Colour Television Receiver

Technical Data Handbook

forgestone

Forgestone Colour Developments Ltd

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SPECIFICATION

The receiver is all solid-state except for 2 valves used in the line OP stage. The main panels are equipped with plugs and can be removed quickly for examination. There are 9 integrated circuits and 24 transistors, plus the usual complement of diodes. The power supply is fully isolated and the LT supplies are regulated.

Coverage:
CCIR "Standard I". 6 MHz
All UHF channels 21–69 or with alternative tuner bands I & III
Aerial input: 75 ohms
Mains input: 200–250V 50Hz AC only
Tube sizes: 19" – 26". 92°
Audio output: 2.5 watts

Integrated circuit functions:

TAA550	Tuning voltage stabiliser
TCA270	Synchronous vision demodulator. AGC amp. AFC and video pre-amp.
TBA750	Sound intercarrier amp. synchronous demodulator/Audio pre-amp.
TBA560	Luminance/Chroma control combination
TBA540	Reference generator
TBA990	Synchronous chroma demodulators
TBA530	RGB matrix/Pre-amp.
TBA920	Sync. separator/Line oscillator combination
MC7812	12V supply regulator

Transistor functions:

BF362	RF amp.	Part of tuner unit
BF362	RF amp.	
BF363	Mixer-oscillator	
BF197	1st IF amp.	Part of IF gain module
BF196	2nd IF amp.	
BF197	3rd IF amp.	
BD131	Sound output	
BD131	Sound output	
BC148	Blanking pulse amp.	
BC148	AGC pulse amp.	
BC148	Beam current limiter	
BF337	RED output	
BF337	GREEN output	
BF337	BLUE output	
MPS6566	Field sync. amp.	
BR101	Field oscillator	
BC148	Discharge switch	
AC128	Field driver	
BD131	Field output	
BD131	Field output	
40321	Line driver	
BC148	40V regulator	
2N3053	40V regulator	
2N3055	40V regulator	

The pre-aligned IF module is available to special order for 5.5 MHz sound spacing for use outside the UK.

CONTENTS — SECTION

I.F. Panel 400 The Mullard ELC1043/06 tuner contains the RF amplifier and frequency changer stages. No mechanical tuning capacitor is necessary, station selection being effected by varying the d.c. voltage applied to the tuner pin 4, by means of the potentiometer associated with each of the six push-buttons. To avoid drift, the tuning voltage is obtained from a highly stable 33v line, which is stabilised by the TAA550 integrated circuit.

The output of the tuner, which has carrier frequencies of 39.5 MHz (vision) and 33.5 MHz (sound) is passed to the Filter/Amplifier unit.

The filter provides the main selectivity of the receiver and incorporates traps to eliminate adjacent channel interference and to reduce the sound carrier to the correct level with respect to vision.

The amplifier section raises the signal to a level of about 70mV, and the second stage is gain-controlled.

The TCA270 I.C. provides the functions of synchronous vision demodulator, video pre-amplifier, vision noise inverter, AGC detector and amplifier, and AFC detector and amplifier.

Synchronous detection is a highly linear process, reducing unwanted intermodulation beats to a negligible level and eliminating "quadrature distortion" which occurs with the conventional diode detector and causes interaction between luminance and chrominance signals.

The video pre-amp gives two antiphase outputs, both at a level of 1.7V (black to white). The positive - going output (pin 9 of TCA270) is fed to the decoder board and is also used for the intercarrier sound take-off. The negative - going output on pin 10 is fed to the synchronising pulse separator on the timebase board.

The vision noise inverter returns all strong interference pulses to mid - grey level in both outputs, so reducing their visibility and preventing them from upsetting synchronisation.

The AGC system is a gated one, the line frequency gating pulses being fed in on pin 7 of the TCA270. To maintain optimum signal to noise ratio, control is applied only to the I.F. amplifier, from the output on pin 5, on signals of low to medium strength. Only on very strong signals is the tuner AGC output (TCA270 pin 4) brought into use. The point at which control is transferred is set by RV1. In both cases forward gain control is used (i.e. increasing +ve bias reduces the gain).

The reference carrier required by the synchronous demodulator is obtained from the input signal via a limiting amplifier within the TCA270 and the filter coil L2 which is tuned to the vision carrier frequency. The AFC circuit ensures optimum tuning, even over a long time period and when used by non-technical viewers, by automatically correcting tuning errors over quite a large range. The centre frequency of the AFC is set by the tuning of L3.

The 6MHz intecarrier sound signal is passed via a bandpass filter (L4 & L5) to the TBA750 I.C. This includes an amplifier and limiter, FM demodulator, d.c. operated volume control and audio pre-amplifier.

The centre frequency of the demodulator is set by the tuning of L6. The de-emphasis is provided by C28 together with a resistor within the I.C. The volume control leads do not carry audio signals and so do not require screening. The audio preamp, together with the class A output transistors TR1 and TR2, provides an output of about $2\frac{1}{2}$w to the speaker. Two negative feedback loops are provided, an A.C. one via R16 and C30 to reduce distortion, and a D.C. one via R15 and R19 to stabilise the standing current in the output transistors.

Decoder Panel 420 In the present receiver it has been possible to produce a decoder and video circuit of excellent performance without undue complication by incorporating most of the vision processing functions into four integrated circuits. The first I.C., type TBA560C, provides pre-amplifiers for the luminance and chrominance channels and also a black - level clamp for the luminance signal, and a burst gating circuit.

The video signal from the I.F. board is first passed to the 6MHz intercarrier sound rejector L2. The luminance path is via the luminance delay line and the 4.43MHz chroma rejector L1 to the luminance input (pin 3) of the TBA560C. The chrominance path is via the chroma bandpass filter associated with L3, to the balanced chrominance input on the TBA560C pins 1 and 15.

The I.C. also provides for Brightness, Contrast and Saturation control by feeding variable d.c. voltages to pins 6, 2, and 13 respectively. The contrast and saturation adjustments track together, i.e. the contrast control adjusts the level of both luminance and chrominance signals in step with each other.

The beam current limiting function is also linked to the contrast control. Excessive mean beam current in the C.R.T. can result in overheating of the tube's shadowmask or damage to the EHT tripler as well as producing a severely defocussed picture. A d.c. voltage which increases with beam current is therefore fed in at S1/7 to the base of TR3. When the beam current is excessive, this voltage exceeds the voltage at TR3 emitter (preset by RV2) sufficiently to turn TR3 on, which then reduces the beam current by reducing the contrast.

The picture black level remains constant when the contrast is varied, whether manually or via the beam limiter.

A flyback pulse from the line timebase is fed in at S2/4, and is used for several functions.

First, the pulse is inverted and clipped by TR1 to form the gating pulse for the vision AGC system. Second, the pulse is applied, together with the field flyback pulse, to the base of TR2. This provides a mixed blanking output on its collector which is fed to pin 8 of the TBA560C to provide flyback blanking in the luminance channel. Thirdly, the pulse is fed to the delay and shaping circuit associated with D1 to produce a pulse coinciding in time with the 'back porch' of the line sync pulse. The exact timing is adjusted by RV1. The pulse is fed to pin 10 of the TBA560C and operates the burst gating and luminance black - level clamp circuits. Finally the pulse is fed to pin 14 of the TBA990 to trigger the PAL bistable.

The TBA560C provides three final outputs. The luminance output appears at pin 5 and is fed directly to the TBA530 matrix I.C. The gated burst appears on pin 7. It is fed via the phase shifting circuit (L5 etc) to the TBA540 reference signal generator. The chrominance output appears on TBA560C pin 9. It is fed to the Chroma Delay Line circuit which separates the U and V (Blue and Red colour - difference) components of the chroma signal from each other. These are then passed to the chroma demodulators in the TBA990 I.C.

The TBA540 I.C. contains the 4.43 MHz crystal reference oscillator, and also the phase detector and control circuits to lock the oscillator in frequency and phase with the colour burst input on pin 5. For setting - up the oscillator frequency, the burst phase detector may be disabled by shorting TP7 to TP8. The network L6, R43, C28 produces two reference outputs differing in phase by 90° which are applied to pins 2 and 8 of the TBA990 demodulator.

To ensure constant saturation despite variations in propogation, fine tuning etc, automatic chrominance control (ACC) is used.

The ACC detector is a synchronous type and measures the amplitude of the burst input. To allow for the ±45° phase shift of the burst on alternate lines, the detector is switched by a half line frequency squarewave applied from the PAL bistable in the TBA990 to the TBA540 pin 8.

When the signal is first applied, the bistable may or may not be in the correct phase, i.e. to correspond with the line - by - line phase reversal of the PAL signal. If it is correct, the output on pin 9 will fall from its initial setting of 4V.

The output is fed to TBA560C pin 14 where it reduces the gain of the chroma pre-amplifier until the correct saturation level is achieved. This level is automatically maintained despite quite large variations in chroma level at the input.

If however the bistable phase happens to be incorrect, the ACC detector, being of the synchronous type, will produce an output of reverse polarity. The voltage at TBA540 pin 9 will rise, and this change is passed to pin 1 of the TBA990 where it is used to correct the bistable phase. ACC control is then established as described above. With the circuit as described so far, on a monochrome transmission the chroma channel would work at full gain, giving coloured noise on the picture. To prevent this, the gain is reduced to zero on monochrome by passing the colour - killer output (pin 7) of the TBA540 to the saturation control point (pin 13) of the TBA560C.

The TBA990 I.C. demodulates the U and V chroma inputs from the delay line, using the reference signal inputs supplied by the TBA540. It also cancels the line - by - line phase inversion of the V signal, using a PAL bistable which is triggered by line flyback pulses fed to TBA990 pin 14.

Red and Blue colour difference signals (R-Y and B-Y) are thus produced, and they are also mixed together in the correct ratio to produce a G-Y output.

The TBA530 matrix I.C. receives four inputs, all d.c. coupled.

The luminance input is applied to pin 5. For setting-up purposes it can be replaced by a fixed d.c. voltage corresponding to nominal black level which is taken from R61 and R62. The three colour difference inputs are fed to pins 2, 3, and 4 via filters which remove most of the remaining 4.43 MHz carrier and its harmonics.

The I.C. produces Red, Green, and Blue outputs on pins 10, 13, and 16 which are passed to the high - voltage output stages TR4, TR5, and TR6. The overall gain in each output amplifier is very high so that heavy negative feedback can be applied (to pins 9, 12, and 15) to stabilise the gain and black level against temperature, voltage etc.

The d.c. levels of the colour difference inputs to the TBA530, and hence also of its RGB outputs, can be set by adjusting RV9, RV10 and RV11. When this is correctly done, there is zero voltage at black level across the gain controls RV12 and RV13. Adjustment of the peak white colour can therefore be done without upsetting the black levels of the three outputs to the tube.

A thick - film resistor assembly is used for the six critical resistors in the video output stages, to give the best possible tracking with temperature and hence consistently correct grey - scale tracking.

Timebase Panel 430 A video signal is received from the I.F. panel on P1/1 and is fed to pin 8 of the TBA920 I.C. via an RC network whose purpose is to attenuate noise and the chrominance component of the video signal. The synchronising pulse separator is contained within the I.C. To prevent strong noise pulses from upsetting the synchronisation, they are detected by the circuit associated with D1 and are fed to the I.C. pin 9 where they are used for gating so that the same noise pulse appearing at pin 8 is not allowed to pass to the output.

The I.C. contains also an inductorless line oscillator together with an advanced type of flywheel synchronising circuit, which has two modes of operation. When out of lock, the circuit has a wide pull - in range so that when a signal is received, it pulls into lock quickly and reliably. A short time after gaining lock, however, the circuit is automatically switched to a narrow pull - in range and bandwidth, making it highly immune to noise.

The flywheel circuit can be disabled for setting - up purposes by shorting the two test points. For use with a domestic video tape recorder, whose output may be subject to large short - term phase shifts between line sync pulses, the flywheel circuit may be switched to a permanently wide pull - in range by shorting point 'T' to chassis.

The line drive output on pin 2 is amplified by TR6 to a level suitable for the line output valve V2. The line output stage is conventional and provides the line scan, boost HT line, EHT supply, line convergence current and via D5, a 'floating' d.c. supply which is used for the line shift function. Due to variation of beam current, short - term variations of phase shift can occur in the line output stage which prevent the verticals of the picture being truly straight. To prevent this, a phase reference pulse is fed to the I.C. at pin 5 from the L.O.P.T. and the phase errors are automatically corrected within the I.C.

The line output valve cathode current, which varies with tube beam current, is monitored by R51 and the resulting voltage passed to the beam limiter on the decoder board.

A sync pulse output is provided on the I.C. pin 7. The field sync is separated by the filter R31, C1 and amplified and inverted by TR1, triggering the field oscillator via C4.

The oscillator is of the silicon controlled switch (SCS) type which gives good stability and interlace without using any inductors. The basic sawtooth waveform is generated by C7 and C8 charging through R12 and VR2, the flyback being initiated when the SCS conducts which turns TR2 on and hence clamps TR3 base to chassis. The output stage TR4, TR5 is a special Class A circuit which requires no output transformer or choke. The thermistor R23 stabilises the height against temperature variations.

Dynamic Convergence Panel 440/441 Basically the dynamic convergence coils are fed with the appropriate currents by connecting them in series with the line and field scan coils. The network in parallel with each convergence coil is used to modify the amplitude and shape of the current waveform to provide exactly the optimum correction. Correction of certain convergence errors is also assisted by controls which vary the symmetry of the currents passed through the two windings on both the line and field scan coils.

Correction of 'pincushion' distortion, caused by the use of a relatively flat screen, is obtained by a special transductor T1 and associated circuits.

Vertical shift is adjusted by passing a direct current through the field scan coils. Also on the convergence board (to make them more accessible) are the A1 voltage presets for the three tube guns, and switches which enable one or more beams to be switched off, which is useful for convergence and purity adjustments.

Blue lateral correction is provided, which has the effect of varying the width of the blue picture relative to the red and green. Due to tube and scan coil tolerances, a wide range of correction in either sense may be necessary, or indeed no correction at all. To allow for this, alternative taps are available on the control L3, giving different ranges of adjustment, the blue lateral coil connections (4F and 4G) may be reversed, or a link may be connected from 4F to 4G to remove the blue lateral connection altogether.

Power Supply Unit All supplies (except to the degaussing coils) are derived from a double - wound mains transformer. This enables the receiver chassis line to be earthed.

The degaussing circuit automatically removes any magnetism in the CRT, magnetic shield and 'P' band each time the receiver is switched on.

The H.T. supplies are derived from a bridge rectifier, a thermistor (VA1104) being included to limit the current surge at switch - on when C2 is uncharged. R15 and R16 maintain the CRT heater at about 100v to minimise strain on its heater - cathode insulation.

The second bridge rectifier provides the 24v line directly and, via an integrated circuit regulator, the 12v line.

The third bridge rectifier, via a voltage regulator circuit, provides the 40v field timebase line.

CONSTRUCTION:

Panel construction is straightforward if the following points and order of construction are followed.

You should be equipped with a soldering iron which is suitable for Integrated Circuit work with as small a size bit as is practical, a good sharp pair of side-cutters is also necessary.

The components should be fitted to the panels in the order shown in the following tables, all components, except wire wound resistors, should be fitted as close to the panel as possible, wire wound resistors should be mounted clear of the panels by 10mm for 2-5w types, 6-10w types by 15mm, also thermistors need to be 10-15mm clear.

We advice carefull study of these instructions before commencing construction.

I.F. PANEL 400 Fitting order,refer to parts list and constructional diagrams.

1. P.C. pins Z1 & Z2
2. S1 & S2
3. Wire Links (use insulated wire for link from S1 pin 3 to 12v near module)
4. Resistors, starting at R1 etc. (R9 fitted clear by 5mm)
5. Polyester Capacitors type C280 (not C25)
6. Electrolytic Capacitors, observe polarity
7. Coil Cans & Choke L1 (standard colour code used i.e. Red dot = L2)
8. Ceramic Capacitors + C25
9. TR1 & TR2 with heat sinks,refer to figure 2.
10. I.F. Gain Module & Tuner Unit
11. IC1 - IC3 (Take Care and double check positioning)
12. Apply core locking compound to the cores of L2 - L6

DECODER PANEL 420

1. P.C. pins for 2TP1 etc. and input pin
2. 2S1 & 2S2
3. Wire links (insulated where shown) make link from 2TP11 to 2TP10 in such a way that when setting up, the link can be easily changed onto 2TP9. There are three insulated links under the panel from 2S1 leave these until step 12.
4. Resistors (except thick film unit) starting at 2R1. Arrange 2R21 so that one end can be disconnected easily.
5. Polyester capacitors type C280
6. Electrolytic capacitors observe polarity
7. 2RV1 etc. and 2C34
8. Coil cans, colour coded i.e. Red, Brown 2L1
9. Ceramic capacitors
10. Delay lines LD & CD
11. Thick film unit and refer to fig. 1.
12. Wire links under panel from 2S1 pins 5, 6, & 8 to points 5, 6, & 8 marked on P.C. board printing, use insulated wire
13. 2TR1 - 6 + heatsinks for 2TR4 - 6 fig. 1. refers
14. 2IC1 - 4 take care when soldering and double check mounting position
15. Apply core locking compound to the cores of 2L1-2L5. NOT to 2L7 (Do not adjust)

TIME BASE PANEL 430

1. P.C. pin for input
2. 3S1, 3S2, fuse holder, and B9D bases for 3V1 and 2
3. Wire links (solid lines, not dotted) the link from 3V2 to 3S1 pin 4 should be made with insulated wire
4. Resistors 3R1 etc. leave 3R23 with sleeving on leads 15mm from panel, also fit VDR with its black end to earth
5. Polyester capacitors type C280 + 3C23 (Do not overheat this capacitor)
6. Electrolytic capacitors, observe polarity
7. 3VR1 - 7
8. Ceramic capacitors and then all the remaining capacitors

9. Drill and tap heat sinks for 3TR4 & 5 as in fig. 5 depending on the type of transistors supplied, either BD131's or 2N5298. Fit to panel using the outside pair of holes for BD131's or inside for 2N5298's
10. 3TR1, 2, 3, & 6 using pads where required
11. Fit 3D1 - 5
12. 3IC1 Double Check before soldering!
13. 3L1 & 3L2 handle these items with care
14. Line O.P. transformer and EHT tripler refer to fig. 3 and wire as shown following the instructions given in fig. 4.
15. Fit 3V1 & 2

CONVERGENCE PANEL 440/1

1. 4RV1 - 13 on panel 440 (knobs come through print side)
2. All capacitors observe polarity
3. 4R1 etc. taking care to fit clear from panel 10mm all except 4R9 (now 1mΩ) which is close to panel
4. 4RV14 - 16 fit using washers on bush then fit through panel and secure with nut on print side
5. 45w1 - 3 fitted on print side (bend tags at right-angles)
6. 4D1 & 2 + 4L4
7. Make up panel 441 with transductor, resistors 4R5 & 4R8, capacitors 4C5 & 4C6, coils 4L1, 2, 3, & 5. Please Note 4R10 is not required
8. Fit panels together with 2BA Bolts & Nuts so that 4L2, 3 & 5 knobs protrude through panel 440 to match the height of the knobs on 4RV1 - 13. Do not fit convergence name panel until unit is wired into the set

CRT BASE PANEL 450

1. P.C. pins
2. B14G base
3. Resistors, taking care with 5R11 not to leave any sharp solder edges
   is not required
4. Capacitors
5. Spark gaps SG1 - 11, these must all be fitted very neatly with short leads. Then fit SG12 5mm clear of panel

POWER SUPPLY

1. Drill chassis plate using template Fig. 8.
2. Fit 6C2/3, 6C4, 6C5, 6C8 with clips taking care not to earth cans to plate
3. Panel 460 fit all resistors taking care with wirewound types and 6R3
4. Rest of capacitors
5. 6TR2 & 3
6. Rectifiers D1 - 4, D5, D6 & D7
7. Make up heat sink unit with 6TR1 & 6IC1 using mounting kits, make ready to assemble on top of mains TX using pillars
8. Refer to Fig. 9. fix panel 460 with 2 x 2BA onto mains TX (see Fig. 8.) Fit mains TX then wire as circuit diagram No. 6, dress all leads well clear of hot resistors, i.e. 6R3, 4, 5, 6 and 7.
9. Preliminary check before installation. Remove fuses 6F2 and 6F4, apply mains input and check the +12v on pin 6P5. Fit fuse 6F4 and set the +40v on pin 6P3 with 6R13.

CRT DEGAUSSING AND SHIELD Make up as in Fig. 6.

WIRING HARNESS ETC.

Wire convergence panel to scan kit as in Fig. 7. and page B12.
Wire varicap control unit as in Fig. 10.

Make up wire harness as in diagram and Figs. 11, & 12. and pages B11, 12, & 13.
Wire RGB leads from Decoder to CRT Base with webbed cable provided.

Check all wiring very carefully especially the + 12V lines from the power supply, the 200V & 295V (do not get muddled!)
Wire loud speaker to Z1 & Z2.
Finally wire focus unit with high voltage cable provided and carefully attach the EHT connector to the CRT keeping these leads neatly dressed away from any others.

DECODER & I.F. PANEL COMPONENT MOUNTING DETAILS.

Care is necessary when fitting the RGB thick film unit to the panel, do not try to bend the leads near the ceramic as the bond may break. Each of the three metal mounting lugs must be soldered to the P.C.

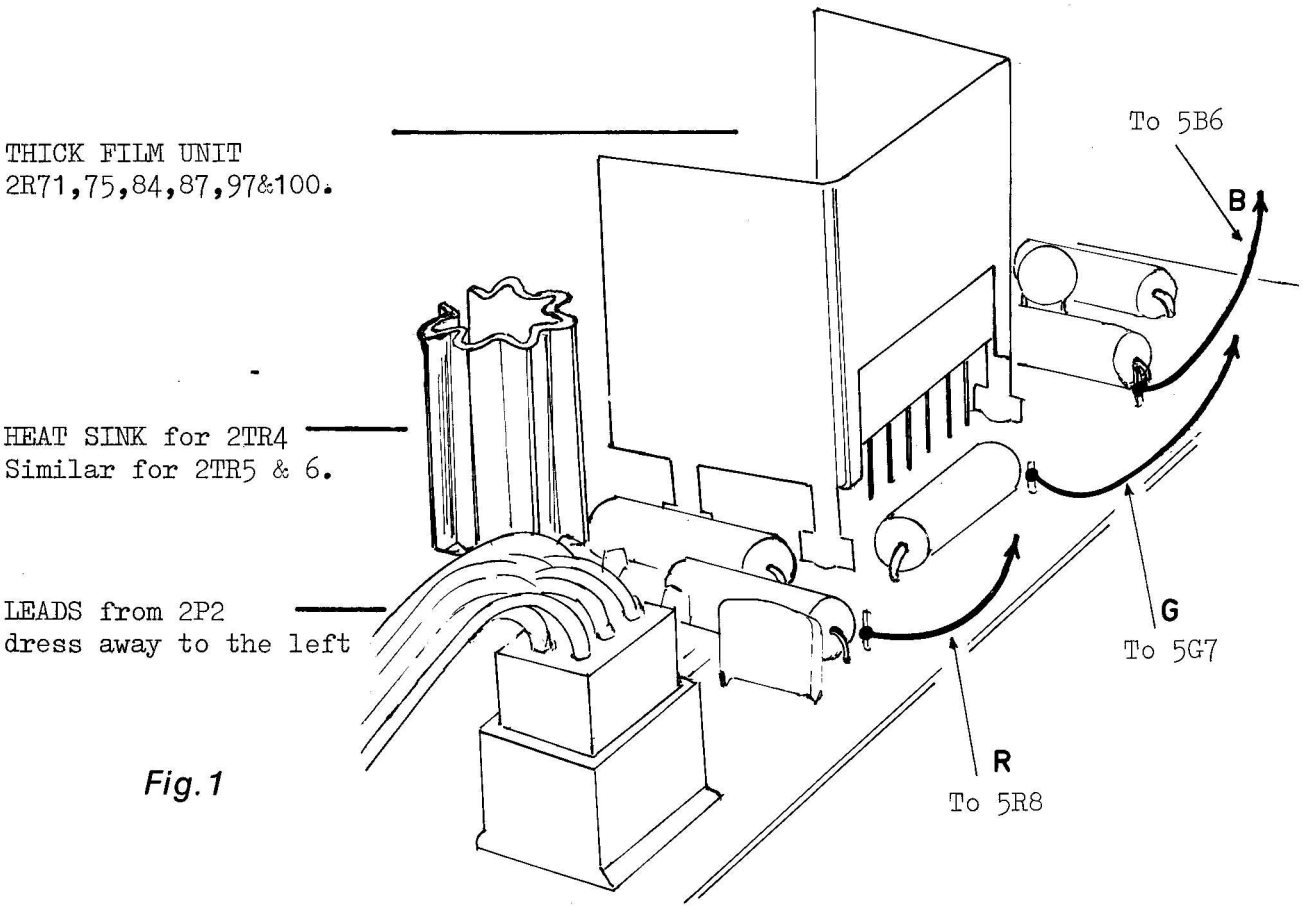


Fig.1

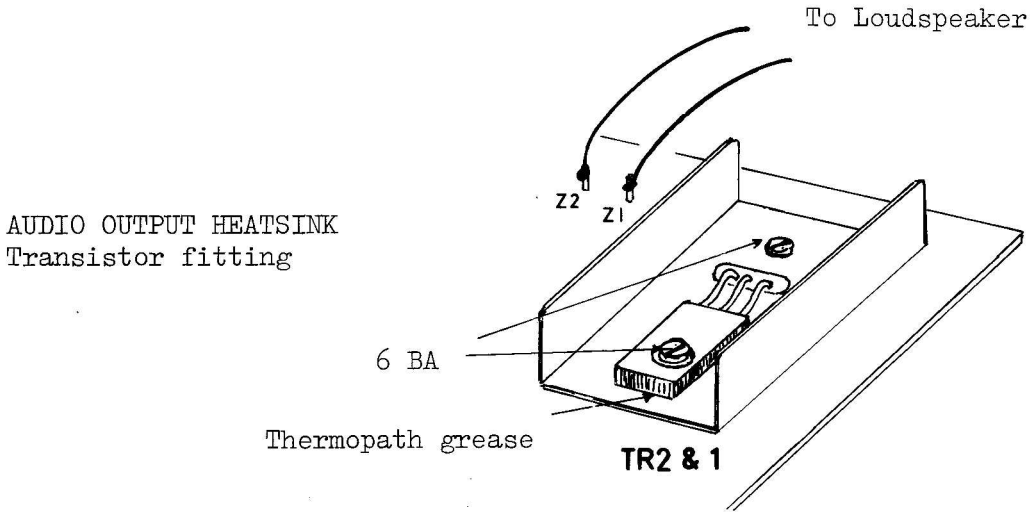


Fig.2

TR1 and TR2 metal side downwards in contact with heat sink.

LINE O.P. TRANSFORMER & E.H.T. TRIPLER WIRING.

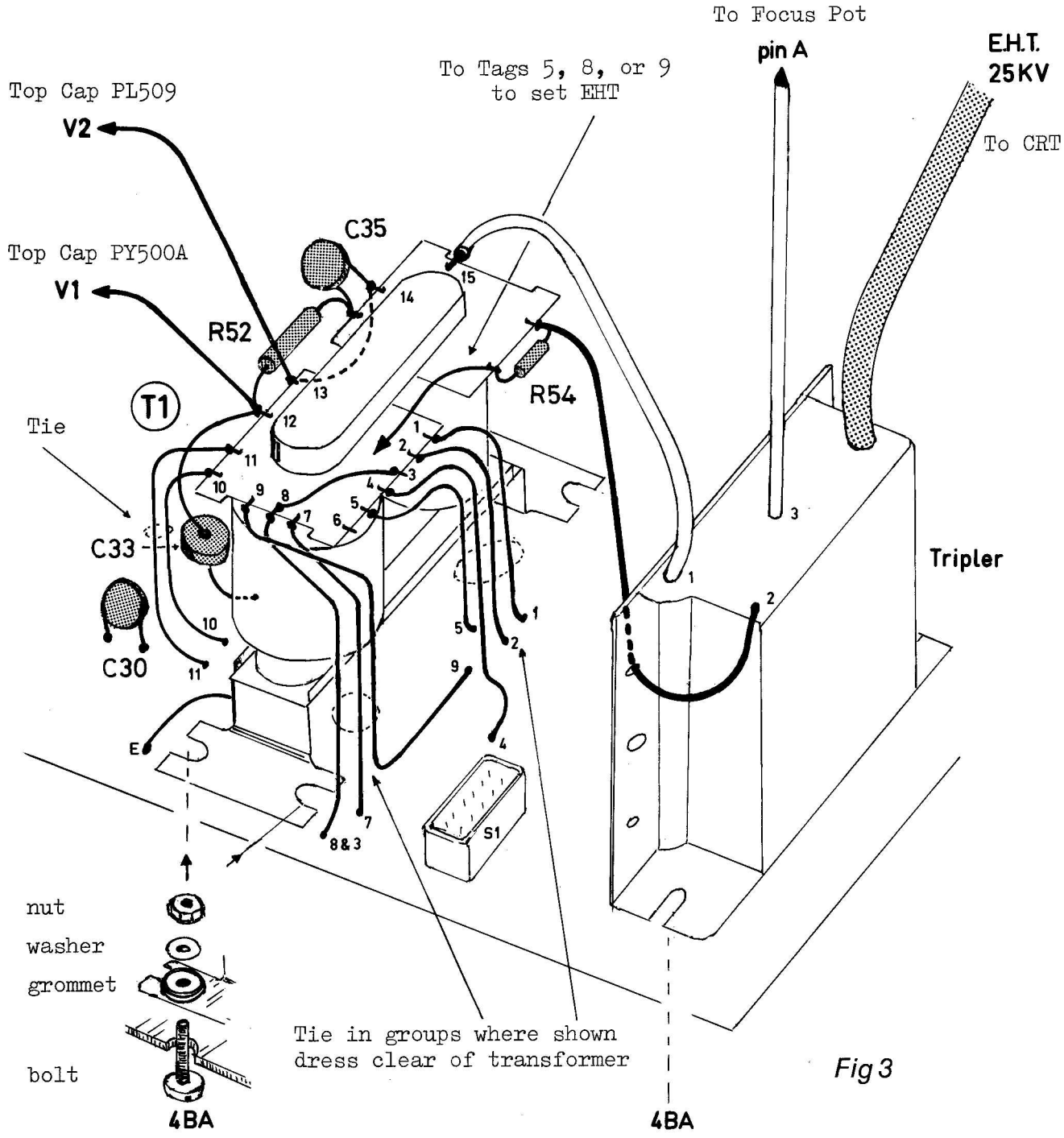


Fig 3

Refer to fitting procedure when constructing this section.

WARNING DANGER: VOLTAGES IN THIS AREA ARE LETHAL, TAKE GREAT CARE WHEN WORKING ON THIS SECTION. EVEN IF THE RECEIVER HAS BEEN SWITCHED OFF THE CRT CAN RETAIN A LARGE CHARGE.

Fig. 4

Refer to Line Transformer wiring diagram.

Fitting Procedure (use sleeving on all bare wires)

1. Fit the four rubber grommets to the transformer bracket feet.

2. Solder two lengths of wire (long enough to reach as in 4.*) to tag on the transformer bottom bracket.

3. Mount transformer using the four medium 4 BA bolts, putting bolt heads under P.C. panel as in diagram.

4.* Wire leads (No.2) one to point E under transformer and one to E at side as shown.

5. Fit, C33, C35, R52 & R54 dress well clear of transformer windings.

6. Wire up transformer tags 1-11, dressing leads away from transformer and tying in three groups as shown.
(Numbers on PC are transformer pin numbers.)

7. Make up valve top cap leads taking care to be as neat as possible, solder to transformer as shown.

8. Mount EHT tripler with two 4BA, wire as diagram, taking care to keep leads clear.

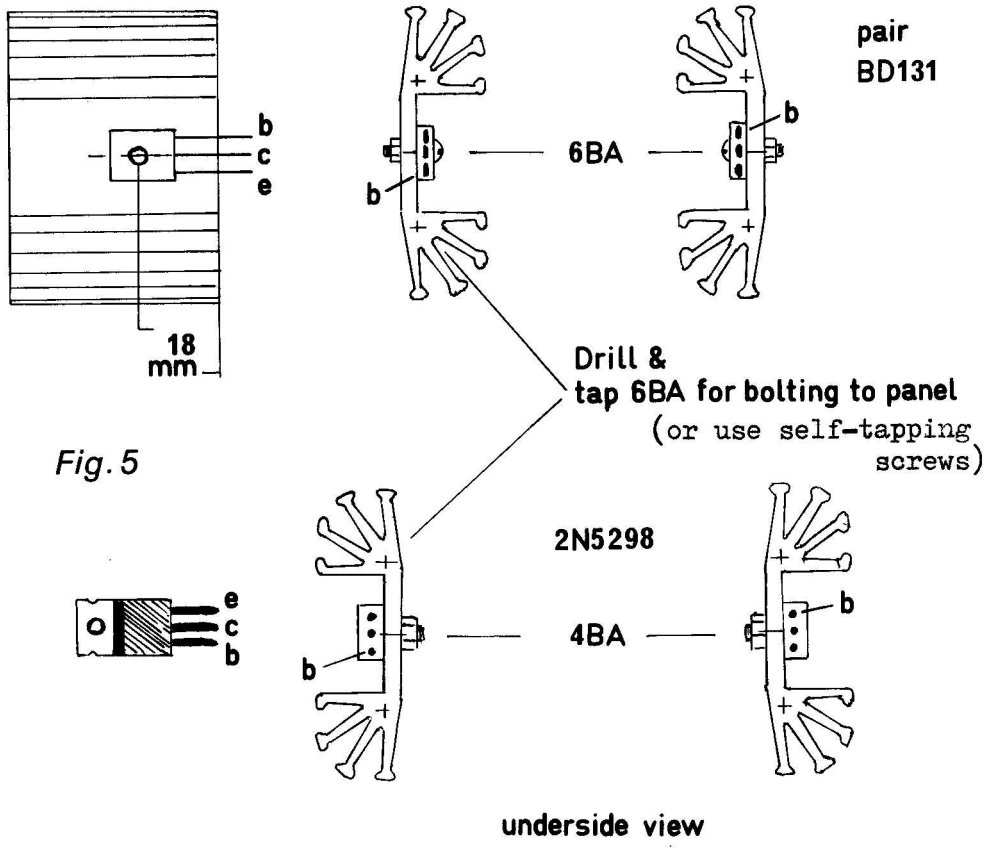
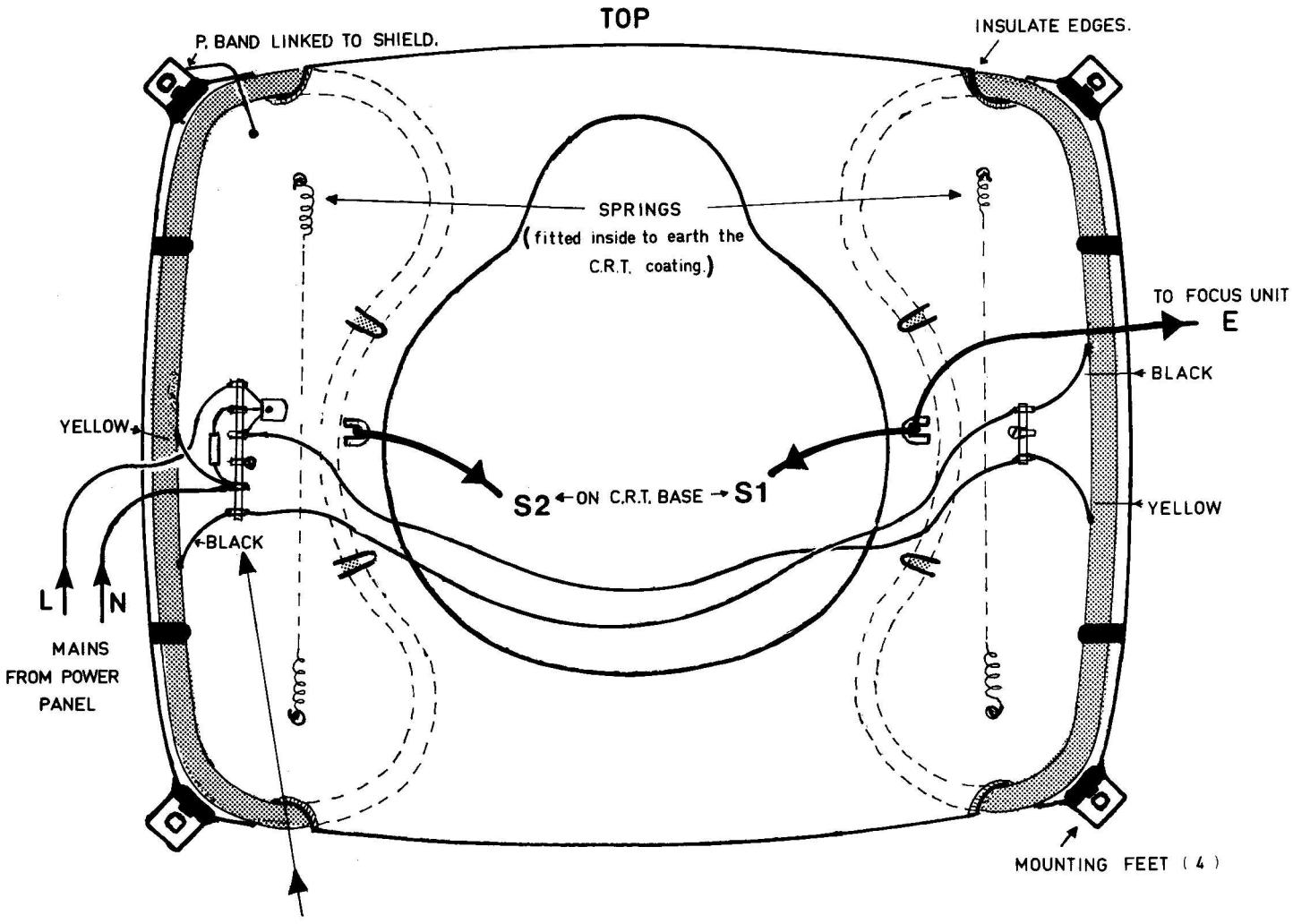
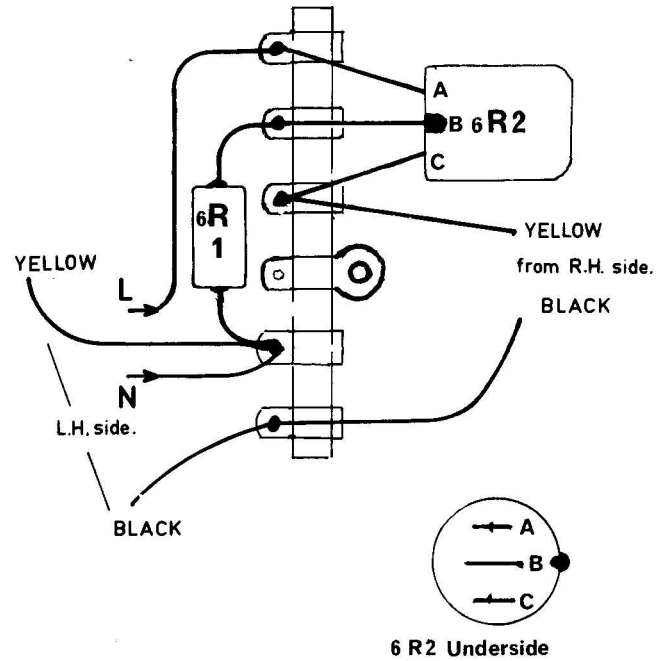


Fig. 5

C.R.T. SHIELD & DEGAUSSING ASSEMBLY.

REAR VIEW





6 R2 Underside

This assembly should be completed before fitting with the C.R.T. Care is necessary where the degaussing coils pass the edges of the metal shield, these edges should be insulated with PVC or tape, make sure also that the springs have good contact with the shield (remove masking tape from holes). Two spade connectors are provided for connecting the leads from S1, S2, and the Focus Control earth to the shield.

Fig.6

SCANNING COMPONENT CONNECTION DATA.

SCAN YOKE:

The coils are housed in a rigid framework which is screw clamped to the tube neck. The construction permits independent axial movement of the coil assembly within the housing so that the correct centre of deflection may be determined to obtain colour purity, the coil assembly is clamped in the correct position by two wing nuts on the housing. Coil connections are brought out to two solder-tag panels, one on either side at the rear.

CONVERGENCE AND PURITY ASSEMBLY:

This is supplied as a combined unit and is designed to be self-supporting on the tube neck, immediately behind the Scan Yoke. Solder-tags are fitted (one on either side of each of the three convergence units) for the connections to the line and field coils. Static adjustment is by rotatable permanent magnets.

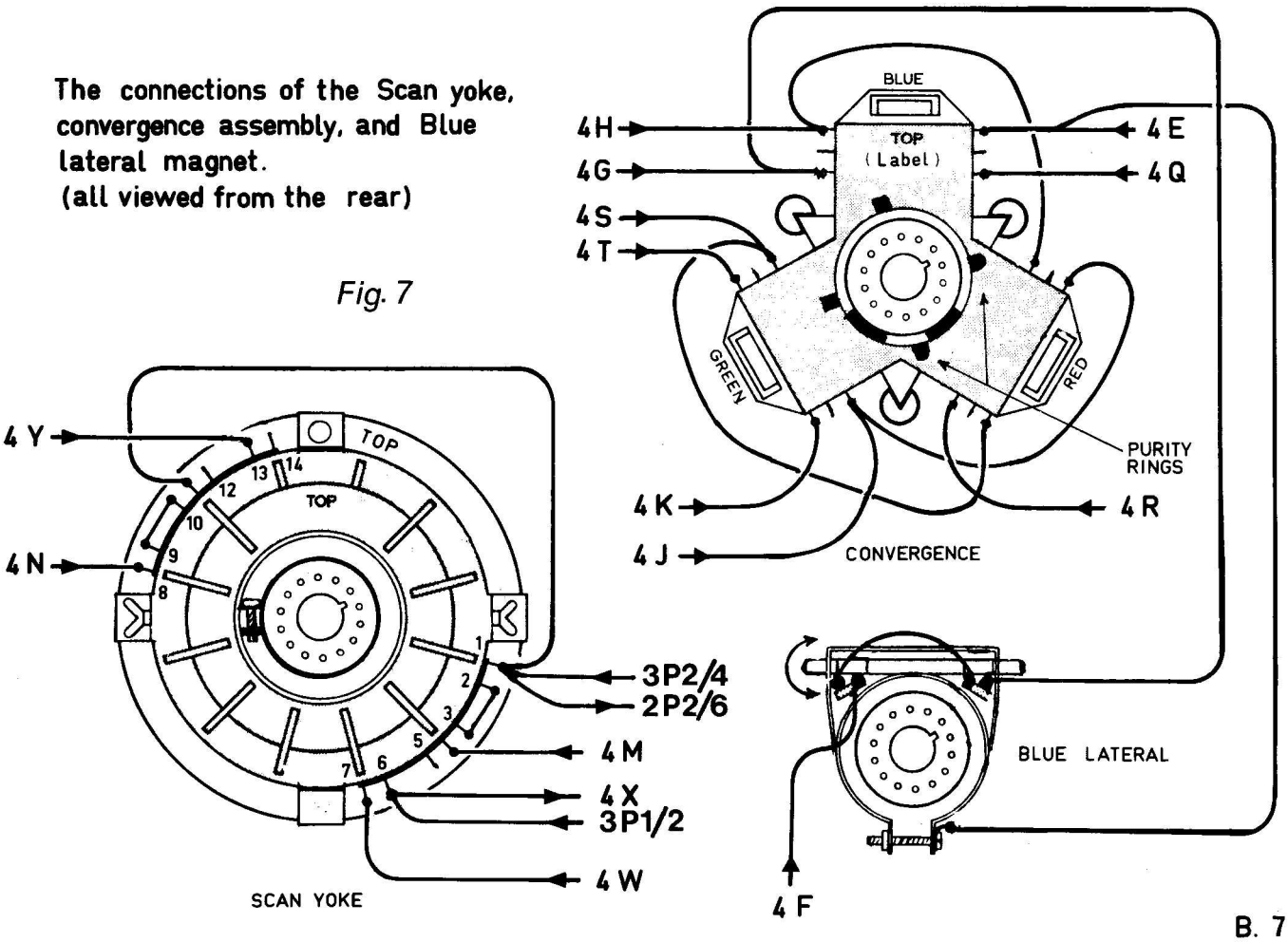
The Purity Assembly consists of two metal rings, magnetised across their diameters, in a plastic holder held by lugs into the Convergence Units.

BLUE LATERAL ASSEMBLY:

This component is designed for screw clamping over the neck of the shadow mask tube. The correct mounting position is as close as possible to the Convergence and Purity Assembly with the clamp surmounting the protruding tongues of the purity ring holder. Static adjustment is obtained by rotating the magnet holder. Coil connections are to four tags.

The connections of the Scan yoke, convergence assembly, and Blue lateral magnet. (all viewed from the rear)

Fig. 7



POWER UNIT CHASSIS DRILLING TEMPLATE

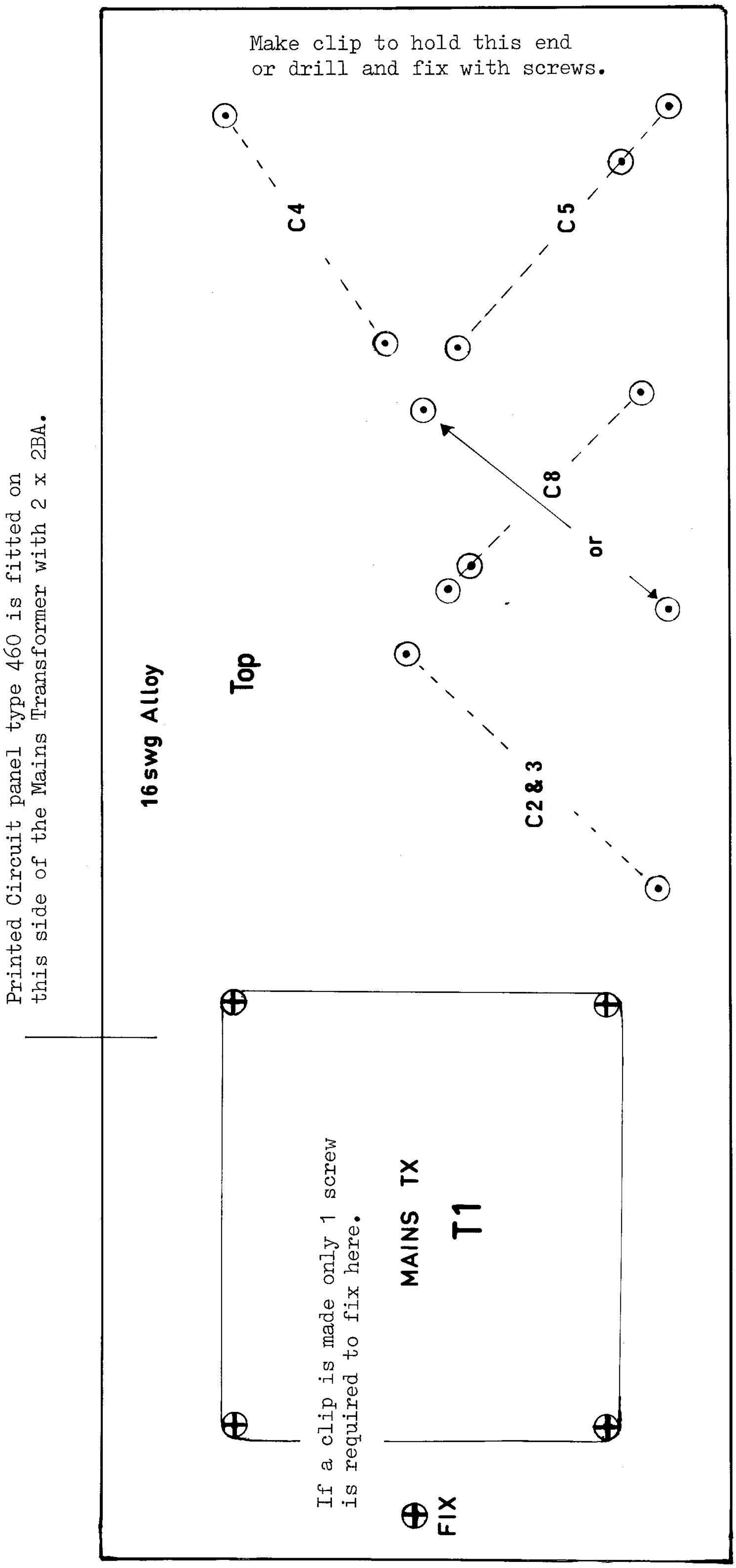


Fig.8

DRILL ⊙ = 4 BA ⊕ = 2 BA

POWER UNIT CONSTRUCTION DETAILS

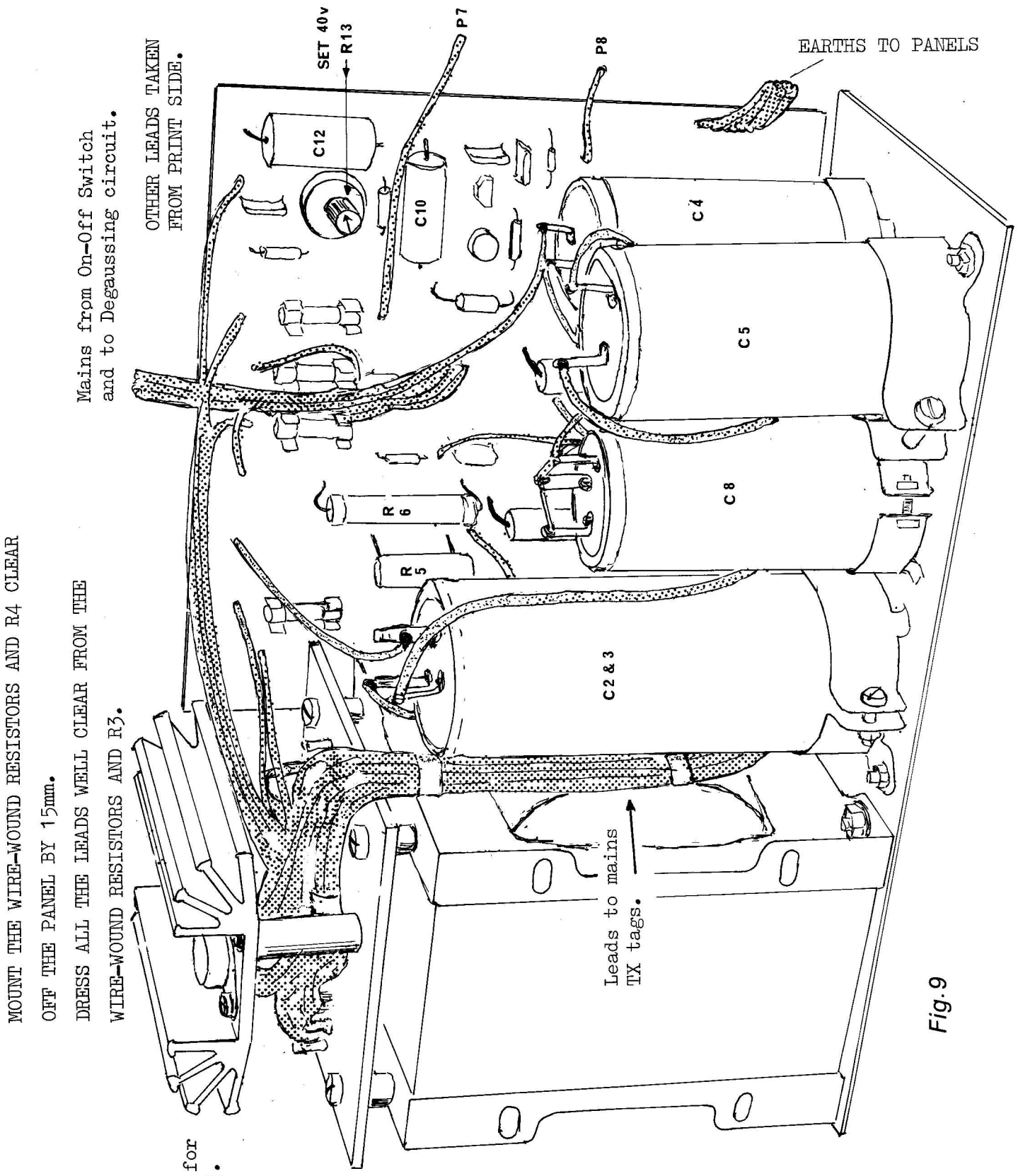


Fig.9

I. F. PLUGS & TUNER CONTROL UNIT WIRING.

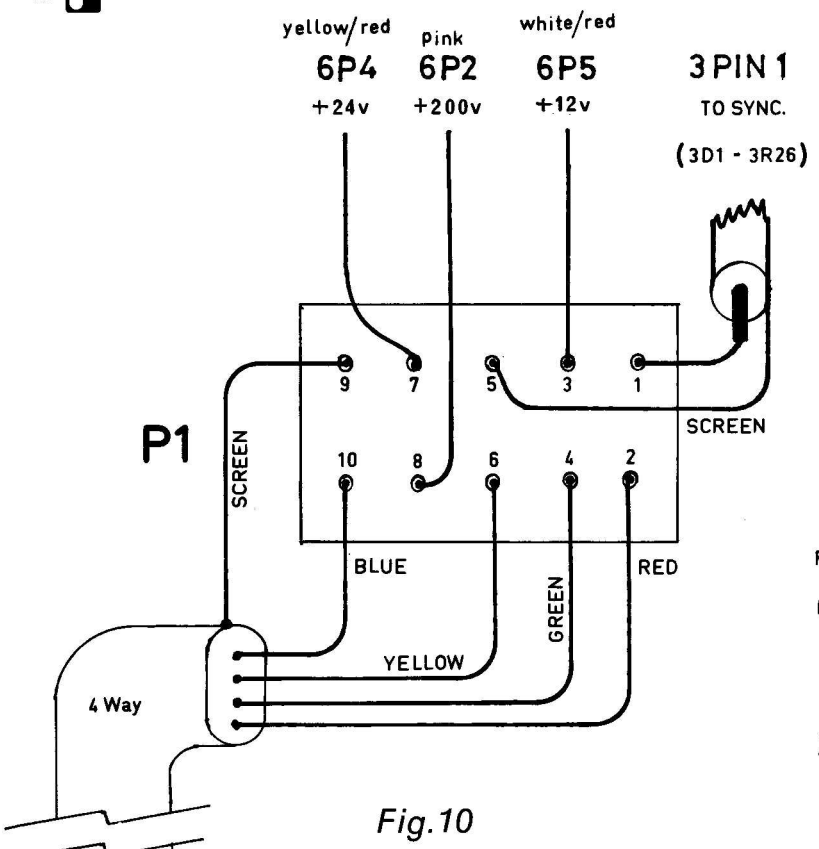


Fig.10

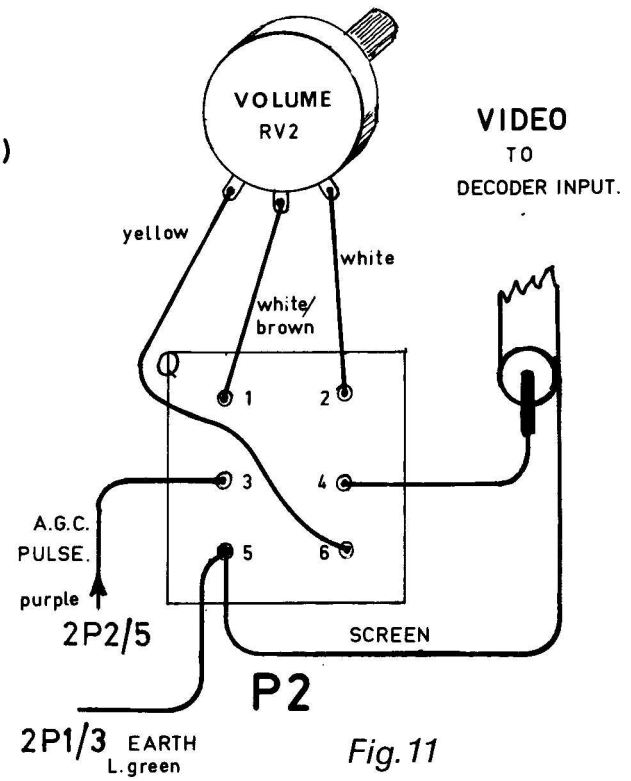
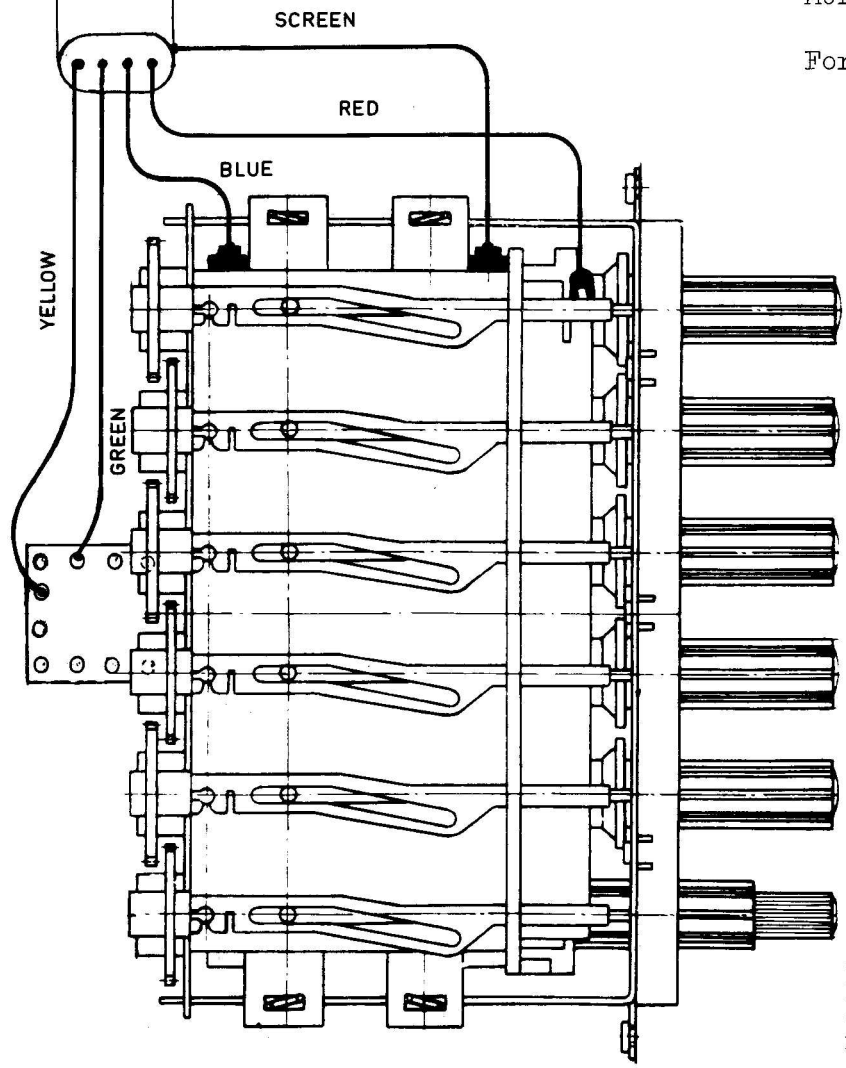


Fig.11

MULTI-BAND TUNER CONTROL UNIT TYPE 4142

For use with UHF Tuner Type ELC 1043/06



This unit has the facility for switching BANDS I - V with the appropriate scale appearing in the front panel "window".
To change the band switch, rotate the BLACK part of the desired button with the button released. Do not attempt to turn the black part with the button pushed in.
As most constructors will use UHF only, the band switch can conveniently be used to defeat the AFC, the wiring for this is as shown.
To operate proceed as follows:
Turn off AFC by releasing the desired button and selecting either band I or III, re-push button which will then be without AFC. Tuning is then effected by rotating the white part of the button until the required channel appears.
AFC is then re-applied by re-setting the switch to UHF.

If VHF operation on bands I and III via tuner type ELC 1042 is required a separate AFC on-off switch is then necessary.

CABLE HARNESS CONNECTION DETAILS

IDENTIFICATION

L = Larger Diameter Wire ie. L/Red = Large/Red

Bi-colour wire is identified as follows, base colour first then band colour ie. a red wire with white bands = red/white.

HARNESS ENDS:

These should be connected as indicated keeping the harness as neat as possible, shortening any leads which may appear too long. Fitting the socket pins to the wire ends for P1 etc. is made less difficult if the required number of socket pins are left attached to the metal strip ie. P1, 10 pins together, attach this length to the bench with drawing pins and then solder a wire to every pin, when this is complete remove from the bench, break off each pin from the strip, identify the wire colour and fit into the correct hole in the plug moulding (these are numbered on the top).

POWER UNIT These leads are soldered directly to the P.C. as in figure 9 except the two browns which go to the transformer on T5 & T6.

L/RED	295v	6P1	
PINK	200v	6P2	
ORANGE/RED	40v	6P3	
YELLOW/RED	24v	6P4	
WHITE/RED	12v	6P5	
L/GREEN	Earth	6P6	
GREY		6P7	3V1 & 3V2 Heaters
GREY		6P8	
BROWN		6T5	C.R.T. Heater
BROWN		6T6	

CONTROLS

WHITE/BROWN	V.C. Slider	Fig. 11
WHITE	V.C. Bottom	
YELLOW	V.C. Top	
BROWN/BLACK	Bottom	Fig. 12
BROWN/PINK	Brightness Slider	
BLUE/WHITE	Brightness Top	
ORANGE	Contrast Slider	
BLUE	Contrast Top	
PINK/WHITE	Saturation Slider	
BLUE/BLACK	Saturation Top	

P1 Ref. Fig. 10

P2 Ref. Fig. 11

2P1

BROWN/BLACK	Pin 1
BROWN/PINK	2
L/GREEN	3
ORANGE	4
PINK/WHITE	5
BLUE/BLACK	6
BLACK/WHITE	7
BLUE/WHITE	8
BLUE	9
YELLOW/RED	10

ODDS

SCREENED VIDEO LEADS see notes on page B14

SINGLE THICK GREEN " " " " " (this lead is not in the harness)

2P2	L/GREEN	Pin 1
	WHITE/RED	2
	PINK	3
	PINK/WHITE	4
	PURPLE	5
	GREY	6
3P1	PINK/WHITE	Pin 1
	L/BROWN	2
	L/RED	3
	BLACK/WHITE	4
	GREY	5
	L/WHITE	6
	GREY	7
	L/GREEN	8
	BLUE/BLACK	9
	L/PURPLE	10
3P2	L/GREEN	Pin 1
	ORANGE/RED	2
	WHITE/RED	3
	GREY	4

SCAN YOKE Ref. Fig. 7

2 X L/BROWN	Pin 6
2 X GREY	Pins 1 & 11 (linked)

For other colours see below:

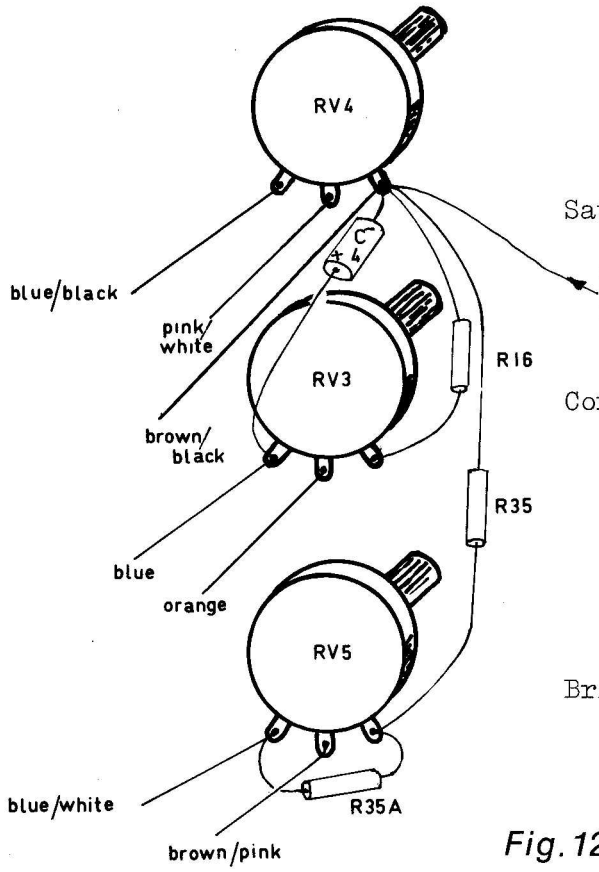
CONVERGENCE PANEL - SCAN - CONVERGENCE YOKE

BLACK	Scan Yoke to Convergence Panel	4M
BLACK/WHITE	" " "	4N
YELLOW	" " "	4W
ORANGE	" " "	4Y
L/GREEN	Convergence Yoke to Panel	4E
BROWN/BLACK	" "	4Q
BROWN/PINK	" "	4R
WHITE/BROWN	" "	4S
PINK/WHITE	" "	4T
BLUE/BLACK	" "	4F
BLUE/WHITE	" "	4G
RED/WHITE	" "	4H
YELLOW/RED	" "	4J
PINK	" "	4K
L/GREEN	Earth	4E
ORANGE/RED	40v	4P3
L/PURPLE	Boost	4U
L/WHITE	From 3P1/6	4Z
BLUE/BLACK	From 3P1/9	4F
L/BROWN	From 3P1/2	4X

Links have to be made between panels 440 & 441 linking points 4A, B, C, D, E, & L.

GREY	From C.R.T. Base	4O
	4R10 is not required and point O is earthed	
RED (may have tracer colour)		4RS
GREEN " " " "		4GS
BLUE " " " "		4BS

C.R.T. BASE	L/GREEN	S2 Tag on Print side
	BROWN	H4
	BROWN	H5
	RED (May have tracer)	1
	BLUE " " "	2
	GREEN " " "	3
	GREY	9
	RED From 2R	R8
	GREEN From 2G	G7
	BLUE From 2B	B6
	THICK GREY From tag S2 to shield	
	THICK GREY " " S1 " "	



Front Panel Controls
Ref: Also to Fig. 12. for Volume Control

Component prefix No. 2

Saturation

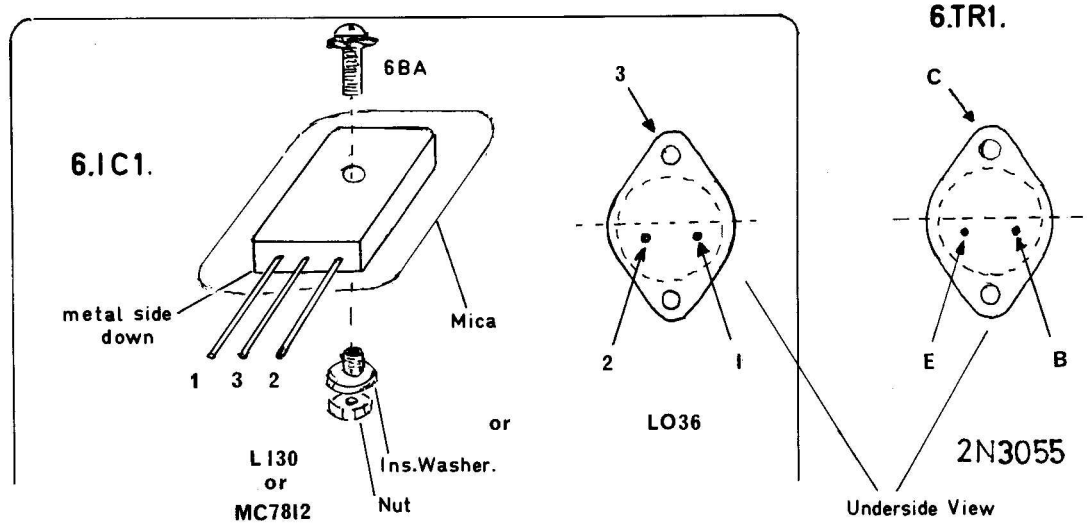
Thick Green
from 430 earth (see dia. layout 430)

Contrast

Brightness

Fig. 12

POWER SUPPLY 12v REGULATOR AND 6TR1 CONNECTION DETAILS



FINAL NOTES

When connecting screened video leads to Decoder and Timebase input pins do NOT try to earth the screen of these leads at the Decoder or Timebase end, the only connection should be at the I.F. end as shown.

Fit the thick green wire between the negative end of 2C4 on the control panel and the earth pin ajacent to the video input on the timebase panel.

It is very important that the mains earth lead is connected directly to the Mains Transformer earth tag and then to the Power Supply P.C. If the controls are mounted on a metal plate this should only be connected to the negative side of 2C4 making sure that there is no possibility of a short to the P.Band of the CRT. the CRT P.Band should be connected directly to the shield as shown in diagram Fig. 6 and NOT to any other point.

Using the ties provided, tie the L.O.P.T. leads together in groups as shown in diagram Fig. 3 dressing well clear of the windings. Fig. 4 also refers. Similarly tie Power Supply wiring into tidy groups well clear of wirewound resistors.

When fitting wire harness dress all leads well clear of the front of the Decoder Panel keeping all leads neat and tidy.

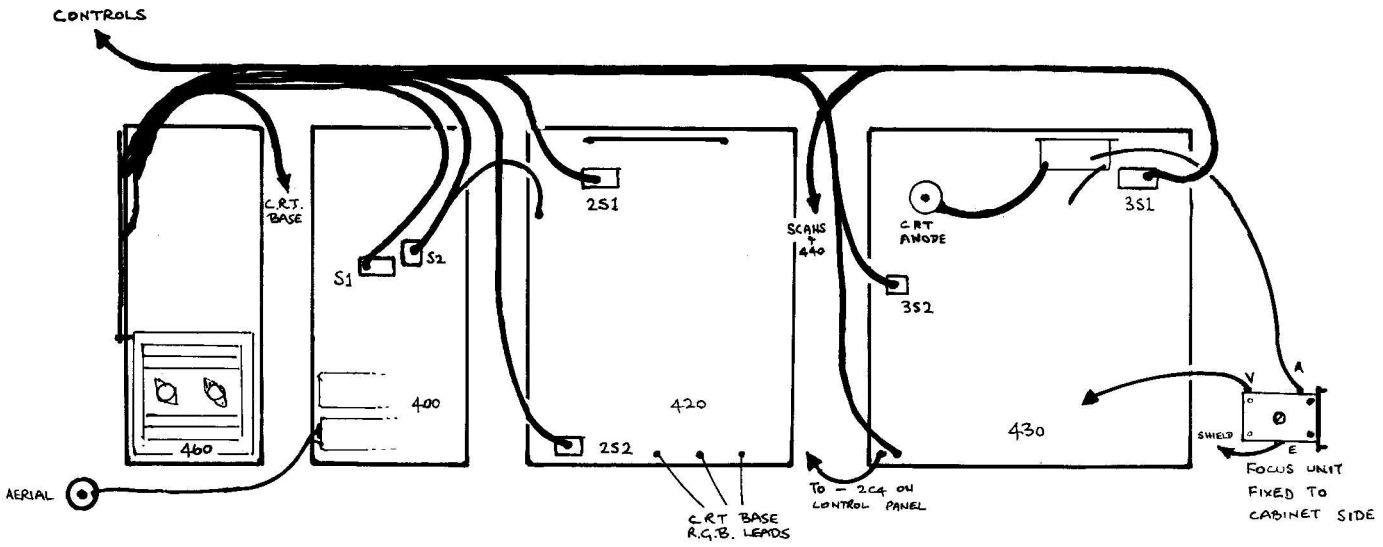


Fig 12

Wire Harness and panel layout.