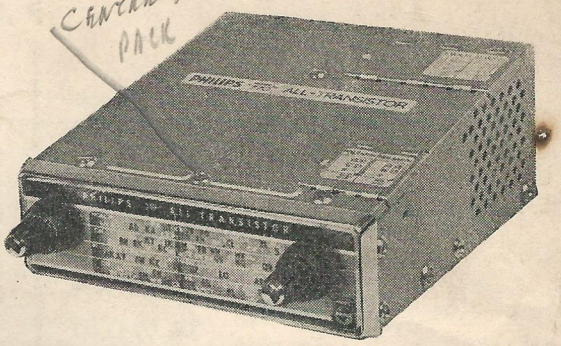
PHILIPS CAR RADIO

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 (12V) 11.5	670 348	0.5 0.4	0 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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PARTS LIST

CAPACITORS

No.	Description	Type or Code No.
C1, 16	30pF air trimmer	CZ.113.700
C2	75pF ± 2½% mica	Type M.S.
C3, 27	0.001μF 100V styroseal	CZ.072.401
C4, 5	0.0039μF 100V styroseal	CZ.074.006
C6	0.0022μF 100V styroseal	CZ.074.007
C7, 10, 11 13, 14, 21 23, 24, 26	+80% 0.047μF —25% 33V ceramic, Hi-K	CZ.097.901
C8, 9, 19, 20, 25	Part of I.F. transformers	
C12	50pF ceramic	Type C.T.R. Style A N750
C15	560pF 600V styroseal	CZ.072.601
C17, 18	485pF ± 2½%	Type S.S.
C22	10pF ceramic	Type S.S.
C28	100μF 10V electrolytic	CZ.100.102.5D
C29	400μF 18V electrolytic	CZ.100.127
C30	250μF 7.5V electrolytic	CZ.100.131
C31	1μF 350V .... electrolytic	CZ.099.305
C32	120μF 10V .... electrolytic	CZ.100.129
C33	0.01μF ± 20% 200V paper	Type 85
C34, 38	0.1μF ± 25% 150V paper	A.E.E. type W48
C35	200μF 3V electrolytic	CZ.100.130
C36	2,000μF 2.5V electrolytic	CZ.100.125
C37	15μF 10V non-polarised electrolytic	CZ.099.875
C39, 40	0.5μF 200V .... suppressor	CZ.040.004

All tolerances are ± 10% unless otherwise specified.

RESISTORS

No.	Description	Type or Code No.
R1, 12	56,000Ω ½W carbon	
R2	470Ω ½W carbon	
R3, 9	12,000Ω ½W carbon	
R4, 10	2,200Ω ½W carbon	
R5	6,200Ω ± 5% ½W carbon	
R6, 18	470Ω ½W carbon	
R7, 29	1,800Ω ½W carbon	
R8	750Ω ± 5% ½W carbon	
R11, 23	4,700Ω ½W carbon	
R13	1,500Ω ½W carbon	
R14	3,900Ω ± 5% ½W carbon	
R15, 20	39,000Ω ½W carbon	
R16	10,000Ω ½W carbon	
R17	1,000Ω ½W carbon	
R19	6,800Ω ½W carbon	
R21	180,000Ω ½W carbon	
R22	47,000Ω ± 20% 0.6W N.T.C.	B8.320.07P/47K
R24	470Ω ± 5% ½W carbon	
R25	1,800Ω ± 5% ½W carbon	
R26	8,200Ω ½W carbon	
R27	2,500Ω taper "C" (rear) } dual	
R28	100,000Ω taper "A" (front) } potentiometer	CZ.032.030
R30	100Ω ½W carbon	
R31	150Ω ½W carbon	
R32	560Ω ½W carbon	
R33	800Ω ± 5% 10W W.W.	CZ.009.824
R34	22Ω ½W carbon	
R35	130Ω ± 20% 1W N.T.C.	B8.320.01P/130E
R36	100,000Ω ½W carbon	
R37	82Ω 1W carbon	
R38	220Ω ½W carbon	
R39	15,000Ω suppressor	CZ.040.005

All tolerances are ± 10% unless otherwise specified.

INDUCTORS

No.	D.C. Resistance (Ohms)	Description	Type or Code No.
L1	<0.5	Aerial choke 4.7μH	I.R.C. Type CLA CZ.122.707
L2	15-16 }	Permeability tuner	CZ.109.005
L3	5.8-6.2 }		
L4	5.0-6.0 }	1st I.F.T.	CZ.320.460
L5	5.0-6.0 }		
L6	5.1-6.3 }	2nd I.F.T.	CZ.320.461
L7	5.1-6.3 }		
L8	<0.5 }		
L9	5.0-6.0 }	3rd I.F.T.	CZ.320.462
L10	1.3-1.6 }		

No.	D.C. Resistance (Ohms)	Description	Type or Code No.
L11	534-652 }	Interstage transformer	CZ.345.824 Rola DR47
L12	57-70 }		
L13	62-76 }	Driver transformer	CZ.345.826 Rola DR50
L14	<0.5 }		
L15 } L16 }	1.34 }	Output transformer	CZ.345.066 Rola TR45
L17	<0.5 }		
L18		Loudspeaker	E.M.I. 5-7 P.B. or Rola 5-7L F86
L19	<0.5	Accumulator filter	CZ.122.706

IMPORTANT! When ordering spare parts, quote CODE NUMBER of part and MODEL NUMBER of Receiver. In claiming free replacement under GUARANTEE, return defective part PROMPTLY and quote MODEL and SERIAL NUMBER of Receiver and DATE OF PURCHASE.

CHASSIS COVER REMOVAL AND REPLACEMENT.

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

Thirteen (13) $\frac{1}{8}$"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 inter-dependent 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 in-accesssible 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.

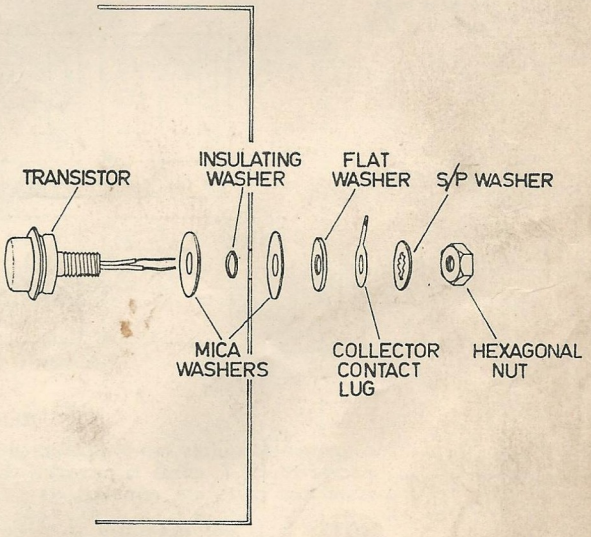
NOTE: The voice coil of the speaker must not be earthed.

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 $\frac{9}{16}$" 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.



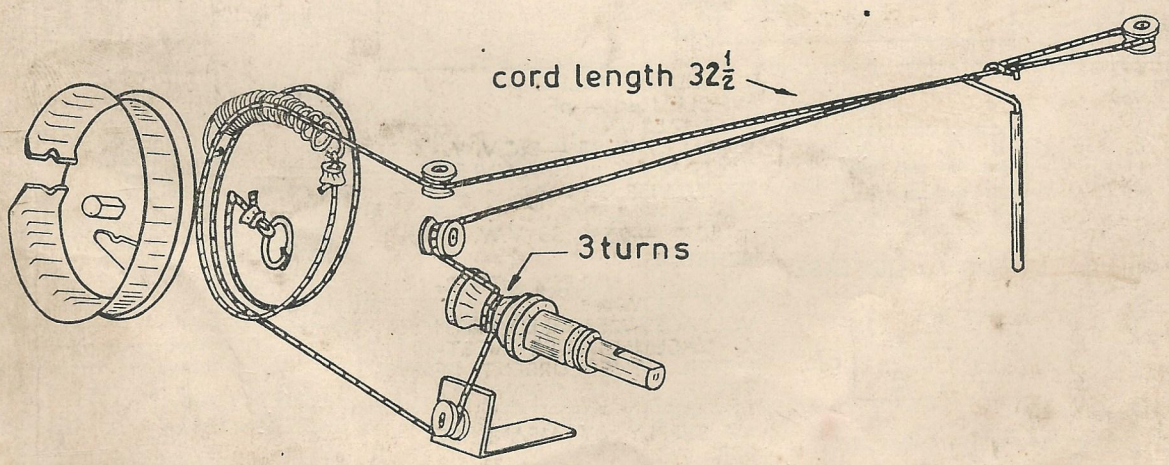
Iodification introduced following publication of circuit diagram:–

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

MISCELLANEOUS COMPONENTS

Description	Type or Code No.
Bracket, cover mtg. (top centre)	CS.233.607
Bracket, potentiometer mtg.	CS.231.271
Clamp, cable (L19 mtg.)	A3.463.84
Cord, dial (32½" required) (Bulk)	06.606.28
Cover, assembly case	CR.572.162
Cursor, assembly	CR.480.672
Drum, dial	CS.359.813
Escutcheon, dial	CS.430.059
Fuse, 1 amp. Australux 3AG	CZ.280.700
Holder, fuse complete M.S.P. Cat. No.	36546
Knob, assy. tuning	CR.523.517
Knob, tone	CR.523.515
Knob, volume	CR.523.516
Label, Philips	CS.437.662
Label, polarity changeover	CS.437.660
Label, voltage changeover	CS.437.659
Lead assy., battery	CZ.360.459
Link, changeover panel	A3.523.92
Nut, decorative x2 (spindle bush to d. window)	CS.274.421
Panel assy. complete (polarity changeover)	CZ.375.094
Panel assy. complete (voltage changeover)	CZ.375.499
Plate, base mtg.	CS.241.854
Plate, diffusion (rear of dial scale)	CS.032.400
Plate, assy., front	CR.280.813
Plate, inspection (voltage changeover)	CS.463.077
Plate, inspection (polarity changeover)	CS.463.076
Scale, dial (al states)	CS.412.430
Scale, dial (N.S.W.)	CS.412.426
Scale, dial (Qld.)	CS.412.427

Description	Type or Code No.
Scale, dial (Vic.Tas.)	CS.412.428
Scale, dial (S.A., W.A.)	CS.412.429
Screw, cover mtg. x 13 ⅛"W x ¼"	CH.008.010.OB
Screw, cover mtg. x 5 $\frac{5}{32}$"W x ¼"	CH.054.010.OB
Screw, changeover panels	CS.258.612
Socket, aerial:—	
Body, connector C/F628-1-7	CS.107.063
Bush, connector C/F530-1-3	CS.107.058
Spring, tension C/F738-4-5	CS.211.027
Socket, speaker 5 pin	CZ.370.513
Socket, dial lamp	CZ.367.719
Spacer x2 (front plate to escutcheon)	CS.284.209
Spindle, tuning	CR.371.231
Spring, compression x2 (diffusion plate to escutcheon)	CS.211.035
Spring, I.F.T. mtg., x3	A3.652.58
Spring, cord dial	CS.210.067
Washer C.S.K. small x13 (cover mtg.)	CH.671.954
Washer C.S.K. large x5 (cover mtg.)	CH.671.956
Window, dial scale	CS.030.019
INSTALLATION	
Baffle, speaker	CS.008.253
Cover, speaker plug	CS.218.733
Holden mounting kit	CR.575.601
Installation pack in polythene bag	CR.575.554
Nut, grip spire } rear mounting	CH.629.064
Nut, inside spire grip } of receiver	CS.400.441
Plug, speaker 5 pin	CZ.365.318
Strip, rear mounting	CS.241.549



EXPLODED VIEW FROM FRONT SHOWING PERMEABILITY TUNER IN CLOSED POSITION.

PHILIPS CAR RADIO
MODEL 770

MODIFICATIONS

(SHEET No.2)

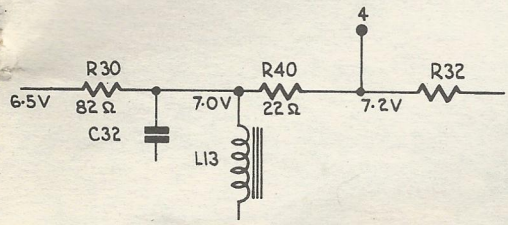


FIG. 1

Position R40
Referred to in original modification sheet

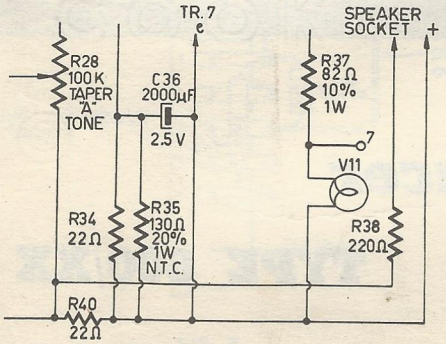


FIG. 2

Modified position R40 referred to in text

REDUCTION OF IGNITION INTERFERENCE:

As a further precaution against ignition interference, the following modifications have been introduced - effective as from Serial No.18233.

1. R40: 22Ω ½W resistor previously referred to in the original modifications sheet as being wired in the negative line has now been transferred to the positive line. See Figs. 1 and 2.

   The modified wiring layout has been effected in the following manner :-

   The three lug strips involved are mounted on the rear of the audio chassis, and for ease of identification will be referred to as :-

   Strip No.1 : Horizontal 9 lug strip, L.H. side of chassis. Lugs numbered left to right.

   Strip No.2 : Vertical 10 lug strip, located centrally. Lugs numbered top to bottom.

   Strip No.3 : Vertical 10 lug strip, R.H. side of chassis. Lugs numbered top to bottom.

   Resistor R40 previously wired between lugs 1 and 3 on No.2 strip now located between lugs 4 and 10 on No.3 strip.

   Resistor R38 220Ω ½W previously wired between lugs 3 and 6 on No.1 strip now located between lugs 4 and 6. An additional lead is connected from lug 4 of strip No.1 to lug 3 of strip No.3.

   The brown lead previously wired to lug 3 on strip No.2 is now reconnected to lug 1 of the same strip.

   The positive lead previously connected from lug 8 on the polarity changeover panel to the strip on the H.F. chassis (lug 1 in chassis layout diagram on data) is deleted. In its place a lead is re-routed from lug 8 on polarity changeover panel to lug 4 on lug strip No.3.

2. An additional 0.5μF 200 V R.F. filter paper capacitor (C42),,is connected in parallel with electrolytic C29, and mounted on R.F. chassis adjacent to same.

MODEL 770A

The 'A' version is the same as Model 770 except for the following modifications :-

TR7 : Type OC26 Transistor
R33 : 1,000Ω ± 5% 10W WW Code No. CZ.009.816

All the interference suppression modifications incorporated in Model 770 are included in the 'A' version, which commenced production at serial No.18501. The method of mounting the OC26 transistor, differs from the OC16, and although the same audio sub chassis is used, and additional three holes are necessary. Insulating bushes prevent collector/chassis short circuit through mounting screws, and a lug mounted under one of the securing nuts provides for collector termination. The emitter lug, passes through the original mounting hole in the sub chassis with the base lug connection through adjacent hole.

NOTE: All mounting and insulating parts are included with transistor OC26.

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PHILIPS CAR RADIO
MODEL 770

MODIFICATIONS

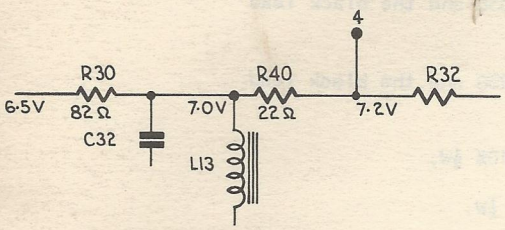


FIG. 1

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.

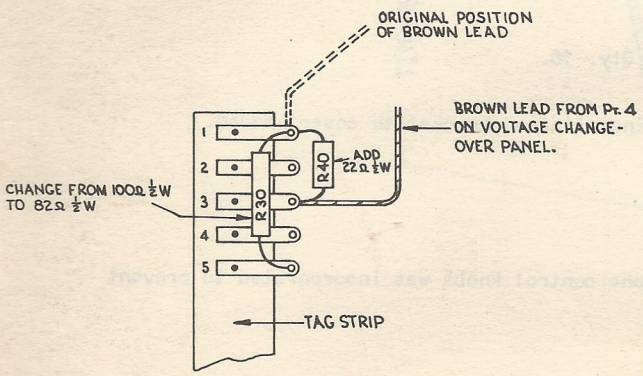


FIG. 2

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.

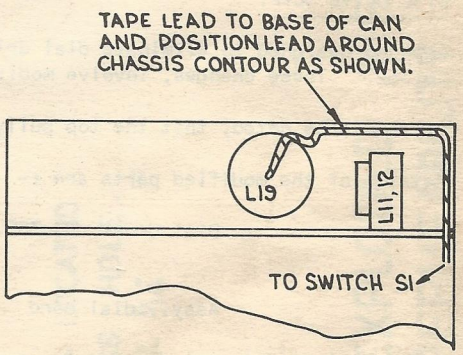


FIG. 3

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 OC16G replaced by type OC16.

No electrical modifications were necessary for the above changes.

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 470 Ω ± 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).

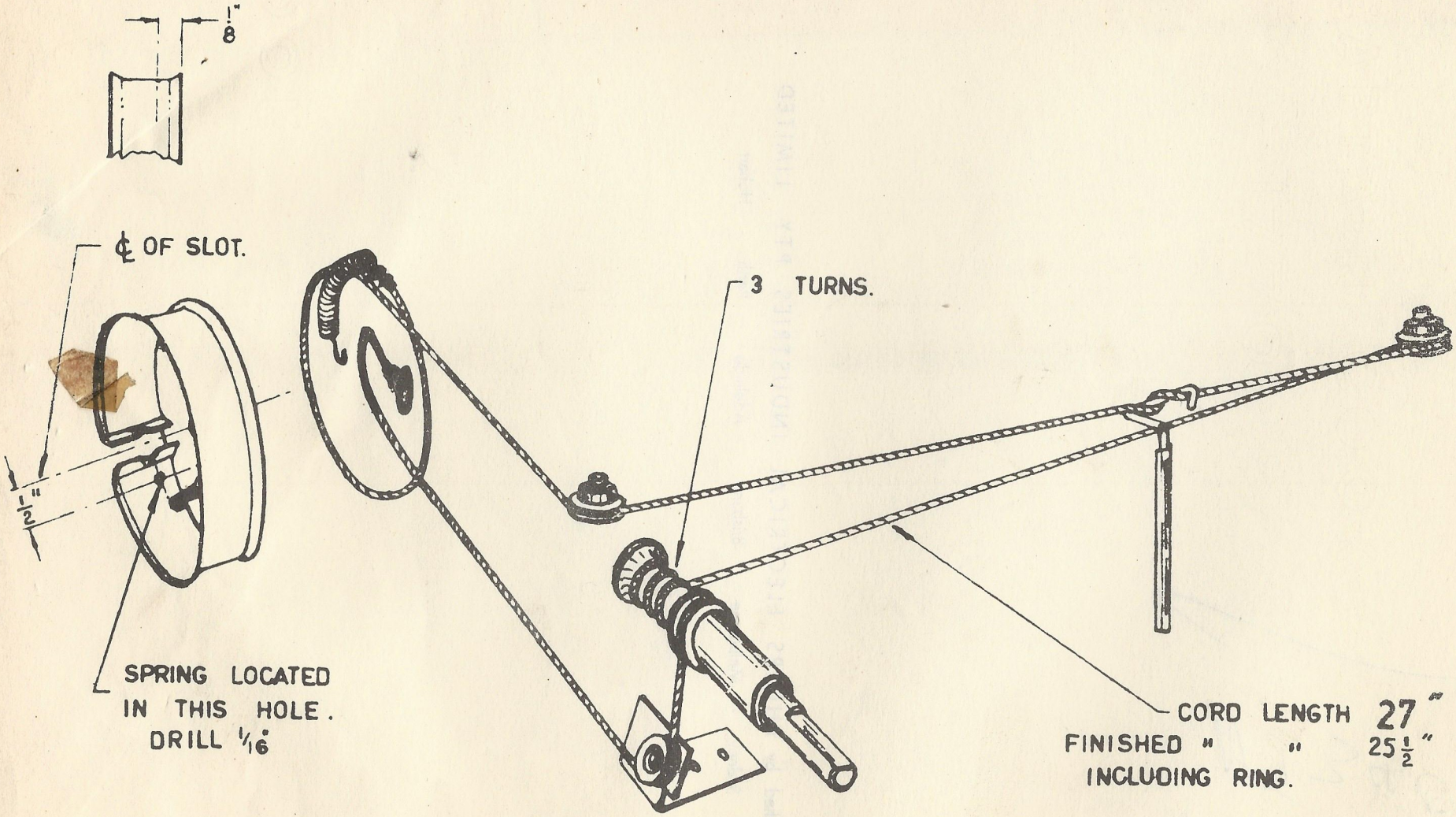
Assy., dial cord CR.384.832.4

Refer dial cord layout drawing for modified stringing procedure.

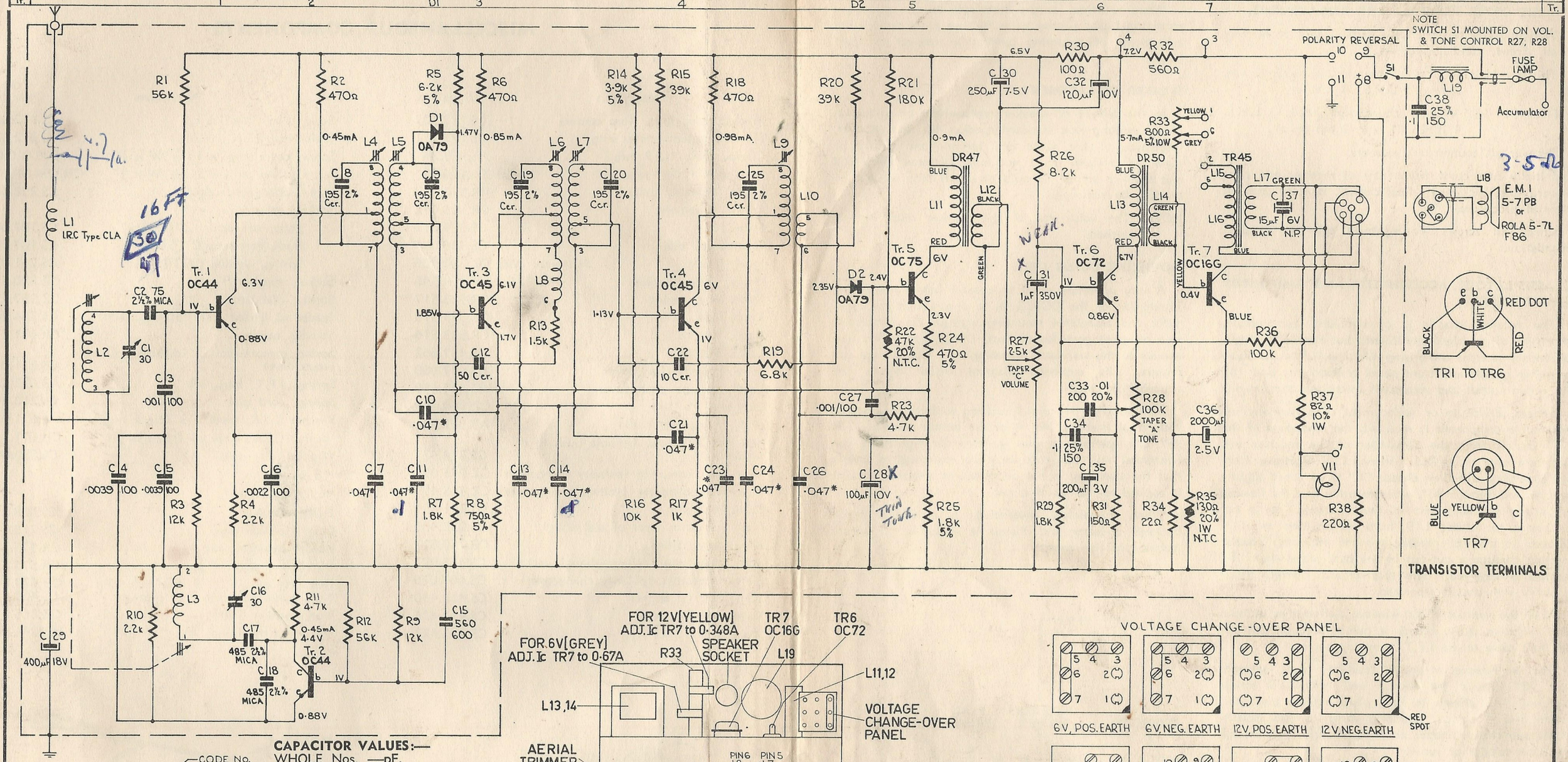
ERRATA TO MODEL 770 SERVICE DATA:

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.



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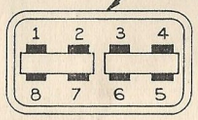
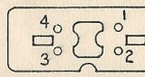


I.F. TRANSFORMER BASE

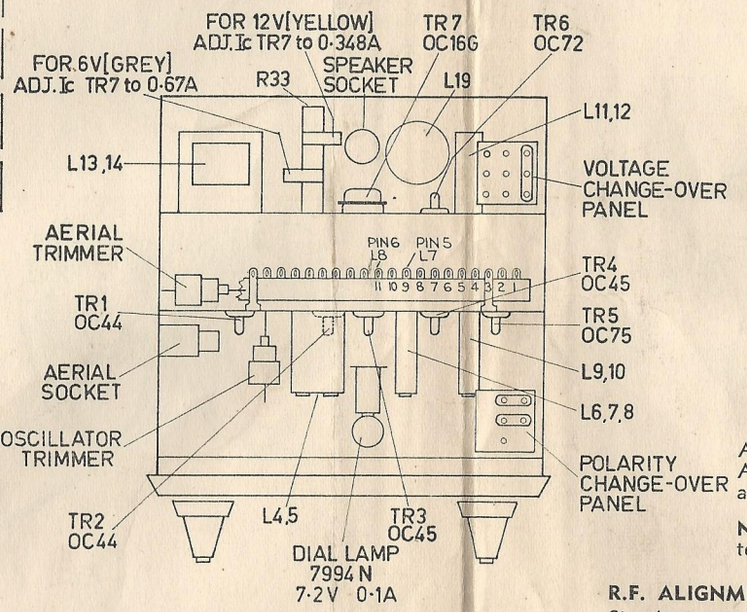
VIEW OF LUGS

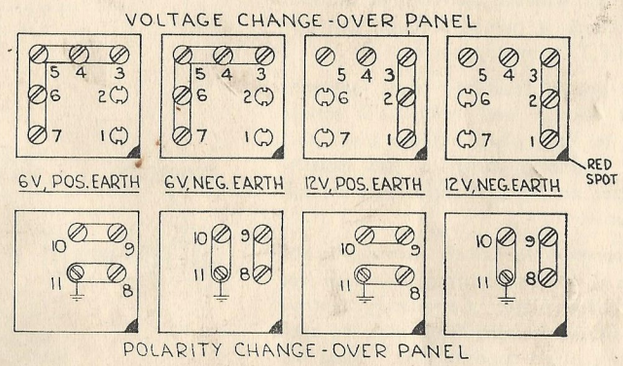


PERMEABILITY TUNER BASE

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.





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.

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.

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."