DIY Kit 114. DUAL UNREGULATED POWER SUPPLY

INTRODUCTION

Many power amplifiers require a dual DC power supply for their operation. Usually this consists of some diodes and electrolytic capacitors to convert an AC voltage to a +/- DC voltage. This simple kit does just that, with all the components mounted on a small PCB to avoid the usual spaghetti-wired mass (mess?).

The kit is constructed on single-sided printed circuit board. Protel Autotrax & Schematic were used in the design.

CONSTRUCTION

Assembly couldn't be simpler, with only four diodes and four electrolytic capacitors to worry about. Insert the diodes first. The diode leads are quite thick and the diode could be damaged when bending the leads. Use a pair of long nose pliers near the body of the diode to hold the leads. Also be careful to bend the leads to the correct spacing. Now fit the electrolytic capacitors, taking care to insert them the correct way around. The positive lead is marked on the overlay. The negative lead is marked on the body of each capacitor.

You have to supply the appropriate center-tapped transformer for your requirements - see below.

CIRCUIT DESCRIPTION

The circuit is a standard bridge rectifier, formed by the four diodes (D1-4) and four electrolytic capacitors (C1-4) to provide DC ripple smoothing. The voltage supply is unregulated. This means that the output voltage is dependent on the voltage that the transformer will supply when the rated current is drawn from it.

The power rating of transformers are generally rated in volts-amps, VA. The transformers voltage is the voltage that the transformer will supply when the rated current is drawn from it. For example, a 30V center-tapped transformer rated at 75VA will supply a maximum of ± 15 volts at 2.5 amps. (75 divided by 30 gives 2.5 amps. 30V center-tapped gives a +15V to -15V supply.)

In order to get a ± 25V supply you would need to use a 50V center-tapped transformer.

The AC input is provided by a **center-tapped transformer**, with the center-tap being the zero volt reference. The AC voltages from the two "half' windings are full-wave rectified by diodes D1-4, which are rated at 3A. The output from the diode bridge is a positive and negative DC voltage. Capacitors C1 and C3 provide DC filtering for the positive voltage while capacitors C2 and C4 do the same for the negative side.

Note that the open circuit DC voltage output measured will be 1.414 times the rated voltage because we are using a full wave bridge rectifier. But this voltage will drop as soon as you start to draw significant current. When the current is near the current rating of the transformer the DC output voltage will equal the transformer voltage.

So using 50V ecaps this would limit the transformer to 60V/90VA rated. This is ± 30V drawing a maximum of 1.5A. (50V/1.414 = 35.3V. Allowing a safety margin 10% gives 30V. 90VA/60V = 1.5.)

PARTS LIST - KIT 114	
Capacitors	
2200uF 50V or 63V..... C1-4	4
electrolytic	
Semiconductors	
1N5401, 100V 3A diodes.... D1-4	4
Miscellaneous	
PCB, K114	1

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