

QUAD 405

POWER AMPLIFIER

Service Data

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Keith Snook modifications	Click here

CIRCUIT DESCRIPTION

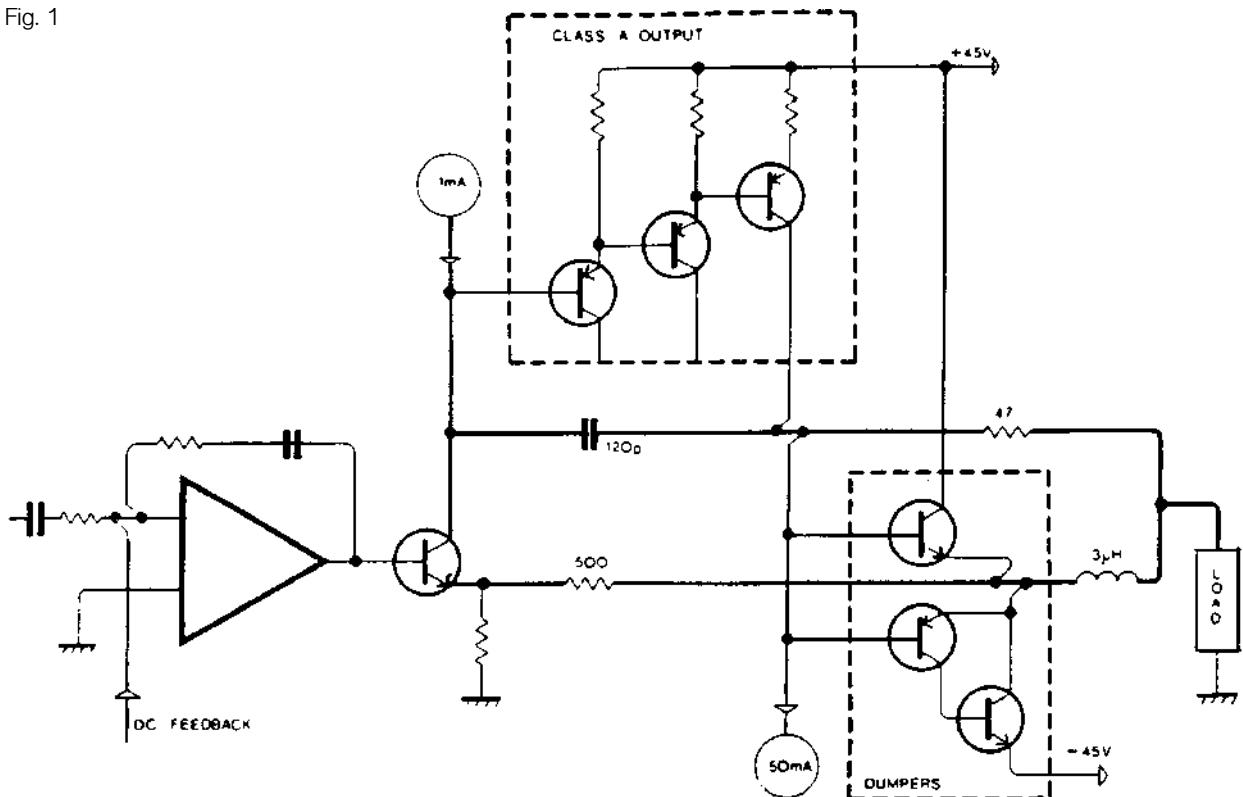
The QUAD 405 is a two channel power amplifier primarily intended for use in high quality sound reproducing systems. The amplifier is usually used with QUAD control units though other signal sources can readily be accommodated.

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 QUAD 405 Amplifier showing Class A, Dumpers and Bridge Components.

TEST EQUIPMENT

Sound Technology Distortion Analyser 1700A (ST1700A)

Dual Beam Oscilloscope

4Ω and 8Ω load of 100W dissipation

1Ω load of 25W dissipation

2.5 kHz Square Wave Generator

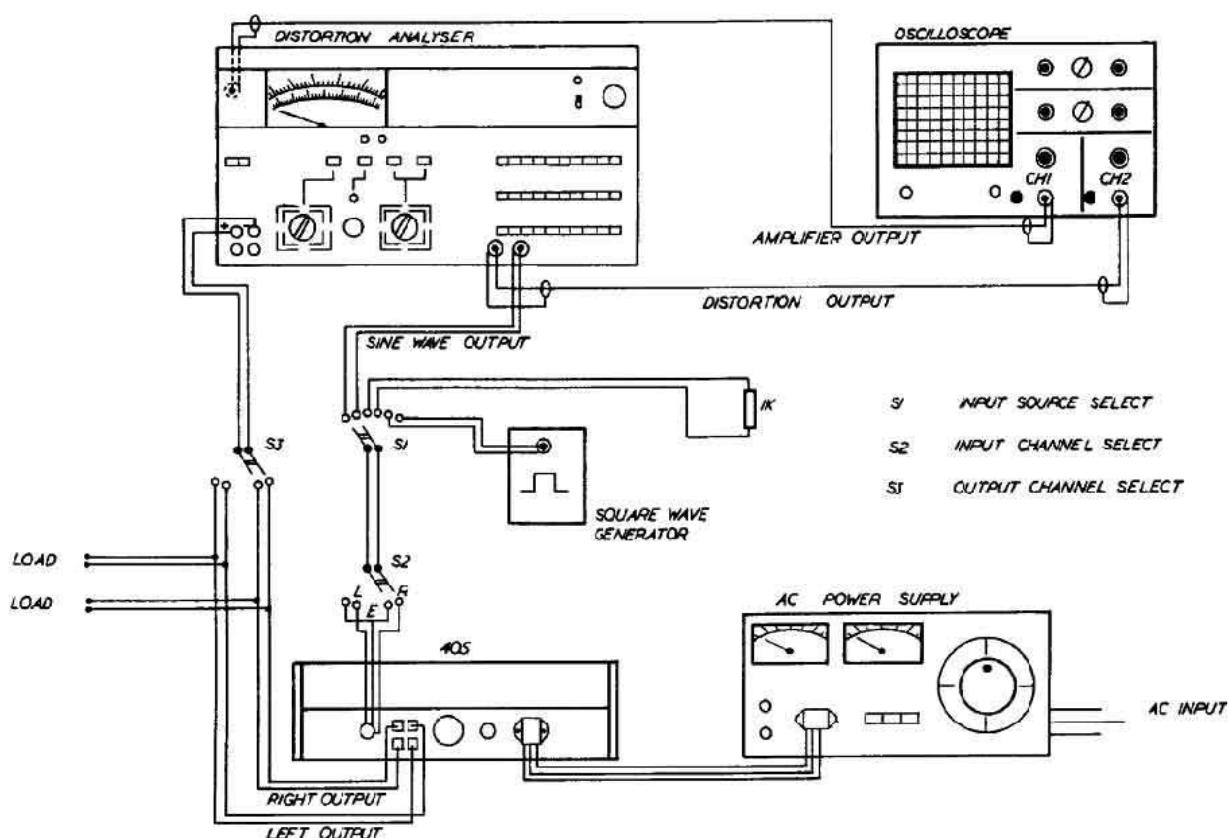
Input Sensitivity Indicator (0 to 1V RMS)

AVOMeter (or similar multimeter)

0 to 12V d.c. power supply

Variac a.c. power supply

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



SUGGESTED SWITCHING ARRANGEMENT FOR TESTING QUAD 405

Fig. 2

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

DISCONNECTING CLAMP CIRCUITS

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

For 405s fitted with amplifier boards M12368, 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 405s fitted with amplifier boards type M12565, 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 become disconnected.

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

AMPLIFIER CIRCUIT TESTING M 12368 - M 12565

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

Select:

Controls	Y1 - 0.5V/cm d.c. coupled Y2 - 0.1V/cm d.c. coupled Timebase 0.2 ms/cm
ST 1700A-	Volts/power 100W RMS Distortion Ratio 0.01% 80kHz and 400kHz filters both in Frequency 1kHz Low Distortion Osc. level minimum
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 **a.c. Supply Volts** whilst observing the current consumption which should not exceed 0.12A.
3. Increase the **oscillator level** to 0.5V RMS ±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 2ms/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 50μs/cm. Select **distortion** which should again be less than 0.01%.
5. Select **volts/power**, increase **applied frequency** to 10kHz and adjust **timebase** to 20μs/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 the **timebase** to 10μs/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 ± 1.5dB.
8. Increase **frequency** to 1kHz. For 405s with amplifier boards type M 12368 insert 1.8kΩ voltage limiting resistors into the mini sockets on each amplifier board. For 405s with amplifier boards type M 12565-3 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 ±1V. Remove voltage limiters, and adjust **oscillator level** for 100W output.
9. Select **volts/power** and **square wave** input, (S1). Adjust **timebase** to 0.1ms/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. Reconnect the 8Ω load.
10. The following checks should be carried out with no input signal and the input to the amplifier board loaded by a 1kΩ 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 1kHz and adjust **oscillator level** for 100W output. Select **1Ω load**. the output should clip equally on both halves of the waveform as shown in Fig. 11.
12. Select **4Ω 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 405s fitted with amplifier boards M 12368 apply **6V d.c.** across the output terminals of the relevant channel with an ammeter in circuit.

For 405s fitted with amplifier boards M 12565 a wire should be soldered across 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 should then be carried out on the other channel.

The complete test should then be repeated using a 12V d.c. supply with a 10Ω 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

1.

R33 Burnt
 R37 Burnt
 R41 Burnt
 R39 Burnt
 R38 Burnt

Cause

Collector-Base Tr10 o/c
 L1 o/c (solder joints)
 L3 o/c (solder joints)
 R20 or R21 o/c
 D5 or D6 o/c

2.

High Current
 \square
 $*$
 $**\square$

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 a.c. supply current for increase in signal

Signal is unstable and clips
 100W output 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 or R21 o/c
 Tr8 o/c, Tr6 s/c, R36 o/c, R30 o/c, C10 s/c
 L2 o/c (solder joints)
 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, Tr2, 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 \square \square
 R33 s/c
 R8 o/c
 C5 s/c, R15 o/c, Tr1 o/c

6.

Distortion at 20kHz

D5 or 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
 R12, R3, R4, Tr2, IC1 (change to topology!)

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

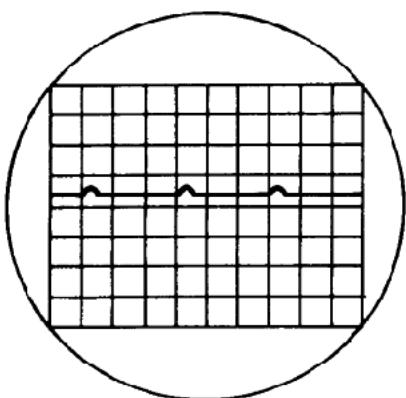


Fig. 3

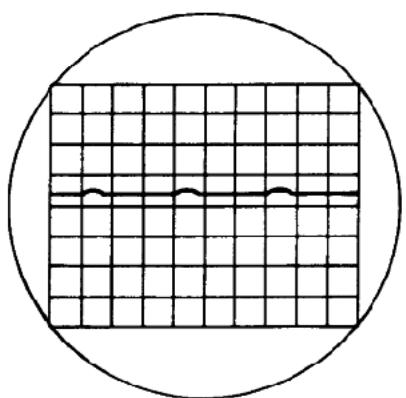


Fig. 4

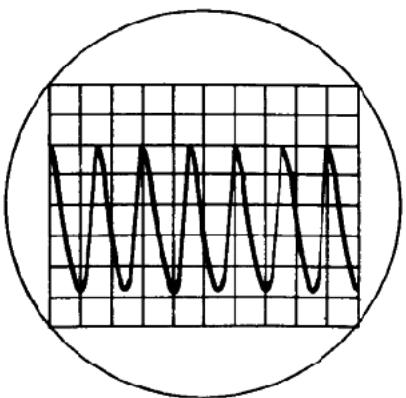


Fig. 5

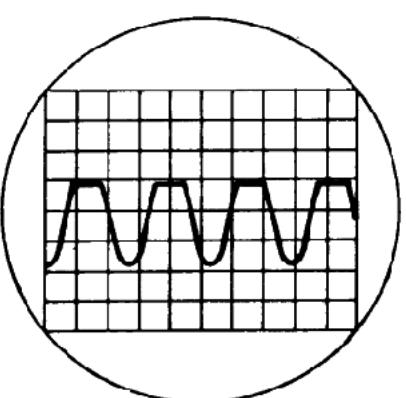


Fig. 6

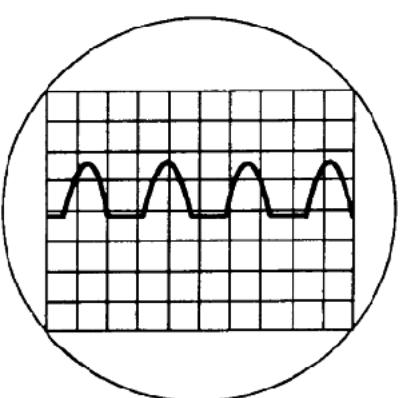


Fig. 7

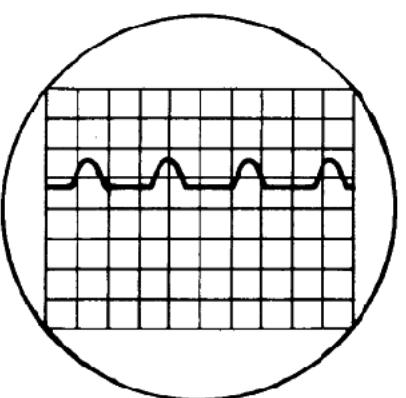


Fig. 8

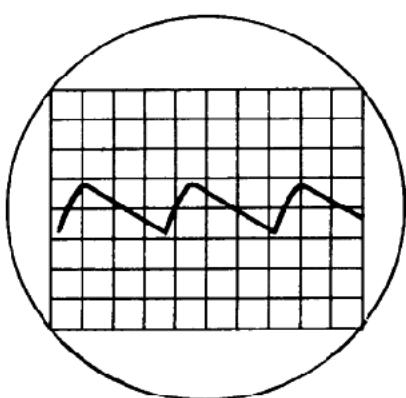


Fig. 9

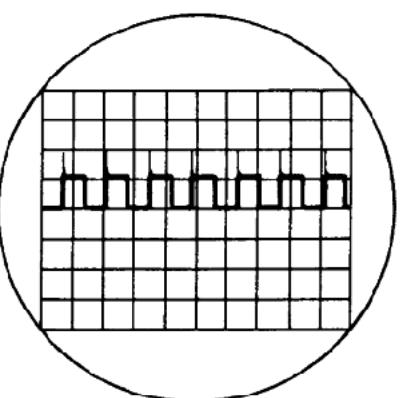


Fig. 10

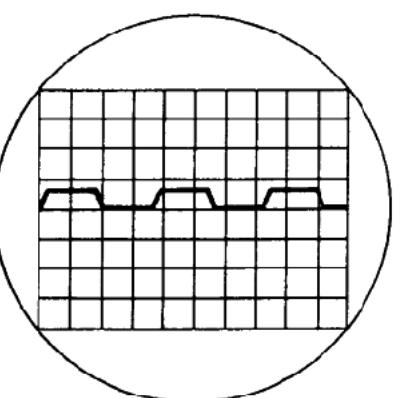


Fig. 11

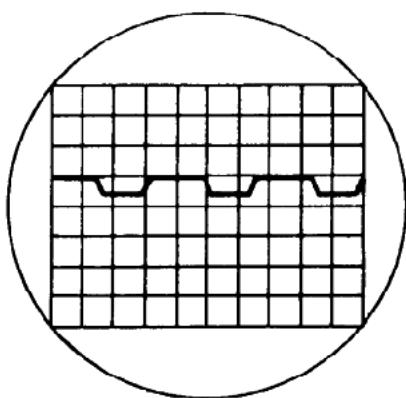


Fig. 12

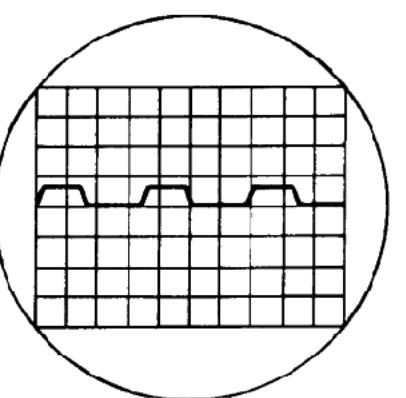


Fig. 13

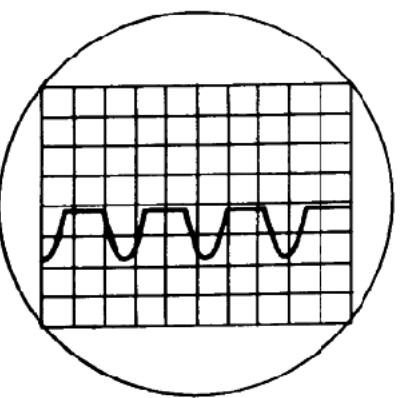


Fig. 14

MODIFICATIONS TO PRINTED CIRCUIT BOARDS.

- **Amplifier Board M 12368 iss.5** originally fitted. □ □ □ Circuit diagram iss. 2.
- 1.□ **Amplifier board M 12368 iss.6**
 - Copper track layout modified - component layout unchanged.
- 2.□ **Amplifier board M 12368 iss.7** □ □ □ □ □ Circuit diagram iss. 3.
 - R4 changed from 10k to 22k
 - R5 changed from 10k to 4k7
 - R9 changed from 180Ω to 220Ω
 - R19 (3k3) removed (combined with R23)
 - R23 changed from 3k3 to 1k2
 - C9 (330pF) removed (would be in parallel with C11)
 - C18 47nF fitted to -ve supply after FS2 - see circuit diagram
 - FS1 and FS2 effectively changed places
 - R2 changed from 2.2Ω to 10Ω
 - Copper track width reduced
- 3.(a)□ **Amplifier board M 12368 iss.9** introduced at serial number 9000. □ □ Circuit diagram iss. 4.
 - R41 22Ω added
 - L3 6.9μH added
 - C15 0.1μF added
 - C16 0.1μF added
 - C18 (47nF) removed
 - C19 1nF fitted between base and collector of Tr10 (**not recommended if stable without**)
 - Copper track width reduced
 - Also at s/n 9000 a clamp circuit, on PCB M 12400, was mounted on the output terminal (Fig. 15).
 - This detects excessive d.c. offset at the output and short circuits, blowing the internal 4A fuses FS1 and/or FS2 to protect the loudspeaker.
- 3.(b)□ The following component changes were made at serial number 29000. □ □ Circuit diagram iss. 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 (op-amp voltage increased from 12V to 15V)
 - D2 changed from LR120C to LR150C (op-amp voltage increased from 12V to 15V)
- 4.□ **Amplifier board M 12368 iss.10**
 - Identical to M 12368 iss. 9 except copper pads for power transistors modified for production.
- 5.□ **Amplifier board M 12565 iss.3** Introduced at serial number 59001. □ □ Circuit diagram iss. 6.
 - Other QUAD 405s with this PCB fitted were serial numbers 57301 to 57600 inc.
 - This board incorporates the clamp circuit and the ESL voltage limiter is now a link
- 6.□ **Amplifier board M 12565 iss.5** (QUAD 405-2 PCB). □ □ □ Circuit diagram iss. 7.
 - Was fitted at serial number 62500 but with a 405 name plate until serial number 65000.
 - See page 12 for 405-2 PCB changes.

Alternatives

Transistors - on PCB M 12368 iss. 5, 6 & 7 BDY77 or BDY74 may have been used for Tr9 and Tr10. BDY77 is a suitable replacement for both but beware - **faster transistors may cause instability.**

On M 12368 iss. 9 & 10 and M 12565 iss. 3 Transistors Tr9 and Tr10 may be 2SD424, 17556 or 2SD676 and are interchangeable.

Tr2 - BC682, ZTX304, BCX32 and BC546B are interchangeable.

Tr3, Tr4 - E5458, ZTX504 and BC556B are interchangeable.

Tr7, Tr8 - 40872 or 2SA740 are interchangeable.

LED - LP1 - HP5082-4850, Exciton XC5053, Toshiba TLR114A (or any modern LED with R40 adjusted).

CLAMP CIRCUIT

Introduced co-incident with amplifier PCB M 12368 iss. 9 at serial number 9001. All 405s with serial numbers 9000 and under being returned for service, should be fitted with a clamp board as shown below.
At serial number 59001 the clamp circuit was fitted as an integral part of the amplifier board M 12565 iss. 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. voltage, the circuit will short circuit the amplifier output and thus protect the speakers.

REPLACING THE CLAMP BOARD

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

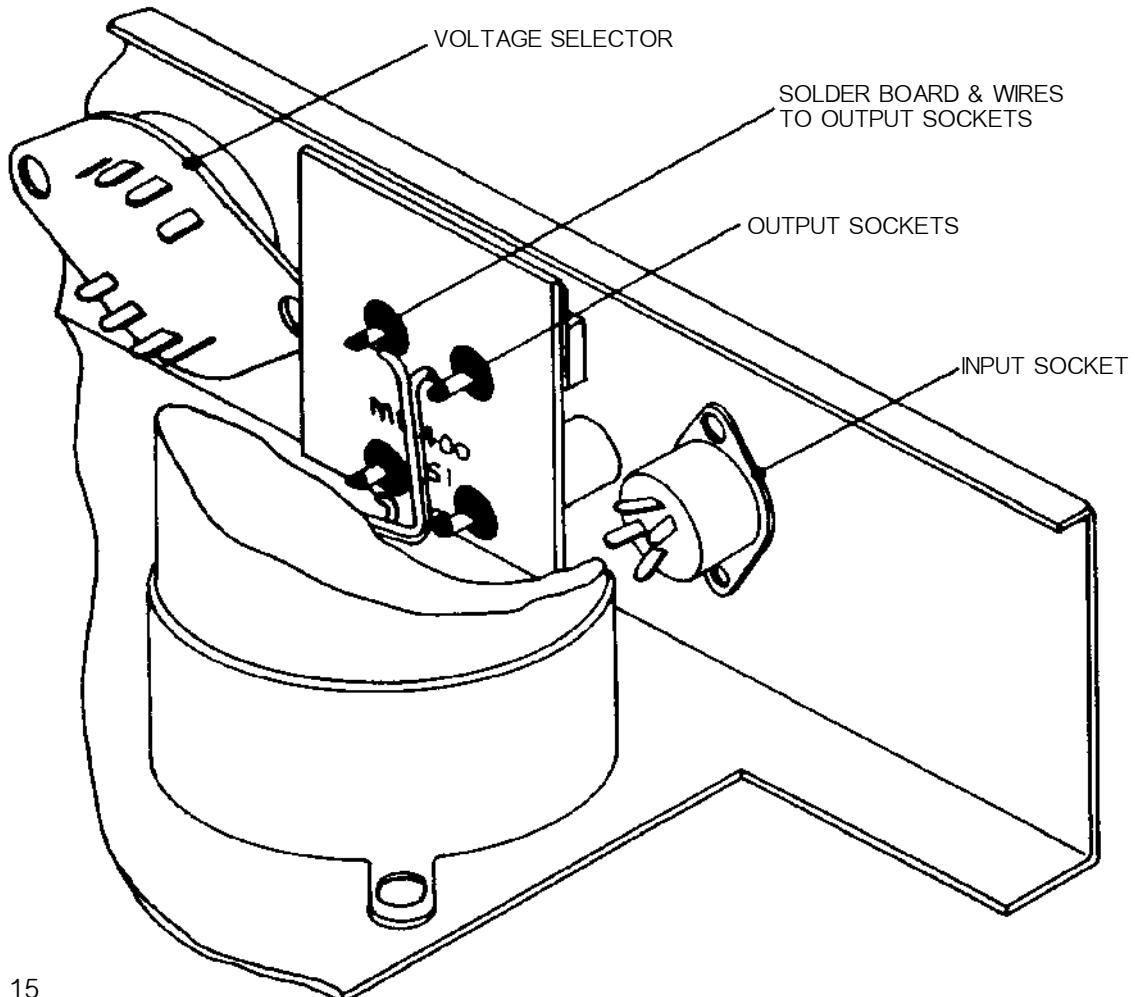


Fig. 15

- 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.
 - Replace the capacitor and reconnect the tags to the right channel amplifier board.

CLAMP CIRCUIT ALTERNATIVES

T1 - 2N4992 or BS08A-03

T2 - Sc141B or TIC226B or RCA T2800

CONVERSION OF 405 TO A MONO 180W AMPLIFIER

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

- 1.□ Remove the 405 cover and base plate.
- 2.□ Unplug the AMP connectors from the right-hand channel PCB (right-hand side when viewed from front).
- 3.□ Release the clip securing the rear 10.000 μ F capacitor (C 14) and lay the capacitor over the right-hand PCB.
 -
- 4.□ Unsolder the 4 leads from the output terminals.
 - For 405s fitted with PCBs M 12368 (serial numbers below 59000) remove the clamp board M 14200.
 - To disconnect the clamp circuit on 405s fitted with PCBs M 12565 (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.
- 5.□ Remove the output terminals and replace those for the right-hand 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 socket and unsolder the leads from it.
- 8.□ Connect these leads to the new input board, White to L and Red to R and the screens to the two E tags.
- 9.□ Fit the new input socket and board.
- 10.□ Refit C 14 and the AMP connector to the right-hand PCB.
- 11.□ Remove the output leads Brown/White from left-hand PCB and Brown/Red from right-hand PCB.
- 12.□ Connect a 4-8Ω speaker between the output tags of these two PCBs.
- 13.□ Switch on the 405, 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, increase the input signal level as required for final setting.
- 14.□ Switch off remove signal input, disconnect the loudspeaker, reconnect the output leads, refit blanking grommet
 -and all covers.□

REMOVING THE AMPLIFIER MODULES

- 1.□ Note the colour coding for reconnection and remove the push-on AMP 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.
□ *(not recommended after years of service - use new heat sink compound or sheet material)*

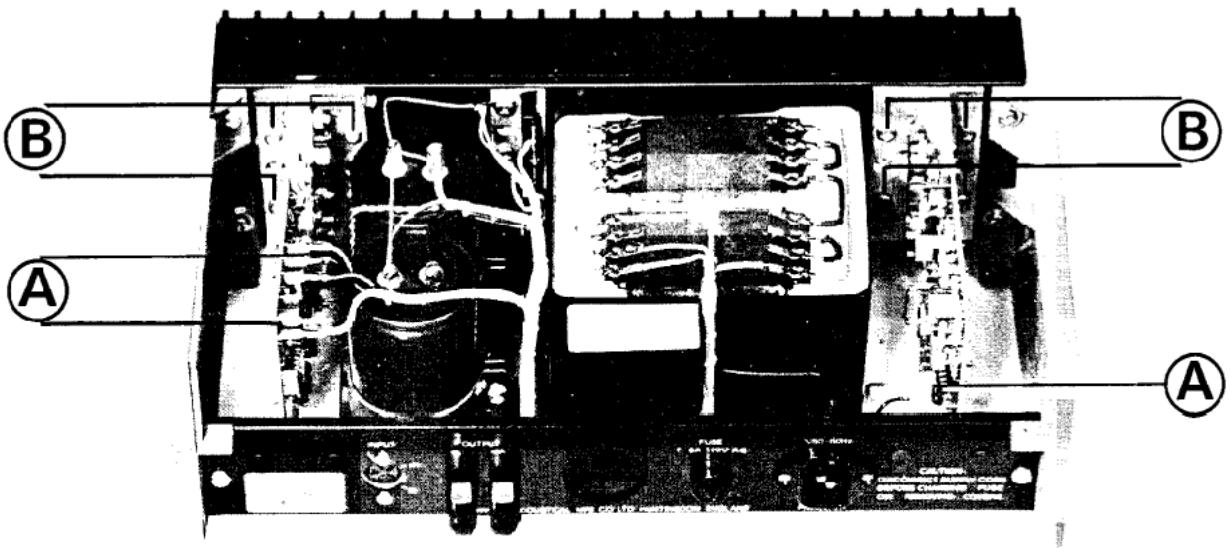


Fig. 16

REPLACING THE QUAD 405 TRANSFORMER

- 1.□ Disconnect the a.c. supply and remove top cover (2 M4 screws) and bottom plate (4 M4 screws).
- 2.□ Note 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 each T-section heat-sink then release the
□ amplifier boards by removing the other 4 screws on 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 plate.
- 5.□ Reverse the procedure with the new transformer.

Note: It should not be necessary to remove the push-on AMP connectors from the amplifier PCBs.

QUAD 405-2

The original 405 provided 100 Watts per channel into load impedances between 4.5Ω and 8Ω . To meet the need of 4Ω and 8Ω loudspeakers whose impedance falls below 4.5Ω , the 405-2 was introduced in January 1983 at serial number 65000, but the 405 modules had already been fitted from serial number 62500 onwards. Many earlier amplifiers have also since been converted to 405-2 by owners and dealers 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 3Ω and 10Ω , and up to 50W into 1.5Ω loads, 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 stage 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 iss. 7 and the PCB reference M 12565 iss. 5.

Subsequent modifications were:

Date	Serial Number	PCB issue	Circuit Diagram	Changes
			12565 iss.	
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 fuse-holder DIN input replaced by phono sockets. Signal earth isolated from chassis by R2 to avoid hum loop when using mains earth.

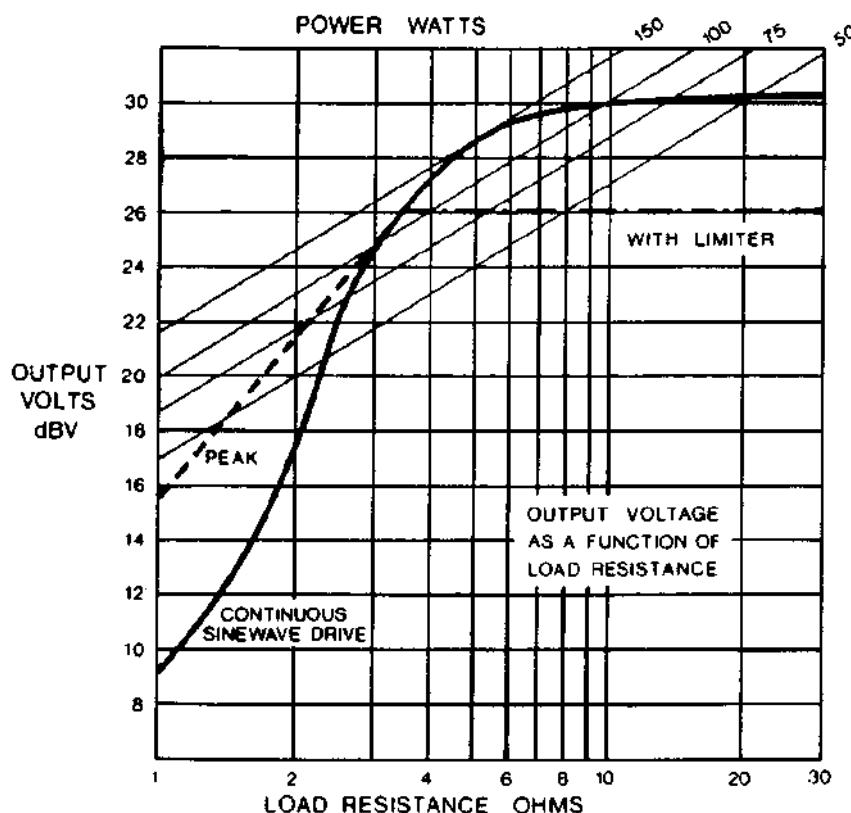


Fig. 17

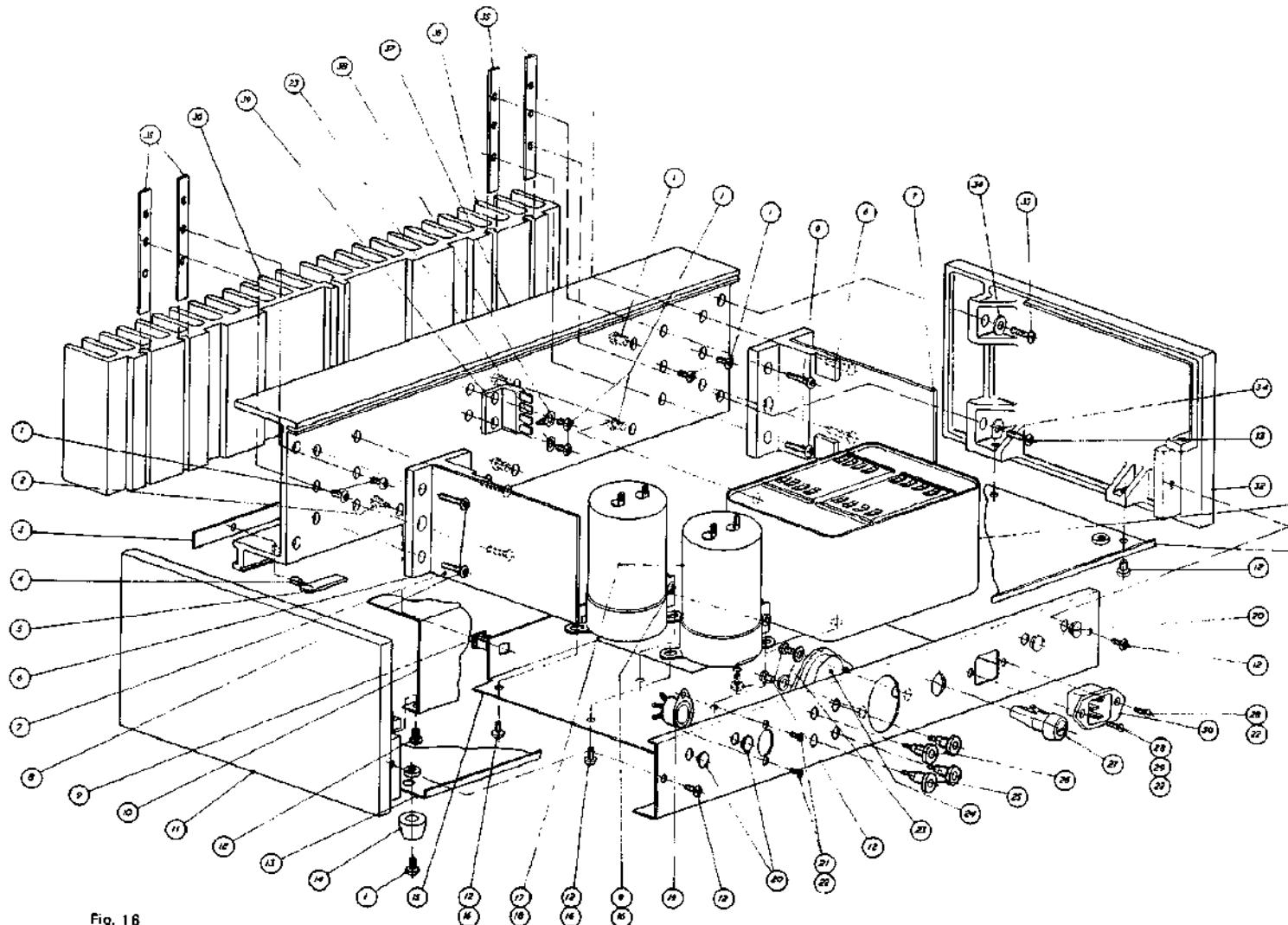


Fig. 16

Assembly Diagram.

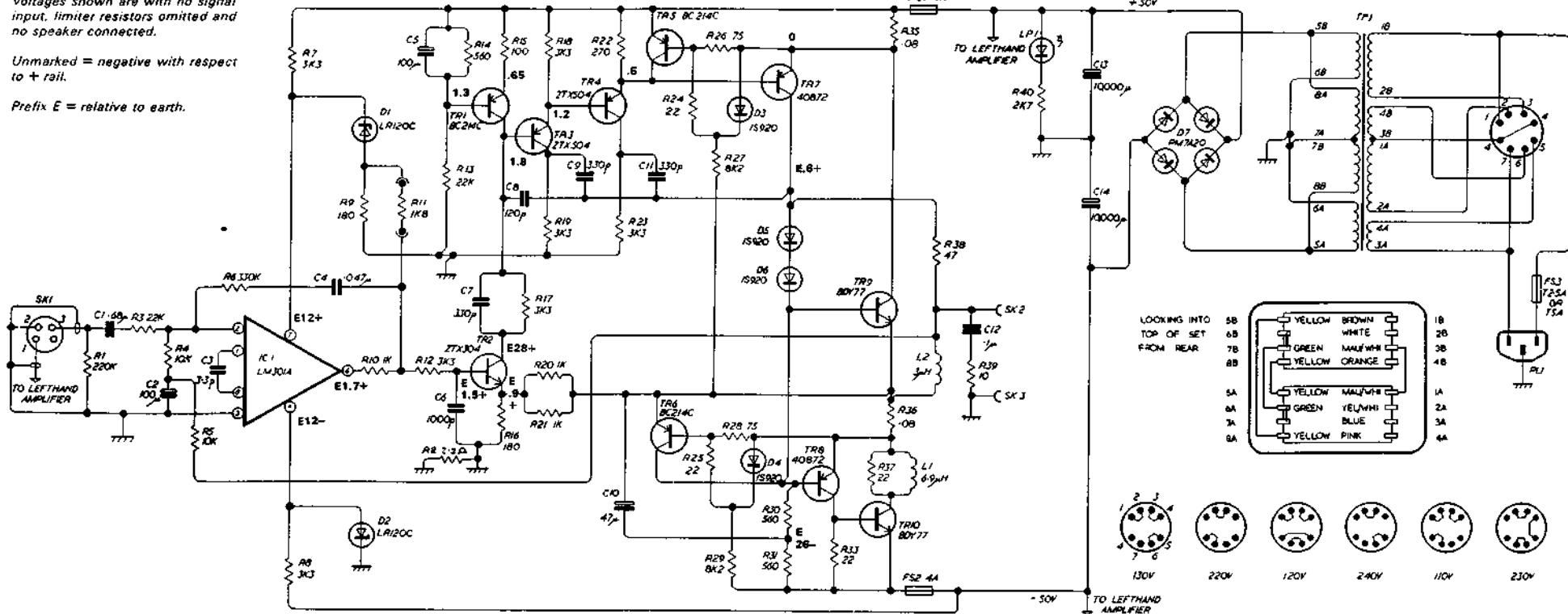
NO.	ITEM NO.	DESCRIPTION	QUANTITY
1	A1/1002	SCREEN MAGNET ASSEMBLY	1
2	A1/1003	SCREEN MAGNET STAB. POSITION	1
3	A1/1004	REAR PANEL	1
4	A1/1005	TOP PANEL	1
5	A1/1006	SIDE PANEL	2
6	A1/1007	FRONT PANEL	1
7	A1/1008	AMPLIFIER MOUNTING BRACKET	2
8	A1/1009	POWER TRANSISTOR	2
9	A1/1010	OUTPUT TRANSISTOR	2
10	A1/1011	OUTPUT TRANSISTOR	2
11	A1/1012	RIGHTHAND SIDE COVER	1
12	A1/1013	SCREEN MAGNET GEAR	1
13	A1/1014	BASS PLATE	1
14	A1/1015	FOOT COP SUPPORT	1
15	A1/1016	CHASSIS	1
16	A1/1017	HORN WIRE	1
17	A1/1018	DISPENSER HOODING, LEFT SIDE	1
18	A1/1019	DISPENSER HOODING, RIGHT SIDE	1
19	A1/1020	INPUT SOCKET	1
20	A1/1021	SOLID STATE DIODE, NYSTROEM	1
21	A1/1022	SHUNT RESISTOR, NYSTROEM	1
22	A1/1023	LINE FILTER	1
23	A1/1024	WIRELESS MIC.	1
24	A1/1025	VOLUME SELECTOR, 70-001	1
25	A1/1026	AMPLIFIER SOCKET, 6AL4, NYSTROEM	1
26	A1/1027	AMPLIFIER SOCKET, 6AL4, NYSTROEM	1
27	A1/1028	SWITCH, SPST, 120VAC, 1A/10A	1
28	A1/1029	SWITCH, SPST, 120VAC, 1A/10A	1
29	A1/1030	PUSHBUTTON, SILICON DIODES	1
30	A1/1031	SWITCH, SPST, 120VAC, 1A/10A	1
31	A1/1032	SWITCH, SPST, 120VAC, 1A/10A	1
32	A1/1033	LINE TRANSPORTER	1
33	A1/1034	LEFT-FRONT SIDE COVER	1
34	A1/1035	SCREEN MAGNET POSITION	1
35	A1/1036	WIRELESS MIC. WIRE	1
36	A1/1037	RIGHT-FRONT SIDE COVER	1
37	A1/1038	REAR PANEL	1
38	A1/1039	SWITCH, SPST, 120VAC, 1A/10A	1
39	A1/1040	SWITCH, SPST, 120VAC, 1A/10A	1
40	A1/1041	SWITCH, SPST, 120VAC, 1A/10A	1
41	A1/1042	SWITCH, SPST, 120VAC, 1A/10A	1
42	A1/1043	SWITCH, SPST, 120VAC, 1A/10A	1
43	A1/1044	SWITCH, SPST, 120VAC, 1A/10A	1
44	A1/1045	SWITCH, SPST, 120VAC, 1A/10A	1
45	A1/1046	SWITCH, SPST, 120VAC, 1A/10A	1
46	A1/1047	SWITCH, SPST, 120VAC, 1A/10A	1
47	A1/1048	SWITCH, SPST, 120VAC, 1A/10A	1
48	A1/1049	SWITCH, SPST, 120VAC, 1A/10A	1
49	A1/1050	SWITCH, SPST, 120VAC, 1A/10A	1
50	A1/1051	SWITCH, SPST, 120VAC, 1A/10A	1
51	A1/1052	SWITCH, SPST, 120VAC, 1A/10A	1
52	A1/1053	SWITCH, SPST, 120VAC, 1A/10A	1
53	A1/1054	SWITCH, SPST, 120VAC, 1A/10A	1
54	A1/1055	SWITCH, SPST, 120VAC, 1A/10A	1
55	A1/1056	SWITCH, SPST, 120VAC, 1A/10A	1
56	A1/1057	SWITCH, SPST, 120VAC, 1A/10A	1
57	A1/1058	SWITCH, SPST, 120VAC, 1A/10A	1
58	A1/1059	SWITCH, SPST, 120VAC, 1A/10A	1
59	A1/1060	SWITCH, SPST, 120VAC, 1A/10A	1
60	A1/1061	SWITCH, SPST, 120VAC, 1A/10A	1
61	A1/1062	SWITCH, SPST, 120VAC, 1A/10A	1
62	A1/1063	SWITCH, SPST, 120VAC, 1A/10A	1
63	A1/1064	SWITCH, SPST, 120VAC, 1A/10A	1
64	A1/1065	SWITCH, SPST, 120VAC, 1A/10A	1
65	A1/1066	SWITCH, SPST, 120VAC, 1A/10A	1
66	A1/1067	SWITCH, SPST, 120VAC, 1A/10A	1
67	A1/1068	SWITCH, SPST, 120VAC, 1A/10A	1
68	A1/1069	SWITCH, SPST, 120VAC, 1A/10A	1
69	A1/1070	SWITCH, SPST, 120VAC, 1A/10A	1
70	A1/1071	SWITCH, SPST, 120VAC, 1A/10A	1
71	A1/1072	SWITCH, SPST, 120VAC, 1A/10A	1
72	A1/1073	SWITCH, SPST, 120VAC, 1A/10A	1
73	A1/1074	SWITCH, SPST, 120VAC, 1A/10A	1
74	A1/1075	SWITCH, SPST, 120VAC, 1A/10A	1
75	A1/1076	SWITCH, SPST, 120VAC, 1A/10A	1
76	A1/1077	SWITCH, SPST, 120VAC, 1A/10A	1
77	A1/1078	SWITCH, SPST, 120VAC, 1A/10A	1
78	A1/1079	SWITCH, SPST, 120VAC, 1A/10A	1
79	A1/1080	SWITCH, SPST, 120VAC, 1A/10A	1
80	A1/1081	SWITCH, SPST, 120VAC, 1A/10A	1
81	A1/1082	SWITCH, SPST, 120VAC, 1A/10A	1
82	A1/1083	SWITCH, SPST, 120VAC, 1A/10A	1
83	A1/1084	SWITCH, SPST, 120VAC, 1A/10A	1
84	A1/1085	SWITCH, SPST, 120VAC, 1A/10A	1
85	A1/1086	SWITCH, SPST, 120VAC, 1A/10A	1
86	A1/1087	SWITCH, SPST, 120VAC, 1A/10A	1
87	A1/1088	SWITCH, SPST, 120VAC, 1A/10A	1
88	A1/1089	SWITCH, SPST, 120VAC, 1A/10A	1
89	A1/1090	SWITCH, SPST, 120VAC, 1A/10A	1
90	A1/1091	SWITCH, SPST, 120VAC, 1A/10A	1
91	A1/1092	SWITCH, SPST, 120VAC, 1A/10A	1
92	A1/1093	SWITCH, SPST, 120VAC, 1A/10A	1
93	A1/1094	SWITCH, SPST, 120VAC, 1A/10A	1
94	A1/1095	SWITCH, SPST, 120VAC, 1A/10A	1
95	A1/1096	SWITCH, SPST, 120VAC, 1A/10A	1
96	A1/1097	SWITCH, SPST, 120VAC, 1A/10A	1
97	A1/1098	SWITCH, SPST, 120VAC, 1A/10A	1
98	A1/1099	SWITCH, SPST, 120VAC, 1A/10A	1
99	A1/1100	SWITCH, SPST, 120VAC, 1A/10A	1
100	A1/1101	SWITCH, SPST, 120VAC, 1A/10A	1
101	A1/1102	SWITCH, SPST, 120VAC, 1A/10A	1
102	A1/1103	SWITCH, SPST, 120VAC, 1A/10A	1
103	A1/1104	SWITCH, SPST, 120VAC, 1A/10A	1
104	A1/1105	SWITCH, SPST, 120VAC, 1A/10A	1
105	A1/1106	SWITCH, SPST, 120VAC, 1A/10A	1
106	A1/1107	SWITCH, SPST, 120VAC, 1A/10A	1
107	A1/1108	SWITCH, SPST, 120VAC, 1A/10A	1
108	A1/1109	SWITCH, SPST, 120VAC, 1A/10A	1
109	A1/1110	SWITCH, SPST, 120VAC, 1A/10A	1
110	A1/1111	SWITCH, SPST, 120VAC, 1A/10A	1
111	A1/1112	SWITCH, SPST, 120VAC, 1A/10A	1
112	A1/1113	SWITCH, SPST, 120VAC, 1A/10A	1
113	A1/1114	SWITCH, SPST, 120VAC, 1A/10A	1
114	A1/1115	SWITCH, SPST, 120VAC, 1A/10A	1
115	A1/1116	SWITCH, SPST, 120VAC, 1A/10A	1
116	A1/1117	SWITCH, SPST, 120VAC, 1A/10A	1
117	A1/1118	SWITCH, SPST, 120VAC, 1A/10A	1
118	A1/1119	SWITCH, SPST, 120VAC, 1A/10A	1
119	A1/1120	SWITCH, SPST, 120VAC, 1A/10A	1
120	A1/1121	SWITCH, SPST, 120VAC, 1A/10A	1
121	A1/1122	SWITCH, SPST, 120VAC, 1A/10A	1
122	A1/1123	SWITCH, SPST, 120VAC, 1A/10A	1
123	A1/1124	SWITCH, SPST, 120VAC, 1A/10A	1
124	A1/1125	SWITCH, SPST, 120VAC, 1A/10A	1
125	A1/1126	SWITCH, SPST, 120VAC, 1A/10A	1
126	A1/1127	SWITCH, SPST, 120VAC, 1A/10A	1
127	A1/1128	SWITCH, SPST, 120VAC, 1A/10A	1
128	A1/1129	SWITCH, SPST, 120VAC, 1A/10A	1
129	A1/1130	SWITCH, SPST, 120VAC, 1A/10A	1
130	A1/1131	SWITCH, SPST, 120VAC, 1A/10A	1
131	A1/1132	SWITCH, SPST, 120VAC, 1A/10A	1
132	A1/1133	SWITCH, SPST, 120VAC, 1A/10A	1
133	A1/1134	SWITCH, SPST, 120VAC, 1A/10A	1
134	A1/1135	SWITCH, SPST, 120VAC, 1A/10A	1
135	A1/1136	SWITCH, SPST, 120VAC, 1A/10A	1
136	A1/1137	SWITCH, SPST, 120VAC, 1A/10A	1
137	A1/1138	SWITCH, SPST, 120VAC, 1A/10A	1
138	A1/1139	SWITCH, SPST, 120VAC, 1A/10A	1
139	A1/1140	SWITCH, SPST, 120VAC, 1A/10A	1
140	A1/1141	SWITCH, SPST, 120VAC, 1A/10A	1
141	A1/1142	SWITCH, SPST, 120VAC, 1A/10A	1
142	A1/1143	SWITCH, SPST, 120VAC, 1A/10A	1
143	A1/1144	SWITCH, SPST, 120VAC, 1A/10A	1
144	A1/1145	SWITCH, SPST, 120VAC, 1A/10A	1
145	A1/1146	SWITCH, SPST, 120VAC, 1A/10A	1
146	A1/1147	SWITCH, SPST, 120VAC, 1A/10A	1
147	A1/1148	SWITCH, SPST, 120VAC, 1A/10A	1
148	A1/1149	SWITCH, SPST, 120VAC, 1A/10A	1
149	A1/1150	SWITCH, SPST, 120VAC, 1A/10A	1
150	A1/1151	SWITCH, SPST, 120VAC, 1A/10A	1
151	A1/1152	SWITCH, SPST, 120VAC, 1A/10A	1
152	A1/1153	SWITCH, SPST, 120VAC, 1A/10A	1
153	A1/1154	SWITCH, SPST, 120VAC, 1A/10A	1
154	A1/1155	SWITCH, SPST, 120VAC, 1A/10A	1
155	A1/1156	SWITCH, SPST, 120VAC, 1A/10A	1
156	A1/1157	SWITCH, SPST, 120VAC, 1A/10A	1
157	A1/1158	SWITCH, SPST, 120VAC, 1A/10A	1
158	A1/1159	SWITCH, SPST, 120VAC, 1A/10A	1
159	A1/1160	SWITCH, SPST, 120VAC, 1A/10A	1
160	A1/1161	SWITCH, SPST, 120VAC, 1A/10A	1
161	A1/1162	SWITCH, SPST, 120VAC, 1A/10A	1
162	A1/1163	SWITCH, SPST, 120VAC, 1A/10A	1
163	A1/1164	SWITCH, SPST, 120VAC, 1A/10A	1
164	A1/1165	SWITCH, SPST, 120VAC, 1A/10A	1
165	A1/1166	SWITCH, SPST, 120VAC, 1A/10A	1
166	A1/1167	SWITCH, SPST, 120VAC, 1A/10A	1
167	A1/1168	SWITCH, SPST, 120VAC, 1A/10A	1
168	A1/1169	SWITCH, SPST, 120VAC, 1A/10A	1
169	A1/1170	SWITCH, SPST, 120VAC, 1A/10A	1
170	A1/1171	SWITCH, SPST, 120VAC, 1A/10A	1
171	A1/1172	SWITCH, SPST, 120VAC, 1A/10A	1
172	A1/1173	SWITCH, SPST, 120VAC, 1A/10A	1
173	A1/1174	SWITCH, SPST, 120VAC, 1A/10A	1
174	A1/1175	SWITCH, SPST, 120VAC, 1A/10A	1
175	A1/1176	SWITCH, SPST, 120VAC, 1A/10A	1
176	A1/1177	SWITCH, SPST, 120VAC, 1A/10A	1
177	A1/1178	SWITCH, SPST, 120VAC, 1A/10A	1
178	A1/1179	SWITCH, SPST, 120VAC, 1A/10A	1
179	A1/1180	SWITCH, SPST, 120VAC, 1A/10A	1
180	A1/1181	SWITCH, SPST, 120VAC, 1A/10A	1
181	A1/1182	SWITCH, SPST, 120VAC, 1A/10A	1
182	A1/1183	SWITCH, SPST, 120VAC, 1A/10A	1
183	A1/1184	SWITCH, SPST, 120VAC, 1A/10A	1
184	A1/1185	SWITCH, SPST, 120VAC, 1A/10A	1
185	A1/1186	SWITCH, SPST, 120VAC, 1A/10A	1
186	A1/1187	SWITCH, SPST, 120VAC, 1A/10A	1
187	A1/1188	SWITCH, SPST, 120VAC, 1A/10A	1
188	A1/1189	SWITCH, SPST, 120VAC, 1A/10A	1
189	A1/1190	SWITCH, SPST, 120VAC, 1A/10A	1
190	A1/1191	SWITCH, SPST, 120VAC, 1A/10A	1
191	A1/1192	SWITCH, SPST, 120VAC, 1A/10A	1
192	A1/1193	SWITCH, SPST, 120VAC, 1A/10A	1
193	A1/1194	SWITCH, SPST, 120VAC, 1A/10A	1
194	A1/1195	SWITCH, SPST, 120VAC, 1A/10A	1
195	A1/1196	SWITCH, SPST, 120VAC, 1A/10A	1
196	A1/1197	SWITCH, SPST, 120VAC, 1A/10A	1
197	A1/1198	SWITCH, SPST, 120VAC, 1A/10A	1
198	A1/1199	SWITCH, SPST, 120VAC, 1A/10A	1
199	A1/1200	SWITCH, SPST, 120VAC, 1A/10A	1
200	A1/1201	SWITCH, SPST, 120VAC, 1A/10A	1
201	A1/1202	SWITCH, SPST, 120VAC, 1A/10A	1
202	A1/1203	SWITCH, SPST, 120VAC, 1A/10A	1
203	A1/1204	SWITCH, SPST, 120VAC, 1A/10A	1
204	A1/1205	SWITCH, SPST, 120VAC, 1A/10A	1
205	A1/1206	SWITCH, SPST, 120VAC, 1A/10A	1
206	A1/1207	SWITCH, SPST, 120VAC, 1A/10A	1
207	A1/1208	SWITCH, SPST, 120VAC, 1A/10A	1
208	A1/1209	SWITCH, SPST, 120VAC, 1A/10A	1
209	A1/1210	SWITCH, SPST, 120VAC, 1A/10A	1
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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	± 10%	Resistor	R220KJ1
R2	2.2	± 5%	Resistor	R2R200S
R3	22K	± 5%	Resistor	R22KJ1
R4	10K	± 10%	Resistor	R10KJ1
R5	10K	± 10%	Resistor	R10KJ1
R6	330K	± 5%	Resistor	R330KJ1
R7	3K3	± 10%	Resistor	R3K30J1
R8	3K3	± 10%	Resistor	R3K30J1
R9	180	± 5%	Resistor	R180RJ1
R10	1K	± 5%	Resistor	R1K00J1
R11	1K8	± 10%	Resistor	R1K80J1
R12	3K3	± 10%	Resistor	R3K30J1
R13	22K	± 5%	Resistor	R22KJ1
R14	980	± 10%	Resistor	R980RJ1
R15	100	± 10%	Resistor	R100RJ1
R16	180	± 5%	Resistor	R180RJ1
R17	3K3	± 10%	Resistor	R3K30J1
R18	3K3	± 10%	Resistor	R3K30J1
R19	3K3	± 10%	Resistor	R3K30J1
R20	1K	± 5%	Resistor	R1K00J1
R21	1K	± 5%	Resistor	R1K00J1
R22	270	± 10%	Resistor	R270RJ1
R23	3K3	± 10%	Resistor	R3K30J1
R24	22	± 10%	Resistor	R22R0J1
R25	22	± 10%	Resistor	R22R0J1
R26	75	± 5%	Resistor	R75R0J1

No.	Value	Tol	Reference	Stock No.
R27	8K2	± 5%	Resistor	R8K2RJ1
R28	75	± 5%	Resistor	R75R0J1
R29	8K2	± 5%	Resistor	R8K2UJ1
R30	560	± 10%	Resistor 2.5W	R560RJS
R31	560	± 10%	Resistor 2.5W	R560RJS
R32				
R33	22	± 10%	Resistor	R22R0J1
R34				
R35	0.08		Resistor Acoustical DRG A4/A/12383	R0091JY
R36	0.08		Resistor Acoustical DRG A4/A/12383	R0091JY
R37	32	± 10%	Resistor	R32R0J1
R38	47	± 5%	Resistor	R47R0J1
R39	10	± 10%	Resistor	R10R0J1
R40	2K7		Resistor 1.6W	R2K70JN
R41				
C1	0.008μ		Capacitor 100V	C0008K5
C2	100μ	± 10%	Capacitor 3V	C100U6ME
C3	2.2μ	± 20%	Capacitor	C2P30KJ
C4	0.0047μ		Capacitor 250V	C47N0J5
C5	100μ		Capacitor 6V	C100U2B
C6	1000P		Capacitor 400V	C1H00KK
C7	330P	± 20%	Capacitor	C330PKJ
C8	120P	± 5%	Capacitor	C120PJ1
C9	330P	± 20%	Capacitor	C330PKJ
C10	47μ		Capacitor 40V	C47U0D9
C11	330P		Capacitor	C330PKJ

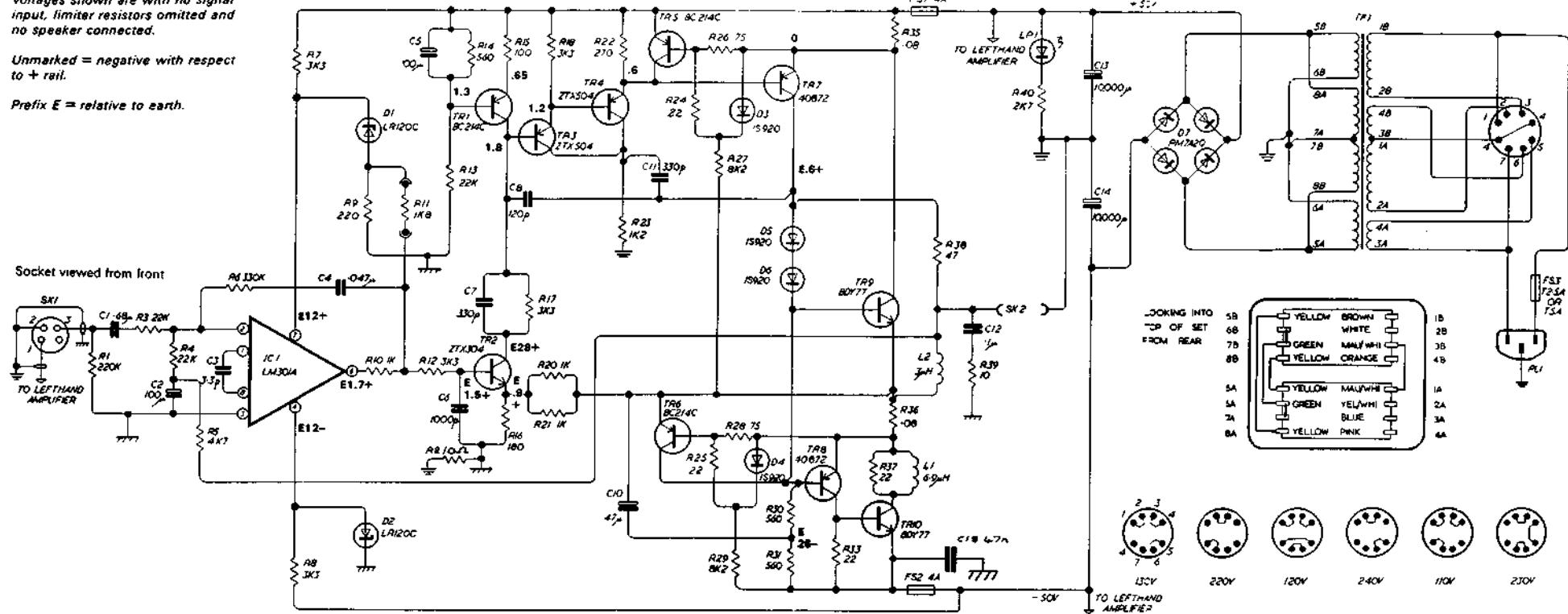
No.	Value	Tol.	Reference	Stock No.
C12	0.1µF		Capacitor 250V	C100KNC
C13	10.000µF		Capacitor 63V	C10KUTA
C14	10.000µF		Capacitor 63V	C10KUTA
TR1			Transistor BC214C	DBC214C
TR2			Transistor BC682 or ZTX304 or BCX32	DZTX304
TR3			Transistor ES458 or ZTX504	DZTX504
TR4			Transistor ES458 or ZTX504	DZTX504
TR5			Transistor BC214C	DBC214C
TR6			Transistor BC214C	DBC214C
TR7			Transistor 40872 or 2SA740	D40872X
TR8			Transistor 40872 or 2SA740	D40872X
TR9			Transistor BDY74 or BDY77	DBDY77Q
TR10			Transistor BDY74 or BDY77	DBDY77Q
D1			Zener Diode UR120C	DZ12VAA
D2			Zener Diode UR120C	DZ12VAA
D3			Diode IS920	DIS920B
D4			Diode IS920	DIS920B
D5			Diode IS920	DIS920B
D6			Diode IS920	DIS920B
D7			Bridge Rectifier	BRPNTAZQ
IIC1			LM301A	OML301A
L1	0.89µH	± 20%	Inductor ANCO TC1/65	L12406A

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.

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No.	Value	Tol.	Reference	Stock No.
R1	220K	$\pm 10\%$	Resistor	R220KU1
R2	10	$\pm 5\%$	Resistor	R10RQJ1
R3	22K	$\pm 5\%$	Resistor	R22KU1
R4	22K	$\pm 2\%$	Resistor	R22KU1
R5	4.7K	$\pm 10\%$	Resistor	R4K7QJ1
R6	330K	$\pm 5\%$	Resistor	R330KU1
R7	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R8	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R9	220	$\pm 5\%$	Resistor	R220RJ1
R10	1K	$\pm 2\%$	Resistor	R1K00U1
R11	1K8	$\pm 10\%$	Resistor	R1K8QJ1
R12	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R13	22K	$\pm 2\%$	Resistor	R22KU1
R14	580	$\pm 10\%$	Resistor	R560RJ1
R15	100	$\pm 10\%$	Resistor	R100RJ1
R16	180	$\pm 2\%$	Resistor	R180RJ1
R17	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R18	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R19				
R20	1K	$\pm 2\%$	Resistor	R1K00U1
R21	1K	$\pm 2\%$	Resistor	R1K00U1
R22	270	$\pm 10\%$	Resistor	R270RJ1
R23	1K2	$\pm 10\%$	Resistor 1.8W	R1K20JR
R24	22	$\pm 10\%$	Resistor	R22RQJ1
R25	22	$\pm 10\%$	Resistor	R22RQJ1
R26	75	$\pm 5\%$	Resistor	R75RQJ1

No.	Value	Tol	Reference	Stock
R27	8K2	$\pm 5\%$	Resistor	R8K20J
R28	75	$\pm 5\%$	Resistor	R75R0J
R29	8K2	$\pm 5\%$	Resistor	R8K20J
R30	560	$\pm 10\%$	Resistor 2.5W	R560RJ
R31	560	$\pm 10\%$	Resistor 2.5W	R560RJ
R32	22	$\pm 10\%$	Resistor	R22R0J
R33	0.08		Resistor Acoustical DRG.JA/12383	R080JU
R34	0.08		Resistor Acoustical DRG.JA/12383	R080JU
R35	22	$\pm 10\%$	Resistor	R22R0J
R36	47	$\pm 5\%$	Resistor	R47R0J
R39	10	$\pm 10\%$	Resistor	R10R0J
R40	2K7		Resistor 1.5W	R2K70J
C1	0.68μF		Capacitor 100V	C680NPK
C2	100μF	$\pm 10\%$	Capacitor 3V	C100UJ
C3	3.3P	$\pm 20\%$	Capacitor	C1P30K
C4	0.047μF		Capacitor 250V	C47UNL
C5	100μF		Capacitor 6V	C100UZ
C6	1000PF		Capacitor 400V	C1NOOK
C7	330PF	$\pm 20\%$	Capacitor	C330PK
C8	120PF	$\pm 5\%$	Capacitor	C120PJ
C9				
C10	47μF		Capacitor 40V	C47U0Z
C11	330PF		Capacitor	C330PK

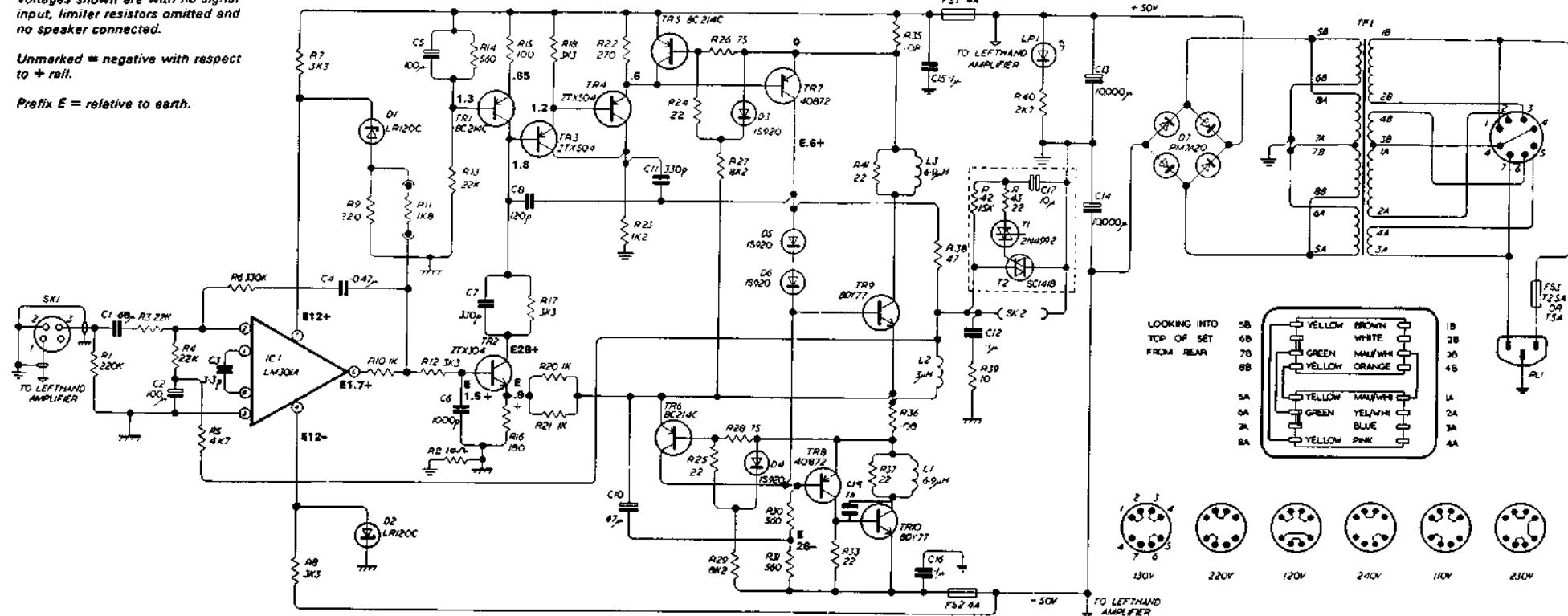
No.	Value	Tpl	Component	Stock No.
C12	0.1µ		Capacitor 250V	C1007K
C13	10,000µ		Capacitor 63V	C10KUT
C14	10,000µ		Capacitor 63V	C10KUT
C15	0.047µ		Capacitor	C47NQJ
TR1			Transistor BC214C	06C214C
TR2			Transistor BC882 or ZTX304 or BCX32	ZTX304
TR3			Transistor E845B or ZTX304	ZTX304
TR4			Transistor E845B or ZTX304	ZTX304
TR5			Transistor BC214C	DBC214C
TR6			Transistor BC214C	06C214C
TR7			Transistor 4087Z or 2SA740	040872Z
TR8			Transistor 4087Z or 2SA740	040872Z
TR9			Transistor BDY74 or BDY77	BDY777
TR10			Transistor BDY74 or BDY77	BDY777
D1			Zener Diode LR120C	DZ12VA
D2			Zener Diode LR120C	DZ12VA
D3			Diode 4882D	DIS920B
D4			Diode 4882D	DIS820B
D5			Diode ISW20	DIS920B
D6			Diode ISW20	DIS920B
D7			Bridge Rectifier	DPM47A2
K1			LM301A	DML301A

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.

BOARD NUMBER M12368 ISS 9



No.	Value	Tol	Reference	Stock No.
R1	220k	$\pm 10\%$	Resistor	R220KJ1
R2	10	$\pm 5\%$	Resistor	R10R0J1
R3	22k	$\pm 2\%$	Resistor	R22K0J1
R4	22k	$\pm 2\%$	Resistor	R22K0J1
R5	4.7k	$\pm 10\%$	Resistor	R4K70J1
R6	390k	$\pm 2\%$	Resistor	R390KJ1
R7	3k3	$\pm 10\%$	Resistor	R3K30J1
R8	3k3	$\pm 10\%$	Resistor	R3K30J1
R9	220	$\pm 5\%$	Resistor	R220RJ1
R10	1k	$\pm 2\%$	Resistor	R1K00J1
R11	1k8	$\pm 10\%$	Resistor	R1K80J1
R12	3k3	$\pm 10\%$	Resistor	R3K30J1
R13	22k	$\pm 2\%$	Resistor	R22K0J1
R14	680	$\pm 10\%$	Resistor	R680RJ1
R15	100	$\pm 10\%$	Resistor	R100RJ1
R16	180	$\pm 2\%$	Resistor	R180RJ1
R17	3k3	$\pm 10\%$	Resistor	R3K30J1
R18	3k3	$\pm 10\%$	Resistor	R3K30J1
R19				
R20	1k	$\pm 2\%$	Resistor	R1K00J1
R21	1k	$\pm 2\%$	Resistor	R1K00J1
R22	270	$\pm 10\%$	Resistor 7.8W	R270RJ1
R23	1k2	$\pm 10\%$	Resistor 7.8W	R1K20RJ1
R24	22	$\pm 10\%$	Resistor	R22R0J1
R25	22	$\pm 10\%$	Resistor	R22R0J1
R26	75	$\pm 5\%$	Resistor	R75R0J1

No.	Value	Tol	Reference	Stock No.
R27	6k2	$\pm 5\%$	Resistor	R6K20J1
R28	75	$\pm 5\%$	Resistor	R75R0J1
R29	6k2	$\pm 5\%$	Resistor	R6K20J1
R30	560	$\pm 10\%$	Resistor 2.5W	R560R0JS
R31	560	$\pm 10\%$	Resistor 2.5W	R560R0JS
R32	22	$\pm 10\%$	Resistor	R22R0J1
R33	0.08		Resistor	R08RJ1
R34	0.08		Resistor Acoustical DRWG A4/12363	R08RJ1
R35	22	$\pm 10\%$	Resistor	R22R0J1
R36	47	$\pm 5\%$	Resistor	R47R0J1
R37	10	$\pm 10\%$	Resistor	R10R0J1
R40	2k7		Resistor 1.8W	R2K70RJ1
R41	22	$\pm 10\%$	Resistor	R22R0J1
R42	18k	$\pm 10\%$	Resistor	R18K0J1
R43	22	$\pm 10\%$	Resistor	R22R0J1
C1	0.88μF		Capacitor 100V	C088NKS
C2	100μF	$\pm 10\%$	Capacitor 3V	C100UNME
C3	3.3μF	$\pm 20\%$	Capacitor	C3P30KJ
C4	0.047μF		Capacitor 250V	C47N0S5
C5	100μF		Capacitor 8V	C100UZB
C6	1.000μF		Capacitor 400V	C1N00KK
C7	220μF	$\pm 20\%$	Capacitor	C3D30KJ
C8	120μF	$\pm 5\%$	Capacitor	C120PJI

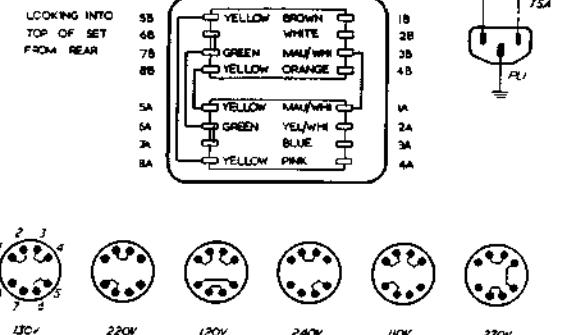
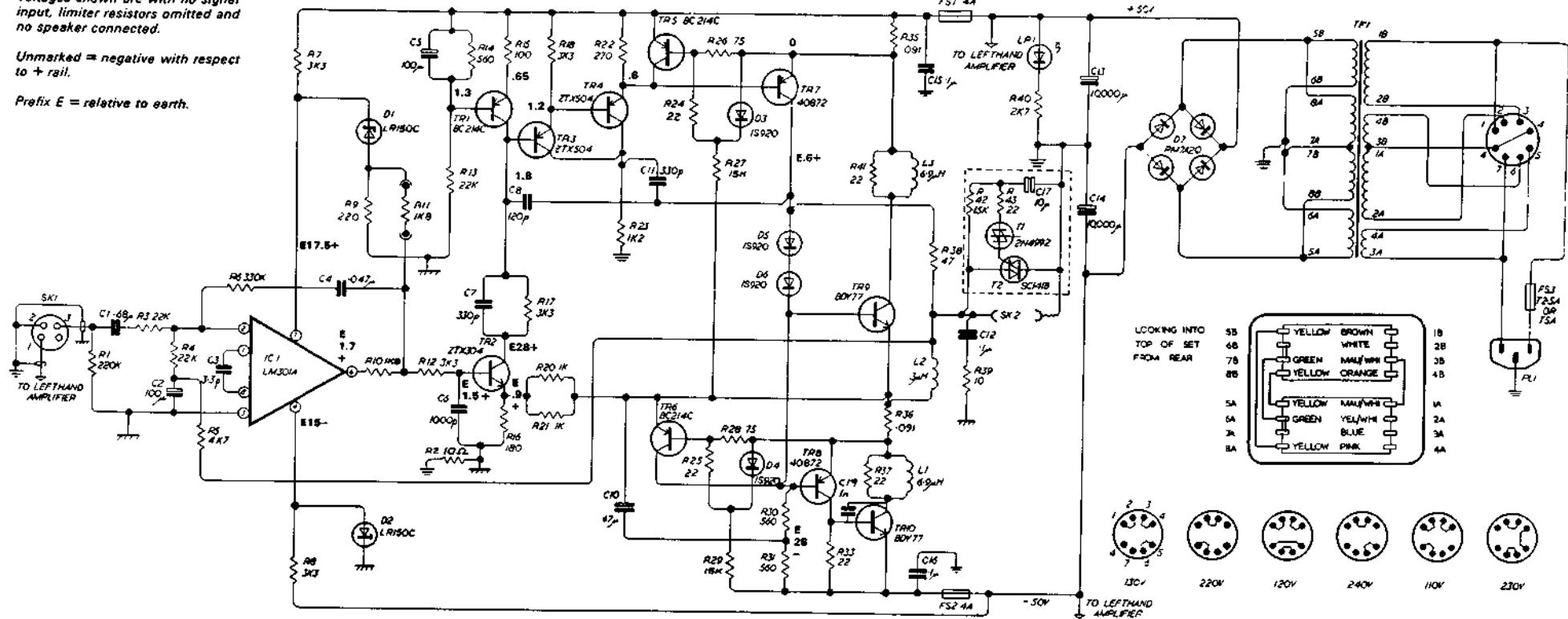
No.	Value	Tol	Reference	Stock No.
C9				
C10	47μF		Capacitor 40V	C47U02B
C11	320μF		Capacitor	C320PKJ
C12	0.1μ		Capacitor 250V	C100NKC
C13	10.000μF		Capacitor 63V	C10KUT4
C14	10.000μF		Capacitor 53V	C10KUT4
C15	0.1μ		Capacitor 100V	C100NKS
C16	0.1μ		Capacitor 100V	C100NKS
C17	10μ		Capacitor 40V	C10U0ZB
C19	1000P		Capacitor	C1H00SA
TR1			Transistor BC214C	DBC214C
TR2			Transistor BC682 or ZTX304 or BCX32	DZTX304
TR3			Transistor ES458 or ZTX504	DZTX504
TR4			Transistor ES458 or ZTX504	DZTX504
TR5			Transistor BC214C	DBC214C
TR6			Transistor BC214C	DBC214C
TR7			Transistor 40872 or 2SA740	D40872X
TR8			Transistor 40872 or 2SA740	D40872X
TR9			Transistor 2SD424 or 2SD678 or 17556	D17556X
TR10			Transistor 2SD424 or 2SD678 or 17556	D17556X
T1			DIAC 2N4992 or 2SD684-03	DB508AA
T2			DIAC BC1418 or T1C2268 or T2600	DT2600

No.	Value	Tol	Reference	Stock No.
D1			Zener Diode LR120C	DZ12VAA
D2			Zener Diode LR120C	DZ12VAA
D3			Diode IS920	DIS920B
D4			Diode IS920	DIS920B
D5			Diode IS920	DIS920B
D6			Diode IS920	DIS920B
D7			Bridge Rectifier	DPM742Q
I61			LM301A	DML301A
L1	0.8μH	$\pm 20\%$	Inductor ANCO TC1/85	L12406A
L2	3μH	$\pm 5\%$	Inductor ANCO 440/D	L12405A
L3	6.8μH	$\pm 20\%$	Inductor ANCO TC1/85	L12406A
F51	4A			UM04AQ
F52	4A			UM04AQ
F53	T2.6A		220-240V	UM2MADA
T54			110-130V	UM05ADA
LP1			Hewlett Packard 5092-4850 Red	BL5050R
TPI			Acoustical ORG A3/12362	L12362A

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	$\pm 10\%$	Resistor	R220KJ1
R2	10	$\pm 5\%$	Resistor	R10RDJ1
R3	22K	$\pm 2\%$	Resistor	R22KQJ1
R4	22K	$\pm 2\%$	Resistor	R22KQJ1
R5	4.7K	$\pm 10\%$	Resistor	R4K70J1
R6	330K	$\pm 2\%$	Resistor	R330KJ1
R7	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R8	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R9	220	$\pm 5\%$	Resistor	R220RJ1
R10	1K8	$\pm 10\%$	Resistor	R1K8QJ1
R11	1K8	$\pm 10\%$	Resistor	R1K8QJ1
R12	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R13	22K	$\pm 2\%$	Resistor	R22KQJ1
R14	560	$\pm 10\%$	Resistor	R560RJ1
R15	100	$\pm 10\%$	Resistor	R100RJ1
R16	180	$\pm 2\%$	Resistor	R180RJ1
R17	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R18	3K3	$\pm 10\%$	Resistor	R3K3QJ1
R19				
R20	1K	$\pm 2\%$	Resistor	R1KQJ1
R21	1K	$\pm 2\%$	Resistor	R1KQJ1
R22	270	$\pm 10\%$	Resistor	R270RJ1
R23	1K2	$\pm 10\%$	Resistor 1.8W	R1K20JR
R24	22	$\pm 10\%$	Resistor	R22RQJ1
R25	22	$\pm 10\%$	Resistor	R22RQJ1
R26	75	$\pm 5\%$	Resistor	R75RQJ1

No.	Value	Tol	Reference	Stock No.
R27	15K	$\pm 5\%$	Resistor	R15KQJ1
R28	75	$\pm 5\%$	Resistor	R75RQJ1
R29	16K	$\pm 5\%$	Resistor	R16KQJ1
R30	560	$\pm 10\%$	Resistor 2.5W	R560RJS
R31	880	$\pm 10\%$	Resistor 2.5W	R560RJS
R32				
R33	22	$\pm 10\%$	Resistor	R22RQJ1
R34	0.091		Resistor	R091JY
R35	0.091		Resistor	R091JY
R36	22	$\pm 10\%$	Resistor	R22RQJ1
R37	47	$\pm 5\%$	Resistor	R47RQJ1
R38	10	$\pm 10\%$	Resistor	R10RQJ1
R39	2K7		Resistor 1.8W	R2K70JR
R41	22	$\pm 10\%$	Resistor	R22RQJ1
R42	16K	$\pm 10\%$	Resistor	R15KQJ1
R43	22	$\pm 10\%$	Resistor	R22RQJ1
C1	0.68μ		Capacitor 100V	C680KES
C2	100μ	$\pm 10\%$	Capacitor 3V	C100UMS
C3	3.3P	$\pm 20\%$	Capacitor	C3P30UJ
C4	0.047μ		Capacitor 250V	C47HQS
C5	100μ		Capacitor 8V	C100UZB
C6	1000P		Capacitor 400V	C1N00K
C7	330P	$\pm 20\%$	Capacitor	C330PKJ
C8	120P	$\pm 5\%$	Capacitor	C120PJ

No.	Value	Tol	Reference	Stock No.	
C9					
C10	47μ		Capacitor 40V	C47U0ZB	
C11	330P		Capacitor	C330PKJ	
C12	0.1μ		Capacitor 250V	C100NK	
C13	10.000μ		Capacitor 63V	C100KUTA	
C14	10.000μ		Capacitor 63V	C100KUTA	
C15	0.1μ		Capacitor 100V	C100NKS	
C16	0.1μ		Capacitor 100V	C100NKS	
C17	10μ		Capacitor 40V	C1000ZM	
C19	1000P		Capacitor	C1N00SA	
TR1					
TR2					
TR3					
TR4					
TR5					
TR6					
TR7					
TR8					
TR9					
TR10					
T1					
T2					
L1	0.8μH	$\pm 20\%$	Inductor ANCO TC1/66	L12408A	
L2	3μH	$\pm 5\%$	Inductor ANCO 440/1D	L12405A	
L3	0.8μH	$\pm 20\%$	Inductor ANCO TC1/66	L12406A	
F51	4A			UM04ADA	
F52	4A			UM04ADA	
F53	72.6A			UM245DA	
TBA				UM05ADA	
LP1				Hewlett Packard 5082-4880 Red	BL5053R
TF1				Acoustical DRG A3/1236Z	L12362A

No.	Value	Tol	Reference	Stock No.	
D1			Zener Diode LR150C	D215VAA	
D2			Zener Diode LR150C	D215VAA	
D3			Diode 15920	DIS920B	
D4			Diode 15920	DIS920B	
D5			Diode 15920	DIS920B	
D6			Diode 15920	DIS920B	
D7			Bridge Rectifier	OPM742G	
IC1			LM301A	DML301A	
L1	0.8μH	$\pm 20\%$	Inductor ANCO TC1/66	L12408A	
L2	3μH	$\pm 5\%$	Inductor ANCO 440/1D	L12405A	
L3	0.8μH	$\pm 20\%$	Inductor ANCO TC1/66	L12406A	
F51	4A			UM04ADA	
F52	4A			UM04ADA	
F53	72.6A			UM245DA	
TBA				UM05ADA	
LP1				Hewlett Packard 5082-4880 Red	BL5053R
TF1				Acoustical DRG A3/1236Z	L12362A

BOARD NUMBER M12368 ISS 9 AND 10

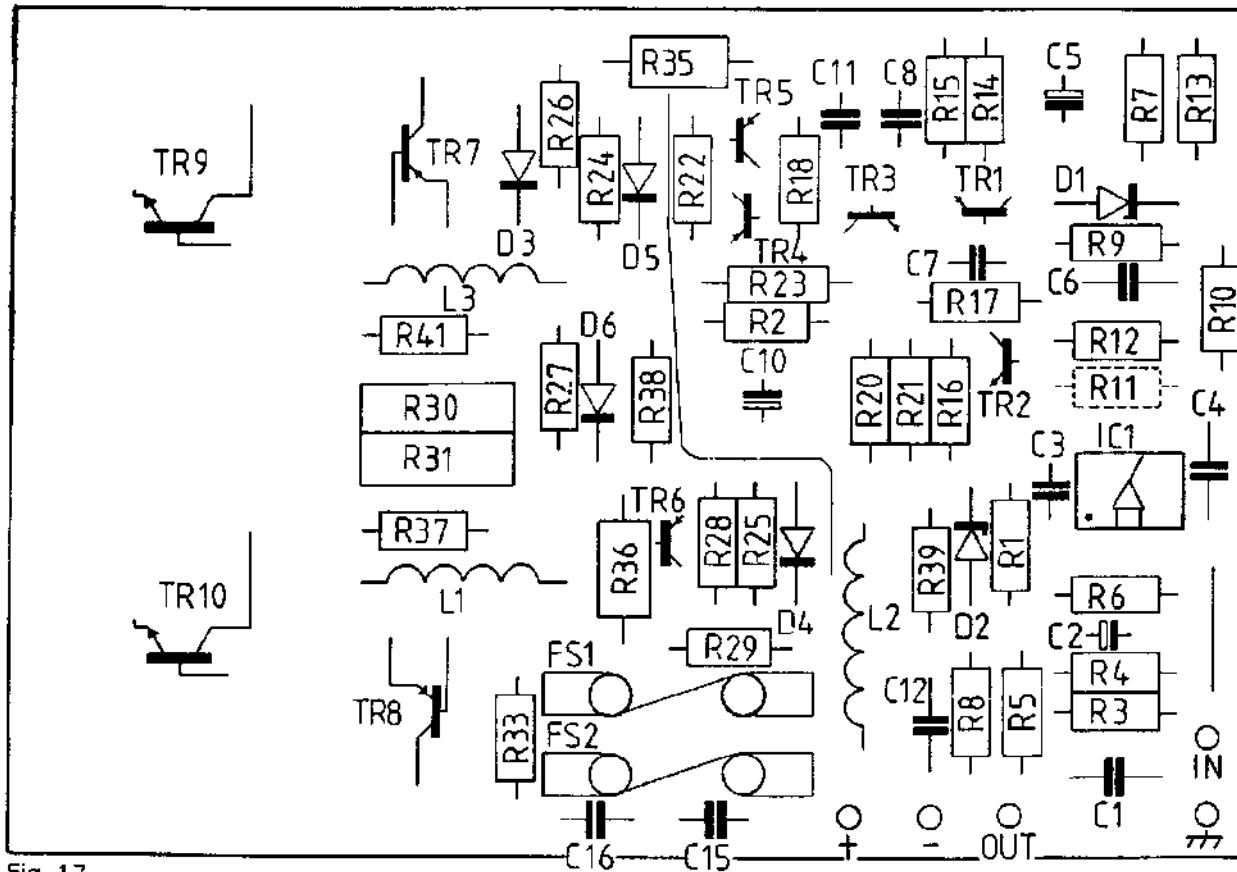


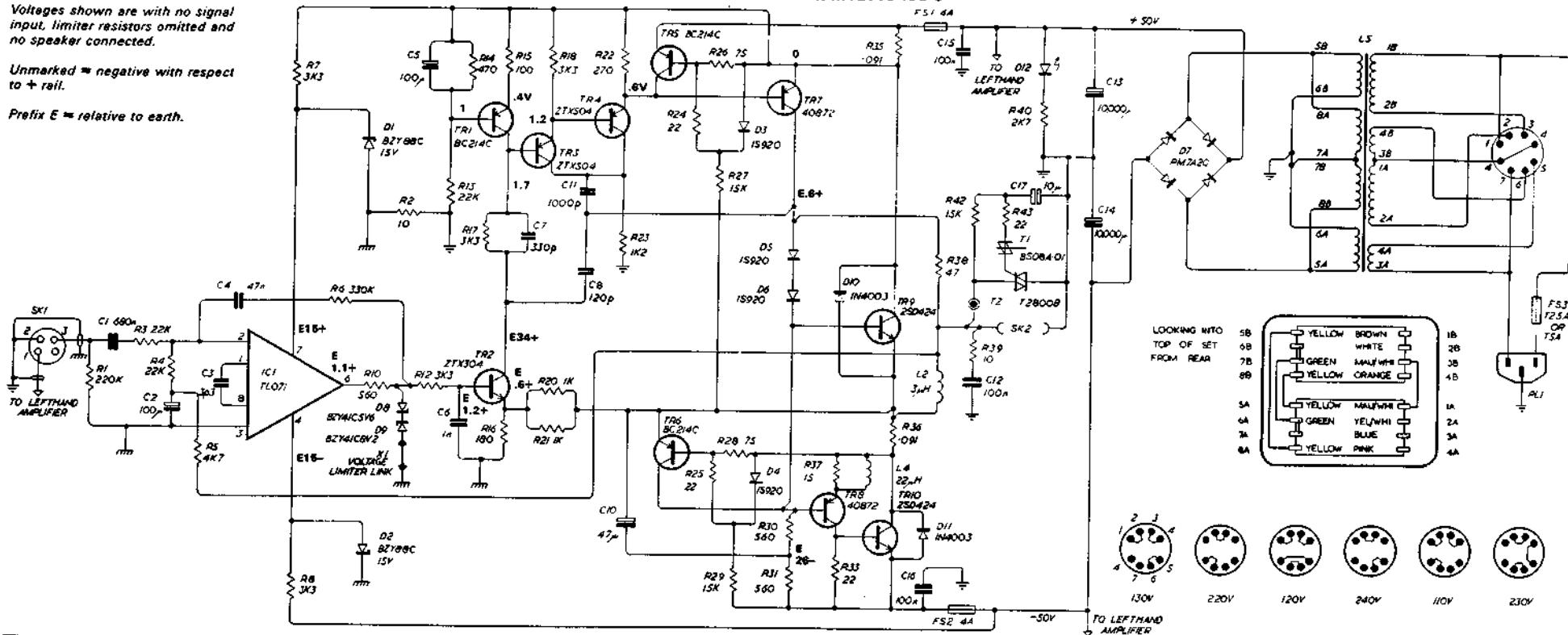
Fig. 17

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.

BOARD NUMBER M12565 ISS 3



No.	Value	Tol.	Reference	Stock No.
R1	220K		Resistor	R220KJ1
R2	10		Resistor	R10R0J1
R3	22K	± 2%	Resistor	R22K0G1
R4	22K	± 2%	Resistor	R22K0G1
R5	4K7		Resistor	R4K7QJ1
R6	330K	± 2%	Resistor	R330K0G1
R7	3K3		Resistor	R3K3QJ1
R8	3K3		Resistor	R3K3QJ1
R10	560		Resistor	R560R0J1
R12	3K3		Resistor	R3K3QJ1
R13	22K	± 2%	Resistor	R22K0G1
R14	470		Resistor	R470R0J1
R15	100		Resistor	R100R0J1
R16	180	± 2%	Resistor	R180R0J1
R17	3K3		Resistor	R3K3QJ1
R18	3K3		Resistor	R3K3QJ1
R20	1K	± 2%	Resistor	R1K00G1
R21	1K	± 2%	Resistor	R1K00G1
R22	270		Resistor	R270R0J1
R23	1K2		Resistor	R1K20R0J1
R24	22		Resistor	R22R0J1
R26	22		Resistor	R22R0J1
R28	76		Resistor	R76R0J1

No.	Value	Tol.	Reference	Stock No.
R27	15K		Resistor	R15K0J1
R28	76		Resistor	R76R0J1
R29	15K		Resistor	R15K0J1
R30	560		Resistor	R560R0J5
R31	560		Resistor	R560R0J5
R33	22		Resistor	R22R0J1
R35	.001		Resistor	R001R0J1
R36	.001		Resistor	R001R0J1
R37	15		Resistor	R15R0J1
R38	47		Resistor	R47R0J1
R39	10		Resistor	R10R0J1
R40	2K7		Resistor	R2K70R0J1
R42	18K		Resistor	R18K0J1
R43	22		Resistor	R22R0J1
C1	800n		Capacitor	C0800PK1
C2	100μ		Capacitor	C100UKT
C3	3μ3		Capacitor	C3P30C1
C4	47n		Capacitor	C47N0JS
C5	100μ		Capacitor	C100UZB
C6	1n		Capacitor	C1N00K
C7	330p		Capacitor	C330PKJ

No.	Value	Tol.	Reference	Stock No.
C8	120p		Capacitor	C120PK1
C10	47μ		Capacitor	C47U0ZB
C11	1000p		Capacitor	C1K0PKJ
C12	100n		Capacitor	C100NJS
C13	10.000μ		Capacitor	C10KUTA
C14	10.000μ		Capacitor	C10KUTA
C15	100n		Capacitor	C100NKS
C16	100n		Capacitor	C100NKS
C17	10p		Capacitor	C10U0ZB
TR1			Transistor BC214C	DBC214C
TR2			Transistor ZTX304	DZTX304
TR3			Transistor ZTX504	DZTX504
TR4			Transistor ZTX504	DZTX504
TR5			Transistor BC214C	DBC214C
TR6			Transistor BC214C	DBC214C
TR7			Transistor 40872	D40872X
TR8			Transistor 40872	D40872X
TR9			Transistor 17566 or 2SD424	D17566X
TR10			Transistor 17566 or 2SD424	D17566X
T1			Diac 17508A-01 or 2SD492	D8508AA
T2			Triac T2800B	D12800B
D1			Zener Diode BZY88C 15V	DZ15VAA

No.	Value	Tol.	Reference	Stock No.
O2			Zener Diode BZY88C 15V	DZ15VAA
O3			Diode 15920T8	D15920B
D4			Diode 15920T8	D15920B
O5			Diode 15920T8	D15920B
O6			Diode 15920T8	D15920B
O7			Bridge Rectifier PM7A2Q	DPM7A2Q
O8			Zener Diode BZY41CBV2	DZBV4AA
O9			Zener Diode BZY41CBV6	DZBV6AA
O10			Diode 1M4003	D1M4003
O11			Diode 1M4003	D1M4003
O12			LED XC5053R	BL5053R
I1			Int. Circuit TL071, ME3534, LM351, LM301	0071CPX
L2	3μH	± 5%	Choke	L1240SA
L4	22μH		Choke	LSC1022
L5			Transformer	L12382A
F51	4A		Fuse	UM0440U
F52	4A		Fuse	UM0440U
F53	T2A5		Fuse 220-240V	UM2ASDA
T5A			Fuse 110-130V	UM0SADA
X1			Link	PP37712

BOARD NUMBER M12565 ISS 3

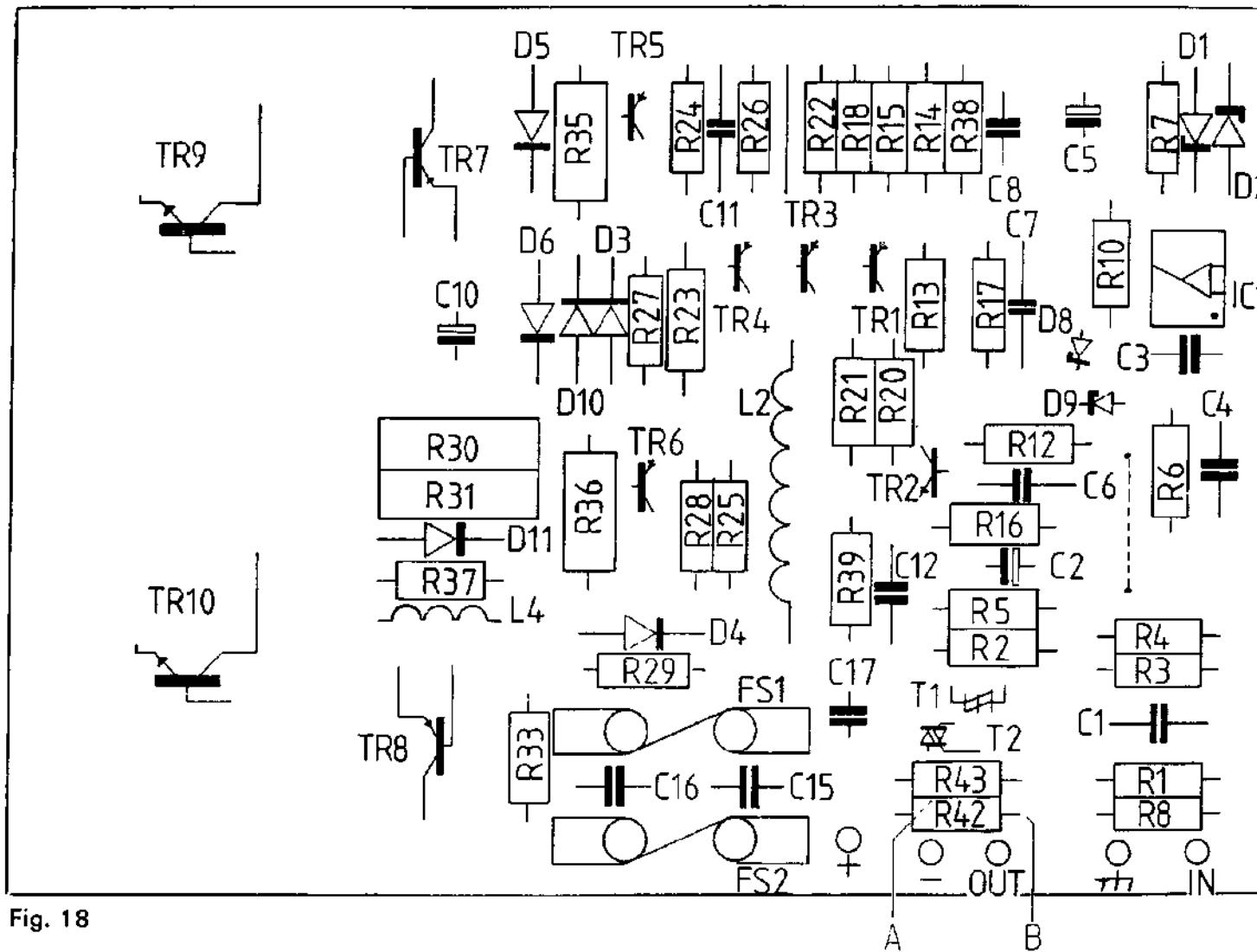
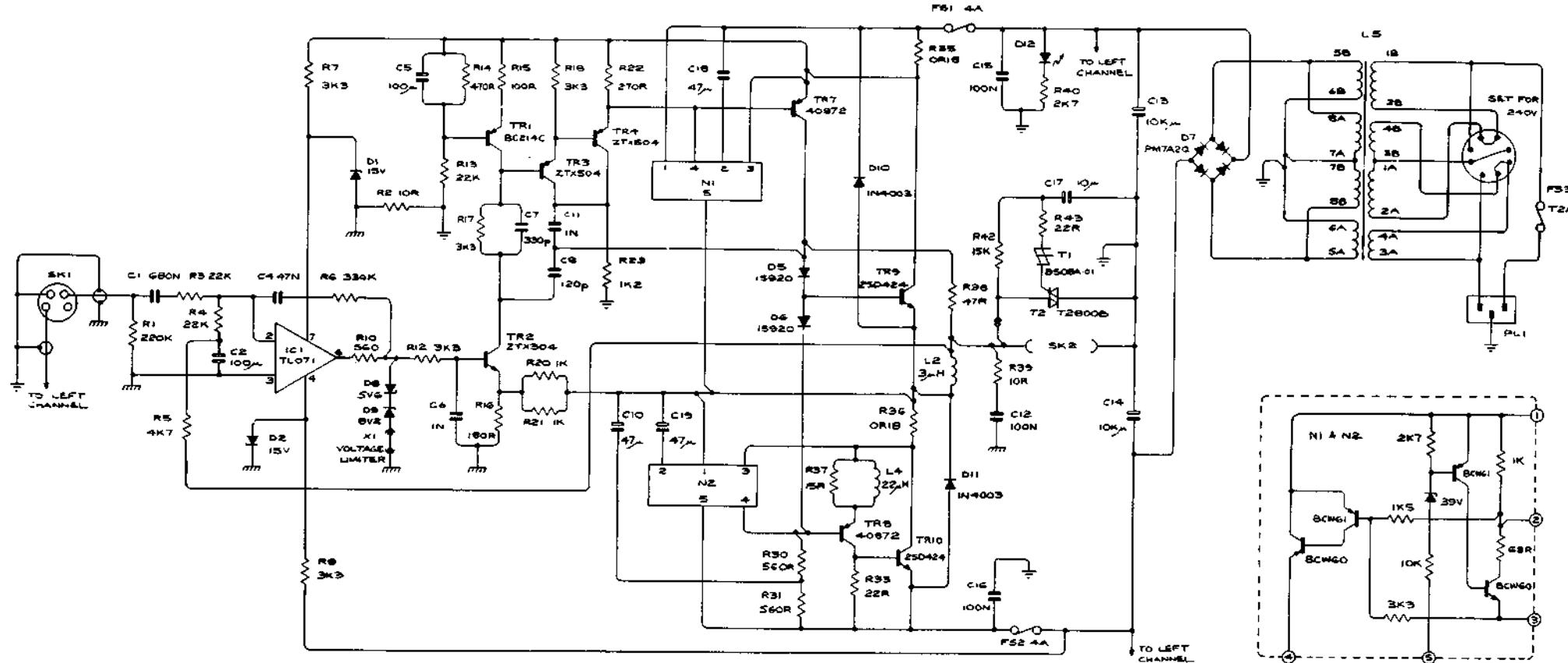


Fig. 18

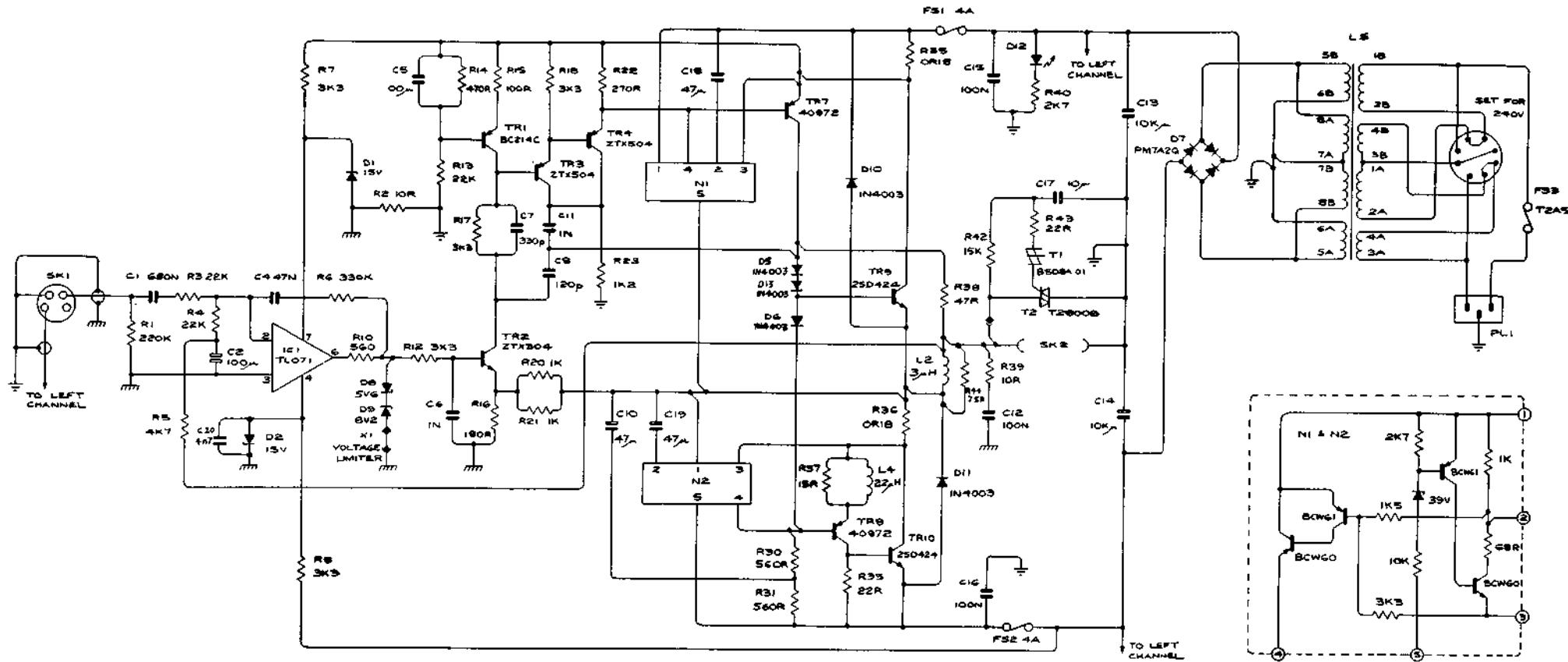


R1	RESISTOR	220K	± 5%	R220KJ1
R2	RESISTOR	10R	± 5%	R10RJ1
R3	RESISTOR	2K3	± 2%	R22K0J1
R4	RESISTOR	22K	± 2%	R22K0J1
R5	RESISTOR	4K7	± 5%	R4K70J1
R6	RESISTOR	350K	± 2%	R350KJ1
R7	RESISTOR	3K3	± 5%	R3K30J1
R8	RESISTOR	3K3	± 5%	R3K30J1
R9	RESISTOR	560R	± 5%	R560RJ1
R10	RESISTOR	2K3	± 5%	R2K30J1
R11	RESISTOR	2K3	± 5%	R2K30J1
R12	RESISTOR	2K	± 2%	R22K0J1
R13	RESISTOR	470R	± 5%	R470RJ1
R14	RESISTOR	100R	± 5%	R100RJ1
R15	RESISTOR	180R	± 2%	R180RJ1
R16	RESISTOR	180R	± 2%	R180RJ1
R17	RESISTOR	3K3	± 5%	R3K30J1
R18	RESISTOR	3K3	± 5%	R3K30J1
R19	RESISTOR	1K	± 2%	R1K0GJ1
R20	RESISTOR	1K	± 2%	R1K0GJ1
R21	RESISTOR	1K	± 2%	R1K0GJ1
R22	RESISTOR	270R	± 5%	R270RJ1
R23	RESISTOR	1K2	± 5%	R1K20J1
R24	RESISTOR	560R	± 5%	R560RJ1
R25	RESISTOR	560R	± 5%	R560RJ1
R26	RESISTOR	22R	± 5%	R22R0J1
R27	RESISTOR	15R	± 5%	R15R0J1

R28	RESISTOR	47R	± 5%	R47R0J1
R29	RESISTOR	10R	± 5%	R10R0J1
R30	RESISTOR	2K7	± 5%	R2K70JR1
R40	RESISTOR	15K	± 5%	R15K0J1
R42	RESISTOR	15K	± 5%	R15K0J1
R43	RESISTOR	22R	± 5%	R22R0J1
C1	CAPACITOR	680N		C680NKS
C2	CAPACITOR	100uF		C100uFJ
C4	CAPACITOR	47n		C47n0J5
C5	CAPACITOR	109u		C109uZB
C6	CAPACITOR	IN		CIN0UJ
C7	CAPACITOR	330P		C330PKJ
C8	CAPACITOR	120P		C120P1J
C10	CAPACITOR	47		C47uQZB
C11	CAPACITOR	IN		CIN00SA
C12	CAPACITOR	100n		C100nJS
C13	CAPACITOR	10m		C10mKUTA
C14	CAPACITOR	10Ku		C10KuKUTA
C15	CAPACITOR	100n		C100nKS
C16	CAPACITOR	100n		C100nKS
C17	CAPACITOR	10u		C10uQZB
C18	CAPACITOR	47		C47uQZB
C19	CAPACITOR	47		C47uQZB

TR1	TRANSISTOR	BCE14C	D8C214C
TR2	TRANSISTOR	ZTX304	D2ZTX304
TR3	TRANSISTOR	ZTX504	D2ZTX504
TR4	TRANSISTOR	ZTX504	D2ZTX504
TR7	TRANSISTOR	40872	D40872X
TR8	TRANSISTOR	40872	D40872X
TR9	TRANSISTOR	2SD424	D2SD424
TR10	TRANSISTOR	2SD424	D2SD424
T1	DIAC	BS508A-01	DB508AA
T2	TRIAC	T2800B	DT2800B
D1	ZENER DIODE	BZY58C 15V	D5515VA
D2	ZENER DIODE	BZY58C 15V	D5515VA
D3	DIODE	1S920	D1S920B
D6	DIODE	1S920	D1S920B
D7	BRIDGE RECTIFIER	PM7A2Q	DPM7A2Q
D8	ZENER DIODE	BZY41C 5V6	DZ5V6AA
D9	ZENER DIODE	BZY41C 8V2	DZ8V2AA
D10	DIODE	IN4003	DIN4003
D11	DIODE	IN4003	DIN4003
D12	LED	XCS053R	BL5033R
X1	SHORTING LINK		PP37712
IC1	INT CIRCUIT	TL071	D071CPX

PS1	FUSE	4A	UM04AQU
PS2	FUSE	4A	UM04AQU
PS3	FUSE	T2A5 220-240V	UN2ASDA
		PSA 110-130V	UNOSADA
L5	MAINS TRANSFORMER		L12362A
L2	CHOKE 3A-H		L12405A
L4	CHOKE 22A		L4T220K
N1	NETWORK		Q05NIAW
N2	NETWORK		Q05NIAW

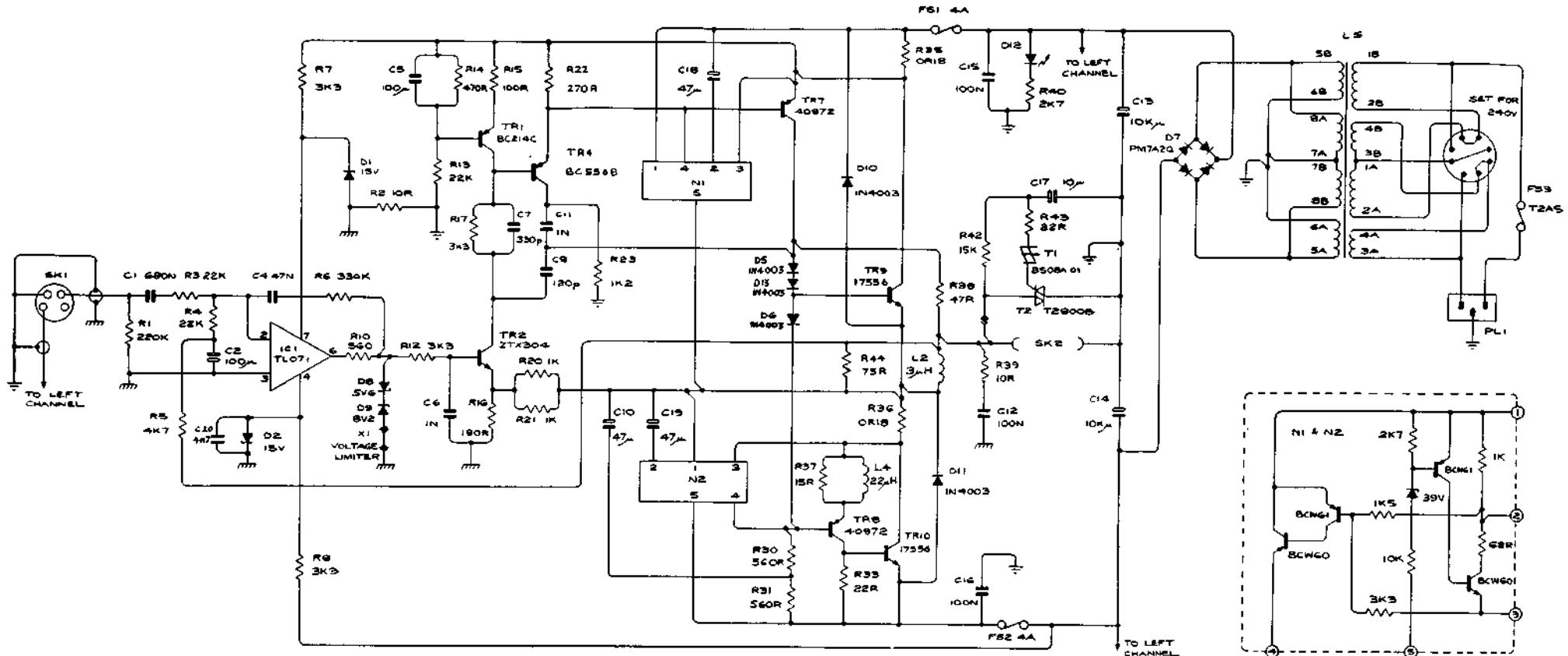


R1	RESISTOR	220K	± 5%	R220KJ1
R2	RESISTOR	10R	± 5%	R10RJ1
R3	RESISTOR	22K	± 2%	R22K0S1
R4	RESISTOR	22K	± 2%	R22K0S1
R5	RESISTOR	4K7	± 5%	R4K70S1
R6	RESISTOR	330K	± 5%	R330KJ1
R7	RESISTOR	3K2	± 5%	R3K20S1
R8	RESISTOR	3K3	± 5%	R3K30S1
R10	RESISTOR	560R	± 5%	R560RJ1
R12	RESISTOR	3K3	± 5%	R3K30S1
R13	RESISTOR	2K8	± 2%	R22K0S1
R14	RESISTOR	470R	± 5%	R470RJ1
R15	RESISTOR	100R	± 5%	R100RJ1
R16	RESISTOR	180R	± 5%	R180RJ1
R17	RESISTOR	3K3	± 5%	R3K30S1
R18	RESISTOR	3K3	± 5%	R3K30S1
R20	RESISTOR	1K	± 2%	R1K0G1
R21	RESISTOR	1K	± 2%	R1K0G1
R22	RESISTOR	270R	± 5%	R270RJ1
R23	RESISTOR	1K2	± 5%	R1K20J1
R30	RESISTOR	560R	± 5%	R560RJ1
R31	RESISTOR	560R	± 5%	R560RJ1C
R32	RESISTOR	22R	± 5%	R22R0J1
R35	RESISTOR	0R15	± 5%	R0R15TC
R36	RESISTOR	0R15	± 5%	R0R15TC
R37	RESISTOR	15R	± 5%	R15R0J1

R38	RESISTOR	47R	$\pm 5\%$	R47R0J
R29	RESISTOR	10R	$\pm 5\%$	R10R0J
R40	RESISTOR	2K7	$\pm 5\%$	R2K70J
R42	RESISTOR	15K	$\pm 5\%$	R15K0J
R43	RESISTOR	22R	$\pm 5\%$	R22R0J
R44	RESISTOR	75A	$\pm 5\%$	R75A0J
C1	CAPACITOR	680N		C680N0KS
C2	CAPACITOR	100uF		C100uFJ
C4	CAPACITOR	47N		C47N0JS
C5	CAPACITOR	100uF		C100uF2B
C6	CAPACITOR	IN		C100uFJ
C7	CAPACITOR	330P		C330PJK
C8	CAPACITOR	120P		C120PJJ
C10	CAPACITOR	47u		C47u0KS
C11	CAPACITOR	IN		C100uS
C12	CAPACITOR	100N		C100NJS
C13	CAPACITOR	10Ku		C10KuT
C14	CAPACITOR	10Ku		C10KuT
C15	CAPACITOR	100N		C100NKS
C16	CAPACITOR	100N		C100NKS
C17	CAPACITOR	10u		C10u02R
C18	CAPACITOR	47u		C47u0Z
C19	CAPACITOR	47u		C47u0Z
C20	CAPACITOR	47u		C47u16J

TR1	TRANSISTOR	BCE214C	DEC214C
TR2	TRANSISTOR	ZTX304	DZTX304
TR3	TRANSISTOR	ZTX504	DZTX504
TR4	TRANSISTOR	ZTX604	DZTX604
TR7	TRANSISTOR	4087B	DC4087B
TR8	TRANSISTOR	4087B	DC4087B
TR9	TRANSISTOR	2SD424	DS2SD424
TR10	TRANSISTOR	2SD424	DS2SD424
TI	DIAC	B508A-01	DB508AA
TE	TRIAC	T2800B	DT2800B
D1	ZENER DIODE	BZY88C 15V	DBZ88VA
D2	ZENER DIODE	BZY88C 15V	DBZ88VA
D5	DIODE	IN4003	DI4003
D6	DIODE	IN4003	DI4003
D7	BRIDGE RECTIFIER	PM7A2Q	DPM7A2Q
D8	ZENER DIODE	BZY41C 5V6	DBZ5V6AA
D9	ZENER DIODE	BZY41C 6V2	DBZ6V2AA
D10	DIODE	IN4003	DI4003
D11	DIODE	IN4003	DI4003
D12	LED	XC5053R	BL5053R
D13	DIODE	IN4003	DI4003
X1	SHORTING LINK		PP3771Z
IC1	INT. CIRCUIT	TL071	DC071CPX

F51	FUSE	4A	UM04AGU
F52	FUSE	4A	UM04AGU
F53	FUSE	T2AS 220- 240V TSA 110 - 130V	UM2ASDA UM0SADA
L5	MAINS	TRANSFORMER	L123G2A
L2		CHOKE 3A H	L12405A
L4		CHOKE 22A H	L4-T2ZOK
N1		NETWORK	QOSNIAW
N2		NETWORK	QOS NIAW



R1	RESISTOR	220K	± 5%	R220KJ4
R2	RESISTOR	10R	± 5%	R10RJ4
R3	RESISTOR	22K	± 2%	R22K061
R4	RESISTOR	22K	± 2%	R22K061
R5	RESISTOR	4K7	± 5%	R4K703J4
R6	RESISTOR	330K	± 2%	R330KG1
R7	RESISTOR	3K3	± 5%	R3K302J1
R8	RESISTOR	5% 3K3	± 5%	R3K302J1
R9	RESISTOR	560R	± 5%	R560AJ4
R10	RESISTOR	2K3	± 5%	R2K303J1
R11	RESISTOR	2K	± 2%	R22K061
R12	RESISTOR	470R	± 5%	R470RJ4
R13	RESISTOR	100R	± 5%	R100RJ4
R14	RESISTOR	160R	± 2%	R160RJ4
R15	RESISTOR	3K3	± 5%	R3K302J1
R16	RESISTOR	100R	± 5%	R100RJ4
R17	RESISTOR	15R	± 5%	R15RJ4
R20	RESISTOR	1K	± 2%	R1K00G1
R21	RESISTOR	1K	± 2%	R1K00G1
R22	RESISTOR	270R	± 5%	R270RJ4
R23	RESISTOR	1K2	± 5%	R1K20JR
R24	RESISTOR	560R	± 5%	R560AJ4
R31	RESISTOR	560R	± 5%	R560AJ4
R32	RESISTOR	22R	± 5%	R22R03J4
R33	RESISTOR	OR18	± 5%	R0R18JC
R34	RESISTOR	OR18	± 5%	R0R18JC
R35	RESISTOR	15R	± 5%	R15RJ4

C1	CAPACITOR	680N	C680NKA
C2	CAPACITOR	100uF	C100UJ1
C4	CAPACITOR	47N	C47N01S
C5	CAPACITOR	100uF	C100UME
C6	CAPACITOR	1N	C1N00UP
C7	CAPACITOR	330P	C330PKJ
C8	CAPACITOR	120P	C120PJI
C10	CAPACITOR	47u	C47U02E
C11	CAPACITOR	1N	C1N00SA
C12	CAPACITOR	100N	C100NJS
C13	CAPACITOR	10Ku	C10KUTS
C14	CAPACITOR	10Ku	C10KUTS
C15	CAPACITOR	100N	C100NK3
C16	CAPACITOR	100N	C100NK3
C17	CAPACITOR	10u	C10U02R
C18	CAPACITOR	47u	C47U02E
C19	CAPACITOR	47u	C47U02E
C20	CAPACITOR	47u	C47U02J3

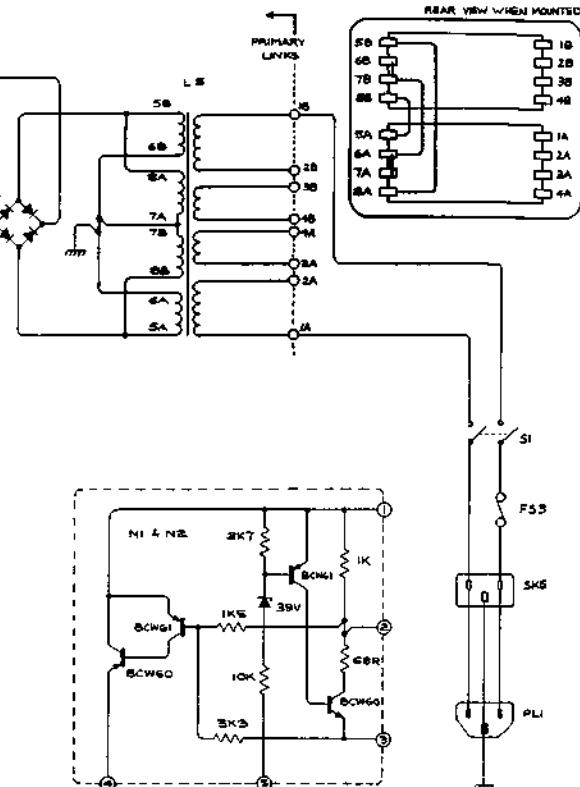
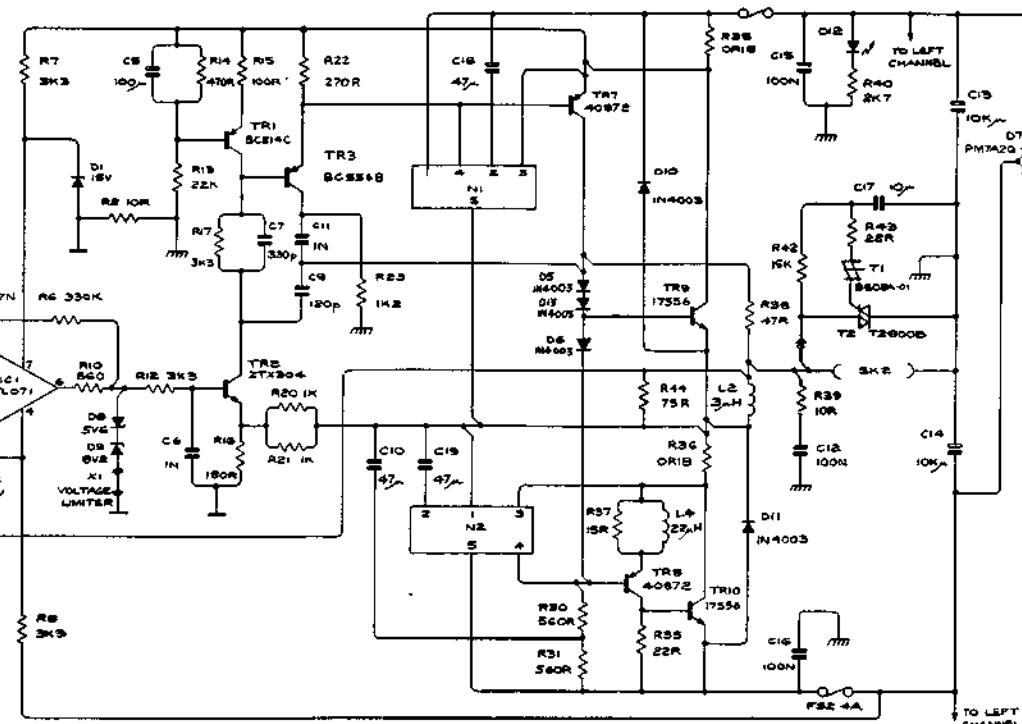
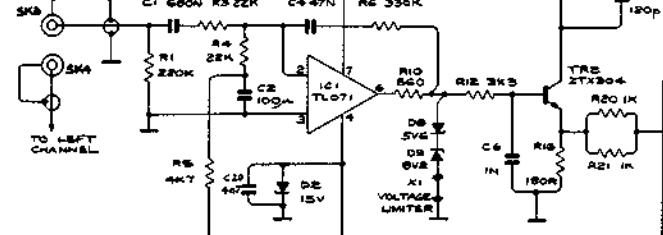
R36	RESISTOR	47R	± 5%	R47R0J4
R39	RESISTOR	10R	± 5%	R10RJ1
R40	RESISTOR	2K7	± 5%	R2K70JR
R42	RESISTOR	15K	± 5%	R15K0J4
R43	RESISTOR	22R	± 5%	R22R03J4
R44	RESISTOR	75R	± 5%	R75R03J4
C10	CAPACITOR	47u	C47U02J3	
C15	CAPACITOR	47u	C47U02J3	
N1	NETWORK	2	1	N2
N2	NETWORK	1	2	N1

TR1	TRANSISTOR	BC214C	BC214C
TR2	TRANSISTOR	ZTX504	ZTX504
TR4	TRANSISTOR	BC556B	BC556B
TR7	TRANSISTOR	40972E	D40972X
TR8	TRANSISTOR	40972E	D40972X
TR9	TRANSISTOR	17556	D17556X
TR10	TRANSISTOR	17556	D17556X
T1	DIAC	B508A-01	D508AA
T2	TRIAC	T2900B	D72900B
D1	ZENER DIODE	BZY88C 15V	DZB88VA
D2	ZENER DIODE	BZY88C 15V	DZB88VA
D5	DIODE	IN4003	DI4003
D6	DIODE	IN4003	DI4003
D7	BRIDGE RECTIFIER	PM7A2Q	DPM7A2Q
D8	ZENER DIODE	BZY41C 5V6	DZBZY41A
D9	ZENER DIODE	BZY41C 9V2	DZBZY41A
D10	DIODE	IN4003	DI4003
D11	DIODE	IN4003	DI4003
D12	LED	XCS503R	SL503SR
D13	DIODE	IN4003	DI4003
X1	SHORTING LINK		QOSLINK
I1	INT. CIRCUIT	TL 071	DOTICPX

F51	FUSE	4A	UM04AQU
F52	FUSE	4A	UM04AQU
F53	FUSE	T2AS 220- 240V TSA 110 - 130V	UM2ASDA UM0SDA
L5	MAINS TRANSFORMER		L123G2A
L2	CHOKE 3A-H		L12405A
L4	CHOKE 22uH		L4T220K
N1	NETWORK		QOSNIAT
N2	NETWORK		QOSNIAT



VOLTAGE SELECTION BY PRIMARY LINK (REAR VIEW)



R1	RESISTOR 220K ±5%	R220K74
R2	RESISTOR 10R ±5%	R10KJ1
R3	RESISTOR 22K ±2%	R22K061
R4	RESISTOR 22K ±2%	R22K061
R5	RESISTOR 4K7 ±5%	R4K7034
R6	RESISTOR 230K ±2%	R230K41
R7	RESISTOR 3K2 ±5%	R3K2031
R8	RESISTOR 3K2 ±5%	R3K2031
R9	RESISTOR 560K ±5%	R560K74
R10	RESISTOR 2K5 ±5%	R2K5071
R11	RESISTOR 2K5 ±5%	R2K5061
R12	RESISTOR 470R ±5%	R470R74
R13	RESISTOR 100R ±5%	R100R74
R14	RESISTOR 100R ±5%	R100R74
R15	RESISTOR 100R ±5%	R100R74
R16	RESISTOR 100R ±5%	R100R74
R17	RESISTOR 3K2 ±5%	R3K2031
R20	RESISTOR 1K ±2%	R1K001
R21	RESISTOR 1K ±2%	R1K001
R22	RESISTOR 270R ±5%	R270R74
R23	RESISTOR 1K2 ±5%	R1K2031
R24	RESISTOR 2K5 ±5%	R2K5074
R25	RESISTOR 2K5 ±5%	R2K5074
R26	RESISTOR 4K7 ±5%	R4K7034
R27	RESISTOR 22R ±5%	R22R034
R28	RESISTOR 0R18 ±5%	R0R18J2
R29	RESISTOR 0R18 ±5%	R0R18J2

R30	RESISTOR 47R ±5%	R47R034
R31	RESISTOR 10R ±5%	R10R031
R40	RESISTOR 2K7 ±5%	R2K7031
R42	RESISTOR 15K ±5%	R15K031
R43	RESISTOR 22R ±5%	R22R034
R44	RESISTOR 75R ±5%	R75R034
C1	CAPACITOR 680N	C680NKA
C2	CAPACITOR 100μF	C100μFJ2
C4	CAPACITOR 47N	C47N051
C5	CAPACITOR 100μF	C100μFNE
C6	CAPACITOR IN	CIN000P
C7	CAPACITOR 330P	C330P0K2
C8	CAPACITOR 120P	C120P0J1
C10	CAPACITOR 47μ	C47U02B
C11	CAPACITOR IN	CIN000A
C12	CAPACITOR 100μF	C100μF2
C13	CAPACITOR 10K2	C10K2T5
C14	CAPACITOR 10K2	C10K2T5
C15	CAPACITOR 100N	C100NK1
C16	CAPACITOR 100N	C100NK1
C17	CAPACITOR 10μ	C10U02R
C18	CAPACITOR 47μ	C47U02E
C19	CAPACITOR 47μ	C47U02F
C20	CAPACITOR 47μ	C47U02F

TR1	TRANSISTOR BC814C	BC814C
TR2	TRANSISTOR ZTX304	ZTX304
TR3	TRANSISTOR BC556B	BC556B
TR7	TRANSISTOR 40672	D40672X
TR8	TRANSISTOR 40672	D40672X
TR9	TRANSISTOR 17556	D17556X
TR10	TRANSISTOR 17556	D17556X
T1	DIAC BS20A-01	BS20A-01
T2	TRIAC T2800B	T2800B
D1	ZENER DIODE BZY88C 15V	BZY88C
D2	ZENER DIODE BZY88C 15V	BZY88C
D5	DIODE IN4005	IN4005
D6	DIODE IN4003	IN4003
D7	BRIDGE RECTIFIER PM7A2Q	PM7A2Q
D8	ZENER DIODE BZY4HC 5V6	BZY4HC
D9	ZENER DIODE BZY4HC 5V2	BZY4HC
D10	DIODE IN4005	IN4005
D11	DIODE IN4003	IN4003
D12	LED XC5605BR	XC5605BR
D13	DIODE IN4003	IN4003
X1	SHORTING LINK	Q05UNLK
I1	INT. CIRCUIT TL071	TL071CPX

F51	FUSE 4A	UM04AQU
F52	FUSE 4A	UM04AQU
F53	FUSE T24% 220-240V	UM245DA
T5A	FUSE 110-130V	UM05ADA
L5	MAIN TRANSFORMER	L12562A
L2	CHOKE 3A/H	L12405A
L4	CHOKE 22A/H	L4-T220K
N1	NETWORK	Q95NIAT
N2	NETWORK	Q95NIAT
PLI	AC POWER IN/FUSEHOLDER PLUG	PPPI2AA
S1	SWITCH	S4105OFF
SK2	OUTPUT SOCKETS	RED PSR514C
		BLACK PSB514C
SK3	INPUT RIGHT	PSPHON2
SK4	INPUT LEFT	PSPHON9
SK5	AC POWER OUTLET SOCKET	PSP6953