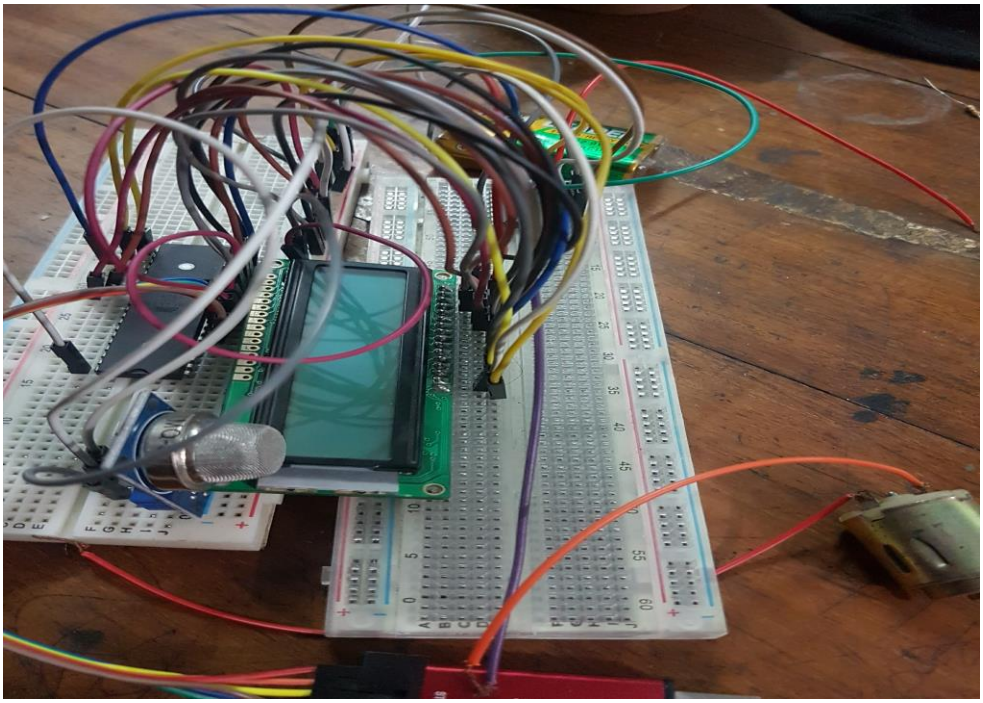
CSE316 Microcontroller Project

Alcohol Detector

With MQ-5



by

Yeaseen Arafat(1405091)

Sajid Samsad(1405118)

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Introduction

This project belongs to detect any alcoholic driver for avoiding unnecessary accidents. TO do this we built a system using MQ-5 gas sensor which can detect alcohol gas and glow a green signal at the back of its led. We are assuming a motor as a vehicle. Now if it sense any alcohol gas then this is shown on the LCD display and system will block the motor. That means if any driver gets alcoholic, this system will detect that.

Hardware Requirements

Hardware : **List of hardware and cost**

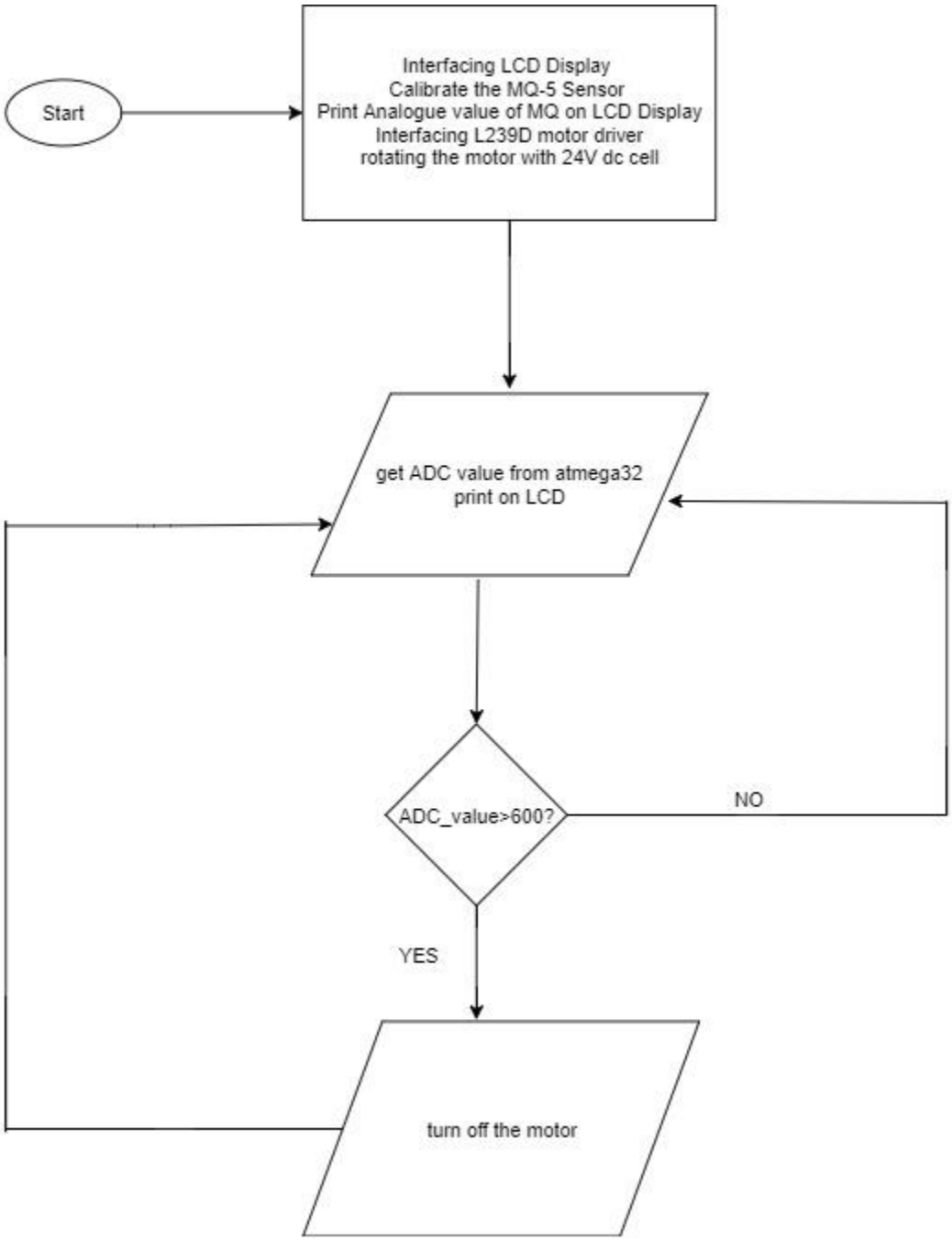
Equipment's	Cost (Tk)
Atmega32 microcontroller	150
1 MQ-5 gas sensor	120
USB ISP 2.0 AVR Programmer	180
16x2 LCD Alphanumeric Display	130
1 DC motor(9V)	110
L293D(Motor driver)	80
Cell(24 V)	80
Wires	70

Software Requirements

List of **Software used**

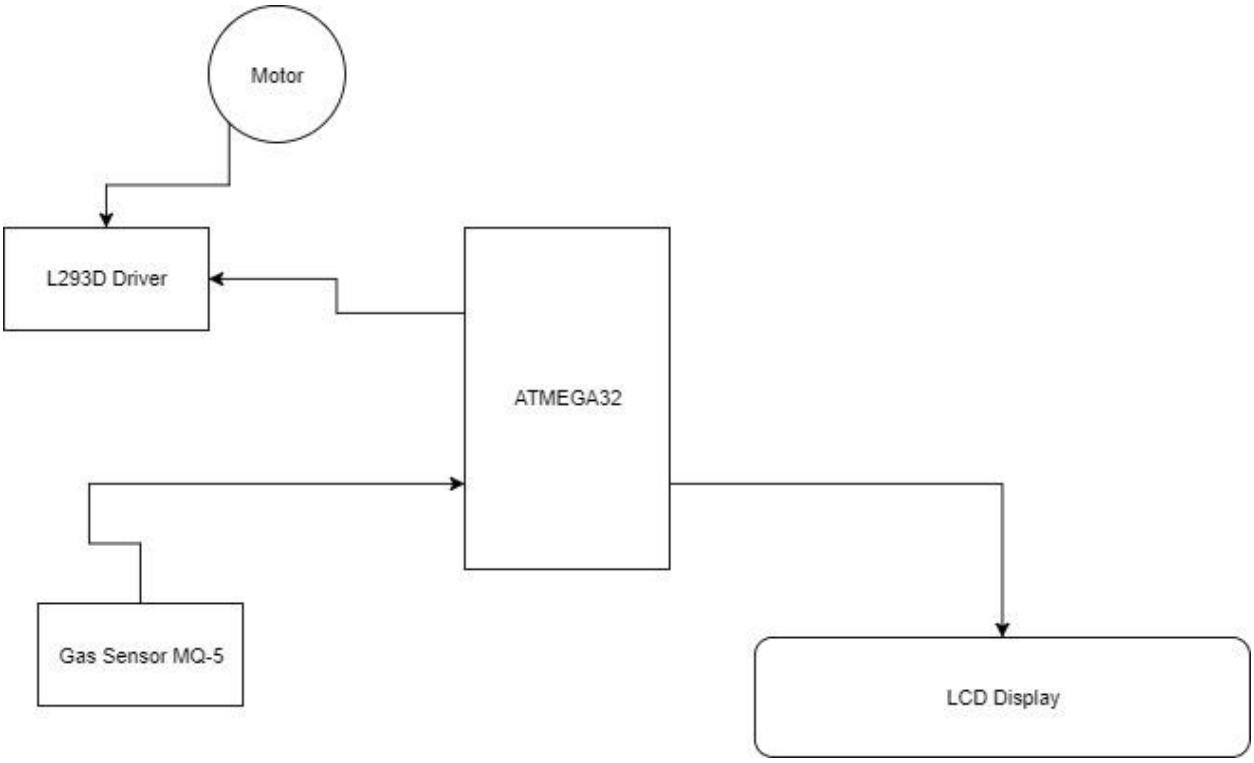
- ATmel Studio 7 (to compile .c code and build .hex)
- PROGISP-1.72 (to load .hex onto ATmega32)
- Proteus 8 Professional (for circuit design)

Flowchart


Start
Interfacing LCD Display
Calibrate the MQ-5 Sensor
Print Analogue value of MQ on LCD Display
Interfacing L239D motor driver
rotating the motor with 24V dc cell
get ADC value from atmega32
print on LCD
ADC_value>600?
NO
YES
turn off the motor

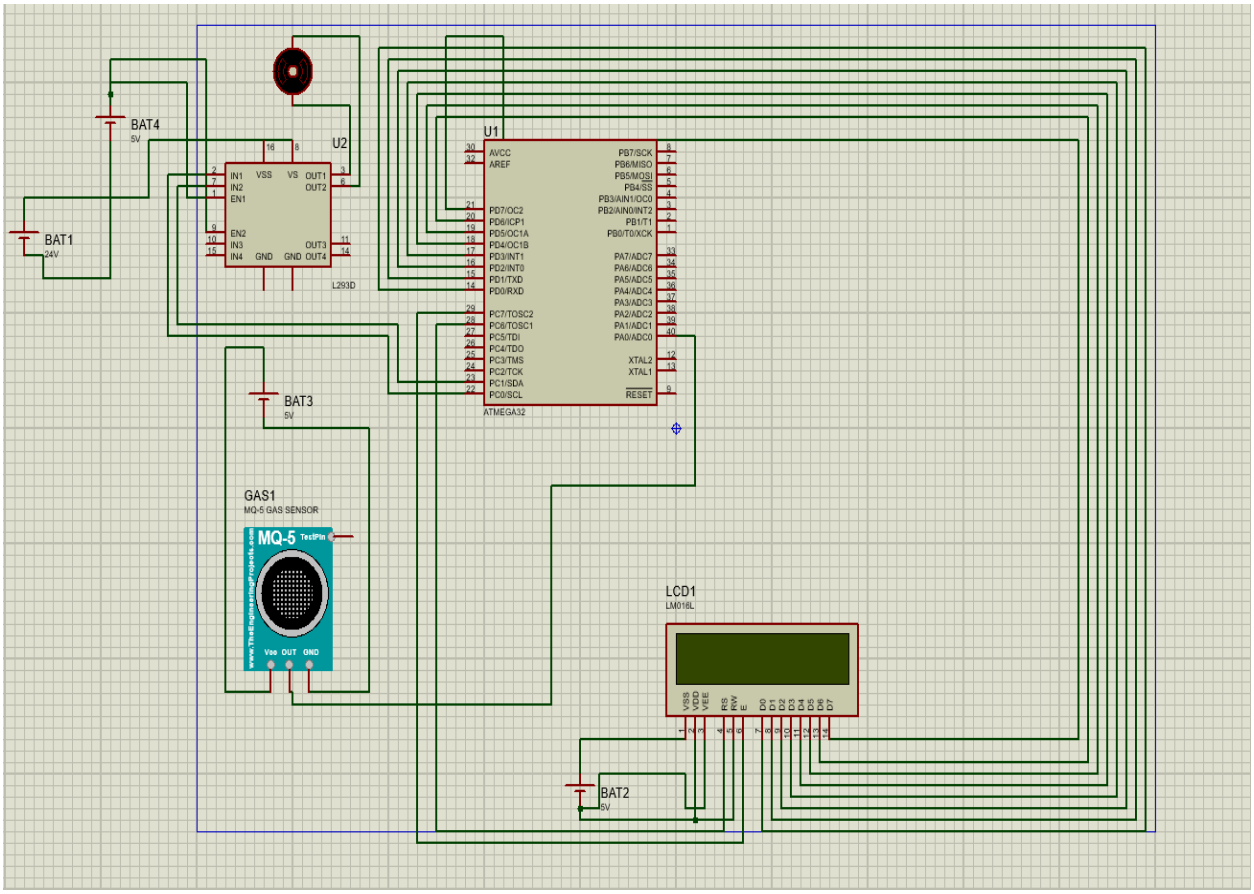
Block Diagram

showing **Input and Output**

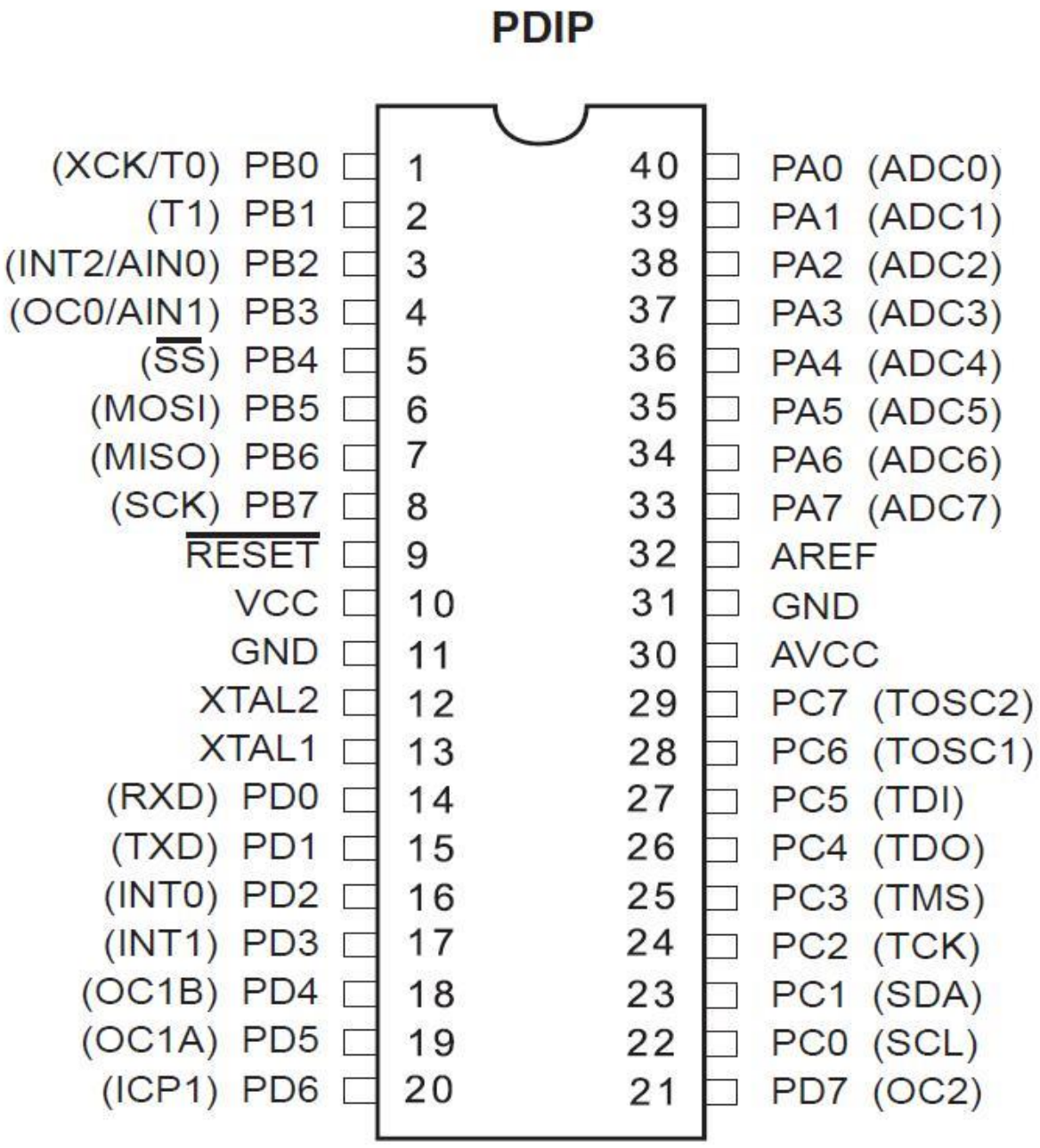


Circuit Diagram

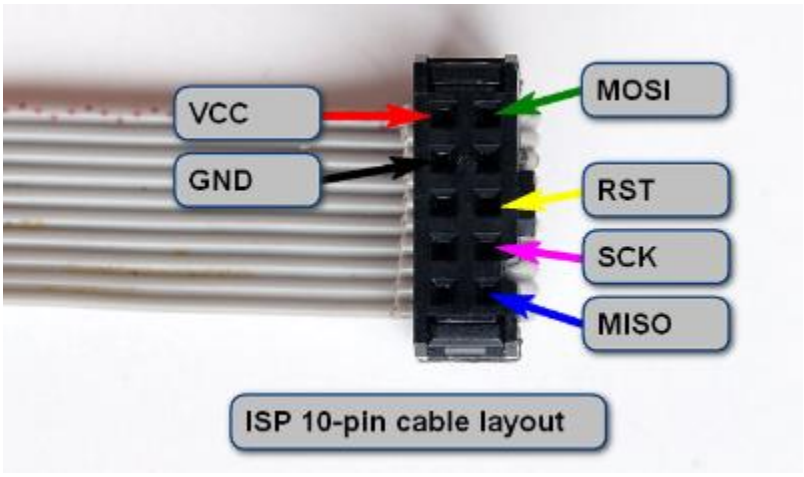
showing **Complete Connection**



showing **Atmega32 ports**

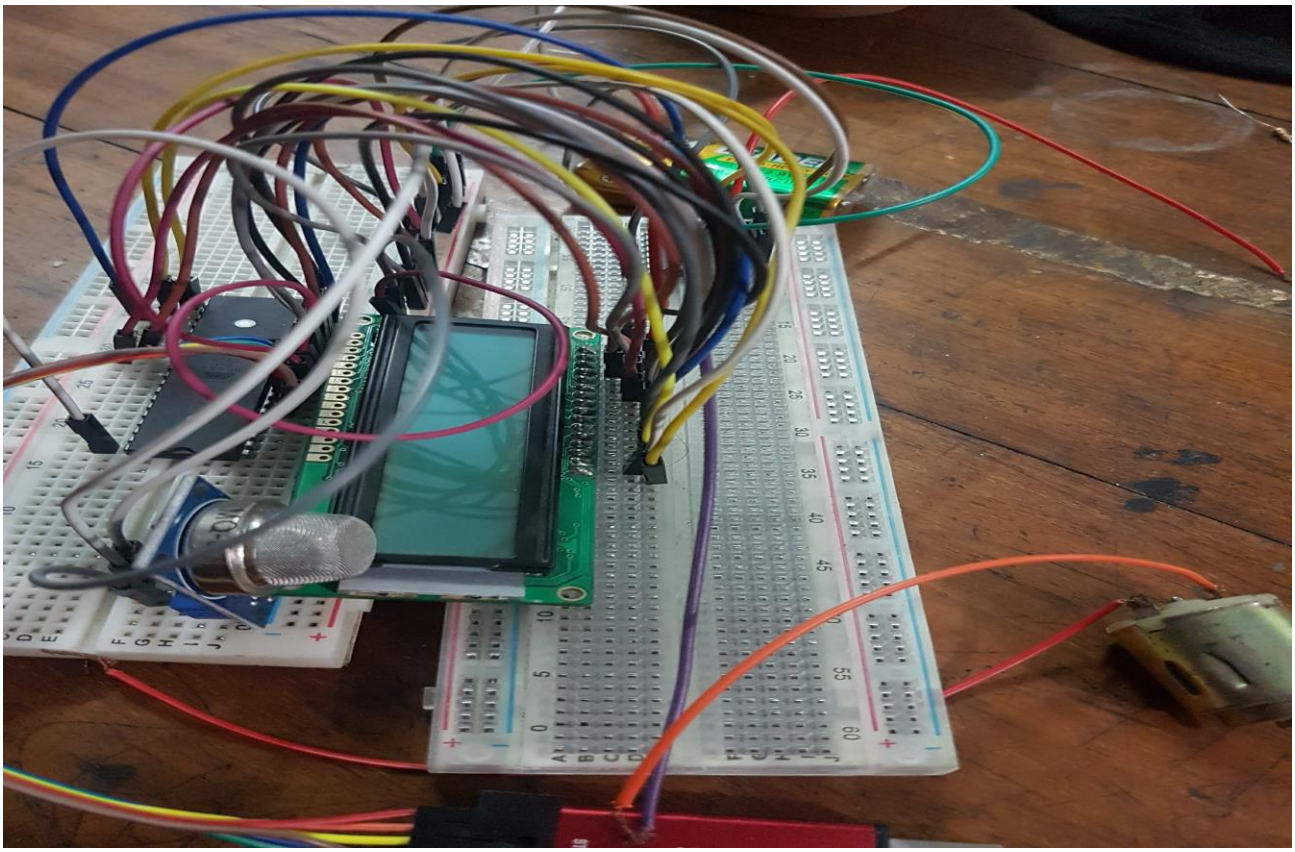


showing **USB-ISP ports connection**



Actual Circuit

Snapshot **of the working circuit.**



USB ISP Programmer

This was used to burn the .hex into the Atmega32 flash memory. It is powered off of 5V USB bus. Our whole project is powered using its USB port power supply.

Description of Modules & Used Libraries

Describing **all** the **hardware parts and their connections.**

MQ-5 Gas Sensor :

The gas sensor MQ2 suitable for detecting of LPG, I-butane, propane, methane, Alcohol, Hydrogen, smoke etc. Since it is highly sensitive and gives fast response, we can take measurements as soon as possible. This sensor can be used for gas leakage detection also.

At normal condition, sensor resistor will be high so voltage drop across the load will be low and it will be a constant. If sensor senses flammable gases, resistance of sensor will drop. That means more current will flow from load resistor. So the voltage across it increases. This output voltage increases with increase in concentration of gas in air. The sensitivity of the gas sensor can be adjusted using potentiometer.

Refer MQ-5datasheet for detailed information.

This Smoke Sensor (MQ5) Board has analog as well as digital output. For this tutorial we will use analog output. Analog output pin needs to be connect ADC channel 0 of atmega 32 breakout as shown in hook up.

For details:

https://exploreembedded.com/wiki/Interfacing_Gas_Sensor_(MQ5)_With_AVR

L239D :

L293D is a Quadruple Half H-Bridge driver commonly used for motor driving. We needn't connect any transistors, resistors or freewheeling diodes. All the four outputs of this IC are TTL compatible and output clamp diodes are provided to drive inductive loads. L293D can provide up to 600mA current, in the voltage raging from 4.5 to 36v. L293 is a similar IC which can provide up to 1A in the same voltage range.

L293 or L293D contains four Half H Bridge drivers and are enabled in pairs. Input EN1 is used to enable pair 1 (IN1-OUT1, IN2-OUT2) and input EN2 is used to enable pair 2 (IN3-OUT3, IN4-OUT4). We can drive two DC Motors with one L293D, but here for demonstration we are using only one. You can connect second DC Motor to driver pair 2 according to your needs.

It is required for interfacing dc motor with Atmega32.

For details:

https://electrosome.com/interfacing-dc-motor-atmega32-l293d/#Circuit_Diagram

16x2 Alphanumeric LCD Display:

The LCD has 16 connector pins. Connections are:

- LCD 1 ***(GND)***to GND
- LCD 2 ***(VCC)***to 5V
- LCD 3 ***(contrast)***to GND
- LCD 4 ***(RS)***to PD0 (Pin 14 on Atmega32)
- LCD 5 ***(R/-W)***to PD1 (Pin 15 on Atmega32)
- LCD 6 ***(Clock or Enable)***to PD2 (Pin 16 on Atmega32)
- LCD 7***(Data 0)***to PD0 (Pin 14 on Atmega32)
- LCD 8 ***(Data 1)***to PD1 (Pin 15on Atmega32)
- LCD 9***(Data 2)***to PD2 (Pin 16 on Atmega32)
- LCD 10 ***(Data 3)***to PD3 (Pin 17 on Atmega32)
- LCD 11 ***(Data 4)***to PD4 (Pin 18 on Atmega32)
- LCD 12 ***(Data 5)***to PD5 (Pin 19 on Atmega32)
- LCD 13 ***(Data 6)***to PD6 (Pin 20 on Atmega32)
- LCD 14 ***(Data 7)***to PD7 (Pin 21 on Atmega32)
- LCD 15 (to VCC) and LCD 16 (to GND) are for background light.

Problems Faced

Describing **the** practical **issues and observations made while putting the project together.**

1. Firstly we have face a lot of problem to interface USB-ISP to Atmega32. So for this problem we used PROGISP-1.72 to burn the .hex file.

   To download this: https://roboindia.com/tutorials/programming-avr-micro-controller-using-usbasp
2. To rotating the dc motor we have to use L293D motor driver , otherwise it is not safe to interface dc motor to Atmega directly.
3. We have to face to take ADC value from the Atmega32.

   Set ADLR=1 while setting ADCMUX
   Then take ADCL value first.

Acknowledgements

These are thesites **that helped us to set up the project.**

For basic interfacing with ATmega32

- **http://maxembedded.com/**
- **http://www.avrfreaks.net/**
- **http://avrprojects.info/**
- **https://alselectro.wordpress.com/2015/02/26/8051-tutorials-loading-hex-file-using-progisp/**

Ending

That is how we built this system. It is really fun to detect Alcohol. There is a kind of charming to buy Alcohol for charming. We went to bar to get that for testing.

January 23, 2018