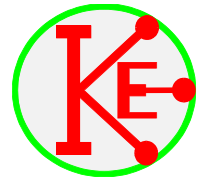


Mains Master-Slave Triac Controller



**APPLY ALL CAUTION WHEN BUILDING AND USING -
MAINS VOLTAGE CAN BE LETHAL**

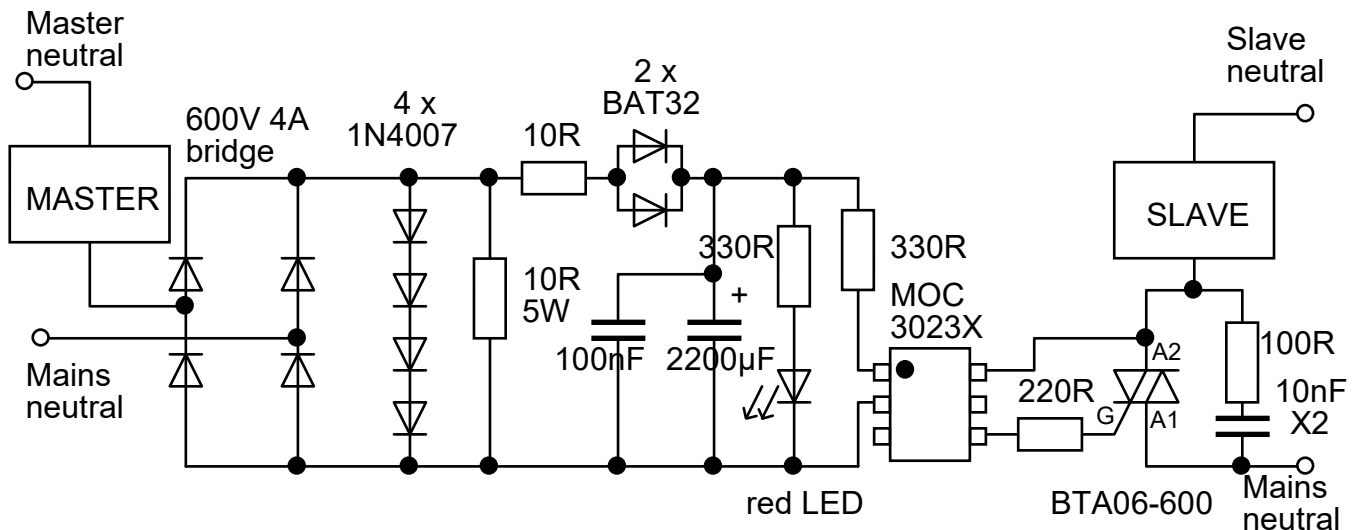
Specification

This circuit allows other electronic appliances (slaves) to be switched on when a master appliance is switched on. It was designed to automatically switch on an audio amplifier, Fire stick etc (slaves) when a television was switched on, and to switch off the slave devices when the television is on standby or switched off.

The circuit is designed so that the control electronics is not permanently powered from the mains supply.

Master	Up to 250W, - minimum power of ~20W needed to operate the slave output
Slave	Up to ~1kW with the BTA06-600B triac used
Isolation	>2500V (isolated tab triac and opto-triac isolation)

Circuit diagram



Circuit description

When the master device is switched on, current to the Master passes through the bridge rectifier and an unsmoothed direct voltage is produced across the 10Ω, 5W resistor. This unsmoothed direct voltage is connected to the 2200µF capacitor via the 10Ω resistor and the two BAT32 diodes. The capacitor charges to the peak voltage of the unsmoothed direct voltage.

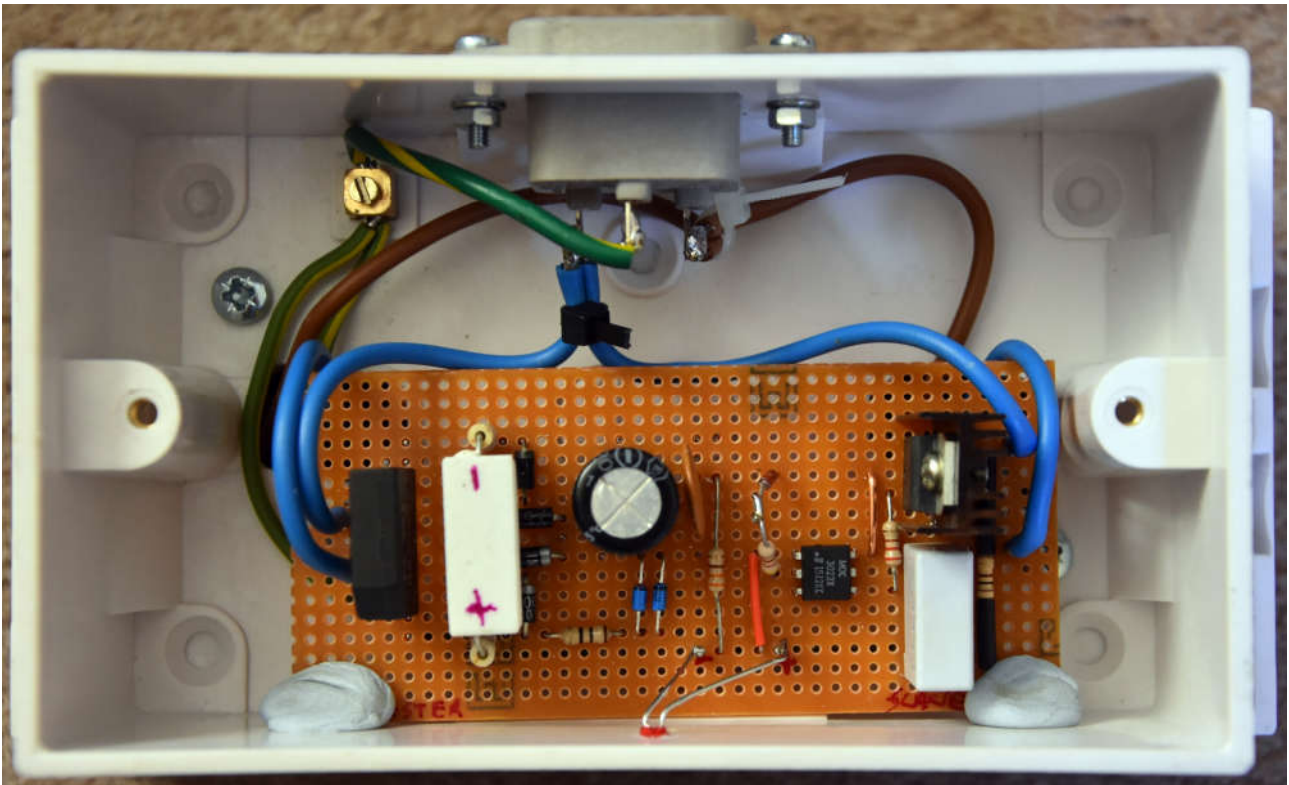
When the Master has a current flowing of ~0.2A, a voltage of ~2.4V is available across the capacitor which lights the red LED and also powers the LED in the MOC3023X opto-triac, which in turn enables the BTA06 triac and so turns on the Slave device.

For Master currents of >0.28A, the four 1N4007 diodes conduct and limit the maximum voltage across the 2200µF capacitor to ~3.7V.

The input circuit has a maximum voltage across it of effectively six silicon diodes, i.e. around 5V, which does not cause a problem for most devices, especially those with switched mode power supplies.

The Master maximum current could be increased to 3A by replacing the four 1N4007 diodes with 1N500x diodes. Similarly, the Slave maximum current could be increased by replacing the BTA06 triac with a BTA41 triac.

Originally a 100nF capacitor was used for the triac 'snubber' network, but this later reduced to 10nF to reduce the current flowing to the slave devices when the triac was turned off.



The prototype was constructed onto strip board, with all unused strips next to the mains wires being removed. The prototype was built into a 45mm deep pattress box, with two mains sockets mounted in a dual pattress box secured to its base.

A small heat sink was fitted to the triac. The photograph above was taken during development, and at this time a 330 Ω resistor was not being used for the LED in the MOC3023X opto triac.

The mains input to the circuit was provided via a standard mains 5A fused 'kettle lead' and socket.

