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CONSTRUCTION MANUAL

for the

K1100 Series

Power Amplifiers

Version 2

PERSONAL VISITORS SHOULD PHONE FIRST TO AVOID DISAPPOINTMENT

Proprietor: Shaun Williams (Former Technical Director of Wilmslow Audio Ltd.).

POWER AMPLIFIER ASSEMBLY

The following instructions are broken down into easily managed sections, making the assembly of this complex design very straightforward.

General assembly principles are outlined in our leaflet 'The Hart Guide to PCB Construction' which we suggest you read before starting. The following instructions assume that you have the level of knowledge contained in this guide.

This kit has been completely engineered separately from the publication of the original articles and this means that there are changes and modifications incorporated in the light of further experience, so please do not deviate from these instructions.

CHECK ALL RESISTORS WITH A MULTIMETER BEFORE FITTING.

The most common faults encountered are:- components fitted in the wrong position or the wrong way round, poor or missed solder joints, solder running across to adjacent tracks and not following the instructions correctly. Take your time and don't be tempted to do too much at once, break the job down in to manageable chunks.

POWER AMPLIFIER ASSEMBLY (PCB 1140-3)

Fit each batch of components as listed then turn the board over, solder and trim the wires before fitting the next batch.

This is a double sided board with the top surface forming an extended earth plane. Some of the components will need to be soldered to this earth plane aswell as the tracks underneath, this is pointed at the appropriate time.

The symbol marked Q16 should be ignored.

Open Resistor Set 1141

1. Fit 1 zero ohm link situated between D2 and R24, shown as a line joining two holes.
2. Fit R4, 5, 6 (1K)~ R3 (1K2)~ R29 (10K)~ R1, 14 (150K)~ R28 (10R) {R28 is also soldered at one end on the top side of the PCB}.
3. Fit R15 (22K)~ R13 (39R)~ R30 (39K)~ R18, 19, R21, 22 (1K0)~ R11 (470R)~ R2 (4K7)~ R7 (47K)~ R10 (470K)~ R12 (56R)~ R8 (820R).

Open Capacitor Set 1142

4. Fit C3 (100pf Polystyrene Axial)~ C2 (330pf Polystyrene Axial)~ C5 (1n0 Polystyrene Axial)~ C8 (2 x 10pf Polystyrene Axial in series) there is a position in the board for each.

Open Semiconductor Set 1143 & Hardware Set 1144

5. Fit D1, 2 (8v2 Zeners)~ D3,4 (1N4148) {Note that small diodes have the cathode end marked by a band or the whole end being a different colour to the main body colour, this band should match up with the line [end of the diode symbol on the PCB}.

Bend the wires at right angles to match the holes and leave the diodes proud of the board by 3 or 4mm. This avoids any contact between the diodes and the top earth plane.

6. No Action

7. Fit R23,24,25,26,27 (0R22 2.5W wirewound)~ R20 (8R2 2.5W wirewound. Don't confuse with the slimmer 0.5W 8R2 for R31) {Solder one end of R20 on the top of the PCB}.

8. Fit Presets RV2,4 (1K)~ RV5 (10K). {Set RV4 to the fully clockwise position, RV2 to its mid position and RV5 to measure 2K2 between its centre pin and the bottom left pin nearest the letter G in Gain}.

9. Fit the right angle 0.250 PCB Tabs. {Solder the 0V2 and LS Earth tabs on both sides of the PCB. Don't be afraid to heat them thoroughly}.

10. Fit R31/L1. {This is made by winding 6 turns of enamelled copper wire around R31 (8R2 0.5W) Scrape the enamel from the ends of the wire with a sharp knife before wrapping round each end of the resistor. Apply plenty of heat to solder}.

11. Fit C21 (10n Radial 5mm pitch).

12. Fit Transistors on 'D' pads using the pad itself to form the leads before fitting. Q3,5,7,8 (BC184)~ Q1,2,6 (BC556)~ Q4,11 (BC214)~ Q16 (2N5459/J111)~ Fit Q10 (VN1210M) afterwards as it is slightly higher than the other transistors.

13. Fit C4,15 (100n Polycarbonate Radial).

14. Fit C13 (220n Polycarbonate)~ C1,6,10,12,14,16 (470n Polycarbonate).

15. Fit Gold Plated Input Phono Socket. {Make sure the centre (live) contact is pushed down so that the thin portion of the pin is fully through the PCB. If this is incorrect, it will be difficult to fit the plug into the socket. At least one of the earthed outer tabs MUST be soldered to the top and bottom of the PCB to preserve continuity to R1,C2 and 0V1}.

16. Fit C7 (10uf) {This may be one or two capacitors depending on availability}.

17. Fit Q9 (BF870). {This is oriented so that the printing on the device faces R5}.

18. Fit C9,11,17,18 (470uf Radial Electrolytic on SA version)~ C20 (1000uf Radial Electrolytic) {Observe the correct polarity on all electrolytics, done here by putting the longer lead through the circled hole. Fit a small self adhesive disc to the top of the tallest electrolytic to prevent them touching any part of the case or PCB above}.

19. Fit the output Mosfets with the Heat Transfer Bracket between them and the PCB.

Q13,15 (ECF10P16 or BUZ905)~ Q12,14 (ECF10N16 or BUZ900).

Check carefully that there are no burrs on the heat transfer bracket that could cut through the T03 insulating gasket.

Cut sixteen 4mm lengths from the sleeving provided and fit one in each the transfer bracket holes that correspond to the legs and screws of the Mosfets. Make sure that the sleeving does not stand proud of the surface as this will prevent proper seating of the Mosfets and thus reduce the heat transfer.

Fit each Mosfet with a special silicone rubber gasket. { The use of silicone grease is NOT recommended }.

With the silicone gasket insulating the Mosfet from the bracket and the bracket on the PCB so that the turned up angle is at the rear edge of the board, loosely fasten each device in place with the M4 x 14mm screws. Put a shakeproof washer under the screw head on the copper side of the PCB and under the nut on the Mosfet flange. When all the Mosfets are in place, settle the bracket with the line on the board and evenly tighten all the nuts. Keep going round tightening the nuts, **holding the screw still to prevent tearing the copper track**, until all the nuts will not tighten any more.

Solder and trim the projecting Mosfet pins to complete construction of this section and if you haven't already done so, take a break!

POWER SUPPLY SECTION (PCB 1150-3)

The complete power supply is contained within the case which forms the mounting for all the components and acts as the heatsink for the series stabilisation Mosfets. The combined mains inlet socket and switch, the speaker output connectors and phono input sockets are accommodated on the rear panel. The PCB is designed to fit round the large toroidal transformer and the complete unit provides a total of six stabilised output voltages, four for the power amplifiers and two for the auxiliary circuits.

The component wires should be trimmed off neatly, but not excessively, to enable the PCB to be situated closely to an insulation sheet on the case floor. This prevents any component wires touching the chassis and causing expensive pyrotechnics.

Open Resistor Set 1151 { All the small (0.3W) resistors are fitted first }.

20. Fit thirteen zero ohm links.

21. Fit R5,6,7,8,9,10,25,26,27,28,41 (4K7).

22. Fit R17,18 (120R)~ R2,3,23,24,47,48 (10K)~ R29,30 (12K)~ R39 (100K).

23. Fit R33,34 (15K)~ R1,4 (33K)~ R42,43 (470K)~ R35,36 (68K)~ R19,20 (1M).
{ The 220R are fitted later }

Open Semiconductor Set 1153 & Hardware Set 1154.

{ **Note polarity on diodes.** The line on the diode symbol is the cathode end and the arrow is the anode end. The cathode end of the diode is marked with a band. }

24. Fit D1,2,3,4,5,6,7,8,10,11,12,13,14,15,16,23,24,31 (1N4148)
{ D9,30 are fitted in vertical cradles later }

25. Fit D29 (24v Zener)~ D25,26,32,33 (10v Zener)~D27,28,34,35 (16v Zener).

26. Fit D17,18 (1N4003).

27. Fit R11,12 (33R 0.5W)~ R46 (3K3 0.5W)~ R21,22,37,38 (10K 0.5W)~
R31,32,40 (12K 0.5W)~ R44,45 (8K2 0.5W)~ R13,14 (15K 0.5W).

28. Fit R15,16 (0R22 2.5W wirewound)~ R50 (390R or 470R 2.5W wirewound)~
R49 (1K 2.5W wirewound).

29. Fit RV1,2 (10K Preset)~ RV3,4 (22K Preset).

30. Fit Q9,11,14,16,21 (BC184) { These should be fitted on 'D' pads }.

31. Fit Q10,12,13,15,22 (BC214) { On 'D' pads }.

32. Fit Q2,3,8,19 (BC546)~ Q4,5,7,20 (BC556) { On 'D' pads }.

33. Fit D9,30 (1N4148) {In vertical cradles with the cathode on the lower edge of the cradle}.

34. Fit the 2 pin Header in the position marked sl just below D27. Then push on its shorting link.

Open Capacitor Set 1152

35. Fit C7,8 (3n3 Polystyrene Axial).

36. Fit C13,14 (22uf 25v Radial Electrolytic) {Observe polarity, the long wire goes through the circled hole}.

37. Fit fifteen (0.250") Connection Tabs and nine (0.110") Connection Tabs. {Orient the small tabs to line up with the mark on the PCB and trim off any excess underneath the PCB after soldering}.

38. Fit C5,6 (2.2uf Polycarbonate Radial).

39. Fit C3,4 (220uf 40v Radial Electrolytic)~ C1,2 (100uf 63vRadial Electrolytic) {Observe polarity}.

40. Fit Q6,23 (TIP41B or C)~ Q1,24 (TIP42B or C)~ D19,20,21,22 (BY229) {The metal back of the BY229 should line up with the mark on the PCB}
{Carefully fit the clip-on heatsinks to Q1,6,23,24 after the rest of the components have been fitted}.

41. Fit SK1 (10 way socket) {The open side faces the edge of the PCB}.

42. Fit C9,10 (220uf Radial Electrolytic) {Note polarity}.

43. Fit C11,12 (4700uf 80v Radial Electrolytic) {**NOTE POLARITY. CAN BE DANGEROUS IF CONNECTED INCORRECTLY!**}

CASE ASSEMBLY

Note that the mounting hole on PCB1150-3 nearest the wording 'SK1' will form the **Central Earth Point** for the whole amplifier and **MUST** provide continuity down to the main chassis.

44. Remove the top cover of the amplifier case.

Fit the Loudspeaker terminals, phono socket(s) and combined IEC inlet socket switch as shown in the separate drawings near the end of these instructions. {See the wiring list for details of the wires going to these terminals from the power amplifier boards}.

45. Connect the wires to Q17 and Q18 sockets before fitting them to the case {See drawing on page 7}. These Mosfets have a 220R resistor (R51,52) fitted in the gate lead as close as possible to the device. The wire and resistor are then insulated with a heatshrink sleeve, as are the rest of the connections {Put the heatshrink over the wire before soldering as it will not go on afterwards}.

Fit Q17 (ECF10P16 or BUZ905)~ Q18 (ECF10N16 or BUZ900).

46. Place the insulation sheet on the base of the chassis after loosely fitting the six hexagonal spacers. The spacers hold PCB 1150-3 away from the chassis with the insulating sheet between the PCB and the chassis.

47. Fit PCB 1150-3 in place loosely with the M4 x 5mm screws, but leave out the screw for the central earth point next to SK1.

48. Great care and attention to this stage of the job are vital to YOUR safety, so please take it slowly and make sure you understand what has to be done.

You may have two integral fuse holders on the switch, these are not used as the mains cable is already fused.

Connect the wires to the mains switch as follows:- (240v)

The short Blue wire connects from the position marked N on the rear of the IEC Inlet Socket to 1A on the rear of the Switch.

The short Brown wire connects from the position marked L on the rear of the IEC Inlet Socket to 4B on the rear of the Switch.

The Orange wires from the Transformer are connected so that one goes to 2A and the other goes to 5B.

The Earth wire is connected from the central pin on the IEC socket to the central earth screw on the PCB next to the 10 way socket, with the ring tag fastened securely under the screw.

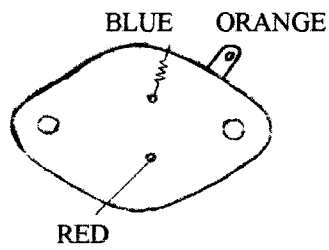
Continuity of the earth path down to the chassis should be checked with a meter.

Now tighten all the screws holding down PCB 1150-3.

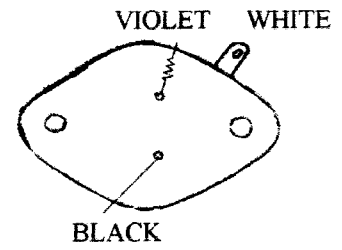
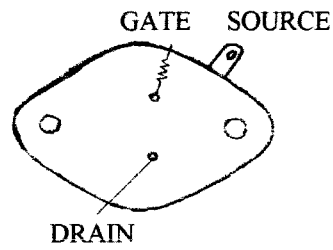
49. Fit the mains transformer together with the rubber washers, one above and one below the transformer and the metal retaining plate on top of the upper washer. The bolt should be tightened firmly without overtightening as this could cause damage to the windings and ultimately shorting of transformer turns. **Under no circumstances should both ends of the fixing bolt be allowed to come simultaneously into contact with the metal chassis so that an electrical path is formed.**

Connect the four secondary wires to their labelled tabs on PCB 1150-3 next to the rectifying diodes D19-22.

POWER SUPPLY TO3 MOUNTING and REAR PANEL POSITIONING

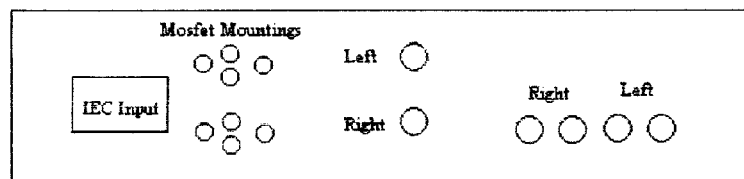
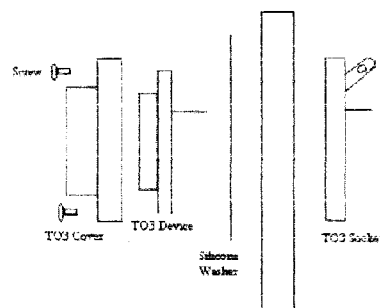


Q17
ECF10P16 or BUZ905



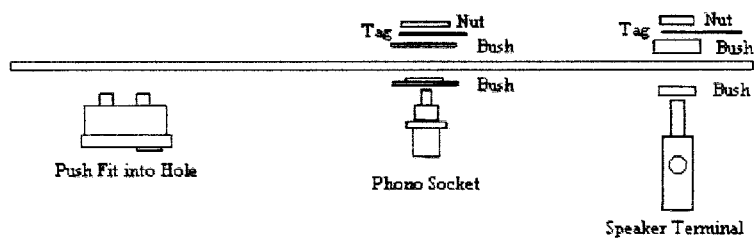
Q18
ECF10N16 or BUZ900

MOUNTING VIEW FROM TOP OF CASE



Phone Inputs

Speaker Outputs



ASSEMBLY OF CABLE 1108A (LEDs)

Open Set 1108A

Check that the wire colours relate to the plug as shown in the drawing below.

Cut back the Brown, Red, Orange, Yellow, Violet and Black wires about 70mm. Carefully trim out the 'web' between the Green/Blue and White/Grey pairs of wires.

Cut 15mm off the Green and the Grey wires and strip 4mm of insulation off all four wires.

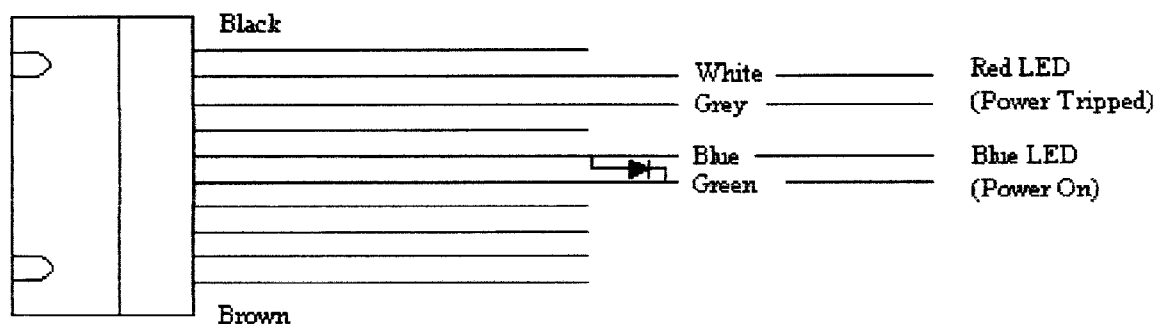
Cut 13mm off the shorter lead on both LEDs.

Cut two 23mm lengths of the red sleeving and slide one over each of the **long** LED leads.

Cut two 35mm lengths of the larger heatshrink sleeving and slide one over each over the Blue/Green and White/Grey pairs, pushing clear of the joints to be soldered.

Solder the LED leads to their correct wires in the ribbon cable. The Blue LED goes to the Blue/Green pair and the Red LED to the White/Grey pair. The polarity should be obvious due to the lead and wire trimming, but check with the diagram below to be certain. Making sure that there can be no shorts, slide the heatshrink sleeve to the base of the LED and shrink in place over a match (without burning anything).

For the purpose of testing the power supply, just plug the cable in to its socket on the PCB. Use glue or blutak to hold the LEDs in place on the front panel when all other testing and assembly has taken place, but before fitting the case top.



TESTING, SETUP AND OPERATING NOTES

When assembly of the power supply is complete, it should be carefully tested and set up.

The power supply should be tested first and without the power amplifier modules being connected.

Make sure that the earth wire (No 26) from near the central earth point is connected to the earth tab near the small + & - 50v connections on same PCB.

The power on and power supply tripped LEDs should be connected (Cable 1108A) and it is normal for the RED (power supply tripped) LED to light momentarily when the unit is switched on to full mains voltage, failure to do so probably indicates that the LED is wrongly connected.

Power supply Set-up (test this on its own)

Check all wiring carefully before switching anything on and do not go to the next stage if anything is not correct.

Always disconnect the mains and allow at least two minutes to elapse for capacitors to discharge before connecting or disconnecting anything to or from the power supply.

If possible, feed the power supply from a variac and slowly apply increasing levels of voltage, checking all DC output points until (assuming everything is correct) the full 240v level on the variac is reached. Measurements should be taken with a multimeter connected in turn and **individually** between each of the 50v/55v rails and earth. Be careful not to short anything out during this procedure.

Set up the low current 50v supplies, preferably with a digital multimeter for accuracy, to give exactly + & - 50 volts by adjusting RV1 (+50v) and RV2 (-50v). Set up the 55 volt supply rails by adjusting RV3 (+55v) and RV4 (-55v).

Occasionally the 55v supply rails, particularly the positive one, will not set up without a load. If this is the case, use the two 1K5 1W resistors in series attached between the problematical 55v rail and earth and you should now be able to set the correct voltage. These resistors may get hot during the process, so be careful.

Power Amplifier Set-up (connect and set up one channel at a time. Do not connect any speakers or inputs at this stage).

Check that RV2 is set to its centre position and RV4 fully clockwise.

Connect all the internal wiring as per the instructions.

Connect an amp meter (replacing the red cable) between the +55v supply tab on PCB 1150-3 and the +55v tab on PCB 1140-3. The current should be set to read 150mA by adjusting RV4.

Using a volt meter connected to the speaker terminals at the back of the amplifier and adjust, if necessary, using RV2 to get a reading of as near to zero as possible.

Repeat this procedure for the second power amplifier board.

Now make up the Phono leads that connect the power amp boards to the phono input sockets as per the enclosed drawing.

Operating Notes

The power supply incorporates a sensitive trip circuit to prevent damage to the speakers in the event of a malfunction. This operates by sensing any DC present on the speaker lines and shuts down the power supply if it finds any. If the DC voltage offset has not been set to zero, the power supply will trip. High volume settings without connecting a speaker load will also cause the power supply to trip.

If the power supply trips out, indicated by the red LED lighting, switch the amplifier off for at least two minutes and then switch it back on again. If the supply is still tripped it would be advisable to look for a reason to prevent the possibility of speaker damage.

The mains plug should be fitted with a fuse rating of at least 5 amps.

A sobering thought should you intend leaving the amplifier switched on permanently. The normal manufacturer's expected operating life of the majority of electronic components is between 2,000 and 5,000 hours (This applies to your other household appliances aswell). Although they are likely to last way beyond this (How long have you had your TV?), in a worst case scenario you would have to replace the main electrolytics every 83.3 days! Now that we have worried you, rest assured that most components will last longer than this, the main 4700uf smoothing capacitors are the ones to watch. They should be replaced if there is any sign of leaking electrolyte and we do not guarantee these items beyond two months.

The amplifier will take some time to 'run in' and will sound better after this running in period, which varies according to circumstances.

COMPONENTS LIST.

POWER AMPLIFIER SECTION.

RESISTORS. All 0.25W Metal Film 1% unless stated

R1 150K
R2 4K7
R3 1K2
R4 1K0
R5 1K0
R6 1K0
R7 47K
R8 820R
R9 Not used after 02/92
R10 470K
R11 470R
R12 56R
R13 39R
R14 150K
R15 22K
R16 Not Used.
R17 Not Used.
R18 1K0
R19 1K0
R20 8R2 2.5W W/W
R21 1K0
R22 1K0
R23 0R22 2.5W W/W
R24 0R22 ...
R25 0R22 ...
R26 0R22 ...
R27 0R22 ...
R28 10R
R29 10K
R30 39K
R31 8R2 0.5W (Matrix for LI)

RV2 1K0 LIN PRESET (Set DC offset)
RV4 1K0 LIN PRESET (Set Quiescent Current)
RV5 10K LIN PRESET (Balance/Gain Preset.)

CAPACITORS Standard Version uses Polyester caps.

C1 470n Polycarbonate Film Radial Pitch 5mm
C2 330p Polycarbonate Film Axial
C3 100p Polycarbonate Film Axial
C4 100n polycarbonate Film Radial Pitch 10mm
C5 1n0 Polycarbonate Film Axial
C6 470n Polycarbonate Film Radial Pitch 15mm
C7 10uf Polycarbonate or Polypropylene
C8 2x10p Polystyrene Film Axial in series.
C9 470u 63 or 100v Radial Electro. Pitch 5/7.5mm
C10 470n Polycarbonate Film Radial Pitch 15mm
C11 470u 63 or 100v Radial Electro. Pitch 5/7.5mm
C12 470n Polycarbonate Film Radial Pitch 15mm
C13 220n Polycarbonate Film Radial Pitch 10mm
C14 470n Polycarbonate Film Radial Pitch 15mm
C15 100n Polycarbonate Film Radial Pitch 10mm
C16 470n Polycarbonate Film Radial Pitch 15mm
C17 470u 63 or 100v Radial Electro. Pitch 5/7.5mm
C18 470u 63 or 100v Radial Electro. Pitch 5/7.5mm
C19 Not Used.
C20 1000u/25v Radial Electrolytic. Pitch 5/7.5mm
C21 10n Polycarbonate Film Radial. Pitch 5mm

SEMICONDUCTORS. All transistors, except BF870 & output devices, fit on 'D' pads.

Q1 BC448/450/556
Q2 BC448/450/556
Q3 BC184
Q4 BC214
Q5 BC184
Q6 BC448/450/556
Q7 BC184
Q8 BC184

cont...

POWER AMPLIFIER SECTION.

cont..

Q9 BF870
Q10 VNI210M
Q11 BC214
Q12 2SK135 Now replaced by ECF10N16 or BUZ900
Q13 2SJ50 Now replaced by ECF10P16 or BUZ905
Q14 2SK135 Now replaced by ECF10N16 or BUZ900
Q15 2SJ50 Now replaced by ECF10P16 or BUZ905
Q16 2N5459/J111

D1 8v2 ZENER 400mW
D2 8v2
D3 1N4148
D4 1N4148

POWER SUPPLY SECTION COMPONENTS.

RESISTORS. All 0.25W 1% unless stated.

R1 33K
R2 10K
R3 10K
R4 33K
R5 4K7
R6 4K7
R7 4K7
R8 4K7
R9 4K7
R10 4K7
R11 33R 0.5W
R12 33R 0.5W
R13 15K 0.5W
R14 15K 0.5W
R15 0R22 2.5W W/W
R16 0R22 2.5W W/W
R17 120R
R18 120R
R19 1M
R20 1M
R21 10K 0.5W
R22 10K 0.5W
R23 10K
R24 10K
R25 4K7
R26 4K7
R27 4K7
R28 4K7
R29 12K
R30 12K
R31 12K 0.5W
R32 12K 0.5W
R33 15K
R34 15K
R35 68K
R36 68K
R37 10K 0.5W
R38 10K 0.5W
R39 100K
R40 12K 0.5W
R41 4K7
R42 470K
R43 470K
R44 8K2 1/2W
R45 8K2 1/2W
R46 3K3 1/2W
R47 10K
R48 10K
R49 1K0 2W5 W/W.
R50 390R 2W5 W/W
R51 220R
R52 220R
RV1 10K PRESET HORIZ (50v+ Adjust)
RV2 10K PRESET HORIZ (50v- Adjust)
RV3 22K PRESET HORIZ (55v+ Adjust)
RV4 22K PRESET HORIZ (55v- Adjust)

cont.....

POWER SUPPLY SECTION COMPONENTS.

cont..

CAPACITORS

C1 100uf 63v Electrolytic Radial Pitch 5mm.
C2 100uf 63v Electrolytic Radial Pitch 5mm.
C3 220uf 40v Electrolytic Radial Pitch 5mm.
C4 220uf 40v Electrolytic Radial Pitch 5mm.
C5 2u2 63v Polyester Radial 15mm Pitch
C6 2u2 63v Polyester Radial 15mm Pitch
C7 3n3 Polystyrene Axial
C8 3n3 Polystyrene Axial
C9 22uf 63v Electrolytic Radial 5/7.5mm Pitch
C10 220uf 63v Electrolytic Radial 15mm Pitch
C11 4700uf 80/100v PCB Mounting Can Type.
C12 4700uf 80/100v PCB Mounting Can Type.
C13 22u 25v Electrolytic Radial Pitch 2mm.
C14 22u 25v Electrolytic Radial Pitch 2mm.

SEMICONDUCTORS. All T092 Devices are fitted on 'D' Pads.

Q1 TIP42B/BD538 With T0220 Clip Heatsink.
Q2 BC447/449/546
Q3 BC447/449/546
Q4 BC448/450/556
Q5 BC448/450/556
Q6 TIP41B/C With T0220 Clip Heatsink.
Q7 BC448/450/556
Q8 BC447/449/546
Q9 BC184
Q10 BC214
Q11 BC184
Q12 BC214
Q13 BC214
Q14 BC184
Q15 BC214
Q16 BC184
Q17 2SJ50 Now replaced by ECF10P16 or BUZ905
Q18 2SK135 Now replaced by ECF10N16 or BUZ900
Q19 BC447/449/546
Q20 BC448/450/556
Q21 BC184
Q22 BC214
Q23 TIP41B/C. With T0220 Clip Heatsink.
Q24 TIP42B/C. With T0220 Clip Heatsink.

D1 TO D16 1N4148
D17 1N4003
D18 1N4003
D19 to 22 BY229 400 or alternative as supplied
D23 1N4148
D24 1N4148
D25 10v 400mW Zener.
D26 10v 400mW Zener.
D27 16v 400mW Zener.
D28 16v 400mW Zener.
D29 24v 400mW Zener.
D30 1N4148
D31 1N4148
D32 10v 400mW Zener.
D33 10v 400mW Zener.
D34 16v 400mW Zener.
D35 16v 400mW Zener.

CIRCUIT DIAGRAMS

Power Amplifier Theoretical Circuit

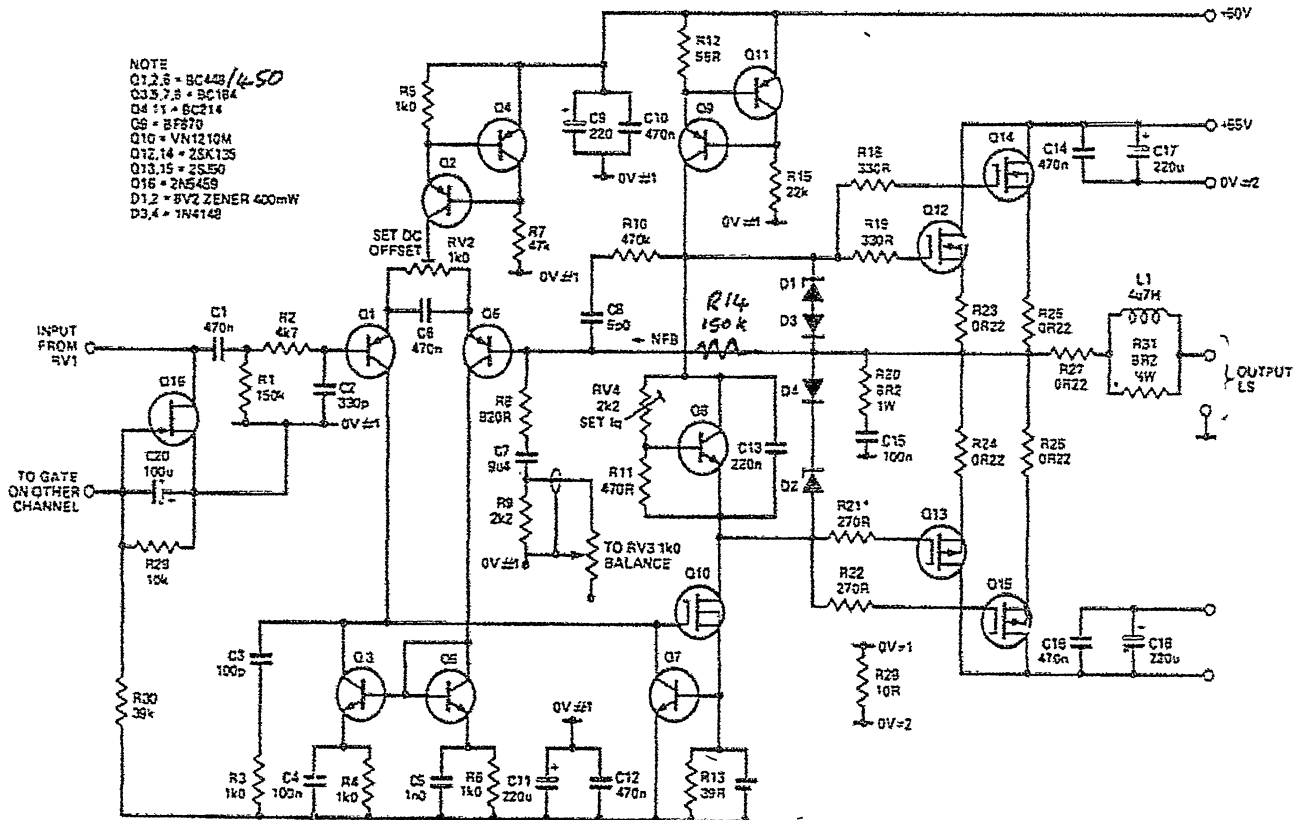


Fig. 7 Circuit diagram of the complete power amplifier

NOTES.

This circuit is taken from the magazine article and the following errors and changes should be noted:-

C20 is shown incorrectly as 100uf, correct value is 1000uf.

R9 is shown as 2K2, this is not used on the latest boards, being replaced with RV5 a 10K preset. This sets the gain, or the amount negative feedback.

R31 is used as the winding matrix for coil L I.

RV3 is no longer used.

RV4 is shown as 2K2, 1K is used in kits to give better control.

BC448 is replaced with BC556

RI8, 19, 21 & 22 are now 1K0.

WIRING DETAILS FOR MOSFET AMP

Colour	Connect From:	Termin.	Length/Size	To Position Marked:	Termin.
]Pink	+ Left Speaker Terminal	RTM5	210 63/.2	Left Amp PCB LS+	.250
] "	"	RTM5	220 7/.2	PSU PCB LS L by R13	.110
] "	PSU PCB LS L by R13	.110	190 7/.2	PSU PCB LS L by SK1	.110
Green/Yell	- Left Speaker Terminal	RTM5	215 63/.2	Left Amp PCB LS E	.250
]Green	+ Right Speaker Terminal	RTM5	170 63/.2	Right Amp PCB LS+	.250
] "	"	RTM5	220 7/.2	PSU PCB LS R by R13	.110
] "	PSU PCB LS R by R13	.110	190 7/.2	PSU PCB LS R by SK1	.110
Green/Yell	- Right Speaker Terminal	RTM5	165 63/.2	Right Amp PCB LS E	.250
White	Q18 S Socket	Solder	100 24/.2	PSU PCB Q18 S	.250
Black	Q18 D Socket	Solder	105 24/.2	PSU PCB Q18 D	.250
Violet	Q18 G Socket	Solder	105 7/.2	PSU PCB Q18 G	.110
Orange	Q17 S Socket	Solder	110 24/.2	PSU PCB Q17 S	.250
Red	Q17 D Socket	Solder	95 24/.2	PSU PCB Q17 D	.250
Blue	Q17 G Socket	Solder	110 7/.2	PSU PCB Q17 G	.110
Black	PSU PCB 55v-	.250	180 63/.2	Left Amp PCB 55v-	.250
Black	PSU PCB 55v-	.250	180 63/.2	Right Amp PCB 55v-	.250
Red	PSU PCB 55v+	.250	300 63/.2	Left Amp PCB 55v+	.250
Red	PSU PCB 55v+	.250	300 63/.2	Right Amp PCB 55v+	.250
Green/Yell	PSU PCB E1	.250	300 63/.2	Left Amp PCB 0v No2	.250
Green/Yell	PSU PCB E2	.250	300 63/.2	Right Amp PCB 0v No2	.250
]White	PSU PCB 50v-	.110	290 24/.2	Right Amp PCB 50v-	.250
] "	<i>Right Amp PCB 50v-</i>	.250	80 24/.2	<i>Left Amp PCB 50v-</i>	.250
]Orange	PSU PCB 50v+	.110	430 16/.2	Right Amp PCB 50v+	.250
] "	<i>Right Amp PCB 50v+</i>	.250	80 16/.2	<i>Left Amp PCB 50v+</i>	.250
]Green/Yell	PSU Central Earth Screw	RTM3	240 24/.2	Left Amp PCB 0v No1	.250
]Green/Yell	PSU Central Earth Screw	RTM3	260 24/.2	IEC Mains Inlet Socket	.250
Green/Yell	PSU PCB E3	.250	250 16/.2	PSU 50v E	.110

KEY TO ABOVE DETAILS:

] Symbol indicates that wires are pre-connected

PSU = Power Supply Unit

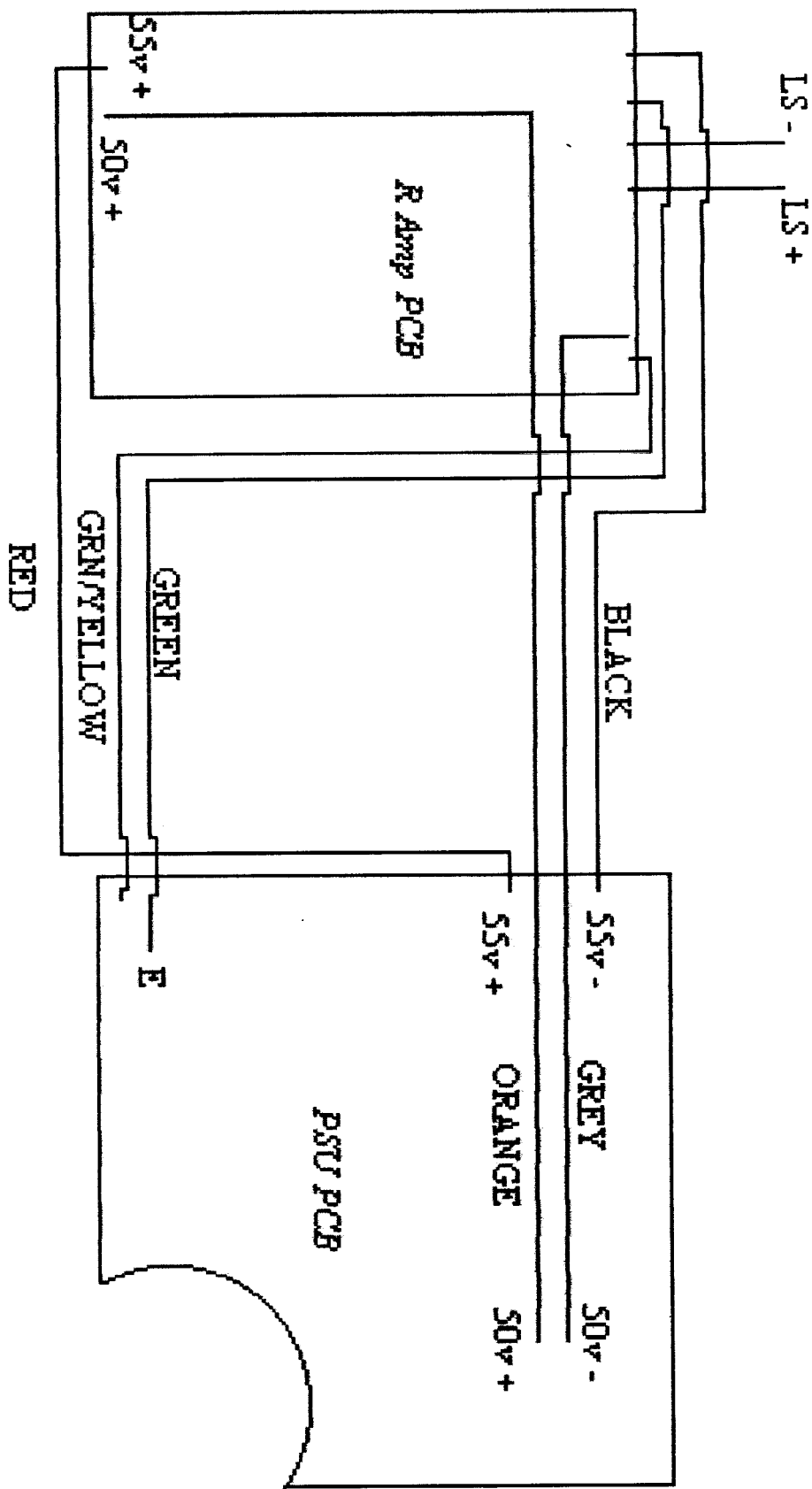
.110 & .250 refers to Push Connectors

Length/Size is the length in mm followed by the cable strand information

RT = Ring Tag followed by thread diameter in mm

Details in Italics relate to stereo amp only.

This Drawing is for guidance purposes only, helping to locate some of the connection points and is not intended to be a literal wiring location plan.



SPECIAL NOTE

PCB 1140-3.

The latest batch of these boards have been cut slightly wider than usual. On some boards this has left a thin edge of copper 01;1 both sides of the top (component) surface. This is easily removed, before starting assembly, with a modelling or Stanley knife.

PCB 1150-3

This PCB has been modified to take the latest power supply capacitors and a small copper wire was left off. This is very simply added at the assembly stage by taking the cathode wire from D 11 to the base (centre) connection of Q14.