

A SMART FARM LAND

Submitted in partial fulfilment of the requirements for the award of

Bachelor of Engineering in Electrical and Electronic Engineering

By

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**DEPARTMENT OF ELECTRICAL AND ELECTRONIC ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONIC ENGINEERING**

SATHYABAMA

**INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)**

Accredited with Grade "A" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600119

APRIL 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **MUTHAMIZHSELVI.R** (Reg. No. 37140054) and **SWATHI.V** (Reg. No. 37140088) who carried out the project entitled "**A SMART FARM LAND**" under our supervision from DECEMBER 2020 to APRIL 2021.

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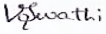
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DECLARATION

We **MUTHAMIZHSELVI.R**(Reg.No. 37140054) and **SWATHI.V** (Reg. No. 37140088) hereby declare that the Project Report entitled “**A SMART FARM LAND**” done by us under the guidance of **Dr.S.JAYAPRAKASH** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electrical and Electronics Engineering.

DATE: 09-04-2021

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1. 
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SIGNATURE OF THE CANDIDATES

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ABSTRACT

Smart farm is associate degree rising idea that refers to managing farms victimization fashionable data and Communication Technology. the most aim of our system presenting here is to watch the wetness content within the soil in cultivating field. supported soil wetness, temperature motor are mechanically switched on or off. this protects the water at an equivalent time and on the opposite hand the plant will get optimum level of water, therefore increasing productivity of crop. The needs of our water irrigation system are to supply a water delivering schedule to the crops to confirm all the crops have enough water for his or her healthy growth, to scale back the quantity of water wasted in irrigation, and to reduce the economic value for the users. it's conjointly attainable to safeguard of the motor against some faults like over current, higher/lower voltage, over temperature in windings, overloading of motor. Here we tend to combinely uses a motion detector to notice wild animals approaching close to the sphere similarly as sends SMS to former through GSM. This ensures complete safety of crops from animals. Therefore, dominant, monitoring, and protection of the system area complete in real time. The GSM technology can send the detector data to user mobile.

TABLE OF THE CONTENT

CHAPTER NO.	TITLE	PAGENO.
	ABSTRACT	VI
	LIST OF FIGURES	X
	LIST OF TABLES	XII
	LIST OF SYMBOLS AND ABBREVIATION	XIII
1.	INTRODUCTION	
1.1	GENERAL INTRODUCTION	1
1.2	LITERATURE SURVEY	8
2.	EXISTING AND PROPOSED SYSTEM	
2.1	SCOPE OF THE PROJECT	5
2.2	EXISTING SYSTEM	5
2.3	DISADVANTAGES OF EXISTING SYSTEM	5
2.4	BLOCK DIAGRAM OF EXISTING SYSTEM	5
2.5	PROPOSED SYSTEM	6
2.6	ADVANTAGES OF PROPOSED SYSTEM	6
2.7	BLOCK DIAGRAM OF PROPOSED SYSTEM	7
2.8	CIRCUIT DIAGRAM OF PROPOSED SYSTEM	8

3. **HARDWARE DISCRPTION**

3.1 PIC1678779 MICRO CONTROLLER	9
3.1.1 PIC MICRO CONTROLLER	9
3.1.2 MICRO CONTROLLER OPTIONS	11
3.1.3 ANALOG TO DIGITAL CONVERTOR MODULE	14
3.1.4 MEMORY ORGANIZATION	14
3.2 SOIL MOISTURE SENSOR	15
3.2.1 SPECIFICATION	16
3.3 WATER LEVEL SENSOR	16
3.4 TEMPERATURE SENSOR	17
3.4.1 PIN DESCRIPTION	18
3.5 HUMIDITY SENSOR	19
3.6 PIR SENSOR	20
3.6.1 HOW PIR SENSOR WORKS	21
3.7 THERMAL SENSOR	22
3.8 RELAY DRIVEN CIRCUIT	22
3.9 PUMP MOTOR	24
3.10 SUMP MOTOR	25
3.11 BUZZER	25
3.12 LCD DISPLAY	26
3.12.1 PIN DESCRIPTION	28
3.13 GSM MODEM	30

4.	SOFTWARE AND HARDWARE OUTPUT RESULT	
4.1	SOFTWARE REQUIREMENTS	32
4.1.1	MPLAB	32
4.1.2	PROTEUS 8.3	32
4.2	SOFTWARE SIMULATION AND OUTPUT RESULT	33
4.3	HARDWARE SIMULATION AND OUTPUT RESULT	37
5.	CONCLUSION	42

LIST OF FIGURES

FIGURE No.	TITLE	PAGE No.
2.1	Existing block diagram	5
2.2	Block diagram of proposed system	7
2.3	Circuit diagram of proposed system	8
3.1	Pin diagram of PIC16F887	13
3.2	Architecture of PIC16F887	13
3.3	Program memory map and stack	15
3.4	Water level sensor	17
3.5	Temperature sensor	18
3.6	Humidity sensor	19
3.7	Types of polymeric humidity sensor	20
3.8	PIR sensor	21
3.9	How PIR sensor works	22
3.10	Circuit diagram of relay driven circuit	24
3.11	Pump motor	24
3.12	Circuit diagram of buzzer	26
3.13	LCD pin diagram	26
3.14	LCD pin configuration	29
3.15	GSM modem	30
3.16	Network of GSM module	31
4.2.1	Simulation of circuit diagram	33

4.2.2	Pump motor turn on	34
4.2.3	Pump motor turn off	34
4.2.4	Sump motor turn on	35
4.2.5	Sump motor turn off	35
4.2.6	Animal is detected	36
4.2.7	Hardware description	37
4.2.8	Soil dry pump motor on	37
4.2.9	Soil wet pump motor off	38
4.2.10	Water level high Suck motor on	39
4.2.11	Water level low Suck motor	40
4.2.12	Animal is detected	41

LIST OF TABLES

TABLE No.	TITLE	PAGE No.
4.1	Status register	15
4.2	Temperature sensor pin description	18
4.3	LCD pin description	28

LIST OF ABBREVIATION

PIC	-	Peripheral Interface Controller
EEPROM	-	Erasable Programmable Read Only Memory
ROM	-	Read Only Memory
RAM	-	Read Access Memory
ADC	-	Analog to Digital Converter
PIR	-	Passive Infrared
LCD	-	Liquid Crystal Display
GSM	-	Global System for Mobile communication
GPRS	-	General Pack Radio Service
DC	-	Direct Current

CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION:

India is largely associate agricultural country, and everyone its resources rely upon the agricultural output. Small Irrigation is a man-made activity of water to the basis of plant. Irrigation has been accustomed assist within the growing of agricultural crops, maintenance of landscapes, and re-vegetation of disturbed soils in dry areas and through periods of inadequate rain. In crop production, irrigation helps in protective plants against frost, suppressing weed growth in grain fields and preventing soil consolidation. Irrigation systems are used for mud suppression, disposal of waste matter, and in mining. The recent technique used for irrigation was the employment of watering cans, water channels that ought to be opened and closed manually or backpack sprinklers. during this case, loads of water is wasted within the method. there's want for improvement on the present or recent sorts of irrigation. an automatic irrigation system has to be developed to optimize water use for agricultural crops. associate intelligent automatic irrigation system should have all the elements that autonomously monitor and management the extent of water obtainable to the plants with none failure or human intervention. 1. incessantly monitor the quantity of soil water obtainable to plants two. verify if watering is needed for the plants supported the knowledge obtained from observation the soil water content. 3. offer precise quantity of water needed for the plants. this can be increased by however well it achieves demand four. Discontinue the water system once the desired quantity has been delivered to the plants. This feature is very important because the quantity of water obtainable for the irrigation system isn't infinite, thus water management is preponderant. the benefits of automatic irrigation to the plants embrace saving cash, water, conservation of labor and overall convenience. Here we tend to combinedly uses a motion detector to sight wild animals approaching close to the sphere furthermore as sends SMS to former through GSM. This ensures complete safety of crops from animals. Crops in farms area unit persistently ravaged by native animals like buffaloes, goats, cows, birds etc. This ends up in vast loss for the formers to barricade entire field or be field

twenty four hours and guard it. Therefore here we tend to projected automatic crop protection from animals so protective the formers loss.

Therefore, dominant, monitoring, and protection of the system area unit complete in real time. The GSM technology can send the detector info to user mobile.

1.2 LITERATURE SURVEY

Iversen w.m, et. al., (2008) proposes Remote sensing and control of an irrigation system using a distributed wireless sensor network, (IEEE), Have proposed efficient water management may be a major concern in several cropping systems in dry and arid areas. Distributed in-field sensor-based irrigation systems supply a possible resolution to support site-specific irrigation management that permits producers to maximize their productivity whereas saving water. This paper describes details of the planning and instrumentation of variable rate irrigation, a wireless detector network, and software package for time period in-field sensing and management of a site-specific preciseness linear-move irrigation system. Field conditions were site-specifically monitored by six in-field detector stations distributed across the sector supported a soil property map, and sporadically sampled and wirelessly transmitted to a base station. associate irrigation machine was reborn to be electronically controlled by a programming logic controller that updates geo documented location of sprinklers from a differential world Positioning System (GPS) and wirelessly communicates with a pc at the bottom station. Communication signals from the detector network and irrigation controller to the bottom station were with success interfaced mistreatment cheap Bluetooth wireless radio communication. an automatic closed-loop irrigation system needs 3 major components: machine conversion, navigation, and mission getting to support the solid communication protocol. This paper developed the machine conversion from a traditional irrigation system to associate electronically governable system for individual management of irrigation sprinklers and developed the navigation of the irrigation system that was ceaselessly monitored by a differential GPS and wirelessly transferred knowledge to a base station for site-specific three irrigation management. the event of WISC software package provided time period remote observation and management of variable rate irrigation, and continued higher cognitive process of mission coming up with for the machine-driven closed-loop

irrigation system. This paper well-tried an idea of a promising cheap wireless resolution for associate in-field WSN and remote of preciseness irrigation. Potential applications of Bluetooth wireless technology in agricultural systems will be extended to real time field observation, machine-driven irrigation management, and

Jyothipriya A.N, et. al,(2013) proposes Design of embedded system for drip irrigation automation, (IEEE), In this paper, the planning of Embedded system for the Automation of Drip irrigation is bestowed. Water is extremely precious to all or any the humans and moreover on the plants, trees. the main quantity of H₂O is employed by the agricultural trade for irrigation. Rural square measureas in many nations of Republic of India are stricken by frequent power cuts and abnormal voltage conditions. during this paper the planning of a Microcontroller based mostly drip irrigation mechanism is projected, that may be a real time feedback system for watching and dominant all the activities of drip irrigation system additional with efficiency. Irrigation system controls valves by victimisation automatic coil valves to show ON & OFF the most gate valves for such that time through zigbee controller whenever a traditional voltage condition exists. this permits the farmer to use the proper quantity of water at the proper time. data is changed in sort of SMS (Short Message Service) between the system and therefore the user cell phones. The system relies on PIC18F452 micro-controller, RTC DS1307, coil valve and Zigbee module and includes protection against single phasing, over-current, dry running. this method can relieve hardships of farmers from manual operation of turning on/off of main gate valves for water distribution to a good extent. The GSM based mostly Zigbee Controlled coil Valve for drip irrigation system proves to be a true time feedback system that monitors and controls all the activities of drip irrigation system with efficiency. victimisation this method, one will save men, water and power consumption is reduced by 2 hundredth and half-hour compared to existing.

Boon Tatt Koit, et. al,(2012) purposed Animal detection method in digital Images, international journal of future computer and communication, Researches relating to animals in image process are a crucial field to various applications. Several algorithms and strategies are developed by creature so as to possess an improved understanding on animal behaviour. Besides, these applications can also act as a warning system to creature from intrusion of dangerous wild animal for early precaution measures. These applications are often narrowed right down to 3 main

branches, particularly detection, chase and identification of animal. the primary branch, that is that the animal detection, has been applied in varied fields of real world application. as an example, a detection algorithmic program has been developed for light-weight detection and locomote (LIDAR) knowledge to alter fisher to seek out the proper location of fishes in deep sea [1]. Researchers in [2] used mobile remote sensing pictures to observe moving wild animals. add [3] on the opposite hand, used micro-Doppler signals to keep up the human security by detective work potential dangerous animal intrusion to territorial dominion. The second branch, that is that the animal chase, is that the main topic in watching animal locomotive behaviour and its interaction with the surroundings. With the technology of device, radio-frequency identification (RFID), and world positioning system (GPS), one amongst the applications is that the development of recent zoological systems for animal trace ability, identification, and anti-theft for the management and security of animal in menagerie [4]. By chase the animal movements, it helps human to possess an improved understanding on living creatures on earth, particularly on however the animal interacts with its surroundings. The third branch, that is that the animal identification, is employed to spot the detected animal. it's been utilized in health watching system for domestic herds. Animal care management becomes a crucial issue as animals have an on the spot impact on human psychological and physical health. even supposing there square measure loads of solutions, ill-usage of animals and risks in animal health square measure increasing. to raised manage the animals in dynamic data retrieving, location chase, and RFID-based mobile watching system (RFID-MMS) has been designed to assist users over a wireless network [5]. Identification of animal has helped creature to watch and manage their animals easier. This paper can offer additional attention and review for animal detection strategies. The review additionally restricted to the strategies that use digital pictures or digital video. This review are going to be given within the next section.

CHAPTER 2

EXISTING AND PROPOSED SYSTEM

2.1 SCOPE OF THE PROJECT

The goal of sensible farm analysis is to ground a decision-making web for farm management, by providing them with the advantages of technological advancements, sensible agriculture aims to cut back the serious work of the farm staff, therefore rising their quality of life. sensible farming deems it necessary to handle the difficulty of increment, Climate changes and labour that has gained tons of technological attention, from planting and watering of crops to health and gather.

2.2 EXISTING SYSTEM

In existing system, The soil wet device, temperature, wetness is interfaced with the microcontroller, the device can sense the information and it'll pass the data to microcontroller so it'll ON/OFF the DC motor to irrigate mechanically. The Microcontroller can receive the sensor's information and it'll send to mobile via GSM.

2.3 DISADVANTAGES OF EXISTING SYSTEM

Here there's no any watching system to sense over irrigation of crops.

The excessive watering could injury the crop and scale back the number and quality of the merchandise.

2.4 BLOCK DIAGRAM OF EXISTING SYSTEM

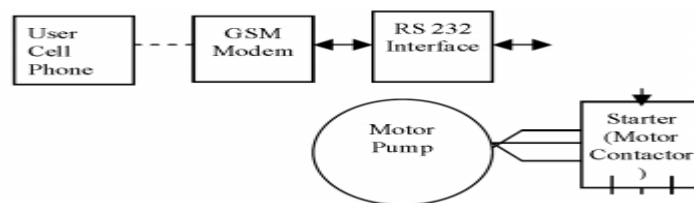


Fig:2.1 Existing Block Diagram

In existing system, The soil wet device, temperature, wetness is interfaced with the microcontroller, the device can sense the information and it'll pass the data to

microcontroller so it'll ON/OFF the DC motor to irrigate mechanically. The Microcontroller can receive the sensor's information and it'll send to mobile via GSM.

2.5 PROPOSED SYSTEM

In projected system, the crop is monitored endlessly and also the numerous tasks area wiped out easy manner. The water level device, temperature, soil wet and wetness device is interfaced with microcontroller and it'll endlessly monitor the crops soil. The wet, temperature content within the soil, supported that pumping motor can mechanically pumps the water into the sphere. The microcontroller can receive the information and it'll send to user mobile through GSM technology. The water level device is employed to sense the water level in ground and additionally sense the crops water level throughout rain. If just in case water level is enhanced in ground level, the microcontroller mechanically pumps the water victimisation motor to require extra water from crops and it'll flow into the storage tank. we are able to shield the motor against some faults like over current, higher/lower voltage, over temperature in windings, overloading of motor. this method sight wild animals approaching close to the sphere also as sends SMS to former through GSM. This ensures complete safety of crops from animals. Crops in farms area repeatedly ravaged by native animals like buffaloes, goats, cows, birds etc. thus here we tend to projected automatic crop protection from animals so protective the formers loss.

2.6 ADVANTAGES OF PROPOSED SYSTEM

- The system is totally automated; the soil condition may be monitored mechanically victimisation numerous sensors.
- The human interference is reduced, in step with the soil information the controller can ON/OFF the motor mechanically.
- The water level within the ground may be maintained mechanically, avoid over irrigation issues.

2.7 BLOCK DIAGRAM OF PROPOSED SYSTEM

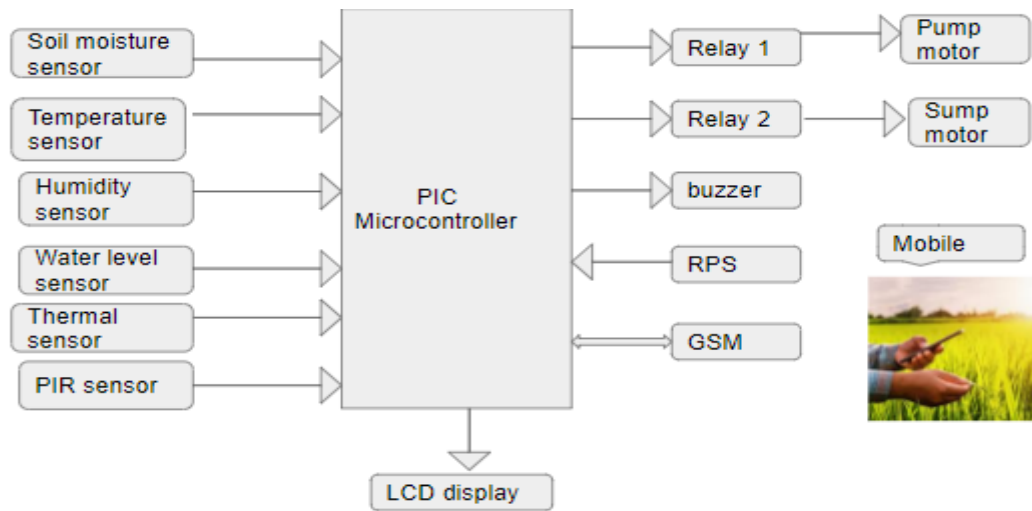


Fig:2.2 Block Diagram of Proposed System

The water level device, temperature, soil wet and wetness device is interfaced with microcontroller and it'll endlessly monitor the crops soil. The wet, temperature content within the soil, supported that pumping motor can mechanically pumps the water into the sphere. The microcontroller can receive the information and it'll send to user mobile through GSM technology. The water level device is employed to sense the water level in ground and additionally sense the crops water level throughout rain. If just in case water level is enhanced in ground level, the microcontroller mechanically pumps the water victimisation motor to require extra water from crops and it'll flow into the storage tank. this method sight wild animals approaching close to the sphere also as sends SMS to former through GSM. This ensures complete safety of crops from animals. Crops in farms area repeatedly ravaged by native animals like buffaloes, goats, cows, birds etc. thus here we tend to projected automatic crop protection from animals so protective the formers loss.

2.8 CIRCUIT DIAGRAM OF PROPOSED SYSTEM

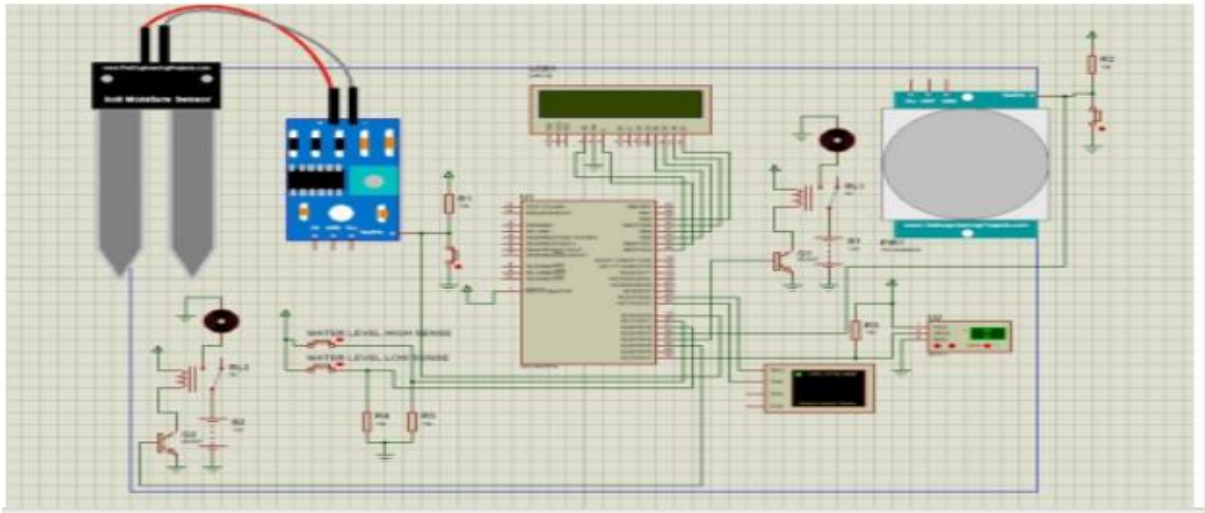


Fig:2.3 Circuit diagram of smart farm land

This system checks the wet, temperature content within the soil, supported that pumping motor can mechanically pumps the water into the sphere. Here we tend to area victimisation soil wet device and temperature. supported soil wet, temperature pumping motor are going to be mechanically switched on or off. this protects the water at constant time and on the opposite hand the plant will get optimum level of water, thus increasing productivity of crop. it's additionally attainable to guard of the motor against some faults like over current, higher/lower voltage, over temperature in windings, overloading of motor. The GSM technology can send the device info to user mobile in step with soil and motor condition. this method sight wild animals approaching close to the sphere also as sends SMS to former through GSM. This ensures complete safety of crops from animals. Crops in farms area repeatedly ravaged by native animals like buffaloes, goats, cows, birds etc. thus here we tend to projected automatic crop protection from animals so protective the formers loss.

CHAPTER 3

HARDWARE DESCRIPTION

3.1 PIC16F877A MICROCONTROLLER

MICROCONTROLLER

The microcontroller is that the heart of the ability saving unit, that get the data from detector and driver the feedback loop. it's associate degree integrated chip that's often a part of associate degree embedded system. The microcontroller includes a processor RAM, ROM, I/O ports and timers sort of a normal laptop however they're designed to execute solely one specific task to manage one system they're abundant smaller and simplified so they'll embody all the functions needed on a single chip. aside from the traditional microcontrollers PIC family has additional features.

3.1.1 PIC MICROCONTROLLER

PIC microcontroller is wide used for experimental and fashionable applications due to its low worth, wide selection of applications, prime quality and simple convenience. it's ideal for machine management applications, mensuration devices, and study purpose and then on.

- ❖ It is additionally known as as “Computer on a Chip”.
- ❖ PIC was developed as Peripheral controller.
- ❖ PIC Microcontrollers ar designed with a separate fourteen bit program memory bus to hold directions.
- ❖ A Separate 8bit information memory bus to hold information.
- ❖ This style is often known as hardware design, and then PIC Microcontroller is predicated on Harvard design.

It consists of nonvolatile storage that makes the programming value and time less

PIC go along with one in all four processor cores

- ❖ 12 bit cores with thirty three directions : 12C50x,16C5x
- ❖ 14 bit cores with thirty five directions : 12C50x,16C5x
- ❖ 16 bit cores with fifty eight directions : 12C50x,16C5x
- ❖ Enhanced sixteen bit cores with seventy seven directions : 18CXX
- ❖ PIC need a Clock to figure
- ❖ Can use crystals ,Clock Oscillators, or maybe associate degree RC Circuit

PIC has 2 differing kinds of program storage:

EEPROM (Erasable Programmable scan solely Memory)

- ❖ Needs high voltage from a coder to program (~13v)
- ❖ Needs windowed chips and ultraviolet lightweight to erase

FLASH

- ❖ Re-writable (even by chip itself)
- ❖ Much quicker to develop on.
- ❖ Finite range of writes
- ❖ Programs ar keep in program house (not in information space), thus low RAM values are ok.

Different PICs have distinction on-board peripherals

Some common peripherals are:

- ❖ Analog to digital converters(ADC)(8,10 and 12bit,50kps)
- ❖ Serial Communications :UART (RS-232C),SPI,I2C,CAN
- ❖ Pulse dimension Modulation (PWM)(10bit)

3.1.2 MICROCONTROLLER OPTIONS:

- ❖ High-Performance RISC processor.
- ❖ Only thirty five directions to find out.
- ❖ Operating speed.
- ❖ Interrupt capability.
- ❖ 8-level deep hardware stack.
- ❖ Direct, Indirect and Relative Addressing modes.
- ❖ Special Microcontroller options.
- ❖ Precision Internal generator.
- ❖ Power-Saving Sleep mode.
- ❖ Wide operative voltage vary (2.0V-5.5V).
- ❖ Industrial and Extended Temperature vary.
- ❖ Low-Power options.
- ❖ Standby Current.
- ❖ Operating Current.
- ❖ Watchdog Timer Current.
- ❖ Peripheral options.
- ❖ 24/35 I/O pins with individual direction management.
- ❖ Analog Comparator module with.
- ❖ Timer0: 8-bit timer/counter with 8-bit programmable pre scalar.
- ❖ Enhanced Timer1.
- ❖ Timer2: 8-bit timer/counter with 8-bit amount register, pre scalar and post scalar.
- ❖ Supports RS-485, RS-232, and LIN 2.0

- ❖ Auto-Baud observe
- ❖ Auto-Wake-Up on begin bit
- ❖ In-Circuit Serial Programming.

REASON for selecting 16F887

- ❖ It follows Harvard design with RISC Instruction set.
- ❖ Number of I/O pins
- ❖ Amount of program and information memory
- ❖ Speed
- ❖ Timer Resources
- ❖ Interrupt management
- ❖ Robustness
- ❖ Error recovery – watchdog timers
- ❖ Power, I/O growth, mathematics support

APPLICATIONS

- ❖ Automotive bag systems
- ❖ Remote management
- ❖ Major home systems – heating and cooling
- ❖ Cordless phones and cell phones
- ❖ Security systems
- ❖ Sound system
- ❖ Industrial Instrument

Pinout diagram

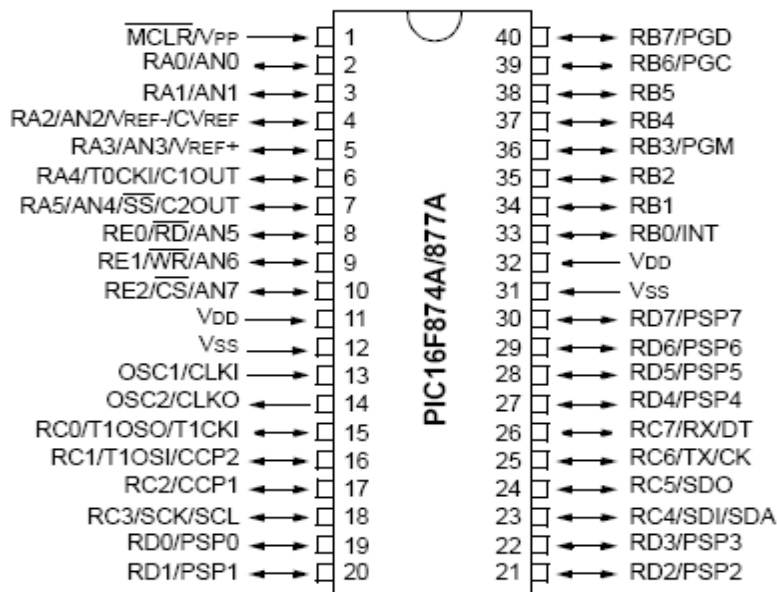


Fig:3.1 Pin diagram of PIC16F887

General Mid-range PICmicro Block Diagram

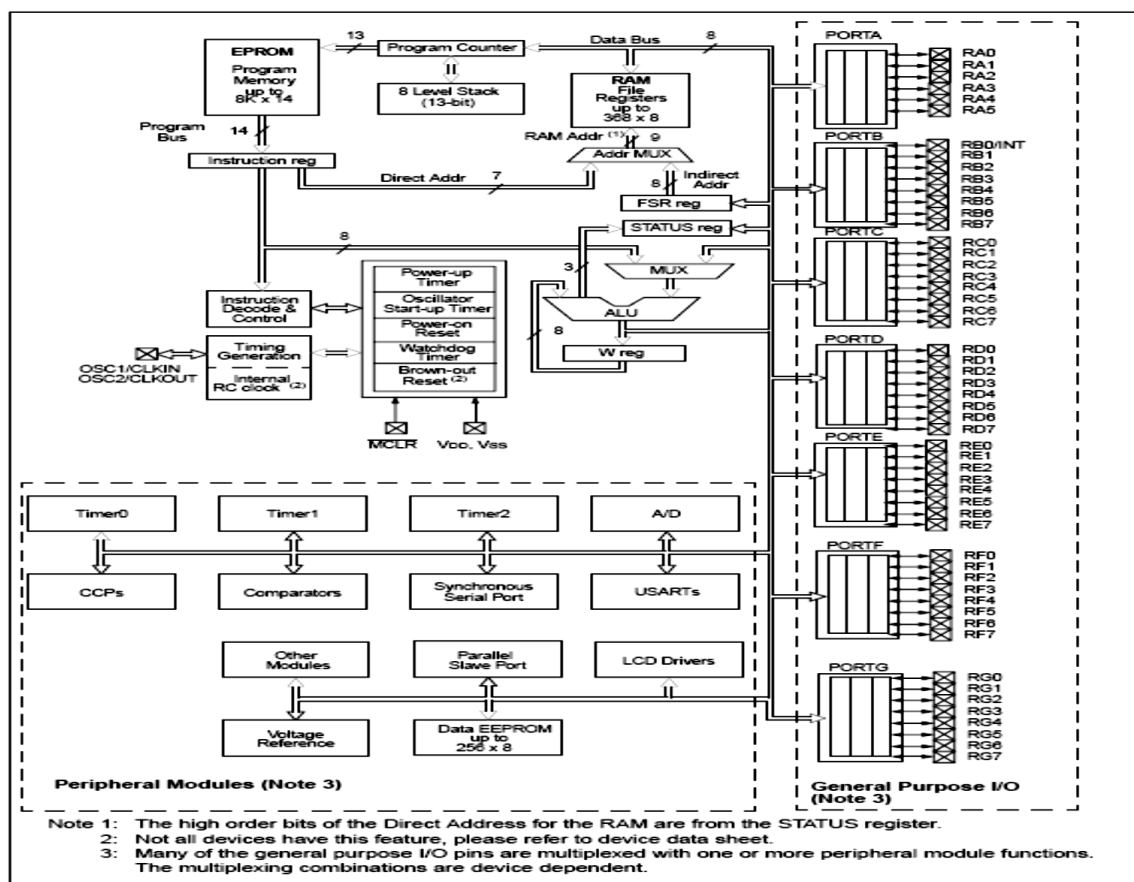


Fig:3.2 Architecture of PIC16F887

3.1.3 ANALOG TO DIGITAL CONVERTER MODULE

When configuring and victimisation the ADC the subsequent functions should be thought-about. Port configuration

- ❖ Channel choice
- ❖ ADC voltage reference choice
- ❖ ADC conversion clock supply
- ❖ Interrupt management
- ❖ Results format

Port configuration: The ADC is wont to convert each analog and digital Signals. once changing analog signals, the I/O pins ought to be the organized for Analog by setting the associated TRIS and ANSEL bits. See the corresponding Port section for a lot of info.

3.1.4 MEMORY ORGANIZATION

1. PROGRAM MEMORY ORGANIZATION:

The PIC16F882/883/884/886/887 contains a 13-bit program counter capable of addressing a 2K x fourteen (0000h-07FFh) for the PIC16F882, 4K x fourteen (0000h0FFFh) for the PIC16F883/PIC16F884, and 8K x fourteen (0000h-1FFFh) for the PIC16F886/PIC16F887 program memory house. Accessing a location higher than these boundaries can cause a garment at intervals the primary 8K x fourteen house.

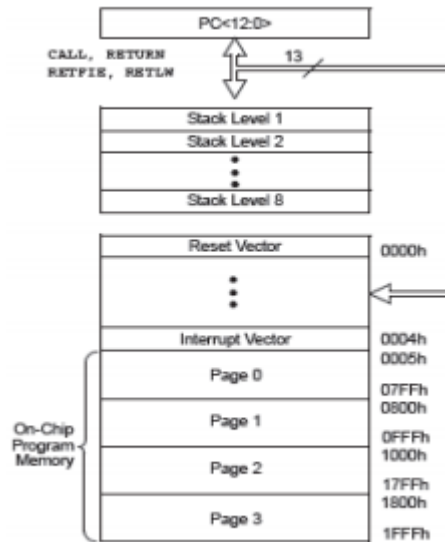


Fig:3.3 Program memory map and stack

2. DATA MEMORY ORGANIZATION:

The data memory is divided into four banks that contain the final Purpose Registers (GPR) and also the Special operate Registers (SFR). The Special Function Registers square measure placed within the initial thirty two locations of every bank. The General Purpose Registers, enforced as static RAM, square measure placed within the last 96 locations of every Bank. Register locations F0h-FFh in Bank one, 170h-17Fh in Bank two and 1F0h-1FFh in Bank three, purpose to addresses 70h-7Fh in Bank zero. The actual range of General Purpose Resisters (GPR) enforced in every Bank depends on the device.

Table:3.1 Status Register

R/W-0	R/W-0	R/W-0	R-1	R-1	R/W-x	R/W-x	R/W-x
IRP	RP1	RP0	$\overline{TO}$	$\overline{PD}$	Z	DC ⁽¹⁾	C ⁽¹⁾
bit 7							
							bit 0

3.2 SOIL MOISTURE SENSORS

soil wet mensuration in agriculture to assist farmers manage their irrigation systems additionally expeditiously. Not solely area unit farmers ready to typically use

less water to grow a crop, they're ready to increase yields and also the quality of the crop by management of soil wet throughout essential plant growth stages.

Besides agriculture, there area unit another disciplines mistreatment soil wet sensors. Golf courses area unit currently mistreatment sensors to will increase the potency of their irrigation systems to stop over watering and natural action of fertilizers and chemicals offsite.

3.2.1 SPECIFICATIONS

Working Voltage: DC 3-5V

Working Current: <20mA

Sensor Type: Simulation

Detection Area: forty millimetre x sixteen millimetre

Manufacturing Process: FR4 double spray tin

Fixed Hole Size: three.2 mm

Working Temperature: ten °C to thirty °C

Work Humidity: 100 percent to ninetieth while not condensation

APPLICATIONS

Rainfall police investigation

Liquid leak

Tank overflow detector

3.3 WATER LEVEL SENSOR

Technology has developed analog kind continuous measure cistern water level device and show instrument for continuous water level observance, show and knowledge recording.

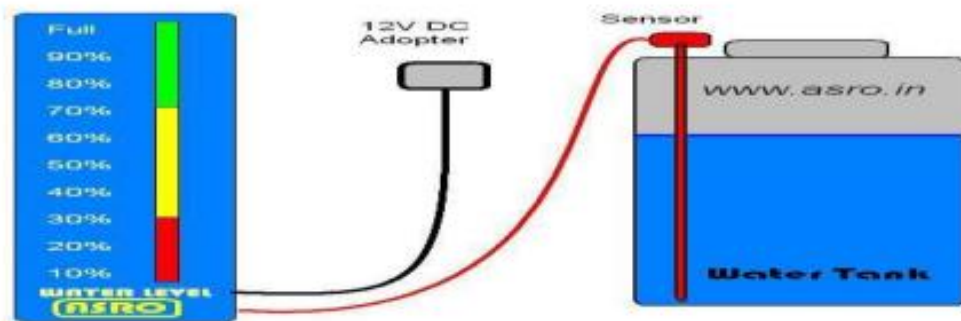


Fig:3.4 water level sensor

APPLICATIONS:

- ❖ Reservoir water level observance
- ❖ River water level observance
- ❖ Overhead cistern level observance
- ❖ Underground cistern level observance

ADVANTAGES

- ❖ Less price, long life and power saving advanced style
- ❖ Reliable speedy data, autochthonic technology
- ❖ Very useful in unfavourable water resource management

3.4 Temperature Sensor (LM35)

LM35 is an accuracy IC temperature sensor the output is directly proportional to the temperature. The sensor is sealed and thus it is not subjected to oxidation and other processes. Temperature LM35 sensor can be measured more accurately than with a thermistor. It also hold low self heating and does not cause more than 0.1 oC temperature rise in still air.

The LM35 does not require any external evaluation or cutting to provide typical accuracy of $\pm 1.2^{\circ}\text{F}$ at room temperature, $\pm 11.2^{\circ}\text{F}$ over a full -50 to $+300^{\circ}\text{F}$ temperature range.

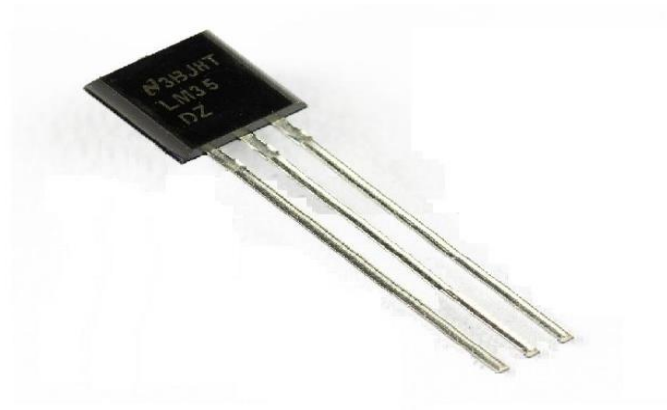


Fig:3.5 Temperature sensor

3.4.1 Pin Description:

Table 3.2 Temperature sensor Pin Description

Pin No	Function	Name
1	Supply voltage; 5V (+35V to -2V)	Vcc
2	Output voltage (+6V to -1V)	Output
3	Ground (0V)	Ground

3.5 HUMIDITY SENSOR



Fig:3.6 Humidity sensor

Humidity is the presence of water in air. The amount of water vapor in air can influence human comfort as well as many manufacturing processes in industries. The presence of water vapor also instigates various physical, chemical, and biological processes. Humidity measurement in industries is crucial because it may affect the business cost of the product and the health and safety of the personnel. Hence, humidity sensing is extensive, especially in the control systems for industrial process and human comfort.

Controlling or monitoring humidity is of paramount importance in several industrial & domestic applications. In semiconductor industry, humidity needs to be accordingly controlled & monitored during wafer processing. In medical applications, humidity control is appropriate for respiratory equipment, sterilizers, incubators, pharmaceutical processing, and biological products. Humidity control is also obligatory in chemical gas purification, dryers, ovens, film desiccation, paper and textile production, and food processing. In agriculture, estimate of humidity is important for plantation protection, soil moisture monitoring, etc. For domestic applications, humidity control is required for cooking controls for microwave oven and the living environment in buildings, etc. In all such applications and multitudinous others, humidity sensors have been employed to offer an indication of the moisture levels in the environment.

Sensing Principle

Humidity measurement has been done using dry and wet bulb hygrometers, dew point hygrometers, and electronic hygrometers. There has been a flood in the demand of electronic hygrometers, often called humidity sensors.

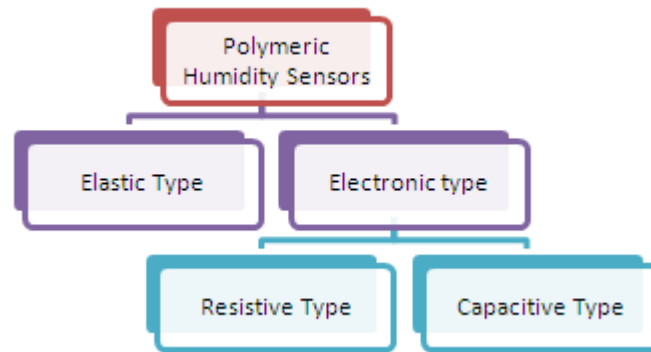


Fig:3.7 Types of polymeric humidity sensor

HUMIDITY SENSOR USES

Private consumers typically use humidity sensors when they endure from allergies or a respiratory illness that low humidity exacerbates. Conversely, high humidity can embolded mold, fungus, or bacteria growth. Humidity sensors are also used in wine cellars and humidors to help keep the air at a logical humidity level to prolong wine and cigar storage. Museums, storage facilities, and commercial HVAC systems use the sensors to secure a consistent level of moisture and air quality in the building(s). Now a days Automobiles use humidity sensors as a part of their defogging or defrosting systems to automatically adjust the amount and type of air used for the vehicle's air conditioning systems. Finally, humidity sensors are too used when collecting weather or oceanographic information while researching or measuring weather effects over time to help predict and analyze weather patterns.

3.6 PIR SENSOR

PIR sensors acknowledge you to sense the motion, nearly always wont to notice whether or not somebody's has been rapt in or out of the sensors vary. they're compact, cheap, less power, simple to use and don't wear out. For that reason

they're typically found in appliances and gadgets utilized in homes, businesses etc., they're often cited as PIR, "Passive Infrared", "Pyro electric", or "IR motion" sensors.



Fig:3.8 PIR sensor

Everything emanate some low level radiation, and the hotter entity is, the more radiation is emitted. The sensor in a motion detector is literally split in two halves. The reason for that is that we are looking to detect motion (change) not median IR levels. The two halves are jumpy so that they cancel each other out. If one half notice more or less IR radiation than the other, the output will oscillate high or low.

3.6.1 How PIRs Work

PIR sensors square measure a lot of refined than many of the opposite sensors explained in these tutorials (like photocells, FSRs and tilt switches) since there square measure numerous variables that spectacular the sensors input and output. To initiate explaining however a primary detector works, we'll use this rather nice diagram The PIR detector itself has 2 slots in it, every slot is formed of a exceptional material that's sensitive to IR. The lens used here isn't really doing a lot of and then ww will be able to notice that the 2 slots can 'see' out preceding a ways (generally the sensitivity of the sensor). once the detector is foolish, each slots discover identical quantity of IR, the encompassing quantity radiated from the space or walls or outdoors. once a heated body sort of a human or animal passes by, it 1st catch one 1/2 the PIR detector, that causes a sensible differential modification between the 2 halves. once the heated body leaves the sensing space, the reverse happens, whereby the detector turn out a negative differential modification. These modification pulses square measure what's determined.

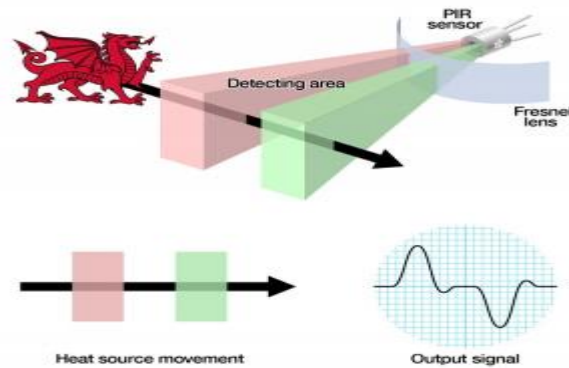


Fig:3.9 how PIR sensor works

3.7 THERMAL SENSOR

Thermal sensors are found in several laptops and desktop PCs in order to sound an alarm when a certain temperature has been outreach. All other reproduction requires permission.

They are devices to calculate temperature readings through electrical signals. The sensor is construct up of two metals, which produce electrical voltage or resistance once it detect a change in temperature. The temperature sensor plays a analytical role in maintaining a specific temperature within any equipment used to make whatever from medicine to beer. To generate these types of content, the precise and responsiveness of the temperature and temperature control are critical to ensuring the end product is perfect.

3.8 RELAY DRIVEN CIRCUIT

A relay is Associate in Nursing management that opens and closes below the management of another device. inside the initial kind, the switch is operated by Associate in Nursing magnet to open or shut one or many sets of junction. it fully was invented by Henry in 1835. As long as a relay is prepared to manage Associate in Nursing output circuit of higher power than the input circuit, it square measure typically investigated, in a {very} very broad sense, to be a kind of Associate in Nursing electrical equipment Relays unit components which allow a low-power circuit to alter a relatively high current on and off, or to manage signals that has got to be electrically secluded from the dominant the circuit itself. to form a relay operate, you've got need to pass a suitable coffee shop and holding current (DC) through its

energizing coil. And primarily relay coils unit planned to figure from a selected offer voltage - typically 12V or 5V, inside the case of the various of the tiny relays used for physics work. In each case the coil contains a resistance that is ready to draw the proper coffee shop and holding currents once it's connected to that offer voltage. that the essential arrange is to determine on a relay with a coil designed to figure from the provision voltage you're exploitation for your feedback loop (and with contacts capable of switch the currents you would like to control), therefore offer a suitable relay driver circuit so as that your low-power equipment can management the current through the relay coil. usually this could be somewhere between 25mA and 70mA. In A, NPN semiconductor unit Q1 (say a BC337 or BC338) is being used to manage a relay (RLY1) with a 12V coil, operational from a +12V offer. Series base resistance R1 is utilized to line the lowest current for Q1, so as that the semiconductor unit is driven into saturation (fully turned on) once the relay is to be energized. Output pin 3 can every provide and sink 200mA (enough to handle most very little relays comfortably), and so the inner flip flop that controls its output stage is triggered swiftly between its a pair of states by internal comparators connected to the sensing inputs on pins a pair of and 6. once these pins unit taken to a voltage on prime of 2/3 the provision voltage, the output switches low (0V); then they are taken below 1/3 the provision voltage, the output swings high. and so the 555 can gayly work on 5V, as you will be able to see, so it's very acceptable for driving a 5V relay coil from this offer voltage. as a result of the sensing inputs of the 555 unit voltage sensing and wish alone atiny low amp a number of current, the price of input resistance R3 square measure typically pr larger than for the semiconductor unit driver circuits. usually you'd use a worth of say 100kW, or maybe 220kW for a circuit operational from 12V. Finally altogether of these circuits, it's AN honest conceive to suit the provision line of the relay/driver stage with a reasonably high value of electrical condenser (say 100uF), to absorb the current transients once the relay activates and off. this could guarantee tons of reliable operation, and facilitate stop interference with the operation of your management equipment.

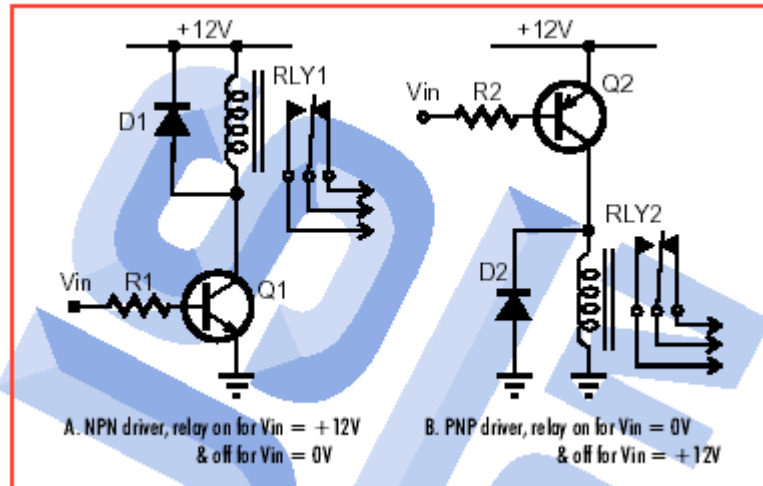


Fig:3.10 circuit diagram of relay driven circuit

3.9 PUMP MOTOR



Fig:3.11 Pump motor

Water, like electricity, will forever flow along the path of least resistance. In order to raise water the pump must come up with a path (area of low pressure or low resistance) to which the water will casually look to flow. It is critical then to acknowledge the role atmospheric pressure plays in creating such lift. At sea level the atmosphere apply a force of 14.7 lb/in² (PSI) on the earth's surface. The weight of the atmosphere on a body of water will avert lift from occurring unless an area of low pressure is created. The below figure shows three hollow tubes, each with a surface area of 1 square inch, emanate from sea level up into the atmosphere. In

tube (A) atmospheric pressure is same inside the tube as what it is in outside PSI. Since the weight of the atmosphere is being brought into play equally across the surface, no change takes place matching in the water level inside the tube. In tube (B) a perfect vacuum is designed making atmospheric pressure greater on the water outside the tube. The resulting differential causes water, flowing inherently to the area of lowest pressure to start filling the tube until it reaches a height of 33.9 feet.

APPLICATIONS

- ❖ Monitor high voltage
- ❖ Output voltage sampling for regulation
- ❖ System control micro for power ON/OFF
- ❖ Ground isolation

3.10 SUMP MOTOR

The float dominant backup pump is mounted within the sump pit on top of the conventional high water mark. Underneath traditional conditions, the most electrical steam-powered suction pump can handle all the pumping duties. Once water rises over traditional for any reason, the backup float within the sump is upraised and activates the backup suction pump. Associate in Nursing ejector pump may be connected to a hosepipe to produce aggressive water, with another hose to hold the water away. Though such ejector pumps waste water and square measure comparatively inefficient, they need the advantage of getting no moving elements and provide the utmost in dependability.

3.11 BUZZER

A buzzer or electronic device is an audio signalling device, which can be mechanical, mechanical device, or electricity. Typical uses of buzzers and beepers embrace alarm devices, timers and confirmation of user input like a click or keystroke.

- Resolution: It not like gas-discharge tube monitors, {lcd|liquid crystal show LCD digital display, alphanumeric display monitors have a native-supported resolution for best display impact.
- Dot pitch: the space between the centers of 2 adjacent pixels. The smaller the dot pitch size, the less graininess is gift, leading to a cheat image. Dot pitch could also be constant each vertically and horizontally, or totally different (less common).
- Viewable size: The scale of AN {lcd|liquid crystal show|LCD|digital display|alphanumeric display} panel measured on the diagonal (more specifically called active display area).
- Response time: The minimum time necessary to alter a pixel's color or brightness.
- Matrix type: Active or Passive.
- Viewing angle: (coll., additional specifically called viewing direction).
- Color support: what number sorts of colours square measure supported (coll., additional specifically called color gamut).
- Brightness: The quantity of sunshine emitted from the show (coll., additional specifically called luminance).
- Contrast quantitative relation: The ratio of the intensity of the brightest bright to the darkest dark.
- Aspect quantitative relation: The ratio of the dimension to the peak (for example, 4:3, 16:9 or 16:10).
- Input ports (e.g., DVI, VGA, LVDS, or maybe S-Video and HDMI).

3.12.1 PIN DESCRIPTION:

Table 3.3 LCD pin description

Pin No	Function	Name
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	V _{CC}
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-

The basic 2051 configuration is shown below. Build this circuit and then you would be ready to add the LCD Module.

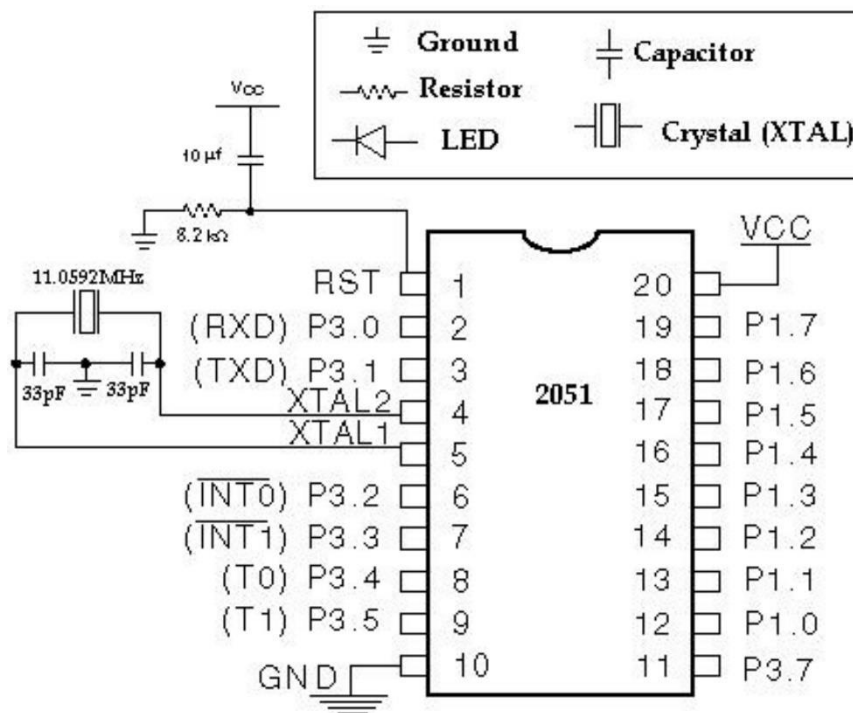


Fig: 3.14 Pin configuration

After you've got engineered a basic 2051 configuration as shown on top of, you'll connect the LCD Module as shown within the table on top of. additionally, you would like to feature the subsequent connections.

Connect LCD Pin three to Vcc (5 Volts). Connect LCD Pin eight to Ground.

Connect a five10 ohm resistance between LCD Pin 5 and ground. Connect a two.2k ohm resistance from LCD Pin two and Vcc. Connect a two.2k ohm resistance from LCD Pin thirteen to Vcc.

3.13 GSM MODEM



Fig:3.15 GSM modem

Applications

- SMS primarily based remote & Alerts
- Security Applications
- Sensor watching
- GPRS Mode Remote knowledge work

Features

- Status of electronic equipment Indicated by semiconductor diode
- Simple to Use & Low price
- On board shift kind power provide regulator
- RS232 output

GLOBAL SYSTEM FOR MOBILE COMMUNICATION (GSM)

Global system for mobile communication (GSM) is globally expected standards for digital cellular communication. GSM is that the name of customary cluster established in 1982 to make a standard European mobile phone standard that may formulate specification for a Pan-European mobile cellular radio system operative at 900 Mc. it's calculable that a lot of countries outside of European can be a part of the GSM partnership.

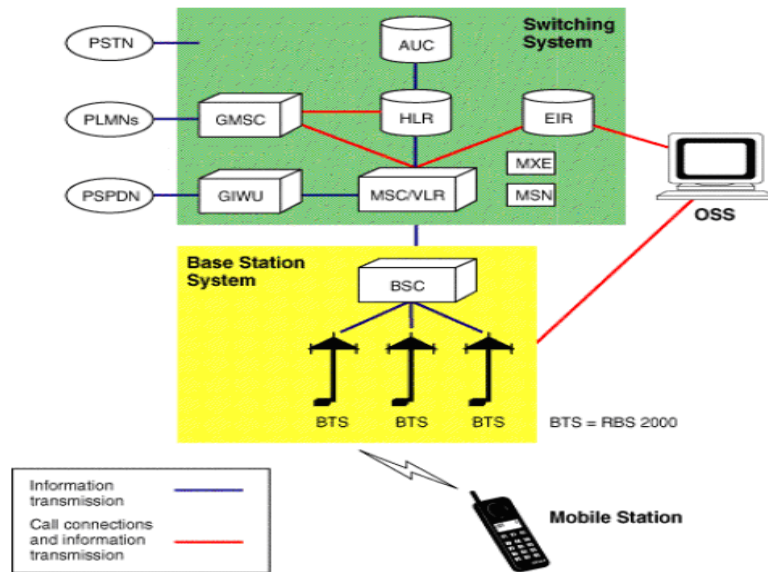


Fig:3.16 network of GSM module

CHAPTER 4

SOFTWARE AND HARDWARE OUTPUT RESULT

4.1 SOFTWARE REQUIREMENTS

- ❖ MpLab
- ❖ Proteus

4.1.1 MPLAB

MPLAB could be a proprietary software system integrated development atmosphere for the event of embedded applications on PIC and dsPIC microcontrollers, and is developed by semiconductor device Technology. MPLAB X is that the latest edition of MPLAB, and is developed on the NetBeans platform. MPLAB and MPLAB X support project management, code redaction, debugging and programming of semiconductor device 8-bit PIC and AVR (including ATMEGA) microcontrollers, 16-bit PIC24 and dsPIC microcontrollers, yet as 32-bit SAM (ARM) and PIC32 (MIPS) microcontrollers. MPLAB is intended to figure with MPLAB-certified devices for programming and debugging PIC microcontrollers employing a notebook computer. PICKit programmers are supported by MPLAB. MPLAB X supports automatic code generation with the MPLAB Code Configurator and also the MPLAB Harmony Configurator plugins.

4.1.2 PROTEUS 8.3 SIMULATION TOOL

Simulation tool proteus 8.3 could be a Virtual System Modeling (VSM) that mixes circuit simulation, animated elements and chip models to co-simulate the entire microcontroller based mostly styles. this is often the proper tool for engineers to check their microcontroller styles before constructing a physical paradigm in real time. This program permits users to move with the look victimisation on-screen indicators and/or light-emitting diode and liquid crystal display displays and, if hooked up to the laptop, switches and buttons. one amongst the most elements of Proteus 8.3 is that the Circuit fiftysix Simulation - a product that uses a SPICE3f5 Associate in Nursingalogue machine kernel combined with an event-driven digital machine that permit users to utilize any SPICE model by any manufacturer. Proteus

VSM comes with intensive debugging options, together with breakpoints, single stepping and variable show for a neat style before hardware prototyping. In summary, Proteus 8.3 is that the program to use after we need to simulate the interaction between software package running on a microcontroller and any analog or digital device connected to that.

4.2 SOFTWARE SIMULATION AND OUTPUT RESULT:

CIRCUIT DIAGRAM:

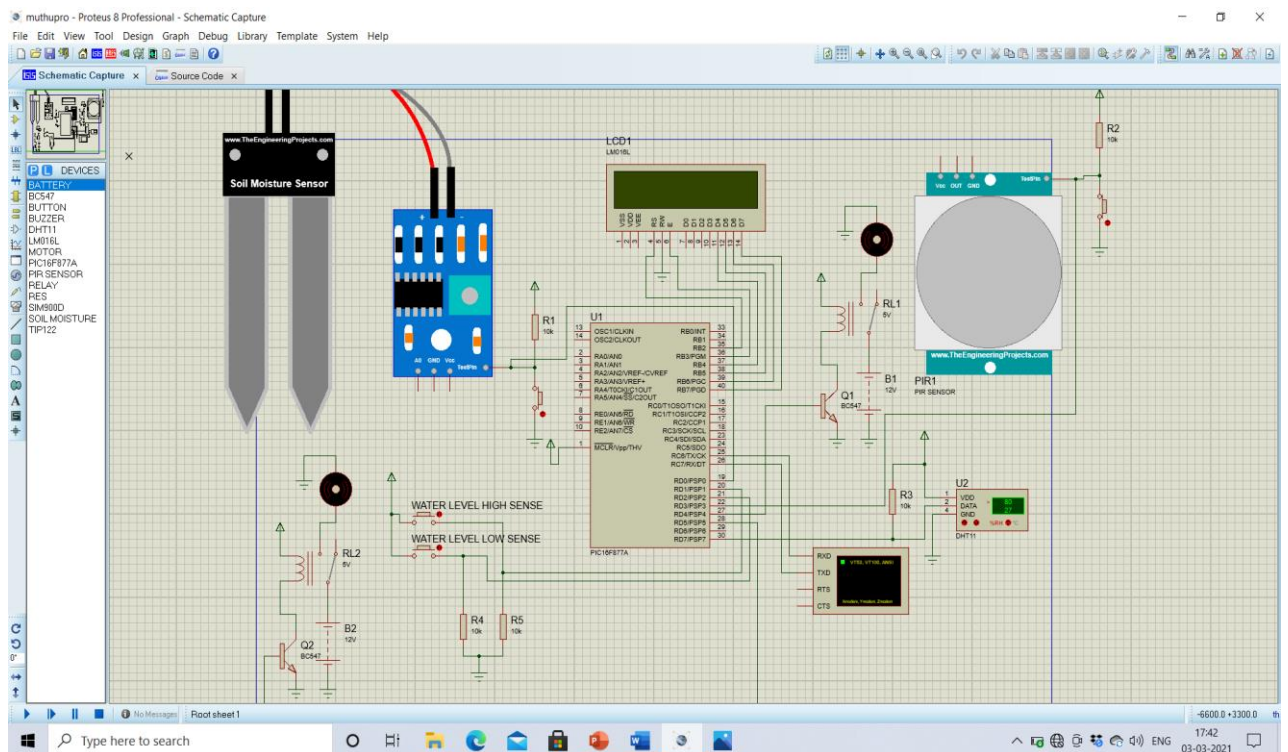


Fig:4.2.1 simulation of circuit diagram

Description: water level is too low when soil is in dry condition, the pump motor turn ON automatically



Description: water reaches the optimum level when soil is in dry condition, then the pump motor turn OFF automatically



WHEN SOIL IS WET:

Description: water level is high when soil is moisture then sump motor automatically turn ON to intake the water.

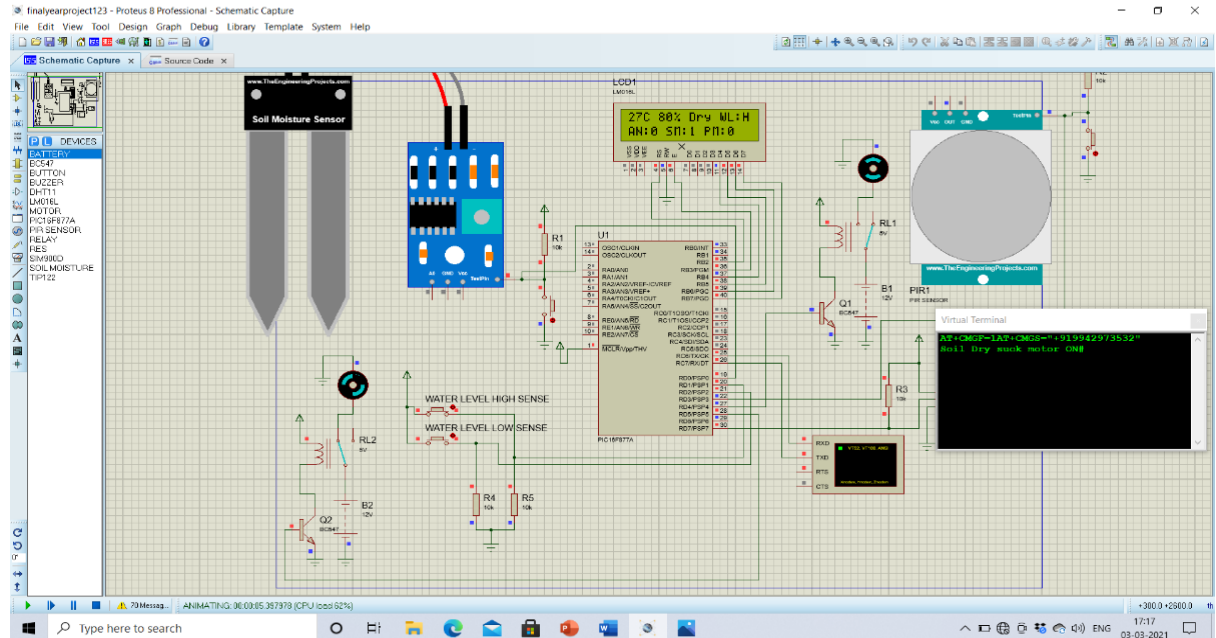


Fig:4.2.4 sump motor turn on.

Description: when sump motor intakes the certain level of water then it automatically turn OFF

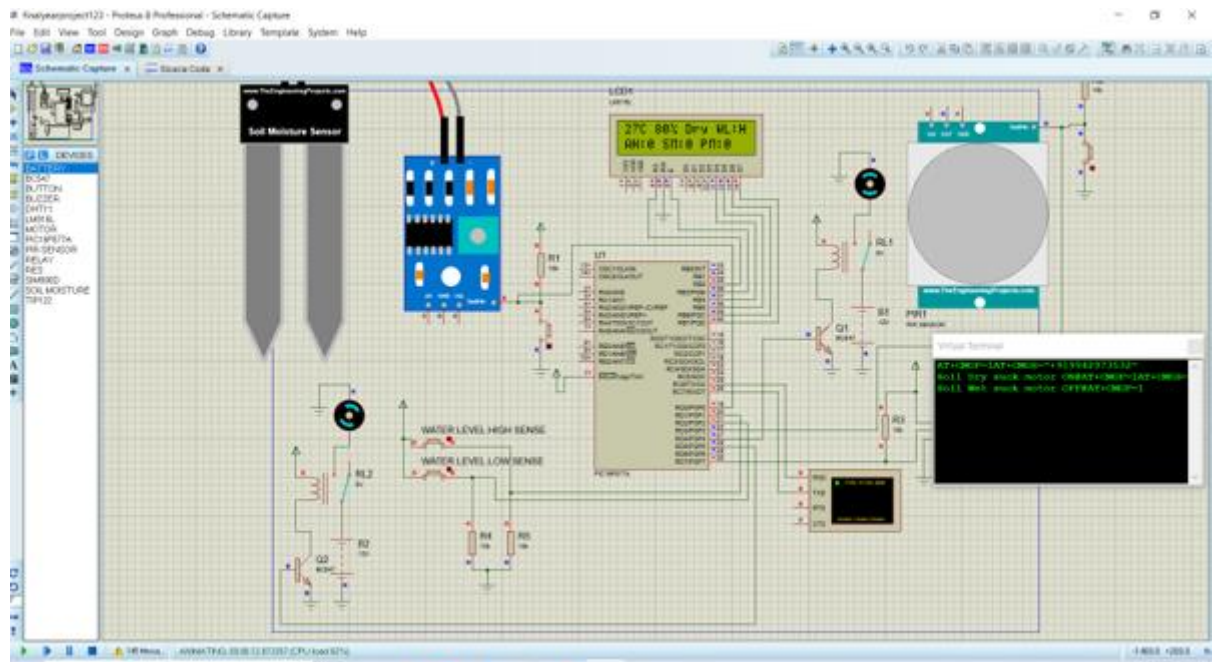


Fig :4.2.5 sump motor turn off.

Description: when an animal is detected the buzzer will make woo sound.



HARDWARE SIMULATION AND OUTPUT RESULT:

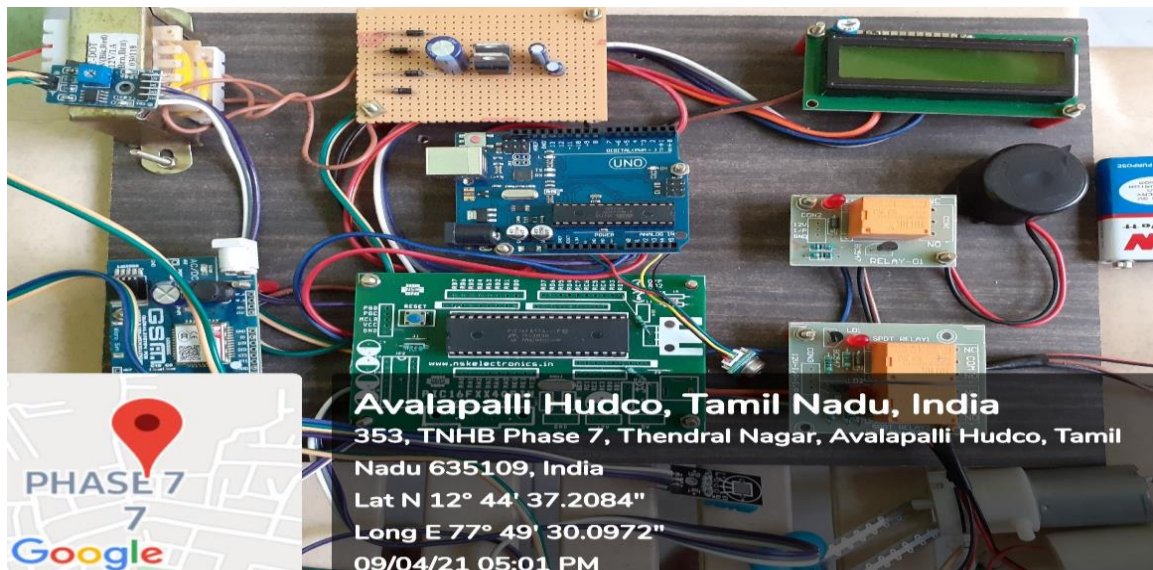


Fig:4.2.7 Hardware description

WHEN SOIL IS DRY:

Description: water level is too low when soil is in dry condition, the pump motor turn ON automatically.

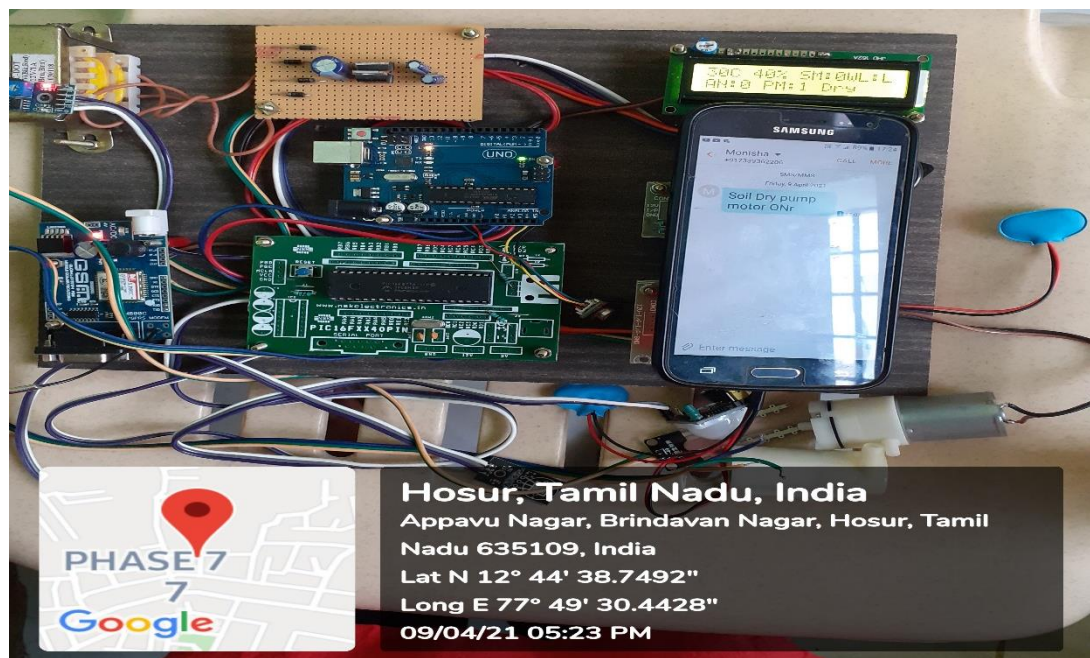


Fig:4.2.8 soil dry pump motor on.

WHEN SOIL IS WET:

Description: water reaches the optimum level when soil is in dry condition, then the pump motor turn OFF automatically.

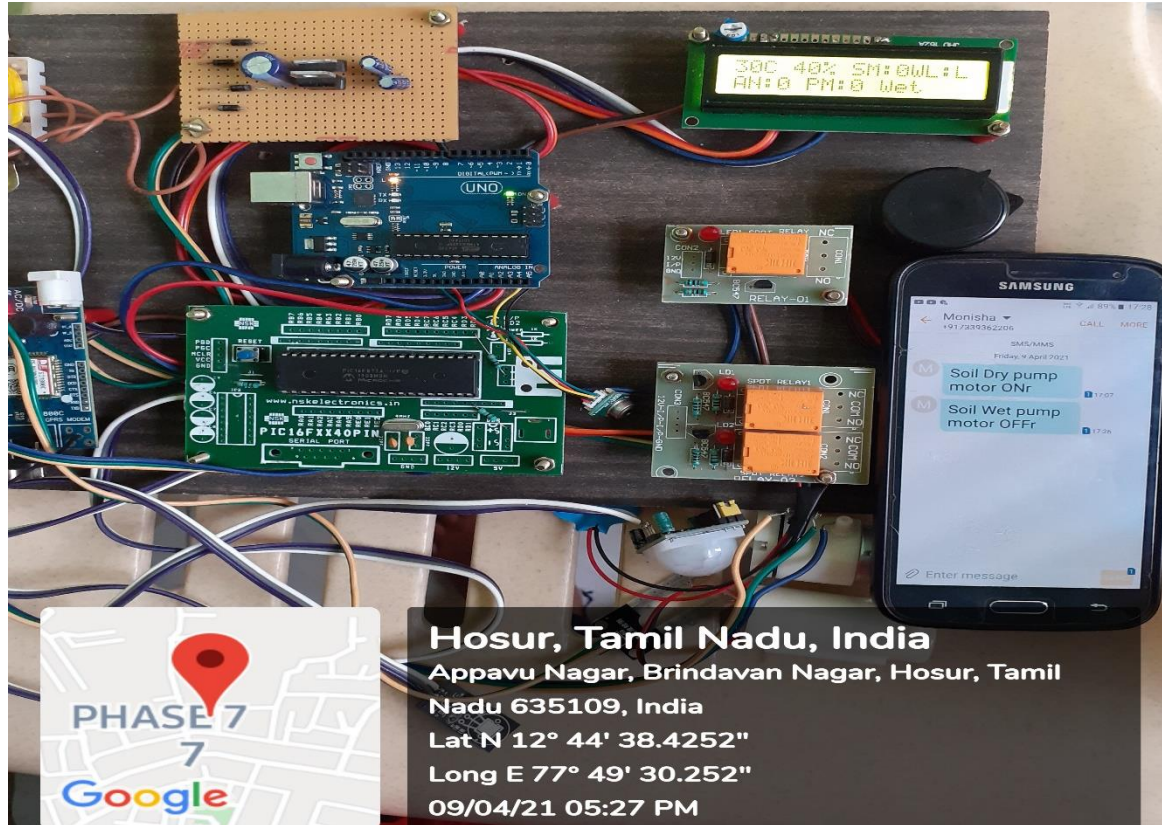


Fig:4.2.9 soil wet pump motor Off.

WHEN WATER LEVEL IS HIGH:

Description: water level is high when soil is moisture then sump motor automatically turn ON to intake the water.

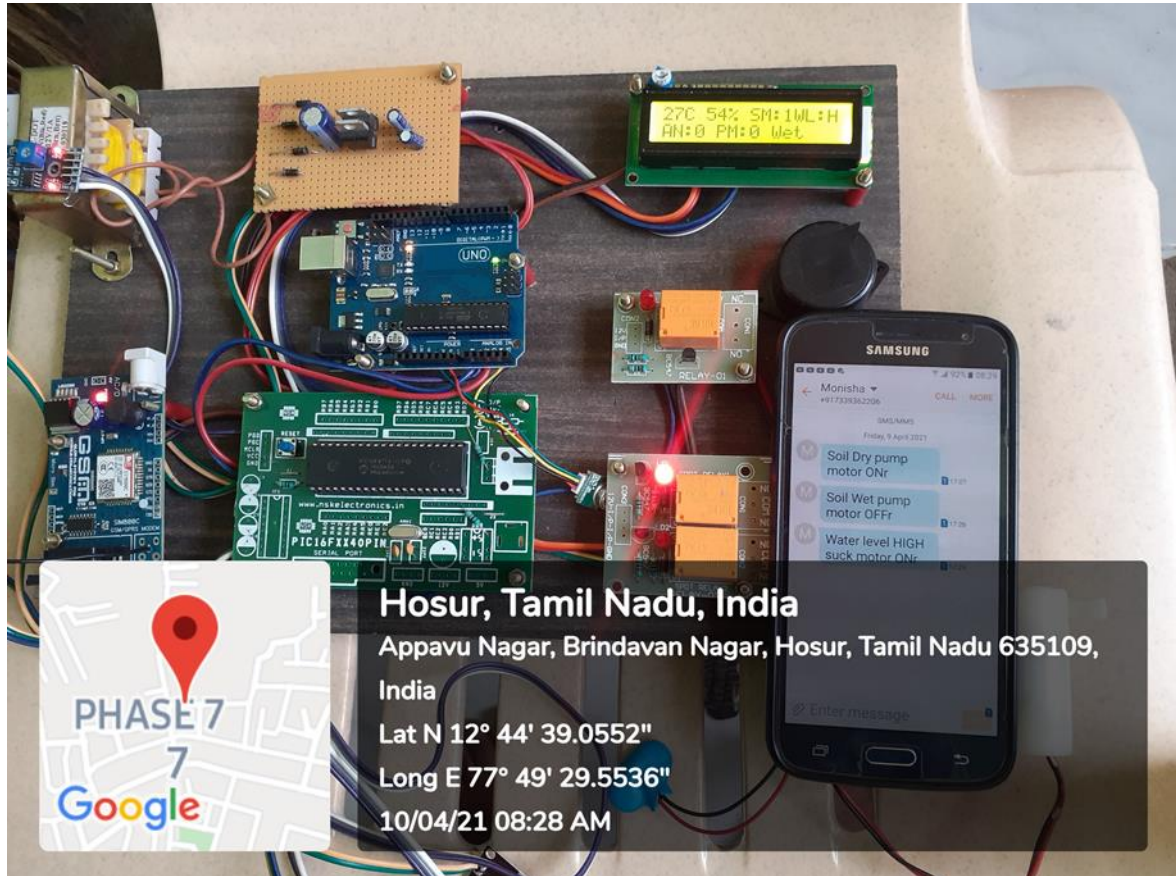


Fig:4.2.10 water level high suck motor on.

WHEN WATER LEVEL IS LOW:

Description: when sump motor intakes the certain level of water then it automatically turn OFF.

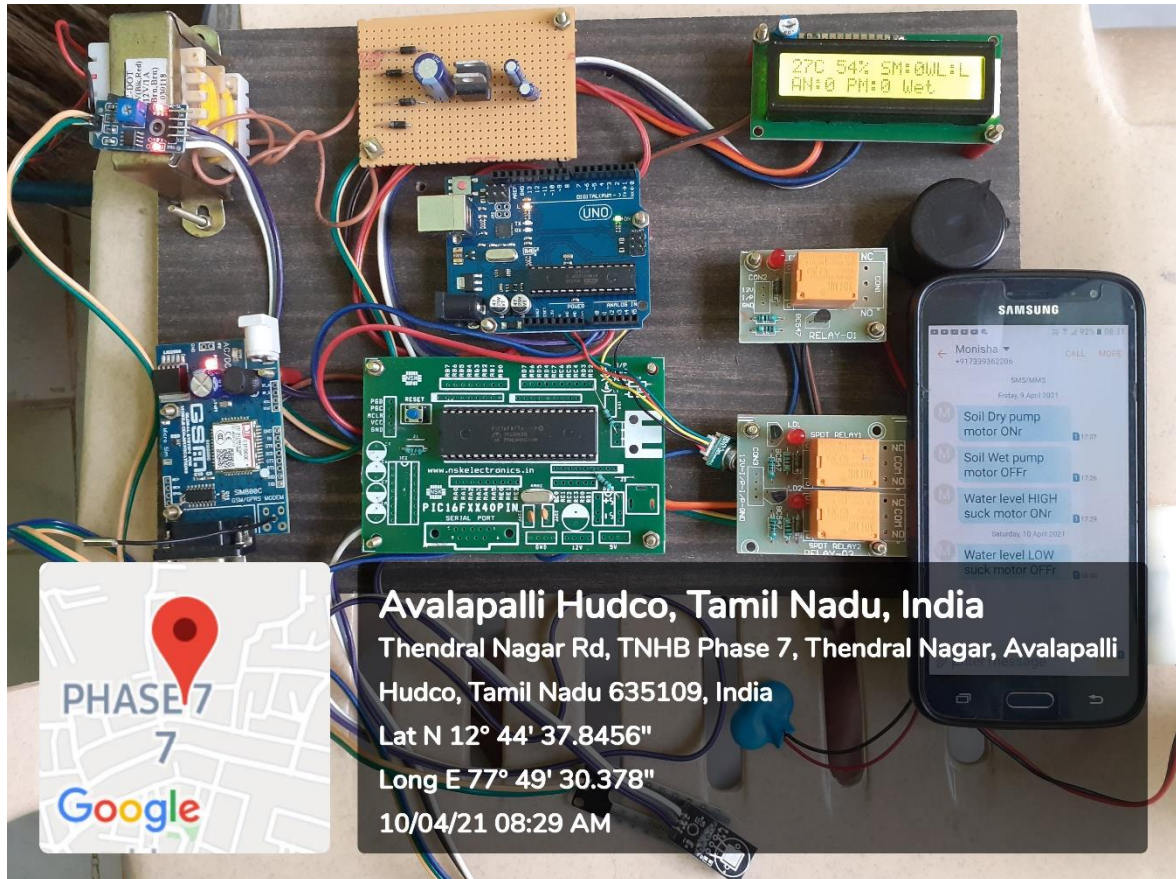


Fig:4.2.11 water level low suck motor off.

WHEN AN ANIMAL IS DETECTED:

Description: When an animal is detected the buzzer will make woo sound.



Fig:4.2.12 animal detected.

CHAPTER 5

CONCLUSION

5.1 CONCLUSION

The projected system is open design therefore anybody will build this sort of system victimisation any approach or path. The system uses wet device to watch the wet level that will increase additional accuracy of the system because it identifies the wet level terribly accurately than human. The system additionally observes completely different environmental conditions like humidness, soil wet and temperature that human cannot live accurately by open eyes to make your mind up the plant health that the accuracy of the system is high. It additionally involves watering mechanism that cut backs human labor and that we will reduce labor additional by modifying the system additional for different agricultural work like selecting, harvesting, weeding. This system notice wild animals approaching close to the sector further as sends SMS to former through GSM. This ensures complete safety of crops from animals.

5.2 FUTURE SCOPE

Water resources will be utilised with efficiency and effectively supported numerous different parameters in order that agricultural sector becomes a lot of productive. Automatic drip irrigation at completely different season is another future scope. Water is allowed to the sector of crops relying upon the actual season. Some a lot of parameters Such as plant growth at completely different stages, whether or not condition area unit to be taken into.

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