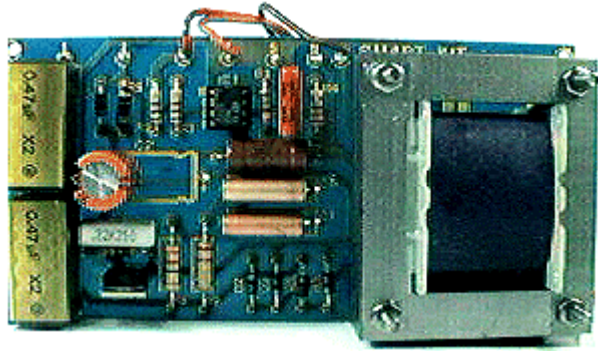


QUASAR ELECTRONICS KIT No. 1058 ELECTRONIC CAR IGNITION



General Description

The advantages of having an electronic ignition in your car are well known. Let us mention them again:

1. Perfect burning of the mixture, greater efficiency.
2. Lower fuel consumption.
3. Reduced distributor contact wear.
4. Better overall performance.
5. Easier engine start on cold days.
6. Reduced pollution, longer engine life.

For the above reasons, electronic ignition systems are becoming more and more popular. This project will let you add this useful accessory to your car for very little money without having to sacrifice any of the features found in more expensive commercial systems.

Technical Specifications - Characteristics

Working voltage: 12V DC
Current: 2 A

How it Works

The circuit uses the discharge of a capacitor through a thyristor to produce the ignition spark. As the current of the discharge is considerably lower than that which normally flows through the primary of the multiplier in conventional low voltage systems. This puts considerable less strain on the distributor contacts and reduces wear.

There is first of all an oscillator built around the integrated circuit IC1 which is the well known timer 555, the output of which is used to drive the power transistor Q1. The voltage which appears on the collector of Q1 is applied to the primary of the transformer T1. This voltage induces a high voltage in the secondary which is then rectified by the rectifier bridge D2-5.

The DC voltage which is around 380 V, is taken to the anode of the thyristor TH1 which works as a switch controlling the current flow through the primary winding of the voltage

multiplier. The current which flows into the multiplier is produced by the discharge of the two capacitors C3,4 and as the voltage is high (380 VDC) the current is much lower than in the classic ignition systems, the spark voltage is higher because the ratio of the multiplier is still the same, and the mixture burns much better.

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 also 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's 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 PCB. In this case use a mini drill to enlarge 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 PCB.
- 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 allow 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.
- When you finish 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 circuit is not a very complicated one thanks to the use of the IC and the p.c. board makes construction even easier. The only thing that you should keep in mind is that the circuit is going to suffer a lot of mechanical strain because of the car's vibrations and this calls for an extremely good construction if you don't want your project to start falling apart after a few hundred kilometres.

Solder first of all the pins and the IC socket, the resistors, the capacitors observing the correct polarity of the electrolytic and finally solder the transformer as it is shown on the component side of the board at points 8,9,10, 11. Insert and solder the thyristor and the diodes taking care not to overheat their leads and making sure that you respect their correct orientation. The power transistor should be mounted on the heatsink provided to keep it at a reasonable temperature during operation, and will be connected to the circuit using short pieces of insulated wire. When you finish mounting the components on the p.c. board make a careful visual inspection to make sure that every thing is all right and clean the copper side of the p.c. board with a suitable solvent to remove all traces of flux that still remain on it. Make sure that there are no short circuits between adjacent tracks of the p.c. board.

After the inspection make the following connections:

Connect the points 3,4 and 7 of the board with the base, emitter and collector of Q1 respectively. The primary winding of the voltage multiplier of your car should be connected at point 1 of the circuit, and point 2 must be connected with the distributor where it was originally connected the primary winding of the multiplier. Connect point 5 of the circuit with the chassis of the car for the negative pole of the power supply and point 6 with the positive supply rail after the ignition switch.

Please note that the voltage multiplier has two leads marked «+» and «-«. The one marked «-« should be connected with the circuit at point 1, while the other, the «+» will go to the earth.

This means that the multiplier's connections will be reversed with respect to conventional systems.

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.

CAUTION

This circuit has high voltages in some of its parts during operation.

Voltages above 50 V are DANGEROUS and could even be LETHAL.

In order to avoid accidents that could be fatal to you or members of your family please observe the following rules:

- DO NOT work if you are tired or in a hurry, double check everything before connecting your circuit to the supply and
- be ready to disconnect it if something looks wrong.
- DO NOT touch any part of the circuit when it is under power.
- DO NOT leave leads exposed. All high voltage leads should be well insulated.
- DO NOT work with wet hands.
- If you are wearing a chain, necklace or anything that may be hanging and touch an exposed part of the circuit BE CAREFUL.
- If the case of your project is made of metal make sure that it is properly earthen.

If you take all the above precautions you are reducing the risks you are taking to a minimum and this way you are protecting yourself and those around you.

A carefully built and well insulated device does not constitute any danger for its user.

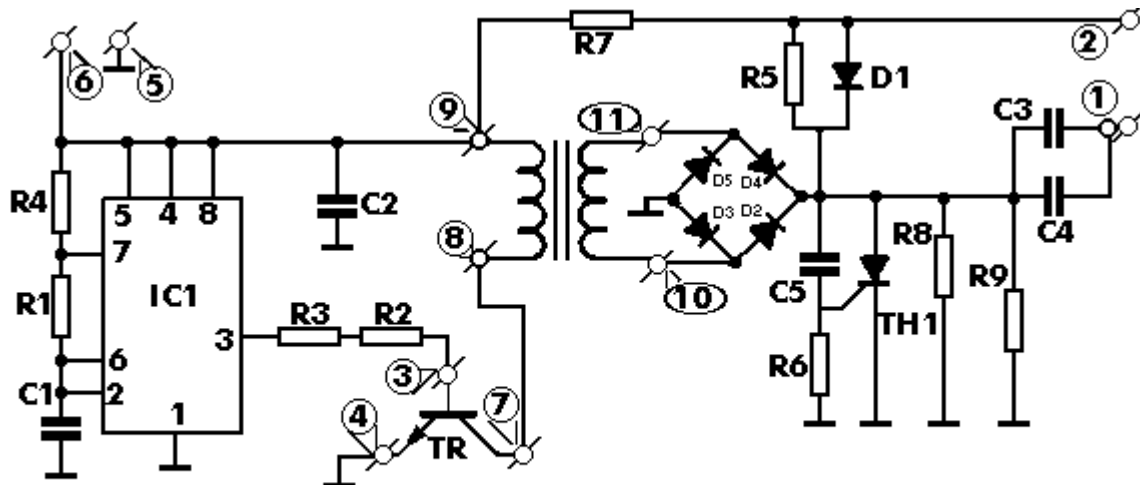
BEWARE: ELECTRICITY CAN KILL IF YOU ARE NOT CAREFUL.

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 that the supply 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/1058.htm>

For further info please contact us by e-mail:

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

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