

**AUTOMATIC RAIN OPERATED WIPER****Saqlain Ahmed\***

Bachelor of Engineering (B.E), Mechanical Engineering, Deccan College of Engineering and Technology, Darussalam Rd, Darus Salam, Aghapura, Nampally, Hyderabad, Telangana 500001, India.

Article Received on 09/05/2018

Article Revised on 30/05/2018

Article Accepted on 20/06/2018

**\*Corresponding Author****Saqlain Ahmed**

Bachelor of Engineering  
(B.E), Mechanical  
Engineering, Deccan  
College of Engineering and  
Technology, Darussalam  
Rd, Darus Salam,  
Aghapura, Nampally,  
Hyderabad, Telangana  
500001, India.

**ABSTRACT**

The aim is to design and develop a control system based on an electronically controlled automotive rain operated motor called AUTOMATIC RAIN OPERATED WIPER. Rain operated motor consists of a conduction sensor (Touch sensor) circuit, Control Unit, wiper motor and glass frame. The sensor is used to detect the rain or water flow. If there is any rain on the glass, the sensor senses the rain or flow water and giving the control signal to the wiper motor. The battery supplies the power to the sensor as well as rain operated motor. Wiper motor is automatically ON during the time of rainfall. The sensor

is fixed in the vehicle glass. The conductive (Touch) sensor is used in this project. It senses the rainfall and giving control signal to the control unit. The control unit activates the wiper motor automatically. This operation is called Automatic rain operated wiper.

**KEYWORDS:** Wiper, automatic, sensor, design, develop, conduction sensor circuit.

**INTRODUCTION**

The aim is to design and develop a control system based on an electronically controlled automotive rain operated motor called AUTOMATIC RAIN OPERATED WIPER. Rain operated motor consists of a conduction sensor (Touch sensor) circuit, Control Unit, wiper motor and glass frame. The sensor is used to detect the rain or water flow. If there is any rain on the glass, the sensor senses the rain or flow water and giving the control signal to the wiper motor. The battery supplies the power to the sensor as well as rain operated motor.

Wiper motor is automatically ON during the time of rainfall. The sensor is fixed in the vehicle glass. The conductive (Touch) sensor is used in this project. It senses the rainfall and giving control signal to the control unit. The control unit activates the wiper motor automatically. This operation is called Automatic rain operated wiper.<sup>[1-3]</sup>

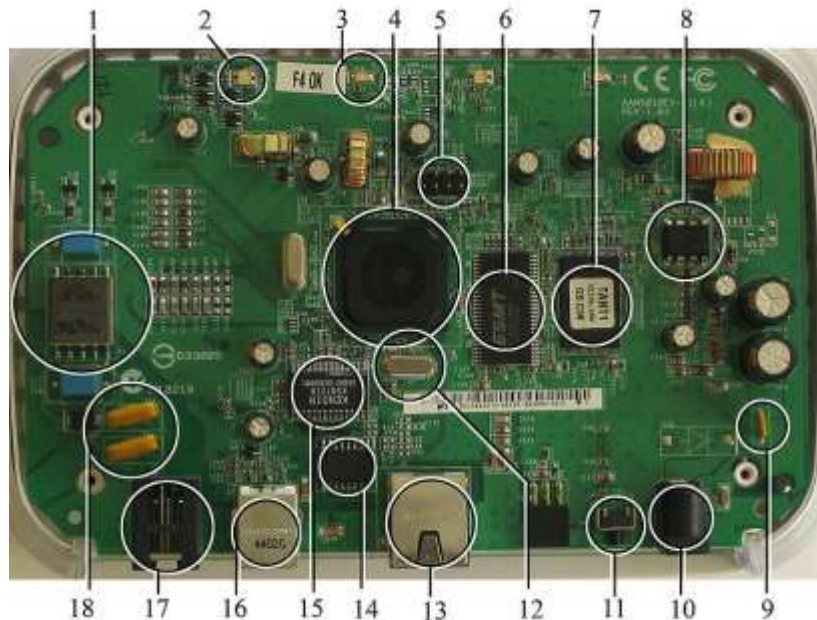
#### **The main objectives of this project are**

- 1) Four wheeler application
- 2) Mobile phone control of robot directions and movement.
- 3) Reliable for industrial and domestic needs.

#### **PROJECT OVERVIEW**

An embedded system is a combination of software and hardware to perform a dedicated task. Some of the main devices used in embedded products are Microprocessors and Microcontrollers. Microprocessors are commonly referred to as general purpose processors as they simply accept the inputs, process it and give the output. In contrast, a microcontroller not only accepts the data as inputs but also manipulates it, interfaces the data with various devices, controls the data and thus finally gives the result. The project Automatic rain operated wiper using PIC16F73 Microcontroller is an exclusive project that can control the servo motor according to the instructions given by the above said microcontroller based on rain moisture sensor.

In general, "embedded system" is not a strictly definable term, as most systems have some element of extensibility or programmability. For example, handheld computers share some elements with embedded systems such as the operating systems and microprocessors which power them, but they allow different applications to be loaded and peripherals to be connected. Moreover, even systems which don't expose programmability as a primary feature generally need to support software updates. On a continuum from "general purpose" to "embedded", large application systems will have subcomponents at most points even if the system as a whole is "designed to perform one or a few dedicated functions", and is thus appropriate to call "embedded". A modern example of embedded system is shown in fig:1.<sup>[4-6]</sup>



**Fig-1: A modern example of Embedded system.**

Labeled parts include microprocessor (4), RAM (6), flash memory (7). Embedded systems programming is not like normal PC programming. In many ways, programming for an embedded system is like programming PC 15 years ago. The hardware for the system is usually chosen to make the device as cheap as possible. Spending an extra dollar a unit in order to make things easier to program can cost millions. Hiring a programmer for an extra month is cheap in comparison. This means the programmer must make do with slow processors and low memory, while at the same time battling a need for efficiency not seen in most PC applications. Below is a list of issues specific to the embedded field.

### **SOFTWARE DESCRIPTION**

This project is implemented using following softwares:

- 1) Express PCB – for designing circuit.
- 2) PIC C compiler - for compilation part.
- 3) Proteus 7 (Embedded C) – for simulation part.

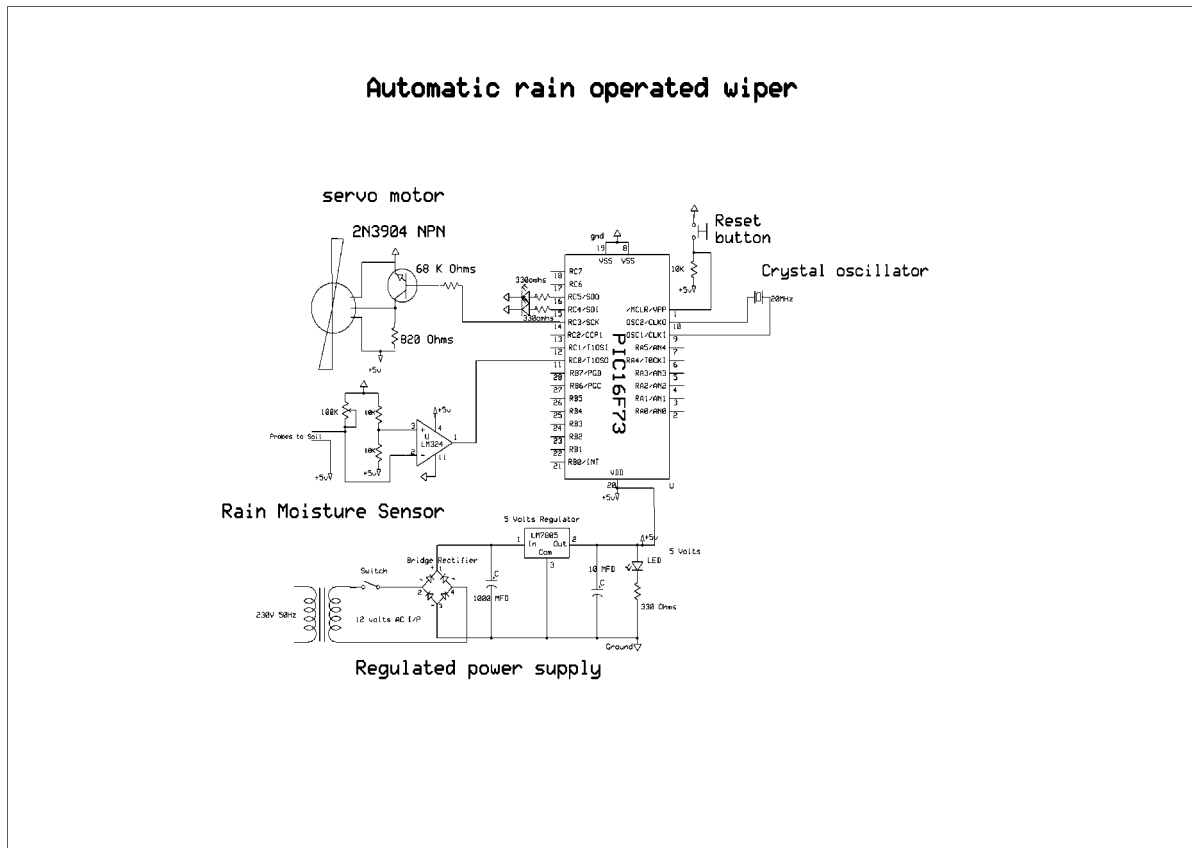
### **EXPRESS PCB**

Breadboards are great for prototyping equipment as it allows great flexibility to modify a design when needed; however the final product of a project, ideally should have a neat PCB, few cables, and survive a shake test. Not only is a proper PCB neater but it is also more durable as there are no cables which can yank loose.

## PROJECT DESCRIPTION

### Schematic Representation

In this chapter, schematic diagram and interfacing of PIC16F73 microcontroller with each module is considered.



**Fig-2: Schematic diagram of Automatic Rain Operated Wiper.**

The above schematic diagram **Automatic Rain Operated Wiper** explains the interfacing section of each component with micro controller, servo motor and moisture detection sensor module. The crystal oscillator connected to 9<sup>th</sup> and 10<sup>th</sup> pins of micro controller and regulated power supply is also connected to micro controller and LED's also connected to micro controller through resistors and motor driver connected to micro controller.

### Interfacing crystal oscillator with micro controller

Fig 2 explains crystal oscillator and reset button which are connected to micro controller. The two pins of oscillator are connected to the 9<sup>th</sup> and 10<sup>th</sup> pins of micro controller; the purpose of external crystal oscillator is to speed up the execution part of instructions per cycle and here the crystal oscillator having 20 MHz frequency. The 1<sup>st</sup> pin of the microcontroller is referred

as MCLR ie., master clear pin or reset input pin is connected to reset button or power-on-reset.

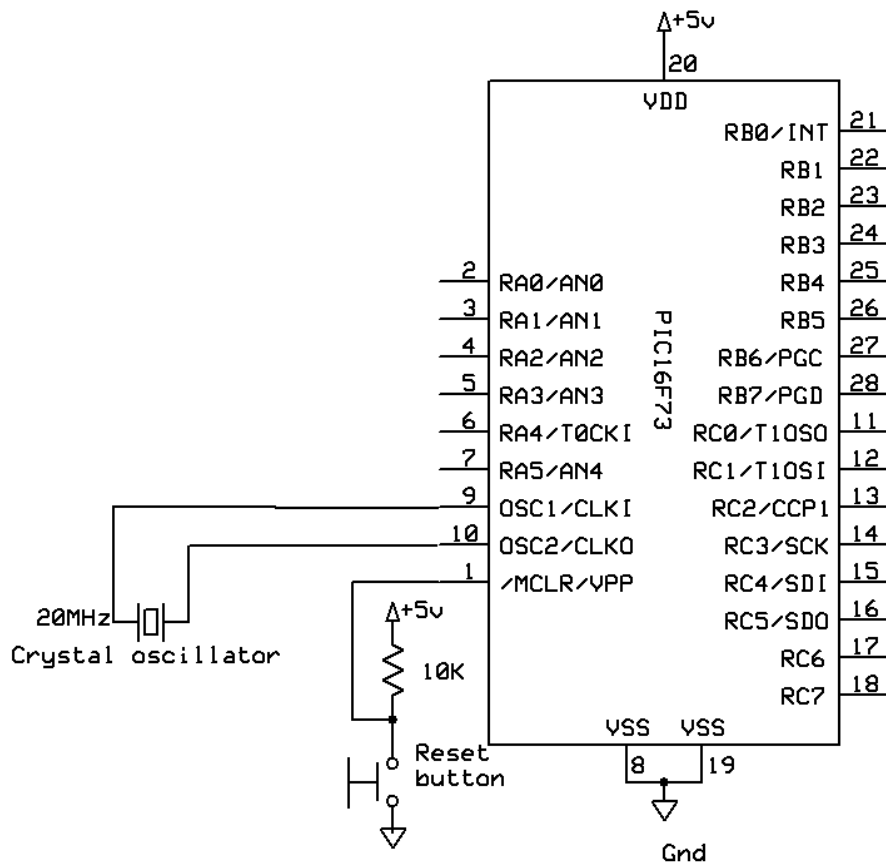


Fig-3: Crystal oscillator interfacing with micro controller.

## ADVANTAGES AND DISADVANTAGES

### Advantages

- 1) The servo motor can be operated automatically.
- 2) Automatic rain moisture detection using rain sensor.
- 3) Efficient working with low cost design.
- 4) Low power consumption.
- 5) Fast response.

### Disadvantages

- 1) The status and feed back of the wiper motor is not obtained.
- 2) The system uses wired technology supports only for limited distance.

### Applications

- 1) The system can be used in any automobiles for cleaning of glasses
- 2) This can be implemented in any four wheeler vehicles.<sup>[7-10]</sup>

### RESULTS

The project “**Automatic rain operated wiper**” was designed to control the wiper automatically based on the rain sensor detection. Rain operated motor was designed based on conduction sensor (Touch sensor) circuit, Control Unit, wiper motor and glass frame. The sensor was used to detect the rain or water flow. There was any rain on the glass, the sensor senses the rain or flow water and giving the control signal to the wiper motor.

### CONCLUSION

Integrating features of all the hardware components used have been developed in it. Presence of every module has been reasoned out and placed carefully, thus contributing to the best working of the unit. Secondly, using highly advanced IC's with the help of growing technology, the project has been successfully implemented. Thus the project has been successfully designed and tested.

### FUTURE SCOPE

Our project “**Automatic rain operated wiper**” is mainly intended to design an automatic wiper which operates automatically as soon as rain sensor gives the input.

The aim is to design and develop a control system based an electronically controlled automotive rain operated motor called AUTOMATIC RAIN OPERATED WIPER. Rain operated motor is consists of conduction sensor (Touch sensor) circuit, Control Unit, wiper motor and glass frame. The sensor is used to detect the rain or water flow. There is any rain on the glass, the sensor senses the rain or flow water and giving the control signal to the wiper motor.

The battery supplies the power to the sensor as well as rain operated motor. Wiper motor is automatically ON during the time of rainfall. The sensor is fixed in the vehicle glass. The conductive (Touch) sensor is used in this project. It senses the rainfall and giving control signal to the control unit. The control unit activates the wiper motor automatically. This operation is called Automatic rain operated wiper. This project can be extended using high efficiency GSM module. The GSM module gives the intimation of the person with this

system through SMS. The speed of the motor can also be measured using contact-less speed measurement. By connecting wireless camera to the robot, then we can see the outer world from our personal computer only by using GPRS and GPS.

#### REFERENCES

1. Raj kamal – Microcontrollers Architecture, Programming, Interfacing and System Design.
2. Mazidi and Mazidi – Embedded Systems.
3. PCB Design Tutorial – David. L. Jones.
4. PIC Microcontroller Manual – Microchip.
5. Pyroelectric Sensor Module- Murata.
6. Embedded C – Michael. J. Pont.
7. [www.wikipedia.com](http://www.wikipedia.com).
8. [www.allaboutcircuits.com](http://www.allaboutcircuits.com).
9. [www.microchip.com](http://www.microchip.com).
10. [www.howstuffworks.com](http://www.howstuffworks.com).