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Alcohol Detection in Car

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ABSTRACT
At present drunken drivers have increased enormously and so is the deaths due to drunken drivers. The main reason for driving drunk is that the police are not able to check each and every car and even if they catch any one the police can be easily bribed. So there is a need for an effective system to check drunken drivers. In our alcohol detection system the ignition of the fuel is regulated by a sensor circuit. The sensor circuit is used to detect whether alcohol was consumed by the driver recently. Our design also consists of a blood pulse rate sensor which is used to check whether alcohol is consumed while driving.

Keywords: Alcohol Sensor, Microcontroller PIC16F877A, Motor Driver 200rpm DC Motor, Co2 Sensor, CMOS, RISC, EEPROM, DC Motor Driver L293D

I. INTRODUCTION

1.1 Aim of the Project
The aim of the project is to detect alcohol in car thereby reducing road accidents and to ensure safety in roads.

1.2 Methodology
We implemented this project using PIC16F877A microcontroller, 16*2 LCD, Motor Driver 200RPM Centre Shaft DC Motor, CO2 Sensor and Power Supply.

1.3 Significance
The main advantage of this project is to: Reduce the number of accidents caused by drunk and drive Ensure safety in roads and to minimize the road accidents Ensure safety for pedestrians and other vehicle travellers.

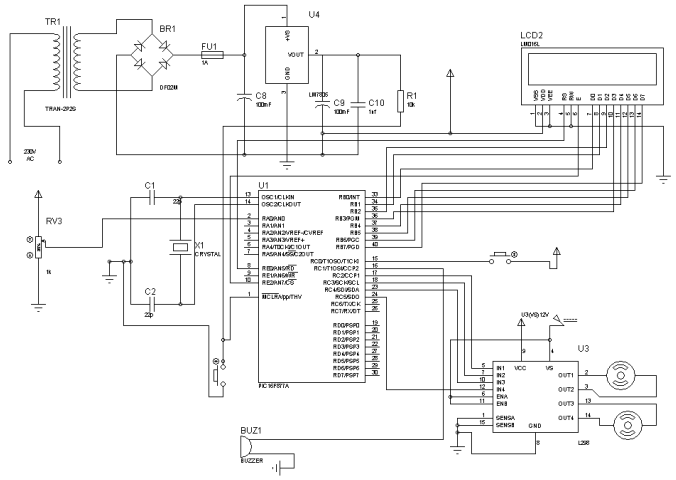


Figure 1: System Block Diagram

II. METHODS AND MATERIAL

Hardware Description

1. Microcontroller PIC16F877A
2. Motor driver 200RPM DC motor
3. 2X16 LCD
4. CO2 Sensor
5. Power Supply +5V +12V

2.1 Microcontroller:

- Microcontroller (MC) may be called computer on chip since it has basic features of microprocessor with internal ROM, RAM, Parallel and serial ports within single chip. Or we can say microprocessor with memory and ports is called as microcontroller.
- Microcontroller can be classified on the basis of their bits processed like 8bit MC, 16bit MC.8 bit microcontroller means it can read write and process 8 bit data.
- Ex. PIC16F877A microcontroller. Basically 8 bit specifies the size of data bus. 8 bit microcontroller means 8 bit data can travel on the data bus or we can read, write process 8 bit data.

Selection Criteria of Microcontroller

(a) Meeting the computing needs of task at hand efficiently and cost effectively

- Speed of operation
- Packing
- Power consumption
- Amount of RAM and ROM on chip
- No. of I/O pins and timers on chip
- Cost

(b) Availability of software development tools such as compiler, assembler and debugger

PIC16F877A

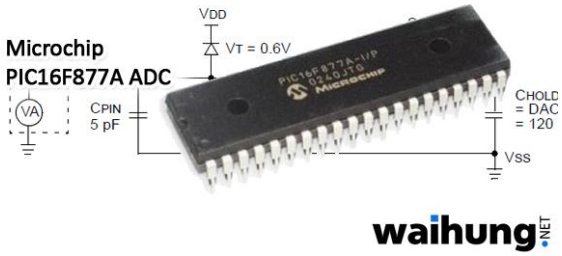


Figure 2: PIC16F877A

Description:

PIC 16F877 is a 40-pin 8-Bit CMOS FLASH Microcontroller from Microchip. The core architecture is high-performance RISC CPU with only 35 single word instructions. Since it follows the RISC architecture, all single cycle instructions take only one instruction cycle except for program branches which take two cycles. 16F877 comes with 3 operating speeds with 4, 8, or 20 MHz clock input. Since each instruction cycle takes four operating clock cycles, each instruction takes 0.2 µs when 20MHz oscillator is used.

It has two types of internal memories: program memory and data memory. Program memory is provided by 8K words (or 8K*14 bits) of FLASH Memory, and data memory has two sources.

One type of data memory is a 368-byte RAM (random access memory) and the other is 256-byte EEPROM (Electrically erasable programmable ROM).

Features:

- 100,000 erase/write cycle Enhanced Flash program memory typical
- 1,000,000 erase/write cycle Data EEPROM memory typical
- Data EEPROM Retention > 40 years
- Self-reprogrammable under software control
- In-Circuit Serial Programming™ (ICSP™) via two pins
- Single-supply 5V In-Circuit Serial Programming
- Watchdog Timer (WDT) with its own on-chip RC oscillator for reliable operation
- Programmable code protection
- Power saving Sleep mode
- Selectable oscillator options
- In-Circuit Debug (ICD) via two pins

Pin Diagram:

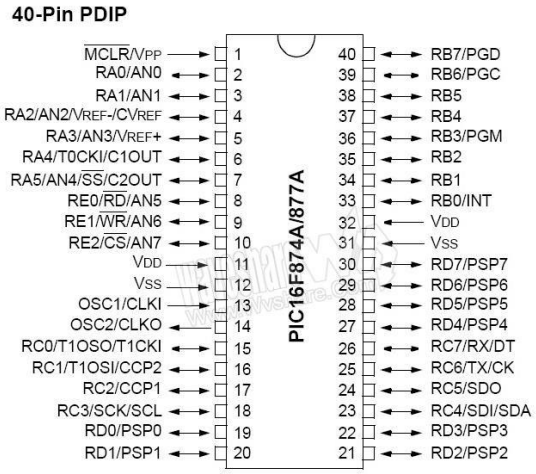


Figure 3. PIC16F877A Pin Diagram

Pin Description:

VCC

- Supply voltage.

GND

- Ground.

Port 0

Port 0 is an 8-bit open-drain bi-directional I/O port. As an output port, each pin can sink eight TTL inputs. When 1s are written to port 0 pins, the pins can be used as high impedance inputs. Port 0 may also be configured to be the multiplexed low order address/data bus during accesses to external program and data memory. In this mode P0 has internal pull-ups. Port 0 also receives the code bytes during Flash programming, and outputs the code bytes during program verification. External pull-ups are required during program verification.

Port 1

Port 1 is an 8-bit bi-directional I/O port with internal pull-ups. The Port 1 output buffers can sink/source four TTL inputs. When 1s are written to Port 1 pins they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 1 pins that are externally being pulled low will source current (IIL) because of the internal pull-ups. Port 1 also receives the low-order address bytes during Flash programming and verification.

Port 2

Port 2 is an 8-bit bi-directional I/O port with internal pull-ups. The Port 2 output buffers can sink/source four TTL inputs. When 1s are written to Port 2 pins they are pulled high by the internal pullups and can be used as inputs. As inputs, Port 2 pins that are externally being pulled low will source current (IIL) because of the internal pull-ups. Port 2 emits the high-order address byte during fetches from external program memory and during accesses to external data memory that uses 16-bit addresses (MOVX @ DPTR). In this application, it uses strong internal pull-ups when emitting 1s. During access to external data memory that uses 8-bit addresses (MOVX @ RI), Port 2 emits the contents of the P2 Special Function Register. Port 2 also receives the high-order address bits and some control signals during Flash programming and verification.

Port 3

Port 3 is an 8-bit bi-directional I/O port with internal pull-ups. The Port 3 output buffers can sink/source four TTL inputs. When 1s are written to Port 3 pins they are pulled high by the internal pull-ups and can be used as inputs. As inputs, Port 3 pins that are externally being pulled low will source current (IIL) because of the pull-ups. Port 3 also serves the functions of various special features of the AT89C51 as listed below:

Port Pin	Alternate Functions
P3.0	RXD (serial input port)
P3.1	TXD (serial output port)
P3.2	INT0 (external interrupt 0)
P3.3	INT1 (external interrupt 1)
P3.4	T0 (timer 0 external input)
P3.5	T1 (timer 1 external input)
P3.6	WR (external data memory write strobe)
P3.7	RD (external data memory read strobe)

Table 1 Port 3 Alternate Functions

Port 3 also receives some control signals for Flash programming and verification.

RST

Reset input. A high on this pin for two machine cycles while the oscillator is running resets the device.

ALE/PROG

Address Latch Enable output pulse for latching the low byte of the address during accesses to external memory. This pin is also the program pulse input (PROG) during Flash programming. In normal operation ALE is emitted at a constant rate of 1/6 the oscillator frequency, and may be used for external timing or clocking purposes. Note, however, that one ALE pulse is skipped during each access to external Data Memory. If desired, ALE operation can be disabled by setting bit 0 of SFR location 8EH. With the bit set, ALE is active only during a MOVX or MOVC instruction. Otherwise, the pin is weakly pulled high. Setting the ALE-disable bit has no effect if the microcontroller is in external execution mode.

PSEN

Program Store Enable is the read strobe to external program memory. When the AT89C51 is executing code from external program memory, PSEN is activated twice each machine cycle, except that two PSEN activations

are skipped during each access to external data memory.

3.2.7 Architecture

Device	Program FLASH	Data Memory	Data EEPROM
PIC16F874	4K	192 Bytes	128 Bytes
PIC16F877	8K	368 Bytes	256 Bytes

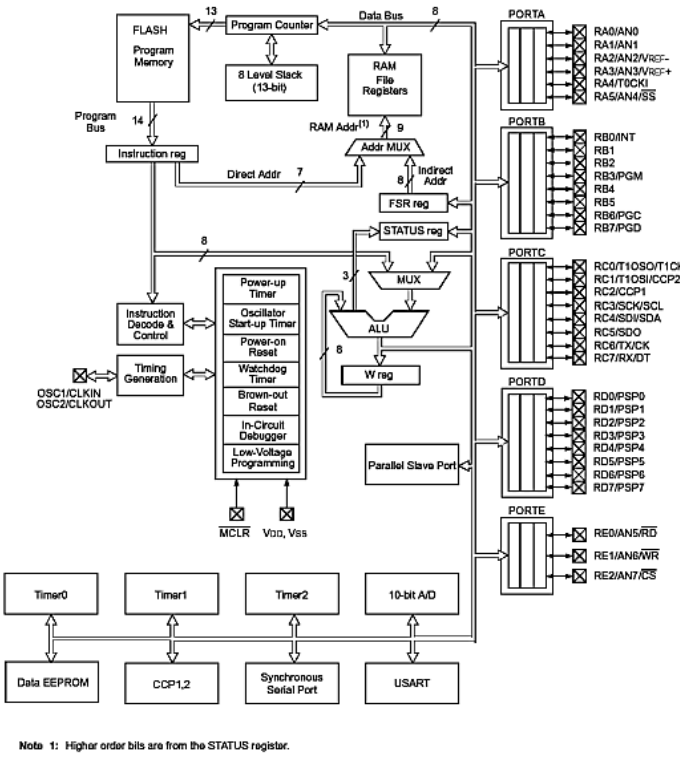


Figure 4. Architecture

EA/VPP

External Access Enable EA must be strapped to GND in order to enable the device to fetch code from external program memory locations starting at 0000H up to FFFFH. Note, however, that if lock bit 1 is programmed, EA will be internally latched on reset. EA should be strapped to VCC for internal program executions. This pin also receives the 12-volt programming enable voltage (VPP) during Flash programming, for parts that require 12-volt VPP.

XTAL1

Input to the inverting oscillator amplifier and input to the internal clock operating circuit.

XTAL2

Output from the inverting oscillator amplifier.

DC Motor Driver L293D

200RPM Centre Shaft Economy Series DC Motor is high quality low cost DC geared motor. It has steel gears and pinions to ensure longer life and better wear and tear properties. The gears are fixed on hardened steel spindles polished to a mirror finish. The output shaft rotates in a plastic bushing. The whole assembly is covered with a plastic ring. Gearbox is sealed and lubricated with lithium grease and require no maintenance. The motor is screwed to the gear box from inside.

Although motor gives 200 RPM at 12V but motor runs smoothly from 4V to 12V and gives wide range of RPM, and torque. Tables below gives fairly good idea of the motor's performance in terms of RPM and no load current as a function of voltage and stall torque, stall current as a function of voltage.

Specifications

- DC supply: 4 to 12V
- RPM: 200 at 12V
- Total length: 46mm
- Motor diameter: 36mm
- Motor length: 25mm
- Brush type: Precious metal
- Gear head diameter: 37mm
- Gear head length: 21mm
- Output shaft: Centred
- Shaft diameter: 6mm
- Shaft length: 22mm
- Gear assembly: Spur
- Motor weight: 105gms

LIQUID CRYSTAL DISPLAY

An HD44780 Character LCD is an industry standard liquid crystal display (LCD) display device designed for interfacing with embedded electronics. These screens come in common configurations of 8x1 characters, 16x2, and 20x4 among others.

A **16x2 LCD** means it can display 16 characters per line and there are 2 such lines. It has two registers, namely, Command and Data. The command register stores the command instructions given to the LCD. A command is an instruction given to LCD to do a predefined task like initializing it, clearing its screen, setting the cursor position, controlling display etc. The data register stores the data to be displayed on the LCD. The data is the ASCII value of the character to be displayed on the

LCD.

Most LCDs with 1 controller has 14 Pins and 16 Pins. (two extra pins are for back-light LED connections).Character LCDs can come with or without backlights. Backlights can be LED, fluorescent, or electroluminescent. Character LCDs use a standard 14-pin interface. If the screen has a backlight, it will have 16 pins.

PIN Description:

Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	Vcc
3	Contrast adjustment; through a variable resistor	VEE
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the Register	Read/write
6	Sends data to data pins when a high to low pulse is Given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6
14		DB7
15	Backlight V_{CC} (5V)	Led+

Table 2 Pin Description of LCD

Interfacing LCD With MC

We now want to display a text in PIC16F877A Friendly Board by using 4 bit LCD module. The PIC16F877A Friendly board has seven numbers of LCD connections are needed to create 4-bit interface; connected with 4 data bits (P0.4 – P0.7, D4-D7), address bit (RS-P0.0), read/write bit (R/W-P0.1) and control signal (E-P0.2) to make LCD display.

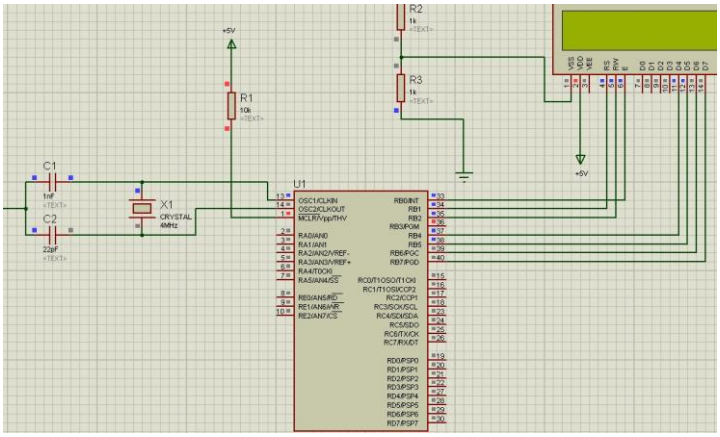


Figure 5 Interfacing LCD with MC

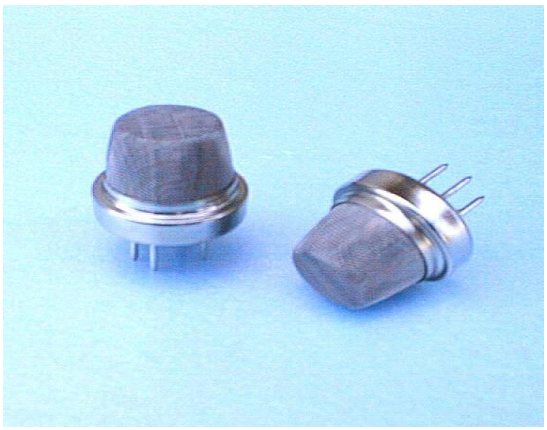
Applications

- copiers,
- fax machines,
- laser printers,
- industrial test equipment,
- networking equipment such as routers and storage devices, etc.

CO2 Sensor :

Features

- High sensitivity to carbon dioxide ▪ Gas diffusion sampling



- Standard sensor size ▪ Temperature compensated detector elements
- Fast Response ▪ Wide operating temperature range
- Internal temperature signal ▪ Low power

Description

Dynament infrared sensors operate by using the NDIR principle to monitor the presence of target gas. The sensor contains a long life tungsten filament infrared light source, an optical cavity into which gas diffuses; a dual temperature compensated pyroelectric infrared detector and an integral thermistor to monitor the internal temperature.

The infrared source should be driven externally with a constant voltage supply switched at a fixed frequency with a 50% duty cycle. The dual pyroelectric detector produces two output signals in response to pulsed incident radiation from the source:• An active signal which decreases in the presence of target gas • A reference signal which is used to monitor the intensity of the source Both signals are composed of a DC offset voltage (typically 0.7V – 1.0V) with a small superimposed response signal alternating in sympathy with the source drive voltage.

The alternating signal must be extracted and amplified in order to obtain a measure of the peak to peak value for both the active and reference. The ratio of active to reference peak to eak signals is essentially independent of variations in source intensity over time and this ratio reduces in the presence of target gas. The internal temperature signal is used to measure the temperature inside the sensor. The internal temperature is typically 10°C higher than ambient at 20°C due to the heat generated from the infrared source.

This internal heating beneficially reduces the probability of water condensing within the optical cavity.Further details on the sensor, interfacing circuitry and signal extraction can be found in the Dynament application notes,on the Dynament website or by contacting Dynament directly.

Mechanical Detail Specification

- **Maximum Power Requirements:** 5V d.c. 60mA max. (50% duty cycle source drive)
- **Minimum operating voltage:** 3.0V d.c. (50% duty cycle source drive)
- **Source drive frequency :** 2.0Hz minimum, 3.0 Hz typical, 4.0 Hz maximum
- **Active mV pk-pk output in N2:** 5.2mV typical @ 3Hz, 50% duty cycle
- **Reference mV pk-pk output in N2:** 4.0mV typical @ 3Hz, 50% duty cycle
- **Sensitivity (reduction in active signal) at 20°C, 3Hz, 50% duty cycle:**
  14% typical @ 5000ppm CO2
  30% typical @ 2.0% volume CO2
- **Measuring range:** 0 -1000ppm up to 0 - 5% volume CO2
- **Resolution:** 1% of measuring range
- **Warm up time:** To final zero ± 100ppm : <20s @20°C (68°F) ambient

To specification: < 30 minutes @20°C (68°F) ambient

- **Response Time T90:** <30s @20°C (68°F) ambient
- **Zero Repeatability:** ± 50ppm @20°C (68°F) ambient
- **Span Repeatability:** ± 50ppm @20°C (68°F) ambient
- **Long term zero drift:** ± 50ppm per month @20°C (68°F) ambient
- **Operating temperature range:** -20°C to +50°C (-4°F to 122°F)

- **Storage temperature range:** -20°C to +50°C (-4°F to 122°F)
- **Humidity range:** 0 to 95% RH non-condensing.
- **MTBF:** > 5 years
- **Temperature signal:** Integral thermistor for temperature monitoring
- **Weight:** 7 grams

III. RESULTS AND DISCUSSION

In the project there are two part transmitter and receiver in the transistor when press the micro switches key given some input of microcontroller , the microcontroller check the key input whose key press and what is the data or information sending after this process the microcontroller1 encoded the input by the RE module the receiver the data by RE module and collected by receiver microcontroller and the microcontroller decoding the information signal and display on the seven segment and microcontroller sending the data in dc Motor, and motors start the receiver part send feedback which data is receives ,sending by the RF module again the transmitter RF module receive feedback information and decoding by microcontroller and display on LCD (liquid crystal display). It's whole process based on the frequency modulation**.**

Applications and Advantages:

Applications of Alchol Detector in Car:

1) "Alcohol Detector project" can be used in the various vehicles for detecting whether the driver has consumed alcohol or not.
2) This project can also be used in various companies or organisation to detect alcohol consumption of employees.

Advantages of Alcohol Detector project:

1) "Alcohol Detection System in Cars" provides an automatic safety system for cars and other vehicles as well.

Future Development:

1) We can implement GSM technology to inform the relatives or owners of the vehicle about the alcohol consumption.
2) We can implement GPS technology to find out the location of the vehicle.

IV. CONCLUSION

This article introduces the vehicle alcohol detection, discusses new alcohol detection and control system design and implementation. In view of the designer's ability and level and electronic product development continued to develop in this system, there are many disadvantages, only in the laboratory test stage, many standards are not mature, but also for the extension and optimization of the system and the complex problem, need further study.

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