

No.  
**188**

**THE 1/6  
B.H. HIGH FIDELITY  
"14"**

**A SUPERB AMPLIFIER FOR THE  
AUDIO ENTHUSIAST  
AND  
PROFESSIONAL MUSICIAN**

- ★ No Technical Knowledge Required.
- ★ Simple to Build even for a Novice.
- ★ Inexpensive in Price.
- ★ Will outperform amplifiers costing three times as much.
- ★ Up to 14 watts Output.
- ★ Ideal for Guitar Use.
- ★ Full Mixing Facilities.
- ★ Point to Point Wiring.
- ★ Separate Bass & Treble Tone Controls.

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**BERNARDS RADIO DESIGNS**  
**THE GRAMPIANS, WESTERN GATE, LONDON, W.6**

All Components for this unique design have been approved and supplied by Technical Suppliers Ltd., 63, Goldhawk Road, London, W.12, who have available complete guaranteed kits of parts for the home constructor.

It is essential that no substitute components be used, otherwise the superb performance of this Amplifier cannot be guaranteed.

Your local dealer can supply you a **GUARANTEED TSL Kit.**

C1	0.01 mF.
C 2	50 mF.
C 3	50 mF.
C 4	0.05 mF.
C 5	0.01 mF.
C6,C7	2 X 8 or 16 mF.
C 8	8 mF. or 16 mF.
C 9	3000 pF.
C10	220 pF. — 270 pF.
C11	0.01 mF.
C12	0.01 mF.
C13	4,700 or 5,000 pF.
C14	0.1 mF.
C15	0.1 mF.
C16	50 mF.
C17	50 mF.
C18, C19	50+50 mF see text)
C20	220 pF. — 270 pF.
C21	100 pF.
V1	EF86, 6F22, 8D8, Z729 or 6CF8.
V2	ECC83, 6L13, B339 or 12AX7.
V3,V4	2xEL84, 6P15, N709 or 6BQ5.
V5	EZ81, U709, UU12, 6BW4 or 6CA4. T1 Mains Transformer.
T 2	Output Transformer.
	Twin input socket strip.
	Tag strips.
	Grommets.
	Output sockets.
	Hardware.
	Chassis.
	Sundries.

#### LIST OF PARTS

R 1	1 Megohm Pot. TSL
R 2	1 Megohm Pot. TSL
R 3	100 k.
R 4	1 M. to 1.5 M.
R 5	820 k.
R 6	100 ohm.
R 7	2.2 k.
R 8	120 k — 150 k.
R 9	470 k.
R10	2 Megohm Pot
R11	100 k.
R12	470 k.
R13	2.2 k.
R14	220 k to 270 k.
R15	120 k.— 180 k.
R16	120 k. — 180 k.
R17	33 k.
R18	47 k to 56 k HS.
R19	Max. Tol. 5%.
R20	4.7 k.
R21	470 k.
R22	4.7 k.
R23	4.7 k.
R24	680 k.
R25	680 k.
R26	270 ohm.
R27	270 ohm.
R28	47 ohm.
R29	47 ohm.
R30	560 to 2000 ohm. 2 w. min.
R31	270 ohm. 3 watt.
R32	270 ohm. 3 watt.
R33	15 k.
R34	33 k.
R35	25 k. Pot with D/P Switch.

#### STAGE 1—ASSEMBLY

During mounting of components, refer, in every case, to layout diagrams FIG. 1 and FIG. 2. Use shake proof washers wherever nuts and bolts are employed.

1. Mount tag strips T.S.2 to T.S.6 inclusive.
2. Unpack the five B9A valve holders: observe that one of the holders is skirted. Mount this holder in position indicated V.1 using the small grommet cut in half to isolate the holder from Chassis. This is to minimise risk of microphony. Note that tag strip T.S.1 is attached to one of the fixing screws. Holders V.2 to V.5 inclusive are now mounted on the chassis.
3. Insert four large grommets as shewn.
4. Select R.1, R.2, R.10 and R.35 and, if necessary, cut spindles to suit individual requirements. Controls are mounted, as shewn. Care must be taken to place them in their proper positions.
5. Screw the loudspeaker sockets and the input socket strip into position, note the solder tag on the input strip.

#### NOTE:

It is imperative that a good electrical connection

exists between the solder tag and Chassis, therefore, clean off paint immediately around fixing hole inside Chassis, and use shake-proof washers between inner side of Chassis and input socket strip, as well as between input socket strip and fixing nuts.

6. C.18 and C.19 consist of a twin electrolytic capacitor unit contained in a single can. This is quoted in the parts list as 50+50mF. In actual fact the values are not critical. C19 (red) should lay between 32 and 50mF and C18 (yellow) can be any value between 32 and 100mF. Depending on the time, capacitors with values other than 50+50mF There is, of course, no reason why, should the ring with P.V.C. tape, because the can must not the chassis.
7. Transformers T.1 and T.2 are now mounted in position. At this stage, the shielding screen is not placed in position. For the benefit of the advanced constructor a theoretical diagram is shewn at FIG.4.

#### STAGE 2—WIRING

Refer, in all cases, to FIGS. 1 & 3.

1. Connect the twin YELLOW wires on T.1 to pins 4 & 5 V.5.
2. Solder the two GREEN wires on T.1 to T.S.5 tags 1 & 2.
3. On the D.P.S.T. mains switch there are four tags. Two of these are marked with a P as shown on FIG. 3. These represent one side of each pole. Take a 6 ft. length of three core mains flex and strip back approximately two inches. Feed through Grommet 4 and solder as follows:—RED & BLACK leads to the two P tags on R.35/SW, GREEN to T.S.2 tag 7.
4. Connect the two BLACK wires on T.1 to T.S.6 tags 7 & 8 and through to the two remaining tags on F.35/SW.
5. Join twin RED wires on T.1 to T.S.6 tags 2 & 3 and ORANGE lead to tag 5.
6. Make main earth link of 18 SWG tinned copper wire between T.S.5 tag 5 and T.S.2 tag 7.
7. Continue earth link from T.S.2 tag 7 to tag 2.
8. Link tags 5 & 2 together on T.S.5 with short length of wire.
9. Wire R.31 between T.S.6 tag 2 and V.5 pin 1.
10. R.32 between T.S.6 tag 3 and V.5 pin 7.
11. Link V.5 pin 3 to T.S.6 tag 4 and on to C.19 (Red).
12. R.30 across C.19 (Red) and C.18(Yellow).
13. T.S.6 tag 5 to main earth link.
14. C.18 yellow to T.S.4 tag 4.
15. T.2 RED to T.S.6 tag 4.
16. Cut off two three-inch lengths of covered wire, strip the ends back and twist the leads together. Connect one leg of each lead to V.3 pins 4 & 5

and the remaining two legs to V 4 pins 4 & 5.

17. Prepare two similar four inch lengths of wire and link pins 4 & 5 on V.4 to pins 4 & 9 on V.2 also, link pins 4 & 5 on V.2 together.
18. Prepare a further pair of wires and link pins 4 & 9, V.2 to pins 4 & 5 V.1.
19. Connect T.S.5 tag 1 to V.3 pin 5 and T.S.5 tag 2 to V.3 pin 4. These two wires may be twisted together.
20. Connect T.S.6 tag 5 to the remaining tag on capacitors C.18—19. This is the negative connection and is joined internally to the metal casing. Some types of capacitor do not have this third tag and the negative connection is taken from a tag on the top of the can, fed through Grommet 3 to link up with T.S.6 tag 5.

#### STAGE 3—WIRING

21. Continue main earth link from T.S.2 tag 2 to T.S.3 tag 1.
22. Join tag E on input socket fixing screw to main earth link,  
NOTE: This is the only connection between the Chassis and the main earth link which travels all over the circuit.
23. Link the earth tags of the two input sockets together and to the tag E on input fixing screw.
24. Connect T.2 GREY to Output Socket BLACK.
25. T.2 YELLOW to Output Socket RED.
26. T.S.3 tag 1 to Output Socket BLACK.
27. T.S.3 tag 6 to Output Socket RED.
28. Input 1 to R.1 tag 3.
29. Input 2 to R.2 tag 3.
30. R.1 tag 1 to R.2 tag 1 and T.S.2 tag 2.
31. R.3 to R.1 tag 2.
32. R.4 to R.2 tag 2.
33. Solder the junction of R.3—R.4 (Refer Fig. 3).
34. V.1 pin 9 through C.1 to soldered junction of R.3—R.4.
35. V.1 pin 2 to spigot and pin 7 and on to T.S.2 pin 2.
36. C.4 from V.1 pin 1 to T.S.1 tag 5.  
NOTE: Where a band is shown at one end of the capacitor, this end is joined to tag strip.
37. R.9 from V.1 pin 1 to T.S.3 tag 4.
38. R.8 from V.1 pin 6 to T.S.3 tag 4.
39. V.1 pin 8 to pin 3 and on to T.S.1 tag 5.
40. C.5 from V.1 pin 6 to T.S.1tag 1.
41. T.S.1 tag 1 to R.10 tag 3.
42. V.1 pin 9 through R.5 to T.S.2 tag 2.
43. V.1 pin 7 through R.6 to T.S.1 tag 2.
44. T.S.1 tag 2 through R.7 to tag 5.
45. T.S.1 tag 2 through C.2 to tag 5.
46. R.15 from T.S.3 tag 4 to tag 7.
47. R.16 from T.S.3 tag 7 to T.S.4 tag 2.
48. R.17 from T.S.4 tag 2 to tag 4.
49. Insulate the can of C.6—C.7 should this not

already be provided with a polythene sleeve.

50. Connect one of the two positive tags to T.S.3 tag 4 and the other to T.S.3 tag 7.
51. Negative tag of C.6—C.7 to T.S.5 tag 2.

#### STAGE 4—WIRING

52. Connect C.9 across tags 2 & 3 R.10
53. C.10 across tags 1 & 2 R.10.
54. Join V.2 pin 7 to R.10 tag 2.
55. R.11 from R.10 tag 1 to T.S.2 tag 7.
56. R.12 from V.2 pin 7 to main earth link.
57. Connect tags 2 & 3 R.35 together and continue to T.S.2 tag 7.
58. R.35 tag 1 to T.S.2 tag 8.
59. C.12 from T.S.2 tag 8 to V.2 tag 6.
60. R.14 from V.2 tag 6 to T.S.3 tag 7.
61. C.11 from V.2 pin 2 to pin 6.
62. R.13 from V.2 pin 8 to T.S.2 tag 3 and on to main earth link.
63. C.13 from V.2 pin 8 to T.S.2 tag 3 and on to main earth link.
64. Join V.2 pin 8 through R.34 & C.21 to T.S.3 tag 6.
65. V.2 pin 1 to T.S.4 tag 1.
66. R.18 from T.S.4 tag 1 to tag 2.
67. C.14 from T.S.4 tag 1 to tag 6.
68. R.21 from V.2 pin 2 to T.S.2 tag 5.
69. C.3 from T.S.2 tag 5 (negative end) to T.S.2 tag 4 and through to V.2 pin 3 (Positive end).
70. R.20 from V.2 pin 3 to T.S.2 tag 5.
71. C.15 from T.S.2 tag 5 to T.S.4 tag 5.
72. R.19 from T.S.2 tag 5 to tag 7.
73. C.8 from T.S.4 tag 2 (positive) to main earth link (negative)

#### STAGE 5—WIRING

74. T.2 GREEN to V.3 pin 7.
75. T.2 BLUE to V.4 pin 7.
76. R.29 from V.3 pin 9 to T.S.4 tag 4.
77. R.28 from V.4 pin 9 to T.S.4 tag 4.
78. R.23 from V.3 pin 2 to T.S.4 tag 6.
79. R.22 from V.4 pin 2 to T.S.4 tag 5.
80. R.24 from T.S.4 tag 6 to main earth link.
81. R.25 from T.S.4 tag 5 to main earth link.
82. R.26 from V.4 tag 3 to main earth link.
83. R.27 from V.3 tag 3 to main earth link.
84. C.17 (positive) from V4 to pin 3 to main earth link (negative).
85. C.16 (positive) from V.3 pin 3 to main earth link (negative).

#### STAGE 6—COMPLETION

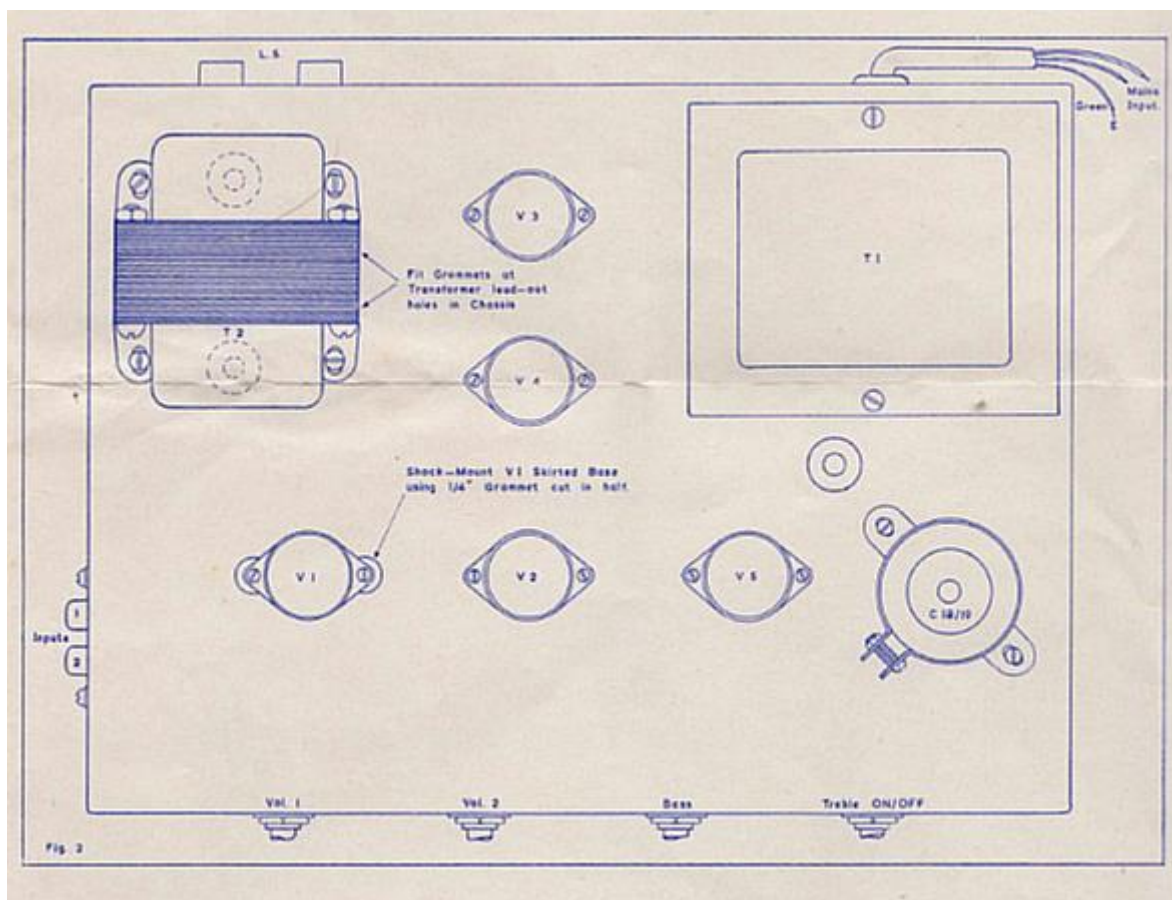
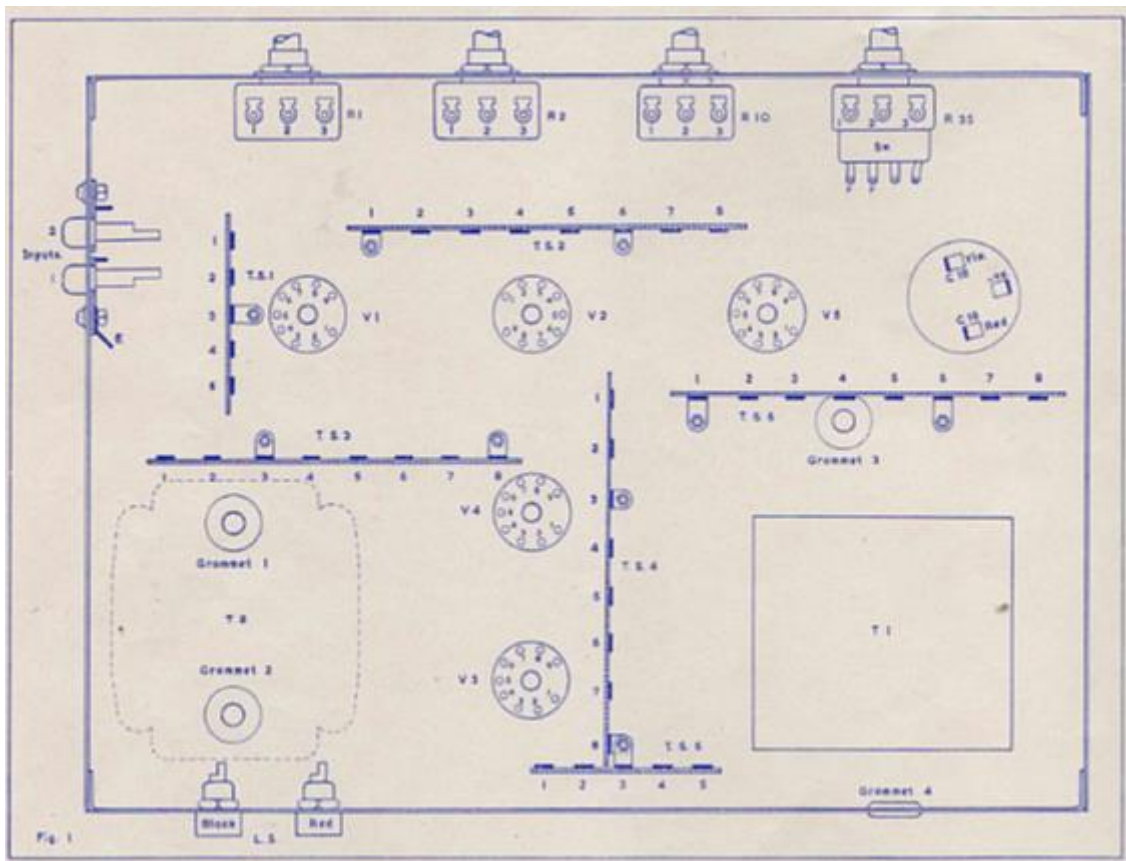
86. A small screening plate is supplied with the kit, this may now be fitted. With emery cloth or a file, remove the lacquer coating from around the three slots. This is to ensure a good electrical

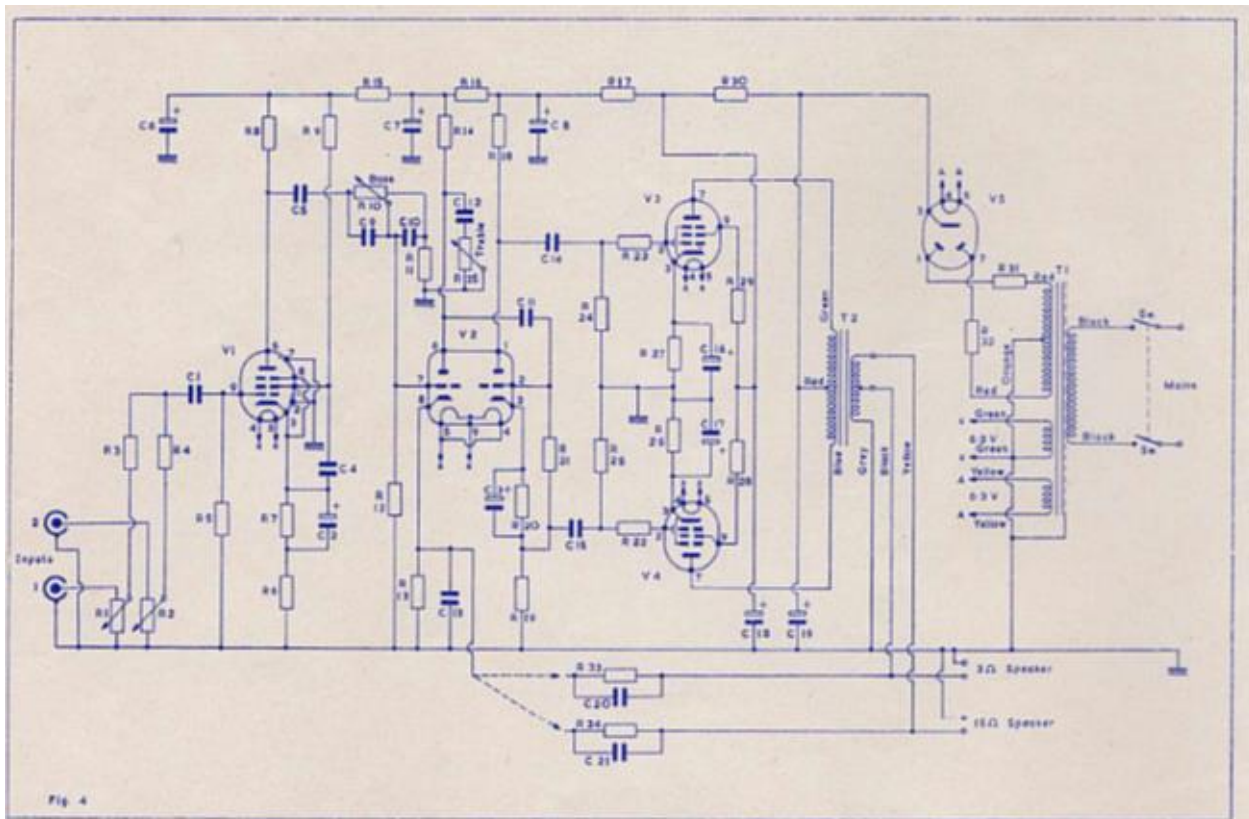
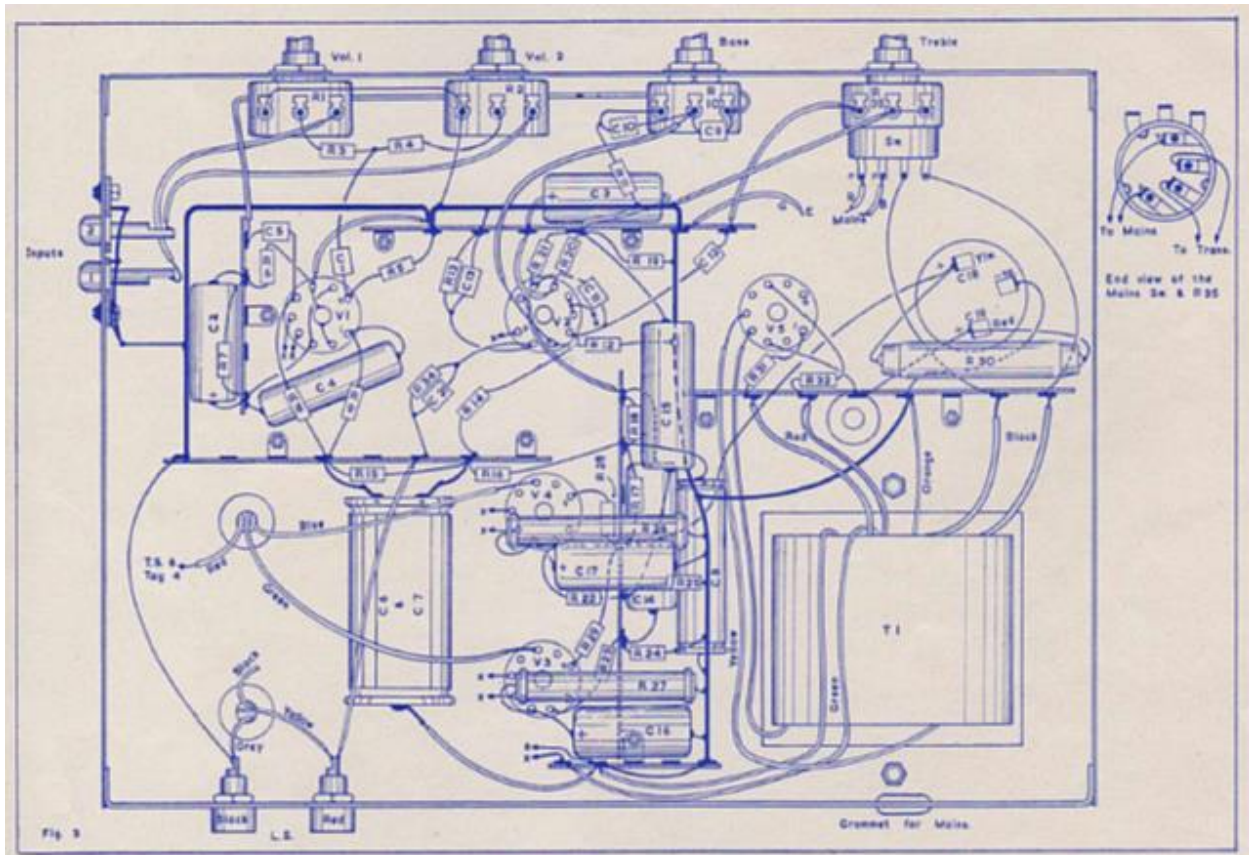
contact between screen and the potentiometer spindles. Slacken the nuts on R.1, R.2 and R.10 and insert screen between Chassis wall and tighten the three nuts previously slackened. Ensure that no components are in contact with the underside of the screen.

87. Insert the valves as detailed on parts list.
88. Before switching on, ensure VOL.1 and VOL.2 are fully anti-clock, i.e. zero level and that the Loudspeaker is connected. All ancillary apparatus must be connected by means of screened cable, such as, television co-axial feeder. Constructors wishing to use 3 to 5 ohm loudspeakers must substitute R.34 & C.21 for R.33 & C.20 and substitute the BLACK lead in place of the YELLOW one on T.2. This is to ensure the correct amount of feedback and correct loudspeaker matching. When R.34 & C.21 are used, as described in the construction details, it is intended that a 15 ohm loudspeaker be used. Whichever lead is not used should be insulated and left free. INPUT 1 is used when it is desired to utilise maximum gain, i.e. crystal tuners low gain P/Us, etc. INPUT 2 provides a degree of attenuation and is suitable for most Xtal and ceramic pick-ups. When either of these two types of cartridge is employed, it is suggested that a constant velocity equaliser is fitted between pickup and amplifier in order to obtain optimum performance.

An attractive escutcheon is provided, which identifies the controls. This may be fixed to the front of a cabinet or other selected housing or if preferred mounted directly on the chassis wall underneath the nuts locking the various controls into position.

The performance of this amplifier is controlled by the quality of the ancillary apparatus used, provided such apparatus is of comparable quality to that of the amplifier, superb performance is assured.





# TSL

Only TSL can supply genuine kits of parts for the B.H. High Fidelity "14" Audio Amplifier. Every kit is complete from drilled and punched chassis, professional escutcheon, TSL valves and transformers, etc., to the last nut, bolt and shake-proof washer.

- ★ All components are tested before despatch and guaranteed.
- ★ Insist on a genuine TSL kit for the B.H. High Fidelity "14", price £9-9-0, or built and tested by TSL ready for use price £11-11-0.
- ★ Your local dealer is in a position to supply this kit: in case of difficulty write to:

## **TECHNICAL SUPPLIERS LTD.**

**HUDSON HOUSE, 63, GOLDHAWK ROAD, LONDON, W.12  
ENGLAND**

Telephone: SHEpherds Bush 2581 and 4794

Telegrams—Home: Teknika London, W.12    Overseas: Teknika London