QUASAR PROJECT KIT # 3004 - HOBBY POWER SUPPLY

Nothing goes flat quicker than batteries whether it is playing Nintendo Game Boy or listening to a Walkman. When getting into electronics batteries soon become too expensive to use on a regular basis. What is needed is a power supply which can be connected to the mains electrical supply of your house and which can provide the range of DC voltages that are required for basic electronic projects.

This kit is designed to fill this need. The circuit is basic but it will satisfy the requirements of most electronic kit users especially when starting out. Two DC voltage outputs are available; one is a fixed regulated 5V for TTL use. The other output is variable from 5V upwards. The maximum output voltage depends on the input voltage. The specified maximum input DC voltage to the regulator is 35V. The minimum input voltage must be 2 volts higher than the regulated output voltage.

The kit is constructed on a single-sided printed circuit board (PCB). Protel Autotrax was used to design the board.

ASSEMBLY INSTRUCTIONS

It is best to add the lowest height components to the board first: the resistors & monoblok capacitors. Care must be taken when bending the terminal leads of the 7805 regulators. Hold the leads in needle nose pliers when you bend the leads. Do not bend them against the case by pushing them over with your fingers as this can easily break the case (really it can - we know from experience.) Make sure to get the 1000uF (1mF) ecap and the bridge rectifier around the correct way.

CIRCUIT DESCRIPTION

The circuit is based around the 7805 voltage regulator. It has only 3 connections (input, output and ground) and it provides a fixed output. The last two digits of the part number specify the output voltage, eg. 05, 06, 08, 10, 12, 15, 18, or 24. The 7800 series provides up to 1 amp load current and has on-chip circuitry to shut down the regulator (rather than blowing out) if any attempt is made to operate it outside its safe operating area. (If this happens to you, let the chip cool down & attach the heatsink.)

It can be seen that there are in fact two separate circuits in this power supply. One 7805 is directly connected as a fixed 5V regulator. The second 7805 has a resistor divider network on the output. A variable 500R potentiometer is used to vary the output voltage from a minimum of 5V up to the maximum DC voltage depending on the input voltage. It will be about 2V below the input DC voltage.)

The capacitor across the output improves transient response. The large capacitor across the input is a filter capacitor to help smooth out ripple in the rectified AC voltage. The larger the filter capacitor the lower the ripple.

For small applications the heat sinks will not be needed. The tab on the regulator will dissipate 2W at 25 oC just in air. (This is equivalent, for example, to an input voltage of 9V, an output of 5V and drawing 500 mA.) However, as your projects get bigger they will draw more current from the power supply and the regulators will operate at a higher temperature. We have supplied the the heat sinks with the kit to cover this. You may easily experiment with this Kit to add voltage & current meters to it and to put it into a suitable plastic case connected to a transformer.

WHAT TO DO IF IT DOES NOT WORK

An LED has been put into the output of the fixed 5V regulator to indicate that the circuit is working. (It may be left out of the circuit if you do not want it.) Poor soldering is the most likely reason that the circuit does not work. Check all solder joints carefully under a good light. Next check that all components are in their correct position on the PCB. Thirdly, follow the track with a voltmeter to check the potential differences at various parts of the circuit.

Other items to check: are the regulators in the correct way & are the electrolytic capacitor & bridge rectifier in correctly. Look at the + & - signs on the component and the overlay and make sure they correspond.

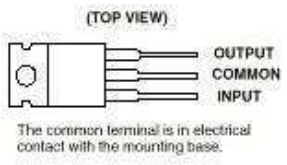
WHAT TO LEARN FROM THIS KIT

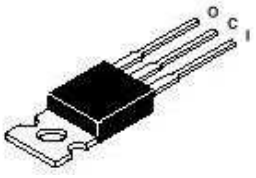
These types of regulators are inexpensive and easy to use. They have made it practical to bring unregulated DC voltages to individual PCB's and do the regulation locally on each circuit card.

OUR OTHER POWER SUPPLY KITS

- Kit 3060 - Regulated Power Supply. PCB & components to take one positive 3-pin regulator.
- Kit 3068 - Power Supply Using LM317T. Up to 30V at 1.5A. Protection diodes included.
- Kit 3083 - Universal Power Supply. You supply the positive & negative 3-pin regulators. We supply the PCB plus components.
- Kit 3114 - Dual Unregulated Power Supply
- Kit 3124 - Positive Adjustable Power Supply Module
- Kit 3125 - Negative Adjustable Power Supply Module

See our website at **http://www.quasarelectronics.com**





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The internet is the place to find out all about 3-pin positive voltage regulators. Go to the website of national Semiconductor **national.com** and search for LM7805. AN103 (Application Note 103) has all the information you want. Or you can download AN103.pdf from our software download page at **www.QuasarElectronics.com**

Note that the name seems to have changed in recent years from 'LM780x' to 'LM340 Series'.

COMPONENTS	
electrolytic capacitor	1
7805 voltage regulator IC	2
HS-103 heat sink	2
Nut & screw for regulator & heatsink	2 sets
500R linear potentiometer	1
5mm LED	1
Bridge rectifier	1
monoblok	4
Input jack	1
Kit 3004 PCB	
Box and screws	1
Two pole Terminal blocks	2