

QUASAR ELECTRONICS KIT No. 1020

0-5 MINUTE TIME SWITCH

General Description

Another simple and practical project from Quasar Electronics that will no doubt find many applications in your everyday life. It can be used to control corridor lights, as a reminder in the kitchen, in photographic laboratories etc. It can be used as a simple reminder thanks to the LED it incorporates and which stays ON for as long as the timer is counting. For the switch function it uses a miniature relay which can make or brake a circuit depending on how it is connected and has contacts rated at 250 V/2 A.

Technical Specifications - Characteristics

Working voltage: 12V DC

Max. current: 50 mA

Time adjustment: 0-5min

How it Works

The "heart" of the timer is the well known LM 555 TIMER IC and is used to drive directly the output relay. The LED is there to indicate that the timer is counting and goes OFF when the pre set time elapses. As soon as the LED goes OFF the relay will be energised turning the circuit it controls ON or OFF depending on the configuration chosen. The time is adjusted from the trimmer VR1 and can be set to any length between 0 and 5 minutes step.

As you can see from the circuit diagram the time is controlled by the R-C ratio formed by VR1 and C1,C2. These two capacitors are of the tantalum type for greater stability. If a different time range is required you can always change the capacitors and the trimmer to suit your needs.

Construction

First of all let us consider a few basics in building electronic circuits on a printed circuit board. The board is made of a thin insulating material clad with a thin layer of conductive copper that is shaped in such a way as to form the necessary conductors between the various components of the circuit. The use of a properly designed printed circuit board is very desirable as it speeds construction up considerably and reduces the possibility of making errors. Quasar Electronics Kit boards also come pre-drilled and with the outline of the components and their identification printed on the component side to make construction easier. To protect the board during storage from oxidation and assure it gets to you in perfect condition the copper is tinned during manufacturing and covered with a special varnish that protects it from getting oxidised and makes soldering easier. Soldering the components to

the board is the only way to build your circuit and from the way you do it depends greatly your success or failure. This work is not very difficult and if you stick to a few rules you should have no problems. The soldering iron that you use must be light and its power should not exceed the 25 Watts. The tip should be fine and must be kept clean at all times. For this purpose come very handy specially made sponges that are kept wet and from time to time you can wipe the hot tip on them to remove all the residues that tend to accumulate on it.

DO NOT file or sandpaper a dirty or worn out tip. If the tip cannot be cleaned, replace it.

There are many different types of solder in the market and you should choose a good quality one that contains the necessary flux in its core, to assure a perfect joint every time.

DO NOT use soldering flux apart from that which is already included in your solder. Too much flux can cause many problems and is one of the main causes of circuit malfunction. If nevertheless you have to use extra flux, as it is the case when you have to tin copper wires, clean it very thoroughly after you finish your work. In order to solder a component correctly you should do the following:

Clean the component leads with a small piece of emery paper.

Bend them at the correct distance from the component body and insert the component in its place on the board.

You may find sometimes a component with heavier gauge leads than usual, that are too thick to enter in the holes of the p.c. board. In this case use a mini drill to increase the diameter of the holes slightly. Do not make the holes too large as this is going to make soldering difficult afterwards.

Take the hot iron and place its tip on the component lead while holding the end of the solder wire at the point where the lead emerges from the board.

The iron tip must touch the lead slightly above the p.c. board.

When the solder starts to melt and flow wait till it covers evenly the area around the hole and the flux boils and gets out from underneath the solder. The whole operation should not take more than 5 seconds. Remove the iron and leave the solder to cool naturally without blowing on it or moving the component. If everything was done properly the surface of the joint must have a bright metallic finish and its edges should be smoothly ended on the component lead and the board track. If the solder looks dull, cracked, or has the shape of a blob then you have made a dry joint and you should remove the solder (with a pump, or a solder wick) and redo it.

Take care not to overheat the tracks as it is very easy to lift them from the board and break them.

When you are soldering a sensitive component it is good practice to hold the lead from the component side of the board with a pair of long-nose pliers to divert any heat that could possibly damage the component. - Make sure that you do not use more solder than it is necessary as you are running the risk of short-circuiting adjacent tracks on the board, especially if they are very close together. - After you had finished your work cut off the excess of the component leads and clean the board thoroughly with a suitable solvent to remove all flux residues that still remain on it.

The construction of the time switch should present no problems even to a beginner. First of all place the pins and the IC socket on the board and solder them, and then continue with the relay, the resistor, the trimmer, the capacitors and finally the diode.

You should be careful with the tantalum capacitors as they are polarised and must be inserted the right way round and also should not be overheated when they are soldered on the board.

The same precautions should be taken with the diodes. When everything is in its place, make a final visual inspection of the board and insert the IC in its socket. Make sure that you have inserted it the right way round and that you have not bent any pins under its body during insertion. You can now connect your time switch to a 12 VDC power supply using points 4 (-) and 5 (+). The LED should turn ON and after a while depending on the setting of VR1 it should turn OFF and at the same time the relay should be energised.

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.

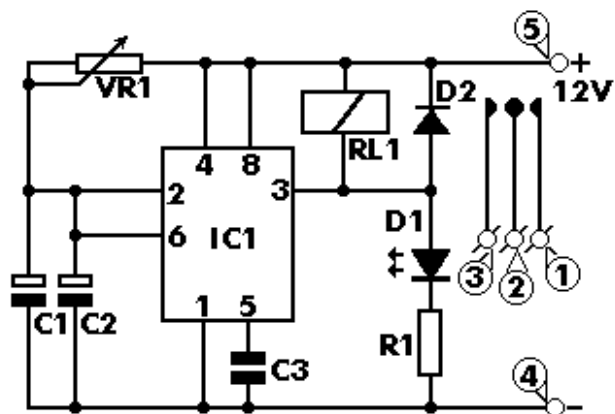
While using electrical parts, handle power supply and equipment with great care, following safety standards as described by international specs and regulations.

If it does not work

- Check your work for possible dry joints, bridges across adjacent tracks or soldering flux residues that usually cause problems.
- Check again all the external connections to and from the circuit to see if there is a mistake there.
- See that there are no components missing or inserted in the wrong places.
- Make sure that all the polarised components have been soldered the right way round.
- Make sure the supply has the correct voltage and is connected the right way round to your circuit.
- Check your project for faulty or damaged components.

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/1020.htm>

For further info please contact us by e-mail:

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

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