

Re: Need Circuit Design -- Cheap...

Source: <http://sci.tech-archive.net/Archive/sci.electronics.design/2009-04/msg03741.html>

- *From:* Jim Thompson <To-Email-Use-The-Envelope-Icon@xxxxxxxxxxxxxxxxx>
 - *Date:* Sun, 26 Apr 2009 11:24:05 -0700
-

On Sun, 26 Apr 2009 14:08:09 -0400, Bob Thomas <bobtms@xxxxxxxxxxxxxxxxx> wrote:

Jim,

I have redrawn your circuit with the actual physical parts and added the relay driver you suggested, I will also follow your advice on the other part substitutions to work out the kinks and study the data sheet, again as you suggested.

So now I am down to 2 questions, the latter I can really just try on my own, but while I have your ear:

1. Can you please look at the schematic I have drawn from your schematic and let me know if it looks right? I think I have all of the connections to the right pins/parts.

http://people.delphiforums.com/wildbill47/X10/New_Alm_Ctrl.jpg

I've revised it about 15 minutes ago, saves one package of parts; and adds the ability to cope with duty-cycle effects.

2. I noticed when I was on Digi-Key looking specifically at the CD74HC002E and the CD74HC00E that they had parts that just had one gate in them, a lot smaller, the only two differences I noticed is they did not have the "HC" in the part number, and the mA was 32mA instead of 5mA, the input voltage / output voltage all were the same, can I use these smaller parts or should I use the exact ones you specified. The CD74HC04E also comes in a 2 gate model, same deal on the specs, all the same but the "HC" and the mA was higher.

Why are you using "CD" parts, go modern with "74HCxxxx"

"Tiny Ckts" are available in many small-gate-count types.

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I will put together the order today with the exact parts as well as the others, but just wondered if it would make a difference, they were all so inexpensive anyway my only interest was on saving space.

Again I really appreciate your help and as soon as it works there will be a check off to the American Cancer Society, which already happens to be one of my main charities, but I will donate it in your name.

Donate in the name of Duane Lee Thompson, my youngest son, who died at age 33, from colon cancer. Thanks!

Are you sure you don't want something for you own time, patience, and talent?

Nope. It was just for fun, something to exercise my brain while I was puzzling over an odd effect in an I/C chip design.

Thanks!

PS -- This is the kind of experience I remember from sci.electronics.design, I am glad it is not dead. There was a day when I was much more able to be a contributor than just a "taker", but when this works I will share it with my fellow X-10 hobbyists and credit you!

Enjoy!

On Sun, 26 Apr 2009 08:12:50 -0700, Jim Thompson
<To-Email-Use-The-Envelope-Icon@xxxxxxxxxxxxxxxx> wrote:

On Sun, 26 Apr 2009 01:57:53 -0400, Bob Thomas
<bobtms@xxxxxxxxxxxxxxxx>
wrote:

Hi Jim,
From the timing chart on page 2 of the PDF this looks PERFECT!!!! Now if I may ask just a few, perhaps dumb questions?

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1 – I take it I should tap in to my circuit between the uC and the LED where I found the clean 0VDC and 5VDC?

Yes.

2 – What is the part labeled D2A1? Is that the LED in my Alarm System?

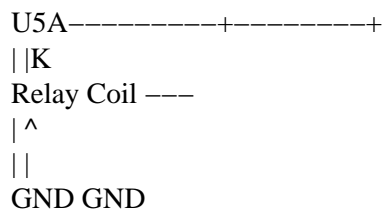
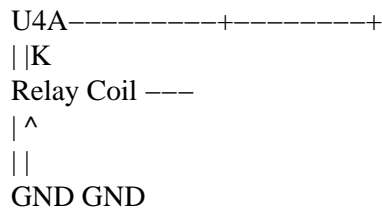
Parts DSTM1 and D2A1 are simulation elements. (So I could use a digital table to represent your incoming waveform.)

The actual circuit begins at the input to inverter 74HC04. Connect your logic signal here.

3 – What are the points with V in a circle? Do those just correspond to the the measurements on the second page of the PDF?

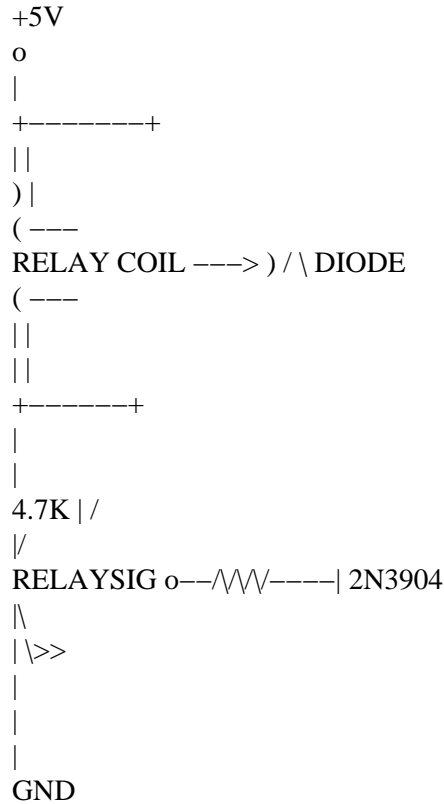
Those are called "markers" and DO corresponds to the measurement shown on the waveforms page.

4. Would the relay I use still be be the Hamlin HE721A0500 wired as such: (5DVC Coil voltage)



What are the current requirements for those relays?

I'd probably buffer with an NPN, like this...



5. If the flash rate is not 50% what are the parts that would need tweeking. Would that be C1 and C4? If so is there a formula I can use to determine the correct values, or just play with it until it is right?

Voltage at point "TT1" is the average of the blinking voltage. At 50% duty cycle it will be +2.5V (with some ripple). If the duty cycle is like 60/40, I'll have to add some resistor/diode gimmicks to keep TT1 centered.

6. I noticed that C1 is an electrolytic and C4 is shown as not, should they both be electrolytics, they seem to be configured the same way in the schematic, hooked to the Threshold pin on the LM555C

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If you can get C1/1uF as non-electrolytic, do it.

7. What exactly does your reference 1/3 – 2/3 mean, did you mean between the 2 LM555C's as in U1/Pin 3 and U3/Pin 3?

555 Trip points are at 1/3 and 2/3 of supply. Grab a data sheet and learn about it.

8. For all the caps that are not electrolytics, are ceramics good or should I use something other type.

Ceramic are best, if available.

9. Are 20% tolerance on the resistors ok or should I go for tighter, 1% / 5% etc?

Your biggest issue may be capacitor tolerances. R1 and R2 might be better as 1 1Meg pot plus a 510K resistor.

That circuit looks so clean and simple, I can't wait to order the parts and try this out.

Many thanks for this, I will try to get the parts ASAP and breadboard this by next weekend.

I will let you know the results as soon as I get it wired!

Again, many thanks!!

You are quite welcome.

Payment? In your original post you mentioned payment. When you are happy with the circuit, please make an appropriate donation to the

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American Cancer Society. Thanks!

On Sat, 25 Apr 2009 17:11:43 -0700, Jim Thompson
<To-Email-Use-The-Envelope-Icon@xxxxxxxxxxxxxxxx>
wrote:

On Fri, 24 Apr 2009 21:45:10 -0400, Bob
Thomas <bobtms@xxxxxxxxxxxxxxxx>
wrote:

Hi Jim,
This time I think I have the
details together a little
better,
and have included three
links to the relevent parts, at
least I hope
so, it took a few of those
questions to see I needed to
give better
details to get a better
answer, I think I have those
now, so here it
is:

[snip]

Try....

www.analog-innovations.com/SED/AlarmController.pdf

CAUTION: If the flash rate isn't
approximately 50%–50% some tweaks
may be necessary to keep the ripple inside
the 1/3 – 2/3 trip points
of the LM555C.

...Jim Thompson

On Sat, 25 Apr 2009 17:11:43 -0700, Jim Thompson
<To-Email-Use-The-Envelope-Icon@xxxxxxxxxxxxxxxx>
wrote:

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On Fri, 24 Apr 2009 21:45:10 -0400, Bob Thomas <bobtms@xxxxxxxxxxxx> wrote:

Hi Jim,
This time I think I have the details together a little better, and have included three links to the relevant parts, at least I hope so, it took a few of those questions to see I needed to give better details to get a better answer, I think I have those now, so here it is:

[snip]

Try....

www.analog-innovations.com/SED/AlarmController.pdf

CAUTION: If the flash rate isn't approximately 50%–50% some tweaks may be necessary to keep the ripple inside the 1/3 – 2/3 trip points of the LM555C.

...Jim Thompson

...Jim Thompson

...Jim Thompson

| James E. Thompson, P.E. | mens |
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I love to cook with wine Sometimes I even put it in the food

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