

QUASAR ELECTRONICS KIT No 1069A

ILLUMINATION USING A FLUORESCENT LAMP WITH 12V(DC)

General Description

It is well known that fluorescent lamps have better performance than the conventional lamps but for their operation, they need high voltage. The lamps are normally connected to the mains through a choke. So how can we use such lamps when we are camping or caravanning where the use of the mains is not possible. This kit is the answer as it enables you to run fluorescent lamps from a 12V (DC) battery. The circuit has low power dissipation which is extremely useful when we can not recharge the battery very often. The circuit offers flicker free operation of fluorescent lamps from 8W to 40W (TLD36W/54). The step-up transformer is provided with the kit.

Technical Specifications - Characteristics

Supply voltage.....11V - 16V (DC)

Dissipation current.....1.3A (max)

Frequency operation.....58KHz

How it Works

The circuit is shown in figure 1. The circuit around the transistor TR1 is known as blocking oscillator. The frequency oscillation is defined by the value of the self - conductance of the transformer T1. The same frequency is determined by the capacitance of the lamp and the capacity of the capacitors C3 and C4 (series connection). Also, the frequency oscillation is defined by the components P1 and R2.

Those two components (P1, R2) together with the resistor R1 determine the safe operating area of the transistor keeping the current dissipation in low levels. Using the trimmer P1, you can adjust the brightness of the lamp and you can achieve the lowest current dissipation.

As you can see from figure 1 the collector of the transistor is directly connected to the terminals 1 and 2 of the primary winding of the transformer T1. The base of the transistor is driven by the terminals 4 and 5 of the first secondary winding through the capacitor C3. Hence, the transistor is supplied and driven simultaneously.

This type of feeding is known as positive feedback and makes the transistor to oscillate. A rectangular pulse of 12Vp-p (amplitude) and 58KHz is present at the terminals of the primary of T1.

The high voltage is present at the terminals 6 and 10 of the secondary. Its frequency must be high in order to turn the light on. Finally, the capacitors C1 and C2 are used to filter the

spurious frequencies which are present in the feeding line (12V DC).

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.

First, try to solder the pins. 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.

Afterwards, place the trimmer and then the transformer. The transformer **MUST** be placed exactly as it is shown on the PCB.

Place the transistor on its heatsink using the screws with their accessories and two plastic isolators as it is shown in figure 2.

Finally, check the PCB again and then connect the lamp to the circuit.

Adjustments

This kit does not need any adjustments, if you follow the building instructions.

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

The circuit provides a very high output voltage. Notice that 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.
- . 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.

Before you supply the circuit it is necessary to realise the following steps:

Turn the shaft of the trimmer to the right position. Connect the fluorescent lamp to the terminals 3 and 4 of the board using only one cable for each side of the lamp.

Connect the positive terminal of the battery to the positive terminal of an ampere meter (scale 0-3A or 0-5A). The negative terminal of the ampere meter is connected to the point 1 of the board. In this case, you have placed the ampere meter in series with the circuit and you can measure the power dissipation of the circuit.

Before you connect the other pole of the battery to the secondary winding of the transformer notice that the voltage across it (after the application of the supply voltage) is higher than 220V.

Then connect the negative pole of the battery to the point 2 of the board. If you made the right connections the lamp should be turned on.

Adjust the trimmer P1 in order to achieve the indication 1.3A for the type TLD36W/54, 1A for the type TLD2W/54 and 0.8A for the type TLD18W/54.

Now, disconnect the supply voltage and the ampere meter. Then connect the two cables or place an ON/OFF switch to control the circuit.

A very high voltage is present at the points 3 and 4 (see figure 1) and at the terminals of the lamp. So, during the operation of the circuit DO NOT touch the PCB.

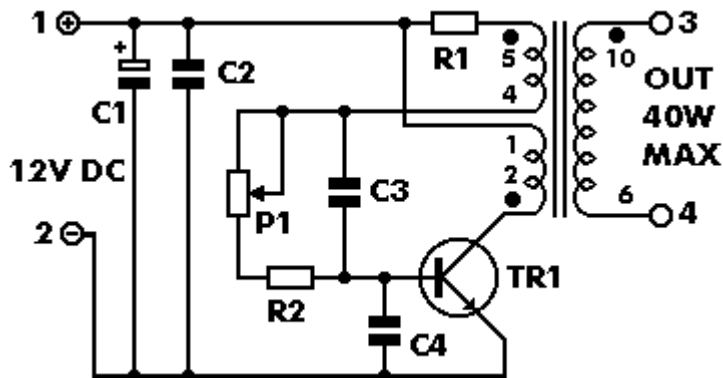
If it does not work

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 everything checks out and your project still fails to work, please contact us for

information on our Get-You-Going service.

Schematic 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/1069.htm>

For further info please contact us by e-mail:

[mailto: sales@QuasarElectronics.com](mailto:sales@QuasarElectronics.com)

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