Instruction Leaflet

JE SUGDEN Q51 4channel matrix Control Unit

INSTALLATION

The Q51 Control Unit is suitable for use either free standing on a shelf or for mounting in a cabinet (vertical or horizontal position).

When shelf mounting, the four screws in the base should be removed and the small feet supplied substituted, utilising the screws taken from the base.

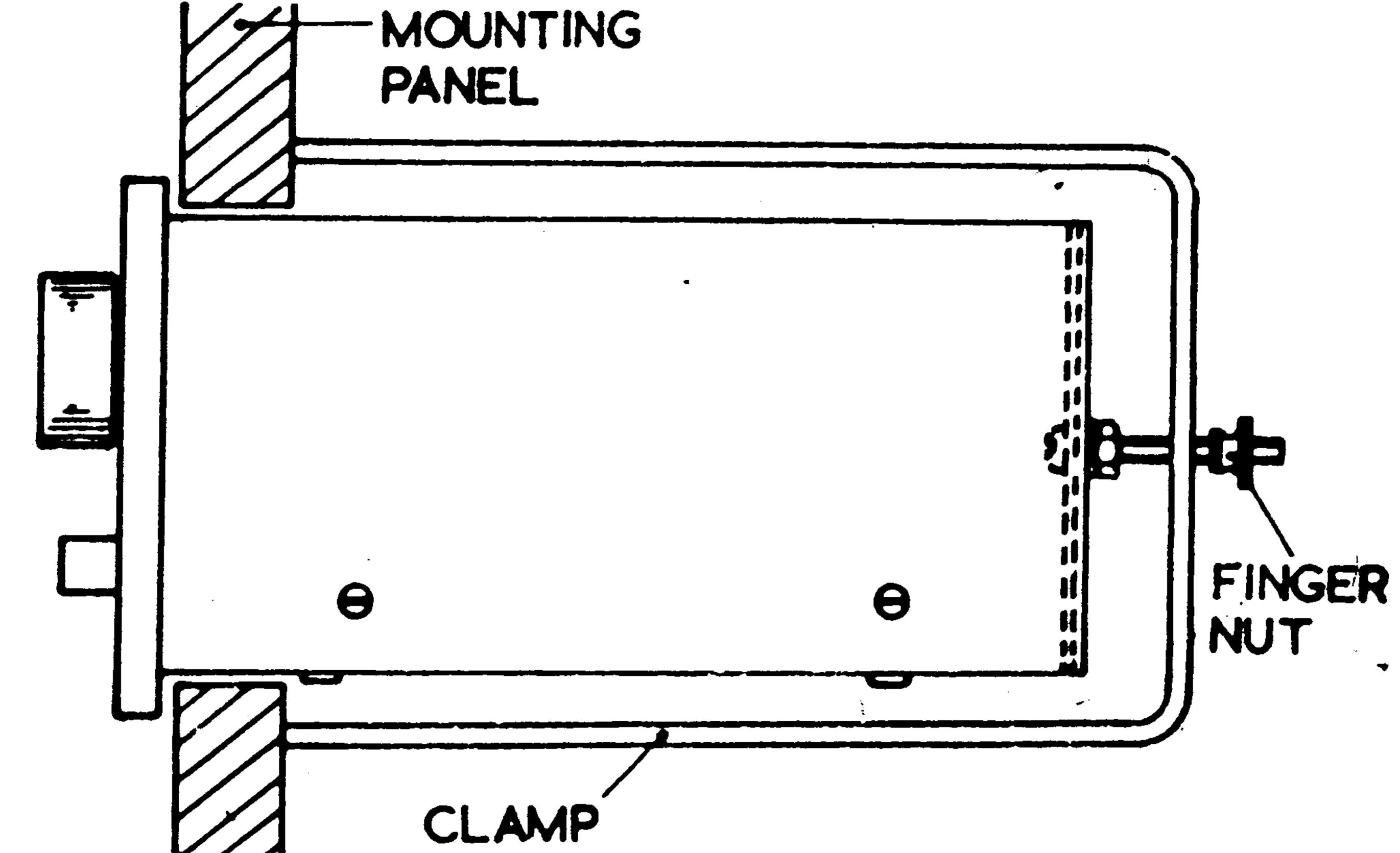
It is advisable to fit one foot at a time leaving the remaining screws intact in order to prevent any undue movement of the base panel.

Instructions for cabinet mounting are as follows:—

- 1. Cut aperture in panel 10.7/16" x 3.1/4" (26.5cms x 8.30 cms).
- 2. Remove the outer cover by unscrewing the four chrome securing screws located at the sides.
- 3. Insert the 4BA x 1.1/4" screws provided into the two central holes in the rear flanges so the screws project rearwards. Secure firmly by means of the spring washers and nuts provided.

4. Replace the cover ensuring that it is "tucked under" the edges of the chrome bezel.

- 5. Insert the control unit through the aperture in the mounting panel.
- 6. Place the U-shaped clamps over the projecting screws at each end and tighten up against the inside of the mounting panel with the knurled finger nuts provided.



CONNECTORS AND CABLES

The Q51 Control Unit is supplied with the following cables and connectors:—

One lead, coloured white, terminated each end with a 5 pin DIN plug containing four individually screened circuits, connecting pins 1, 4, 5 and 3.

One lead, coloured black, terminated each end with a 5 pin DIN plug containing two individually screened circuits connecting pins 5 and 3 only.

Two leads, coloured red, terminated each end with a 5 pin DIN plug containing two individually screened circuits connecting pins 5 and 3 for signal, and also two plain wires connecting pins 1 and 4 for LT (power) feeds.

Two spare 5 pin DIN plugs.

The ready made cables will permit, along with the cables supplied with the P51 amplifiers and C51 Control Unit, the intended system of Q51+C51+2xP51—one P51 for the front channels and one for the back channels and a facility also exists (q.v.) to raise the gain of the back outputs two times (6dB) when it is desired to use two P51 amplifiers at the front. Should a more elaborate system be desired—though it is not in the manufacturer's opinion necessary—two C51 Control Units may be used in the system to independently vary the signals in terms of frequency response of the front relative to the back, or to permit the playing of discreet four channel sources and then the interconnections to the Q51 need to be different and two extra "black" cables plus a cable DIN to 2x PHONO will be needed which should be ordered direct from the factory.

CONNECTIONS

Preliminary—Before connecting up we ask you to appreciate the use of the two pairs of linked sockets on the back panel marked "TPF FRONT" and "LT-BACK". The former is to provide an input to the Q51 tape circuits of the front C51 output for the TPF facility (q.v.) i.e. the C51 output signal is fed into one socket and out again from the other, as are its associated LT feeds, and the signal tapped off in the process. The latter is necessary as the Q51 derives its power supply from the 16 volt source available from the P51 amplifier driving the back channels and this feed is similarly "looped" through the two sockets and the LT tapped off. When using a back amplifier of another make these sockets provide a useful access point for an LT supply. They are not used with the normal system of only one C51 as the decode BACK output socket which feeds the back P51 also has the appropriate pins connected to the LT circuit of the Q51. It is of course clear that in the subsequent detail of connections, if the TPF facility is not required then that particular linking may be omitted. Easier understanding will also be made if it is appreciated that other than the need for power supply the DECODE circuits controlled by the first three push buttons are quite independent from the TAPE facilities circuits controlled by the other seven buttons. If preamplifiers (control amplifiers—control units) and power amplifiers of other makes are being used then read for C51 the pre-amplifier, etc. and for P51's the power amplifiers.

In the event of doubt, please do not hesitate to write to or telephone the factory.

NORMAL SYSTEM WITH ONE C51 and TWO P51's

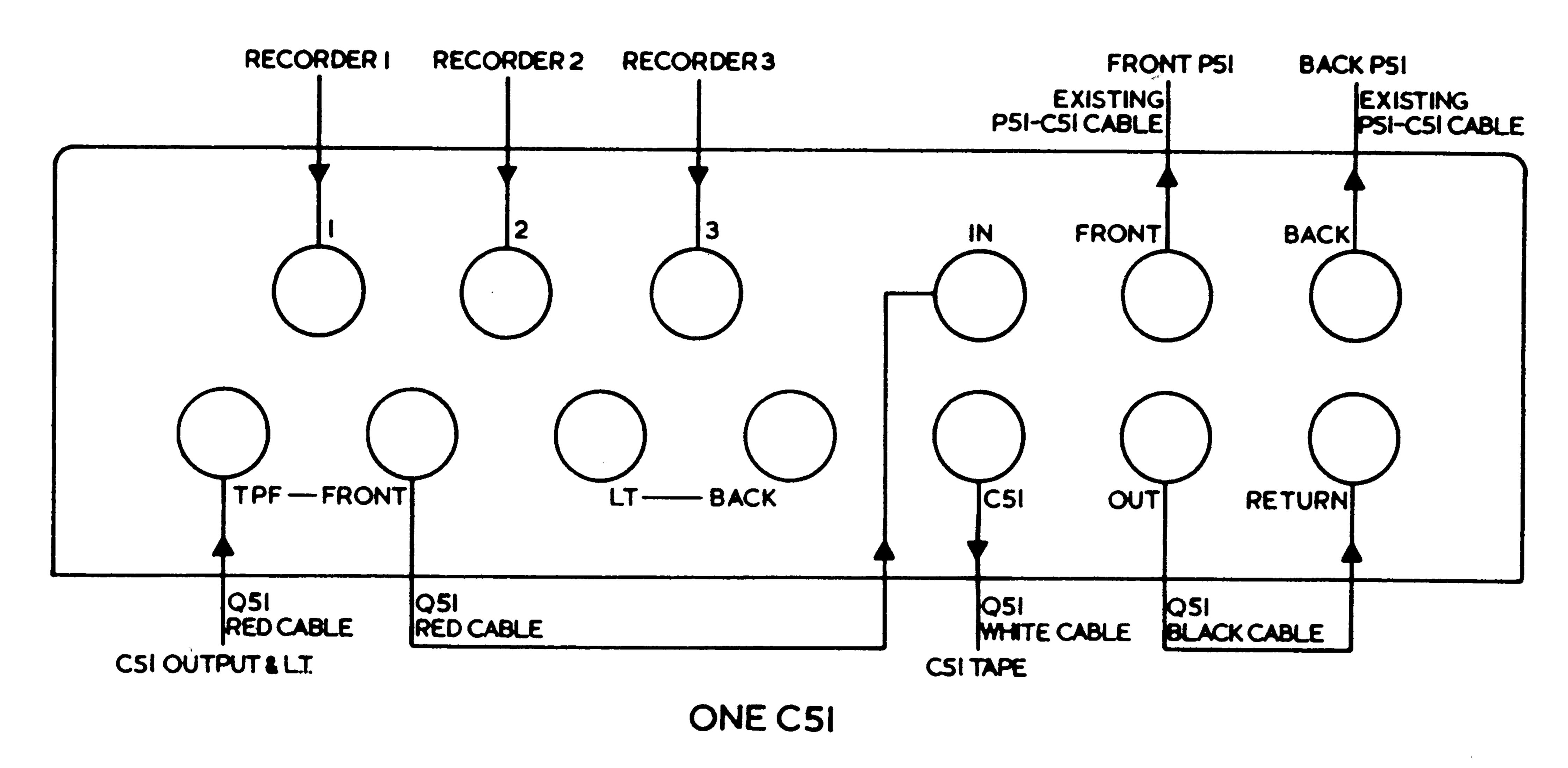
Connect the mains cables up in a logical way—input feed to the C51 then from the C51 outlet to one P51 and then from the P51 outlet to the other P51 (and again if two front P51's are being used). Connect DISCS and RADIO to the C51 normally but not any tape recorders. Using the white cable connect the C51 TAPE socket to the Q51 socket marked C51—TAPE INTER CONNECT. Using a black cable connect the TAPE INTERCONNECT RETURN socket to OUT. (The RETURN socket is connected inside the Q51 to the C51 socket with RETURN 3 and 5 connected to C51 1 and 4—the OUT socket pins 3 and 5 are the final output from all the tape switching). Using a red cable connect the C51 output socket to one of the pair TPF-FRONT and using another RED cable connect the other socket of this pair to DECODE IN. Connect DECODE FRONT to the front P51 using the cable normally supplied with the P51 and connect DECODE BACK to the back P51 (this will also power the Q51) using the cable normally supplied with the P51. Connect one, two or three tape (reel to reel or cassette) recorders to the sockets TAPE 1, 2 or 3. Connection to the TAPE recorders should be made to their "LINE" or "AUX" inputs and outputs. If their "DIN" inputs, if they have them, are used or if there is only a DIN input as on some cheaper European recorders it will be necessary to use an attenuator lead. A standard ex-factory available item is our "Tape Attenuator Lead". This lead also permits connecting 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.

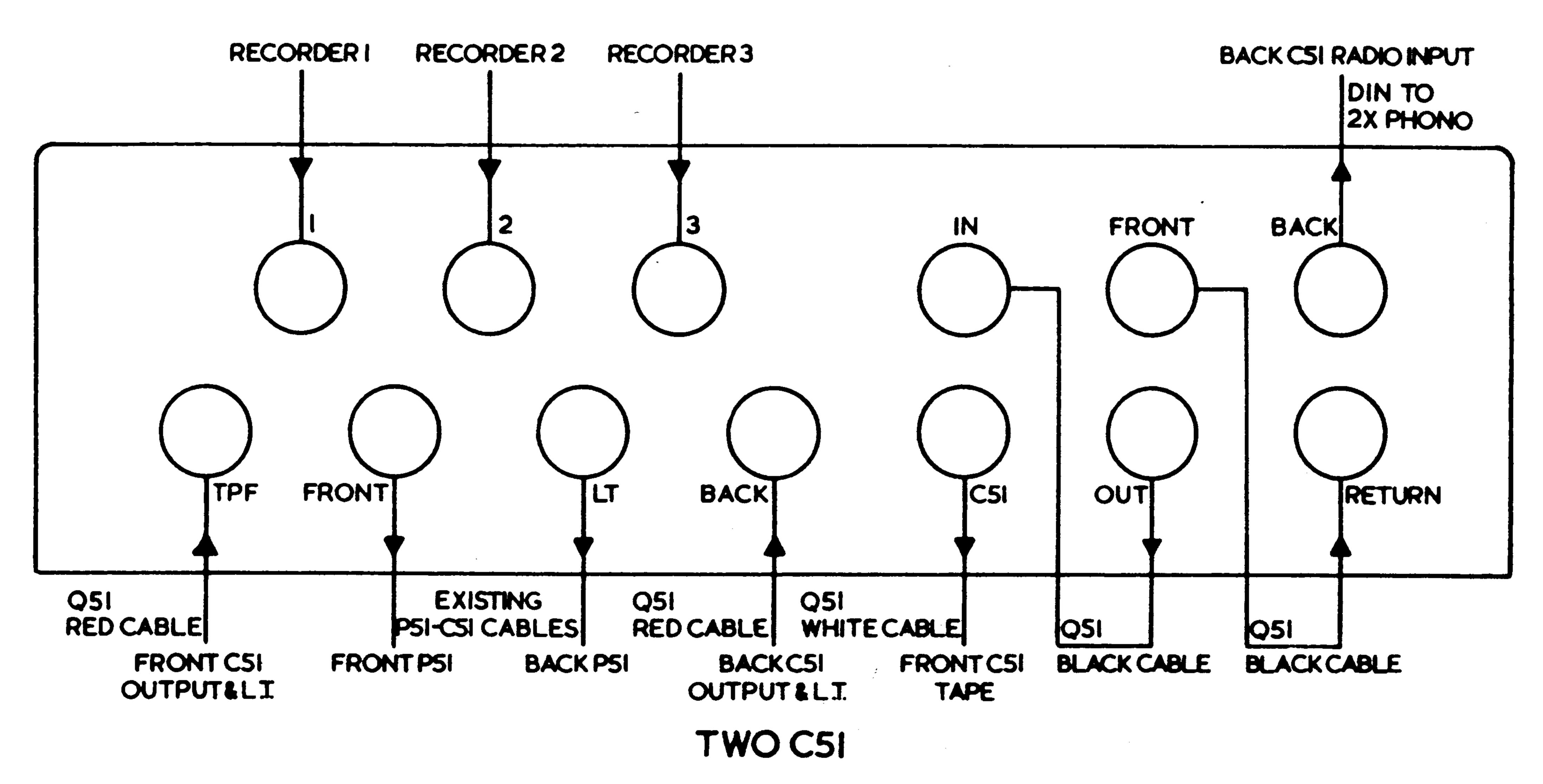
SYSTEM WITH TWO C51's

The interconnections vary slightly and reference should be made to the diagram. Remember you require the two extra BLACK leads and a lead DIN to 2xPHONO.

GAIN ALTERATION WITH TWO FRONT P51's

Remove the cover when two pairs of pins protruding from the "mother" printed circuit board will be seen. Each of these pairs should be linked using (say) 24SWG tinned copper wire. Carefully replace the cover taking care to tuck the front edges within the chrome bezel.





OPERATION

Good image placement (localisation) is most dependant on loudspeaker placement. A good stereo centre image is a must before good four channel results can be attempted. Remember that matrixed material cannot offer 'discrete' results but assuming you listen to music or plays rather than "pingpong-pang" effects you will not be disappointed provided that you set up your listening room correctly. Thus—first you get a good stereo image. Set all the balance controls central, set stereo on the Q51 (none of the first three buttons depressed) and select mono on the C51 (press LEFT or RIGHT or better both). Sit in your favourite chair with the left loudspeaker pointing a bit to your right and the right loudspeaker pointing a bit to your left and check that you hear the image central. If not move the loudspeakers slightly until you do. Unless your room is very assymetric you should not have to resort to moving the balance control—if this is the case you will eventually move the Q51 FRONT L/R balance control (q.v.)

The back loudspeakers should be symmetrically disposed behind you or to your sides—you may after experimentation point them away from you towards the side walls, or up at the ceiling—both of which methods have been found suitable if you cannot achieve the ideal—a baronial hall with a loud-speaker in each corner and you right in the middle.

The back loudspeakers ideally will be the same as the front but in practice will be smaller—try and avoid very dissimilar sounds however—especially in the extreme top or localisation will be poor. The back loudspeakers should be mounted high in the majority of domestic settings—this prevents absorption by furniture and permits a greater number of persons to enjoy the effect. Select what we refer to as 2 + 2 on the Q51—stereo fed to both front and back—by depressing DECODE only and unplug the FRONT loudspeakers. Do not merely turn the FRONT/BACK balance control to BACK but take care when unplugging the front loudspeakers not to "short out" the amplifier connections. Now adjust the back loudspeaker positions until you have a centre image exactly behind you (MONO is still selected on the C51—as it is throughout the initial setting up procedure). As a last resort adjust BACK L/R balance. Leaving the BACK balance as you have set it, unplug the LEFT BACK loudspeaker and re-connect the RIGHT FRONT loudspeaker—now adjust the FRONT/BACK balance until the image is to the right side. Now reconnect the LEFT BACK and LEFT FRONT loudspeakers and unplug the other two. Check that the image is on the left side and repeat this and the previous conditions until a good compromise is found, repeatedly checking the front balance and back balance conditions. The system should now be satisfactorily set up and the various four channel conditions may now be used. The three left hand buttons are self explanatory for four channel matrix encoded stereo sources. The DECODE button should be pressed. As described in the foregoing setting up procedure pressing this button alone produces normal stereo signals from both front and back. Pressing the QS button as well causes the Q51 to produce the correct decode equations for the phase shifted Scheiber matrix known commercially as Regular Matrix or QS. Similarly, the SQ button alone is for the Phase Matrix or SQ equations and both the first two buttons, shewn on the facia as BMX cause the Q51 to correctly respond to the basic matrix of the QMX or UD4 system which is known as BMX. Facilities exist for the artificial production of four channel or "surround" sound and for this the Decode button should be released. With neither of the first two buttons depressed normal stereo is obtained. With the first or QS button depressed the Scheiber matrix is used whereas with the second or SQ button a "difference" or Hafler system obtains. Generally, for "pop" music the QS position (possibly also with decode pressed) will be better but for classical or soloist music the SQ position will be found preferable. The BMX position is produced whether decode is pressed or not and will not be found of value for enhanced effects on stereo sources but may be found of value on the NRDC "ambisonics" system should such sources be available.

FULL DECODE EQUATIONS

000	Stereo	LT 1.0 0 0	RT 0 1.0 0 0	LF RB RB
00	2 + 2	1.0 0 1.0 0	0 1.0 0 1.0	
0.0	Difference	1.0 0.1 0.5 -0.5	0.1 1.0 -0.5 0.5	
••••	Scheiber	0.92 0.38 0.92 -0.38	0.38 0.92 0.38 0.92	
		0.92 0.38 -j0.92 -j0.38	0.38 0.92 j0.38 j0.92	
	SQ	1.0 0.1 0.71 (0.4+j) 0.71 (1+j0.4)	0.1 1.0 -0.71 (1+j0.4) -0.71 (0.4+j)	
	BMX	0.85 -j0.35 0.15 -j0.35 0.85 +j.035 0.15 +j0.35	0.15 + j0.35 0.85 + j0.35 0.15 - j0.35 0.85 - j0.35	

TAPE FACILITIES

Provided that TAPE is pressed on the C51 (or FRONT C51) what is done with the tape facilities will be heard—if it is not "copying" in accordance with the following descriptions can be carried out (but not with TPF q.v.) and some other programme can be heard, as for example DISC or RADIO. A tape source can be selected by one of the three PLAY TAPE buttons. Note that only one can be used and should two be pressed at once the higher number will take precedence. This selected source is fed out to the record circuit of the other two, but not the one that is selected. The replay circuits also come to the TAPE MONITOR circuits and can be selected by one of the appropriate monitor buttons. The gain of these circuits can be controlled by the MONITOR VOLUME control in order to get parity of levels for example AB monitoring using recorders without their own output level controls. The TPF button causes the record circuits to be fed with the output of the C51. In this condition the TAPE MONITOR circuits cannot be used. Parity of levels will be found in most circumstances with the C51 volume control at about "2.0 o'clock". In the practical event if this level is too high for listening and only stereo is selected the system gain can be reduced by turning FRONT/ BACK balance towards BACK without affecting the gain of the record channels. When the user is fully conversant with the controls of his Q51 he will find its facilities invaluable. It is however appreciated that it is a relatively complex unit and some aspect may be strange to the layman audiophile. Please do not hesitate to contact the factory with any query however trivial—our aim is that you obtain maximum enjoyment from your Q51.

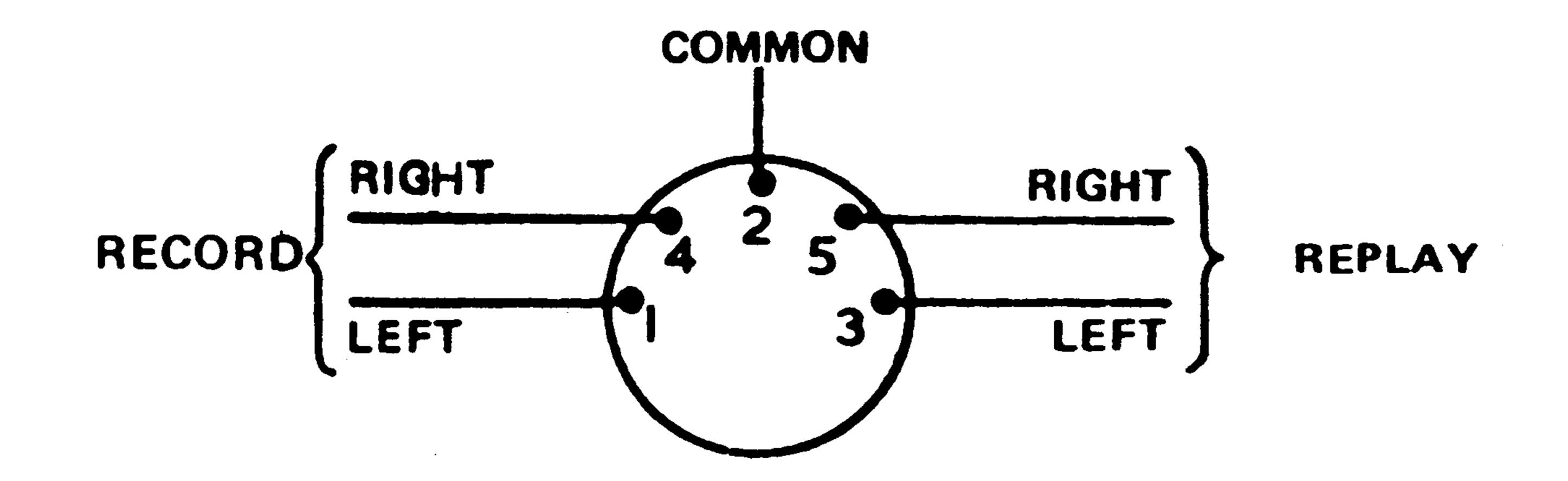
One final point—remember that two channel tapes recorded from four channel matrix encoded discs or stereo radio broadcast four channel matrix encoded discs and tapes decode in exactly the same way.

Appendix One—Application of discreet Four channel sources

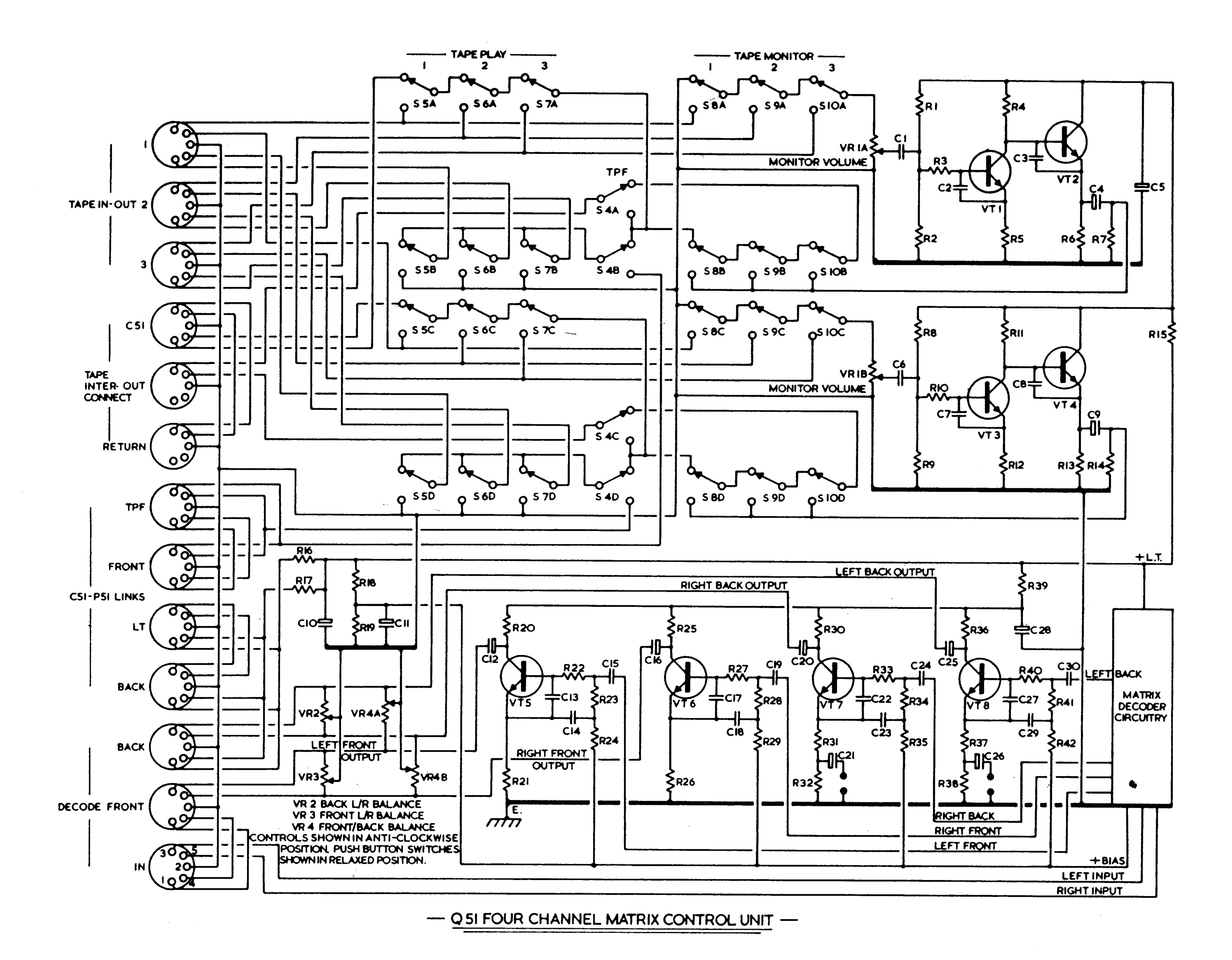
Discreet four channel sources can be accommodated with the use of the two C51 system. The front and back sources should be respectively connected to the AUX inputs of the two C51's. Similarly a four channel tape recorder can be connected using (say) TAPE 1 on the Q51 for the front channels and the tape socket of the back C51 for the back channels. It is of course necessary to operate both C51 volume controls simultaneously.

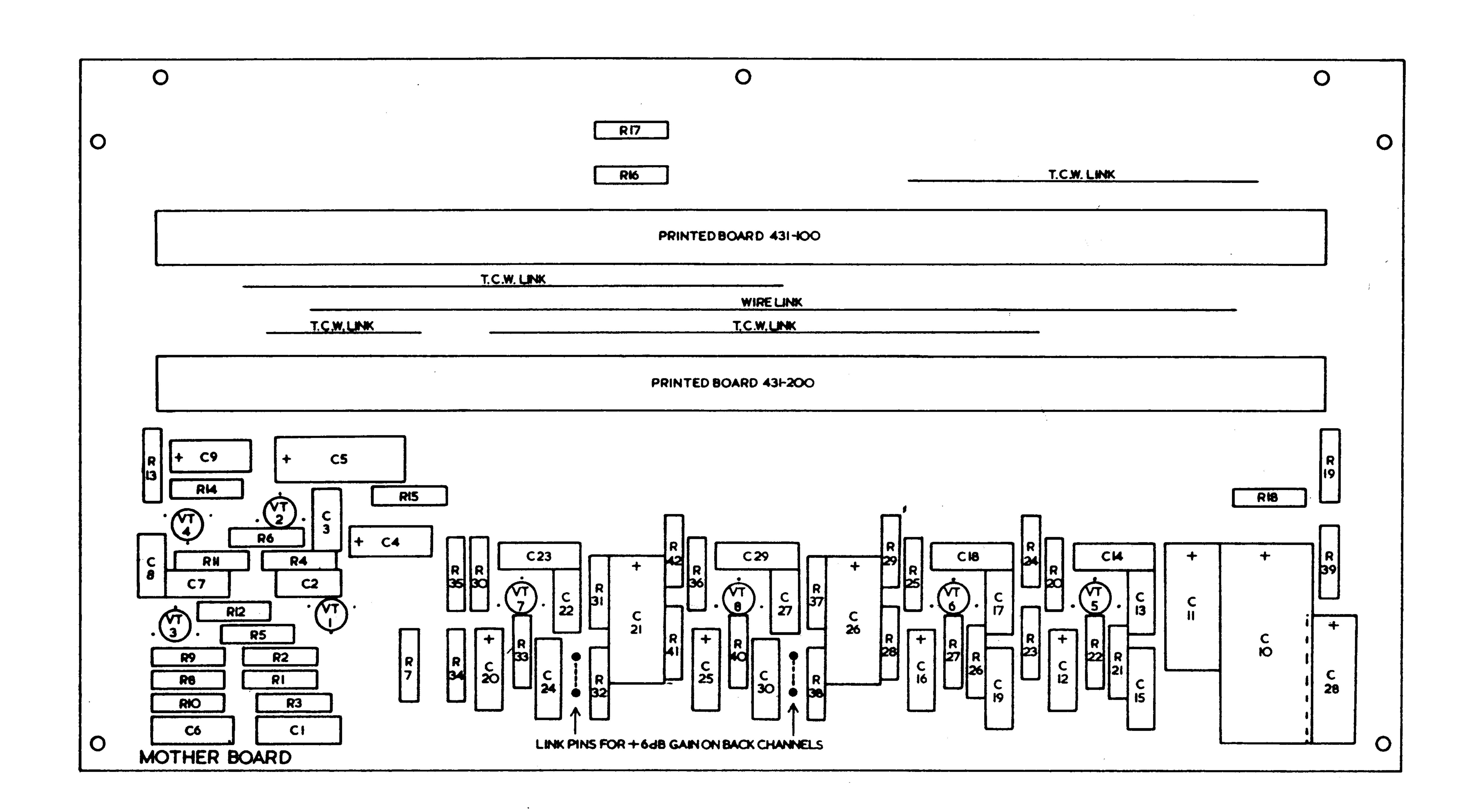
Appendix Two—Powering the Q51 for Power Amplifiers other than the P51 As described earlier one of the linked sockets LT-BACK can be used for the power supply feed. Negative is connected to pin 2 and positive to pins 1 and 4. The supply should be 16 to 20 volts DC and reasonably smoothed to prevent hum. A 16 volt Zener diode circuit is effective as is also a pair of PP9 batteries. Most amplifiers can be very easily modified to provide a 16 volt Zener diode circuit.

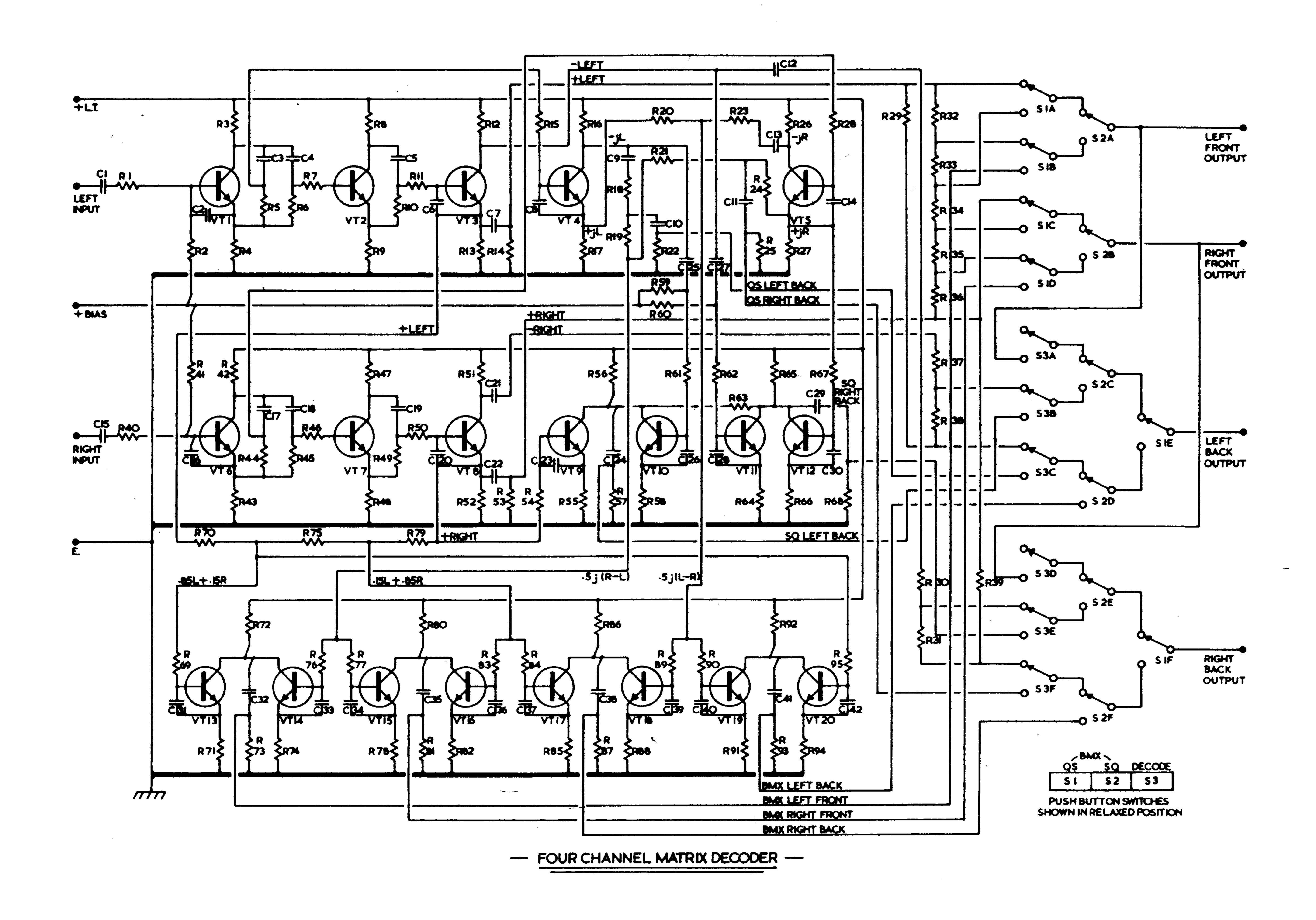
Appendix Three—Tape Connections
Standard DIN CONNECTIONS are used as shewn:

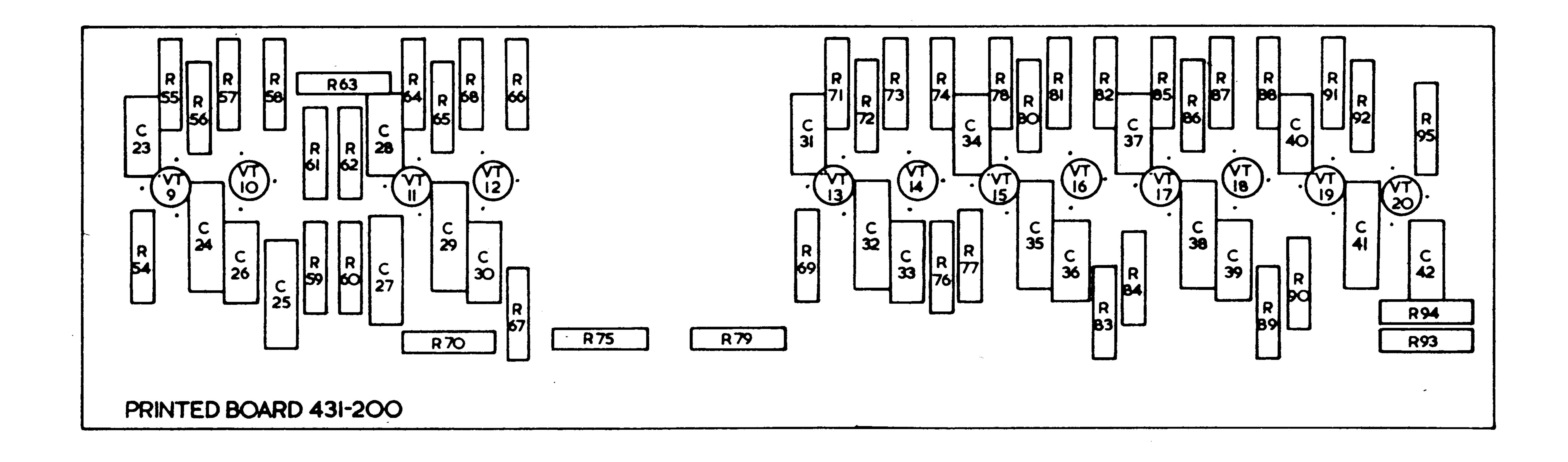


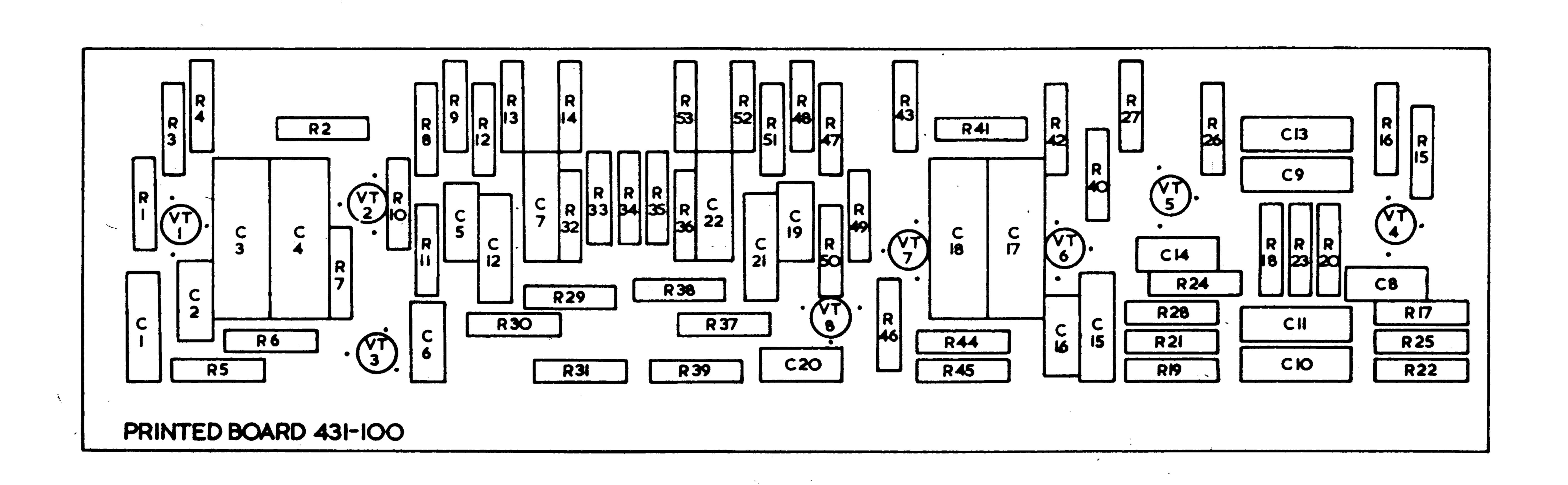
View on outside of socket or inside of plug











COMPONENTS LIST

Chassis and Mother Board

R 1	1M	R22	4K7	VR1	2x250K Log	C 1	220n	C22	270p
R 2	220K	R23	470K	VR2	50K	C 2	270p	C23	220n
R ₃	4K7	R24	470K	VR3	50K	C 3	270p	C24	220n
R 4	22K	R25	6K8	VR4	2x50K	C 4	2u2	C25	10u
R 5	10K	R26	4K3			C 5	100u	C26	470u
R 6	10K	R27	4K7	VT1	BC549C	C 6	220n	C27	270p
R 7	47K	R28	470K	VT2	BC549C	C 7	270p	C28	100u
R 8	1M	R29	470K	VT3	BC549C	C 8	270p	C29	220n
R 9	220K	R30	6K8	VT4	BC549C	C 9	2u2	C30	220n
R10	4K7	R31	2K2	VT5	BC549C	C10	470u		
R11	22K	R32	2K2	VT6	BC549C	C11	470u		
R12	10K	R33	4K7	VT7	BC549C	C12	10u		
R13	10K	R34	470K	VT8	BC549C	C13	270p		
R14	47K	R35	470K			C14	220n		
R15	1K2	R36	6K8			C15	220n		
R16	470	R37	2K2			C16	10u		
R17	470	R38	2K2			C17	270p		•
R 18	6K8	R39	1K2			C18	220n		
R19	3K9	R40	4K7			C19	220n		
R20	6K8	R41	470K			C20	10u		
R21	4K3	R42	470K			C21	470u		

Decoder Boards

R 2 R 3 R 4	4K7 4K7 4K7 4K7	R35	150K 68K 150K	R66 R67 R68		C 2 C 3 C 4	47n	C33 C35 C36	270p 220n
R 5		R37	3		4K7		•	C37	_
R 6		R38			100K		270p	C38	•
_	4K 7	R39			4K7	_	220n	C39	
	4K7	R40		•	4K7	-	270p	C40	
	4K7		470K		100K		220n	C41	
R 10			4K7	R74			220n	C42	2/Up
	4K7		4K7		470K		220n		
R12		R44			4K7		220n		BC549C
R 13		R45		_	4K7		220n		BC549C
R 14		· · · · ·	4K7		6K8		270p		BC549C
R 15		R47			100K		220n	• • • • • • •	BC549C
R 16			4K7		4K7		270p		BC549C
R 17		R49			100K	C17			BC549C
R 18		R50			4K7	C18			BC549C
R19		R51			4K7	•	470p	-	BC549C
	68 K	R52			4K7		270p		BC549C
R21			2M2		4K7		220n	•	BC549C
	2M2		4K7		4K7		220n		BC549C
	68K		4K7		100K		270p		BC549C
R24		R56			6K8		220n		BC549C
	2M2	R57		R89			220n		BC549C
R26		R58			4K7		270p	_	BC549C
R27		R59		R91					BC549C
	4K7	R60		R92			270p		BC549C
R29		R61	7	•	100K		220n		BC549C
	68 K	R62			4K7		; • • • • • • • • • • • • • • • • • • •		BC549C
R31		R63		R95	4K7	`\`	270p	VT20	BC549C
R32	33K	R64	4K7			C32	220n		