

QUAD 405

POWER AMPLIFIER

Service Data

0004~8

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

The Acoustical Manufacturing Co. Ltd
St Peters Road, Huntingdon, Cambs, PE18 7DB, England
Telephone: 0480 52561 Telex 32348 QUAD G

Contents	<i>page</i>
Circuit Description	3
Test Equipment	4
Disconnecting Clamp Circuits	4
Amplifier Circuit Testing	5
Clamp Circuit Testing	5
Fault Finding	6
Modifications	8
Clamp Circuit	9
Replacing a Clamp Board	9
Conversion of a 405 to a Mono 180 watt amplifier	10
Replacing Transformer	11
Replacing Amplifier Modules	11
QUAD 405-2	12
Assembly Diagram	opp. 12
Amplifier Board Layout Diagram M12368 ISS 9 and 10	rev. 15, 16
Amplifier Board Layout Diagram M12565 ISS 3	rev. 17
Circuit Diagram 2 amplifier boards M12368 ISS 5 and 6	13
Circuit Diagram 3 amplifier board M12368 ISS 7	14
Circuit Diagram 4 amplifier board M12368 ISS 9	15
Circuit Diagram 5 amplifier board M12368 ISS 9 and 10	16
Circuit Diagram 6 amplifier board M12565 ISS 3	17
Circuit Diagram 7 amplifier board M12565 ISS 5	18
Circuit Diagram 8 amplifier board M12565 ISS 6	19
Circuit Diagram 9 amplifier board M12565 ISS 7	20
Circuit Diagram 10 amplifier board M12565 ISS 7	21

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

CIRCUIT DESCRIPTION

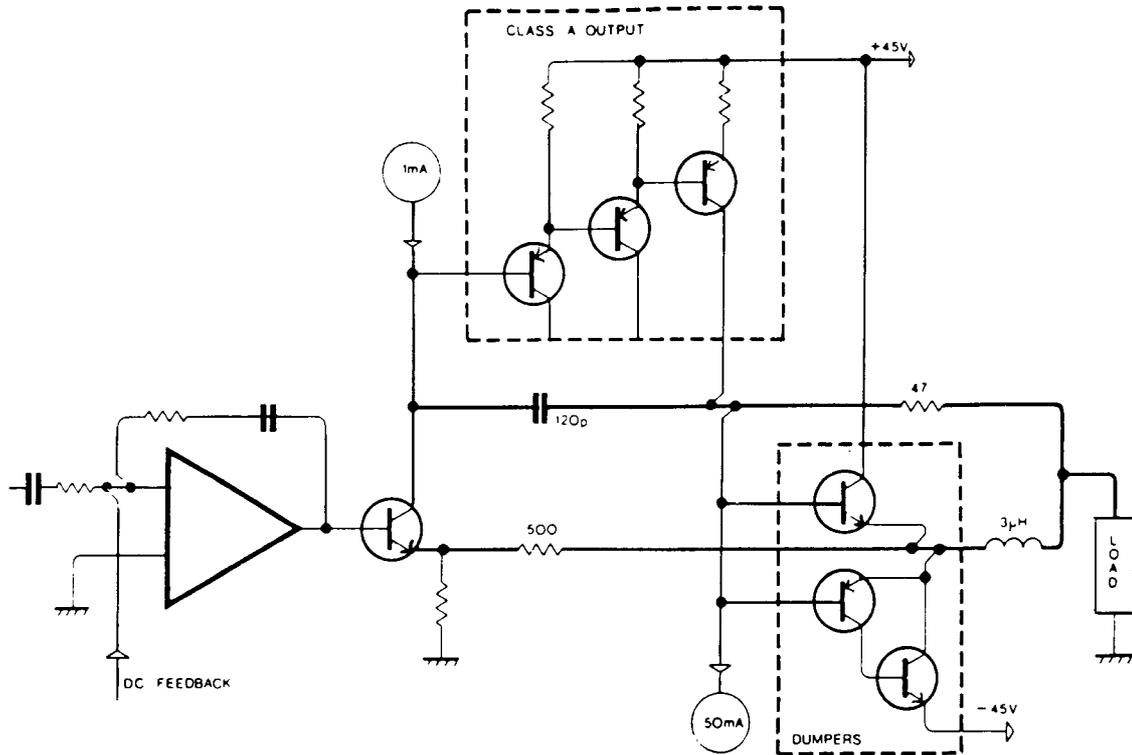
The Quad 405 is a two channel power amplifier primarily intended for use in high quality sound reproducing systems. The amplifier is usually used with Quad control units though other signal sources can readily be accommodated.

The amplifier uses a current dumping output circuit, a Quad invention which eliminates many of the problems associated with transistor amplifiers, and covered by patents in several countries.

In a current dumping amplifier there is in effect both a low powered very high quality amplifier and a high powered heavy duty amplifier. The low power amplifier controls the loudspeakers at all times, calling upon the high power section to provide most of the muscle. The small amplifier is so arranged – it carries an error signal – that provided the larger power transistors (the dumpers) get within the target area of the required output current it will fill in the remainder accurately and completely. The reproduced quality is *solely* dependent on the small amplifier which because of its low power can be made very good indeed.

Problems of crossover, crossover distortion, quiescent current adjustment, thermal tracking, transistor matching, all disappear. There are no internal adjustments or alignments and the choice of power transistor types is less restrictive.

Fig. 1



Simplified Schematic of 405 Amplifier showing Class A, Dumpers and Bridge Components.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

TEST EQUIPMENT

Sound Technology Distortion Analyser 1700A (ST1700A)

Dual Beam Oscilloscope

4Ω and 8Ω loads of 100W Dissipation

1Ω load of 25W dissipation

2.5 KHz Square Wave Generator

Input Sensitivity Indicator (0 to 1V Rms)

Avometer (or similar multitester)

0 to 12V d.c. power supply

Variac AC power supply

Fig. 2 illustrates a simple switching circuit which may assist if much testing is anticipated.

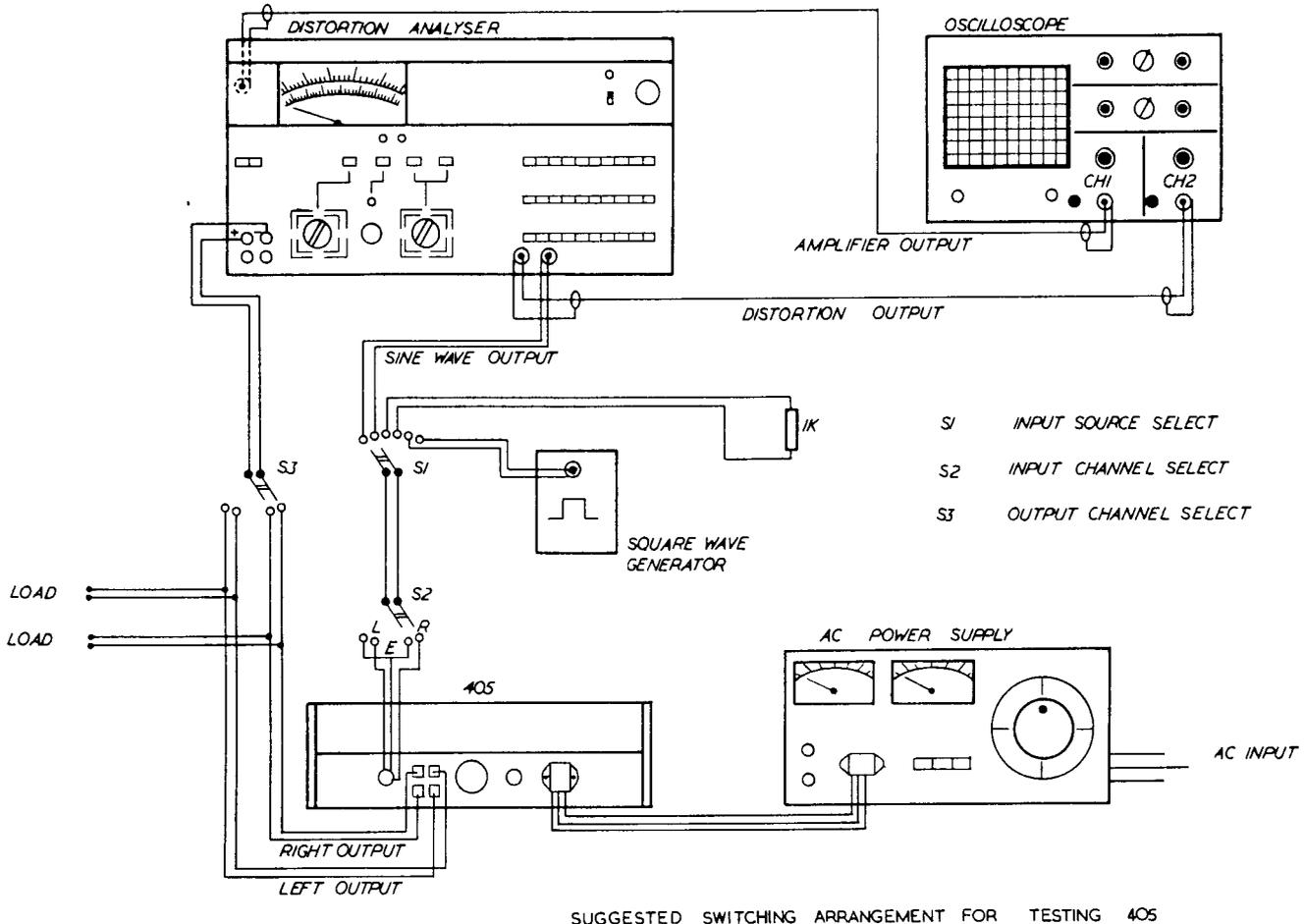


Fig. 2

Before testing, the cover of the 405 should be removed.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel:- 01844-351694 Fax:- 01844-352554
 Email:- enquiries@mauritron.co.uk

DISCONNECTING CLAMP CIRCUITS

When servicing a 405 fitted with a clamp circuit, it may be necessary to bypass this circuit.

For 405's fitted with amplifier boards M1 2368, this may be done by removing the push-on connectors carrying the brown wires from the amplifier boards, and connecting the loads between the black output terminals and the output terminals on the amplifier boards.

For 405's fitted with amplifier boards type M1 2565, it will be necessary to remove the side panels to gain access to the printed copper side of the amplifier boards. The three screws securing each side panel should be removed, the panel may then be slid outwards from the amplifier. If the solder is removed from the link pad shown in Fig. 18 (A), the clamp circuit will be disconnected.

Care should be taken to ensure that when testing is completed, the link pad is re-soldered.

AMPLIFIER CIRCUIT TESTING M12368 – M12565

The following test procedure is with reference to a 240V amplifier with no voltage limiters.

Select:

Controls **Y1 – 0.5V/cm DC coupled**
 Y2 – 0.1V/cm DC coupled
 Timebase 0.2 ms/cm

ST. 1700A – **Volts/power 100W RMS**
 Distortion Ratio 0.01%
 80KHz and 400Hz filters both in
 Frequency 1KHz
 Low Distortion
 Osc. level minimum

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

Connections **Load 8Ω**
 S1 Sine Wave (ST1700A)
 S2 Left Input
 S3 Left Output

If the Amplifier fails any of the following tests, refer to the appropriate part of the fault finding section, page 6.

1. Check inside the amplifier for obvious faults such as burnt components, blown internal fuses etc. Each of the following checks should be repeated on the other channel.
2. Apply the **AC Supply Volts** whilst observing the current consumption which should not exceed 0.12A.
3. Increase the **oscillator level** to 0.5V Rms \pm 0.5dB. The output should be 100W with no sign of clipping.
4. Select **set level** and adjust meter deflection for zero. Select **distortion** which should be less than 0.01%. Select **volts/power**, decrease the **applied frequency** to 100Hz, remove **400Hz** filter and adjust **oscilloscope timebase** to 2 ms/cm. **Set level**, select **distortion** which should be less than 0.01%. Select **volts/power**, increase the **applied frequency** to 3KHz, select **400Hz** filter and adjust **timebase** to 50 μ s/cm. Select **distortion** which should again be less than 0.01%.
5. Select **volts/power**, increase **applied frequency** to 10KHz and adjust **timebase** to 20 μ s/cm. Adjust **oscillator level** so that output is 100W. **Set level** then select **distortion** which should be less than 0.05%.
6. Select **volts/power**, increase **applied frequency** to 20KHz and adjust **timebase** to 10 μ s/cm. Reduce **output level** to 80W. **Set level** and measure **distortion** which should be less than 0.1%.
7. Select **volts/power** and decrease **frequency** to 1KHz. Adjust **oscillator level** so that output is 100W and adjust **timebase** to 0.2ms/cm. The following checks are to monitor the low frequency roll off of the 405. Select **30Hz** and the output level should fall by approximately 0.3dB. Select **20Hz** and the output level should fall by approximately 1dB. Select **10Hz** and the output level should fall by 7dB \pm 1.5dB.
8. Increase **frequency** to 1KHz. For 405's with amplifier boards type M12368 insert 1K8 voltage limiting resistors into the mini sockets on each amplifier board. For 405's with amplifier boards type M12565-3 insert a link into these sockets. The output waveform should indicate clipping. Reduce the **oscillator level** until the clipping just disappears at which point the output level should be 20V Rms \pm 1V. Remove voltage limiters, and adjust **oscillator level** for 100W output.
9. Select **volts/power** and **square wave** input, (S1). Adjust **timebase** to 0.1 ms/cm. Remove **load** and note the difference in the waveform with load and no load. There should be a slight difference in gain (10mV) but no overshoot. Re-connect 8 Ω load.
10. The following checks should be carried out with no input signal and the input to the amplifier board loaded by a 1K resistor, (S1). Remove **400Hz filter** and select **noise** which should be better than -93dB unweighted.
11. Select **volts/power 400Hz filter** and **sine wave** input at a **frequency** of 1 KHz and adjust **oscillator level** for 100W output. Select **1 Ω load**. The output should clip equally on both halves of the waveform as shown in Fig. 11.
12. Select **4 Ω load**, output level should be 70W just prior to clipping.
13. **CLAMP CIRCUIT TESTING**
In order to test the clamp circuit, the circuit should first be disconnected from its amplifier board, as described on page 4.
For 405's fitted with amplifier boards M12368 apply **6V d.c.** across the output terminals of the relevant channel with an ammeter in circuit.
For 405's fitted with amplifier boards M12565 a wire should be soldered to the back of the amplifier board as shown in Fig. 18(B). 6V d.c. should be applied between this wire and the black output terminal of the relevant channel, with an ammeter in circuit.
In both cases the current should not exceed 0.5mA. Reverse the polarity of the supply and repeat the test. The test may then be carried out on the other channel.
The complete test should then be repeated using a 12V d.c. supply with a 10 Ω resistor in series, when the current should be approximately 1A.

FAULT FINDING

The following information may assist in locating faults occurring on the amplifier boards of a 405. In each case only the faulty channel of the 405 is driven, as in the test procedure. The input should be a sine wave of 0.5V Rms and the output should be applied to an 8Ω load unless otherwise stated. The numbers refer to the relevant test check.

*Board type M12368 only **Board type M12565 only.

Effect	Cause
1. R33 Burnt R37 Burnt* R41 Burnt* R39 Burnt R38 Burnt	Collector-base TR10 O/C L1 O/C L3 O/C R20 O/C, R21 O/C D5 or D6 O/C
2. High Current * ** Draws high current which drops to 0.1A after approx 2 seconds	TR2 O/C, TR3 O/C, TR7 O/C, TR9 S/C TR10 S/C, R7 O/C C8 S/C C3 S/C D2 O/C R8 O/C R14 O/C
3. No increase in AC supply current for increase in signal Signal is unstable and clips 100W o/p for 0.3V input Waveform trace as in Fig. 3 Waveform trace as in Fig. 4 Approximately 4W output	R3 O/C, C1 O/C, R31 O/C R6 O/C R20 O/C, R21 O/C TR8 O/C, TR6 S/C, R36 O/C, R30 O/C, C10 S/C L2 O/C R16 O/C
4. Second Harmonic Distortion Second Harmonic Distortion especially at 100Hz and on O/C load. Third Harmonic Distortion especially at 100Hz Third Harmonic Distortion Hum and noise Hum* Waveform trace as in Fig. 5* Waveform trace as in Fig. 6* Waveform trace as in Fig. 7 Waveform trace as in Fig. 8* Waveform trace as in Fig. 9	IC1, TR1, TR ² , TR3, TR4, R5, R6, R17, R18, R22, C1, C2, C7, C8 R5. L2, R3, R6, R16, R20, R21, C3. C5 O/C R37 O/C TR3 S/C R23 O/C, R5 O/C R33 S/C R8 O/C C5 S/C, R15 O/C, TR1 O/C
6. Distortion at 20KHz	D5 S/C, D6 S/C
8. Limiting resistor R11 has no effect	R10 S/C
9. Square Wave Trace as in Fig. 10	C6 O/C
10. Noise especially at 100Hz Noise with large Spikes Noise	R5 TR1 IC1, R12, R3, R4, TR2
11. Current limiting check with 1Ω load. Waveform trace as in Fig. 12 Waveform trace as in Fig. 13 Waveform trace as in Fig. 14 Waveform trace as in Fig. 8	R29 O/C, R28 S/C, R25 O/C D3 S/C, R27 O/C, R24 O/C, R26 S/C TR6 O/C C11 S/C, TR5 O/C
13. Draws high current with 6V D.C. supply	T2 S/C

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

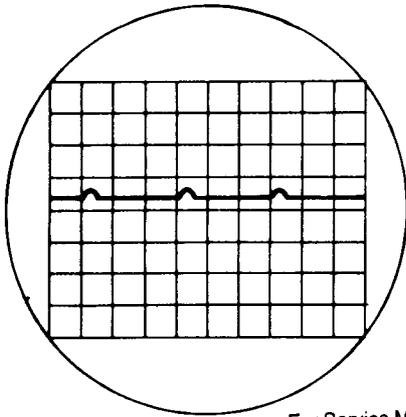


Fig. 3

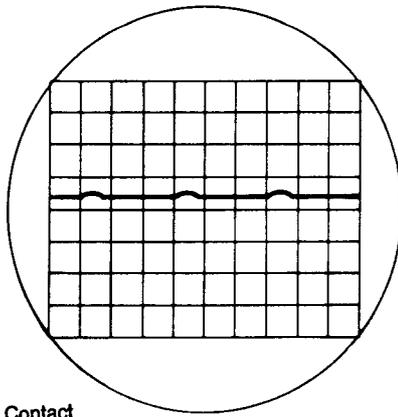


Fig. 4

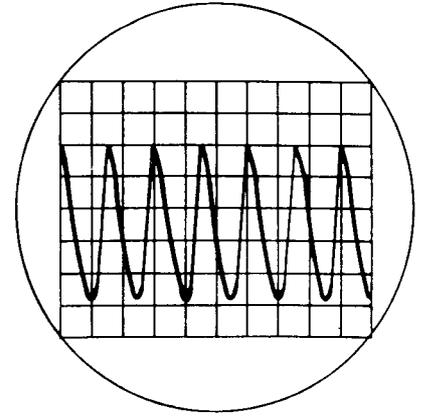


Fig. 5

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel:- 01844-351694 Fax:- 01844-352554
 Email:- enquiries@mauritron.co.uk

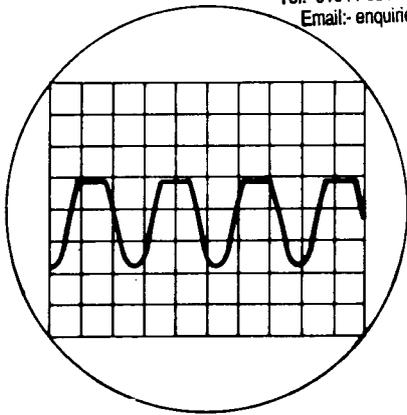


Fig. 6

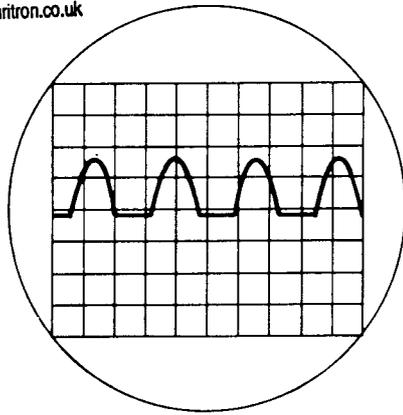


Fig. 7

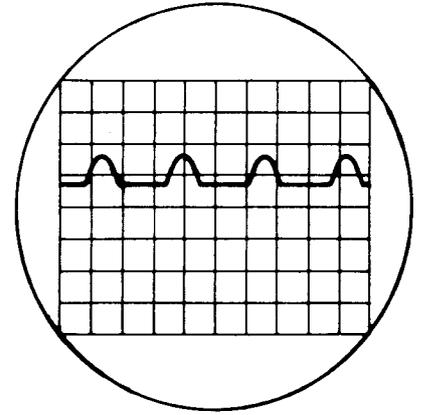


Fig. 8

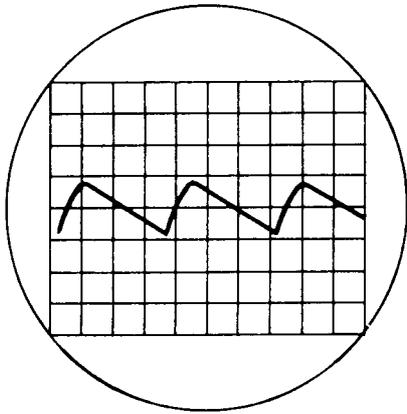


Fig. 9

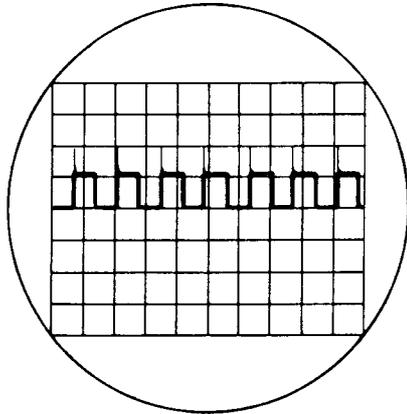


Fig. 10

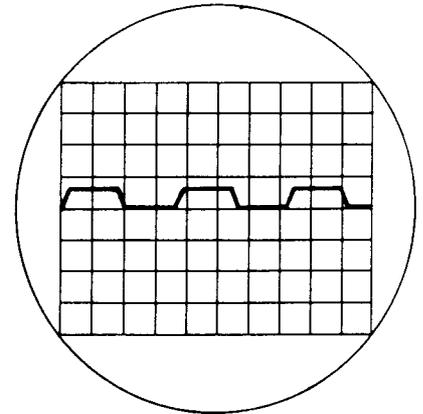


Fig. 11

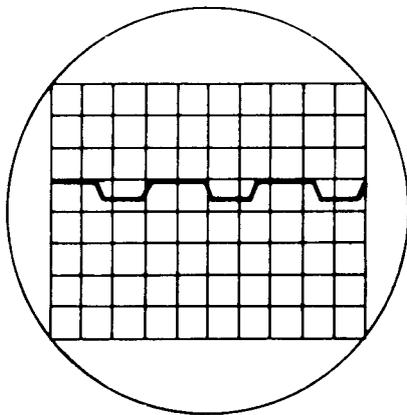


Fig. 12

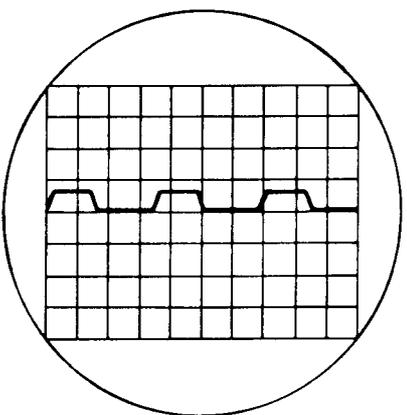


Fig. 13

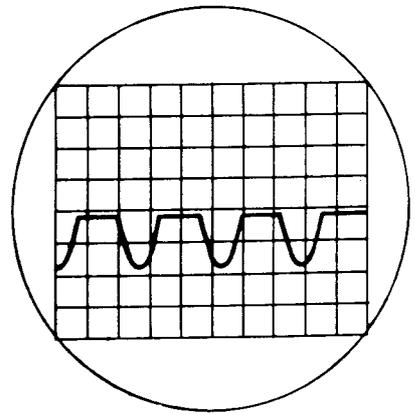


Fig. 14

MODIFICATIONS TO PRINTED CIRCUIT BOARDS.

- Amplifier Board M12368.5** originally fitted. Circuit diagram issue 2.
1. **Amplifier Board M12368.6**
Copper track layout modified component layout unchanged.
2. **Amplifier Board M12368.7** Circuit diagram issue 3.
R4 changed from 10K to 22K
R5 changed from 10K to 4K7
R9 changed from 180Ω to 220Ω
R19 3K3 removed
R23 changed from 3K3 to 1K2
C9 330p removed
C18 47nF added as on circuit diagram
FS1 and FS2 effectively changed places
R2 changed from 2.2Ω to 10Ω
Copper track width reduced.
- 3.(a) **Amplifier Board M12368.9** introduced at Serial Number 9000. Circuit diagram issue 4.
R41 22Ω added
L3 6.9μH added
C15 0.1μH added
C16 0.1μH added
C18 47nF removed
C19 1nF added
Copper track width reduced.
Also at Serial Number 9000 a clamp circuit, on PCB M12400, was mounted on the output terminals (fig. 15). This detects excessive DC off-set at the output and short-circuits, blowing the internal 4 amp fuses FS1/FS2, to protect the loudspeaker.
- 3.(b) At Serial Number 29,000 the following changes occurred. Circuit diagram issue 5
R10 changed from 1K to 1K8
R27 changed from 8K2 to 15K
R29 changed from 8K2 to 15K
R35 changed from 0.08Ω to 0.091Ω
R36 changed from 0.08Ω to 0.091Ω
D1 changed from LR120C to LR150C
D2 changed from LR120C to LR150C
4. **Amplifier Board M12368.10**
Identical to M12368.9 except for copper pads for power transistors modified for production purposes.
5. **Amplifier Board M12565.3** introduced at Serial Number 59,001. Circuit diagram issue 6. Other 405's with this board are Serial Numbers 57,301 to 57,600 inc.
This board incorporates the clamp circuit and voltage limiter is now a link.
6. **Amplifier Board M12565.5**, circuit diagram issue 7, was also fitted from serial number 62500 onwards but with 405 nameplates. See 405.2, page 12.

Alternatives

Transistors – on M12368 issues 5, 6 and 7 BDY77 or BDY74 may have been used for TR9 and TR10. BDY77 is a suitable replacement for both, but faster transistors may cause instability.

On M12368 issues 9 and 10 and M12565.3 the following transistors may have been used, 2SD424, 17556, 2SD676 and are interchangeable.

TR2 – BC682, ZTX304, BCX32, BC546B interchangeable

TR3, TR4 – E5458, ZTX504, BC556B interchangeable

TR7, TR8 – 40872 or 2SA740 interchangeable

L.E.D.

LP1 Hewlett Packard 5082-4850, Exciton XC5053, Toshiba TLR114A interchangeable.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

CLAMP CIRCUIT

Introduced co-incident with amplifier board M12368.9 at serial number 9001. All 405's with serial numbers 9000 and under being returned for service, should be fitted with a clamp board as shown below.

At serial number 59,001 the clamp circuit was fitted as an integral part of the amplifier board M12565.3. The function of this circuit is to monitor the D.C. component of the output. In the event of a component failure which causes excessive D.C. volts, the circuit will short circuit the amplifier output and thus protect the speakers.

REPLACING A CLAMP BOARD

If it is necessary to replace a clamp board the following instructions should be followed:

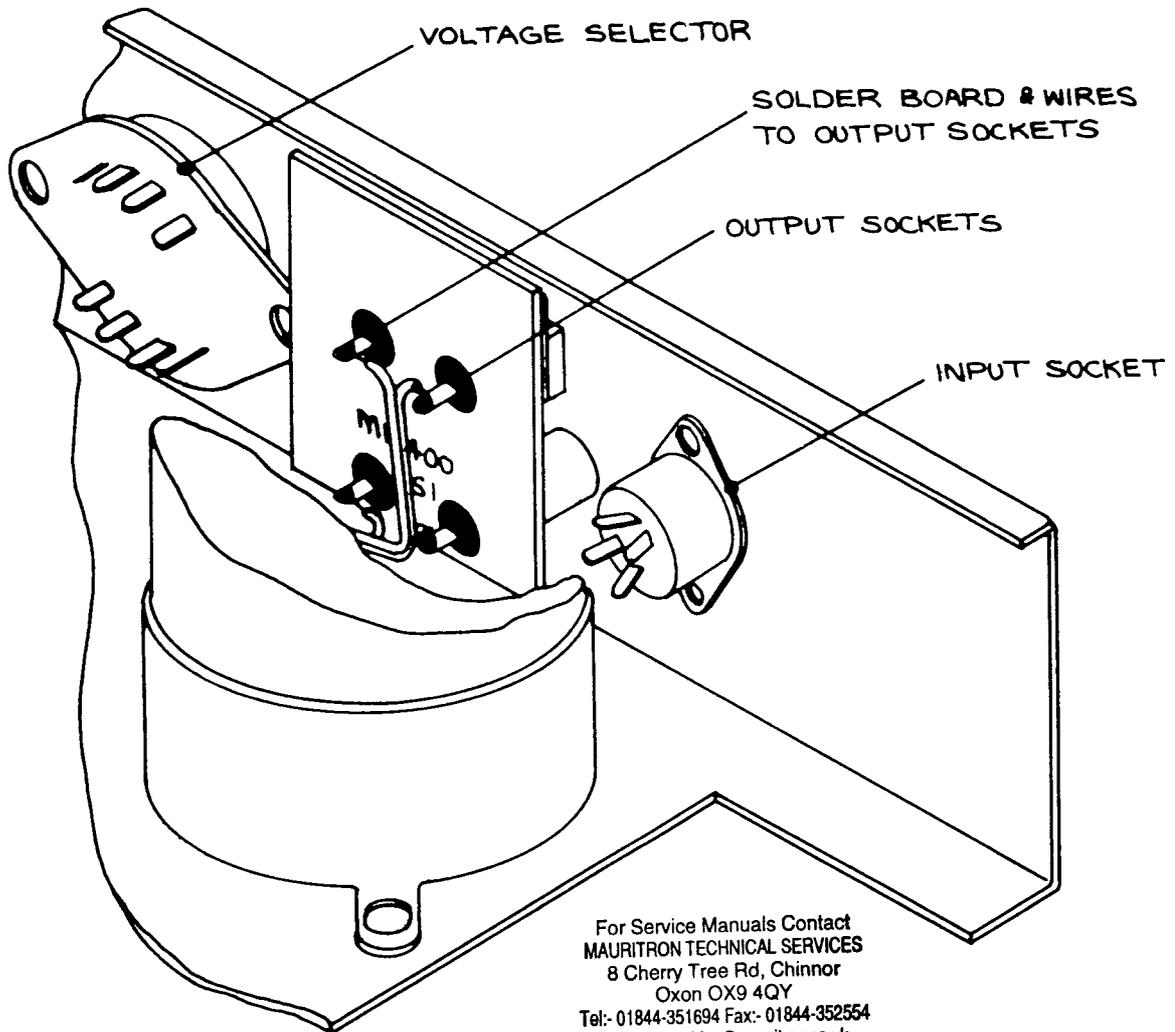


Fig. 15

1. Disconnect the wiring to the right channel circuit board and fold it back onto the transformer. Loosen the clamp holding the electrolytic capacitor next to the output terminals, and lift the capacitor out of the way.
2. Disconnect the leads to the output sockets, place the clamp board over the output connectors and re-solder. It is advisable to tin the output connector tags before positioning the clamp board. This makes soldering easier.
3. Replace the capacitor and re-connect the tags to the righthand amplifier board.

CLAMP CIRCUIT ALTERNATIVES

T1 2N4992 or BS08A 03

T2 SC141B or TIC226B or RCA T2800.

CONVERSION OF 405 TO A MONO 180 WATT AMPLIFIER

To carry out the conversion, the modification kit Q410MOD should first be obtained.

1. Remove 405 cover and baseplate.
2. Unplug the Amp connectors from the righthand channel printed circuit board (righthand side when viewed from the front).
3. Release the clip securing the rear 10,000 μ F capacitor (C14) and lay the capacitor over the righthand channel board.
4. Unsolder the four leads from the output terminals.
For 405's fitted with amplifier boards M12368 (i.e. serial numbers 59000 and below) remove the clamp board.
To disconnect the clamp circuit on 405's fitted with amplifier boards M12565 (i.e. serial numbers above 59000) remove both of the side panels. The solder should then be removed from the link pads shown as A in fig 18. The side panels should then be refitted.
5. Remove the output terminals and replace those for the righthand channel with the sockets provided, Red at the top. Fit the blanking grommets provided in the vacant holes.
6. Fit the new printed circuit clamp board to the output sockets and reconnect the output leads. Brown/Red to the pin marked R, Brown/White to the pin marked L and both Green leads to the pin next to L.
7. Remove the 4 pin Din input socket and unsolder the leads from it.
8. Connect these leads to the new input board, White to L and Red to R and screens to the two E tags.
9. Fit the new input socket and board.
10. Refit the 10,000 μ F capacitor and Amp connectors to the righthand board.
11. Remove the output leads, Brown/White from lefthand and Brown/Red from righthand printed boards.
12. Connect a 4-8 Ω speaker between the output tags of these two boards.
13. Switch on the amplifier, inject a signal of approximately 100mV at 1kHz at the input socket (left and right pins are now common). Remove the blanking grommet adjacent to the input socket and adjust the pre-set potentiometer through this hole for a null in the signal from the speaker, increasing the input signal level as required for final accurate setting.
14. Switch off, remove signal input, disconnect the loudspeaker, reconnect output leads, refit blanking grommet, base and cover.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

REMOVING THE AMPLIFIER MODULES

1. Note the colour coding for reconnection and remove the push-on tab connectors A.
2. Undo the four fixing screws B, for each module.
3. Remove the heatsink grease from the face of the aluminium T-section and retain for use when re-fitting.

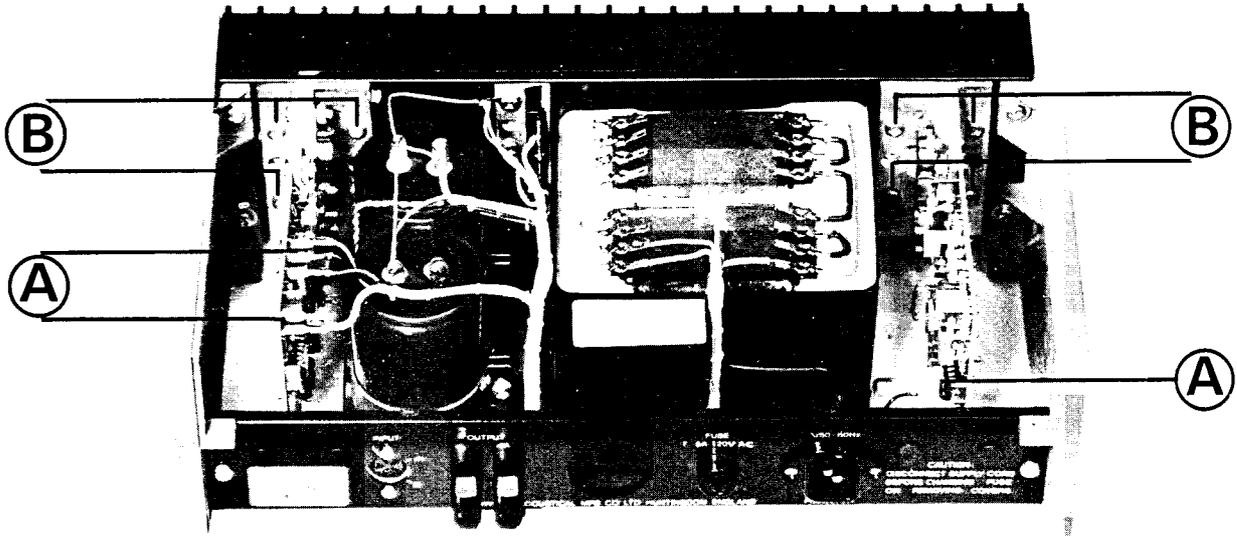


Fig. 16

REPLACING THE QUAD 405 TRANSFORMER

1. Disconnect the A.C. supply and remove top cover (2 screws) and bottom plate (4 screws).
2. Note carefully the connections and then unsolder the external wiring to the A.C. supply transformer.
3. Remove the two retaining screws through the large centre holes of the 6 in each amplifier board mounting, and then release the boards by undoing the other 4 in each. These 12 screws fasten into tapped strips located in slots in the rear of the finned heat sink sections, which now become free of the front plate.
4. Release the transformer by undoing 4 screws through the front plate and 2 through the bottom.
5. Reverse the procedure with the new transformer.

Note: It should not be necessary to remove the push-on connections from the boards but if they are removed they should be handled carefully and replaced correctly.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
8 Cherry Tree Rd, Chinnor
Oxon OX9 4QY
Tel:- 01844-351694 Fax:- 01844-352554
Email:- enquiries@mauritron.co.uk

QUAD 405-2

The original 405 provided 100 watts per channel into load impedances between 4.5 and 8 ohms. To meet the need of 4 ohm loudspeakers and 8 ohm speakers whose impedance falls below 4.5 ohms, the 405-2 was introduced in January 1983 at serial number 65000, but the 405-2 modules had already been fitted from 62500 onwards. Many earlier amplifiers have also since been converted to 405-2 by owners and dealers, by replacing the modules.

The 405-2 has a more sophisticated current limiter circuit based on a thick film assembly N1/N2, permitting full output into loads between 3 and 10 ohms, and up to 50 watts into 1.5 ohms, provided the output transistors will not be hazarded by doing so. (See Fig. 17). As with earlier 405 models after serial number 59001, the output clamp circuit is incorporated in the main module boards and a shorting link used for the voltage limiter.

The first 405-2 circuit diagram was 12333 issue 7 and the printed board reference M12565.5.

Subsequent modifications were:

Date	Serial No.	PCB 12565 issue	Circuit Diagram 12333 issue	Changes
May 83	66700	6	8	C20 (4n7) added to avoid mild instability when switching off. D13 added in series with D5 to correct response at 20kHz. R44 added to maintain unconditional stability.
July 83	67950	6	8	Output terminals replaced by 4mm sockets.
Aug 84	72501	7	9	TR4 changed to BC556B and R18 omitted replacing both TR3 and TR4.
Dec 85	83000	7	—	Voltage selector omitted.
Feb 86	85000	7	10	New mains input connector incorporating fuseholder. Din input replaced by phono sockets. Signal earth isolated from chassis by R2 to avoid hum loop when using mains earth.

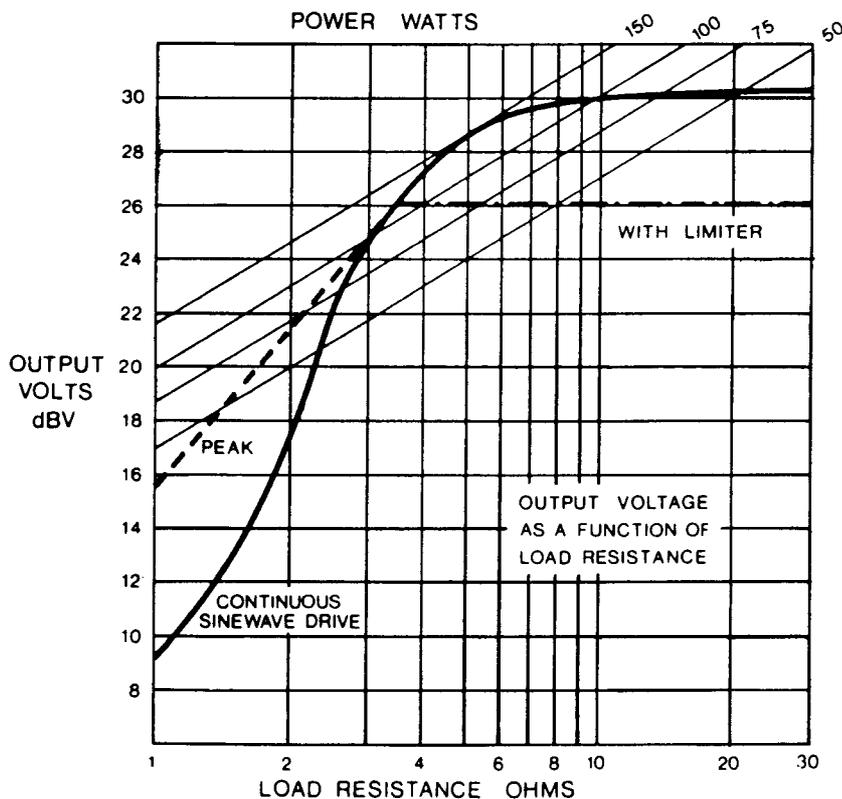
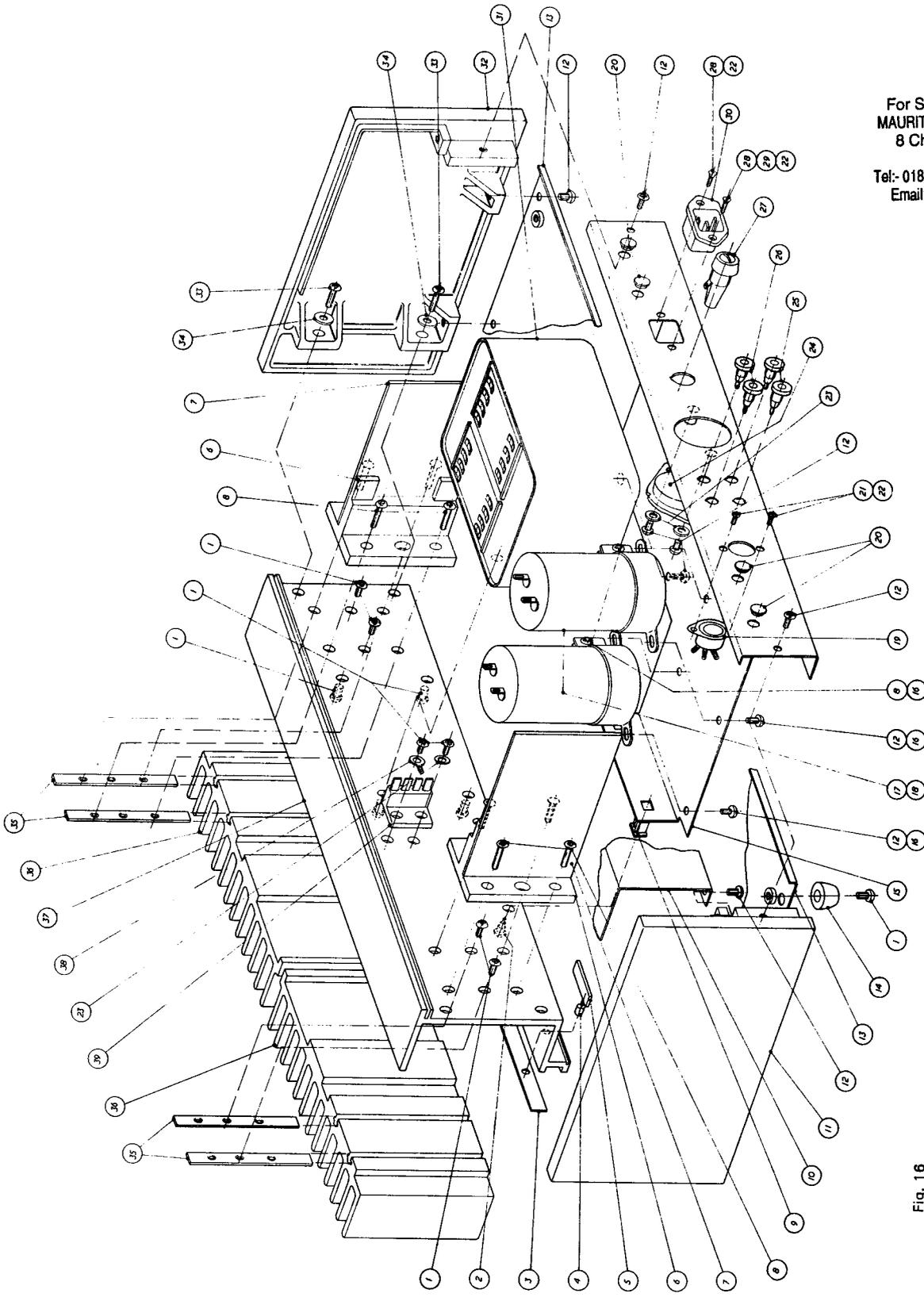


Fig. 17.

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel: 01844-351694 Fax: 01844-352554
 Email: enquiries@mauritron.co.uk

NO	DIMENSION	DESCRIPTION	UNIT
1		SCREW M4 X 8mm POSDRIV	
2		SCREW M4 X 8mm POSDRIV	
3	A1/E335	TEMPERATE	
4	A1/E335	TEMPERATE	
5	A1/E337	PRINTED WHITE BOARD	
6	A1/E338	AMPLIFIER MOUNTING BRACKET 8	
7	A1/E338	PRINTED WHITE BOARD	
8		SCREW M4 X 8mm POSDRIV	
9		SCREW M4 X 8mm POSDRIV	
10	A1/E337	COVER	
11	A1/E335	RIGHTHAND END COVER	
12		SCREW M4 X 8mm POSDRIV	
13	A1/E338	BASE PLATE	
14	A1/E338	CHARLES LOW B1/E338	
15	A1/E338	NUT M4 FULL HEX	
16		CONNECTION 00004 82V 81E	
17		CONNECTION CLIP 81E V4	
18		INPUT SOCKET	
19		SOLD BRONZEWAY IN/STEB IN PIN	
20		SCREW M4 X 8mm POSDRIV	
21		SCREW M4 X 8mm POSDRIV	
22		NUT M4 FULL HEX	
23		WOTONAS RELAYTOR 71/007	
24		OUTPUT SOCKET BALL LUGS BLACK 51/0	
25		OUTPUT SOCKET BALL LUGS RED 51/0	
26		FUSIONHOLDER BULLAN FERRITE	
27		SCREW M4 X 8mm IRING POLYON	
28		SCREW M4 X 8mm IRING POLYON	
29		WASHER PLUS OTTO HEL-ARBEZE	
30		WASHER PLUS OTTO HEL-ARBEZE	
31	A1/E338	WINDS TRANSFORMER	
32	A1/E338	LEFTHAND END COVER	
33		SCREW M4 X 8mm POSDRIV	
34		SCREW M4 X 8mm POSDRIV	
35	A1/E338	HEATSHINK	
36	A1/E338	HEATSHINK	
37	A1/E338	FRONT PANEL	
38		SCREW TMS M4 TUCKER 888	
39		RECTIFIER AEL P147A/8	
40			
41			
42			
43			
44			
45			
46			
47			
48			
49			
50			
51			
52			
53			
54			
55			
56			
57			
58			
59			
60			
61			
62			
63			
64			
65			
66			
67			
68			
69			
70			
71			
72			
73			
74			
75			
76			
77			
78			
79			
80			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95			
96			
97			
98			
99			
100			
101			
102			
103			
104			
105			
106			
107			
108			
109			
110			
111			
112			
113			
114			
115			
116			
117			
118			
119			
120			
121			
122			
123			
124			
125			
126			
127			
128			
129			
130			
131			
132			
133			
134			
135			
136			
137			
138			
139			
140			
141			
142			
143			
144			
145			
146			
147			
148			
149			
150			
151			
152			
153			
154			
155			
156			
157			
158			
159			
160			
161			
162			
163			
164			
165			
166			
167			
168			
169			
170			
171			
172			
173			
174			
175			
176			
177			
178			
179			
180			
181			
182			
183			
184			
185			
186			
187			
188			
189			
190			
191			
192			
193			
194			
195			
196			
197			
198			
199			
200			
201			
202			
203			
204			
205			
206			
207			
208			
209			
210			
211			
212			
213			
214			
215			
216			
217			
218			
219			
220			
221			
222			
223			
224			
225			
226			
227			
228			
229			
230			
231			
232			
233			
234			
235			
236			
237			
238			
239			
240			
241			
242			
243			
244			
245			
246			
247			
248			
249			
250			
251			
252			
253			
254			
255			
256			
257			
258			
259			
260			
261			
262			
263			
264			
265			
266			
267			
268			
269			
270			
271			
272			
273			
274			
275			
276			
277			
278			
279			
280			
281			
282			
283			
284			
285			
286			
287			
288			
289			
290			
291			
292			
293			
294			
295			
296			
297			
298			
299			
300			
301			
302			
303			
304			
305			
306			
307			
308			
309			
310			
311			
312			
313			
314			
315			
316			
317			
318			
319			
320			
321			
322			
323			
324			
325			
326			
327			
328			
329			
330			
331			
332			
333			
334			
335			
336			
337			
338			
339			
340			
341			
342			
343			
344			
345			
346			
347			
348			
349			
350			
351			
352			
353			
354			
355			
356			
357			
358			
359			
360			
361			
362			
363			
364			
365			
366			
367			
368			
369			
370			
371			
372			
373			
374			
375			
376			
377			
378			
379			
380			
381			
382			
383			
384			
385			
386			
387			
388			
389			
390			
391			
392			
393			
394			
395			
396			
397			
398			
399			
400			



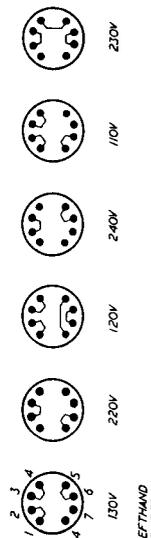
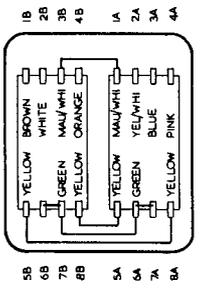
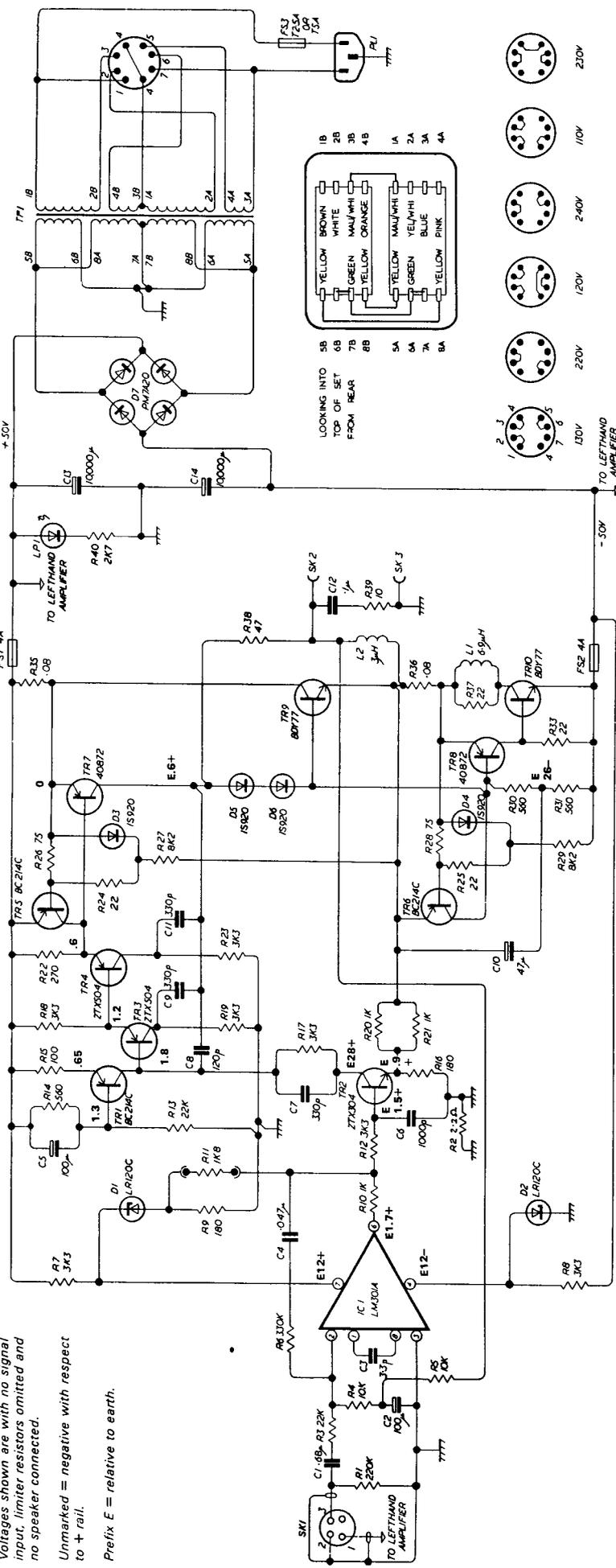
For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel:- 01844-351694 Fax:- 01844-352554
 Email:- enquiries@mauritron.co.uk

Fig. 16

Assembly Diagram.

BOARD NUMBER M12368 ISS 5 AND 6

Voltages shown are with no signal input, limiter resistors omitted and no speaker connected.
 Unmarked = negative with respect to + rail.
 Prefix E = relative to earth.

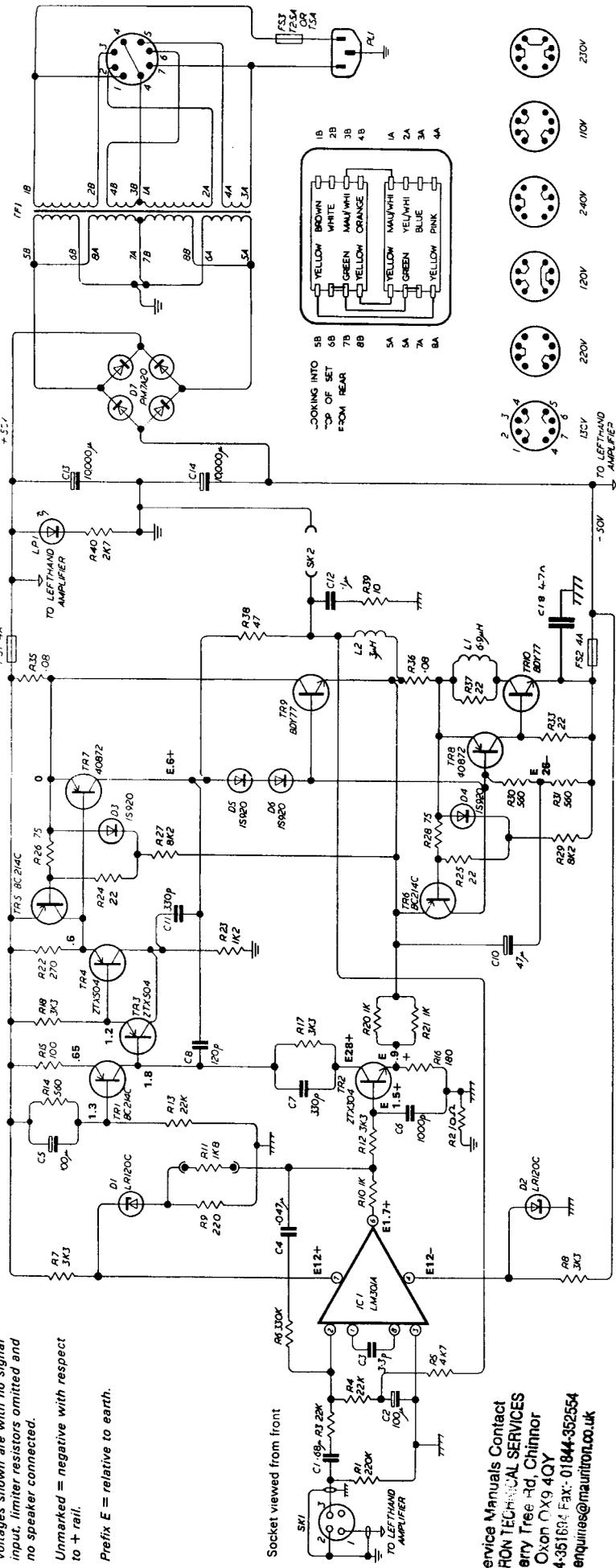


No.	Value	Tol	Reference	Stock No.	No.	Value	Tol	Reference	Stock No.
R1	20K	± 10%	Resistor	R220KJ1	C12	0.1µ		Capacitor 250V	C100K/C
R2	2.2	± 5%	Resistor	R2500J1	C13	10.000µ		Capacitor 63V	C10K/TA
R3	22K	± 5%	Resistor	R220KJ1	C14	10.000µ		Capacitor 63V	C10K/TA
R4	10K	± 5%	Resistor	R10K0J1	TR1			Transistor BC214C	DB214C
R5	10K	± 10%	Resistor	R10K0J1	TR2			Transistor BC982 or ZTX304 or BCX32	DZTX304
R6	330K	± 5%	Resistor	R330KJ1	TR3			Transistor ES458 or ZTX504	DZTX504
R7	3K3	± 10%	Resistor	R3K30J1	TR4			Transistor BC214C	DB214C
R8	3K3	± 10%	Resistor	R3K30J1	TR5			Transistor BC214C	DB214C
R9	180	± 5%	Resistor	R180RJ1	TR6			Transistor BC214C	DB214C
R10	1K	± 5%	Resistor	R1K00J1	TR7			Transistor 40B72 or 2SA740	D40B72X
R11	1K8	± 10%	Resistor	R1K80J1	TR8			Transistor 40B72X or 2SA740	D40B72X
R12	3K3	± 10%	Resistor	R3K30J1	TR9			Transistor 80Y74 or 80Y77	DB0Y77Q
R13	22K	± 5%	Resistor	R220KJ1	TR10			Transistor 80Y74 or 80Y77	DB0Y77Q
R14	560	± 10%	Resistor	R560RJ1	D1			Zener Diode LR120C	DZ12VAA
R15	100	± 10%	Resistor	R100RJ1	D2			Zener Diode LR120C	DZ12VAA
R16	180	± 5%	Resistor	R180RJ1	D3			Diode 1S520	DIS520B
R17	3K3	± 10%	Resistor	R3K30J1	D4			Diode 1S520	DIS520B
R18	3K3	± 10%	Resistor	R3K30J1	D5			Diode 1S520	DIS520B
R19	3K3	± 10%	Resistor	R3K30J1	D6			Diode 1S520	DIS520B
R20	1K	± 5%	Resistor	R1K00J1	D7			Bridge Rectifier	DP17A20
R21	1K	± 5%	Resistor	R1K00J1	IC1			LM301A	DM1301A
R22	270	± 10%	Resistor	R270RJ1	L1	6.9µH	± 20%	Inductor ANCO TC1/65	L12406A
R23	3K3	± 10%	Resistor	R3K30J1					
R24	22	± 10%	Resistor	R220J1					
R25	22	± 10%	Resistor	R220J1					
R26	75	± 5%	Resistor	R75R0J1					

Stock numbers listed for replacement parts, may be equivalents for original parts which are no longer available. therefore manufacturers and tolerances may vary.

BOARD NUMBER M12368 ISS 7

Voltages shown are with no signal input, limiter resistors omitted and no speaker connected.
 Unmarked = negative with respect to + rail.
 Prefix E = relative to earth.

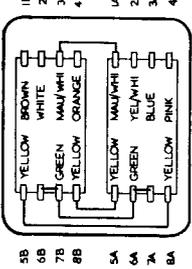
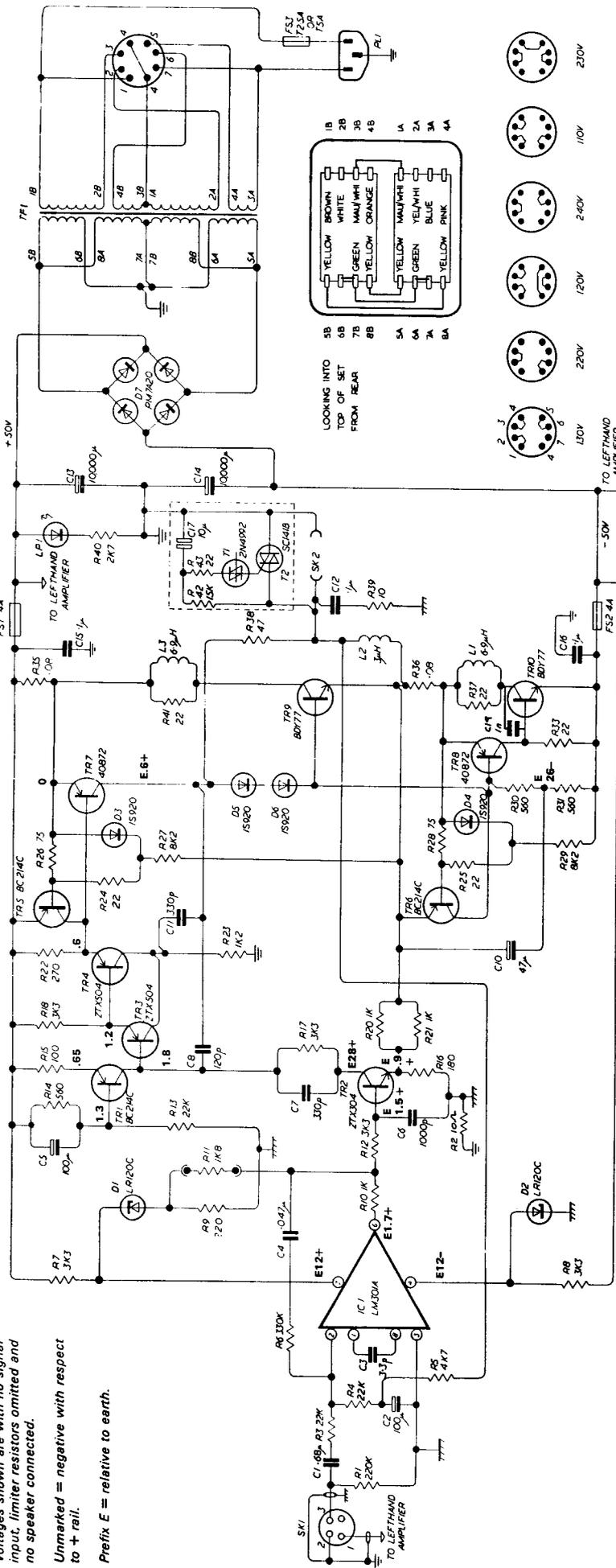


For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel: 01844-351684 Fax: 01844-352554
 Email: enquiries@mauritron.co.uk

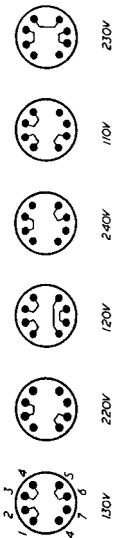
No.	Value	Tol	Reference	Stock No.
R1	220K	± 10%	Resistor	R220KJ1
R2	10	± 5%	Resistor	R10R0J1
R3	22K	± 2%	Resistor	R22K0J1
R4	22K	± 2%	Resistor	R22K0J1
R5	4.7K	± 10%	Resistor	R4700J1
R6	330K	± 5%	Resistor	R330KJ1
R7	3K3	± 10%	Resistor	R3300J1
R8	3K3	± 10%	Resistor	R3300J1
R9	220	± 5%	Resistor	R220R0J1
R10	1K	± 2%	Resistor	R1000J1
R11	1K8	± 10%	Resistor	R1800J1
R12	3K3	± 10%	Resistor	R3300J1
R13	22K	± 2%	Resistor	R22K0J1
R14	500	± 10%	Resistor	R500R0J1
R15	100	± 2%	Resistor	R100R0J1
R16	180	± 2%	Resistor	R180R0J1
R17	3K3	± 10%	Resistor	R3300J1
R18	3K3	± 10%	Resistor	R3300J1
R19			Resistor	
R20	1K	± 2%	Resistor	R1000J1
R21	1K	± 2%	Resistor	R1000J1
R22	270	± 10%	Resistor	R270R0J1
R23	1K2	± 10%	Resistor	R1200R1
R24	22	± 10%	Resistor	R22R0J1
R25	22	± 10%	Resistor	R22R0J1
R26	75	± 5%	Resistor	R75R0J1
C1	0.047µ		Capacitor 100V	C047µE
C2	100µ	± 10%	Capacitor 3V	C100µME
C3	3.3P	± 20%	Capacitor	C33P0J1
C4	100µ	± 20%	Capacitor 250V	C100µE20
C5	100µ	± 20%	Capacitor 6V	C100µE6
C6	1000P	± 20%	Capacitor 400V	C1000P0J1
C7	330P	± 20%	Capacitor	C330P0J1
C8	120P	± 5%	Capacitor	C120P0J1
C9			Capacitor	
C10	47µ		Capacitor 40V	C47µE20
C11	330P		Capacitor	C330P0J1
D1			Zener Diode LR120C	DZ12VAA
D2			Zener Diode LR120C	DZ12VAA
D3			Diode 6S920	D6S920B
D4			Diode 6S920	D6S920B
D5			Diode 6S920	D6S920B
D6			Diode 6S920	D6S920B
D7			Bridge Rectifier	BR1A20
IC1			LM301A	LM301A
LI	6.9µH	± 20%	Inductor ANCO TC1/65	LI2406A
L2	3µH	± 5%	Inductor ANCO 440/D	LI2405A
FS1	4A			UM040A
FS2	4A		220-240V	UM040A
FS3	T2.5A		110-130V	UM050A
U1			Hewlett Packard 6082-4880 Red	BL5053R
TR1			Acoustical DRG AZ712562	LI2352A
TR2			Transistor BC214C	DBC214C
TR3			Transistor BC182 or ZTX304 or BC332	DZTX304
TR4			Transistor 6S458 or ZTX604	DZTX604
TR5			Transistor 6S458 or ZTX604	DZTX604
TR6			Transistor BC214C	DBC214C
TR7			Transistor 40872 or 2SA740	D40872X
TR8			Transistor 40872 or 2SA740	D40872X
TR9			Transistor 6D774 or 6D777	DBD774Q
TR10			Transistor 6D774 or 6D777	DBD774Q

BOARD NUMBER M12368 ISS 9

Voltages shown are with no signal input, limiter resistors omitted and no speaker connected.
 Unmarked = negative with respect to + rail.
 Prefix E = relative to earth.



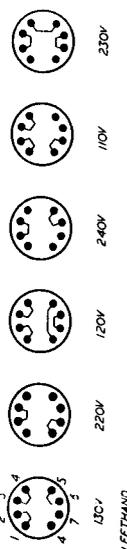
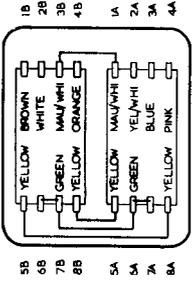
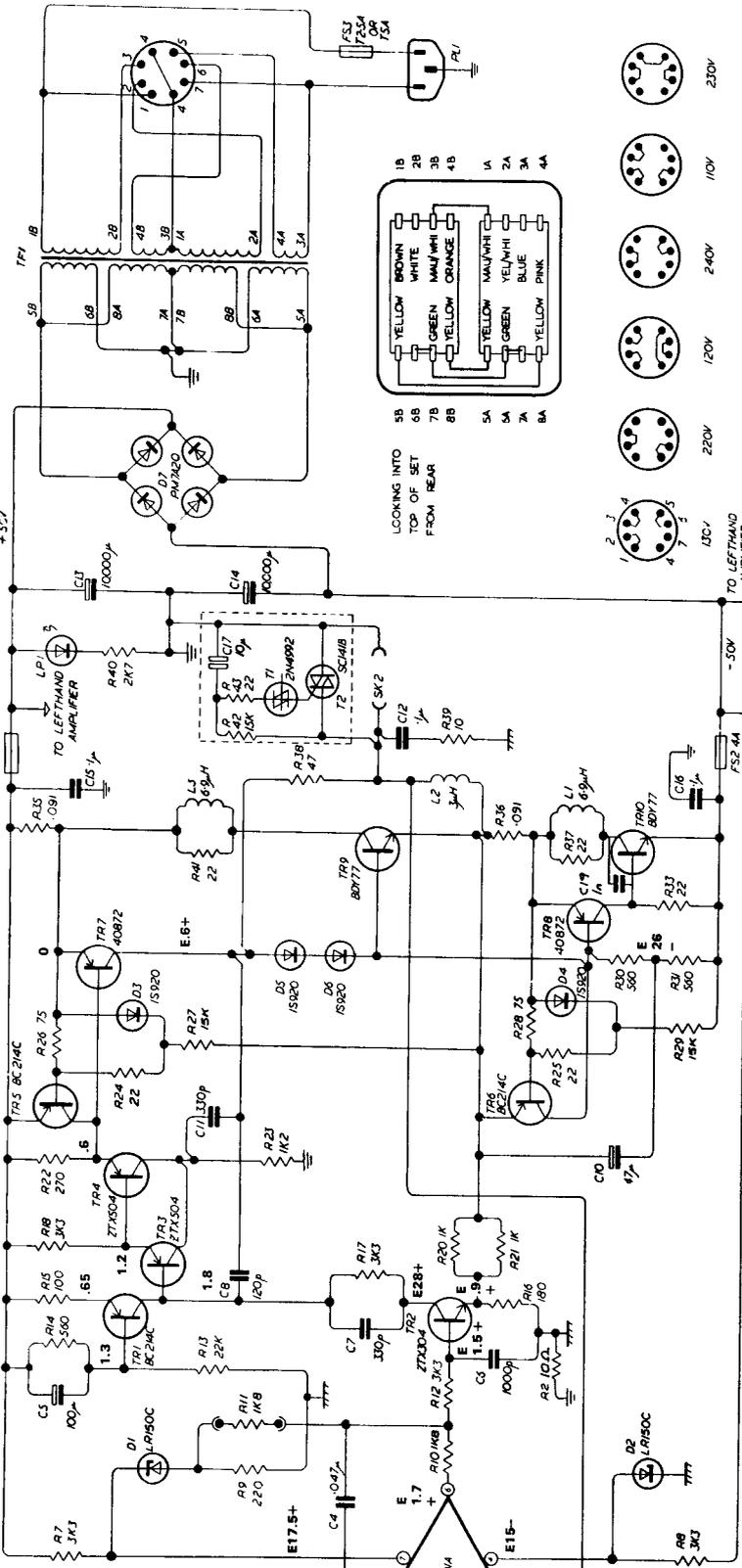
LOOKING INTO TOP OF SET FROM REAR



No.	Value	Tol	Reference	Stock No.
R1	220K	± 10%	Resistor	R220KJ1
R2	10	± 5%	Resistor	R10R0J1
R3	22K	± 5%	Resistor	R22K0J1
R4	22K	± 5%	Resistor	R22K0J1
R5	4.7K	± 10%	Resistor	R4700J1
R6	350K	± 5%	Resistor	R350KJ1
R7	3K3	± 10%	Resistor	R3300J1
R8	220	± 5%	Resistor	R220R0J1
R9	1K	± 10%	Resistor	R1000J1
R10	1K8	± 10%	Resistor	R1800J1
R11	3K3	± 10%	Resistor	R3300J1
R12	22K	± 5%	Resistor	R22K0J1
R13	22K	± 5%	Resistor	R22K0J1
R14	500	± 10%	Resistor	R500R0J1
R15	100	± 10%	Resistor	R100R0J1
R16	180	± 2%	Resistor	R180R0J1
R17	3K3	± 10%	Resistor	R3300J1
R18	3K3	± 10%	Resistor	R3300J1
R19				
R20	1K	± 2%	Resistor	R1000J1
R21	1K	± 2%	Resistor	R1000J1
R22	270	± 10%	Resistor	R270R0J1
R23	1K2	± 10%	Resistor	R1200J1
R24	22	± 10%	Resistor	R22R0J1
R25	22	± 10%	Resistor	R22R0J1
R26	75	± 5%	Resistor	R75R0J1
C1	0.05	± 10%	Capacitor	C0500J1
C2	100µ	± 10%	Capacitor	C1000J1
C3	3.3P	± 30%	Capacitor	C3300J1
C4	0.047µ	± 10%	Capacitor	C0470J1
C5	100µ	± 10%	Capacitor	C1000J1
C6	1.000P	± 10%	Capacitor	C1000J1
C7	330P	± 30%	Capacitor	C3300J1
C8	120P	± 5%	Capacitor	C120P1
D1			Zener Diode LR120C	DZ12VA
D2			Zener Diode LR120C	DZ12VA
D3			Diode IS920	DS920B
D4			Diode IS920	DS920B
D5			Diode IS920	DS920B
D6			Diode IS920	DS920B
D7			Bridge Rectifier	DFM7A2Q
IC1			LM301A	DM1301A
L1	6.9µH	± 20%	Inductor ANCO TC1/65	LI2406A
L2	3µH	± 5%	Inductor ANCO 440/D	LI2405A
L3	6.9µH	± 20%	Inductor ANCO TC1/65	LI2406A
F1	4A			UMN040A
F2	4A			UMN040A
F3	7.5A		220-240V	UMN240A
F4	7.5A		110-130V	UMN540A
LP1			Hewlett Packard 6082-4850 Red	BL6082R
TF1			Acoustical DRG A3/12362	L12362A

BOARD NUMBER M12368 ISS 9 AND 10

Voltages shown are with no signal input, limiter resistors omitted and no speaker connected.
 Unmarked = negative with respect to + rail.
 Prefix E = relative to earth.



For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd Chinnor
 Oxon OX9 4QY
 Tel: 01844-351894 Fax: 01844-352554
 Email: enquiries@mauritron.co.uk

No.	Value	Tol	Reference	Stock No.
R1	220K	± 10%	Resistor	R220KJ1
R2	10	± 5%	Resistor	R10R0J1
R3	22K	± 2%	Resistor	R22K0J1
R4	22K	± 2%	Resistor	R22K0J1
R5	4.7K	± 10%	Resistor	R4K70J1
R6	330K	± 2%	Resistor	R330KJ1
R7	3K3	± 10%	Resistor	R3K30J1
R8	3K3	± 10%	Resistor	R3K30J1
R9	220	± 5%	Resistor	R220RJ1
R10	1K8	± 10%	Resistor	R1K80J1
R11	1K8	± 10%	Resistor	R1K80J1
R12	3K3	± 10%	Resistor	R3K30J1
R13	22K	± 2%	Resistor	R22K0J1
R14	560	± 10%	Resistor	R560RJ1
R15	100	± 10%	Resistor	R100RJ1
R16	180	± 2%	Resistor	R180RJ1
R17	3K3	± 10%	Resistor	R3K30J1
R18	3K3	± 10%	Resistor	R3K30J1
R19				
R20	1K	± 2%	Resistor	R1K00J1
R21	1K	± 2%	Resistor	R1K00J1
R22	270	± 10%	Resistor	R270RJ1
R23	1K2	± 10%	Resistor	R1K20R1
R24	22	± 10%	Resistor	R22R0J1
R25	22	± 10%	Resistor	R22R0J1
R26	75	± 5%	Resistor	R75R0J1
C1	0.09µ		Capacitor	C0909J1
C2	100µ	± 10%	Capacitor	C100U0E1
C3	3.3P	± 20%	Capacitor	C3P30KJ1
C4	0.047µ		Capacitor	C4704J1
C5	100µ		Capacitor	C100U0E1
C6	1000P		Capacitor	C1000PJ1
C7	330P	± 20%	Capacitor	C330PJ1
C8	120P	± 5%	Capacitor	C120PJ1
D1			Zener Diode	DZ151VA
D2			Zener Diode	DZ151VA
D3			Diode	DS9208
D4			Diode	DS9208
D5			Diode	DS9208
D6			Diode	DS9208
D7			Bridge Rectifier	DM1742C
IC1			LM301A	LM301A
L1	6.9µH ± 20%		Inductor	L12408A
L2	3µH ± 5%		Inductor	L12405A
L3	6.9µH ± 20%		Inductor	L12408A
F1	4A			UM1040A
F2	4A			UM1040A
F3	72.5A		220-240V	UM1245DA
TF1			110-130V	UM105ADA
LP1			Hewlett Packard 5062-4850 Red	BL5063R
TF1			Acoustical DRG A31/238Z	L12362A
C9	47µ		Capacitor	C47U0E1
C10	330P		Capacitor	C330PJ1
C11	0.1µ		Capacitor	C100KJ1
C12	0.1µ		Capacitor	C100KJ1
C13	10,000µ		Capacitor	C10000J1
C14	10,000µ		Capacitor	C10000J1
C15	0.1µ		Capacitor	C100KJ1
C16	0.1µ		Capacitor	C100KJ1
C17	10µ		Capacitor	C10U0E1
C18	1000P		Capacitor	C1000PJ1
C19	1000P		Capacitor	C1000PJ1
TR1			Transistor BC214C	BC214C
TR2			Transistor BC682 or 2TX304 or BC332	DZ7X304
TR3			Transistor E488 or 2TX804	DZ7X804
TR4			Transistor E488 or 2TX804	DZ7X804
TR5			Transistor BC214C	BC214C
TR6			Transistor BC214C	BC214C
TR7			Transistor 40872 or 2SA740	D40872X
TR8			Transistor 40872 or 2SA740	D40872X
TR9			Transistor 2SD424 or 2SD876 or 17556	D17556X
TR10			Transistor 2SD424 or 2SD876 or 17556	D17556X
T1			DIAC 2M4892 or 8508A-03	D8508AA
T2			TRIAC SC1418 or TIC2288 or T2800	D72800B

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel:- 01844-351694 Fax:- 01844-352554
 Email:- enquiries@mauritron.co.uk

BOARD NUMBER M12368 ISS 9 AND 10

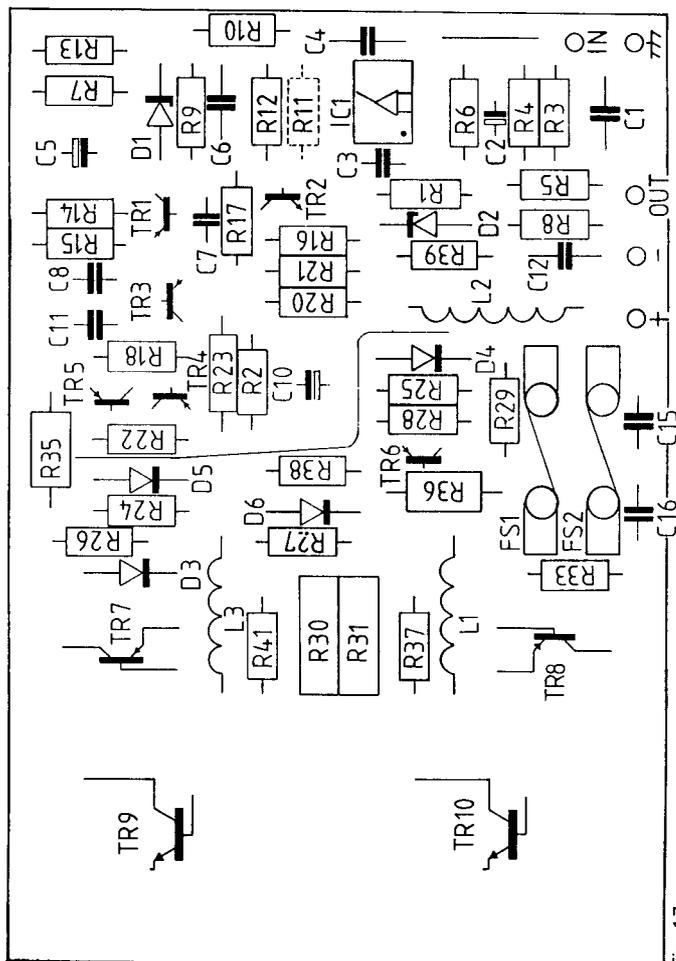
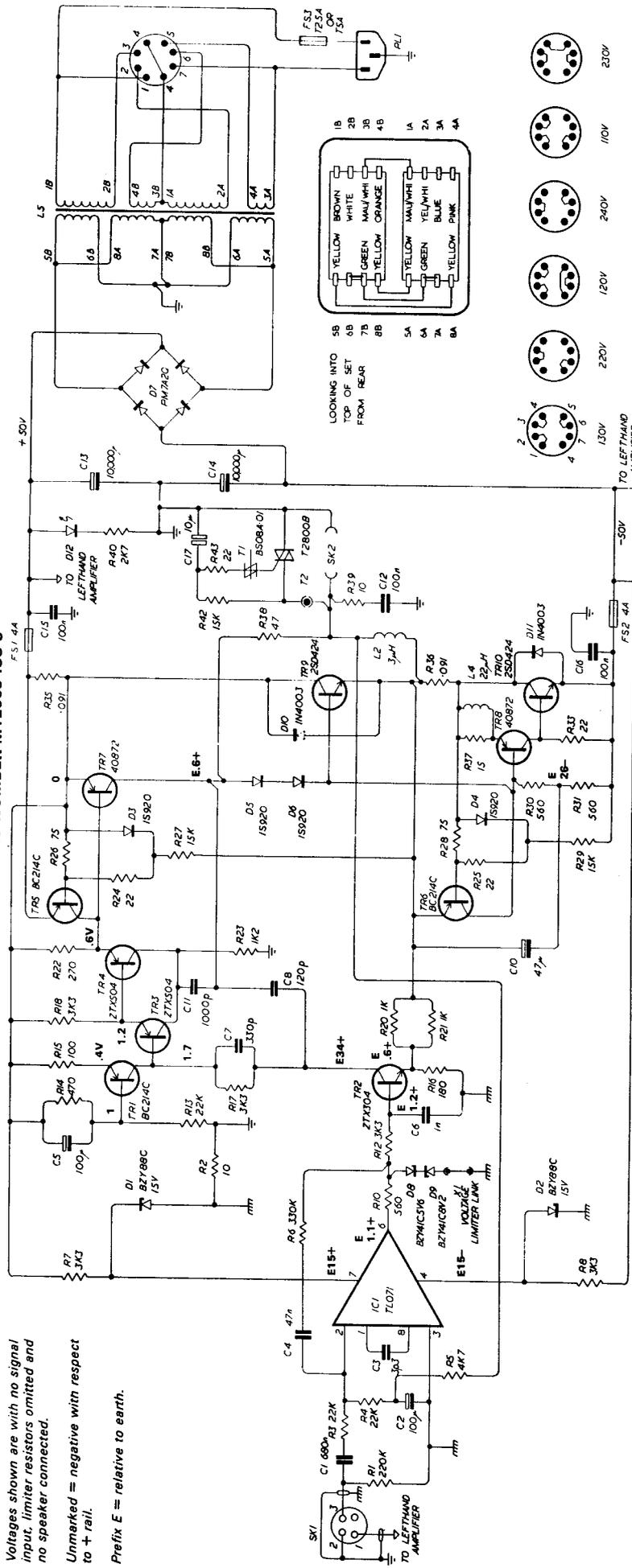


Fig. 17

BOARD NUMBER M12565 ISS 3



Voltages shown are with no signal input, limiter resistors omitted and no speaker connected.

Unmarked = negative with respect to + rail.

Prefix E = relative to earth.

No.	Value	Tol	Reference	Stock No.
R1	220K		R220KJ1	R220KJ1
R2	10		R10R0J1	R10R0J1
R3	22K	± 2%	R22KOG1	R22KOG1
R4	22K	± 2%	R22KOG1	R22KOG1
R5	4K7		R4K7OJ1	R4K7OJ1
R6	330K	± 2%	R330KJ1	R330KJ1
R7	3K3		R3K3OJ1	R3K3OJ1
R8	3K3		R3K3OJ1	R3K3OJ1
R10	560		R560RJ1	R560RJ1
R12	3K3		R3K3OJ1	R3K3OJ1
R13	22K	± 2%	R22KOG1	R22KOG1
R14	470		R470RJ1	R470RJ1
R15	100		R100RJ1	R100RJ1
R16	180	± 2%	R180RGI	R180RGI
R17	3K3		R3K3OJ1	R3K3OJ1
R18	3K3		R3K3OJ1	R3K3OJ1
R20	1K	± 2%	R1K00G1	R1K00G1
R21	1K	± 2%	R1K00G1	R1K00G1
R22	270		R270RJ1	R270RJ1
R23	1K2		R1K20R1	R1K20R1
R24	22		R22R0J1	R22R0J1
R25	22		R22R0J1	R22R0J1
R28	75		R75R0J1	R75R0J1
C1	800n		C800NS	C800NS
C2	100µ		C100UKT	C100UKT
C3	3p3		C3P30C1	C3P30C1
C4	47n		C47N0S1	C47N0S1
C5	100µ		C100U2B	C100U2B
C6	1n		C1N00K1	C1N00K1
C7	330p		C330PKJ	C330PKJ
C8	130p		C130PJ1	C130PJ1
C10	47µ		C47U2B	C47U2B
C11	1000p		C1000P1	C1000P1
C12	100n		C100NS	C100NS
C13	10000µ		C10000U	C10000U
C14	10000µ		C10000U	C10000U
C15	100n		C100NS	C100NS
C16	100n		C100NS	C100NS
C17	10p		C10P0J1	C10P0J1
TR1			TR15KJ1	TR15KJ1
TR2			TR47R0J1	TR47R0J1
TR3			TR10R0J1	TR10R0J1
TR4			TR270R1	TR270R1
TR5			TR15KJ1	TR15KJ1
TR6			TR22R0J1	TR22R0J1
TR7			TR4087Z	TR4087Z
TR8			TR7556 or 7556A	TR7556 or 7556A
TR9			TR7556 or 7556A	TR7556 or 7556A
TR10			TR17556 or 17556A	TR17556 or 17556A
TR11			TR4087Z	TR4087Z
TR12			TR4087Z	TR4087Z
TR13			TR4087Z	TR4087Z
TR14			TR4087Z	TR4087Z
TR15			TR4087Z	TR4087Z
TR16			TR4087Z	TR4087Z
TR17			TR4087Z	TR4087Z
TR18			TR4087Z	TR4087Z
TR19			TR4087Z	TR4087Z
TR20			TR4087Z	TR4087Z
TR21			TR4087Z	TR4087Z
TR22			TR4087Z	TR4087Z
TR23			TR4087Z	TR4087Z
TR24			TR4087Z	TR4087Z
TR25			TR4087Z	TR4087Z
TR26			TR4087Z	TR4087Z
TR27			TR4087Z	TR4087Z
TR28			TR4087Z	TR4087Z
TR29			TR4087Z	TR4087Z
TR30			TR4087Z	TR4087Z
TR31			TR4087Z	TR4087Z
TR32			TR4087Z	TR4087Z
TR33			TR4087Z	TR4087Z
TR34			TR4087Z	TR4087Z
TR35			TR4087Z	TR4087Z
TR36			TR4087Z	TR4087Z
TR37			TR4087Z	TR4087Z
TR38			TR4087Z	TR4087Z
TR39			TR4087Z	TR4087Z
TR40			TR4087Z	TR4087Z
TR41			TR4087Z	TR4087Z
TR42			TR4087Z	TR4087Z
TR43			TR4087Z	TR4087Z
TR44			TR4087Z	TR4087Z
TR45			TR4087Z	TR4087Z
TR46			TR4087Z	TR4087Z
TR47			TR4087Z	TR4087Z
TR48			TR4087Z	TR4087Z
TR49			TR4087Z	TR4087Z
TR50			TR4087Z	TR4087Z
TR51			TR4087Z	TR4087Z
TR52			TR4087Z	TR4087Z
TR53			TR4087Z	TR4087Z
TR54			TR4087Z	TR4087Z
TR55			TR4087Z	TR4087Z
TR56			TR4087Z	TR4087Z
TR57			TR4087Z	TR4087Z
TR58			TR4087Z	TR4087Z
TR59			TR4087Z	TR4087Z
TR60			TR4087Z	TR4087Z
TR61			TR4087Z	TR4087Z
TR62			TR4087Z	TR4087Z
TR63			TR4087Z	TR4087Z
TR64			TR4087Z	TR4087Z
TR65			TR4087Z	TR4087Z
TR66			TR4087Z	TR4087Z
TR67			TR4087Z	TR4087Z
TR68			TR4087Z	TR4087Z
TR69			TR4087Z	TR4087Z
TR70			TR4087Z	TR4087Z
TR71			TR4087Z	TR4087Z
TR72			TR4087Z	TR4087Z
TR73			TR4087Z	TR4087Z
TR74			TR4087Z	TR4087Z
TR75			TR4087Z	TR4087Z
TR76			TR4087Z	TR4087Z
TR77			TR4087Z	TR4087Z
TR78			TR4087Z	TR4087Z
TR79			TR4087Z	TR4087Z
TR80			TR4087Z	TR4087Z
TR81			TR4087Z	TR4087Z
TR82			TR4087Z	TR4087Z
TR83			TR4087Z	TR4087Z
TR84			TR4087Z	TR4087Z
TR85			TR4087Z	TR4087Z
TR86			TR4087Z	TR4087Z
TR87			TR4087Z	TR4087Z
TR88			TR4087Z	TR4087Z
TR89			TR4087Z	TR4087Z
TR90			TR4087Z	TR4087Z
TR91			TR4087Z	TR4087Z
TR92			TR4087Z	TR4087Z
TR93			TR4087Z	TR4087Z
TR94			TR4087Z	TR4087Z
TR95			TR4087Z	TR4087Z
TR96			TR4087Z	TR4087Z
TR97			TR4087Z	TR4087Z
TR98			TR4087Z	TR4087Z
TR99			TR4087Z	TR4087Z
TR100			TR4087Z	TR4087Z
TR101			TR4087Z	TR4087Z
TR102			TR4087Z	TR4087Z
TR103			TR4087Z	TR4087Z
TR104			TR4087Z	TR4087Z
TR105			TR4087Z	TR4087Z
TR106			TR4087Z	TR4087Z
TR107			TR4087Z	TR4087Z
TR108			TR4087Z	TR4087Z
TR109			TR4087Z	TR4087Z
TR110			TR4087Z	TR4087Z
TR111			TR4087Z	TR4087Z
TR112			TR4087Z	TR4087Z
TR113			TR4087Z	TR4087Z
TR114			TR4087Z	TR4087Z
TR115			TR4087Z	TR4087Z
TR116			TR4087Z	TR4087Z
TR117			TR4087Z	TR4087Z
TR118			TR4087Z	TR4087Z
TR119			TR4087Z	TR4087Z
TR120			TR4087Z	TR4087Z
TR121			TR4087Z	TR4087Z
TR122			TR4087Z	TR4087Z
TR123			TR4087Z	TR4087Z
TR124			TR4087Z	TR4087Z
TR125			TR4087Z	TR4087Z
TR126			TR4087Z	TR4087Z
TR127			TR4087Z	TR4087Z
TR128			TR4087Z	TR4087Z
TR129			TR4087Z	TR4087Z
TR130			TR4087Z	TR4087Z
TR131			TR4087Z	TR4087Z
TR132			TR4087Z	TR4087Z
TR133			TR4087Z	TR4087Z
TR134			TR4087Z	TR4087Z
TR135			TR4087Z	TR4087Z
TR136			TR4087Z	TR4087Z
TR137			TR4087Z	TR4087Z
TR138			TR4087Z	TR4087Z
TR139			TR4087Z	TR4087Z
TR140			TR4087Z	TR4087Z
TR141			TR4087Z	TR4087Z
TR142			TR4087Z	TR4087Z
TR143			TR4087Z	TR4087Z
TR144			TR4087Z	TR4087Z
TR145			TR4087Z	TR4087Z
TR146			TR4087Z	TR4087Z
TR147			TR4087Z	TR4087Z
TR148			TR4087Z	TR4087Z
TR149			TR4087Z	TR4087Z
TR150			TR4087Z	TR4087Z
TR151			TR4087Z	TR4087Z
TR152			TR4087Z	TR4087Z
TR153			TR4087Z	TR4087Z
TR154			TR4087Z	TR4087Z
TR155			TR4087Z	TR4087Z
TR156			TR4087Z	TR4087Z
TR157			TR4087Z	TR4087Z
TR158			TR4087Z	TR4087Z
TR159			TR4087Z	TR4087Z
TR160			TR4087Z	TR4087Z
TR161			TR4087Z	TR4087Z
TR162			TR4087Z	TR4087Z
TR163			TR4087Z	TR4087Z
TR164			TR4087Z	TR4087Z
TR165			TR4087Z	TR4087Z
TR166			TR4087Z	TR4087Z
TR167			TR4087Z	TR4087Z
TR168			TR4087Z	TR4087Z
TR169			TR4087Z	TR4087Z
TR170			TR4087Z	TR4087Z
TR171			TR4087Z	TR4087Z
TR172			TR4087Z	TR4087Z
TR173			TR4087Z	TR4087Z
TR174			TR4087Z	TR4087Z
TR175			TR4087Z	TR4087Z
TR176			TR4087Z	TR4087Z
TR177			TR4087Z	TR4087Z
TR178			TR4087Z	TR4087Z
TR179			TR4087Z	TR4087Z
TR180			TR4087Z	TR4087Z
TR181			TR4087Z	TR4087Z
TR182			TR4087Z	TR4087Z
TR183			TR4087Z	TR4087Z
TR184			TR4087Z	TR4087Z
TR185			TR4087Z	TR4087Z
TR186			TR4087Z	TR4087Z
TR187			TR4087Z	TR4087Z
TR188			TR4087Z	TR4087Z
TR189			TR4087Z	TR4087Z
TR190			TR4087Z	TR4087Z
TR191			TR4087Z	TR4087Z
TR192			TR4087Z	TR4087Z
TR193			TR4087Z	TR4087Z
TR194			TR4087Z	TR4087Z
TR195			TR4087Z	

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel:- 01844-351694 Fax:- 01844-352554
 Email:- enquiries@mauritron.co.uk

BOARD NUMBER M12565 ISS 3

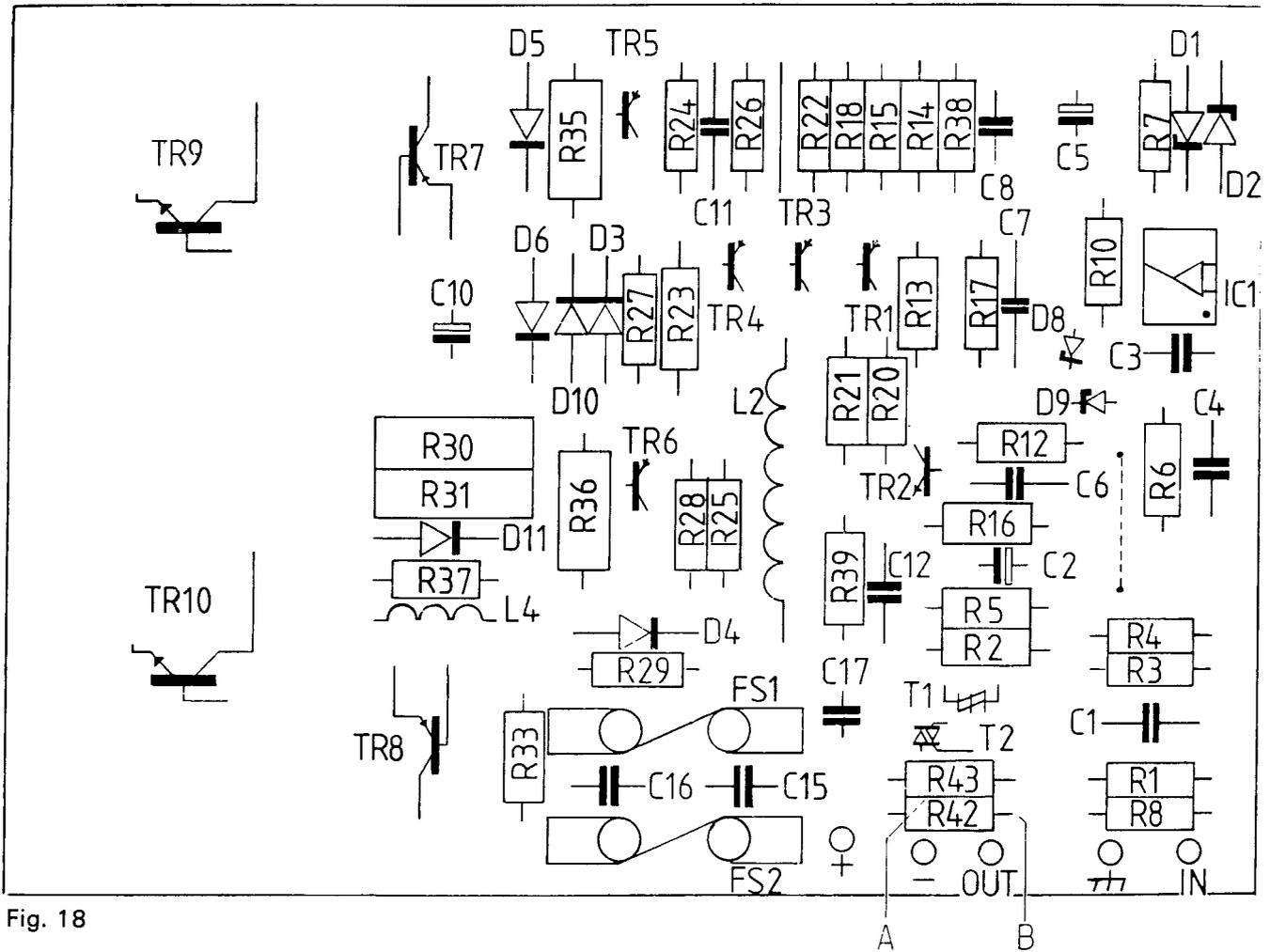
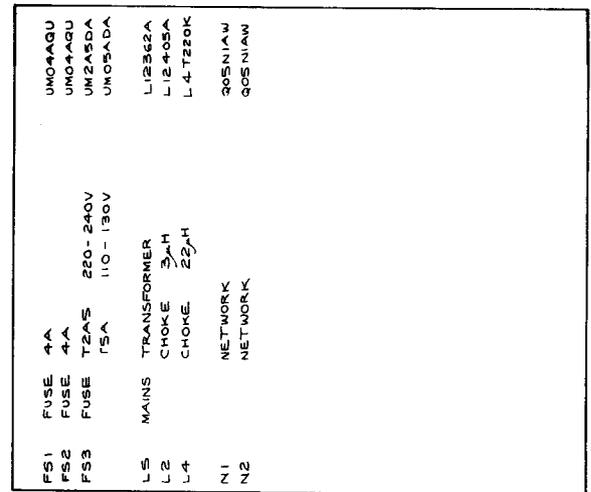
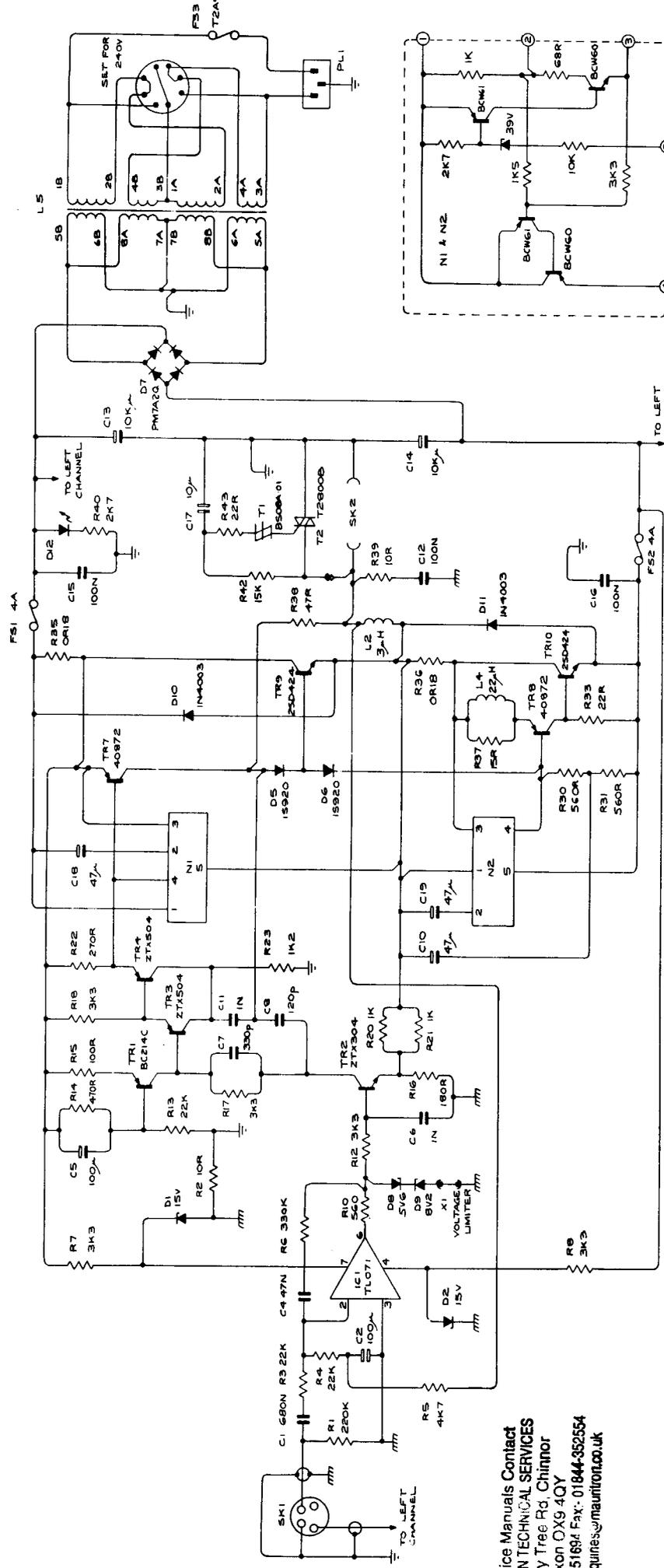


Fig. 18

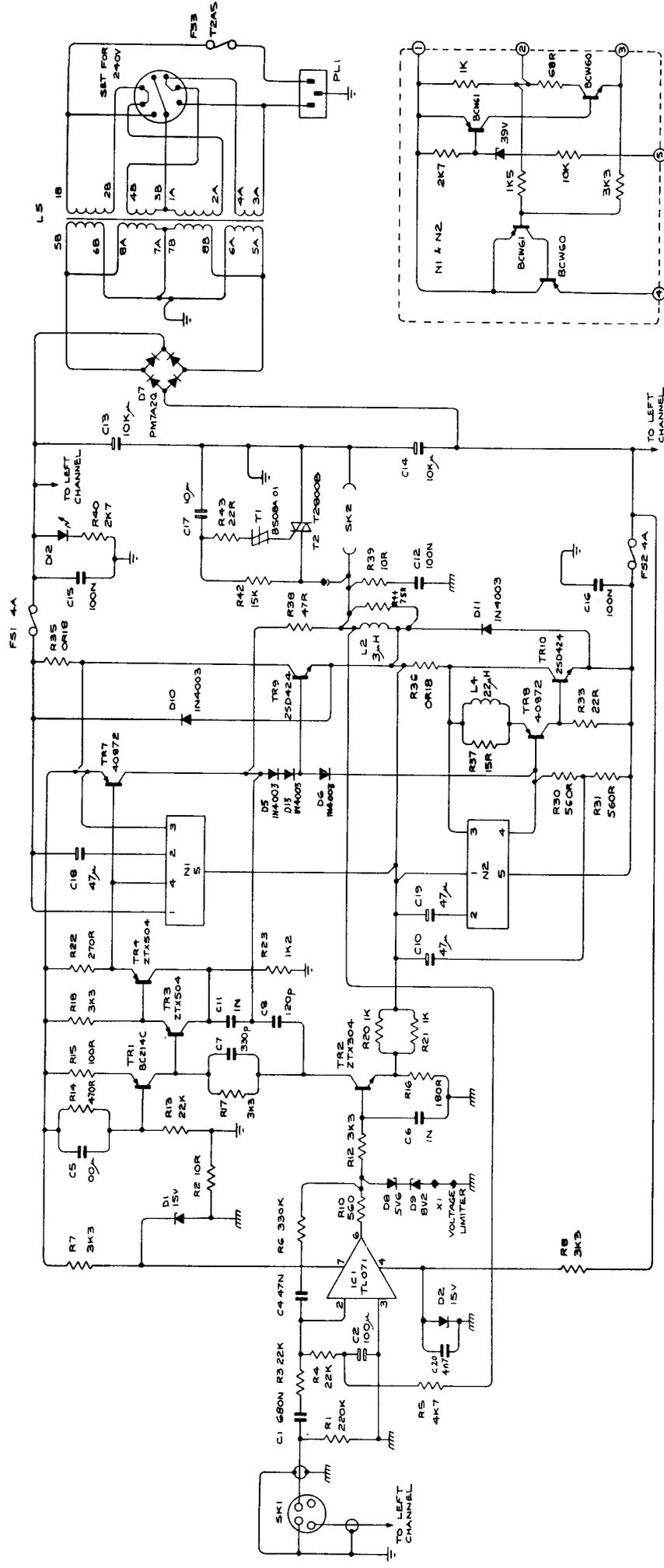


FS1	FUSE	4A	UMQ4AQU
FS2	FUSE	4A	UMQ4AQU
FS3	FUSE	250-240V	UM2A5DA
L5	MAINS TRANSFORMER	110-130V	UMQ5ADA
L2	CHOKE	3mH	L12362A
L4	CHOKE	22mH	L12405A
NI	NETWORK		L4T220K
N2	NETWORK		Q05N1AW
			Q05N1AW

TR1	TRANSISTOR	BC214C
TR2	TRANSISTOR	ZTX304
TR3	TRANSISTOR	ZTX504
TR4	TRANSISTOR	ZTX504
TR7	TRANSISTOR	40872
TR8	TRANSISTOR	40872
TR9	TRANSISTOR	2SD424
TR10	TRANSISTOR	2SD424
T1	DIAC	B50BA-01
T2	TRIAC	T2800B
D1	ZENER DIODE	BZY88C 15V
D2	ZENER DIODE	BZY88C 15V
D5	DIODE	1S920
D6	DIODE	1S920
D7	BRIDGE RECTIFIER	PM7A2G
D8	ZENER DIODE	BZY41C 5V6
D9	ZENER DIODE	BZY41C 8V2
D10	DIODE	1N4003
D11	DIODE	1N4003
D12	LED	XC5053R
X1	SHORTING LINK	
IC1	INT. CIRCUIT	TL071

R1	RESISTOR	220K	±5%
R2	RESISTOR	10K	±5%
R3	RESISTOR	22K	±2%
R4	RESISTOR	22K	±2%
R5	RESISTOR	4K7	±5%
R6	RESISTOR	330K	±2%
R7	RESISTOR	3K3	±5%
R8	RESISTOR	3K3	±5%
R9	RESISTOR	560R	±5%
R10	RESISTOR	3K3	±5%
R11	RESISTOR	22K	±2%
R12	RESISTOR	22K	±2%
R13	RESISTOR	470R	±5%
R14	RESISTOR	100R	±5%
R15	RESISTOR	180R	±2%
R16	RESISTOR	3K3	±5%
R17	RESISTOR	3K3	±5%
R18	RESISTOR	3K3	±5%
R19	RESISTOR	1K	±2%
R20	RESISTOR	1K	±2%
R21	RESISTOR	270R	±5%
R22	RESISTOR	1K2	±5%
R23	RESISTOR	560R	±5%
R24	RESISTOR	560R	±5%
R25	RESISTOR	22R	±5%
R26	RESISTOR	OR18	±5%
R27	RESISTOR	OR18	±5%
R28	RESISTOR	15R	±5%

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel: 01844-351691 Fax: 01844-352554
 Email: enquiries@maurtron.co.uk

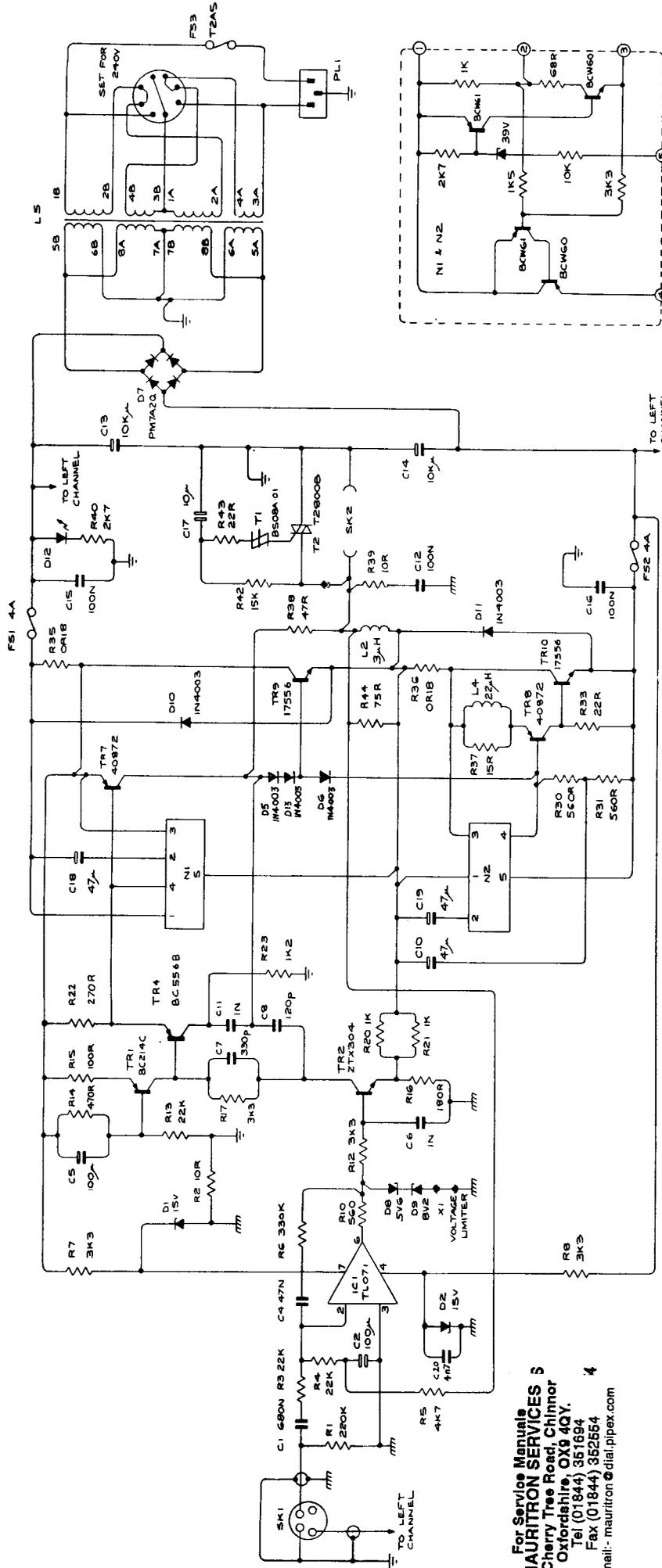


F51	FUSE	4A
F52	FUSE	4A
F53	FUSE	220-240V
L5	TRANSFORMER	110-130V
L2	CHOKES	3mH
L4	CHOKES	22mH
N1	NETWORK	
N2	NETWORK	

TR1	TRANSISTOR	BC214C
TR2	TRANSISTOR	ZTX304
TR3	TRANSISTOR	ZTX504
TR4	TRANSISTOR	ZTX504
TR7	TRANSISTOR	40872
TR8	TRANSISTOR	40872
TR9	TRANSISTOR	2SD424
TR10	TRANSISTOR	2SD424
T1	DIAC	B508A-01
T2	TRIAC	T2900B
D1	ZENER DIODE	BZY88C 15V
D2	ZENER DIODE	BZY88C 15V
D6	DIODE	IN4003
D7	BRIDGE RECTIFIER	PM7A2Q
D8	ZENER DIODE	BZY41C 5V6
D9	ZENER DIODE	BZY41C 8V2
D10	DIODE	IN4003
D11	DIODE	IN4003
D12	LED	XC5053R
D13	DIODE	IN4003
X1	SHORTING LINK	
IC1	INT. CIRCUIT	TL071
DO71	CPX	

R36	RESISTOR	47R	±5%
R39	RESISTOR	10R	±5%
R40	RESISTOR	2K7	±5%
R42	RESISTOR	15K	±5%
R43	RESISTOR	22R	±5%
R44	RESISTOR	75R	±5%
C1	CAPACITOR	680N	
C2	CAPACITOR	100µ	
C4	CAPACITOR	47N	
C5	CAPACITOR	100µ	
C6	CAPACITOR	IN	
C7	CAPACITOR	330P	
C8	CAPACITOR	100P	
C10	CAPACITOR	47µ	
C11	CAPACITOR	IN	
C12	CAPACITOR	100N	
C14	CAPACITOR	10µ	
C15	CAPACITOR	100N	
C16	CAPACITOR	100N	
C17	CAPACITOR	10µ	
C18	CAPACITOR	47µ	
C19	CAPACITOR	47µ	
C20	CAPACITOR	47µ	

R1	RESISTOR	220K	±5%
R2	RESISTOR	10K	±5%
R3	RESISTOR	22K	±2%
R4	RESISTOR	22K	±2%
R5	RESISTOR	4K7	±5%
R6	RESISTOR	330K	±2%
R7	RESISTOR	3K3	±5%
R8	RESISTOR	3K3	±5%
R9	RESISTOR	560R	±5%
R10	RESISTOR	3K3	±5%
R12	RESISTOR	3K3	±5%
R13	RESISTOR	22K	±2%
R14	RESISTOR	470R	±5%
R15	RESISTOR	100R	±5%
R16	RESISTOR	180R	±2%
R17	RESISTOR	3K3	±5%
R18	RESISTOR	3K3	±5%
R20	RESISTOR	1K	±2%
R21	RESISTOR	1K	±2%
R22	RESISTOR	270R	±5%
R23	RESISTOR	1K2	±5%
R30	RESISTOR	560R	±5%
R31	RESISTOR	560R	±5%
R33	RESISTOR	22R	±5%
R35	RESISTOR	0R18	±5%
R36	RESISTOR	0R18	±5%
R37	RESISTOR	15R	±5%
R20KJ1			
R10KJ1			
R22KJ1			
R22KJ1			
R4KJ1			
R30KJ1			
R3KJ1			
R56KJ1			
R3KJ1			
R24KJ1			
R470R			
R100R			
R180R			
R3KJ1			
R3KJ1			
R1KJ1			
R1KJ1			
R270R			
R1K20R			
R560R			
R560R			
R22R			
R0R18			
R0R18			
R15R			



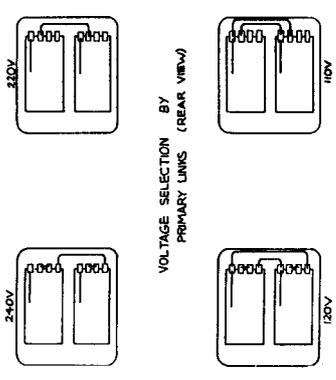
For Service Manuals
MAURITRON SERVICES 5
 8 Cherry Tree Road, Chinnor
 Oxfordshire, OX9 4QY.
 Tel (01844) 351694
 Fax (01844) 352554
 email:- mauritron@dial.pipex.com

F1	FUSE	4A	UM04AGU
F2	FUSE	4A	UM04AGU
F3	FUSE	TEAS	UM2ASDA
F4	FUSE	TEAS	UM05ADA
L1	TRANSFORMER	220-240V	L12362A
L2	CHOKE	110-130V	L12405A
L3	CHOKE	22µH	L4-TZ20K
N1	NETWORK		Q05NIAT
N2	NETWORK		Q05NIAT

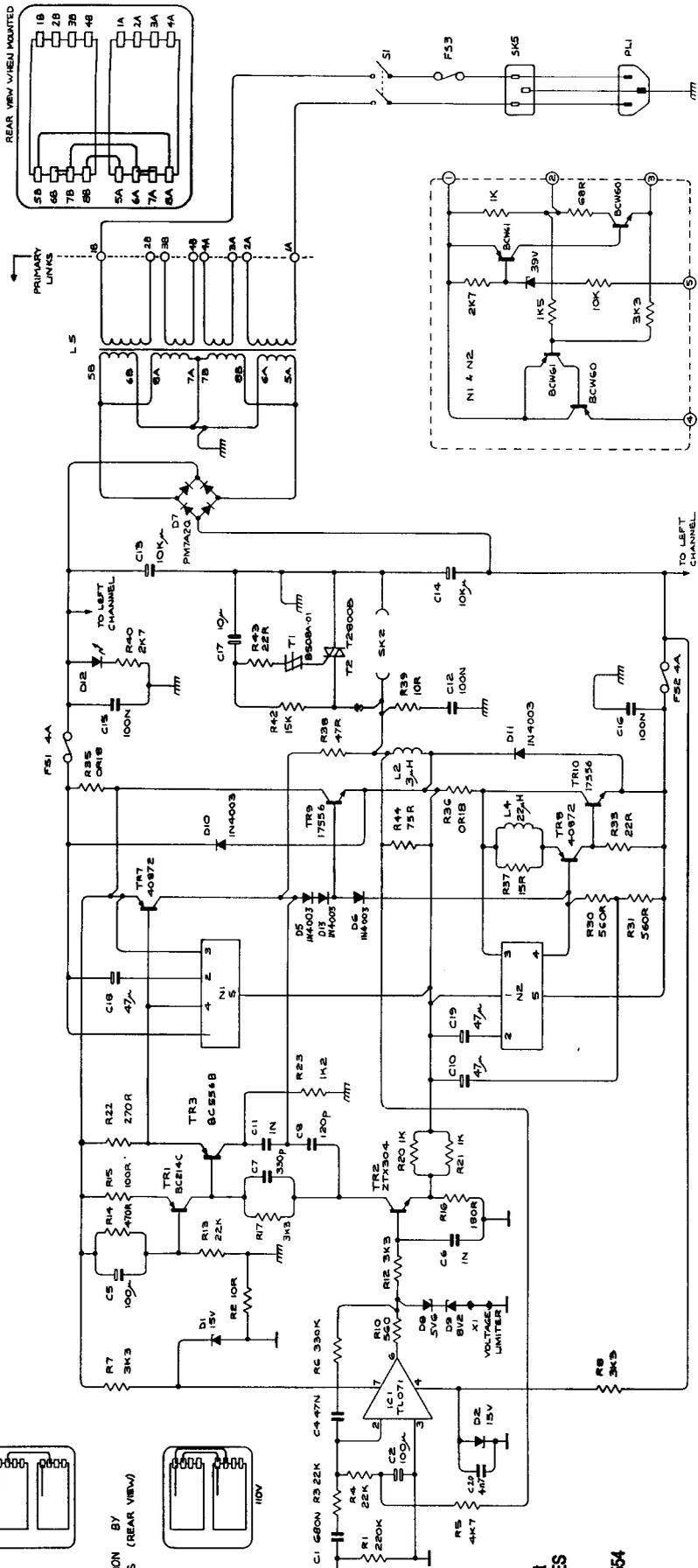
TR1	TRANSISTOR	BC214C	DE2R14C
TR2	TRANSISTOR	ZTA304	DZTA304
TR3	TRANSISTOR	BC556B	DE556B
TR4	TRANSISTOR	4087E	D4087E
TR5	TRANSISTOR	4087E	D4087E
TR6	TRANSISTOR	17556	D17556X
TR7	TRANSISTOR	17556	D17556X
TR8	DIAC	BS08A-01	DBS08A
TR9	TRIAC	T2800B	DT2800B
TR10	ZENER DIODE	BZY88C 15V	D8815VA
TR11	ZENER DIODE	BZY88C 15V	D8815VA
TR12	DIODE	IN4003	DI4003
TR13	DIODE	IN4003	DI4003
TR14	DIODE	IN4003	DI4003
TR15	DIODE	IN4003	DI4003
TR16	LED	XE5053R	BL5053R
TR17	DIODE	IN4003	DI4003
TR18	SHORTING LINK		Q05LINK
TR19	INT. CIRCUIT	TL071	DT071PX

R1	RESISTOR	220K	±5%	R170J74
R2	RESISTOR	10K	±5%	R10K0J1
R3	RESISTOR	22K	±2%	R22K061
R4	RESISTOR	22K	±2%	R22K061
R5	RESISTOR	4K7	±5%	R4K70J4
R6	RESISTOR	330K	±2%	R330K61
R7	RESISTOR	3K3	±5%	R3K30J1
R8	RESISTOR	3K3	±5%	R3K30J1
R9	RESISTOR	560K	±5%	R560KJ4
R10	RESISTOR	3K3	±5%	R3K30J1
R11	RESISTOR	22K	±2%	R22K061
R12	RESISTOR	22K	±2%	R22K061
R13	RESISTOR	470K	±5%	R470KJ4
R14	RESISTOR	100K	±5%	R100KJ4
R15	RESISTOR	100K	±5%	R100KJ4
R16	RESISTOR	100K	±5%	R100KJ4
R17	RESISTOR	3K3	±5%	R3K30J1
R18	RESISTOR	1K	±2%	R1K0061
R19	RESISTOR	1K	±2%	R1K0061
R20	RESISTOR	270K	±5%	R270KJ4
R21	RESISTOR	1K2	±5%	R1K20J4
R22	RESISTOR	560K	±5%	R560KJ4
R23	RESISTOR	560K	±5%	R560KJ4
R24	RESISTOR	22K	±5%	R22K061
R25	RESISTOR	OR18	±5%	ROR18J4
R26	RESISTOR	15K	±5%	R15K0J4

C1	CAPACITOR	680N		C680NKA
C2	CAPACITOR	100µ		C100µJ
C3	CAPACITOR	47N		C47N0J5
C4	CAPACITOR	100µ		C100µJ
C5	CAPACITOR	100µ		C100µJ
C6	CAPACITOR	1N		C1N00P
C7	CAPACITOR	330P		C330PJT
C8	CAPACITOR	120P		C120PJ1
C9	CAPACITOR	47µ		C47µ0Z8
C10	CAPACITOR	1N		C1N00A
C11	CAPACITOR	100N		C100N2S
C12	CAPACITOR	10µ		C10µTB
C13	CAPACITOR	10µ		C10µTB
C14	CAPACITOR	10µ		C10µTB
C15	CAPACITOR	100N		C100N4S
C16	CAPACITOR	100N		C100N4S
C17	CAPACITOR	10µ		C10µZ8R
C18	CAPACITOR	47µ		C47µ0ZE
C19	CAPACITOR	47µ		C47µ0ZE
C20	CAPACITOR	47µ		C47µ0Z7



VOLTAGE SELECTION BY PRIMARY WINDS (REAR VIEW)



F51	4A	UM04AGU
F52	4A	UM04AGU
F53	T2A5	UM2ABDA
L5	UM05ADA	UM05ADA
L2	L12362A	L12362A
L4	L12405A	L12405A
N1	L4-7220K	L4-7220K
N2	Q05NIAT	Q05NIAT
PL1	Q05NIAT	Q05NIAT
S1	PRF12AA	PRF12AA
SK2	S4050FF	S4050FF
SK3	PSR51AC	PSR51AC
SK4	PSPH0N2	PSPH0N2
SK5	PSPH0N9	PSPH0N9
	PSP6925	PSP6925
	AL. POWER OUTLET	SOCKET

D0C214C	TR1	TRANSISTOR	BC14C
D2TX304	TR2	TRANSISTOR	ZTX304
0BC556B	TR3	TRANSISTOR	BC556B
D40872X	TR7	TRANSISTOR	40872
D40872X	TR8	TRANSISTOR	40872
D17536X	TR9	TRANSISTOR	17536
D17536X	TR10	TRANSISTOR	17536
DB280AA	T1	DIAC	B50BA-01
DT2800B	T2	TRIAC	T2800B
D8B19VA	D1	ZENER DIODE	BZ78BC 15V
D8B19VA	D2	ZENER DIODE	BZ78BC 15V
DM440 03	D3	DIODE	1N4003
DM440 03	D4	DIODE	1N4003
DM7A2AQ	D7	BRIDGE RECTIFIER	PM7A-2Q
DZ25V6AA	D8	ZENER DIODE	BZ54HC5V6
DZ25V6AA	D9	ZENER DIODE	BZ54HC5V6
DIN4003	D10	DIODE	1N4003
DIN4003	D11	DIODE	1N4003
BL5053R	D12	LED	XC8053R
DM440 03	D13	DIODE	1N4003
Q05LINK	X1	SHORTING LINK	
D071CPX	IC1	INT. CIRCUIT	TL071

R47R03J4	R38	RESISTOR	47R	±5%
R10R03J1	R39	RESISTOR	10R	±5%
R2K703J7	R40	RESISTOR	2K7	±5%
R15K03J4	R42	RESISTOR	15K	±5%
R15K03J4	R43	RESISTOR	22R	±5%
R75R03J4	R44	RESISTOR	75R	±5%
C600NKA	C1	CAPACITOR	680N	
C000UJ	C2	CAPACITOR	100µ	
C47N0U3	C3	CAPACITOR	47N	
C100U0	C4	CAPACITOR	100µ	
C100U0	C5	CAPACITOR	100µ	
C390P4J	C6	CAPACITOR	390P	
C100P1	C7	CAPACITOR	100P	
C47U02B	C8	CAPACITOR	47µ	
C1000A	C9	CAPACITOR	1000µ	
C100N2S	C10	CAPACITOR	100N	
C100U0	C11	CAPACITOR	100µ	
C100U0	C12	CAPACITOR	100µ	
C100U0	C13	CAPACITOR	100µ	
C100U0	C14	CAPACITOR	100µ	
C100U0	C15	CAPACITOR	100µ	
C100U0	C16	CAPACITOR	100µ	
C100U0	C17	CAPACITOR	100µ	
C47U02E	C18	CAPACITOR	47µ	
C47U02E	C19	CAPACITOR	47µ	
C47U02E	C20	CAPACITOR	47µ	

R20K03J4	R1	RESISTOR	20K	±5%
R10K03J1	R2	RESISTOR	10K	±5%
R22K061	R3	RESISTOR	22K	±2%
R22K061	R4	RESISTOR	22K	±2%
R4K703J7	R5	RESISTOR	4K7	±5%
R35K03J4	R6	RESISTOR	35K	±2%
R35K03J4	R7	RESISTOR	35K	±2%
R56K03J4	R8	RESISTOR	56K	±5%
R3K303J1	R9	RESISTOR	3K3	±5%
R2K061	R10	RESISTOR	2K	±2%
R470R34	R11	RESISTOR	470R	±5%
R100R34	R12	RESISTOR	100R	±5%
R100R34	R13	RESISTOR	100R	±5%
R100R34	R14	RESISTOR	100R	±5%
R100R34	R15	RESISTOR	100R	±5%
R100R34	R16	RESISTOR	100R	±5%
R100R34	R17	RESISTOR	100R	±5%
R100R34	R18	RESISTOR	100R	±5%
R100R34	R19	RESISTOR	100R	±5%
R100R34	R20	RESISTOR	100R	±5%
R100R34	R21	RESISTOR	100R	±5%
R100R34	R22	RESISTOR	100R	±5%
R100R34	R23	RESISTOR	100R	±5%
R100R34	R24	RESISTOR	100R	±5%
R100R34	R25	RESISTOR	100R	±5%
R100R34	R26	RESISTOR	100R	±5%
R100R34	R27	RESISTOR	100R	±5%

For Service Manuals Contact
MAURITRON TECHNICAL SERVICES
 8 Cherry Tree Rd, Chinnor
 Oxon OX9 4QY
 Tel: 01844-351694 Fax: 01844-352554
 Email: enquires@mauritron.co.uk