

***Instruction  
Leaflet***

**J.E.SUGDEN**

**A48  
Amplifier**

Series Two May 1976

## INSTALLATION

Examine your amplifier to ensure that it is in a new state and that all the controls appear to operate mechanically in the correct manner. Confirm from the rating label underneath your amplifier that it is supplied at the correct mains voltage for your supply.

You should receive with your amplifier an owners registration card and a sealed polythene bag containing one set of four loudspeaker plugs, three DIN plugs and a plug to fit the mains outlet of your amplifier.

## CONNECTIONS

### i Mains

Approximately 10 feet (3 metres) of 3 core cable is supplied for connection to the mains supply. The colour coding of the mains lead is BROWN—LIVE; BLUE—NEUTRAL; GREEN/YELLOW—EARTH. A safety earth terminal is provided on the back panel adjacent to the mains input lead. This terminal may be used for the connection of an earth lead where it is inconvenient to use the green/yellow core of the mains lead. This terminal is NOT for the earthing of ancillary equipment. For certain markets a two core mains cable is fitted, coded BROWN or BLACK—LIVE and BLUE—NEUTRAL. It is possible to alter the internal connections of your amplifier to operate on other mains voltages—if this is necessary the work must be only entrusted to a qualified engineer. An auxiliary mains output socket is provided for connecting to ancillary equipment such as a turntable or self-powered radio tuner. The total load on this outlet should not exceed 250 Watts. Viewing from the underside of the amplifier, the mains fuse (1 amp slow blow) is located on the mains transformer panel and the two LT fuses (2.0 amp) are mounted on the power amplifier printed circuit panels.

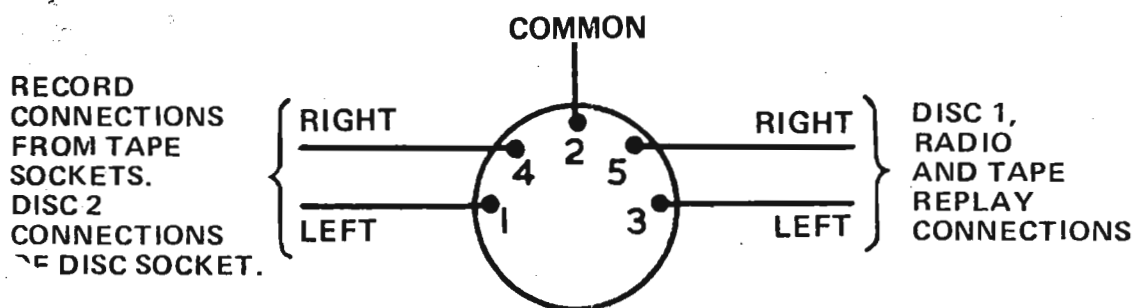
### ii Loudspeakers

Loudspeaker connections are made via the red and black 4mm sockets provided on the rear panel. Mains twin flex of about 5 amp rating colour coded for ease of phasing is recommended for the connecting wire. The amplifier produces its full rated output into loudspeakers of 8 or 4 ohms impedance. It will however, operate satisfactorily into loudspeakers of higher impedance but at reduced maximum output (approx. 30 watts into 15 ohms).

### iii Headphones

A headphone socket is provided on the front panel of the amplifier.

### iv Inputs



Four input sockets are provided for using 5 pin DIN plugs for DISC 1 and DISC 2, RADIO, TAPE 1 and TAPE 2 which should be wired according to DIN standards as shown, viewing from the inside of the plug, i.e. at the solder tag end. Please note that both DISC inputs are made to one socket.

### **Earthing of DISC inputs**

It is important that the L.H. and R.H. screened leads from the pick-up cartridge, and the chassis lead (sometimes combined in the pick-up lead) should be connected **ONLY** to pin 2 of the DIN plug. Do **NOT** connect to the plug body, and care must be taken to insulate the screens from the plug body securing clip. If only one disc input is used, we recommend that this should be Disc 1 and that the unused pins in the DIN plug, i.e. 1 and 4 should be "earthed" or "grounded" by connecting them to Pin 2.

### **Adjustment of disc sensitivity**

The sensitivity of the disc input has been carefully chosen to match most of the high quality cartridges currently available. There are a few cartridges which offer a much higher output, the use of which may necessitate a reduction of disc sensitivity—indicated by a need to operate the volume control at low settings, i.e. approaching 7.00 o'clock. Your dealer can do this for you. He should remove the pre-amplifier covers to reveal two pairs of pins on the print side of the printed circuit board at the input end. The pins are linked with thin tinned copper wire. If these wires are removed the resultant sensitivity will be 10mV instead of 2.5 or if they are replaced by 4.7K ohm resistors the sensitivity will be approximately 5mV. The overload capacity increases in the same proportion. This modification alters the sensitivity of both disc inputs.

## **OPERATION**

Control facilities are provided by means of five rotary controls and thirteen push buttons on the front panel. The rotary controls offer the following facilities:

*Input Selection*—this is controlled by the extreme left hand large knob allowing five selections to be made—DISC 2, DISC 1, RADIO, TAPE 1 and TAPE 2.

*Volume*—Continuously variable controlled by the second large knob.

*Bass, Treble and Balance*—continuously variable controlled by the three smaller knobs. These three controls have central "click" positions giving "flat" response in the case of the tone controls and exactly equal outputs per channel in the case of the balance control.

## **TAPE**

To play pre-recorded tape TAPE 1 or TAPE 2 should be selected by means of the rotary control. To record from programme sources: DISC 1, DISC 2 or RADIO, it is necessary to select the appropriate source on the rotary control. The selected input is automatically connected to BOTH tape output sockets. If the output from the monitoring circuit on the tape recorder is connected to the tape input of the amplifier A-B monitoring is possible by depressing the relevant TAPE button. When TAPE 1 is selected on the rotary control, this input is connected **ONLY** to TAPE 2 output socket. Similarly when TAPE 2 is selected this input is fed **ONLY** to TAPE 1 output socket. Thus it is possible to transfer from one tape machine (reel to reel or cassette) to another.

**Tape Record Level:** Connections to the Tape recorders should be made to their "LINE" or "AUX" inputs and outputs. This will normally require connecting cables with a DIN plug at one end and four phono plugs at the other. If it is required to use the "DIN" input—as for example with some European recorders which only have DIN inputs, it will be necessary to use an attenuator lead. A standard ex-factory available item is our "tape Attenuator Lead". This lead also permits connection to a monophonic recorder without the cross-connection "monoing" everything else.

In the event of a recorder with non-standard levels we are always pleased to assist in making up a special lead—do not hesitate to ask.

The push buttons which are of independent push on and push off operation are arranged in two groups of five and one group of three and offer facilities as follows:—

*Left hand group*—function.

*Mute*—silences the amplifier, without having to switch off or turn down the volume control, by “earthing” or “grounding” the input of the amplifier.

*Tape 1 and Tape 2*—offer monitoring facilities and A-B switching with three head tape recorders (see TAPE section).

*Mono*—mixes the left and right inputs and feeds them to both amplifiers.

*Reverse*—feeds left input to the right amplifier and right input to the left amplifier.

*Central Group*—filters and quiet control. The low frequency filter is selected by depressing the LF button and is useful for removing rumble, traffic and wind noise from the programme material. The turnover frequency is 70Hz and the rate of attenuation 18dB per octave. The high frequency filters are useful for removing distortion, hiss and surface noise from poor programme material and are selected by depressing one or both of the HF filter buttons. The rate of attenuation or slope is 6dB per octave and can be increased to 18dB per octave by depressing the steep button. The button marked 7KHz selects the 7KHz turnover frequency, the 10KHz button the 10KHz turnover frequency and both buttons together the 4KHz turnover frequency. The quiet button selects the quiet listening facility. Normal level should first be set on the volume control and the quiet button is depressed. The mid frequency level will then be attenuated 16dB but the lower frequencies to a less extent to cater for the equal subjective loudness effect of the ear. This facility is useful for applications such as background music.

*Right hand group*—

Mains — switches the amplifier on shown by lamp immediately above the switch lighting up.

L.S.1 — connects the amplifier outputs to loudspeaker pair one.

L.S.2 — connects the amplifier outputs to loudspeaker pair two.

## **DISMANTLING**

If it is necessary to dismantle the amplifier—e.g. in order to gain access to the pre-amplifier board to adjust the disc sensitivity, it should be undertaken in the following order:-

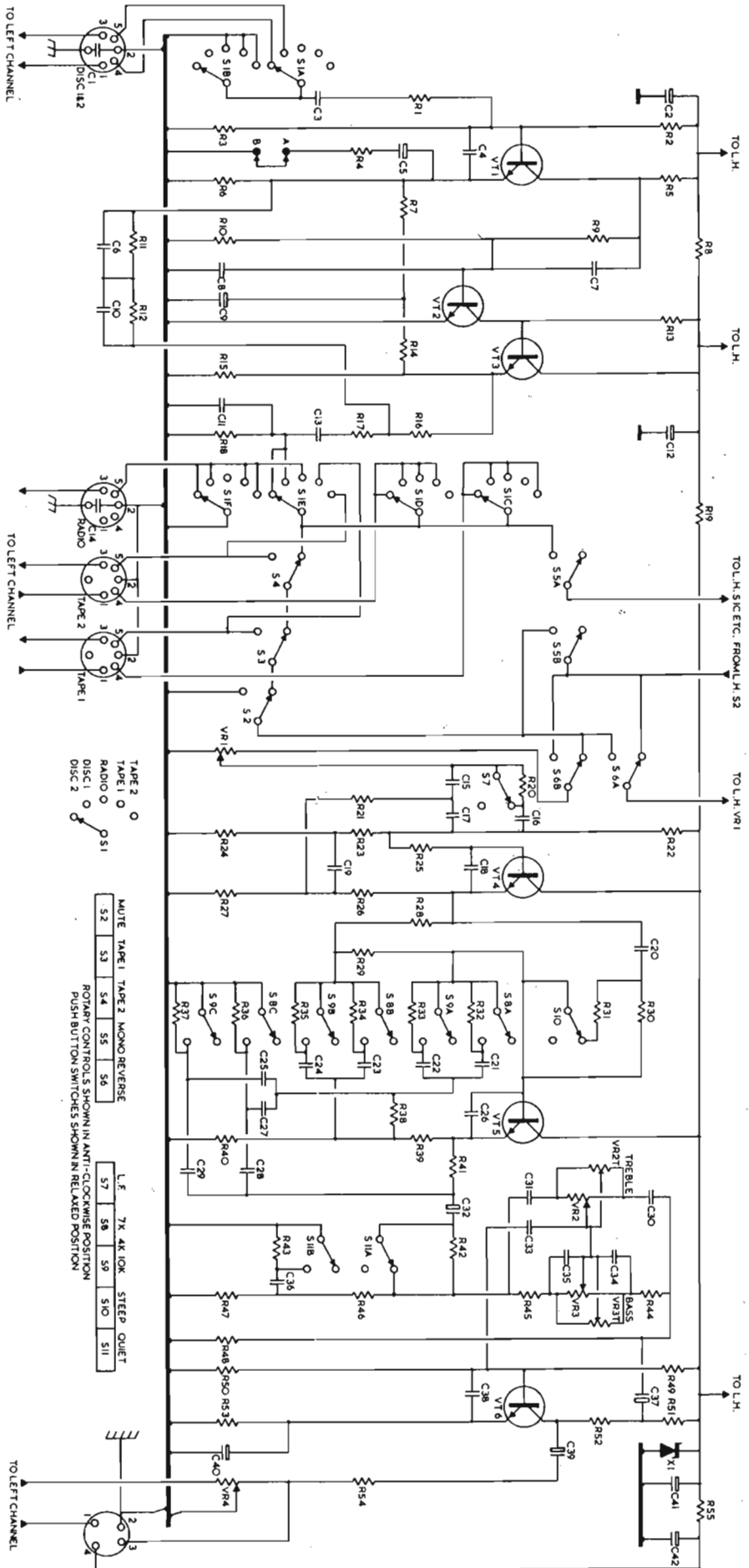
1. Remove the two side panels, by unscrewing the two securing screws on each side with an Allen key—this will reveal the fixing screws for the top panel.
2. Remove the top panel by unscrewing the two fixing screws with a small “Posidriv” screwdriver. Care should be taken not to “snag” the front brushed aluminium trim on the protruding screw heads on the steel front panel.
3. Remove the base plate by unscrewing the four fixing screws with a large “Posidriv” screwdriver.
4. Remove the pre-amplifier covers by unscrewing the four screws holding each half section with a small electricians screwdriver.

On no account should this dismantling procedure be undertaken unless the amplifier is disconnected from the mains.

If through carelessness or inadvertance the DC fuses on the power amplifier panels are blown, access to them is gained by standing the amplifier on its heatsink at the rear and removing the base plate as explained in section three above.

**Warning** because the extremely large electrolytic capacitors in your amplifier hold their charge for some time, it is dangerous to replace a DC fuse immediately after it has blown. Either wait at least five minutes for the charge to leak away naturally or discharge all six capacitors with a resistor of approximate value 10 ohms, and the loudspeakers switched off.

The right is reserved to change the specification or design without notice.  
 J. E. Sugden & Co. Ltd., Carr Street, Cleckheaton, West Yorkshire.

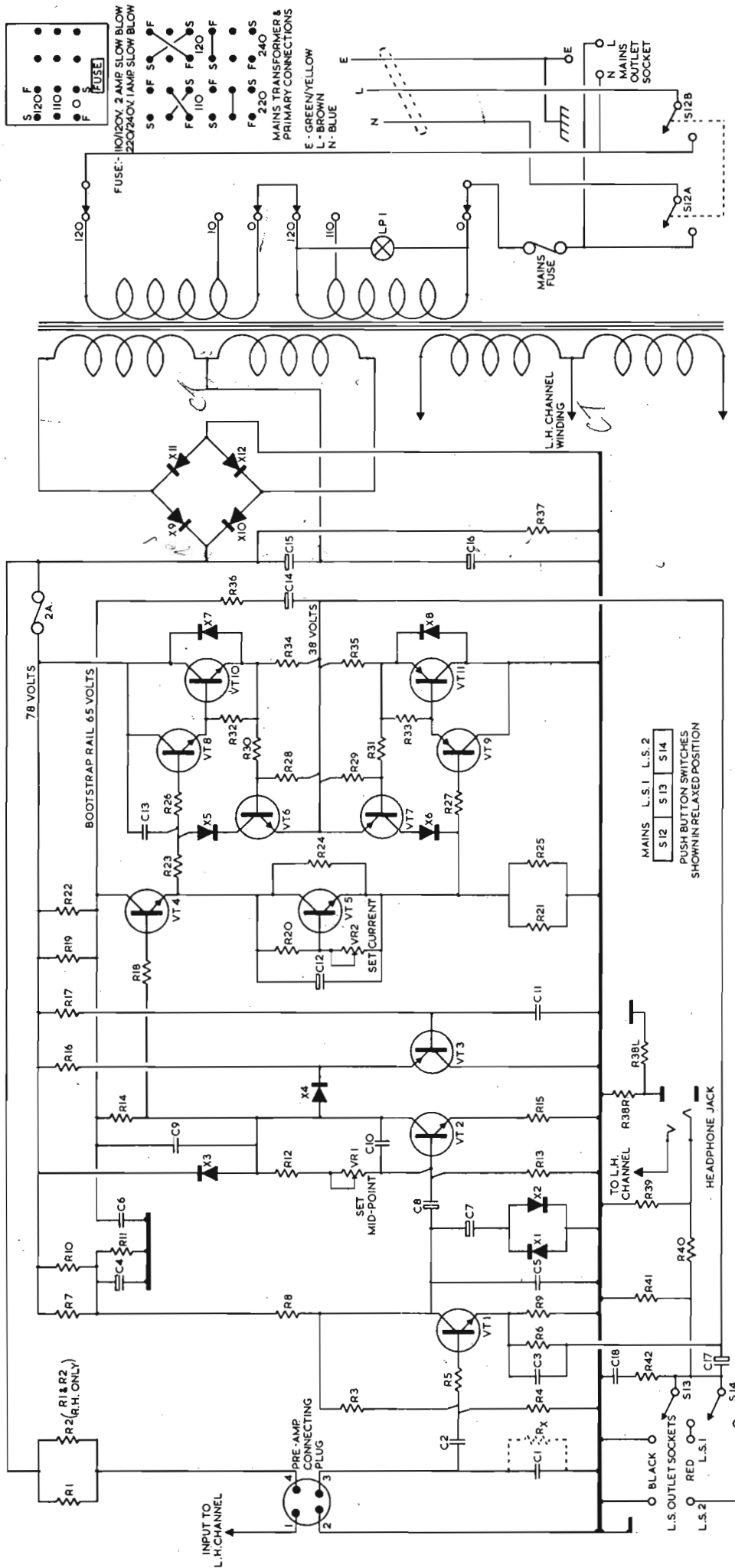


— PRE-AMPLIFIER-A48 —  
 (R.H. CHANNEL SHOWN IN DETAIL)

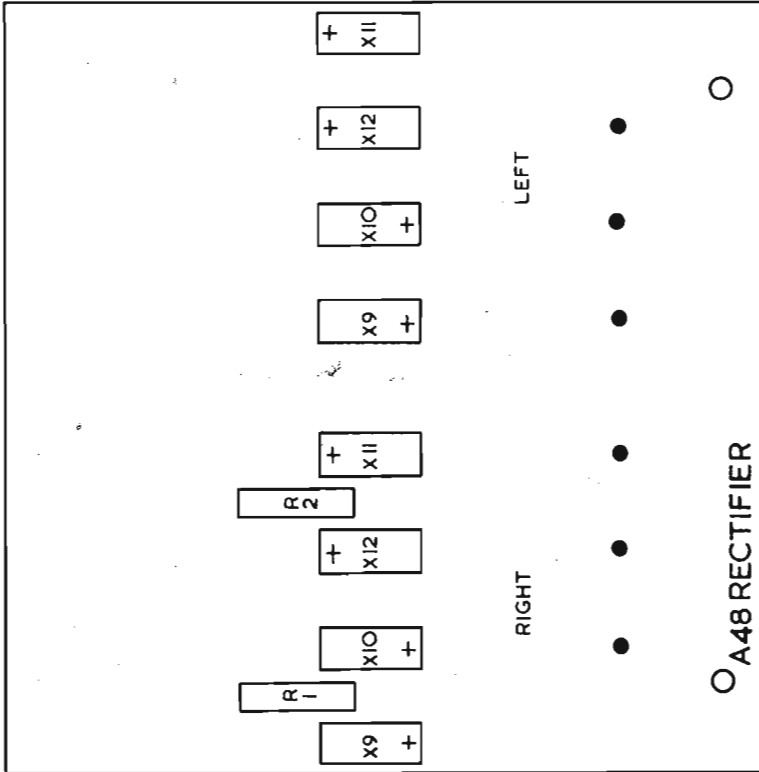
MUTE TAPE 1 TAPE 2 MONO REVERSE  
 52 53 54 55 56

7.5k 7.5k 7.5k 7.5k 7.5k  
 57 58 59 510 511

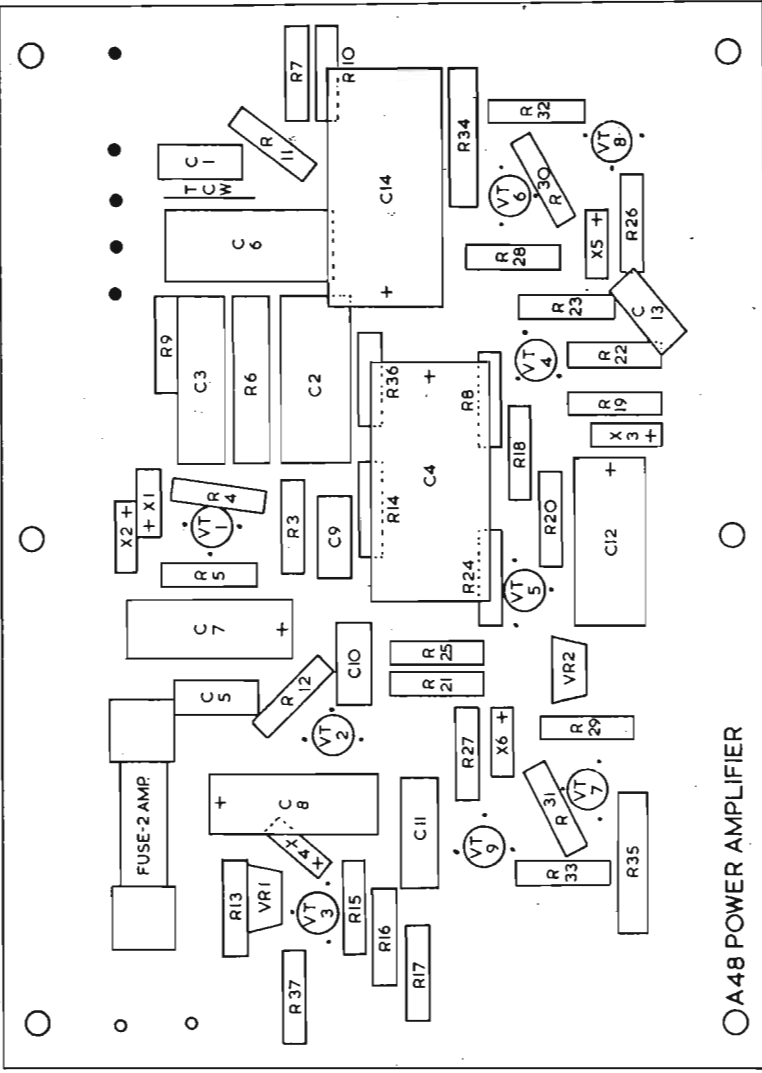
ROTARY CONTROLS SHOWN IN ANTI-CLOCKWISE POSITION  
 PUSH BUTTON SWITCHES SHOWN IN RELAXED POSITION



— POWER AMPLIFIER-A48 —  
(R.H. CHANNEL SHOWN IN DETAIL)



○ A48 RECTIFIER



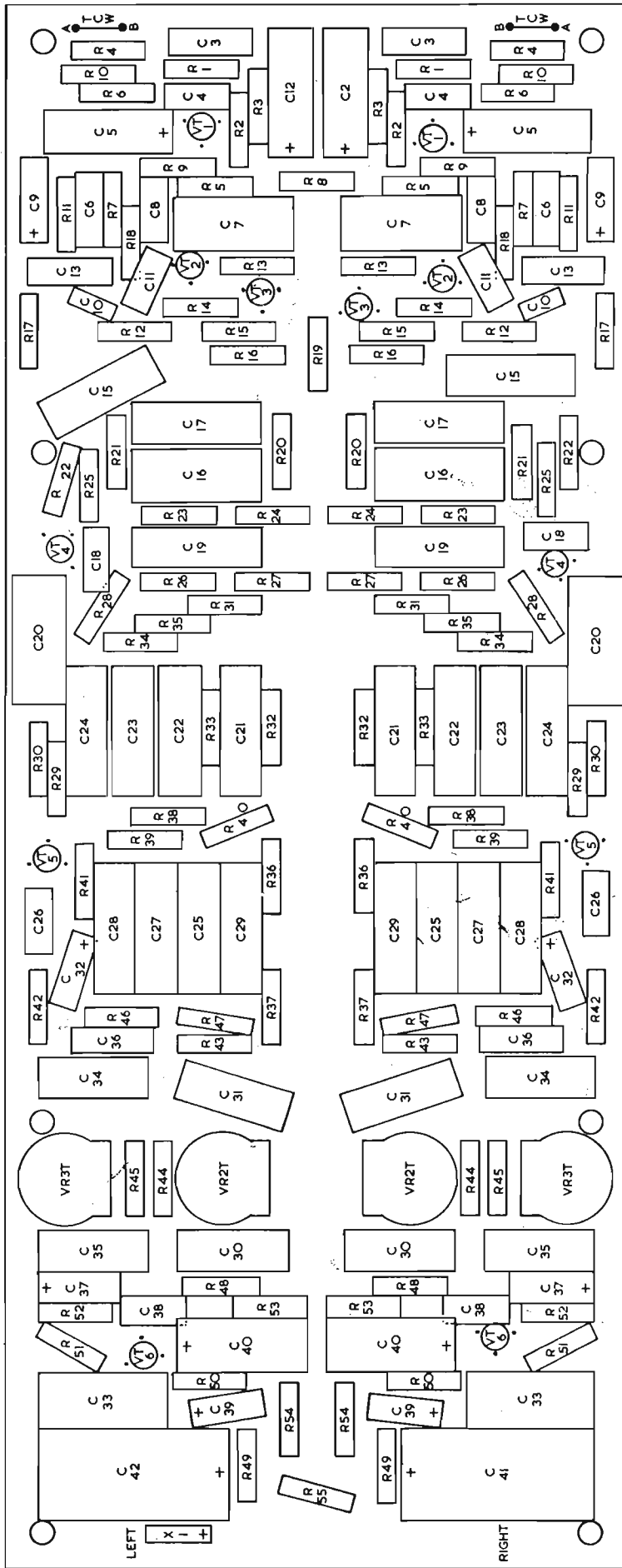
○ A48 POWER AMPLIFIER

### Main Amplifier Component List

R 1	5K6	R13	10K	R25	3K9
R 2	5K6	R14	10K	R26	10
R 3	2M2	R15	100	R27	10
R 4	470K	R16	220K	R28	39
R 5	6K8	R17	8M2	R29	39
R 6	1K5	R18	1K2	R30	68
R 7	8K2	R19	1K2	R31	68
R 8	4K7	R20	4K7	R32	100
R 9	47	R21	3K9	R33	100
R10	8K2	R22	1K2	R34	0.33
R11	2K2	R23	1K8	R35	0.33
R12	220K	R24	330	R36	10
R37	10K	R38	10	R39	390
R40	390	R41	100	R42	1.0
R X	27K-220K	VR1	220K	VR2	4K7
C 1	270p	C 1	270p		

C 2	100n	C14	470	X 1	1N4148
C 3	2n2	C15	10,000	X 2	1N4148
C 4	470	C16	10,000	X 3	OA202
C 5	1n0	C17	10,000	X 4	OA202
C 6	100n	C18	220n	X 5	1N4148
C 7	100	X 6	1N4148	X 6	1N4148
C 8	100	X 7	BY206	VT 1	BC549CS
C 9	470p	X 8	BY206	VT 2	ZTX341
C10	270p	X 9	1N5401	VT 3	ZTX541
C11	220n	X10	1N5401	VT 4	BC548
C12	470	X11	1N5401	VT 5	BC548
C13	47p	X12	1N5401	VT 6	BC548

VT 6	BC548
VT 7	BC558
VT 8	BCX31
VT 9	BCX35
VT10	2N4915
VT11	MJ2955



A48 PRE-AMPLIFIER

**Pre-amplifier Component List**

R 1	2K7	R 15	15K	R 29	10K	R 43	1M	VR 1	250K Log	C 8	8	VR 2	50K	C 9	10	VR 3	220K	C 10	1n0	VR 4	50K	C 11	470p	C 12	100	C 13	220n	C 14	10n	C 15	10n	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n
R 2	330K	R 16	4K7	R 30	1M	R 44	18K	C 1	10n	C 9	10	C 2	100	C 10	1n0	C 3	220n	C 11	470p	C 4	470p	C 12	100	C 13	220n	C 14	10n	C 15	10n	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n		
R 3	56K	R 17	4K7	R 31	1K2	R 45	18K	C 5	100	C 10	1n0	C 6	100	C 11	470p	C 7	220n	C 12	100	C 13	220n	C 14	10n	C 15	10n	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n						
R 4	2K2	R 18	8M2	R 32	8M2	R 46	1K5	C 2	100	C 11	470p	C 7	220n	C 12	100	C 3	220n	C 13	220n	C 14	10n	C 15	10n	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n								
R 5	100K	R 19	680	R 33	8M2	R 47	6K8	C 3	220n	C 12	100	C 8	470p	C 13	220n	C 4	470p	C 14	10n	C 15	10n	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n										
R 6	8K2	R 20	8M2	R 34	8M2	R 48	47K	C 4	470p	C 13	220n	C 9	10	C 14	10n	C 5	100	C 15	10n	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n												
R 7	22K	R 21	100K	R 35	8M2	R 49	470K	C 5	100	C 14	10n	C 10	470p	C 15	10n	C 6	100	C 16	100n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n														
R 8	2K2	R 22	1M	R 36	8M2	R 50	68K	C 6	3n6	C 15	10n	C 11	470p	C 16	100n	C 7	220n	C 17	10n	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																
R 9	2M2	R 23	220K	R 37	8M2	R 51	1K	C 7	100n	C 16	100n	C 12	100	C 17	10n	C 8	470p	C 18	470p	C 19	22n	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																		
R 10	470K	R 24	220K	R 38	4K7	R 52	4K7	C 8	470p	C 17	10n	C 13	220K	C 19	22n	C 9	10	C 20	100n	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																						
R 11	1M	R 25	1K2	R 39	1K	R 53	1K2	C 9	10	C 18	470p	C 14	10n	C 20	100n	C 10	470p	C 21	2n2	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																								
R 12	75K	R 26	1K	R 40	3K9	R 54	4K7	C 10	470p	C 19	22n	C 15	10n	C 21	2n2	C 11	470p	C 22	47p	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																										
R 13	10K	R 27	4K7	R 41	2K2	R 55	220	C 11	470p	C 20	100n	C 16	100n	C 22	47p	C 12	100	C 23	10	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																												
R 14	39K	R 28	10K	R 42	10K			C 12	100	C 21	2n2	C 17	10n	C 23	10	C 13	220K	C 24	1n0	C 25	470p	C 26	100	C 27	220n	C 28	10n	C 29	10n	C 30	100n	C 31	10n	C 32	470p	C 33	22n	C 34	100n	C 35	22n																														

X1 BZX 79-C27

BC549CS  
BC549CS  
BC549CS  
BC549CS  
BC549CS  
BC549CS



# A48 AMPLIFIER

FROM SERIAL No. 4200 ONWARDS

To promote even greater reliability and also to permit the driving of higher currents into certain loudspeakers whose impedance falls rather low, the A48 output stage has been slightly altered. Paralleled pairs of output transistors are now used and a time delay relay is incorporated to connect the loudspeakers. In operation this means that the loudspeakers are not connected until six to ten seconds after switching on. The extremely rugged output stage permitted us to remove some protection circuitry, which gave a further benefit in that the amplifier can not be prematurely clipped with reactive loudspeakers such as the Quad E.L.S. The new power amplifier circuit together with the layout and parts list, are shown on this amendment sheet.

## Pre-amplifier—minor detail changes

Connecting socket is now 5 pin DIN, wired to conform to the power amplifier. R55 is now 470 ohms. X1 is now a 33 volt diode and is in parallel with C42, not with C41.

**Nominal input sensitivities for 25W output 8 ohms**

**DISC 1, DISC 2**

2.5mV into 47K input impedance, shunt capacity 100pF. (Together with lead offers cartridge ideal loading of approximately 350pF). Overload capability 110mV at 1KHz

**RADIO, TAPE 1, TAPE 2**

100mV into 200K input impedance, overload capability infinite.

**Nominal Output Levels**

**TAPE 1, TAPE 2**

From Radio or other Tape direct connection, from disc approximately 200mV at average modulation or 1 volt peak with average cartridges. Presented load impedance not to be less than 47K ohms and preferably not less than 100K ohms. Use a connecting lead DIN to 4 x PHONO for most recorders, or our TAPE ATTENUATOR LEAD (DIN to DIN) if preferred.

**Headph**

Suitable for most 8, 600 or 2000 ohm headphones (20 volts maximum into L pad of 2 x 390 ohm resistors).

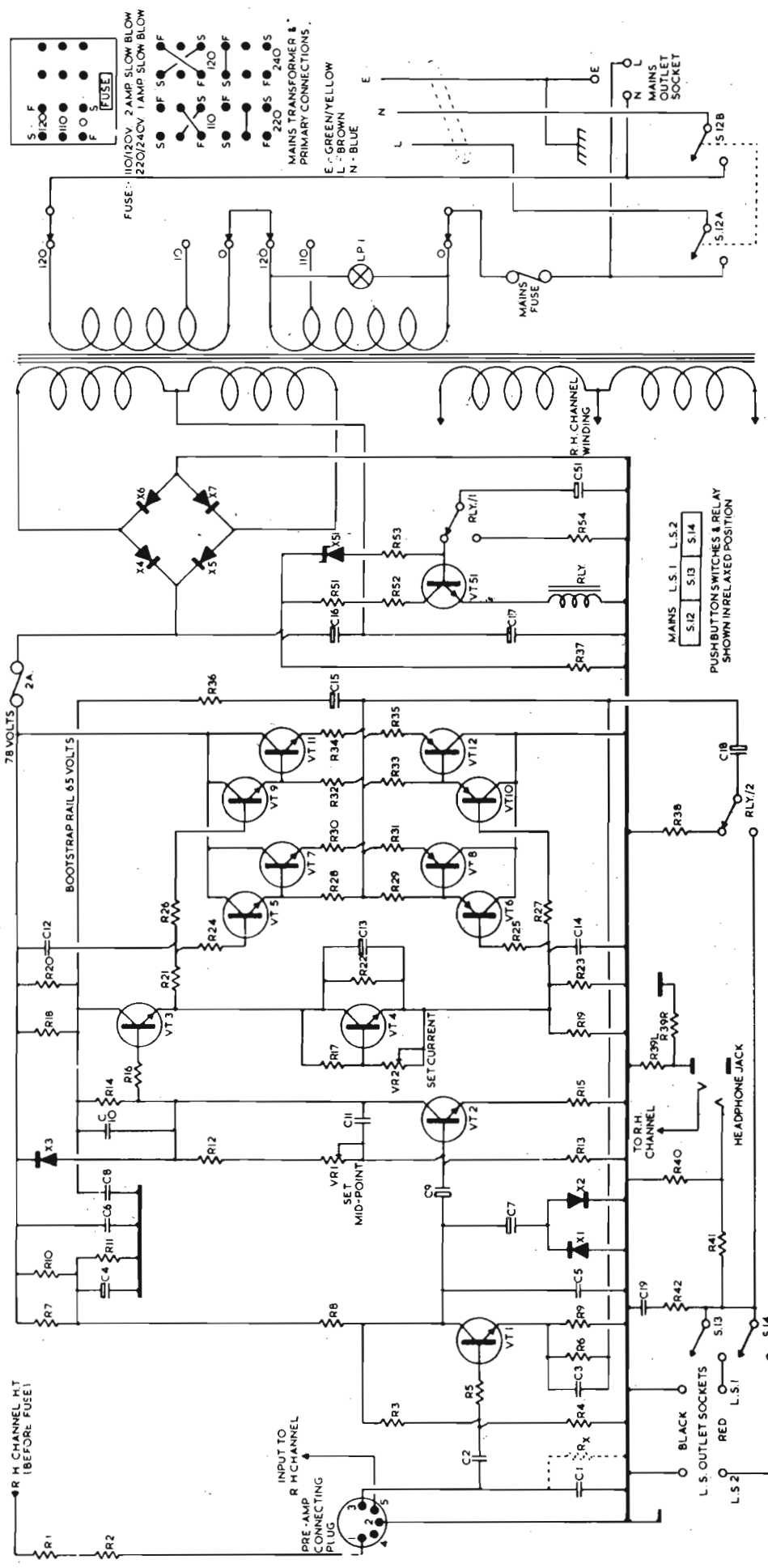
**Loudspeakers**

One pair 4 ohm, up to 2 pairs of 8 ohm or 15 ohms. Maximum output at just clipping level, continuous signal, both channels driven is 45W into 8 ohms, 50W into 4 ohms, 30W into 15 ohms. (Instantaneous 'music power' rating to be derived from 70 volts available peak to peak—76 watts into 8 ohms).

To  
high  
low  
out  
to  
spea  
The  
tect  
not  
E.L  
part

M11 2K2  
 R12 220K  
 H23 3K9  
 R24 10R  
 R35 3K9  
 R36 10R  
 R54 100R  
 C11 270p  
 C12 47p  
 X2 1N4148  
 X3 0A202  
 VT2 ZTX341  
 VT3 BC639

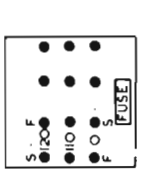
TIP35  
 TIP36  
 3055  
 2955



- POWER AMPLIFIER-A48 -  
 (L.H. CHANNEL SHOWN IN DETAIL)

639  
 540  
 B  
 E

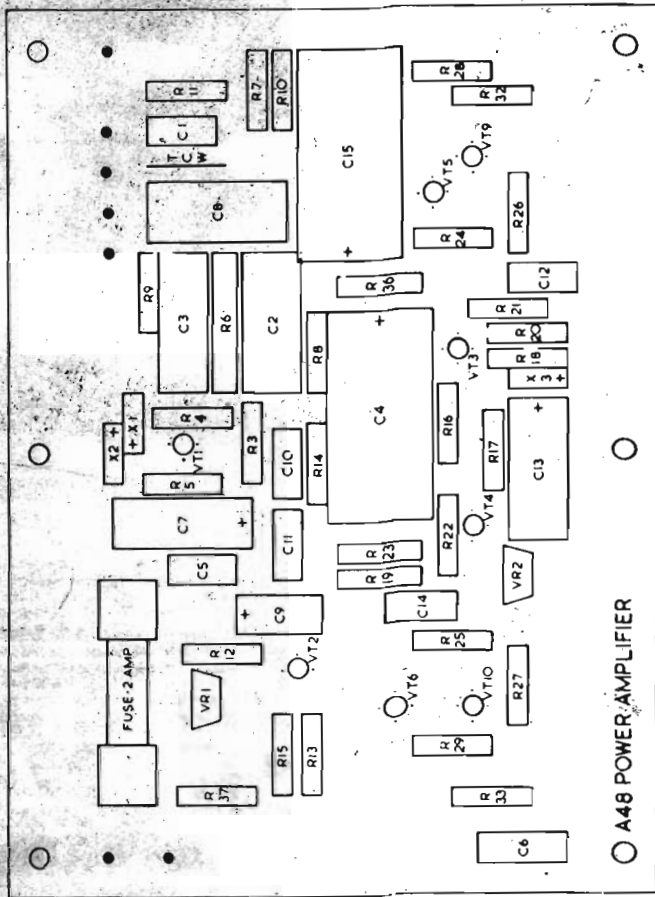
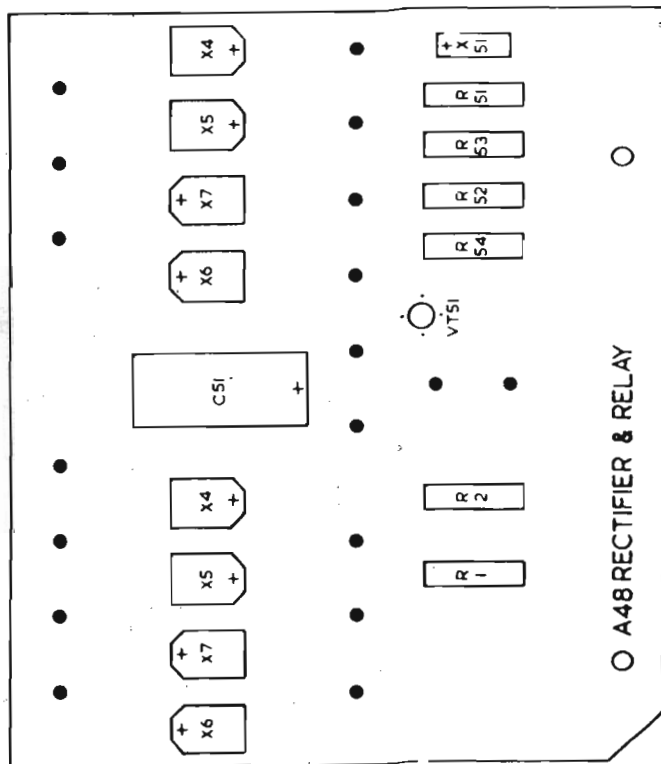
B  
 E



110/120V. 2 AMP SLOW BLOW  
 220/240V. 1 AMP SLOW BLOW  
 S - F  
 120  
 110  
 O  
 S  
 FUSE

MAINS TRANSFORMER &  
 PRIMARY CONNECTIONS.  
 E - GREEN/YELLOW  
 L - BROWN  
 N - BLUE

MAINS L.S.1 L.S.2  
 S.12 S.B. S.14  
 PUSHBUTTON SWITCHES & RELAY  
 SHOWN IN RELAXED POSITION



### Main Amplifier Component List

R1	1K2	R13	10K	R25	10R	R37	15K	C1	270p	C13	470u	X4	1N5401	VT4	BC548-549
R2	1K2	R14	10K	R26	10R	R38	47R	C2	100n	C14	270p	X5	1N5401	VT5	BC639
R3	2M2	R15	100R	R27	10R	R39	10R	C3	2n2	C15	220u	X6	1N5401	VT6	BC640
R4	470K	R16	1K2	R28	100R	R40	390R	C4	470u	C16	10,000u	X7	1N5401	VT7	BDV95-TIP35
R5	6K8	R17	4K7	R29	100R	R41	390R	C5	1n0	C17	10,000u	X51	BZX79-C33	VT8	BDV96-TIP36
R6	1K5	R18	1K2	R30	0R33	R42	1R0	C6	220n	C18	10,000u	VR1	220K	VT9	BC639
R7	8K2	R19	3K9	R31	0R33	Rx	27K-220K	C7	100u	C19	220n	VR2	4K7	VT10	BC640
R8	4K7	R20	1K2	R32	100R	R51	680	C8	100n	C51	100u	VT1	BC549CS	VT11	BDV95-TIP35
R9	47R	R21	1K8	R33	100R	R52	1K2	C9	2u2	X1	1N4148	VT2	ZTX341	VT12	BDV96-TIP36
R10	8K2	R22	390R	R34	0R33	R53	33K	C10	470p	X2	1N4148	VT3	BC639		
R11	2K2	R23	3K9	R35	0R33	R54	100R	C11	270p						
R12	220K	R24	10R	R36	10R			C12	47p						

TIP35 - MSE 3055  
TIP36 - MSE 2955