Re: Specifying a relay to control lights etc.

Source: http://sci.tech−archive.net/Archive/sci.electronics.basics/2007−10/msg00788.html

- *From*: John Fields <jfields@xxxxxxxxxxxxxxxxxxxx>
- *Date*: Tue, 23 Oct 2007 04:49:33 −0500

On Tue, 23 Oct 2007 01:17:25 −0700, scouselad
<allanlewis99@xxxxxxxxxxxxxx> wrote:

> On Oct 22, 11:58 pm, John Fields <jfie...@xxxxxxxxxxxxxxxxxxxx>
> wrote:
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> > On 22 Oct 2007 01:49:49 −0700, scouselad
> >
> > <allanlewi...@xxxxxxxxxxxxxx> wrote:
> >
> > > Hi,
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> > > I'm doing a project on home automation and, as you might
> > > expect, I'd
> > > like to control a lighting circuit (standard filament bulbs,
> > > most
> > > likely) via a digital light sensor and a micro−controller.
> > > Obviously,
> > > to control the mains supply, I'll need some sort of relay.
> > > However,
> > > I'm not sure how I could emulate a "dimmer" control in this
> > > way. For
> > > example, I considered using PWM (which my
> > > micro−controller can produce
> > > automatically), but I'm not sure if a relay can respond that
> > > fast. I
> > > understand that solid−state relays (SSRs) respond much
> > > faster than
> > > electromagnetic and electromechanical relays, so I'd like to
> > > use an
> > > SSR if possible.

> Basically, I'd like a device that I can give some variable input so
> that it will vary the amount of AC mains voltage across my light bulb
> (or heater, or fan, etc.). It would be nice if there was something
> that will take digital input (perhaps PWM) but all I've found so far
> in that department is the Crydom MCTC range, which are a little too
> expensive (~£80/$160) compared to small SSRs (~£4−10/$8−20). However,
> I'd be happy with something that takes analog input if it saves me a
> lot of money.
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> −−−
> From your description I assume that you want to be able to set, and have the device keep the ambient light level constant in, say, a room, regardless of the effects of external light streaming in through windows or from adjacent rooms.
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> That is, if there was no external light streaming into the room the lamp would be at its brightest, but as more and more external light illuminated the room the lamp would dim in order to compensate.
>
> Is that right?
>
> −−
> JF

Exactly. I have already bought a light sensor (an Intersil ISL29003) with I2C output that I intend to control from a Microchip 16F877 or similar − setting up that system is really another task entirely. What I'm looking for is something that I can give a variable input (either PWM or some digital input − I2C would be nice − or just an analogue voltage level) causing it to adjust the power delivered to the light. I know I can do this by adjusting the firing angle of a triac, but I'm not sure of the circuitry involved to make to control fully electronic. I've found lots of similar "dimmer" circuits on the net, mostly using triacs, but they all have a large potentiometer to control the dimming. What I want to do is use a circuit like that but with an electronically−controlled potentiometer. Again, I know that digital pots exist, but I don't think they will take UK mains voltage (220−240V).

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Since you're going to use a µC, you could use something as simple as

a pushbutton or two to ramp the setpoint up and down, and the output of the sensor to cause the µC to servo about that point.

For example, let's say that you have one pushbutton which causes the light to get brighter, another which causes the light to grow dimmer, and that you've held one of them down (or repeatedly pressed and released one of them) until the illumination in the room is at the level you want.

Now, when you release the pushbutton and the illumination in the room changes because of, say, the sun shining into the room through a window, later, the output from the sensor will increase and the µC will dim the light until the output from the sensor is as it was when the pushbutton was released.

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JF
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