

QUASAR KIT No. 1014

3-CHANNEL WIRELESS LIGHT MODULATOR

General Description

A light modulator is one of the most popular light effects in parties, discos and wherever is needed a light effect in accordance with a music program. The effect is created very easily and is quite effective even if it is used with only one lamp. The only tricky part of the affair is that the modulator which is used to drive 220 V lamps usually must be connected to your expensive Hi-Fi system and if anything goes wrong ... Now Quasar Kit offers you a solution that is easy to build, cheap, safe to use and has three different channels to make your effect more interesting. The project you are about to build is a light modulator that needs no connection with the amplifier as it incorporates a microphone to pick up the music. It has three different channels one for each frequency range, and can take loads of up to 800 Watts on each channel.

Technical Specifications - Characteristics

Working voltage: 220VAC
Max. current: 5 A
Max. output power: 3X400 Watts
Input sensitivity: 2-60 Watts

How it Works

The circuit of the light modulator is very simple. As you can see in the circuit diagram there is a microphone which is of the condenser type for greater sensitivity and a preamplifier circuit consisting of two transistors TR1 & TR2 which amplifies the signal from the microphone up to a level that is capable to drive the thyristors TH1,2,3. The three potentiometers P1,2,3 are used to adjust the brightness of each channel separately by controlling the threshold sensitivity of each thyristor gate. The capacitor-resistor networks that you can see connected around each thyristor are used to determine the group of frequencies each channel is going to respond to. The diode D1, the resistor R4 and the smoothing capacitor C4 are used to provide the DC supply voltage for the preamplifier circuit. The circuit does not require any other power supply but it draws its power from the mains. That means that the whole circuit must be considered as being LIVE at all times and should be handled with great care.

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 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 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 having 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.

This project is one of the easiest to build and you should face no problems if you follow the instructions carefully and patiently. Start your work by soldering the pins and the fuse holder

on the p.c. board. Continue with the resistors taking care not to put them in wrong places and then solder in place the capacitors taking care not to insert the electrolytic the wrong way round. Solder the diode and the thyristors in their places taking care not to overheat them. Finally solder the two transistors and the microphone avoiding again to overheat these components and taking care to connect them correctly. The condenser microphone is very sensitive and very delicate. Please handle it with great care. Using the pins provided in the kit solder the potentiometers above the p.c. board from the component side or if you have already decided where you are going to house your project you can leave them loose and connect them with long wires to the board. If you are going to use the modulator with loads heavier than 400 Watts per channel then you must fit heatsinks to the thyristors. Be very careful if you do so because the heat sinks should NOT touch each other or any other part of the circuit. When you finish soldering all the components on the board, connect three lamps at the output points 3-4, 5-6, 7-8 that will light to the rhythm of the treble, medium, and bass parts of the music. If and only if you are 100% sure that everything is OK then you can connect your project to the mains. The mains should be applied at the points 1 & 2 and is preferable to use a switch or some means to remove the supply quickly if something goes wrong. The three potentiometers should be turned about halfway clockwise. Provided everything is right when you apply the power to the circuit and if there is some music on the lights should start flickering to the rhythm of the music. If they don't try each extreme of the travel of the potentiometer rotors as you may have connected them the wrong way round. If on the contrary the lamps stay on at full intensity then you should reduce the sensitivity or lower the level of the music. Do not forget that the microphone is extremely sensitive and will respond even to very low levels of music.

Adjustments

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

Warning

Quasar 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.

This circuit works from the mains and there are 220 VAC pre sent in some of its parts. 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 every thing before connecting your circuit to the mains 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 mains leads exposed. All mains leads should be well insulated. -DO NOT change the fuses with others of higher rating or replace them with wire or aluminium foil. - DO NOT work with wet hands. -If you are wearing a chain in the neck or anything that may be hanging and touch an exposed part of

the circuit, BE CAREFUL. -ALWAYS USE a correct mains lead with the correct plug and earth your circuit correctly. - If the case of your project is made of metal make sure it is properly earthen. - If it is possible use a mains transformer with a 1:1 ratio to isolate your circuit from the mains. - When testing a circuit that works off the mains wear shoes with rubber soles, stand on dry non conductive floor and keep one hand in your pocket or behind your back.

If you take all the above precautions you reduce the risks you are taking to a minimum and this way you are protecting your self 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.

Make sure that all the polarised components have been soldered the right way round in their places.

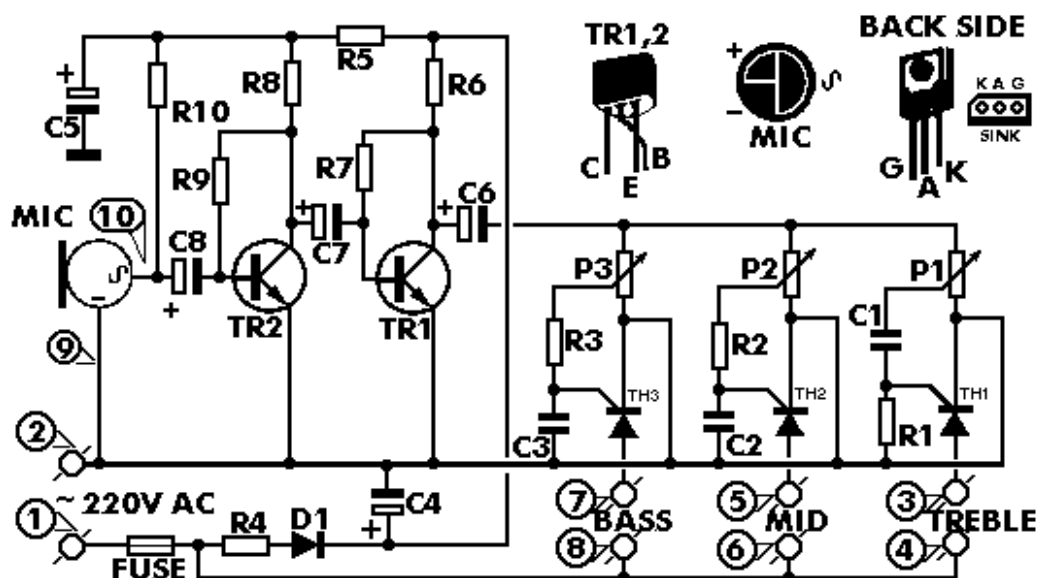
See that you don't have a blown fuse and if you do try to find out what has caused it to blow before replacing it.

Check again all the external connections to the mains and the loads to see if there is a mistake there.

Are all the components in their places?

If your project still fails to work, please contact us for information about 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/1014.htm>

For further info please contact us by e-mail:

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

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