Re: Capacitor size

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- *Date*: Thu, 30 Aug 2007 14:49:33 +0200

Chris skrev:

> On Aug 30, 1:04 am, Eeyore <rabbitsfriendsandrelati...@xxxxxxxxxxx>
> wrote:
>
> > Jan Nielsen wrote:
> >
> > > Hi,
> > > I have a simple circuit with a PICAXE that controls a relay
> > > board, when
> > > the relay board is empty it works fine.
> > > But when I put a simple 20W lamp on one of the relays
> > > (230Vac) the chip
> > > resets very often when that relay starts/stops.
> > > I have a 0.1uf on the power legs of the IC, how do I know
> > > what other
> > > size is needed to prevent it from resetting.
> > > I didnt make the relay board myself, but from what I can see
> > > there is no
> > > caps on the board.
> >
> > Relays produce EMI (electro−magnetic interference) particularly when
> > switching
> > off the load.
> >
> > This EMI can 'couple' into your circuitry and cause random resets and the
> > like.
> > Changing the value of the supply decoupling capacitor is fairly unlikely to do
> > much to affect it. Long pcb traces that form large 'loops' are one of the worst
> > offenders for EMI pickup btw.
> >
> > How to design for reasonable immunity to EMI is a huge subject in its own
> > right.
> > You may however get some inprovement by lowering the impedance of the
> > reset
> > circuit.
> >
> > Graham

> I'd agree with Graham. The relay contact is almost certainly arcing, causing EMI that's being picked up by the microcontroller (more likely through one of the I/O pins, not the power supply), which causes the reset.
>
> I'm hoping you're using a relay rated for 240V service −− if, not, try replacing the it. Relays that aren't made for switching higher voltages have armatures that don't move the relay contacts far enough apart. That will draw nice, juicy arcing which will cause your Picaxe all kinds of problems (and also destroy the relay in short order).
>
> If the relay's OK, you'll have to look elsewhere to solve your problem. Ideally, you'd want to put an inductor in series with the light bulb to limit surge current. But a line rated inductor that can handle that much current can be pretty expensive.
>
> Incandescent loads can be tough, because the turn−on surge current can easily be eight or more times the rated current. Your best bet to start with might be to get a MOV rated for your line voltage, and put that across the relay contacts.
>
> What might also help is adding some series resistance. If you happen to have a 10 watt, 100 ohm wirewound resistor in your junkbox, you might want to put that in series with the lightbulb, too. That will limit the surge current, and also lower the voltage across the relay contact with the arc on make.
>
> Another thing which might help is just putting some distance between the relay and your microcontroller. "The solution...to pollution...is dilution". Let the inverse square law work for you, and get that arc as far away as you can. If your Picaxe and your relay board are a couple of inches apart, you might accomplish your purpose just by moving things around a bit.
>
> Good luck
> Chris

I have solved some of the problem with capacitors, its not perfect, but alot better than before.

I added
1000uf before the 7805
0.47uf on the picaxe power pins (that already have 0.1uf)
0.1uf on another mcu component power pins
0.33uf on 7805 input
0.1uf on 7805 power output

It can now switch just about everything I have tried, but a rare few times it still resets.

The boards is fairly close, as they are contained in a medium sized box rated for 230V equipment.

The board is made on vero, the one with 3holes connected, so theres lots of unused traces to pickup emi, although they arent directly connected to the picaxe.

I have 2 free ports on the picaxe, both inputs, would grounding them help anything ?

The relays are rated for 230V 10A each and the system is limited to 5A total by fuse.

Maybe picaxe is just very sentisive, because I did the same system with a SBC65EC board from modtronix and it didnt have any problems with it.

/Jan
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