

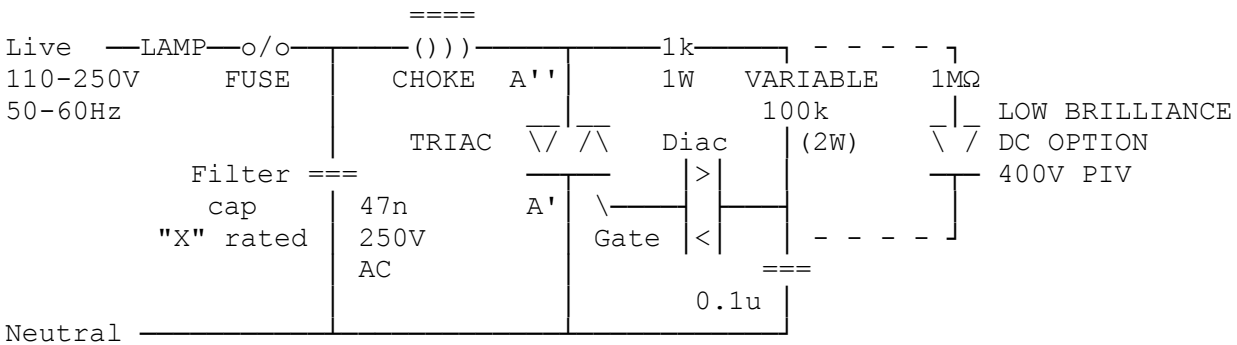
TRIAC Light Dimmer

By G8MNY

(Updated Aug 10)

(8 Bit ASCII graphics use code page 437 or 850, Terminal Font)

Here is a simple circuit used in most dimmers.



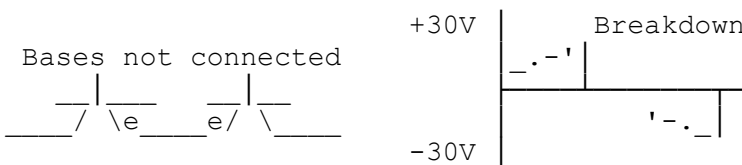
The circuit is shown here on the Neutral but in practice may be in the LIVE side. It is not really suited to Transformer loads as there is a risk of DC output, but some makers do use it into transformers!

FILTERING

Filtering must be provided to reduce the high frequency content of Anode A'' from getting out of the dimmer. The Choke is often 20 turns on a small ferrite rod or ring.

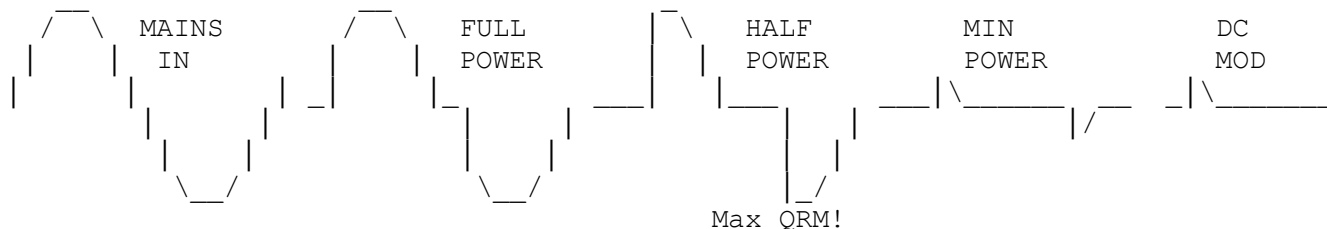
TRIGGERING

The DIAC is a 20-30V (20V on 110V) device, when the 0.1uF cap charges up over its' strike voltage, the 0.1uF charge is dumped into the TRAIAC gate. I have seen 2 identical low voltage transistors used as instead of a diac, when they avalanche they produce a similar action, provided the current is not excessive.



AT FULL BRILLIANCE

When the pot is set to minimum, the 0.1uF cap charges up through the 1k almost instantly. The CR provides some false spike mis-trigger protection. So the TRIAC is triggered when the Live is about 30V, & stays on, lighting the lamp until the mains is gone to Zero volts at the end of the 1/2 cycle.



AT HALF POWER

When the pot is about half way around, the 0.1uF capacitor reaches 30V around 1/2 way along the 1/2 cycle when triggering occurs. This still produces the full peak voltage, & generally causes the most QRM, but only half the energy is delivered to the lamp.

AT MAX DIMMING

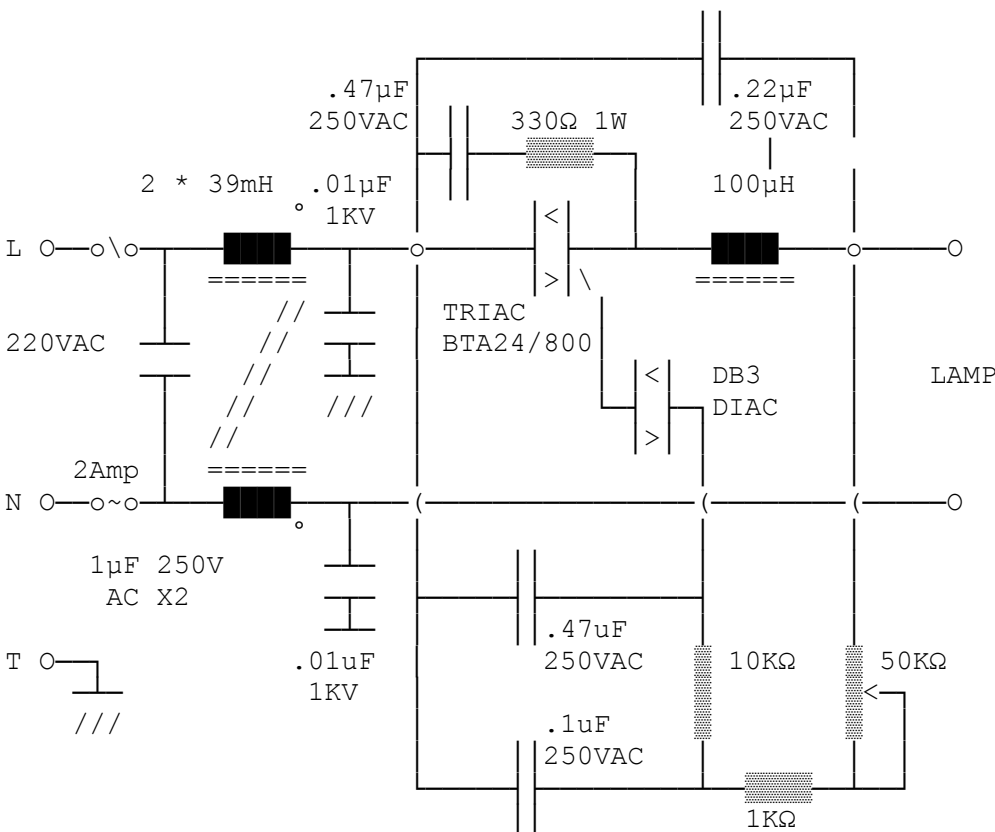
When the pot is at maximum the 0.1uF cap only just charges up 30V near the end of the 1/2 cycle. The Traic is then triggered & provides the very low voltage mains at the end of the 1/2 cycle to the lamp, until Zero volts releases the traic ready for re-triggering.

DC LOW DIMMING IMPROVEMENT

Due to the uncertainty of triggering the TRIAC when the mains is low etc, as the 0.1uF may not reach the 30V required, a modification to the circuit is sometimes incorporated. This applies a small amount of DC to the 0.1uF cap as the POT resistance increases. This actually puts out unequal portions of the ± mains phases causing the non triggering effect to be reduced. But the DC or half frequency (50Hz not 100Hz) powering can cause visible flicker in small power lamps! If used on Transformer excited lamps, it will burn out the transformers!

from Lod LW1DSE...

It is impotant to add to your intresting bul, that this devices generates lots of harmonics, that can be irradisted from the load and line wires, acting as antennas (aerials), and causing lots of QRM's to some sensitive devices. (TV's, AMradios, ham's, etc) So, I made one of them incorporating a double LC filter, one in common mode, an other in differential mode to prevent the harmonics to exit via the wires. This is my circuit, actually in use:



Good luck, and best regars from Barrio Garay, Buenos Aires Argentina!!!

See my buls on "Transistors, SCRs & TRIACs" & "SCR Drill Speed Controller",

Why don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP