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## Introduction

After my integrated audio/navigation system was stolen out of my car, I designed a simple and cheap alarm that will hopefully prevent this from happening again. There are of course a lot of commercial car alarm systems available, which try to prevent people from entering the car and can be switched on/off with a remote control. These systems are well known to the thief guild and unfortunately they have found ways to prevent them from sounding (again), which also happened in my case.

## Working principle

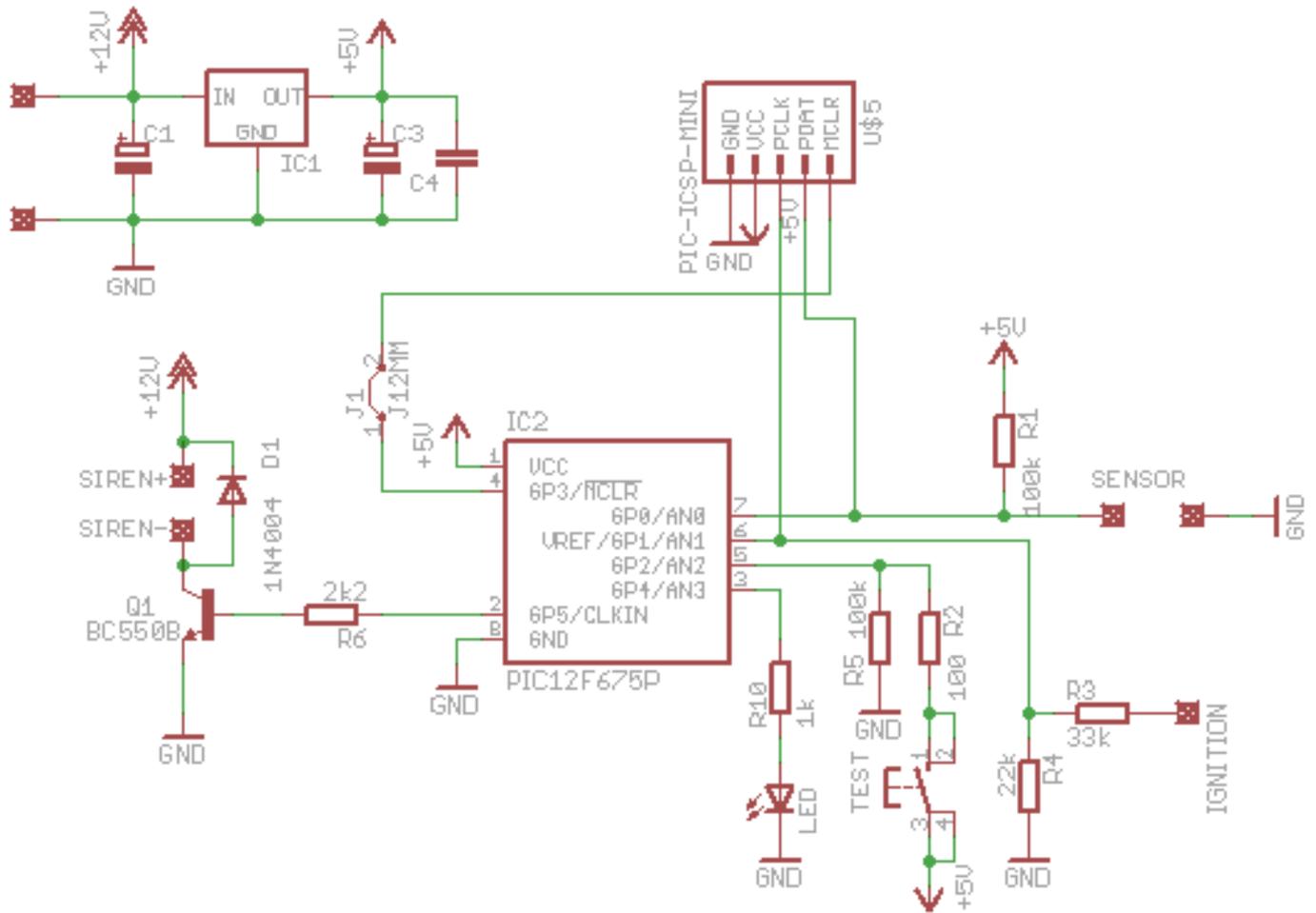
This alarm uses a different operating principle, the idea is that it makes a lot of noise when the sensor connection is interrupted, e.g. when the thief removes the front panel of your audio system. The alarm will keep on sounding for a small period of time (20s) after the sensor connection is restored again. If the sensor connection is not restored anymore the alarm will stop sounding after a larger period of time (200s). As a sensor, a simple wire can be connected that will break on removal of the front panel, but also a reed relay with a magnet. As the magnet is connected to the rear side of the front panel, the alarm will sound when the panel is removed.

The internal heart of the alarm is a small microcontroller that takes care of the following functions:

- Show the status of the alarm by blinking a led
- Switch of the alarm when the motor is started to prevent the alarm from sounding during driving
- Sound the alarm when the sensor connection is interrupted
- Sound the alarm if the test button is pressed
- Stop sounding the alarm 20s after the sensor connection is restored
- Stop sounding the alarm if the sensor connection is interrupted for more than 120s

## Schematic

The schematic of the car audio alarm is shown here



The alarm only needs three external connections to operate: GND, +12V and IGNITION (switched to 12V if motor is ignited). Using IC1, a 78L05 voltage regulator and some capacitors, a 5V supply for the micro-controller is constructed, which draws little current (< 10 mA). Output pin2 of the uC is used to switch on a siren by saturating Q1. Your choice of 12V siren can be connected to SIREN+ and SIREN- connections. Output pin3 is connected to a status led using current-limiting resistor R10. A test button is connected to input pin5, when it is pressed pin is pulled to 5V, else R5 pulls it to GND. Voltage divider R3/R4 scales the IGNITION signal to 5V to be connected to input pin6. The sensor (reed relay or just a wire) will pull input pin7 to GND, if it is interrupted, R1 pulls it to 5V.

### Software

The software running on the microcontroller is written in C++ and compiled with SDCC. It is not very complex and is already running for more than 3 weeks now without problems. I am not (yet) willing to publish the software, but if there is interest, I will supply programmed microcontrollers. Just let me know if you are interested!

### Conclusions

This is a simple and cheap project, which can be built for less than 20 euros. Besides programmed microcontrollers, I also might make kits or pcb's available for this project. Let me know if you are interested!