451.21

## DIAL DRIVE SLIP:

Changes designed to eliminate dial drive slip, have been incorporated as from chassis serial number 16,362. These changes, involve modification to dial drum and dial drive cord layout.

It should be noted, that the top pully on receiver front plate is now deleted.

Details of the modified parts are :-

Dial drum CS.359.813.3H (1/16" hole drilled in position shown on cord layout drawing).

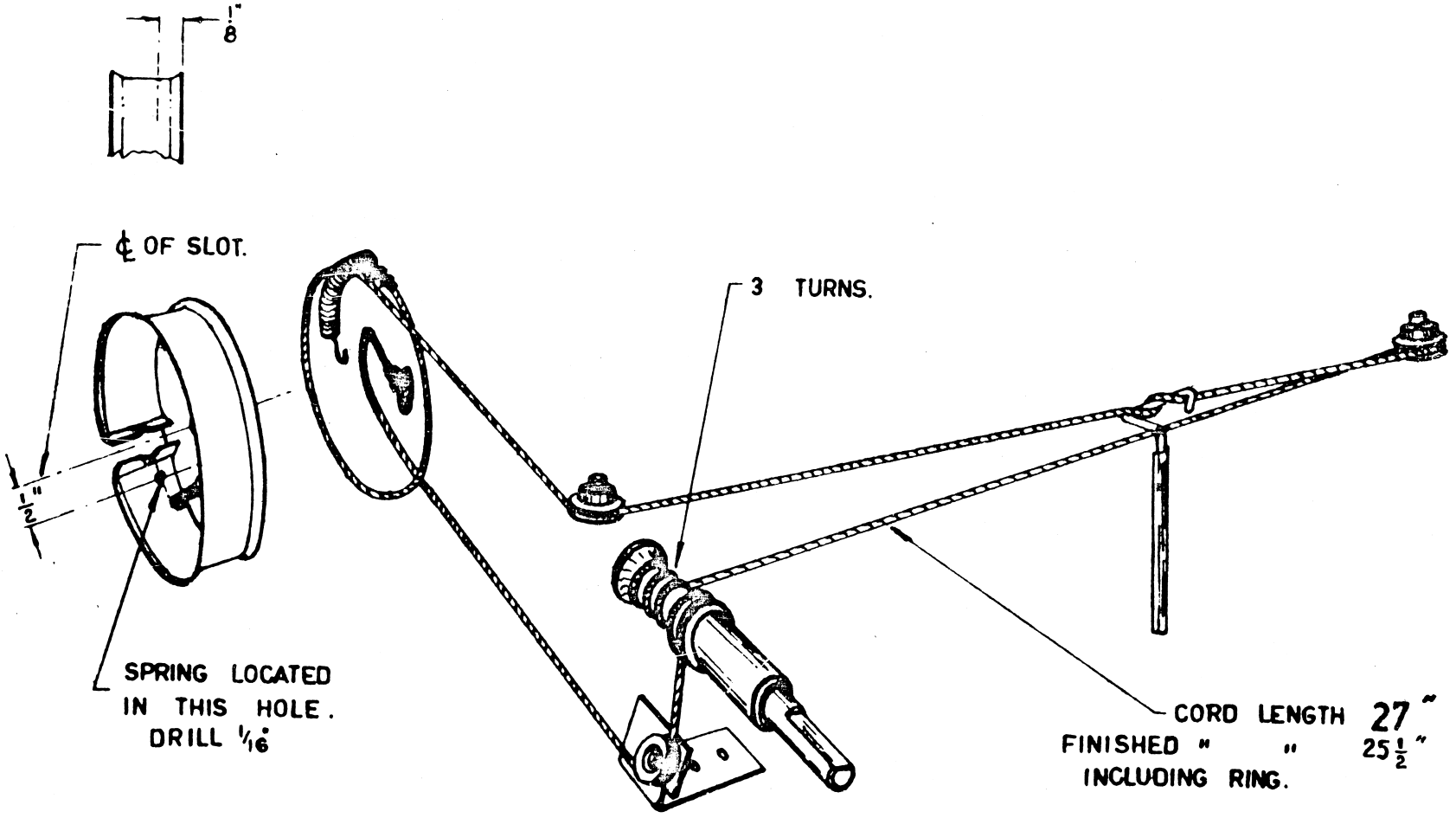
Assy., dial cord CR.384.832.4

Refer dial cord layout drawing for modified stringing procedure.

## ERRATA TO MODEL 770 SERVICE DATA:

### INDUCTORS

| No. | DC Resistance | Description | Type | Code No. |
|---|---|---|---|---|
| L1 | 4.37 (ohms) | Aerial Choke 4.7 µH | I.R.C. Type CLA | CZ.122.707 |




EXPLODED VIEW FROM FRONT SHOWING PERMEABILITY TUNER IN OPEN POSITION.

# PHILIPS CAR RADIO
## MODEL 770

## MODIFICATIONS

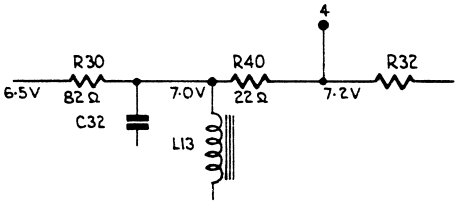



FIG. 1

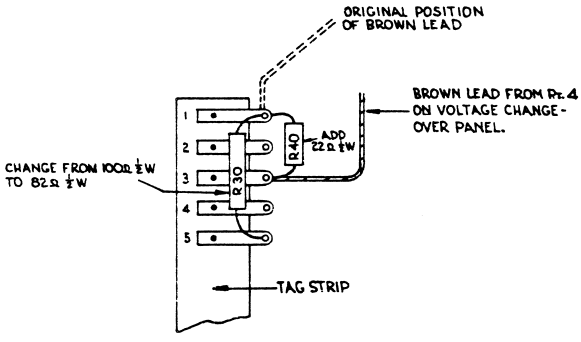



FIG. 2

REDUCTION OF IGNITION INTERFERENCE:

The following modifications, designed to reduce ignition noise when receiver is operated on a 6V battery system, were incorporated as from chassis serial number 16,126. See Figs. 1 and 2 for details.

R 40 : 22Ω ± 10% ½W resistor added between junction point 4 with R 32 and the junction of L 13, C 32 and R 30.

R 30 : 100Ω ± 10% ½W resistor reduced to 82Ω ± 10% ½W.

These changes may be effected by firstly separating the power sub-chassis. Fig.2 shows the modified connections to the tag strip (vertical strip adjacent to TR 7). Remove the brown lead from No.1 lug on the tag strip, and re-connect to lug No.3. Connect a 22Ω ½W resistor (R40) between lugs 1 and 3. The existing 100Ω resistor R 30, wired between lugs 1 and 5, should be replaced by an 82Ω ½W resistor.

A previous modification, designed to minimise hash pick-up by interstage transformer (L11, 12), provides for the lead from the accumulator choke L 19, to be held in position against the can at the maximum distance from L 11, 12.

See Fig. 3 for details

In addition to the usual suppression measures described in the installation book, it is necessary for all cars incorporating a negative earthing system, to connect a suppression capacitor (CZ.040.004) to the point where the receiver is connected to the battery supply. Ensure that good electrical contact exists between the condenser mounting point and the receiver earthing strip.

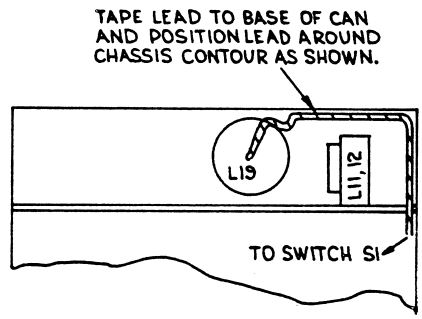


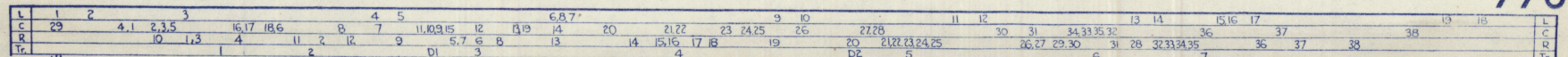

FIG. 3

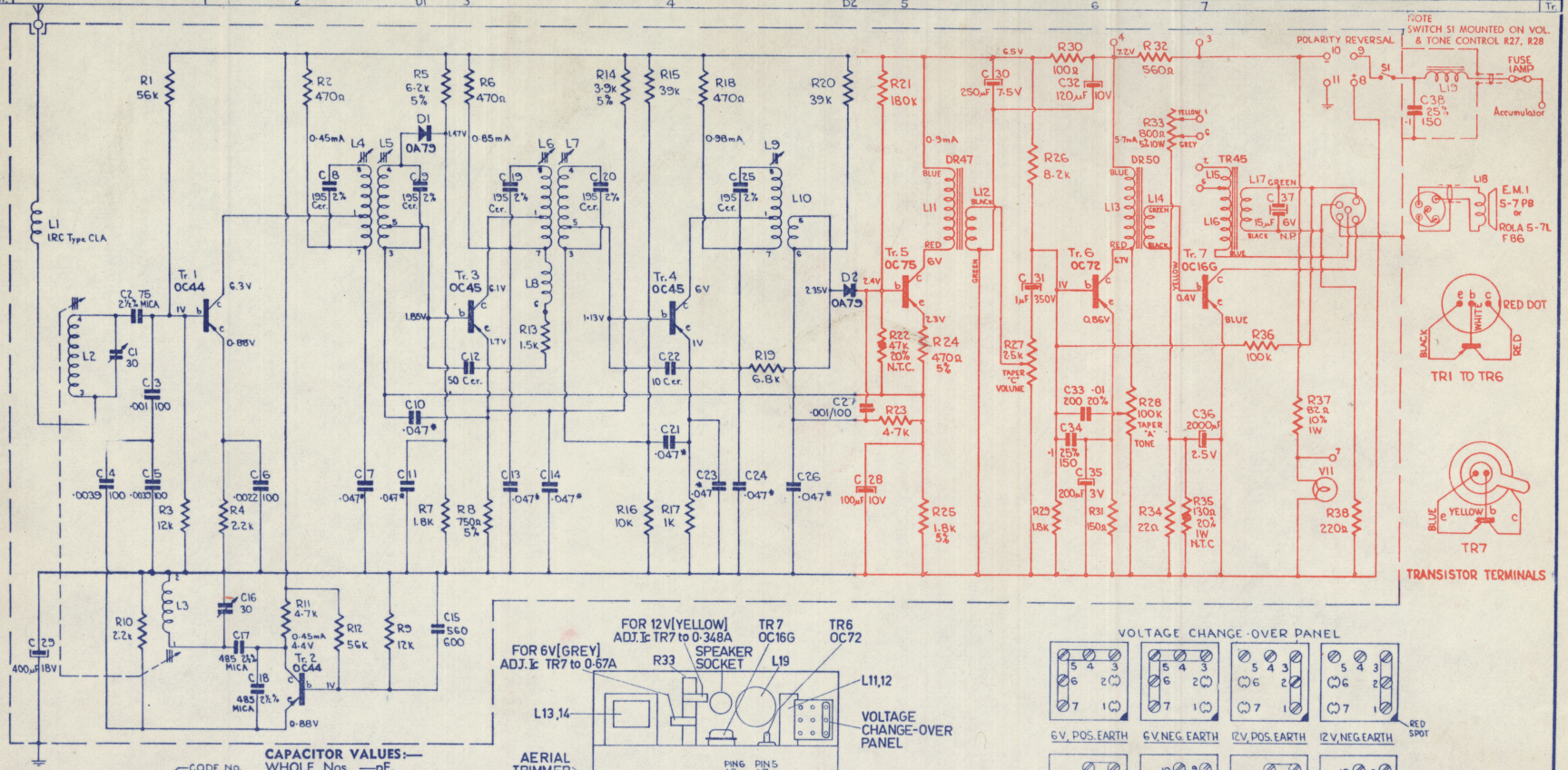
TRANSISTOR TYPE CHANGES:

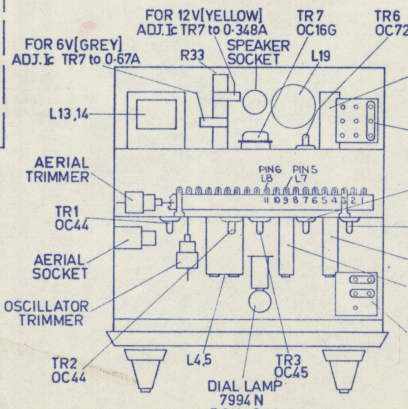
Due to a shortage of certain transistor types, the following substitutions were made:-

Transistor type OC72 replaced by type OC74.
Transistor type OC166 replaced by type OC16.

No electrical modifications were necessary for the above changes.

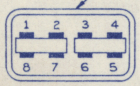











I.F. TRANSFORMER BASE


PERMEABILITY TUNER BASE

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½W 10% UNLESS OTHERWISE SHOWN.
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