DESIGN AND IMPLEMENTATION OF GSMBASED WATER LEVEL INDICATOR WITH AUTOMATIC PUMP CONTROL

A Project submitted in partial fulfillment of the requirements for the Award of Degree of Bachelor of Science in Electrical and Electronic Engineering.

By

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December, 2018

Certification

This is to certify that this project and thesis entitled **"DESIGN AND IMPLEMENTATION OF GSM BASED WATER LEVEL INDICATOR WITH AUTOMATIC PUMP CONTROL"** is done by the following students under my direct supervision and this work has been carried out by them in the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering. The presentation of the work was held on December 2018.

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Dedicated to

Our Parents

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Teachers

List of Abbreviations

GSM	Global System for Mobile Communication
SIM	Subscriber Identity Module
LCD	Liquid Crystal Display
GPRS	General Packet Radio Service
AC	Alternating Current
LDR	Light Depending Resistor
DC	Direct Current
IC	Integrated Circuit
PCB	Printed Circuit Board
SMS	Short Message service
MXE	Message Center
BSS	Base Station System
AUC	Authentication Center

ACKNOWLEDGEMENT

First of all, we give thanks to Allah. Then we would like to take this opportunity to express our appreciation and gratitude to our project supervisor **Mr. Saikat Basak, Senior Lecturer Department of EEE** for being dedicated in supporting, motivating and guiding us through this project. This project can't be done without his useful advice and helps. Also thank you very much for giving us opportunity to choose this project.

We also want to convey our thankfulness to **ProfessorDr. Md. Shamsul Alam, Dean, and Faculty of Engineering (FE) and Professor Dr. Md. Shahid Ullah, Head, Department of EEE** for his help, support and constant encouragement.

Apart from that, we would like to thank our entire friends for sharing knowledge, information and helping us in making this project a success. Also thanks for lending us some tools and equipment.

To our beloved family, we want to give them our deepest love and gratitude for being very supportive and also for their inspiration and encouragement during our studies in this University.

ABSTRACT

This is the age of modern science. The advanced technology makes our life easier and also negatively affected our life such as increasing the crime rate. So people are trying to keep themselves save. To keep save themselves and their family, they want to make their home is the safest place ever. Day by day, people develop their home security system. There are so many security systems which are developed in various ways. Security is an important issue of all time. That is why we choose advance home security system as our final year project. This paper proposes the development of GSM and Laser Based Home Security system. The main scheme is to develop a system based on Arduino that is providing a full security system of home by alarming against undesired things as well as notifying via sms through mobile services when we stay outside of home. The system basically consists of Arduino, GSM module, LDR, LASER, and Buzzer to ensure the safety system both home and industries. If there are any undesired things around our home or industry, the system will notify us by alarming and via sms. It is worked by sensing any obstacle in LASER path.If there is any substance between LDR and LASER, the LASER breaks and LDR sense no LASER. Then it gives a signal to Arduino,Arduino analysis the problem and gives an amplified signal to Buzzer which alerts the user. In the meantime it also sends an alert message to the user by GSM module for extra security. The whole system isArduino dependent and it is controlled by Arduino programming. The main objective of this system is to ensure the safety system by Arduino programming which gives safety from any unwanted situation and as well as alert people by sending an SMS.

CONTENT

CHAPTER-1

INTRODUCTION

1.1. Introduction

GSM-based automatic water level indicator with motor controller uses an uncomplicated process to detect and control an overhead tank or other water holder with motor control. The key objective of this project is to build up an embedded system, which uses the RF water level indicator. Using this system; you can remotely monitor the water level of an overhead tank that is placed up to 100 meters away. The system features an RF transmitter receiver twin doing away with the need to run the wire from the roof on the ground. The transmitter is positioned near the tank with sensors inside the tank to monitor the level of water. The satellite layer is flowing through the Wireless system via RF transmitter. This receiver unit is taken remotely by decoding and indicating the level of water on an LCD.

1.2. Problem Statement

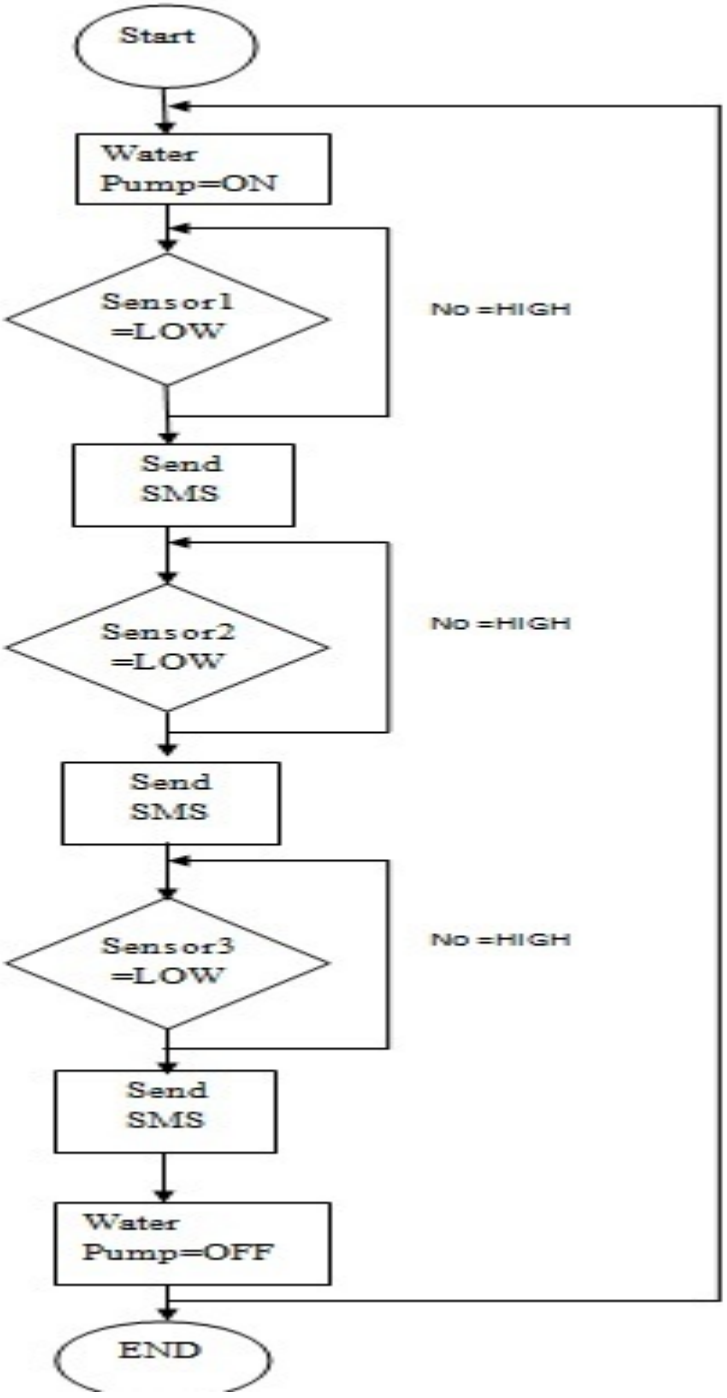
Literature survey to understand the constraints and requirements of our security system.

1. Simulation of the microcontroller system using ESAI EDA
2. Program burning in the microcontroller and hardware Implementation

1.3. Objectives

GSM based water level indicators with automatic motor control are very important projects in our daily lives. This project keeps us safe because this project automatically starts our pump when our water tank is empty and automatically closes this pump when our water tank is full. So this project is saving people's energy. This project is secure west water and also safe west electrical force.

1.4. Flow Chart



CHAPTER-2

WATER LEVEL INDICATOR IN WORLD

2.1. Water Level Alarm Circuit Using 555timer

Automatic water level controller circuit is an easy engineering project. It can automatically and off-switch based on the domestic water pump tank water level. You could implement this motor driver circuit in your home or college using less expensive components. The approximated cost of the project is about $5 only. The main advantage of this water level controller circuit is to automatically control the water.

This pump controller circuit heart is an EN 555 IC; here we used 555 timer IC flip flop inside. Our project consists of two water level sensors, one on top and one on the other. The work of this circuit is almost the same as a bi-stable mute-vibrator. The simulation of this circuit is given below. Definitely this will help you to do your academic project.

2.2. Water Level Indicator & Alarm

The law of this circuit is very easy to understand and it is very practical. The elements used in this circuit are CMOS input compatible, 7-channel IC, which is the Darlington array. If the water level is in the tank, then the water interacts with P1 to P7 and thus the pin increases from 7 to 1. So the equal output pins decrease 10 to 16 after the other and the LED will move from 1 to 7. If the water level is on the final probe P7, the sound is produced by the piezobokar and it is connected to the output pin 16 with LED7.

2.3. Water level Indicator with LED

Level Indicator keeps an eye on the water level of the circuit diagram tank and switches to the water pumps even after the water tank level decreases. Tank water level is indicated by using 5 LEDs and the water pump is completely closed when tanker water level is complete. The following figure shows the water level indicator circuit image which has 4 probes that are placed in overhead tanks and interfaces with microcontroller port 2.

2.4. Water Level Alarm

The electronic water-level alarm is connected to the circuit alarm and it is placed in the electronic water level circuit above, which has the ability to alert a home. When the water level is exceeded high or low or high.

2.5. Water Level Alarm Circuit using Level Sensor

The following circuit shows the water layer circuit image. In this circuit, this circuit uses a liquid level sensor to measure the water level of the water tank. The sensor creates the word when the sensor feels the water leak drop. The circuit is made with microcontrollers and it is very easy to use basic electrical and electronic components.

2.6. Summary

Water level indicator indicates and indicates water level and overhead tank or any other water holder. Tank water level indicates using 5 LEDs and the water pump is completely closed when tanker water level is complete. Water level indicator is made up of 4 probes which are placed in overhead tanks and interfaces with port 2 micro-controllers.

CHAPTER-3

THEORY OF THIS PROJECT

3.1 Microcontroller

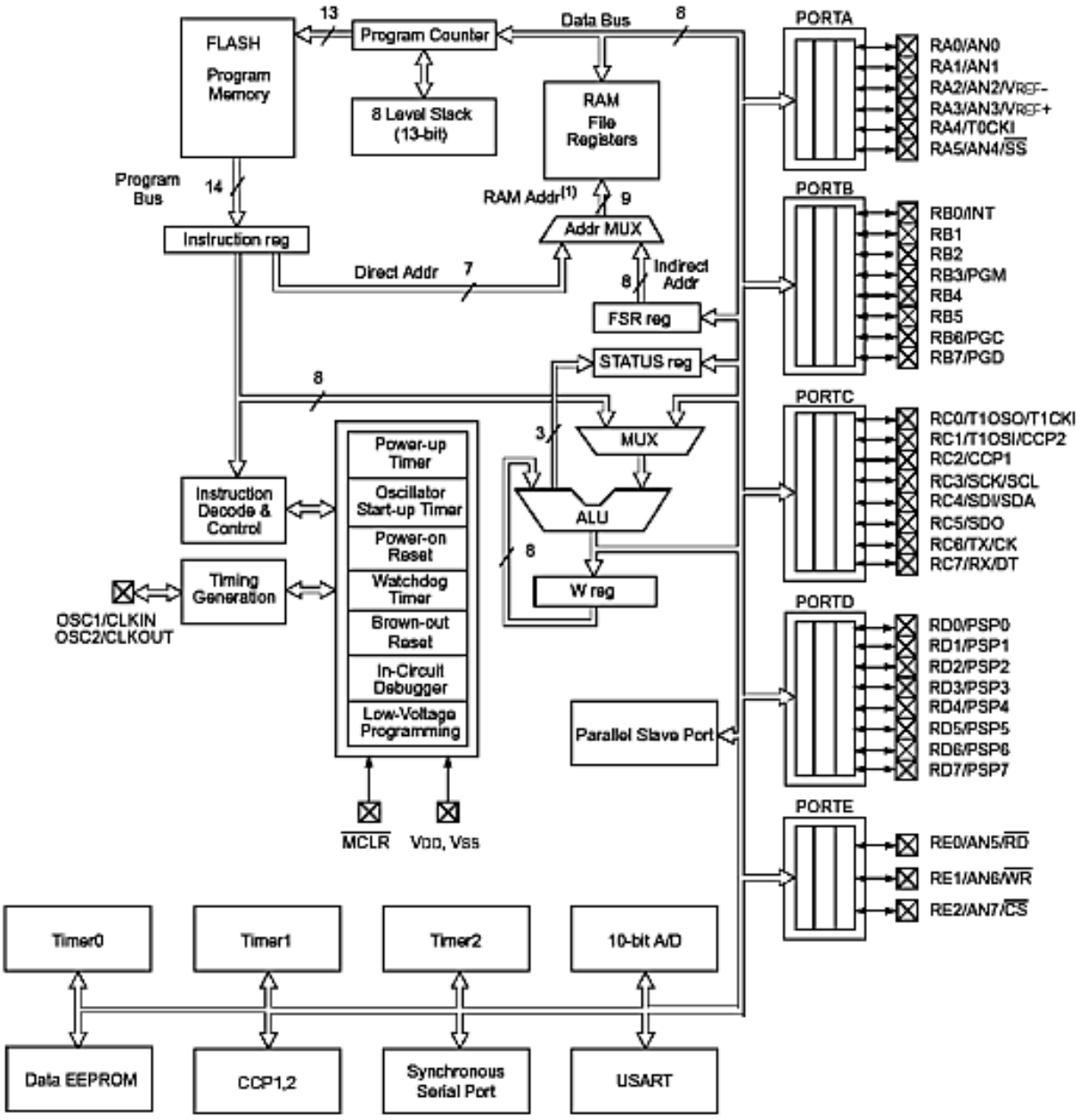
A single integrated circuit is a micro-controller small computer. In modern terminology, it is less than a system of chip or SoC, but less sophisticated. A SoC could include a micro-controller as one of its components. A microcontroller has one or more CPU (processor core) with memory and programmable input / output peripheral. Program memory chips in the shape of Ferroelectric RAM, NOR flash or OTP ROM are also included with a little bit of RAM. Microcontrollers are designed for embedded applications in contrast to microprocessors used on personal computers, or other general-purpose applications contain several discrete chips.

3.1.1 Architecture of PIC16F73 Microcontroller

PIC microcontrollers are a family of special microcontroller chips formed by Arizona Chandler's microchip technology. The acronym PIC stands as "Peripheral Interface Controller", although the term is rarely used nowadays. A compact microprocessor designed to handle the activities of embedded systems on a microcontroller's motor component, robot, office machine, medical device, mobile radio, vending machine, home appliances and various other devices. A common micro-controller includes a processor, memory, and peripheral.

The internal logic design of a device is called its architecture. The microcontroller architecture determines how and how different operations are performed. The Architecture of the PIC16F73 Microcontroller is shown in fig.

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



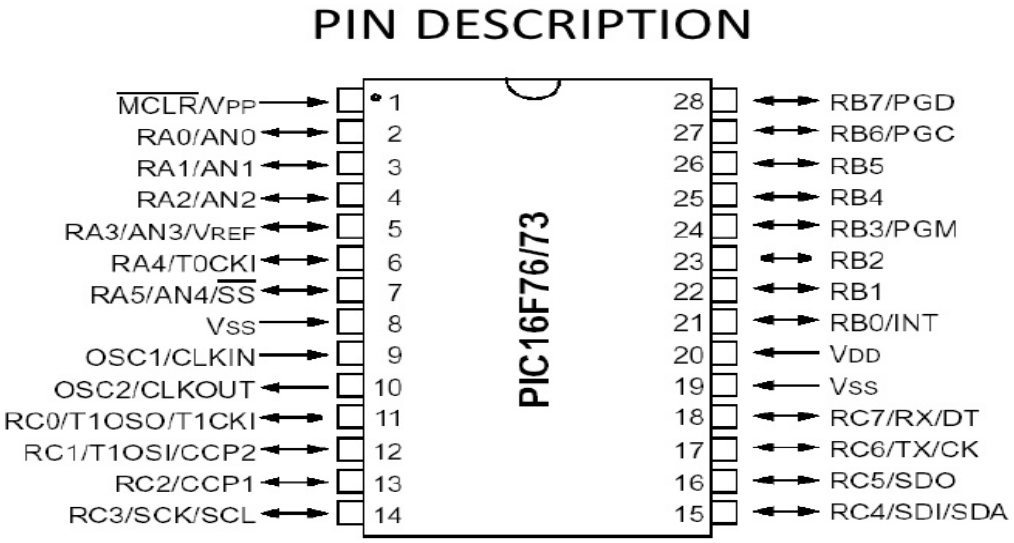
Note 1: Higher order bits are from the STATUS register.

The Architectural features of PIC16F73 Microcontroller Are given below

1. High performance RISC CPU
2. All single-cycle instructions except for program branches which are two cycles
3. Power-on reset (POR)
4. Power-up timer (PWRT) and oscillator start-up timer (OST)
5. Watchdog timer (WDT) with its own on-chip RC oscillator for reliable operation
6. Programmable code protection
7. Power saving sleep mode
8. In-Circuit Serial Programming □ (ICSP™) via two pins
9. -40 to +85°C Temperature range (industrial)

3.1.2 PIC16F73 Microcontroller Pin Configuration

A 28 pin DIP of the PIC16F73 microcontroller. The pin diagram has a short name for the signal for each pin. It is important to remember that the pins are used for multiple functions. The programming function or physical pin connection determines the use of any multifunction pin. System designers decide which of these functions will be used and accordingly design hardware and software that affect pins.

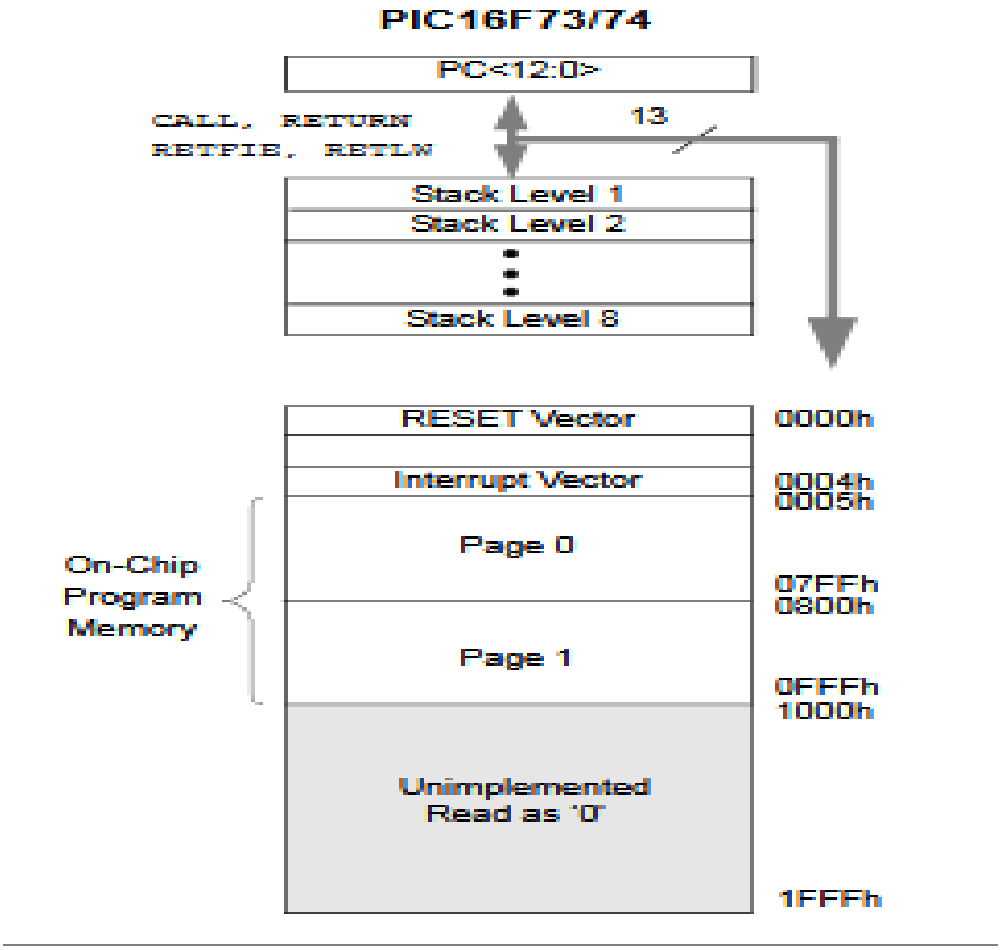


3.1.3 Construction Details:

Specification	Documents
Product Category:	8-bit microcontroller
Manufacture:	Microchip
Mounting Style:	SMD/SMT
Package:	SOIC-28
Series:	PIC16
Core:	PIC16
Data Bus Width:	8 bit
Maximum Clock Frequency:	20MHz
Program Memory Size:	7kB
Data RAM Size:	192B
ADC Resolution:	8 bit
Number of I/O:	22 I/O
Operating Supply Voltage:	2 v to 5.5 v
Maximum Operating Temperature:	+ 85 c
Packaging:	Tube
Brand:	Microchip Technology
Data RAM Type	RAM
Data ROM Size:	192 B
Data ROM Type:	Flash
Height:	2.31 mm
Interface Type:	I2C, SPI, USART
Length:	17.87 mm

3.1.4 Memory Organization

These PIC microcontrollers have two memory blocks in each of MCU. Program memory and data memory can be accessed simultaneously so that there are separate buses and details in this section. Program memory can be read on the inside by user code (see section 3.0). Additional information on the device memory can be set up in the PIC microcontroller mid-range reference manual (DS33023).



A. Program Memory Organization

PIC16F7X devices have a 13-bit program counteract that can address an 8K word x 14-bit program memory space. ThePIC16F73 device has 4K words. Program memory map for PIC16F7X devices is shown in Figure 2-1. A position of physically implemented address will cause a wraparound to enjoy a position. Reset vector is at 0000h and Interpreting vector is 0004h.

B. Data Memory Organization

Data memory is divided into more than one bank, which includes broad function registers and extraordinary purpose registry. BTS RP1 (Status <6>) and RP0 (STATUS <5>) is the reservoir selection bit

RP1:RP0	Bank
00	0
01	1
10	2
11	3

Each bank extends up to 7Fh (128 bytes). The bottom position of each bank is kept for the particular function registrar. Wide-ranging function registers are applied as static RAM, on special function registry. All implementation banks have special function registry. Regardless of the code reducing and quick access, special banknotes frequently used by some banks can be reflected in other banks.

3.1.5 Working Principal

PIC microcontrollers (programmable interface controllers), electronic circuits that can be programmed to run in a broad range of tasks. They can be programmed to be timer or to make a production line and more. They are available in most electronic devices such as alarm systems, computer control systems, phones, virtually any electronic device. Many types of PIC microcontrollers exist, although the best programmable microcontroller is available in the GENIE range. These programs and circuits are simulated by the wizard software.

PIC microcontroller can be purchased as a relatively inexpensive and pre-made circuit or as a kit that can be combined by user.

As a Circuit Wizard, you will require a computer to run the software, which allows you to program a PIC microcontroller circuit. A fairly cheap, low-specification computer should run

software easily. Computer is need a serial port or a USB. This is used to connect the computer to the microcontroller circuit.

As such software, Genie Design Studio can be downloaded for free. It can be used in program micro-controller circuits. This lets the programmer imitate the program before downloading it to a peak micro-controller IC (Integrated Circuit).
Program simulation on the screen, correct programmer's error and modify programs.

The software is very easy to learn, based on the flow chart. Each 'box' of the flow chart has a purpose and replaces the numerous lines of text programming code. This means that a program can be written very quickly with fewer programs.
A USB Lead connects the computer to programmable circuits, which allows the transfer of program to PIC micro-controller IC.

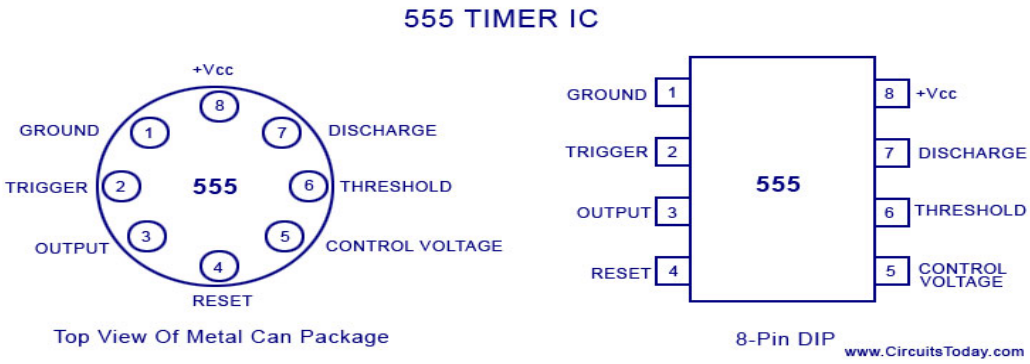
3.2. 555 Timer IC:

555 timer ICs are used in an integrated circuit (chip) timer, pulse generation, and oscillator applications. 555 timer, it can be used as an oscillator and as a flip-flop material.

3.2.1 History of 555 IC

The 555 timer was launched in 1970 by ICT Signet Corporation and it's addressed an SE / NE 555 timer. It is fundamentally monumental time circuits which produce accurate and extremely firm time delay or glue. Compared to op-amp applications in the identical area, 555IC is uniformly reliable and expensive. Its 555 timers, like Constable and Stable, can be used for DC-DC converter, digital logic probe, wave-form generator, analog frequency meter and touchometer, temperature measurement and control device, voltage regulator etc. Timer ICT setup to work in two modes - One-shot or single-colored or free-running or stable multivibrator for the range of 555 temperatures for the SE 555 - 55 ° C to 125 ° can be used. NE 555 knows how to be used for temperature.

3.2.2 IC Pin Design



555 Timer IC 8-Pins Metal Can, Available as an 8-pin tiny DIP (Dual-In-Package) or 14-stick Dip Pin arrangement statistics are shown.

This IC composed of 23 transistors, 2 diodes and 16 resistors. Apply of every pin of IC is explained underneath. The following PIN numbers can be used for 8-pin DIP and 8-pin metal packages.

Pin 1: **Grounded Terminal:** All the voltages are calculated with admiration to the Ground terminal.

Pin 2: Trigger Terminal: The trigger pin is used to trigger input 555 IC is locating as a constable multivibatter. This pin is in charge for the conversion of flip-flop to a assessment of an inverting input and reset from the set. The timer output depends on the amplitude of the external trigger pulse applied to this pin. A unconstructive pulse with a DC level bigger than Vcc / 3 is applied to this terminal. At the negative end, the trigger passes through Vcc / 3, the output of the low comparative becomes high and the compliment of Q becomes zero. So 555 IC gets a high voltage of output, and thus a quasistable state.

Pin 3: Output Terminal: Timer output is available at this pin. There are two ways which can be connected to a loaded output terminal. One way is to connect between the output pin (pin 3) and the ground pin (pin 1) or 3 between the pins and the pin (pin 8). The connected load between the

output and the Ground Supply Pins is usually called load and the load connected to the output and ground pins is usually called load.

Pin 4: Reset Terminal: Whenever the timer IC is reset or disabled, the negative pulse is applied to pin 4 and thus it is named as the reset terminal. Regardless of the input status the output is reset.

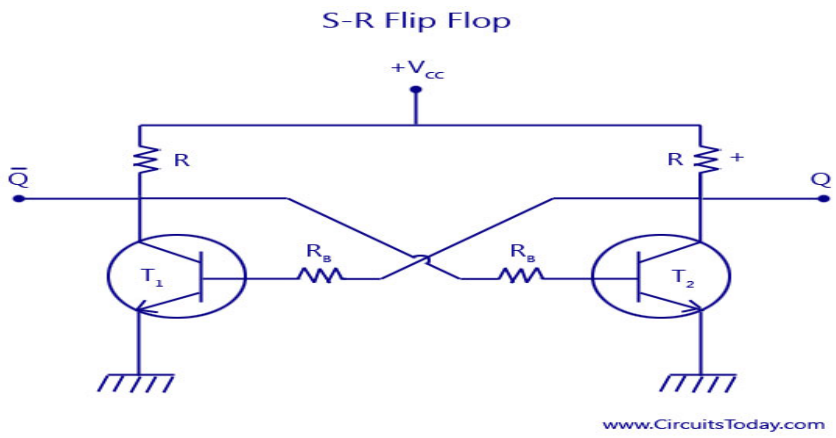
Pin 5: Control Voltage Terminal: Entrance and generate levels are restricted using these pins. Therefore, the quantity of voltage functional to this workstation will determine while the compotator switches and thus will change the output pulse width. When this pin is not used, it should bypass the ground via a 0**.**

Pin 6: **Threshold Terminal:** It is comparable to the non-inverter input terminal 1, which compares the voltage applied to the terminal with a reference voltage of 2/3 VCC. This terminal is responsible for the status of the flotation-flop set of amplitude of the applied voltage.

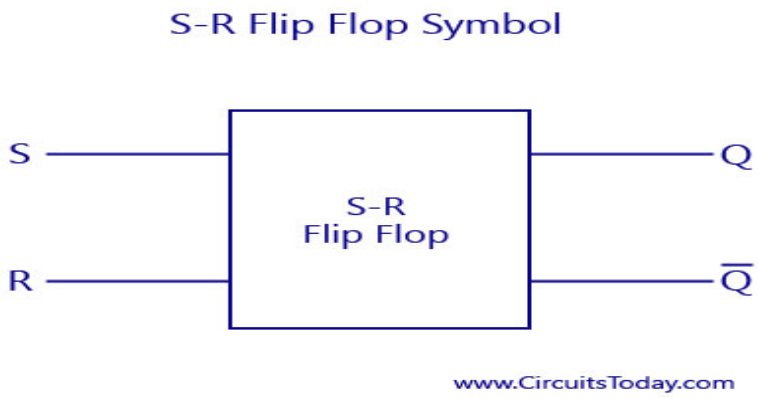
Pin 7: **Expulsion workstation:** These pin transistor collectors are internally attached and mostly a capacitor is connected between these terminals and the ground. When the transistor saturates it, the discharge through the capacitor transistor is called because it is called the discharge terminal. When the transistors are cut, the capacitor is resistant to the outer .

3.2.4 555 Timer Basics

The 555 timer consists of a relaxation oscillator, two comparators, an R-S flip-flop, and a free capacitor.

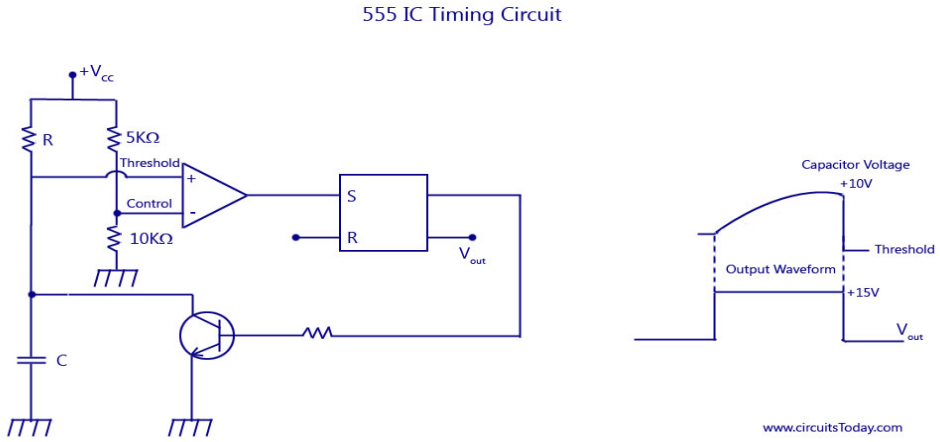


As publicized in the diagram, T1 and T2 are two transistors are connected. Transistor T1 antenna runs the base of transistor T2 through Writer R2. Transistor T2 collector transistors drive through T1 base resistant Rb1. When one of the transistors is synthesized, other transistors will remain in cut-off mode. So there is a zero foundation drive for the transistor.



The value will respond to the transistor T1 foundation when it cuts off the cut. Thus, the prosperity and cut-off value Q and its praise set high and low prices of any person in the transistor. Adding supplementary elements to the circuit an R-S flip-flop is obtained. By the way, a compensatory (reverse) amount produced Q is accessible from another transistor antenna. Symbol designed for SM is revealed on top of. Circuit Q latches lately latches lately question or

in its complimentary state. S input sets the value of Q to go higher in a higher value. And the high value of the input resets the value of Q to less.

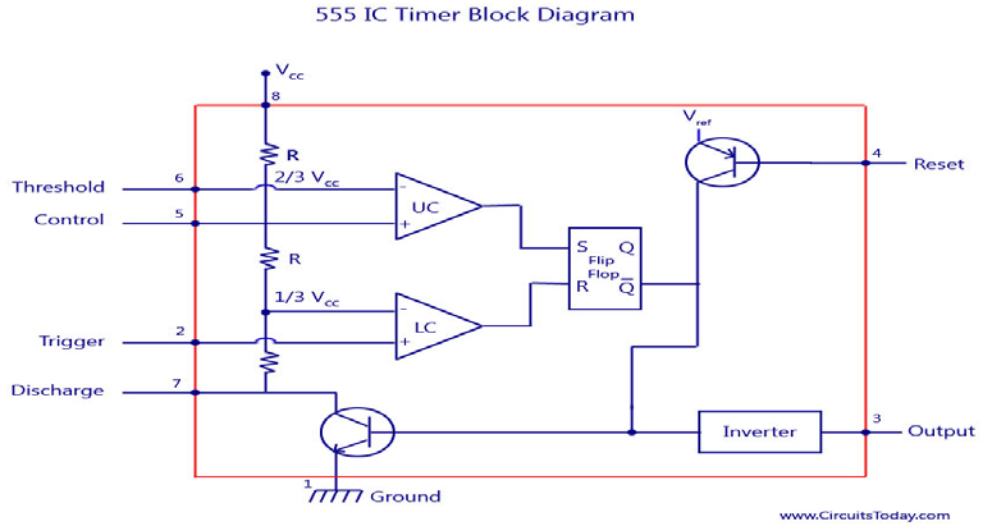


3.2.4 Essential Timing idea

Starting above outline, assume flip flop amount produced of S., Q is higher. These high values are transmitted to the transistor base and transistors are synthesized and thus create a nil voltage of the collector. The capacitor power is stuck on the floor, which capacitor city is short and cannot be charged.

Capacitor C now charge free As this capacitor C charge increases the threshold voltage. Finally, the threshold voltage grew slightly larger than (+10V). Comparative output then goes high, RS is forced to set flip-flop. High Q saturates the output transistor, and this quick capacitor drainage. An exponential growth capacitor appears across C and the output is displayed in a positive running pulse. So capacitor voltage VC is exponential and rectangular. This is shown in the figure above.

3.2.5 555 IC Timer Block Diagram



3.2.6. Functioning law

Internal resistor acts as a voltage divider network, (2/3) Vcc provides high comparable non-interfering terminals and (1/3) Vcc low comparative inverting terminal. The amount produced of the above comparisons is applied to the set of flip-flop set (s). When the high production from the flip-flop supplies the free transistor base, it syntheses it and disrupts transistor which is externally coupled to the liberation pin 7. The flip-flop supplemental signal pin is 3, the output. Pin 3 available output less. These conditions will be strong until the low connector flip-flop trigger triggers. The threshold input voltage (2/3) VCC, which falls below the high comparator, cannot change the flip-flop again.

Transform flip-flop production, reduce the voltage at the trigger input (+1/3) Vcc. When this happens, the low-end flip-flop triggers, its output is low. The low output discharge from the flip-flop closes the transistor and gives power to the amplifier to gain high power output. These conditions will continue to independent the trigger input voltage. Lower comparison flip-flop output may be less. To strengthen the production from the timer far, trigger input voltage must be reduced (+1/3) the VCC.

Control input can be applied to change the level which occurs in a voltage switching. When not used, a 0.01 NANO-Farad capacitor should be connected to pin 5 and the ground so that the false trigger is created in this pin. Connecting the reset (pin 4) A logic will place a high level of flip-flop output. The discharge will turn on the transistor and the power amplifier will have a lower output. This condition will continue until reset is taken high. This allows synchronization or resetting of the circuit's operation. When it's not in use, reset should be tied to $+V_{CC}$.

3.3 RF Module:

Generally, there are two overriding limitations of the wireless system designer: it works on a certain distance and has to transfer a certain amount of data into the data rate. RF module levels are very small and a wide range of operating voltage ranges from 3V to 12V.

Basically RF modules (315 MHz / 418MHz / 433MHz / 915MHz) RF transmitters and receiver modules. When transmitting the logic zero while fully suppressing the carrier frequency, the transmitter cannot draw any strength, resulting in significantly less energy in battery operation. When the lyric is sent, it is about 4.5m with the power provider to get 5 volts. The information is transmitted gradually from the transmitter, which is obtained by the protected receiver. The transmitter and the receiver are properly interfaced to the two.

We can connect directly to the controller 3 pin RF module; No encoder and decoder is needed. The work of 3-pin RF transmitter and receiver modules is transmitted / transformed as follows.

3.3.1 Working of RF Transmitter Module:

From the circuit, the power supply is connected to the 5V 28 micro-controller pin and the ground is connected to the 20th pin. Here, we've got two switches that are well stretched up to 5V with a micro-controller and these two switches form the input command of the micro-controller. We got an LCD display to display the information sent. We have an arrangement for a computer key board to connect from the keyboard output to the microcontroller's input frequently and from the

data pin to the positive and negative part and this information is displayed at the end of the LCD. We have an RF transmitter. It has the VCC supply, GND. The microcontroller goes to the data pin. The program is so written that by doing this proper operation we activate the first key board. Once the keyboard is activated by pressing the buttons, the keyboard entry can be displayed on the LCD. If it is sent against codes instead of 0 to 9, it will be displayed on the LCD. Here every press is going forward from 0 to 9 in the code, and finally we will send the push button to send it to microcontroller and then to be sent from the 433 MHz frequency antenna to the RF transmitter module.

3.3.2 Working of RF Receiver Module:

At the end of the receiver we have +5V as the microcontroller has similar connections for the power supply. Likewise, in the transmitter, we hear that two push buttons are being used with 10k printers by supplying 5V for RF module. We are using Pin 3.0 to connect the RF module's data pin and 1 and 2 pins of the RF module to GND and VCC.

There are two buttons for selecting our code and receiving information. Data is dodolated when received by receiver module and the receiver pin according to the program goes to 10 microcontrollers. It then displays LCD display messages.

3.3.3 Pin diagram and Pin description:

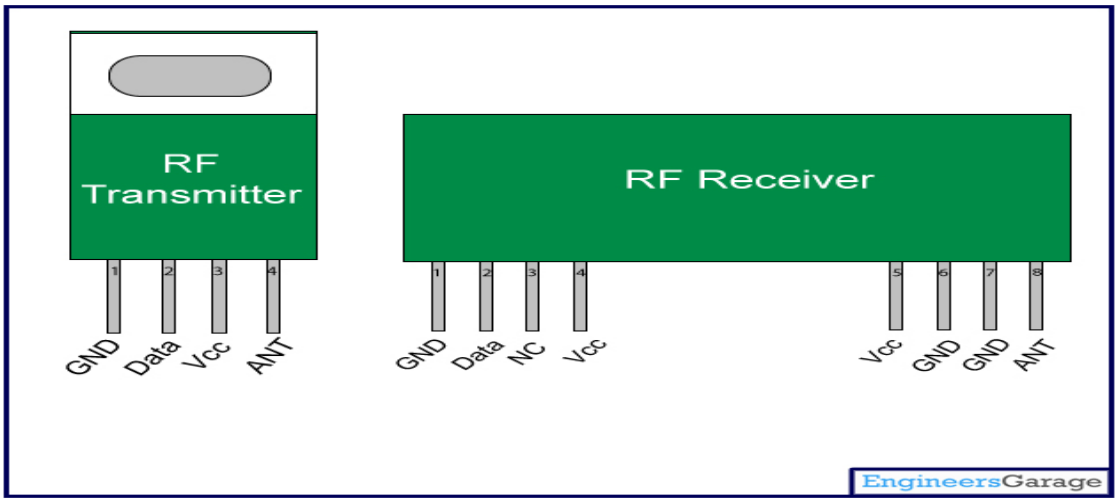


Figure: (3.11) RF Transmitter& RF Receiver

RF Transmitter

Pin on	Function	Name
1	Ground (0v)	Ground
2	Serial data input pin	Data
3	Supply voltage's 5v	Vcc
4	Antenna output pin	ANT

RF Receiver

3.3.4. Features Of RF Transmitter And Receiver:

Pin no.	Function	Name
1	Ground (0V)	Ground
2	Serial data output pin	Data
3	Linear output pin; not connected	NC
4	Supply voltage; 5v	Vcc
5	Supply voltage; 5v	Vcc
6	Ground (0v)	Ground
7	Ground (0v)	Ground
8	Antenna output pin	ANT

1. Receiver frequency: 433MHz
2. Receiver typical sensitivity: 105Dbm

3. Receiver current supply: 3.5mA
4. Receiver operating voltage: 5V
5. Low power consumption
6. Transmitter frequency range: 433.92MHz
7. Transmitter supply voltage: 3V~5V
8. Transmitter output power: 4~12Dbm

It has many applications in various areas like Remote lighting controls, long range RFID, wireless alarm and security systems etc.

3.3.5Main Factors Affecting RF Module's Performance:

Compared to other radio frequency devices, the performance of the RF module will increase the power of the transmitter; depending on many services such as the distance of a greater contact will be collected. However, due to the high electrical power drain on the transmitter device, the battery-powered device may cause short operating life. This will also interfere with other RF devices using these devices in higher powered power.

3.3.6. Applications:

1. Wireless security systems
2. Car alarm systems
3. Remote control
4. Sensor reporting
5. Automation systems

3.4 Capacitor

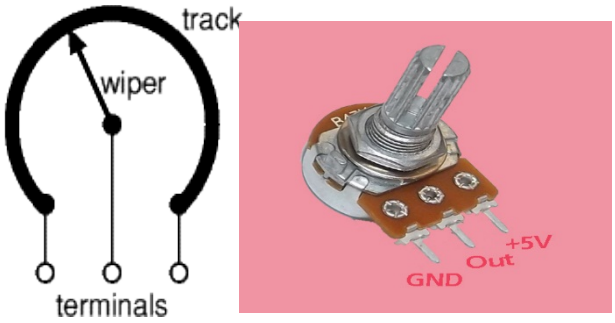
Capacitor is a passive electronic component or device which is capable of saving charges with a specific voltage level across two inverted plates or surfaces, which is separated by an insulating material or dielectric material.

During this charging process, a charging current, (i) changes the electric charge equivalent to the rate of the plate flowing in the capacitor in opposition to any change in the voltage.

This charging can be defined as current: I = CDV / DT. Once the capacitor is "fully charged", the capacitor blocks the electrons due to its flow in its plates. However, if we apply an alternative current or AC supply, the capacitor will optionally charge and discharge at the rate determined by the frequency of supply. Then the Capacitance in AC circuits varies with frequency as the capacitor is being constantly charged and discharged.

3.5 Variable Resistor

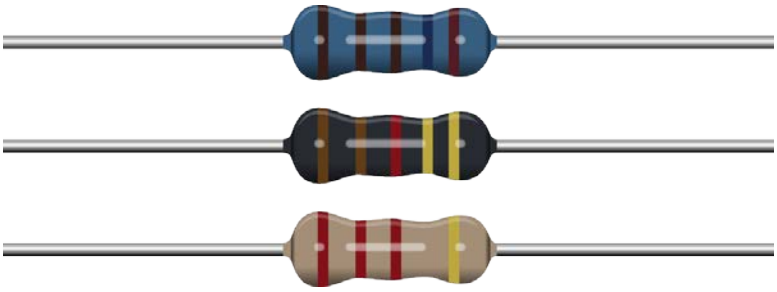
A variable resistor is a device which is used to change the resistance of an electronic circuit according to our requirement. It can be used as a three terminals and a two terminal device. Most stars are used as three terminal devices. Variable Resistant Most devices are used for calibration. As shown in the diagram below



A variable resistor consists of a track which provides the resistance path. Two terminal devices are connected to both ends of the track. The third terminal tracks the speed determines a wiper is attached. Help prevent wiping speed through the track and decrease the growth.

3.6 Resistor

Linear resistor is a linear, passive two-terminal electrical component which uses electrical resistance as a circuit element. The direct ratio of voltage across the current resistor's terminal through a resistor. Therefore, the resistance of voltage across a resistor terminal is called resistance to running intensity through the stream.This relation is represented by Ohm's law:



Ohm's Law: **V = IR**

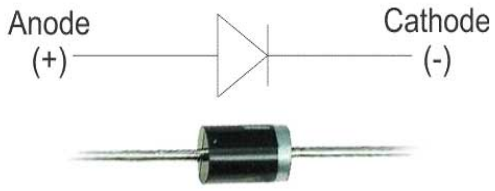
Where V is the voltage applied across resistor,

I is the current flowing through it, and R is the constant called resistance.

The unit of resistance is ohms.

3.7 Diode

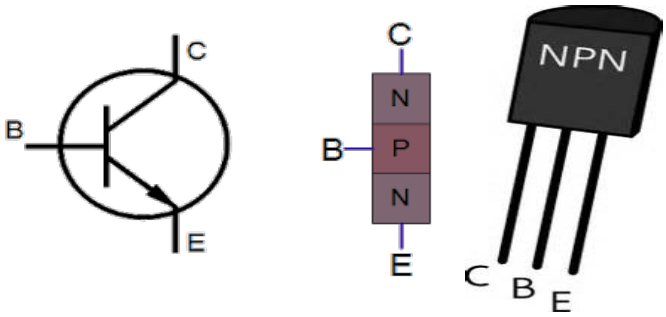
A diode is a device that only operates at rated rated voltage levels, allowing current flow of unmarried flows. A diode only blocks the current to the opposite side, the opposite voltage is in a limited range, but the opposite barrier separator and the voltage of this voltage is called the opposite break voltage. Diode works as a valve in electronic and electric circuit. The most straightforward form of a PN junction diode, which ideally behaves as a short circuit, and when it is inverted bias, it ideally behaves like an open circuit. There is a variety of diodes in front of the general PN junction diode, even though the basic principles are less or less. Therefore, a specific diagram of the diode can convert AC to DC Pulsing Dc and this is sometimes also known as the Rectifier.



3.8 Transistor

NPN Transistor Bipolar Junction is a transistor (BJT) type. The NPN transistor contains two n-type semiconductor material and is separated by a thin layer of P-type semiconductor. Here is the most charge carrier electron. This electrone flow from the collector to the collector forms the

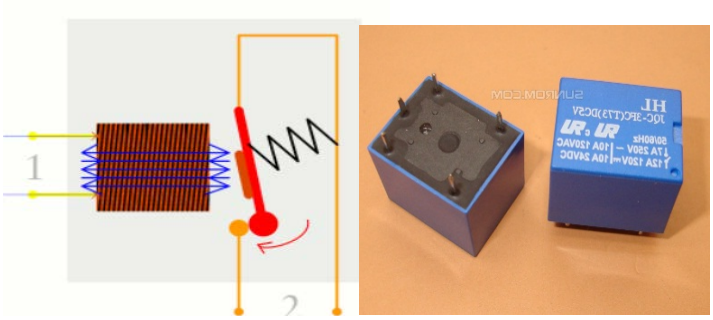
current flow of the transistor. Generally, the NPN transistor is the most commonly used bipolar transistor because the mobility of electrons is more than the dynamics of the hole. The NPN transistor has three terminals – emitter, base and collector. The NPN transistor is frequently used for amplifying and switching the signals.



The above figure shows the symbol and structure of NPN transistor. In this structure we can observe the three terminals of transistor.

3.9 Relay

An electromagnetic switch in a relay is operated by relatively small electrical current which can turn on or off a large electric current. A relay heart is an electromagnet (a coil of wire that becomes a temporary magnet when flowing through electricity). You can think of a relay as a kind of electric lever. Switch it to a small current and it switches to other tools ("leverage") using a large current. Why is that useful? The name suggests, many sensors produce incredibly sensitive pieces of electronic equipment and only small electric currents. But often we need them to run larger pieces of equipment that uses larger currents. Relays gap bridge, it turns the tiny currents activated to greater ones. That means those relay switches (things turned on and off) or act as an amplifier.



When electricity is flowing through the first circuit, it activates electromagnet (brown), creates a magnetic field (blue) that attracts a contact (red) and the second circuit activates the second. When the power stops, the spring again switches the second circuit again, dragging its contact with its original location.

3.10 LCD Display

LCDs (liquid crystal displays) are used in all electronics projects to show the status of the process. A 16x2 alphanumeric LCD nowadays is the most widely used module of LCD. Other LCD types are available in the market.

Selecting LCD on other display components or devices because it is low cost, easily programmable, display letter numbers, etc.

16x2 LCD has two horizontal lines which have 16 display characters. It has two type of register integral that is Command Register, Data Register.

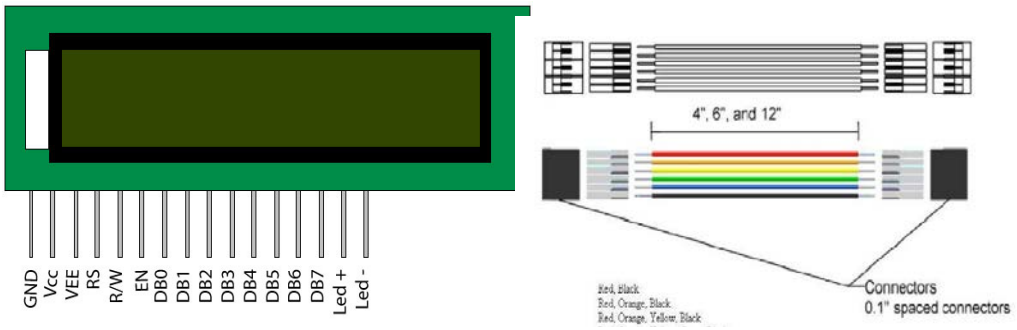


Figure: (3.17) Symbol Of LCD display

The command article is used to insert a special command in the LCD. When data is entered into information on the LCD document. The command is a special set of data that is used for LCD internal commands like clear screens, lines 1 character 1, settings for cursor etc.

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	V_{EE}
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+
16	Backlight Ground (0V)	Led-

3.11 Water Level Indicator

For water level indication unit we can use LCD or relay which will work for water level indication. By sensing water levels through water level sensor, LCD should be display as on/off.

3.12 Water Pump Controlling System

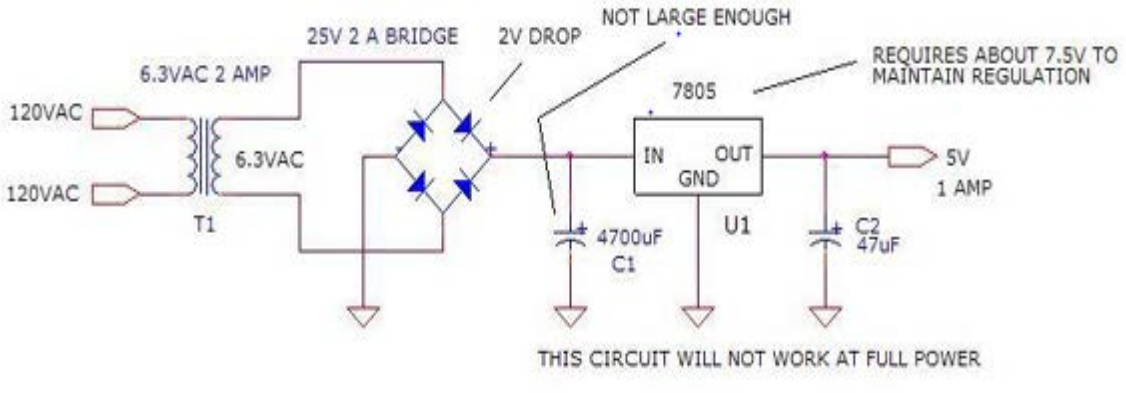
We can control the water pump by connecting it with the motor driver circuit output pin through the micro-controller. When the micro-controller motor driver sends a positive signal (+5V) or a ground signal (0V) to the circuit, the water pump gradually or closes, respectively. We would like to use a manual switch on motor driver circuits which should be used to control it manually. It makes this system more user-friendly.

3.13 Power supply

In most of our electronic products or projects we need a power supply for converting mains AC voltage to a regulated DC voltage. For making a power supply designing of each and every component is essential. Here I'm going to discuss the designing of regulated 5V Power Supply.

7805 is a 5V fixed three terminal positive voltage regulators IC. The IC has features such as safe operating area protection, thermal shut down, internal current limiting which makes the IC very rugged. Output currents up to 1A can be drawn from the IC provided that there is a proper heat sink. A 6.3V transformer steps down the main voltage, 1A Bridge rectifies it and capacitor C1 filters it and 7805 regulates it to produce a steady 5Volt DC. The circuit schematic is given below.

3.13.1 Circuit diagram



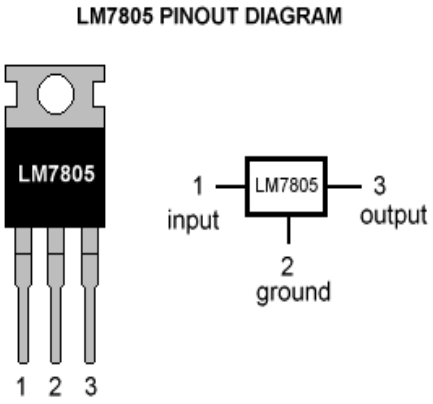
3.13.2 Component List

1. Step down transformer
2. Voltage regulator
3. Capacitors
4. Diodes

3.13.3 Voltage Regulator:

The most generally used IC regulators get into the market for 5V DC regulation use is LM7805.

IC LM7805 is a DC regulated IC of 5V. This IC is very flexible and is widely working in all types of circuit like a voltage regulator. It is a three terminal device and primarily called input, output and ground. Pin diagram of the IC LM7805 is shown in the diagram below.



LM7805 IC Rating:

1. Input voltage range 7V- 35V
2. Current rating $I_{c=}$ 1A
3. Output voltage range $V_{Max=5.2V}, V_{Min=4.8V}$

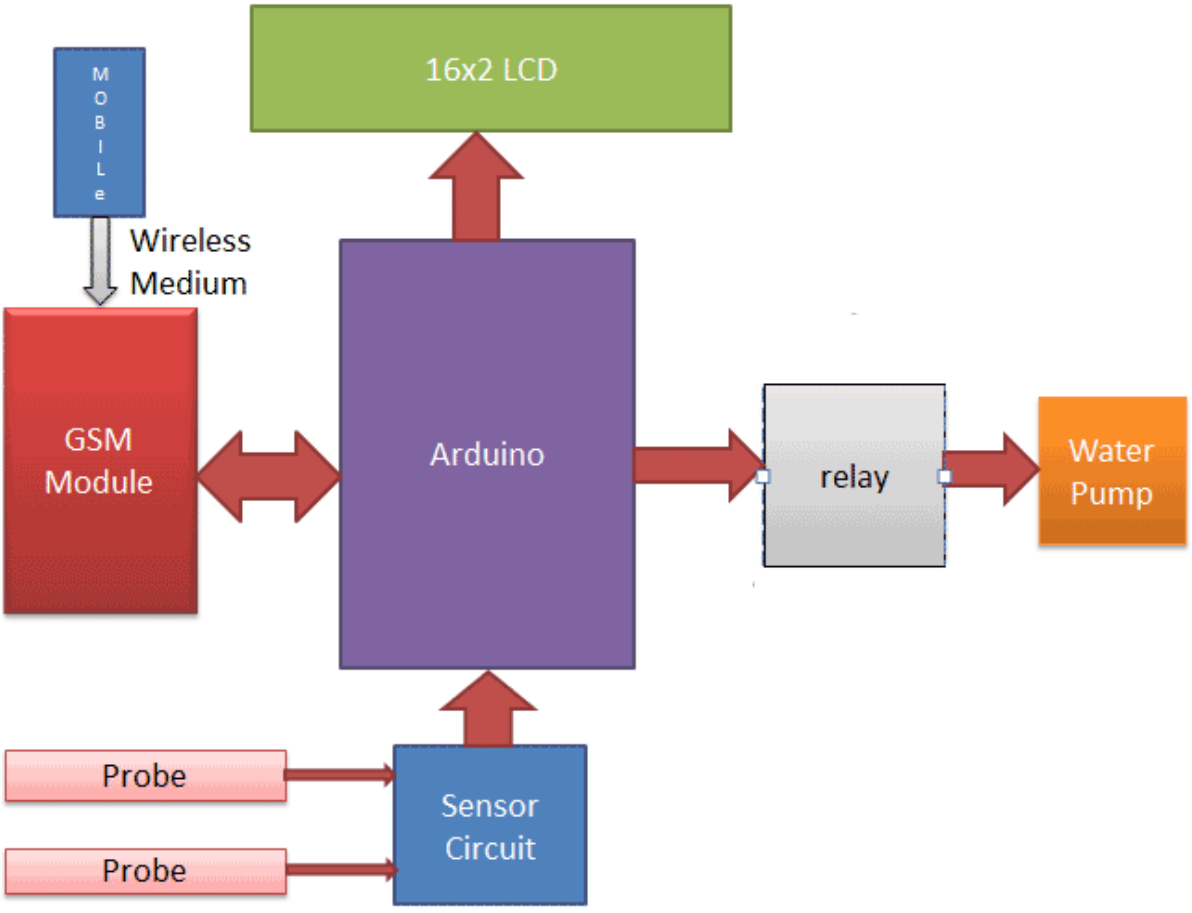
SUMMARY:

Modern science age Advanced technology makes our life easier and also negatively impacts our lives by blocking crime rates. So people are trying to protect them. People develop their security day by day. Security measures are critical issues of all-time water security, serious problems. Due to the busy life it is usually on flowers without general notice. To switch a motor that could be used to monitor the motor seal polar pump water, it must monitor the level of water in its tanks and sometimes it may also be.

CHAPTER 4

DESIGN AND FABRICATION

4.1 Block Diagram



4.2. Flow chart:

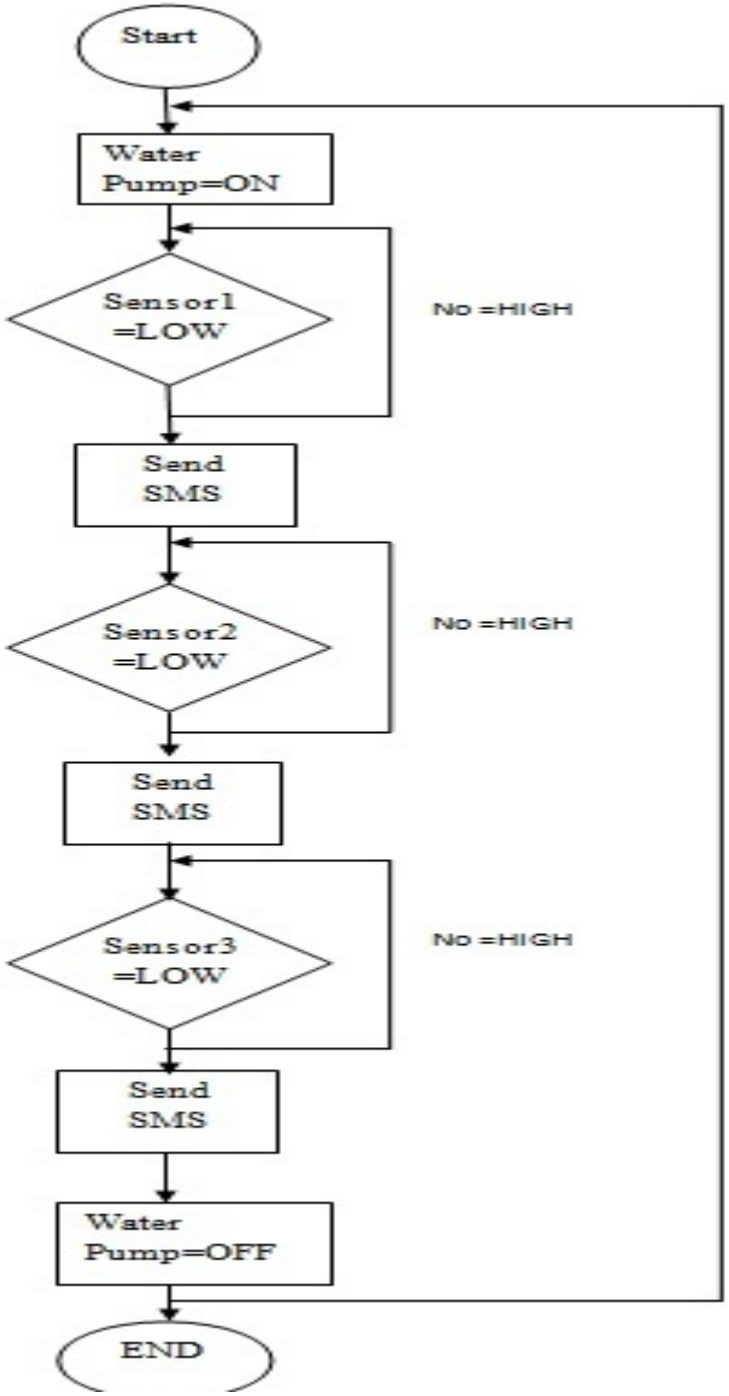
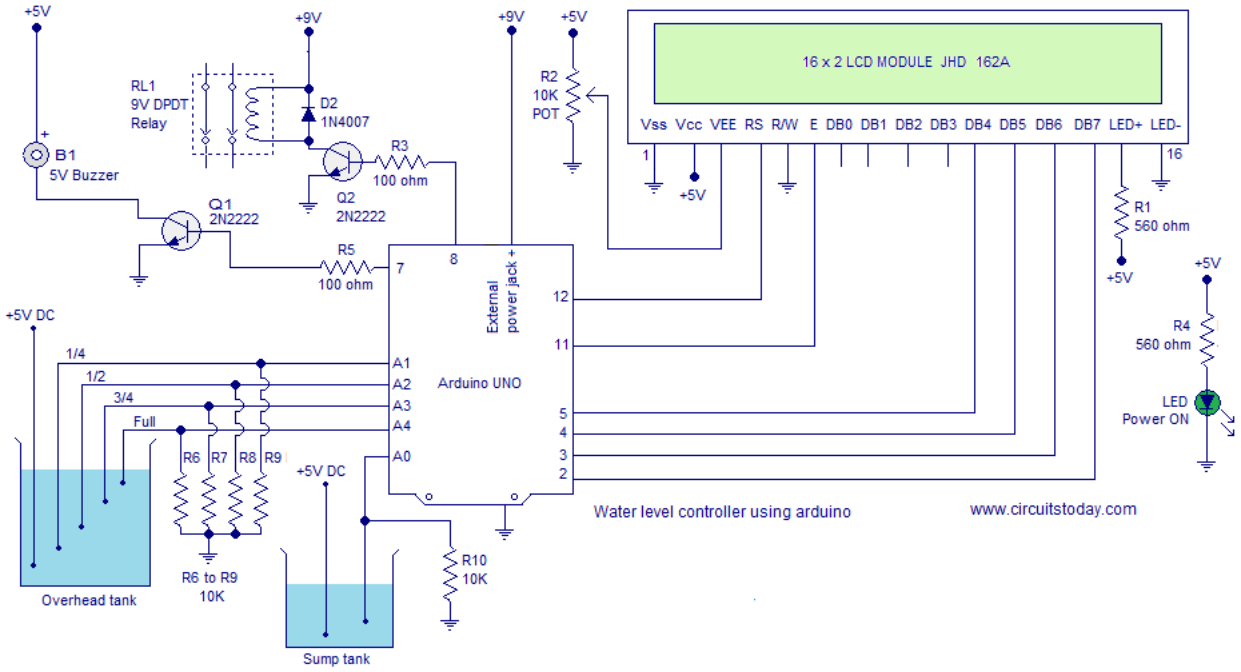
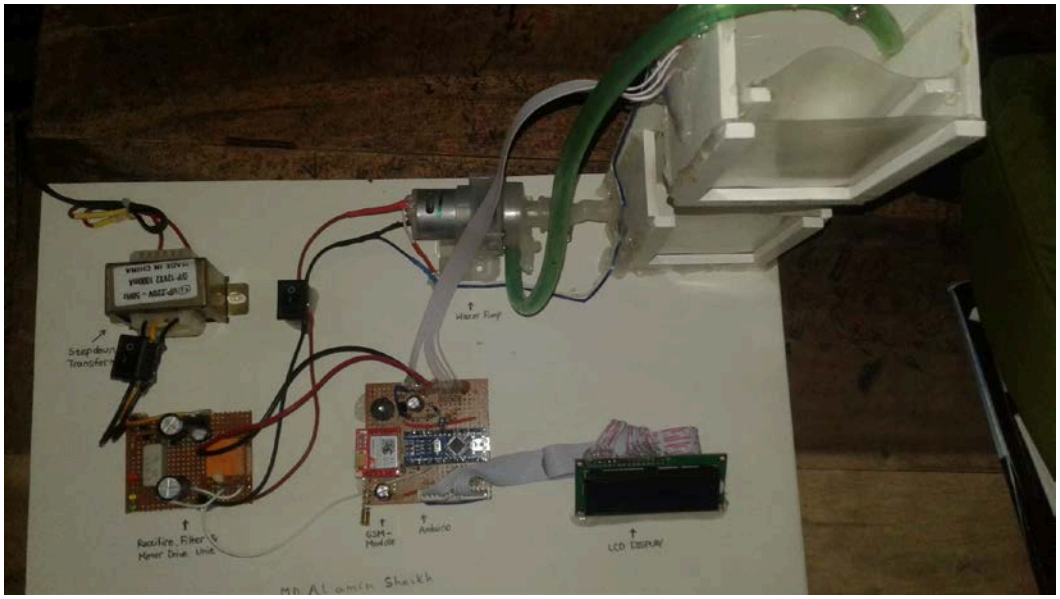


Figure: (4.1) Flow Chart

4.3. Circuit Diagram:



4.4. Image Of The Project



4.5. Summary:

Water level indicator indicates and indicates water level and overhead tank or any other water holder. Tank water level indicates using 5 LEDs and the water pump is completely closed when tanker water level is complete. There are 4 probes in the water level indicator that are placed in overhead tanks and interfaces with port 2 microcontrollers.

CHAPTER-5

DISCUSSIONS

5.1. Working Improvement

This project is very easy to operate. Its functions are wireless and motor control automatically. So the human power is not needed for its work.

5.2. Circuit Improvement

Our project circuit is very simple circuit. Because this circuit equipment is present in the market. We used mechanical tools for water level indicators. There is no used ultrasonic sensor, and the sensation induction conductor indicates. So our circuit is simple.

5.3. Maintenance Improvement

Unite control of this system does not have any connection to the above tunts and no ultrasonic hydrogen sensor. So our project maintenance is easy.

5.4. Costing Improvement

Our circuit equipment is fragmented at the prevailing market and equipment prices. Unite those controls there until the upper tune up to no one does its connection. So their value is lowered.

5.5. Water Level Indicator Project Circuit Features

1. Trouble-free setting up.
2. Packed together elegant design.
3. By controlling the automatic water level, the pump does not guarantee any overflows or dry running. Avoid roof and wall seepage due to overflowing tanks.
4. Automatic, man saves power completely
5. Swallow for very little energy, ideal endless activity. The automatic water level control gives you the flexibility to decide for yourself the water level for the Pump Sum activity.
6. See the clearness of the water level in the upper tank.

5.6. Water Level Indicator Project Applications

1. Automatic water level controllers are used in hotels, factories, homes apartments, commercial complexes, drainage, etc.
2. It is suitable for solo step motor, single episode submersibles, three-step motor. Stepping for 3 steps and a lonely step submersible starter is worthwhile being open and good, good bother sump. We can control two top tunks with two motors and two sumps and solo parts.
3. Automated water level controller automatically starts the pump amount as soon as the water level drops below the previously set level (usually 1/2 tank), the sooner the pumps will be switched off as soon as the pans are set.
4. Fuel level pointer in vehicles.
5. Liquid level indicator in the huge containers in the companies.

5.7. Cost Estimation

NO	Particulars	Specification	Qty.	Unit Price	Total Price
1	Microcontroller IC	PIC 16F73-28pin	1no.	200	200
2	555 Timer IC	200mA	1no.	30	30
3	TX Module	3pin	1no.	275	275
4	Rx Module	4pin	1no	275	275
5	LCD Monitor	16x2 Backlit	1no.	165	165
6	Power Supply	5V-DC	1nos.	400	400
7	Variable Resistor	3pin	1nos.	20	20
8	Relay	5V-10A	1no.	30	30
9	Motor Pump	DC	1no.	600	600
10	Battery	5V Lead Acid	2nos.	120	240
11	Capacitor	Various	5nos.	10	50
12	Voltage Regulator	LM 7805	1no.	10	10
13	Diode	IN4007	4nos.	5	20
14	Transistor	BJT-NPN	1no.	5	5
15	Resistor	Various	14nos.	1,7	20
16	LED's	Various	10nos	3	30
17	PCB Board	PCB	3nos	25	75
18	Buzzer	BUZ1	1no.	20	20
	Total Amount				2465

CHAPTER-6

CONCLUSION & RECOMMENDATIONS

6.1. Conclusion

On this paper we have a money-making user-friendly system to manage the water level of wirelessly and mechanically explain the devise. According to our designs, this is the best implementable home and office. The limit is coverable only above the household and workplace areas. It is observable that the domestic and the office are one of the important areas of water samples. One solution is the simple-to-use warehouse scheme to implement so low prices. It's a problem, such as its distraction.

We can avoid water from being wasted by using it. We can also stay away from seepage of roofs and walls due to overflowing tanks. As it is fully automatic, we can save man power by using water level indicator. It consumes low power, so it saves electricity. Though we faced some troubleshooting during the making of this project, we overcame it by the help of our course teacher. We can also add some further improvement in this project. We are planning to add buzzer and LCD display in our project. By adding buzzer and LCD display we can know about the water level monitoring the LCD display.

6.2. Application:

1. Security system
2. Water level system
3. Remote control
4. Sensor reporting
5. Automation system

6.3. Limitations of the work:

Although we have tried to build an additional house security system. There are some limitations. If the laser has any objection to it. It is a warning message or it may be dangerous or with a danger. It is the only one barrier to detect. This is a problem with our project. We can also use this system to automate the automation system to control the electrical appliance by making some additional modification-changes.

6.4. Future Scopes:

The system specification shows the description of the function and the performance of system and the user. The scope of our project design and construction of GSM and laser based home application control system is immense. The future implementation of the project are very great considering the amount of time and resources it saves. The project we have under taken can be used as a reference or as a base for realizing a scheme to be implemented in other project of greater level such as temperature update, device synchronization home automation etc.

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Appendix

Program code:

Program Analysis

```
int LED = 8;
int motor = 9;
int temp=0;
int i=0;
charstr[15];
void setup()
{
Serial.begin(9600);
pinMode(motor,OUTPUT);
pinMode(LED,OUTPUT);
digitalWrite(motor,LOW);
digitalWrite(LED,LOW);
delay(20000);
delay(20000);
delay(20000);
Serial.println("AT+CNMI=2,2,0,0,0");
delay(1000);
Serial.println("AT+CMGF=1");
delay(500);
Serial.println("AT+CMGS=\"+91xxxxxxxxxx\"\r"); // Replace x with mobile number
delay(1000);
Serial.println("System is ready to receive commands.");// The SMS text you want to send
delay(100);
Serial.println((char)26); // ASCII code of CTRL+Z
```

```
delay(1000);
}
void loop()
{
if(temp==1)
{
check();
temp=0;
i=0;
delay(1000);
}
}
voidserialEvent()
{
while(Serial.available())
{
if(Serial.find("/"))
{
delay(1000);
while (Serial.available())
{
charinChar=Serial.read();
str[i++]=inChar;
if(inChar=='/')
{
temp=1;
return;
}
}
}
}
```

```
}
void check()
{
if(!(strncmp(str,"motor on",8)))
{
digitalWrite(motor,HIGH);
digitalWrite(LED,HIGH);
delay(1000);
Serial.println("AT+CMGS=\"+91xxxxxxxxxx\"\r"); // Replace x with mobile number
delay(1000);
Serial.println("Motor Activated");// The SMS text you want to send
delay(100);
Serial.println((char)26); // ASCII code of CTRL+Z
delay(1000);
}
else if(!(strncmp(str,"motor off",9)))
{
digitalWrite(motor,LOW);
digitalWrite(LED,LOW);
delay(1000);
Serial.println("AT+CMGS=\"+91xxxxxxxxxx\"\r"); // Replace x with mobile number
delay(1000);
Serial.println("Motor deactivated");// The SMS text you want to send
delay(100);
Serial.println((char)26); // ASCII code of CTRL+Z
delay(1000);
}
else if(!(strncmp(str,"test",4)))
{
Serial.println("AT+CMGS=\"+91xxxxxxxxxx\"\r"); // Replace x with mobile number
delay(1000);
```

```
Serial.println("The System is Working Fine.");// The SMS text you want to send
delay(100);
Serial.println((char)26); // ASCII code of CTRL+Z
delay(1000);
}
}
```