QUASAR ELECTRONICS KIT No 1169

STABILISED POWER SUPPLY 3-4.5-6-9-12VDC, 1.5A KIT

General Description

As you know, all the small electronic devices powered by batteries, can also operate using the mains, provided that it exists, the appropriate adapter (power supply), which will convert the mains voltage (220Vac) to the direct voltage needed by them.
Given the multitude of existing devices and since all of them operates under a different voltages (and furthermore, some of them demand a stabilized one), one should have a large selection of all the appropriate power adapters.
Quasar Electronics is now offering a stabilized power pack of «multiple voltage» that can cover all your needs, since it can supply all devices with power demands of 3V / 4.5V / 6V / 9V and 12VDC. The kit is designed for a direct current supply of 1.5A, but can stand maximum peaks up to 3.4A. The output voltage ripple is 1.5% for complete rectification 100Hz.
All these advantages, place the kit above the usual “universal power packs” (common power packs), which lack the «multiple voltages» or aren’t stabilized or cannot supply high currents and advanced stabilization requirements.

Technical Specifications – Characteristics

- Continuously output current supply (nominal): 1.5A
- Peak output current: < 3.4A
- Ripple rejection 100Hz: >65db
- AC input voltage: From transformer, according to text
- Output voltage variation, in relation to input voltage variation < 0.04%
- Output voltage variation, in relation to load variation < 1.5%

How it Works

As shown in circuit diagram below, the main component of the power pack is the integrated circuit U1 (LM317T) which, in a casing of only three leads (TO220), contains a complete circuit of electronic voltage stabilization, with the ability to choose its values via external components. The construction is extremely simple, due to the minimum number of peripheral parts.
Choice of the several voltages is done via the jumping device (header 2X5) which can be transferred on the pin series. Depending on the position of the jumper, it connects the precision resistance combinations R2-R3 (for 3V output), R4-R5 (for 4.5V), R6-R7 (for 6V), R8-R9 (for 9V) and R10-R11 (for 12V) with the ground.

The alternate input voltage (different each time and depending on the desired output voltage) is applied to points 3 and 4. Following that, the voltage is applied to the ends of the rectifying bridge GR1 (where it is rectified to DC) and consequently filtered through the capacitors C1 and C2. The resulting direct voltage is applied to the input IN of the LMT317T (U1), whereas at the output OUT of the integrated circuit, we receive the stabilized voltage, which as mentioned above, can be chosen via the position of the jumper on the header.
The loop which is formed by the resistor R1 combined with the pairs of the precision resistors, defines the voltage applied to the third lead Adj. of U1, adjusting thus the output voltage. The precision resistors R1 through R11 are of a 1% tolerance, guaranteeing the precision of the output voltage.
The diodes D1 and D2 protect the U1 from reverse voltages, while C3 rejects the ripple that may occur at lead Adj. The capacitor C4 guarantees the rejection of any high frequency voltages.
To guarantee the continuous output power supply of 1,5A with no overheating U1 (something that might happen if, for example for an output voltage 3VDC we supplied the circuit with input voltage of 15VAC), several mains transformers are used, connected to the leads 3 and 4 of the PCB, according to the following table:

Nominal value of Output Voltage	**Transformer used**	**Measured Output Voltage**	**Maximum Output Current**
3 Volt DC	**7.5-8V AC/3A**	**3.05V DC**	**1.5A**
4.5 Volt DC	**9-10V AC/3A**	**4.51V DC**	**1.5A**
6 Volt DC	**11-12V AC/3A**	**6.01V DC**	**1.5A**
9 Volt DC	**12-13V AC/3A**	**8.98V DC**	**1.5A**
12 Volt DC	**14-15V AC/3A**	**12.0V DC**	**1.5A**

The transformers are not included in the kit. The DC output voltage is provided at pins 1(+) and 2(-) (the polarity is also mentioned on the board).
In order to have the desired voltage at any given moment, you may use a transformer with multiple secondary windings and choose any one of them via a rotary switch (see Fig 2).

Construction

Due to the simplicity of the whole construction, the only points you have to attend to, are the polarity of the integrated circuit, the electrolytic capacitors, the bridge and the diodes. The positioning of the parts is drawn on the board, for ease of assembly.
Be careful with the soldering on the printed circuit board. A cold or unsuccessful solder may cause several problems (e.g. parasitic capacities or shortages between nearby pads). Also you should be careful not to overheat some parts, since they may be damaged due to high temperatures.
Start assembling by placing the pins, the resistors, the electrolytic and normal capacitors, the diodes, the bridge and finally the integrated circuit (after you have fastened it firmly on the heatsink with the screws included in the kit).
After completing the construction, check the circuit and supply it with the input voltage (from the secondary of the transformer at points 3 and 4).

Place the jumper on the header at the appropriate position, (depending on the desired output voltage), and measure at the pins 1(+) and 2(-) (on the PCB), to ensure that the chosen voltage is the correct one, before the connection of the kit to the load.

If It Does Not Work

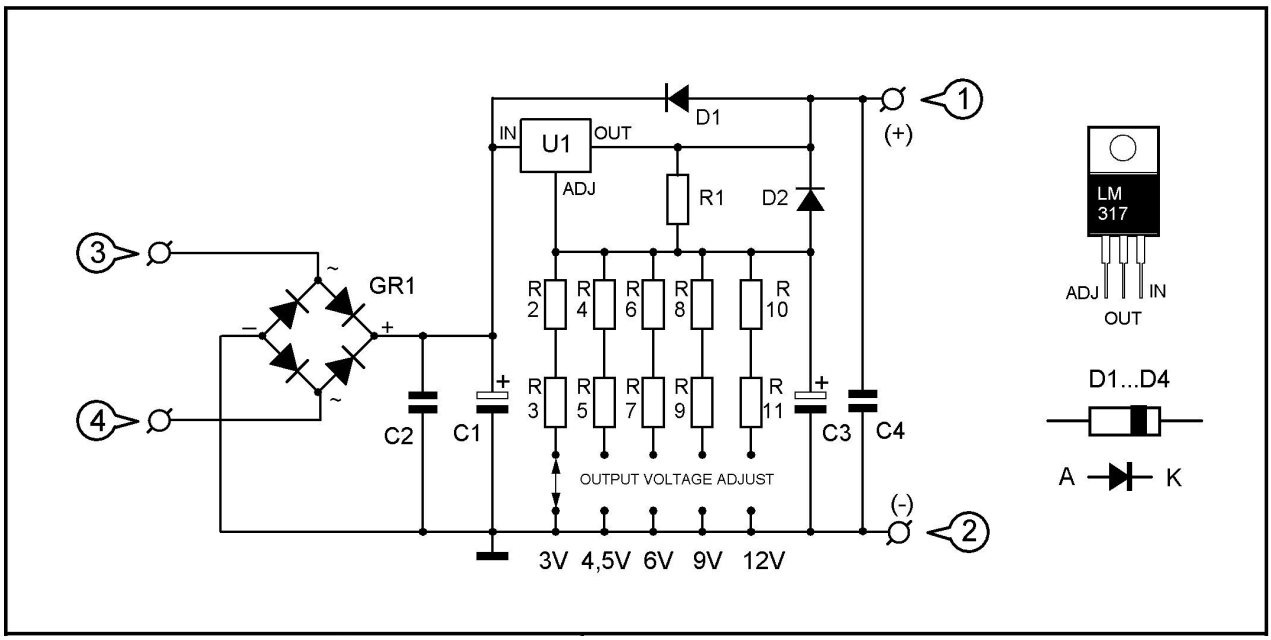
1. Be sure that the U1 has been correctly placed.
2. Check carefully for the correct positioning and polarity of the parts.
3. Check if all the solders have been done properly.
4. Watch out for cold solders. A successful soldering is a glittering one, spreading uniformly around the pad, whereas the cold one is opaque, with uneven surface and many problems for the circuit.
5. Watch out for shortages between nearby pads of the PCB.
6. If you use soldering flux, clean the board from its residue.

Warning

Quasar Electronics kits are sold as stand alone training kits.
If they are used as part of a larger assembly and any damage is caused, our company bears no responsibility.

While using electrical parts, handle power supply and equipment with great care, following safety standards as described by international specs and regulations.

Circuit Diagram



Parts List

All components including printed circuit board, assembly instructions including schematics and detailed parts list are supplied when you purchase the kit.

Ordering

For pricing info and online ordering please visit:

https://www.quasarelectronics.co.uk/1169.htm

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