Products related to this project are for sale on this page.

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

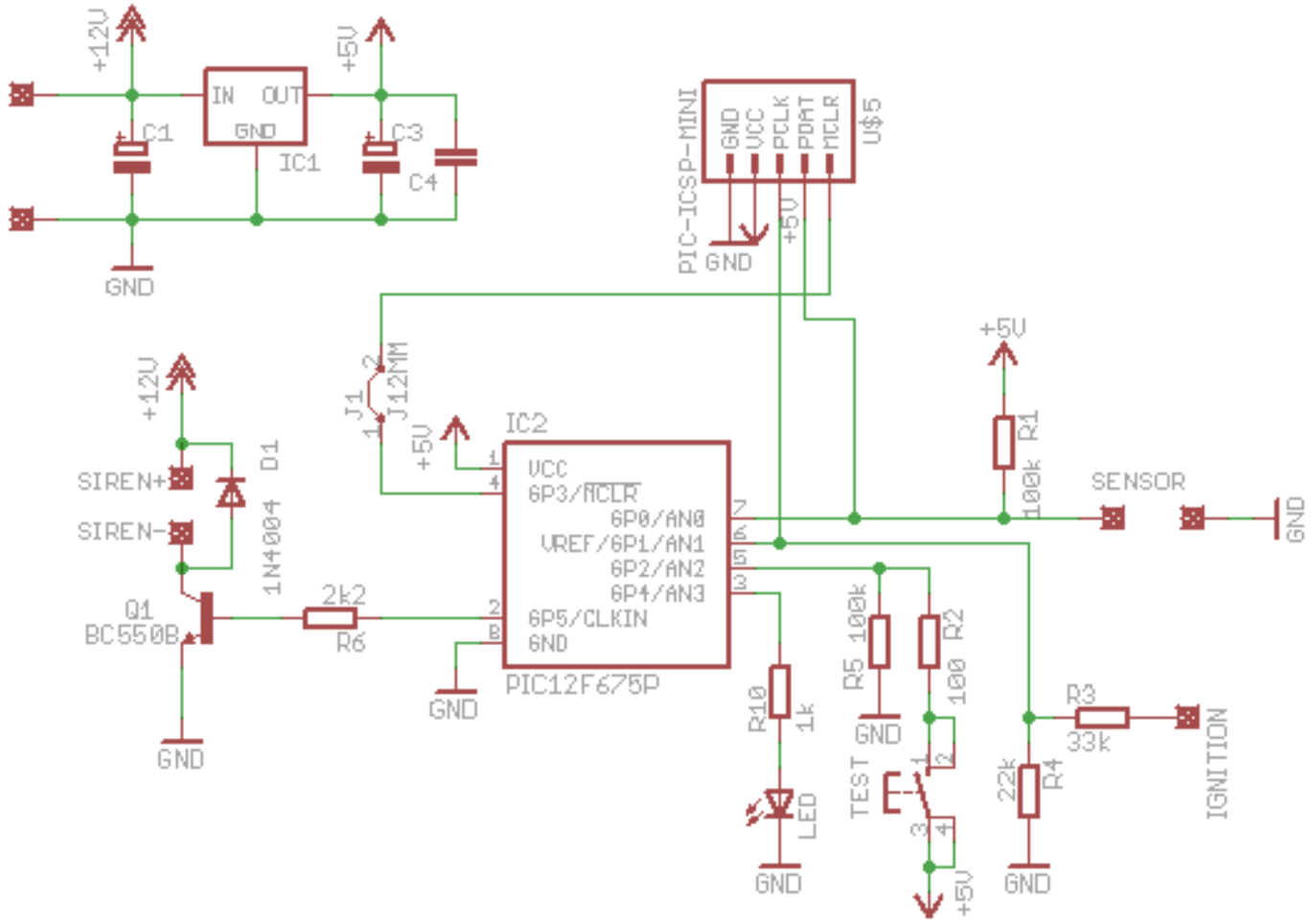
This alarm uses a different operating principle, the idea is that it makes a lot of noise when the sensor connection is interrupted, e.g. when the thief removes the front panel of your audio system.The alarm will keep on sounding for a small period of time (20s) after the sensor connection is restored 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!