QUASAR ELECTRONICS KIT No 1171
POWER SUPPLY 12 - 14V / 3A WITH ANTI - RF FILTERS

General Description

People who are working with high frequency circuits as transmitters, receivers, PLL's (Phase Locked Loop), linear, etc. know that the main problem of their power supplies is the presence of the high frequency. Under such conditions, the result is the bad performance. The most usual consequences are the presence of noise or the power transistors destruction that are part of the circuits. The solution to the problem is given by the new kit No 1171, a complete power supply. It provides a feeding of 12 - 14V / 3A. The presence of the IC LM350K ensures the achievement of complete voltage stabilisation. Also, special filters are used to filter the inserted high frequencies.

Technical Specifications - Characteristics

. Adjusted output voltage from 1.2V to 30V.
. Output current 3A.
. Output is short circuit protected.
. Guaranteed thermal regulation
The above characteristics make the LM350K one of the most popular voltage regulators. The IC is the main component in many devices such as an adjustable power supply or a battery charger.
Since the LM350K includes a current limit circuit, a thermal protection circuit, a secure operation region circuit, etc., the realisation of a simple voltage regulator can be achieved using this IC and two resistors. However, in order to achieve a reliable voltage regulator, we made our structure more complicated.

How it Works

Looking the figure 1 you can see that an AC voltage applies at points 1 and 2. The value of the voltage is 18V (AC) and is derived by the secondary of a transformer 220V / 18V / 3A. Between the point 1 and the terminal of the capacitor C1 there is a fuse of 5A for the protection of the circuit.
The capacitor C1 is used to reject the interference signals, that are present in the electric network. The AC voltage applies to the terminals of four rectifiers (diodes D1-D4) which form a bridge in order to achieve double rectification. These rectifiers are 1N5400 type which can tolerate a current of 3A.
The capacitors C3 (4700ìF) and C2 form a smoothing filter in order to eliminate spurious signals.
The dc current that is delivered at the output of the bridge is applied at the input pin (point 3) of the IC1.
The resistors R1,R2,R3 and the trimmer P1 form a small adjustable voltage divider in order to cover the range 12 - 14V (DC). The divider can be used with devices that need 12V for their operation. Such devices are transmitters, receivers, CB, walkie-talkie, etc.
The trimmer P1 is used for more detailed adjustments in the range 12 - 14V, i.e. 12.6V.
The capacitors C4, C5, C6 and the coil L1 (type VK200) form a filter that is particularly

useful, when the power supply is used to supply transmitters. In that case, because of the existence of static waves, the insertion of the radio frequency in the power supply is possible and can destroy the regulator. However, the electrolytic capacitors because of their technical characteristics have very bad performance in the high frequencies region. Hence, the capacitor C6 (electrolytic) is in parallel connection to the capacitors C4 (ceramic) and C5 (polyester). The last two capacitors operate much better in high frequencies.
The points 6 (positive) and 7 (negative) represent the output of the circuit.

Construction

Before you start the construction of the circuit you MUST read the instructions, in order to avoid many serious problems.
To construct the circuit you should need a small sized cutter and a small soldering iron of 15 - 25W. Place the lead of the soldering iron on the conductor, in order to be adjoined on the p.c. board and let it to heat the conductor and the pad simultaneously for 3 - 5sec. Then, bring the solder and the component very close to the lead. After the removal of the soldering iron, the small quantity of the solder that was melted, must have covered the whole of the pad's surface. It should also have a smooth and shiny surface. Following the above method you can ensure that the component is soldered very well.
The integrated circuit socket should be installed first. Begin soldering the pins of the socket.
All the resistors should be installed next. In order to find their values you have to check the colour code or you can look at the back side of the package of the kit.
Similarly, all the capacitors should be installed next. Special care should be taken in order to find the polarity of the electrolytic capacitors. Notice that the terminal with the long length is the positive and the other is the negative. The capacitor C3 is large and is placed horizontally on the p.c. board.
Afterwards, solder the trimmer, the fuse holder, the coil L1, and the diodes D1 - D4.
Special care should be taken in order to find the polarity of the diodes. The characteristic line on the body of the diode represents its cathode. So, the diodes D1, D2 must be located with the line to be closer to the capacitor C3 and the diodes D3, D4 must be located with the characteristic line to be closer to the other side.
Place the IC1 on its heatsink using screws. Following the instructions in figure 2 place it on the p.c. board. Notice that the heatsink should not be adjoined on the p.c. board.
You MUST use silicon grease between the IC and the heatsink in order to allow a good heat transfer. If you don't have such grease, use the normal grease.
Use three small pieces of cable to connect pin 3 to the terminal IN of the regulator, pin 4 to the terminal ADJ and pin 5 to the terminal OUT (figure 2).
Finally, repeat the above procedure and do the following step.

Adjustments

Finishing the previous steps, connect the ac voltage from the secondary of the transformer to the points 1 and 2. DO NOT supply mains voltage 220V.
Connect a voltmeter 0 - 20V or a multimeter (scale 30V) to the points 6 and 7. Then supply the voltage 220V. If you made the right connections the multimeter should indicate a value between 12 and 14 Volts. Rotating the shaft of the trimmer to the right or the left side until

you achieve the voltage you want.
If you can not achieve this, or if you see smoke rising from the board disconnect the mains immediately.

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.

ATTENTION Since the transformer is connected to the electric network (220V AC), our attention is very useful for our lives. Each voltage, higher than 50V is dangerous and can cause the death. So, if your knowledge about electronics is not so good you MUST follow the next steps: . Do not try to repair devices or structures when the supply voltage is higher than 50V. . Do not touch devices or tools which are in relation with the electric current with bare hands.
. Do not touch bare cables or conductors even though they are not supplied.
. Since the gold is the best conductor for the current, avoid to wear golden crosses or chains.
. Special care should be taken to connect the right plug to the right wall socket.
. If the circuit is contained in a metal box, the box must be grounded.
. Do not replace the fuses with others of greater value and don't wrap them using other materials.
. Do not leave bare cables. All the points on which the voltage 220V is present must be isolated very well.
. Use isolation transformer 1:1 (220 primary, 220 secondary).
. When you repair a circuit that operates with a 220V voltage, it is better to work with someone else.
. If you don't know something, it is better to ask someone else who knows more than you.
Taking seriously all the above precautions, you can limit the possibility of an accident and you protect other people who may use your device.

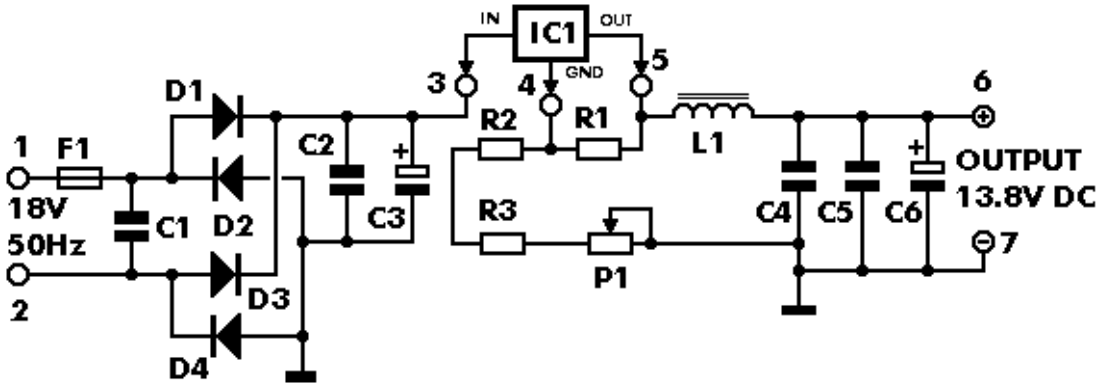
If it does not work

If the circuit does not work you have to follow the next steps:
. Check if there are any dry joints. A proper joint is spread all over the pad and is shiny. A dry one is dull, bulky and has the shape of a ball. If you find a dry joint remove the solder and do the soldering again.
. Check if any components have been installed at the wrong place. The PCB has the circuit's component layout diagram printed on it. You can use it as a guide for the proper location of the components.
. Avoid the use of a soldering flux. A good quality solder contains all the necessary ingredients for a good soldering. Use a PCB cleaner or an equivalent spray.
. Check if there is a short circuit formed between neighbouring circuit pads. For better checking light up the back side of the board looking carefully all the pads. If you find a

fracture use a small piece of cable in order to connect the two points.
. Since the device contains external components as batteries, speakers etc., you must ensure that the connections have been made right. You can check it using the external connections diagram. Do not use other components that are different.
. Do not try to make any changes in the circuit in order to improve its operation. The circuit has been designed and tested in order to satisfy the specifications that are referred to as technical characteristics. So, any change may cause the total destruction of the circuit.

If your project still fails to work, please contact us for information about our Get-You-Going service.

Electronic 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:

http://www.quasarelectronics.com/1171.htm

For further info please contact us by e-mail:

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