

## A general purpose, dual 12 V supply

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Whilst this supply was designed specifically to power the Series 4000 moving-coil cartridge preamp it should find application in many electronic projects.



Our prototype was housed in a diecast box to match that used for our Series 4000 moving-coil cartridge preamp, although any suitable box may be used if the power supply is intended for another application. Scotchcal front panels should be available from kit suppliers or separately from Radio Despatch Service in Sydney.

THIS POWER SUPPLY provides the +/-12 volts needed by the Series 4000 moving coil cartridge preamplifier. We intend designing a range of hi-fi system 'add-ons' like the M.C. preamp and rather than have a power supply in each unit they will be powered from this supply. This decreases the cost of building the units and just as importantly removes the major source of hum from within the chassis.

The supply delivers positive and negative 12V dc at 1A while the IC series regulators provide short circuit and temperature protection. These regu-

lators have a tendency to oscillate at around 3 MHz and for this reason must have their output pins bypassed to ground through an appropriate capacitor. If they are allowed to oscillate the device quickly overheats and its thermal protection cuts in.

The regulators are mounted onto the chassis which acts as a heat sink. If the recommended power transformer is used, the voltage after rectification is approximately 17 volts. The regulators must drop 5 volts at a worst-case current of one amp, so they are dissipating a maximum of five watts which is well within their ratings.

### Construction

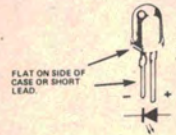
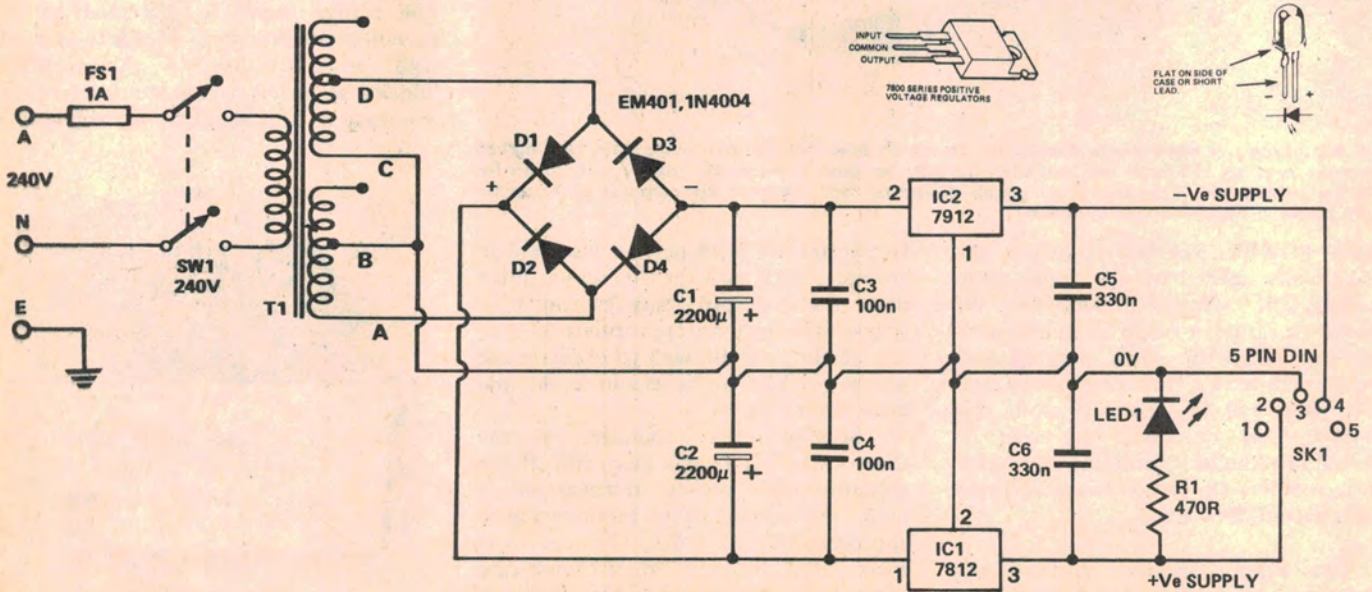
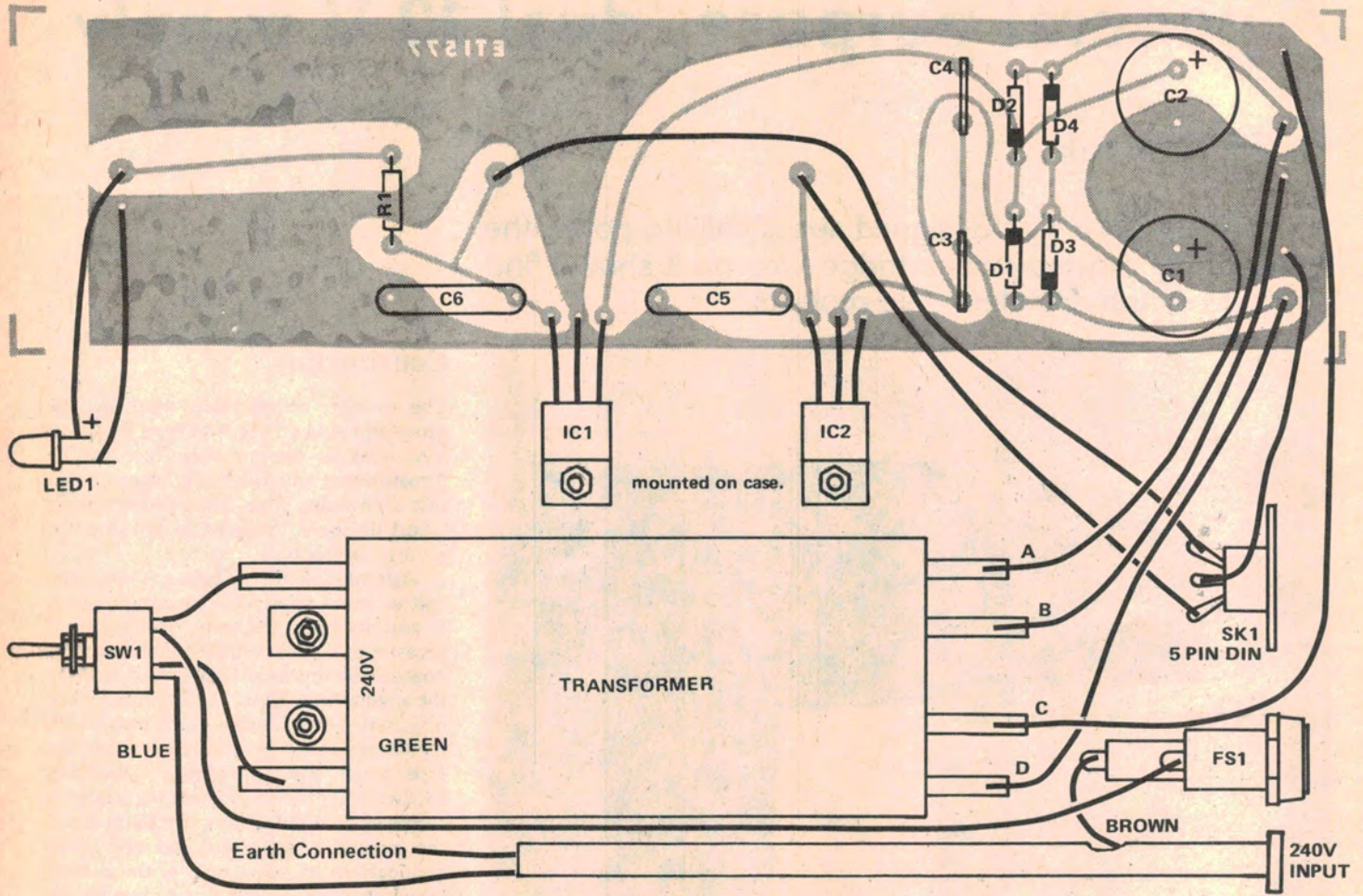
The power transformer used in the prototype was a Ferguson type PL30/40 VA. This is one of their low profile transformers and fits easily into the die-cast aluminium box. The printed circuit board has been designed to slot into the grooves in this box.

Assembly of the pc board is not difficult as it has relatively few components. If you are using the same box we did it is easier to solder pc board pins onto the board, slot the board into place, bolting the regulators down, and then make the necessary wiring interconnections. Both regulators must be insulated from the case using the appropriate mounting hardware. The case of these regulators is connected to pin 2. For the 7812 this is the ground connection, and accidental connection to case will cause a hum loop when the unit is connected to the moving coil cartridge pre-amp. In the 7912, pin 2 is the input to the regulator and as such has 17 volts directly from the bridge rectifier connected to it. Accidental connection of this to ground will probably damage the rectifier diodes, so check with a multimeter that the case of this regulator is well insul- ▶

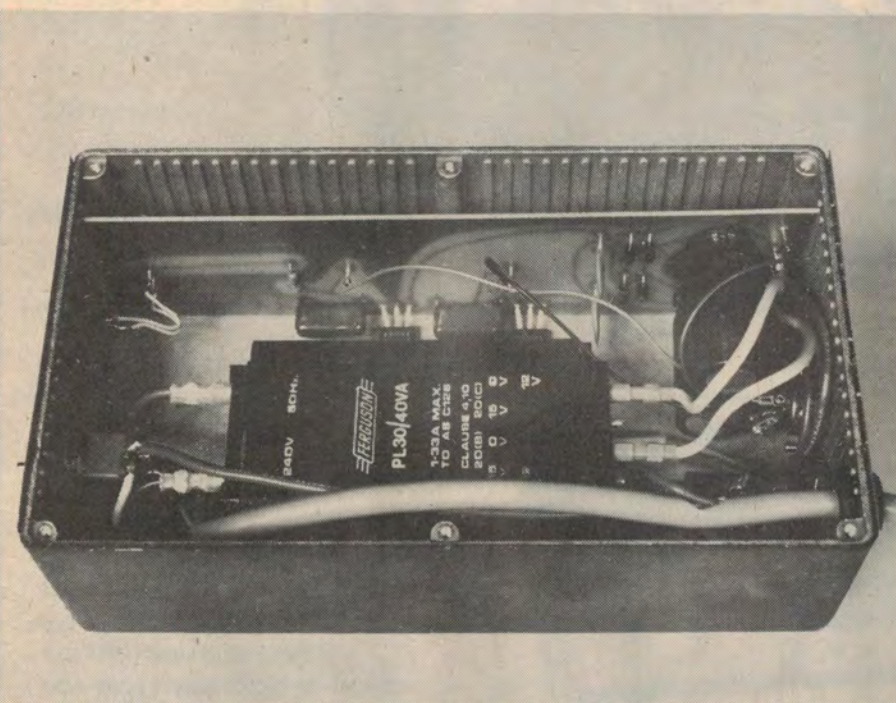
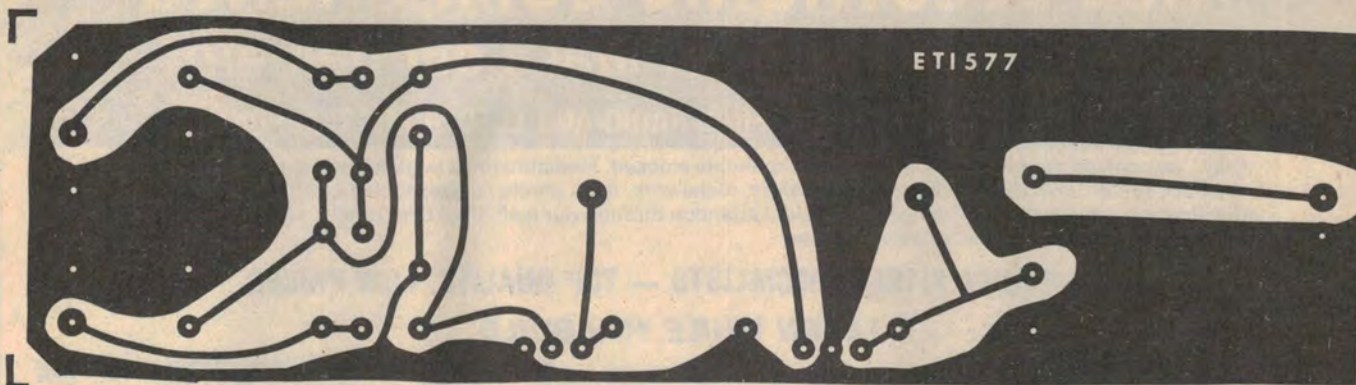


Rear view of the power supply showing placement of the major components.

# Project 577



ETI 577



Internal view of the power supply showing how the pc board was mounted, the position of the power transformer and the general wiring arrangement. General parts placement is not at all critical and a variety of layouts is possible. Be sure to insulate the regulator ICs.

ated from the chassis before powering up.

The LED is mounted onto the front panel with a standard LED mounting grommet and connected to the board by two short lengths of hook-up cable.

Make absolutely certain that all 240 volt connections are secure and that the mains cable ground lead is connected to chassis as shown in the wiring diagram. The mains flex must be secured to the chassis, either with a clamp-type grommet where it enters the box or with a cable clamp on the inside.

Before applying power to the unit make a final check of the board and all connections to the power transformer. Check the 240 volt connections and ensure that the regulators are satisfactorily insulated from the chassis. If all is correct, turn the power supply on. The LED on the front panel should come on immediately. Check the voltage present on the output DIN socket which should be very close to 12 volts (certainly within 0.25 V). Make sure the positive and negative supply connections terminate on the correct DIN socket pins. ●

### HOW IT WORKS - ETI 577

Mains 240 Vac is applied to the primary of the transformer via a 1A fuse. The transformer secondary consists of two 15 V windings with tapings at 12 V. The 12 V tapping of one is joined to the 0 V of the other - this junction (effectively a centre-tap) forming the volt rail.

A bridge rectifier D1-D4 rectifies the ac voltage from the transformer and supplies around 17 volts to the inputs of the regulator ICs. Capacitors C1-C4 filter the input to the regulators while C5 and C6 ensure high frequency stability of the regulators.

The IC regulators provide a stable, regulated output very close to the specified 12 Vdc and can supply up to one amp of dc current. Overload and thermal protection is provided internally on the IC chip. These regulators are convenient, inexpensive and require the minimum number of components.

### PARTS LIST - ETI 577

- |                       |   |
|-----------------------|---|
| <b>Resistors</b>      | all 1/2W, 5%  |
| R1 . . . . .          | 470R  |
| <b>Capacitors</b>     |   |
| C1, C2 . . . . .      | 2200µF 25V electro  |
| C3, C4 . . . . .      | 100n greencap   |
| C5, C6 . . . . .      | 330n greencap   |
| <b>Semiconductors</b> |   |
| D1-D4 . . . . .       | 1N4004, EM401 or sim  |
| LED1 . . . . .        | Red led, T1L220R or sim                                     |
| IC1 . . . . .         | 7812 or LM340-12 volt-<br>age regulator (positive)          |
| IC2 . . . . .         | 7912 or LM320-12 volt-<br>age regulator (negative)          |
| <b>Miscellaneous</b>  |   |
| T1 . . . . .          | transformer, 15V-0-15V,<br>1.3 amps (Ferguson<br>PL30/40VA) |
| SW1 . . . . .         | DPDT 240V switch  |
| F1 . . . . .          | 1A, 3AG type fuse   |
| SK1 . . . . .         | Chassis mounting 5 pin<br>DIN socket                        |
- Chassis mounting 3AG fuse holder, 5 pin DIN plug, 240V mains plug, 240V/3 core cable, rubber mains cable grommet, Die-cast aluminium box 190 x 60 x 110 mm.