

Re: Need help understanding how to use opto-isolator

Source: <http://sci.tech-archive.net/Archive/sci.electronics.basics/2005-04/msg01104.html>

- *From:* "Larry Brasfield" <donotspam_larry_brasfield@xxxxxxxxxxx>
 - *Date:* Sat, 23 Apr 2005 00:31:26 -0700
-

"John Fields" <jfields@xxxxxxxxxxxxxxxxxxxxxxxx> wrote in message news:0chi619a9bmorr8pt1pt5qu5ok498dhnv3@xxxxxxxxxxx
> On Fri, 22 Apr 2005 09:42:24 -0700, "Larry Brasfield"
> <donotspam_larry_brasfield@xxxxxxxxxxx> wrote:
>
>>"John Fields" <jfields@xxxxxxxxxxxxxxxxxxxxxxxx> wrote in message
>> news:560i61tfmof8mhjis826fj5q3dcghb53of@xxxxxxxxxxx
>>> On 22 Apr 2005 05:57:14 -0700, "mjohnson" <crvmp3@xxxxxxxxxxx> wrote:
....
>>> Before anything can happen we need to find out definitively what's
>>> happening at the buzzer when the alarm goes off, or we need to find a
>>> signal somewhere in the clock which changes state when the alarm goes
>>> off.
>>
>>The power needed to drive a buzzer will be many
>>times larger than what needs to be picked off to
>>activate another circuit, (many mW versus uW).
> ----
> Depends. The OP's advocating using the signal driving the buzzer to
> also drive the LED in an opto, which will be milliwatts VS milliwatts.

I was not addressing use of the optoisolator in that position. However, if the current taken through the opto LED is limited to a few 100 uA, such usage would still be a small fraction of the buzzer power. As you point out, CTR would be reduced, but no more than a few uA of output would be needed.

All the alarms with buzzers I have heard are very loud (and annoying). It is hard to imagine getting that without using many 10s of mW.

>>> I wouldn't use an opto because of the current required for its LED and
>>> the uncertainty of being able to use its transistor output to trigger
>>> the remote.
>>
>>Some such uncertainty is warranted, but I suggest that
>>there is reason to believe an opto-isolator will be fine.

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>>The cheap (typically membrane) switches used in many
 >>remotes are not asked to carry much current and, to
 >>conserve battery power, large value pull-{up,down}
 >>resistors are used. If a replacement for the contact
 >>had to carry more than 100 uA, I would be surprised.
 >>The CTR (current transfer ratio) for opto-isolators is
 >>often guaranteed to be 100% or better, so a similar
 >>current is all that the LED would need.

>
 > ----
 > Not necessarily, CTR falls off quickly as LED forward current
 > diminishes and there are temperature effects which need to be taken
 > into consideration which can largely be ignored with a comparator-reed
 > switch solution. Also, with the reed switch solution there is no
 > saturation voltage VS LED If problem since it's either on or off.

I agree that the reed relay is simpler to apply. For that reason alone, it may well be most suitable for the OP's project. My suggestion about an optoisolator in its place is more like a feasible alternative than any kind of compelling improvement. Reed relays are fragile and, if their leads are not carefully heat-sunk during soldering, they can fail quickly or slowly as a result. That, together with a dislike of moving parts, made me think it might be an attractive alternative.

>>Finally, the signal sent thru the opto-isolator can be time limited
 >>to just over what is needed for the remote in order to
 >>conserve the battery.

> ----
 > Either solution will require the generation of a timed pulse to the
 > remote, so that's probably a wash.

Yes.

>>> Here's what I see as a much simpler solution, with only the clock
 >>> output needing to be defined in order to make it work:
 >>>
 >>> INTERFACE
 >>> BATTERY
 >>> CLOCK 4.5V REMOTE
 >>> BATTERY | BATTERY
 >>> 3V +-----+-----+ 3V
 >>> ||||
 >>> +---+---+ +---+---+ +---+---+ +---+---+ +---+---+
 >>> |CLOCK|---|ALARM|---|1SEC |---|REED |---|REMOTE|
 >>> +-----+ | DET | |MONO | |RELAY|---|SWITCH|
 >>> +-----+ +-----+ +-----+ +-----+
 >>
 >>The opto-isolator would plug into that with little
 >>change except reduction of the 4.5V battery drain

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>>(unless my power surmises are completely wrong).

>

> ---

> Could be. I'll defer judgement and wait until the OP comes back with
> something definitive on the buzzer signal to post my design. If he
> doesn't, I can always fall back on the acoustic thing I've already
> posted.

Seems reasonable.

> You may want to ask him about the current being conducted by
> the remote's switch switch to see whether you can use an opto in
> there. An easy way to determine the current would be to jump the
> switch contacts with a milli/microammeter...

Yes.

--

--Larry Brasfield

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Above views may belong only to me.

• *Follow-Ups:*

- ◆ **[Re: Need help understanding how to use opto-isolator](#)**
◇ From: John Fields

• *References:*

- ◆ **[Need help understanding how to use opto-isolator](#)**
◇ From: mjohnson
- ◆ **[Re: Need help understanding how to use opto-isolator](#)**
◇ From: John Fields
- ◆ **[Re: Need help understanding how to use opto-isolator](#)**
◇ From: mjohnson
- ◆ **[Re: Need help understanding how to use opto-isolator](#)**
◇ From: John Fields
- ◆ **[Re: Need help understanding how to use opto-isolator](#)**
◇ From: Larry Brasfield
- ◆ **[Re: Need help understanding how to use opto-isolator](#)**
◇ From: John Fields

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