

QUASAR PROJECT KIT # 3012 - MUSIC TO LIGHT MODULATOR

General Guidelines for Electronic Kits and Assembled Modules

Thank you for choosing one of our products. Please take some time to carefully read the important information below concerning use of this product. The assembly and operating instructions are on the following pages. Help with component identification can be found on our website at www.quasarelectronics.com/componentid.htm. If you are unsure about any aspect of the assembly or use of this product please contact our Support Team before proceeding.



WEEE Directive (Waste Electrical and Electronic Equipment)

Notice To All European Union Citizens. Important environmental information about this product.

The crossed out wheeled bin symbol on this product, package or documentation indicates that disposal of this product after its lifecycle could harm the environment. Do not dispose of this product (or batteries if used) as unsorted municipal waste. It should be disposed by a specialized company for recycling.

The unit should be returned to your distributor or to a local recycling service. Please respect the local environmental rules. If in doubt contact your local authorities about waste disposal rules.

Safety: General rules concerning safe use of our Kits or Modules.

To ensure your safety, please observe these safety measures. In no way are these complete. As safety requirements vary, please check with your local authorities, in order to comply with local requirements. If in doubt, seek the help of a qualified person.

Battery or wall-adaptor operated devices are safe devices. They do not require special attention unless mains voltage is connected to an output e.g. a relay.



To ensure electrical safety, and also protection from fire or personal injury, make sure your mains operated equipment complies with these safety hints:

- Use a suitable plastic enclosure. If a metal enclosure is used, make sure it is properly earthed.
- Use a power switch if the device consumes more than 10W. Use a double pole switch for mains operated, transformer-less kits.
- Mount a fuse in series with the mains switch. Use a slow blow (T) 50mA fuse for transformers up to 10W and a 100mA fuse for transformers up to 20W.
- Use a mains input connector, or a robust power cord with a clamp.
- Internal wiring carrying mains voltages must have a minimum cross-sectional area of 0.5mm².

If supplied, attach the power rating label near the power cord of the device and fill-out the mains voltage, frequency, power consumption and fuse values.

Troubleshooting and Support

90% of non working kits are due to poor soldering.

We operate a Get-You-Going service for non-working kits but there is a charge based on the time and components needed to complete the repair. Quite often it is not economically viable for us to repair and it is cheaper to supply a new ready made product at full cost.

Disclaimer

Quasar Electronics reserves the right to change product specifications or to discontinue products without notice. Quasar Electronics cannot be held responsible for any loss or damage, direct or indirect, which might occur from the use of a product. Quasar Electronics Kits or Modules are intended for educational and demonstration purposes only. They are not intended for use in commercial applications. If they are used in such applications the purchaser assumes all responsibility for ensuring compliance with all local laws. In addition, they are not suitable for use as or as a part of life support systems, or systems that might create a hazardous situation of any kind.

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INTRODUCTION

A music-to-light modulator is a circuit which controls the intensity of one or more lights in response to an audio input. The problem in older circuits is that there was a direct electrical connection between the lights using mains voltages (110 to 250V AC) and the amplifier circuit low 9 to 12 voltage levels. Any fault in the high voltage circuit could completely destroy the low voltage section (and give a nasty shock to anyone holding it.)

This potential problem has been overcome using the optocoupler. There is no electrical link between the two parts of the circuit. This kit introduces the opto-triac (3021) which is a further development of the optocoupler. An audio input controls a LED. The light from the LED drives a phototriggered form of a silicon controlled rectifier (SCR) or triac. The LED and the triac are mounted within a single package. This triac is used as a driver to control a separate, slave triac capable of handling larger currents.

The kit is constructed on a single-sided printed circuit board (PCB). Protel Autotrax and Schematic were used to design the board.

WARNING! Mains Voltage! Risk of Electrocutation!

This board is mains powered and must be housed in a suitable enclosure prior to operation. Finished project must comply with all relevant safety regulations.

ASSEMBLY INSTRUCTIONS

Assembly is straight forward. Start with the lowest height components first. Leave the triac and heatsink until last. Lightly secure the triac to the heatsink using the screw and nut then fit the whole assembly to the PCB. Once soldered into position tighten the screw and nut.

Note: The value of resistor R3 depends on the mains supply to be used. For 110V systems use the 2K7 resistor. For 220-240V systems use the 5K6 resistor.

It is suggested that in your first experiments with the kit you screw it onto a piece of wood (using a plastic spacer to keep it just off the surface) so that you do not grab it when it is connected to the mains. This will also stop it moving by accident and perhaps shorting out on some conducting surface (or dropping into your lap!)

WARNING! HEATSINK is at MAINS VOLTAGE!

Terminal blocks are provided to attach the mains supply and the load to be modulated. Check that you put the 3021 in the correct way around.

CIRCUIT DESCRIPTION

The diagram shows how simple the circuit is. The audio signal is applied across the LED of the opto-triac. The potentiometer adjusts the input sensitivity while the resistor is used as protection from high signal peaks. The LED emits infra-red light in response to the input signal.

The triac driver inside the 3021 package is sensitive to this IR light which activates a slave triac and load.

SPECIFICATIONS

Input trigger voltage	2.3 - 2.5V (min)
AC input voltage	110V - 250V AC
Load (max)	500W @ 250V
	220W @ 110V

WHAT TO DO IF IT DOES NOT WORK

Warning! Disconnect board from the mains supply. Unplug it completely before handling.

Poor soldering is the most likely reason for the problem. Check all solder joints carefully under a good light. Next check that all components are in their correct position on the PCB. Is the optocoupler chip in the correct way? Is the potentiometer wound around too far?

Reconnect the AC mains supply. Carefully use a voltmeter, follow around the tracks to check the potential differences at various parts of the circuit. Maybe the input signal is not enough to drive the optocoupler. It needs 1.2V and a current of 5mA (approx). A small tape recorder or radio will need an amplifier stage to amplify the signal before supplying it to the audio input.

WHAT TO LEARN FROM THIS KIT

The Kit introduces the optocoupler-triac and shows how to get signal connection but electrical isolation between a low voltage input audio signal and a high voltage mains supply.

PARTS LIST - KIT 3012

Resistors

1K potentiometer	R1	1
PCB mounting		
1/2W carbon	R2	1
1W carbon.....	R3	1
1W carbon.....	R3	1

Semiconductors

MOC3021	IC1	1
Opto-triac		
.....	Q1	1
Triac		

Miscellaneous

2.5mm audio jack.....	X1	1
2 way screw terminal	X2,3	2
connectors		
IC socket, 6 pin, for IC1		1
Heatsink, vertical mounting		1
3mm screw and nut		1
PCB, 3012.....		1

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