Re: Ideas for low voltage sound activated switch

Source: http://sci.tech−archive.net/Archive/sci.electronics.design/2005−10/msg02349.html

- *From*: Ian Stirling <root@xxxxxxxxxxxxxxxx>
- *Date*: 18 Oct 2005 00:59:07 GMT

Nobody <nobody@xxxxxxxxxx> wrote:
> I'm looking for ideas how to solve a problem of designing a very small
> sound−activated switch.
>
> The basic requirements are:
>
> 0) Sound triggers a mechanical action. A piece of nylon stops the
> mechanical action, so if the nylon is melted, the action takes place.
> Hence sound must melt nylon.
>

What's this for?
A better doubled over condom, for drug mules?

> 1) Circuit works from two button cells. Size is a real limit. The
> ultimate (and distant) aim is to build a circuit that is small enough
> that a person could swallow it.

I would not go with button cells as such, but something like 1/3AAA cell.

>
> 2) Sound at a specific frequency triggers the switch.
>
> 3) When the switch is triggered, the battery voltage is applied to a 0.2
> Ohm resistor, which heats up and melts the nylon.
>
> Are there any switching devices that will have an on−resistance of well
> under 0.1 Ohms whilst still being very small? A large power FET is out
> of the question due to size.

Yes.

> A high on−resistance will mean the switching device will dissipate more
> power than the load resistor, which is not a good idea. At that point I
> might as well use the switch as the heater! That might be possible in
> fact, although a concern is the semiconductor will be destroyed before
> the nylon melts.

Why do you have to use nylon, and not (for example) hot−melt−glue?

>
> The load, which acts as the heater is (or at least should be) matched to
> the internal resistance of the cells. So the on−load voltage will drop
> to half the off−load voltage. So whatever switch mechanism is used, it
> will have to keep triggered even if the battery voltage drops to about
> 1.4V (0.7 V/cell), although triggering will start with full battery voltage.
>
> Using a DC−DC step up converter and storing some charge in a cap is one
> idea I am considering. That way, I will have a source of reasonable

Useless.
Caps of a worthwhile size are HUGE, compared to what you are aiming at.

> I've been asked to look at designing this, but I think the size
> constraints are quite serious given the circuit will need to supply
> about 7W of power for a short time period.

And this is where you find another client, if this one won't negotiate.
Small button cells are low current. (generally)

Have you ruled out pyro devices?
There exist several mixtures that will on being heated to 100C or so,
heat themselves to 300C quite easily.
This could dramatically cut your power needs. Ask over on sci.chem

Your first step is the batterys.
What is the maximum size (button cells go all the way from about 5*1mm to
30*4mm).
Now, go away and find the impedance of those cells.
I'd be really surprised if you could get 7W out of anything smaller than
1/2AAA.

And sound triggering may be fairly simple − can you use an ultrasound
machine to trigger them?
Hmm.
Images of glass toroids, with the string tied to them shattering when hit
by ultrasound emerge.
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- ***Follow−Ups***:
  - ♦ ***Re: Ideas for low voltage sound activated switch***
    - ◊ *From:* Nobody

- ***References***:
  - ♦ ***Ideas for low voltage sound activated switch***
    - ◊ *From:* Nobody

- Prev by Date: ***Re: Lunacy from Brussels***

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