

Door Alarm

Steak Electronics

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1 Overview

Client wants a door alarm. Let's do a few transistors, an audio amplifier board, a magnet and magnetic reed switch, along with a light switch.

Functionality req'd:

Makes noise when door opened.

Able to be shut off with light switch.

2 BOM

Any audio amplifier loud enough will work. I'm going to use this one:

IS31AP4088A-QFLS2-EB

I think I have speakers and transistors. I'll need a magnetic reed switch and magnet. They should be black, as the door is black.

MS-324-3-3-0500

let's also try 59140-1-S-03-A,¹ as first co. doesn't make the matched magnets...

and the magnet,
57140-000

A speaker, although I have plenty in my junk bin. AS07708PS-2-WR-R

That's a start.

3 Work Log: LM324, LM555, TIP120,125

I spent a bit on this during the evening. I tried first with a LM324, in falstad (sim software) to see if I could make a function gen, out of 3 op amps. I was unable to get the sim to work, although reportedly the circuit works online (ref: <https://www.eevblog.com/forum/beginners/simple-analog-function-generator-design/msg1174548/#msg1174548>)

I decided instead, to simulate a triple 5 with a LM324, to finally a transistor output, and this worked in sim. I breadboarded the circuit however, the output was not switching correctly. It turned out later, that I had not read my TIP125 close enough - it is a PNP. Oops.

Before realizing this error, I breadboarded two op amps, (ref: <https://electronics.stackexchange.com/questions/311648/obtaining-a-triangle-wave-from-a-square-wave-using-a-lm324n-op-amp>) and these were able to make the square / triangle wave without issue. Not practical in this situation however, as the freq. is low. I tried adjusting

¹A and F ending letters on this, A is tinned, F untinned leads

via the R between output 1 and inverting input for op amp 2, but this did not work as expected. I had long leads with a variable resistance box. Most likely, the issue.

Next, I will breadboard the triple 5 with the LM324 (which may be optional) and use that. I will throw in an Arduino to switch the triple 5 on/off via the RST pin. This will allow for some adjustment of tone.² Future improvements would be to get some way of removing the Arduino from the project. I would need a solution that will adjust how often the RST pin is switched, for some short period of time while the door magnet switch is active.

I might end up just using tone, if the 555 doesn't sound good.

4 Door Magnet Reed Sensor

I tried buying one from mouser,digikey but they are all small. Seems the standard is 28mm by 10mm or so. I didn't realize it until I purchased it, but it looks quite a bit smaller than I am used to. Not acceptable.

I spent some time looking at all the options. I was unable to find the bigger size. Even the imports from Sparkfun and Adafruit were small. There was a nice screw terminal omrom option but it was \$30. I opted for ebay where there were some used, brand name, sensors in the US. I found some for about \$5 each, including magnet AND the sensor (on mouser/digikey, you often have to get them separately).

4.1 Buzzer or Bell

I thought about a buzzer. Like, a ringer from a telephone. I didn't find them on mouser/digikey, but I did see a lot of piezo buzzers. Need to look again. Even better would be a bell, but that requires an actuator or a motor. I don't want to deal with moving parts, it will be more likely to break. Let's put that idea aside for another day.

Still, I like the idea of a bell, and an actuator to ring it...

²I could just use the tone() function on the Uno, and have a transistor handle the output, but the goal of this project was to lean more towards the analog.

I tried one on ebay. If that doesn't work there is this one:
<https://www.allelectronics.com/item/sol-154/12vdc-push-type-solenoid/1.html>
per this discussion: <https://forum.sparkfun.com/viewtopic.php?t=10308>

As for the bell, I will hold off until I know how the solenoid works.

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³I decided that the sound of the bell is worth the risk of using moving parts.