

Project Proposal

Breathalyzer+

2/13/2011

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Project Abstract

This project will take advantage of an Alcohol Gas Sensor to create a working breathalyzer. Since the input is dependent on relative humidity as well as temperature, a humidity and temperature sensor will need to be incorporated into the product. Both the environmental and alcohol gas stats will output to an LCD display. Ideally, if I have time I would like there to be some additional “activation” output based on a blood alcohol threshold. It could be any arbitrary output, such as turning on a TV with the IR transmitter.

Strategy

Description of the overall design: See above

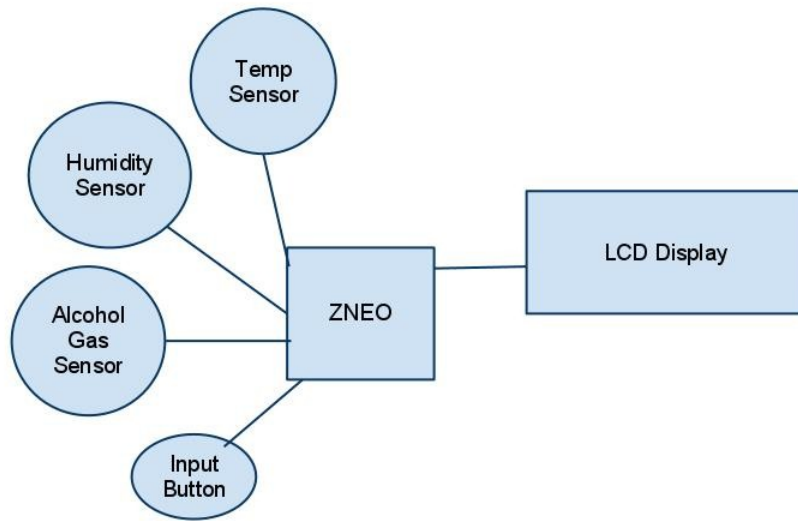
What platform: Based on the Zilog Z16 chip and development platform.

What capabilities: Lots of GPIO, timers, interrupts, an analogue input.

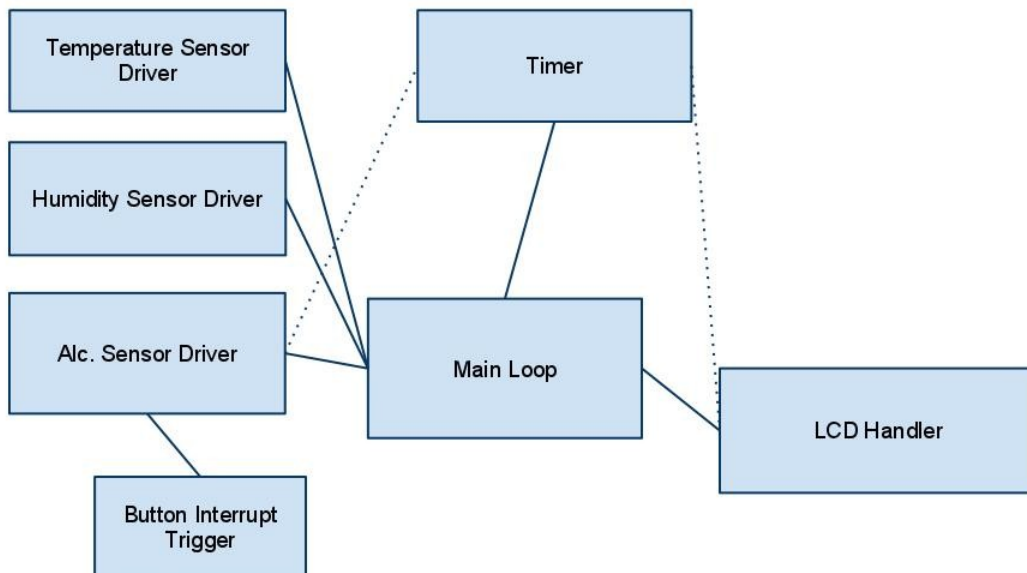
What external: Alcohol gas sensor, 16x2 LCD display, temperature sensor, humidity sensor.

What evaluations: The environmental inputs both use I2C to communicate with the microcontroller. The main input, the alcohol gas sensor datasheet looks reasonable enough.

On the software side, there will be at least one timer that will be initialized in the main block. There will be a module for each of the main hardware segments (LCD display, humidity sensor, temperature sensor, Alcohol gas sensor, and input button). The LCD Display will be periodically updated from a timer interrupt. The two environmental sensors will be polled from within a round robin loop in main. The purpose of the input button is to call an interrupt to poll the gas sensor, which is not (strictly speaking) necessary but would make the final product more like an actual breathalyzer (I assume). Depending on the feasibility of it, an additional “activation” function will be called from the main loop following a sufficiently low alcohol gas reading.



Hardware Diagram



Software Diagram

Unknowns

Additionally, figuring out how to accurately the alcohol gas sensor input relative to the environment could prove difficult. From reading some of the comments on the sparkfun order page, calibration may also be a difficult step.

Implementation Plan

- Use Z16 development kit
- Acquire necessary external hardware(Alcohol gas sensor, temperature sensor, humidity sensor, 16x2 LCD display)
- Verify Alcohol gas sensor works; write driver
- Verify LCD display for BAC stats, write driver
- Verify Temperature sensor works; write driver
- Verify Humidity sensor works; write driver
- Set up main event handler, so that the board can take gas sensor input and output data to LCD screen

Resources

- ZNEO board (university provided)
- Speaker (university provided)
- Alcohol Gas Sensor MQ-3 ([need to order](#))
- Temperature sensor ([need to order](#))
- Humidity sensor ([need to order](#))
- Character LCD Display ([need to order](#))