

AUTOMATIC IRRIGATION SYSTEM

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

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Certification

This is to certify that this project and thesis entitled “**Automatic Irrigation System**” is done by **Imranul Islam, ID No: 153-33-2950** and **Nurnabi Hossain, ID No: 153-33-2933**, 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 26 December 2018

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DEDICATED TO

We dedicate this Project to our parents.

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List of Abbreviations

AC	Alternating Current
DC	Direct Current
IC	Integrated Circuit
NC	Normal Close
NO	Normal Open
PCB	Printed Circuit Board
FDR	Frequency Domain Reflectometry
TDR	Time Domain Reflectometry
TDT	Time Domain Transmission
GDP	Gross Domestic Product
SCADA	Supervisory Control And Data Acquisition
GPS	Global Positioning System
USB	Universal Serial Bus
MHz	Megahertz
UART	Universal Asynchronous Receiver-Transmitter
TWT	Travelling-Wave Tube
SPI	Serial Peripheral Interface
LED	Light-Emitting Diode
USART	Universal Synchronous/Asynchronous Receiver/Transmitter
MIPS	Million Instructions Per Second
EEPROM	Electrically Erasable Programmable Read-Only Memory
RAM	Random-Access Memory
CPU	Central Processing Unit
ALU	Arithmetic-Logic Unit

LIST OF SYMBOLS

1 Ø	Single Phase
V	Voltage
Q	Charge
C	Capacitance
f	frequency

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ABSTRACT

Watering is the most important cultural practice and most labor intensive task in daily greenhouse operation. Watering systems ease the burden of getting water to plants when they need it. Knowing when and how much to water is two important aspects of watering process. To make the gardener works easily, the automatic plant watering system is created. There have a various type using automatic watering system that are by using sprinkler system, tube, nozzles and other. This project uses watering sprinkler system because it can water the plants located in the pots. This project uses Arduino board, which consists of ATmega328 Microcontroller. It is programmed in such a way that it will sense the moisture level of the plants and supply the water if required. This type of system is often used for general plant care, as part of caring for small and large gardens. Normally, the plants need to be watered twice daily, morning and evening. So, the microcontroller has to be coded to water the plants in the greenhouse about two times per day. People enjoy plants, their benefits and the feeling related to nurturing them. However for most people it becomes challenging to keep them healthy and alive. To accommodate this challenge we have developed a prototype, which makes a plant more self-sufficient, watering itself from a large water tank and providing itself with artificial sunlight. The pro-To type reports status of its current conditions and also reminds the user to refill the water tank. The system automation is designed to be assistive to the user. We hope that through this prototype people will enjoy having plants without challenges related to absent or forgetfulness. Bangladesh is a third world country with less economic growth. About 36 % (Bangladesh) of GDP and 64% (Bangladesh) of its employment comes from agriculture. But our agricultural history is declining due to lack of irrigation facility. At the same time the existing irrigation facilities cost the government a huge amount of subsidy every year. So it's a high time that we find an alternative way of irrigation so that our subsidy is reduced as well as people get water throughout the year. And gives birth to our project. In our project, we will be analyzing the feasibility of solar irrigation system for surface irrigation in the context of Bangladesh. Our main goal is to identify if the existing diesel run STW can be replaced by solar irrigation pump or not. RET Screen software has been used for the analysis.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Bangladesh's noteworthy wellspring of pay is from agribusiness zone. What's increasingly, 70% of farmers and general people depend upon the agribusiness. In Bangladesh by far most of the water framework structures are worked physically. These antiquated methodologies are superseded with semi-automated and motorized frameworks. His available customary techniques look like dump water framework, terraced water framework, spill water framework, sprinkler structure. The overall water framework circumstance is organized by extended enthusiasm for higher agrarian benefit, poor execution and lessened openness of water for Agribusiness. These issues can be fittingly corrected in case we use robotized structure for water framework.

A. Need of Automatic Irrigation Simple and easy to present and organize. Saving essentialness and resources, with the objective that it will in general be utilized in real way and aggregate. Agriculturists would have the ability to spread the fitting proportion of water at the ideal time by means of modernizing property or nursery water framework. Dodging water framework at the wrong time of day, decrease overflow from over watering doused soils which will upgrade trim execution. Automated water framework structure uses valves to turn motor ON and OFF. Motors can be motorized viably by using controllers and no need of work to turn motor ON and OFF. It is correct strategy for water framework and a productive contraption for exact soil moistness control in exceedingly thought nursery vegetable age. It is productive, the human mix-up end in open soil suddenness levels.

The essential purpose of this endeavor was to offer water to the plants or developing normally using microcontroller (Arduino Uno). We can normally watering the plants when we are taking a break or don't we have to inconvenience my neighbors, Sometimes the neighbors do unnecessarily of watering and the plants end up kicking the container at any rate. There are check based contraptions open in India which waters the earth on set between time. They don't recognize the earth clamminess and the including temperature to know whether the soil very watering or not.

1.2 Problem Statement

Water framework has been recognized as one of the backbones of achieving vision 2030 by the governing body of Kenya in 2007. In its proclamation named Kenya vision 2030 the country intends to save water and start better methodologies for social occasion additionally usage of rain and underground water to propel cultivating proficiency. Kenya is a water uncommon country according to the world sustenance programming engineer, the vision 2030 action proposes heightened utilization of science, development and progression to raise benefit and profitability anyway water framework augmentation is most likely going to extend the deficiency of water which will provoke the restriction for the open substance by irrigators, adventures and pastoralists.. It sees the essential imagined by inventive work in animating money related enhancement in all the as of late industrialized countries of the world. Starting late moved water framework designs e.g. the one million area of land Galana-Kulalu water framework plan still handle the use of manual water framework which will incorporate use of more water since there is no control and subsequently this endeavor proposes the use of customized water framework control system.

1.3 Objectives

The goal or goals of which the arranged contraption is required to accomplish is to make a customized water control with modified water framework structure The standard objective of this endeavor was s to setup, create and test a customized water framework control system.

1. Perceive the requirement for water sparing in water system frameworks.
2. To control an irrigation system Using soil Moisture sensor
3. Decrease the amount of work pressure in workplace
4. To avert over laborers of the siphoning machine and keep it from getting terrible.
5. To dodge loss of water.

1.4 Scopes

To consequently control the siphon of undertaking has designed which guarantees stream of water in the land. The degree of the structure was keeping brief and simple to in other not to display futile complexities and render it all around uneasy. muddled fringe gadget does not appended in The framework which anyway unfathomable for the detail printable information has been dodged for reasons of moderateness material of low range and less exact presentations instead of a very much amassed customized water framework was used to achieve this point, the modified water framework perceive and control the water in the soil.

1.5 Methodology

For planning a programmed water system framework, we can be utilized numerous strategies such the gadget of exchanging yet all techniques need of human supportive. Utilizing electronic control to supply the water aside from human cooperation is structured in this project. It has designed diligently put on to inundate the water, at long last closed down the water siphon is consequently whenever and the siphon is off while soil is wet.

The approach used in this work is the deliberate structure get to the general arrangement was broken into limit square outlines. Where each square in the outline address a territory of the circuit that completes an express limit.

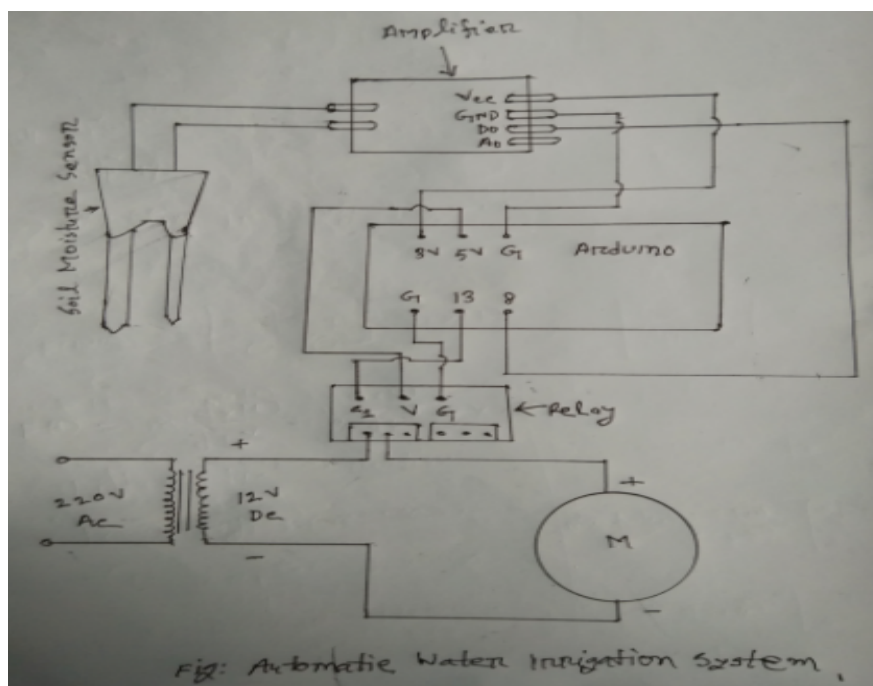


Fig. 1.1 Automatic water irrigations block diagram

1.6 Project Outline

This Project is organized as follows:

Chapter 1: Introduces the project “Automatic water irrigation system”. Also explain its objectives and methods.

Chapter 2: Reviews the literature of the automatic water irrigation system.

Chapter 3: Analyzes water irrigation system components. Overview of the whole system with the circuit diagram. At that point, singular portrayal of each segment. The framework is clarified alongside their appraisals and associations and their purpose.

Chapter 4: Recite the hardware development part of the different unit of the project. Also describes the basic operation of the controller.

Chapter 5: Analysis the result and. adjacently, the advantages and estimate cost of the whole equipment’s were discussed and disadvantage,

Chapter 6: Working performing conclusion so far. How it will do the work in future and its limitation.

Chapter 2

LITERATURE REVIEW

2.1 Introduction

The turn off the siphon when the land begins overflowing and Generally Switch is on the siphon by People when their territories go dry. As a results sometimes non-accessibility of water and the inessential wastage on account of crisis.

we are utilizing makes this framework programmed of this circuit , i.e. it switches on the siphon when the dirt will be get and switches it dry when the water system comes to a pre-decided dimension.

2.2 Review

A programmed water system identifies the measure of water in the field and furthermore guarantees persistent water stream nonstop due to it's programmed, this programmed water control is comprised of Arduino and ATmega328 IC with 16 pins. IT was because of the way that transistors were not just less expensive, progressively solid and less power utilization however was a lot littler in size than an electronic cylinder. To exploit little transistors estimate, the detached segment also were diminish in size there by making the whole circuit little advancement of printed circuit board(PCB) further decrease the measure of hardware gear by dispensing with cumbersome wiring and tie point. In the mid-1960s another field of microelectronics was conceived basically to meet the prerequisite of the military which was to diminish the extent of it gadgets gear to roughly one tenth of it at that point existing volume. The drive outrageous decrease in the extent of electronic circuit has prompted the advancement of miniaturized scale hardware circuit called incorporated circuit (ICS) which are so little than their real development is finished by professionals utilizing powerful magnifying instruments. A coordinated circuit is a total circuit in which both the dynamic and inactive part are manufactured in on a minor single chip of silicon, Active component are those which have the ability to produce gain example are transistors and field effect transistors (FET). An integrated circuit sometimes called a chip or microchip is a semi-

conductor wafer on which thousands of millions of tiny capacitors are fabricated and transistors, either analog digital An IC can be depending on its intended application.

2.3 survey

The including features are clever GPS based remote controlled robot to perform assignments like weeding, sprinkling, clamminess distinguishing, human disclosure and keeping watchfulness. [3]The disseminated registering contraptions that can make a whole figuring structure from sensors to mechanical assemblies that watch data from agrarian field pictures and from human performing craftsmen on the ground and decisively feed the data into the vaults close by the region as GPS coordinates.[4]This thought proposes a novel technique for splendid developing by associating a wise recognizing structure and sharp irrigator structure through remote correspondence technology.[5]It proposes an insignificant exertion and profitable remote sensor compose methodology to pick up the earth clamminess and temperature from various region of farm and as per the need of yield controller to take the decision whether the water framework is enabled or not.[6]It proposes an idea with respect to how automated water framework system was made to update water use for cultivating harvests. Likewise, a portal unit handles sensor information.[7]The barometrical conditions are checked and controlled online by using Ethernet IEEE 802.3.The partial root zone drying technique can be realized to a biggest extent.[8]It is proposed for Arduino based watching system to inspect alter condition and the procedure to improve the profitability of essential administration by dismembering harvest statistics.[9]In this paper picture getting ready is used as a mechanical assembly to screen the contaminations on natural items in the midst of developing, perfect from domain to social event. The assortments are found in shading, surface and morphology. [10]In this paper, nursery is a working in which plants are created in close condition. It is used to keep up the perfect conditions of the earth, nursery the administrators and data getting.

2.4 Sensors

Saturate sensor (Electrode) distinguish the dirt temperature or clammy of soil that send granular materials, powders and including fluids slurries. All substance that stream to end up basically level in their holders (or other physical limits) on account of gravity. The substance to be measure can be inside a holder or can be in its common shape (e.g. stream or lake). The dimension estimation can be either persistent or point esteem. Ceaseless dimension sensors measure inside a predefined extend and decide the correct measure of substance in a specific place. Slope point level sensors just show whether the substance is above or underneath the detecting point commonly the last recognize levels that are unnecessarily high or low there are numerous physical and use of factors that influence choice of ideal dimension checking strategy for mechanical and business forms. The determination criteria incorporate the physical stage (fluid strong or slurry), temperature, weight or vacuum, thickness (explicit gravity) of medium, unsettling, acoustic or electrical commotion, vibration, mechanical stun, tank or container size and shape additionally critical are the application imperative value, exactness, appearance reaction rate, simplicity of alignment or programming, physical size and mounting of the instrument or discrete (point) levels. [5]

2.5 Summary

This endeavor structure by two connector or power supply unit, Arduinouno R3 which microcontroller exhibit is Atmega328p, exchange module and soil immerse sensor.

CHAPTER 3

ANALYSIS OF THE SYSTEM COMPONENT

3.1 Introduction

Water stream Controller uses a direct instrument to distinguish and keep up the water framework in an agricultural land or some other compartment by trading it on/off the motor normally when required. Here used soil soaked sensor. The sensor is keeping up the water stream in the soil by actuating and retriggering the clock IC. Here the check IC is acting in mono stable mode or one-shot mode.

3.2 Materials and Methods

Notwithstanding the way that there are a couple of associations moving these systems made in various courses, there is a fundamental way by which one can build his/her very own plant watering structure in just a Barely any hours, if each required material are available nearby basic required data about devices. To assemble this system one ought to honestly interface following

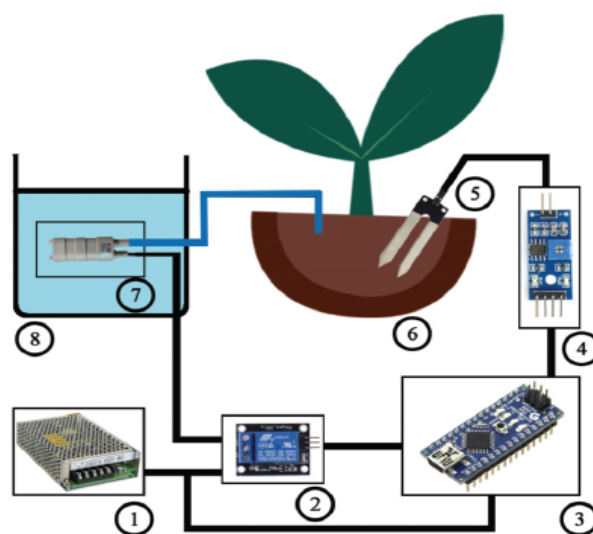


Fig:3.1: Methods of system.

- 1) Power Supply (12V)
- 2) Relay module
- 3) Microcontroller (Arduino)
- 4) Amplifier circuit as part of a soil moisture sensor
- 5) Soil moisture probes
- 6) Plant in the flowerpot
- 7) Water pump
- 8) Water container

Figure 3.1 Underneath shows the relationship of all recently referenced materials in the structure. (Figure 3.1) In our examination, definitely related each and every required material by us as showed up in Figure 1 above, in this state to test whether our system will work suitably or not. In like manner, the general lead and the nearness of our plant, that was subject of the examination, were found in the going with 30 days.

3.2.1 Arduinouno R3

In this undertaking has utilized an Arduinouno R3 in which microcontroller board dependent on the ATmega328. There are add up to 32 sticks in this Arduino UNO R3 and 14 pins are advanced stick of them in the Arduino. 6 stick can be utilized PWM yields, for simple information utilized 6 stick, fired resonator is 16 MHz it's called clock recurrence .it has one port USB association and one 12 volt control supply port by which supply the power another circuit, it has a reset catch which is reset the program. TXD and RXD both are computerized stick. TXD is sequentially transmitting and RDX is sequentially accepting port. Then again it has 6 simple sources of info 5v vcc stick, 3.3v vcc stick, ground stick (it has 3 ground stick however all simple stick), ROW input, RESET stick, and finally Analog reference stick. Presently another 6 pins are MOS-0, MOS-1, SS, SCK, SDA, and SCL, this six pins are called stick header. Two 8 bits microcontroller has utilized in this Arduino and other two pins are input/yield stick and just boot loader (its programming stacking framework). The microcontroller bolstered require all that it has contains; USB link or power utilized essentially interface it to a PC with an AC-to-DC connector or battery to begin The Uno varies from every former board in that it doesn't utilize the FTDI USB-to-sequential driver chip.



Fig. 3.2: Arduino UNO R3 Board

The power source is picked therefore. External (non-USB) power can come either from an AC-to-DC connector (divider mole) or battery The Arduino Uno can be energized by methods for the USB affiliation or with an outside power supply. 2.1mm center positive fitting into the board's ability jack associated by stopping with connector. Connector. By 6 to 20 volts can work the board an outside supply. On the off chance that supply voltage under 7V, in any case, under five volts by 5V stick and subsequently the board not stable.

Table 3.1: Arduino Specifications

Feature	Specification
Microcontroller	Atmega328
Operating voltage	5v
Input voltage (recommended)	7-12v
Input voltage (limits)	6-20v
Digital I/O pins	14 (of which 6 provide PWM output)
Analog input pins	6
DC Current per I/O Pin	40mA
DC Current for 3.3v	50mA
Flash Memory	32KB(Atmega328) of which 0.5KB Used by boot loader
SRAM	2KB(Atmega328)
EEPROM	1KB(Atmega328)
Clock Speed	16 MHZ

3.2.1a Analysis of Programming:

Utilizing Arduino programming chosen the program which is works in The Arduinouno " from the products of Arduino Uno > Board menu (as per the microcontroller on your board). See instructional exercises the and reference. For subtleties, it without the utilization of an outside equipment developer The ATmega328 on the Arduino Uno comes perjured with a boot loader that enables you to transfer new code to. Utilizing the first STK500 convention (reference, C header records) it conveys. the ICSP (In-Circuit Serial Programming) header; is sidestep in a microcontroller this is the boot loader and projects the through observe their information for details The DFU boot loader used to stack by ATmega16U2/8U2 , which can be actuated by: different microcontrollers and another Arduino likewise utilized PC for conveying

Offices or UART TTL (5V) sequential communication used ATmega328 gives, on advanced pins 0 (RX) and 1 (TX) are accessible in the Arduino. This sequential correspondence over USB and shows up as a virtual com port to programming on the PC AnATmega16U2 on the board channel. The '16U2 firmware utilizes the standard USB COM drivers, and no outside

driver is required. In any case, on Windows, an .in document is required. The Arduino programming incorporates a sequential screen which enables straightforward printed information to be sent to and from the Arduino board. The RX and TX LEDs on the board will streak when information is being transmitted by means of the USB-to-sequential chip and USB association with the PC (yet not for sequential correspondence on pins 0 and 1). A Software Serial library takes into account sequential correspondence on any of the Uno's advanced pins. The ATmega328 likewise bolsters I2C (TWI) and SPI correspondence. The Arduino programming incorporates a Wire library to rearrange utilization of the I2C bud.

3.2.1b Physical Characteristics:

The Uno PCB are 2.7 and 2.1 inches separately are the most extreme length and width with the power jack and USB connector and reaching out past the previous measurement. The board to be joined to a surface or four screw gaps permit case. The computerized stick 7 and 8 is 160 mil (0.16"), remove between them not an even numerous of the 100 mil separating of alternate pins.

3.2.1c Function of Different Pin

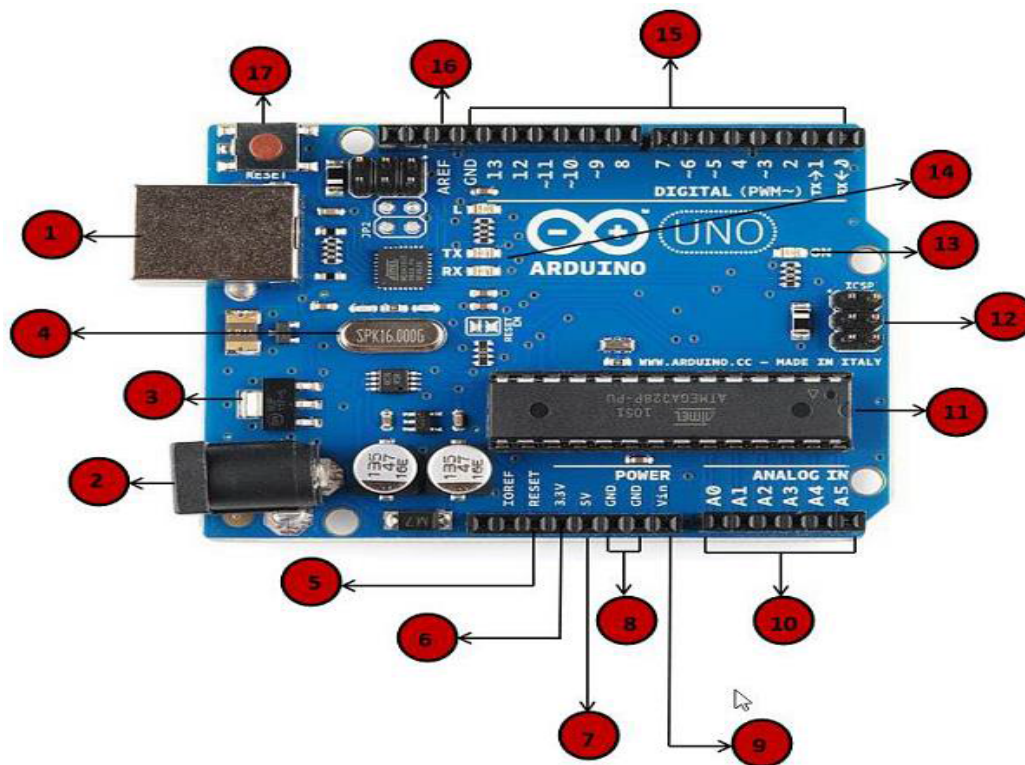


Fig.3.3: Function of Different Pin

I, USB power port

Using the USB cable Arduino board can be got power from our PC. Connected USB link to the USB association you need to do.

II, Barrel Jack of power

By connecting it to the Barrel Jack (2). Arduino sheets can be controlled straightforwardly from the AC mains control supply.

III, Voltage Controller

The amount of voltage is required control the Arduino board and balance out the DC voltages discover by the different components and processor.

That's voltage control by the voltage regulator

IV, Arduino Crystal Oscillator

Arduino in managing time issues is helped by the precious stone oscillator. The Arduino ascertain the time by utilizing the gem oscillator. Best of the number printed of Arduino gem is 16.000H9H. It has the measure of recurrence is 16,000,000 Hertz or 16 MHz

V, 17Reset pin of Arduino

Arduino board can be reset by you, i.e., from the earliest starting point will be start begin your program. Two separate ways, you will be reset the UNO board. First way, by utilizing the reset catch (17) on the board. And 2nd way, the Arduino stick named RESET (5) can be associate an outer reset catch by you.

6,7,8,9 Pins (3.3v, 5v, GND, VIN)

- 6 pin is supply 3.3 output volt
- 7 number pin is 5 volt output supply
- Arduino board works fine most of the component with 3.3 volt and 5 volt.
- 8 number pin is GND (Ground) –in the Arduino has several GND pins, these are used to ground our circuit.
- 9 number pin is Vin –by the Vin pin you can supply the power at Arduino board from an external power source, like the mains power supply of Ac.

X, simple or (Analog) pins

There are five Analog sticks in the Arduino UNO board, as A0 through A5. Here the stickiness sensor and temperature sensor are simple sensor. At the point when any flag originate from simple sensor which is changed over into computerized value By These pins and read it by the chip.

XI, Prime microcontroller

This is claim microcontroller (11) of Each Arduino board. You think the microcontroller is the cerebrum of an Arduino board. On the Arduino is marginally unique in relation to board to board by the principle IC (coordinated circuit).generally ATMEL Company makes the microcontrollers. You ought to perceive what IC your square has previously stacking another program from the Arduino IDE. This information is open on the most astounding purpose of the IC. To realize more bits of knowledge concerning the IC improvement and limits.

XII, ICSP pin

ICSP (12) is an AVR it is the most imperative piece of an Arduino, for the Arduino involving MISO, RESET, MOSI, VCC, SCK, and GND in an unobtrusive programming header. As a SPI (Serial Peripheral Interface)it is much of the time alluded and as an "advancement" of the yield it could be considered. Extremely, the yield substance to the ace of the SPI transport are unraveled by you.

XIII, indicator as a Power LED

Power LED demonstrate the power when the power supply in the board.

When we interface the fitting with our Arduino into a power source to demonstrate that your block is fueled correctly. When the association will be something incorrectly then the light portion not turn on.

XIV, the pin of TX and RX LEDs

This is another vital piece of Arduino board. There are two capacities: like for transmit is TX (transmit) and for getting is RX (receive).Appear these stick is first, pins 0 and 1 are computerized stick, by these stick indicate the sequential correspondence. Second, the RX and TX a drove (13). The TX drove flashes while sending the sequential information with

various speed. Flashing speeds relies upon the baud rate utilized by the board. At the point when the accepting procedure happen that time is RX streak time.

XV, Digital Input/output pin

There are add up to 14 advanced I/O sticks in this Arduino 0 to 13 stick are Digital stick. There are 6 PWM (beat Width Modulation) These pins can be masterminded to fill in as data mechanized pins to examine justification regards (0 or 1) or as cutting edge yield pins to drive assorted modules like LEDs, exchanges, etc. The pins named "~" can be used to create PWM.

XVI, AREF

It is once in a while, as far as possible for the simple information pins. used to set an outside reference voltage (somewhere in the range of 0 and 5 Volts) as AREF represents Analog Reference. [5]

3.2.2 Power Supply

Two power supply has utilized in this task. An electrical load received electric vitality bay control supply. Which is an electronic gadget and by that is to change over one type of electrical vitality to another. At that point outcomes, as electric power converters refereed are now and then by power supplies. While others are incorporated with bigger gadgets alongside their heaps. Instances of the last incorporate power supplies found in personal computers and purchaser gadgets. The wellspring of this power can emerge out of various source like the primary power source AC voltage and battery or even from a sustainable power source like sun powered board wind turbine or energy component to give some examples. The most widely recognized wellspring of intensity is typically the principle AC

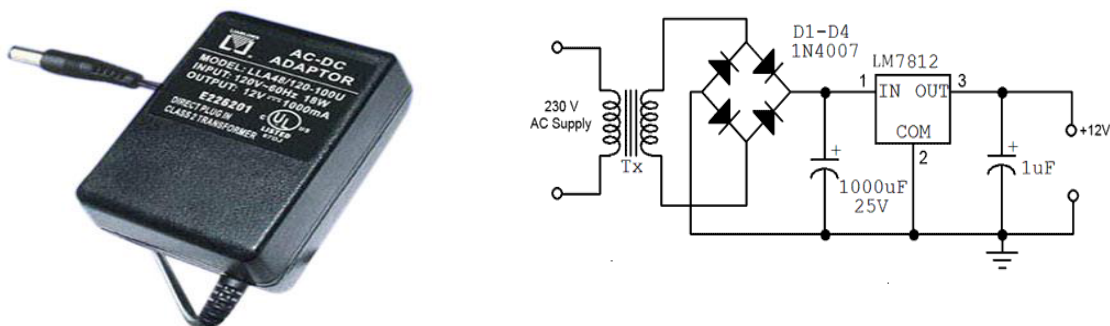


Fig. 3.4: Power Supply & Circuit Diagram AC-DC (220v-12v)

Two stick Plug: by the two stick plug AC supply to transformers essential side from the switch board. It supplies 220v from AC line and its believer 9v yield by the transformer.



Fig.3.5: 2pin Plug

3.2.2a transformer

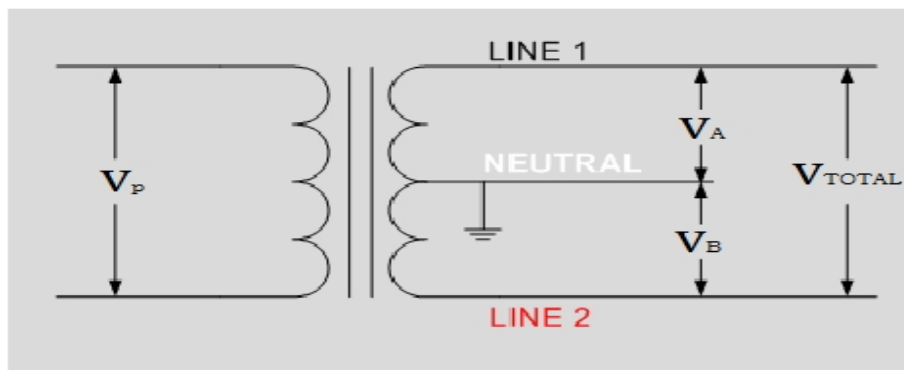


Fig.3.6 Transformer circuit representation

The transformer works as indicated by 'faradays' electromotive enlistment rules. It has two loops and we can consider first curl is essential and second loop is optional loop. Two curl remain nearly. There are numerous kinds of transformer however here we will examined about advance down transformer since we require 12v transformer in this undertaking. At the point when AC voltage supply to the essential at that point stream the current in the essential curl as an outcomes make attractive flux which is cut the optional loop and incited new voltage at the secondary coil.

Turn ration = $V_P/V_S = N_P/N_S$ and power out = power in or V_s .

3.2.2b Works of the Transformer

We can see the fig: 3.6 is a middle tap transformer its yield add up to voltage isolated by two voltage. First voltage is between line 1 and impartial and second voltage is between line nonpartisan and line two there name individually V_a and V_b .the condition of numerically between two voltages are needy upon the essential voltage and additionally the turn proportion of the transformer.

$$V_A = (N_a / N_p) * V_P$$

$$V_b = (N_b / N_p) * V_p$$

The extent of two output voltage V_a and V_b separately are equivalent yet bearing is inverse, the stage distinction between two voltages is 180 degrees. In this reason we should utilize full wave rectifier with a middle tap transformer. To make both the voltage in phase.

3.2.2c Full-Wave Bridge Rectifiers

A full wave bridge rectifier are made by four diodes like D1, D2, D3 and D4. This is and electronic circuits by which changes over AC voltage to DC voltage. A rectifier is made utilizing diode and capacitor blend. The diode property is exceptional, in a solitary bearing the current to stream is used in here allowing. The applied AC voltage is converted an AC voltage into a pulsating DC voltage for both half cycles. It converts both the half cycles of AC input into DC output it is the advantage of the bridge rectifier.

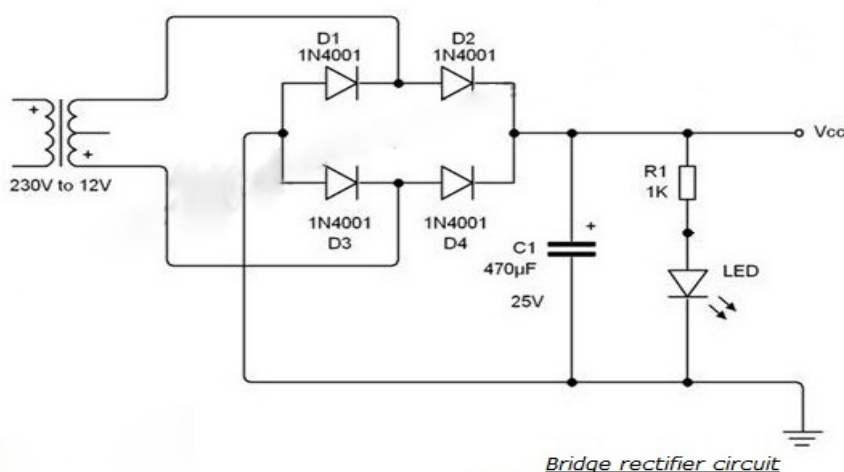


Fig. 3.7: Bridge rectifier circuit

When applied AC supply in the rectifier circuit for positive half cycle diodes D2 and D3 are stay forward condition and diodes D1 and D4 are reverse condition. So seen this stage the current through from D2 to Load after that load to D3. As an outcomes complete positive half cycle. When applied negative half cycle in the rectifier then, diodes D1 and D4 are forward state and rectifier diodes D2 and D3 are reverses condition. In this stage the current through from D4 to load after that load to D1. And complete negative half cycle. Mix of both cycle, stack current streams a comparative way. Consequently we get a throbbing DC voltage as appeared in fig ,

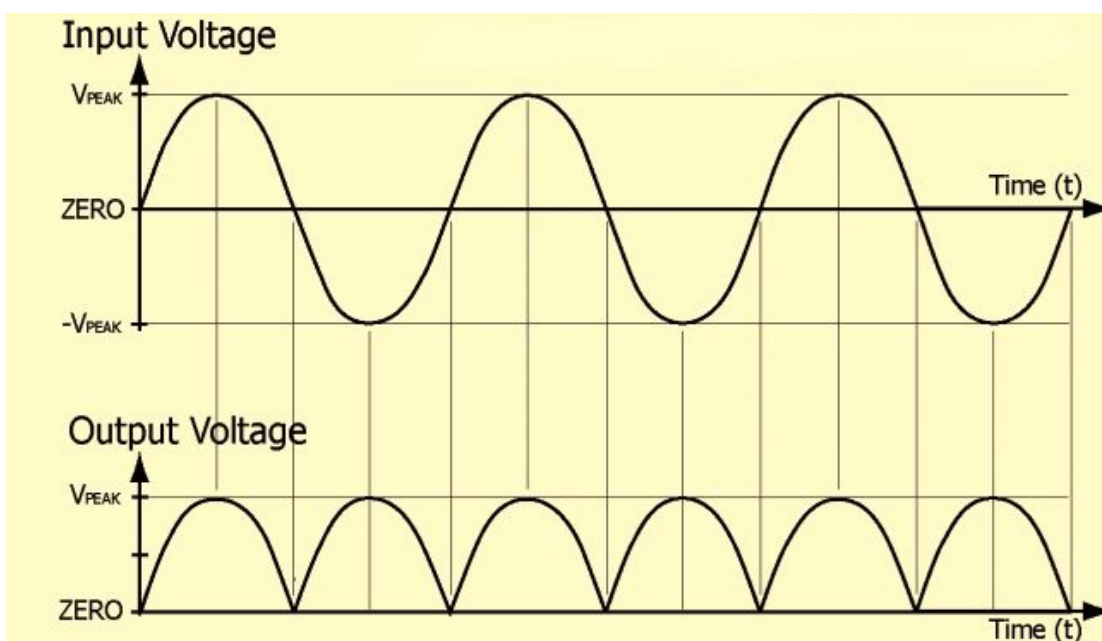


Fig: 3.8: Input output curve

- by addition capacitor converted the output DC pulsating voltage to settle DC voltage.
- Capacitor will reverse biases when time period $t=1s$ Input go to decrease, then the voltage across that capacitor the diodes D2 and D4 it will not conduct. If time period is $t=1s$ then input voltage is increased and at the same time the value of capacitor charges will be maximum (peak value) of the input. Again after time. Voltage over the capacitor diminishes in light of the fact that capacitor releases through the load.
- □ At the point when the capacitor voltage surpassed from the pinnacle voltage, at that point forward inclinations gain diodes D2 or D4 and as a Result capacitor star

charging again to the pinnacle esteem. This procedure proceeds. Thus we get nearly

Smooth DC voltage as shown in fig (3.7).

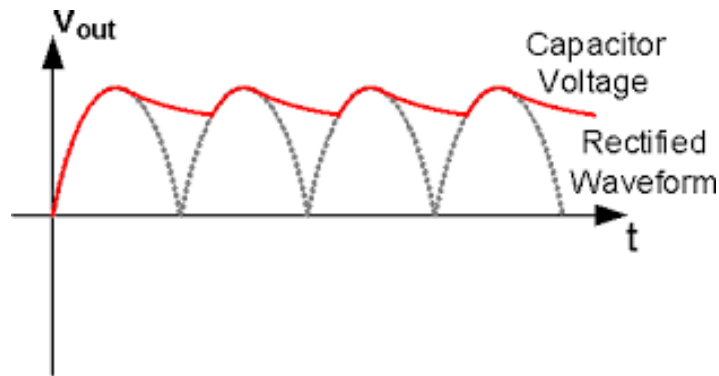


Fig. 3.9: Filtered output

3.3 Discussion about AT mega 328P Microcontroller

In this area we will talk about ATmega328p Microcontroller the ATmega328P is a low-control CMOS 8-bit microcontroller reliant on the AVR redesigned RISC structure. By executing astonishing bearings in a single clock cycle, it has 2kb RAM Furthermore, 32 kb ROM in which 4kb is for reveres boot and other 28kb useable another capacity it has 16 MHz clock bring recurrence and task voltage 5v. There are 32 sticks in the ATmega328p microcontroller. It has 3 port and every port has 8 stick other then again it has 2 ground pins.2 Vcc pins, 2 precious stone pins and 1 reset stick and 1 simple reference the ATmega328P accomplishes throughputs progressing toward 1 MIPS for each MHz permitting the structure expected to streamline control use as opposed to arranging speed The ATmega328P gives the running with highlights: 4K/8K bytes of In-System Programmable Flash with Read-While-Write limits, 256/512/512/1K bytes EEPROM, 512/1K/1K/2K bytes SRAM, 23 for the most part accommodating I/O lines, 32 completely important working registers, three flexible Timer/Counters with look at modes, inward and outside freight boats in on, a back to back programmable USART, a byte-engineered 2-

Wire serial interface, a SPI sequential port, a 6-channel 10-bit ADC (8 diverts in TQFP and QFN/MLF bundles), a programmable watchdog timer inward oscillator, and five programming selectable power sparing modes. The idle mode stops the CPU while permitting the SRAM, Timer/Counters, USART, 2-wire serial interface, SPI port and interface with framework to keep working. The power down mode spares the enlist substance yet solidifies the oscillator, handicapping all other chip capacities until the point that the following hinder or equipment reset. In power-spare mode, the offbeat clock keep on running, enabling the client to keep up a clock base while whatever remains of the gadget is dozing. The ADC noise reduction mode stops the CPU and all I/O modules aside from no concurrent clock and ADC to limit exchange clamor amid ADC change. In standby mode, the precious stone/resonator oscillator is running while whatever is left of the gadget is dozing. This permits quick start-up joined with low power utilization. The AVR center combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The idle mode stops the CPU while allowing the RAM, timer/counters, serial port and interrupt system to continue functioning. The power-down mode saves the RAM contents but freezes the oscillator, disabling all other chip function until the next interrupt or hardware reset. The device is manufactured using Atmel's high density non-volatile memory technology. The on-chip ISP flash allows the program conventional non-volatile memory programmer or by an On-chip boot program running on the AVR core.



Fig 3.10: ATMEGA 328

Regardless of the way that there are confined tending to plans and enhanced pick codes for select archive and I/O enroll get to, all can even now be tended to and controlled as if .They were in SRAM. In the ATMEGA variety, the working register archive isn't mapped into the data address space; everything thought of it as, is crazy to hope to treat any of the ATMEGA's working registers as though they were SRAM. Or maybe, the I/O registers are mapped into the data address space starting at the plain beginning of the area space. Likewise, the proportion of data convey space focused on I/O registers has grown essentially to 4096 bytes (000016– 0FFF16). Likewise as with past ages, in any case, the speedy I/O control bearings can simply accomplish the underlying 64 I/O enroll regions (the underlying 32 zones for bitwise rules). In numerous varieties of the AVR structure, this inside EEPROM memory isn't mapped into the MCU's addressable memory space. It must be gotten to a comparative way an external periphery contraction is, using remarkable pointer registers and read/write bearings which makes EEPROM get to much slower than other inside RAM.

3.3.1: Architecture block diagram Atmega328

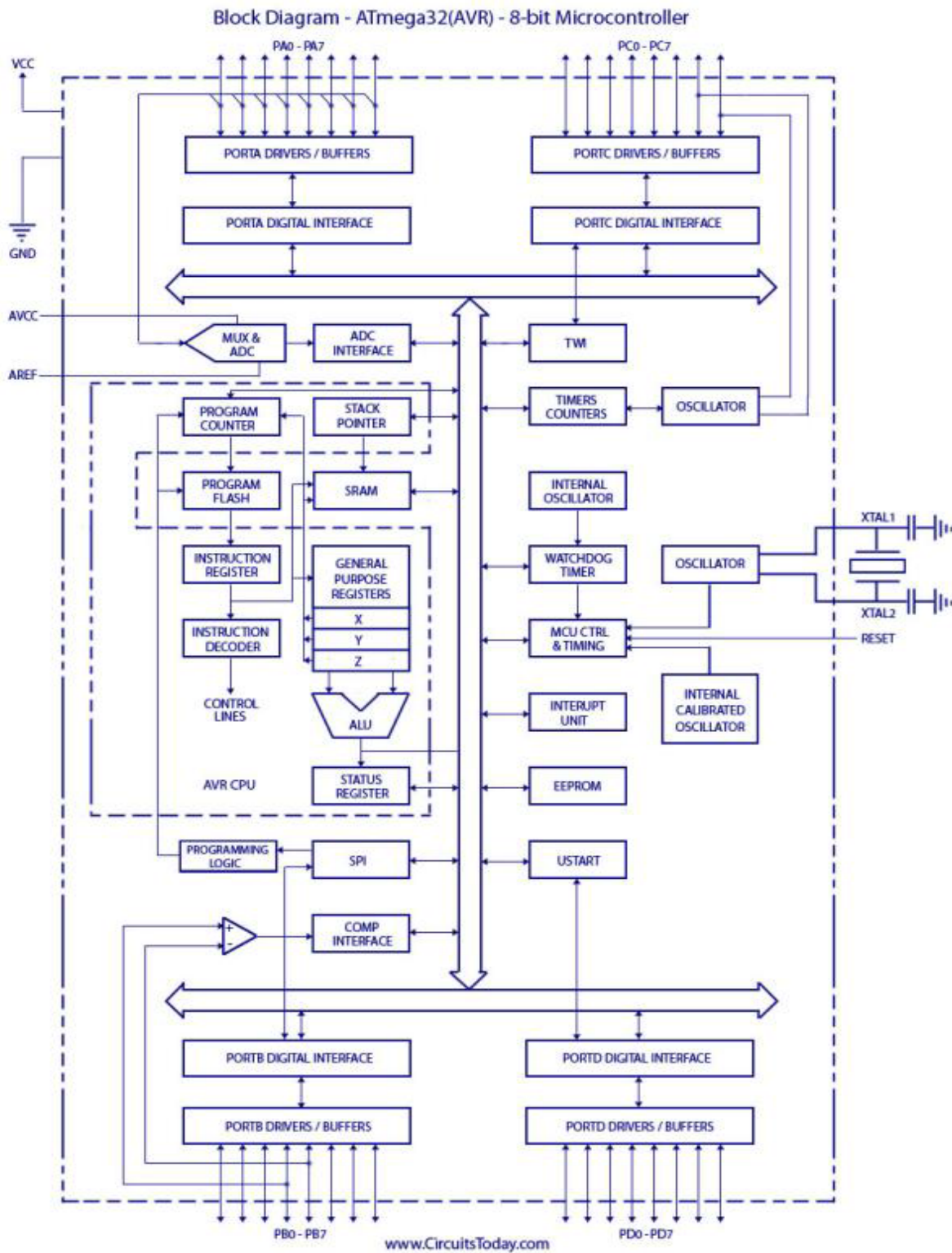


Fig 3.11: Pin configuration

3.4:12v DC Water Pump



Fig: 3.12: Pump

12v dc vehicle glass locally built model self-production arrangements, with a little siphon can moreover be changed over into various usages a little siphon, RS-360 Mini 4-12v water siphoning engine reversible rigging aquarium siphon RS-360 micro motors small pump. The radiating siphon is normally found inside a submersible wellspring siphon and some cooling units. As the impeller inside it turns, water is attracted one side of the siphon. It is then removed out the opposite end. The power and size of the impeller choose the measure of water stream. More water can be siphoned on the off chance that we have a vast impeller. As the impeller turns, it moves water from the gulf (which is situated close to the focal point of pivot of the impeller) along the surfaces of the impeller to the external bits of the volute by methods for outward power (in this manner, it's name radial siphon). As this water gathers in the external locales of the volute, it is coordinated to the outlet. The water leaving the outlet causes the water strain to drop at the bay. To coordinate the rate with which water is leaving the outlet, the siphon sucks in new water at the gulf.

These pumps must be prepared before beginning, which for this situation is now done as a result of its submerged application. Rating Voltage: 12v Dc. Current: 1 amps.

3.4.1 Specification:

1. Model : 360
2. Color : silver + white
3. Quantity : 1
4. Material :
5. Flow rate 0.5L per minute
6. Suitable voltage : Ac 4-12v
7. Standing voltage : 6v
8. Please avoid long time operation under 12v and longtime no-load testing
9. Absorption range: Water pump with air about 1m, over 3m without air
10. Raising range : 0.5
11. Power supply verify of Dc power adapter, such as high current battery, normal battery, the power of the router, the record power with 6v-9v and 0.8A current.
12. Great for DIY project

Dimension:

2, 56in*1.73in*1.73in (6.5cm*4.4cm*4.4cm)

Weight 2.25 or (71kg)

3.5 Connecting Wires

Wire is typically encircled by outline the metal through an opening in a pass on or draw plate. A wire is a single, for the most part tube molded, versatile strand or post of metal. Wires are used to persevere through mechanical weights or power and media correspondences signals. The term wire is moreover used even more unreservedly to insinuate a pile of such strands, as in 'multi stranded wire', which is even more precisely named a wire rope in mechanics, or a connection in power. Wire measures come in different standard sizes, as conveyed the extent that a check number.

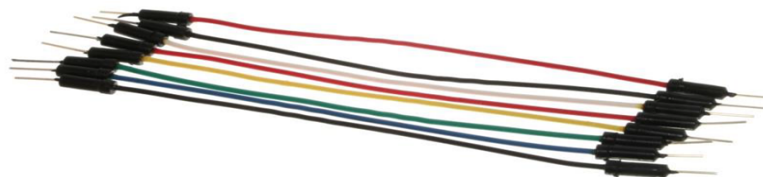


Fig. 3.13: connecting wire

3.6: Soil moisturize sensor

The volumetric water content in soil measure by the dampness sensors. Since the direct gravimetric estimation of free soil sogginess requires removing, weighting and drying of a model, measure the volumetric water content roundabout by using some other property of soil dampness sensors of the dirt, for example, dielectric steady, electrical opposition, as an intermediary for the dampness content. Or on the other hand communication with neutrons, soil dampness and the deliberate property must be adjusted between them. it is relying upon numerous worldwide parts like soil type, electric conductivity or temperature. The dirt dampness consequences for Reflecting microwave radiation. at Agricultural and hydrology framework is utilized remote detecting innovation. Ranchers or plant specialists can utilize Portable test instruments. By this sensor gauge volumetric water substance and Soil dampness sensors regularly allude to sensors. Measure another property of dampness in soils by another class of sensors called water potential; these sensors are regularly insinuated as soil water potential sensors and join sensitometers and gypsum squares.

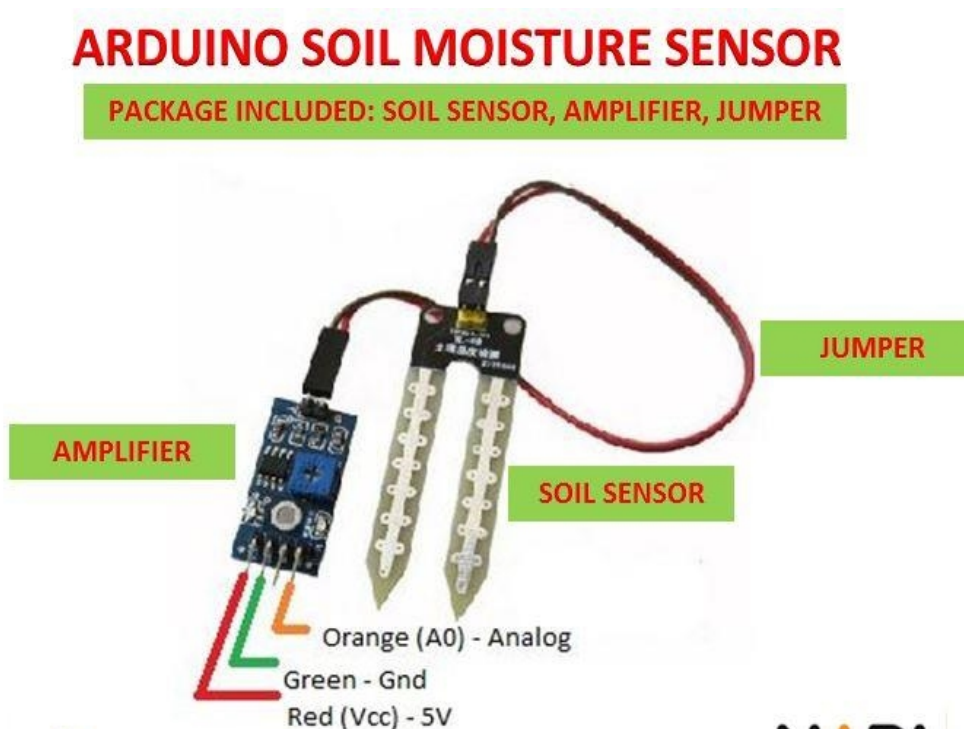


Fig 3.14: Soil moisturize sensor

3.6.1a Identification of various part

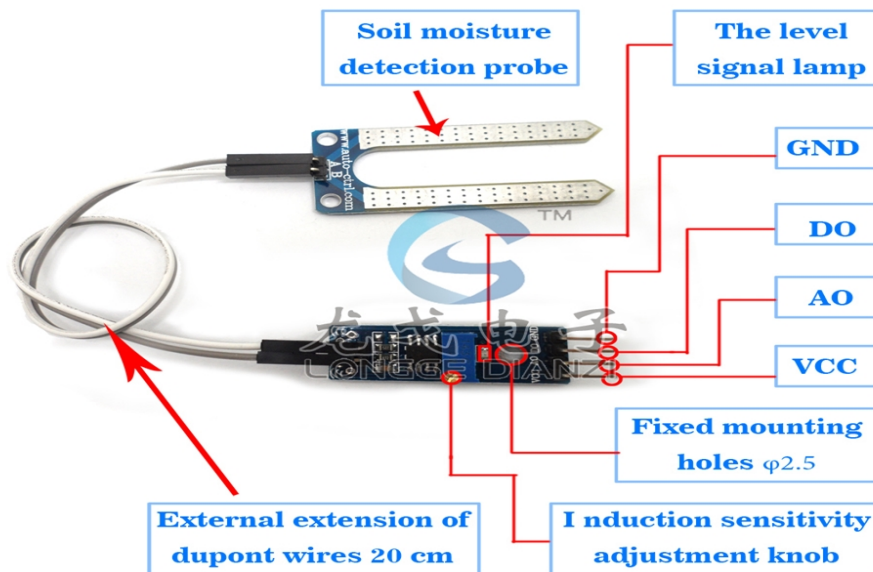


Fig 3.15: Identity Soil moisturize sensor

3.6.1b: Technology

Around the sensors certain volume components dielectric steady is gotten by estimating the swaying circuits working recurrence. Time Domain Reflectometry (TDR): The dielectric consistent of an express volume fragment around the sensor is acquired by evaluating the speed of affecting along an anchored transmission line.

- Neutron dampness checks: to appraise soil dampness content between a source and finder test the properties of water as a mediator for neutrons are used.
- Soil resistivity: To decide the dirt dampness content the steam of power between two cathodes can be utilized estimating how unequivocally the dirt stand up tp.

3.6.1c: Application

Agriculture: Bangladesh is a horticultural nation. So we require enough water system system. so the dirt dampness sensor is most fundamental piece of water system framework

.Estimating soil dampness sensor is basic for agrarian applications to empower farmers to manage their water framework structures even more capably. Knowing the right soil moistness conditions on their fields, notwithstanding the way that ranchers are prepared to all around use less water to grow a gather.

Landscape irrigation: Using soil suddenness sensors can interface with a water framework control in urban and country regions, scenes and private yards. An essential water framework clock will change over it into a "canny" by Connected an earth moistness sensor. Right when the earth is starting at now wet at that point water framework cycles thwarts by Irrigation controller following a progressing precipitation occasion. to avert over-watering and increment the productivity likewise leaching of their water system frameworks Golf causes are utilizing soil dampness sensors of manures and different synthetics into the ground.

Research: This is utilized different sorts of research applications in horticultural science or normal science including solute transport considers and as aide sensors for soil inhale measurements. And development including water framework orchestrating, environment investigate.

Simple sensors for gardeners: The dirt is too dry, wet or clammy for plant it's demonstrate After embeddings a test into the dirt for around 60 seconds, a meter . It is basic sensor for plant specialists' .it has utilized straightforward gadget and generally cheap. it require not accessible require control hotspot for checking whether plants have adequate dampness to flourish.

3.7: Relay Module of 2 channel 5v

5v 2-channel relay interface board is the low level relay. 15-20mA driver current is needed every channel. The Appliance and hardware which are drive extensive measure of current these apparatus and gear can be control the relay. This relay works under AC250v 10A or 10A DC30v with high current relay. A standard interface has in this transfer microcontroller can control specifically.

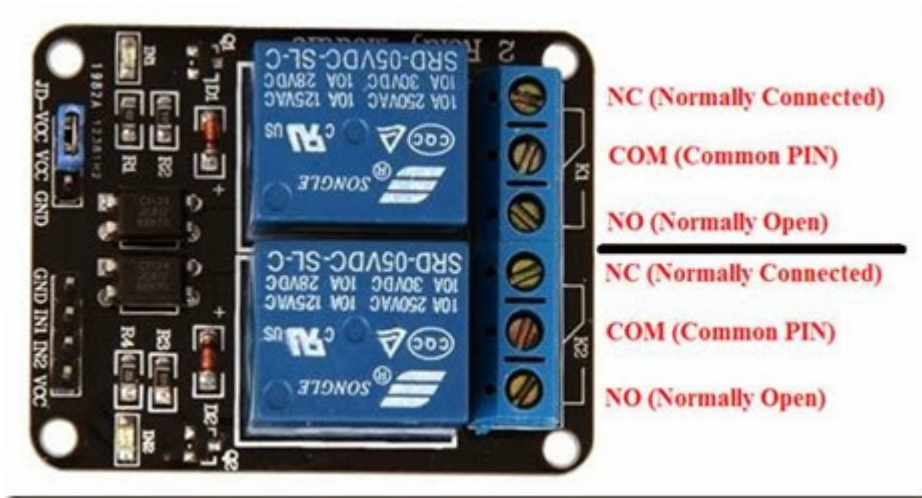


Fig: 3.16 : 2 channel relay module

3.7. 1a Property

- AC 250v/10A,DC 30v/10A are the maximum output of this relay
- Opt coupler LOW Level Trigger development board with 2 Channel Relay Module is perfect with Arduino.
- Microcontroller can control directly standard interface (TTL logic.MSP430, ARM, DSP, PIC, AVR, 80510.
- SPDT relays is high quality loose music relay. One normally close terminal, one normally open terminal, and A common terminal.
- Good anti-jamming, isolation is opt coupler.

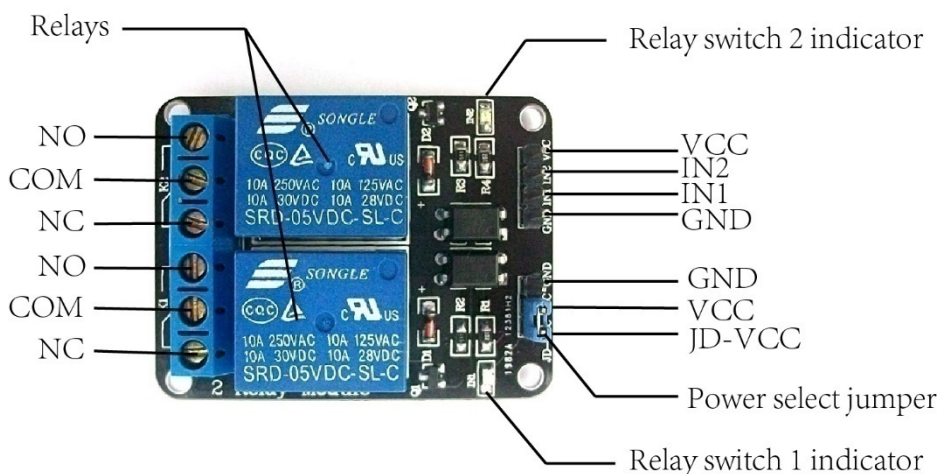


Fig: 3.17: Identity with relay pin

3.7.1b: Designed

The power supply of the relay module are VCC and RY-VCC. When the large power load need to drive any machine, connect an extra power to RY-VCC to supply the relay and you can take the jumper cap off ; the MCU board to supply input signals is connected VCC to 5V

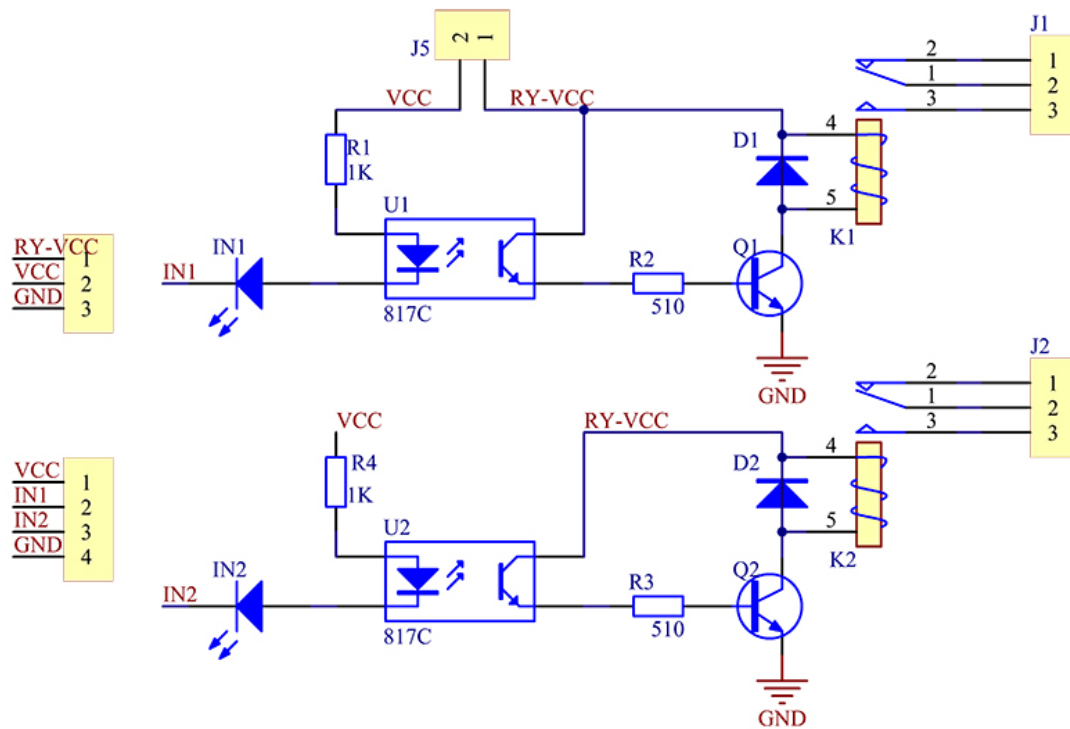


Fig:3.18: Relay schematic diagram

3.7.1c Principle

See the picture underneath: A characterize by electromagnet, B is armature, and C is spring, the moving contact is D, and E settled contacts. Two settled plate has in this transfer, a conventionally closed one and a regularly open one. Exactly when the circle isn't enabled, the customarily open IN2 contact is the one that is off, while the commonly closed one is the other that is on.

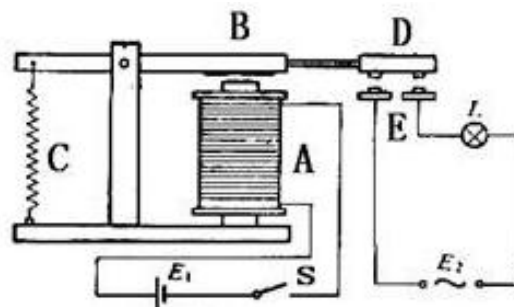


Fig:3.19: Principle of relay

At the point when the a few flows will go through the loop and add a specific voltage to the curl in this way prompted the electromagnetic impact. As an outcomes the armature press the strain on the spring and is pulled in profoundly, in this way closing the moving contact of the armature and the ordinarily open contact. State releasing the past and the. After the circle is de-invigorated, by then the armature moves back to the main position and the electromagnetic power vanishes and, releasing the moving contact and regularly closed contact. The power on and off of the circuit is depend upon the end and releasing of the contacts.

Input:

VCC: the supply voltage is connected with positive terminal (supply control as per transfer voltage)

Ground (GND): supply voltage is connected to negative terminal

Input1 (IN1): Signal activating terminal 1 of hand-off module

Input2 (IN2): Signal activating terminal 2 of hand-off module

Output:

It has one NC (normal close) of each sub-modular, one COM (Common), and one NO (normal open) so it has two NO, two NC and two COM of the channel relay in total. The state without power then NC represents the typical close port contact; for the ordinary open port contact No stands and the state with power.COM is the common port. As per whether control or not you can choose NC port or NO port.

3.8 Water tank

Features:

- Perfectly suited for use with 100 it water tank (MWT-100)
- Help access tank water
- Durable construction
- Made form recycled plastic

Specification:

- Product dimensions: 39.5cm*39cm*31.5cm
- Weight: 1.3kg
- Code: MWT-MS
- Color: Blue



Fig: 3.20: water pot

3.9 Jumper wire

The wires would all be able to be utilized together or effectively stripped separated exclusively or in segments. This is a lot of 40 associated female-female DuPont jumper wires. At the point when set with the silver side out in light of the fact that the slide with the silver appearing through the dark connector is standard breadboard dividing the fit cozy by one another on a breadboard, (2.54mm) contrasted with 2.25mm on the opposite side.

Product contents:

1 jumper wires-40*200(7.8in) is piece female-female



Fig: 3.21: jumper wire

3.10 Summary

The segments utilized are examined especially. Clarified alongside their evaluations and associations and talked about different reason in the framework.

CHAPTER 4

HARDWARE DEVELOPMENT

4.1 Introduction

This part will clarify about the development of three fundamental area of this project.

- i. Power Supply Unit:** Explain the development of a directed power supply.
- ii. The Water irrigation control Unit:** Explain the construction of water irrigation control system.
- iii. Main Circuit:** Take the water saturate sensor motion as info, looked at them and hence control the pump ON/OFF condition.

4.2 Power Supply Unit

The principal furthest reaches of a power supply is to change more than one kind of electrical Energy to another and, as such, control supplies are now and then recommended as electric Power converters. A power supply is an electronic substance that plans electric criticalness to an electrical Load. . Instances of the last merge control supplies found in work stations and customer gadgets. Some power supplies are discrete, free contraptions, be that as it may. Others are joined with more prominent gadgets near to their heaps.

4.2.1 Representation of a Regulated Power Supply and Block Diagram

This is can be separated into a progression of hinders, every one of them play out an individual activity. There are numerous sorts of intensity supply which is expected to change over high voltage AC mains power to low voltage dc flows for a basic Electronic circuit and different device.

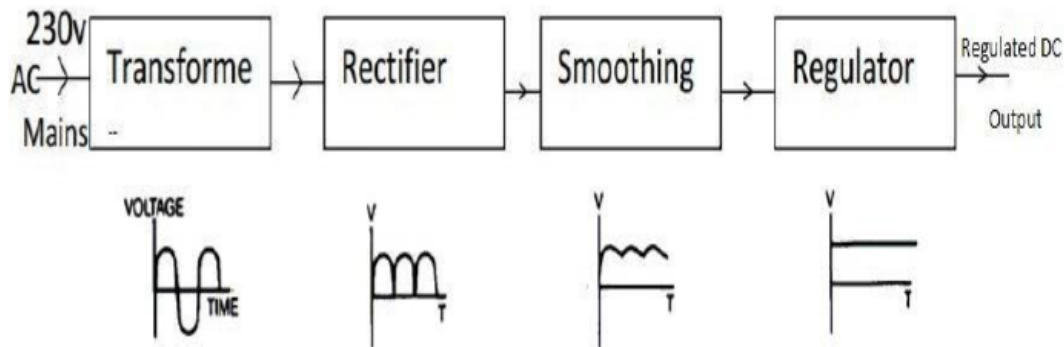


Fig. 4.1: Block diagram of a regulated power supply system

Transformer: It is step down transformer AC to AC (230-12v)

Rectifier: Rectifier is an electronic device in which converted into AC to DC using diodes.

Smoothing: Smoothers the DC from fluctuating extraordinarily to a little swell controller dispenses with swell by setting DC yield to a settled voltage.

Controller: A voltage controller is intended to naturally keep up a steady voltage level

4.2.1a Circuit Diagram and Representation of a Regulated Power Supply

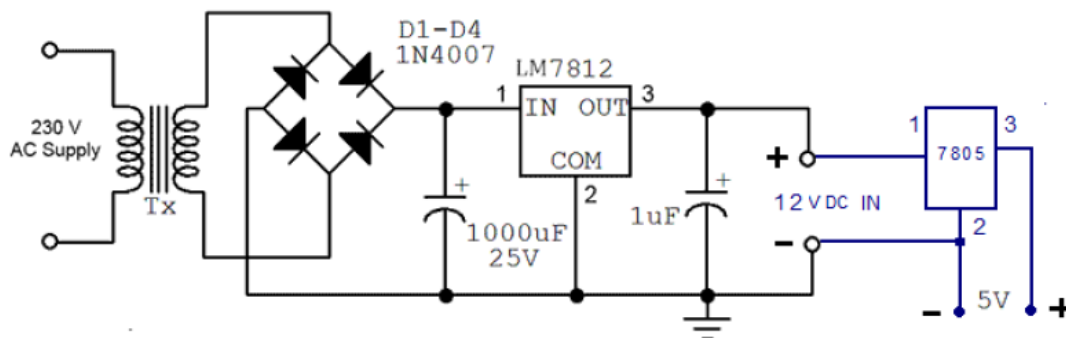


Fig. 4.2: 12v-5v DC Regulated power supply circuit

In this circuit is consist a 5V regulated DC supply based on 7805 Regulator IC is shown above. To reduce the voltage level is used A small step down transformer.

This devices needs. In Bangladesh, single phase 230 volts regulated power supply circuit is available. Pulsating sinusoidal AC voltage is the output of the transformer,

Using the rectifier can converted to pulsating DC. To reduce the AC ripples, and passes the DC components has used a filter circuit with output.

4.3 Circuit Diagram and Construction

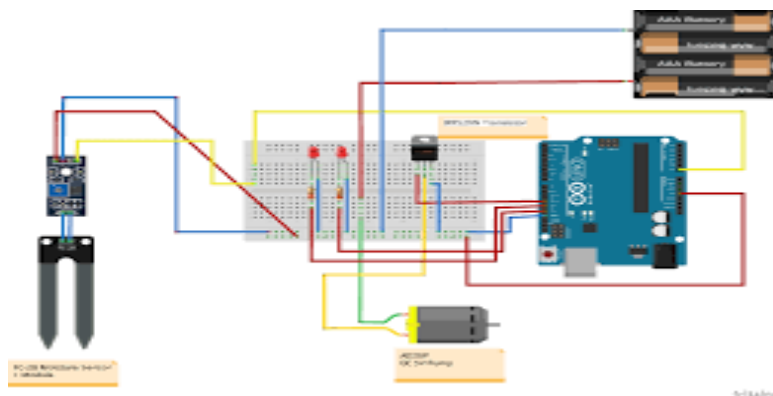


Fig: 4.3: circuit diagram

In this project use dampness sensor including amplifier circuit by which send a signal to Arduino as an input. Two adapter used for power supply 1 Adapter supply power to the Arduino and another supplies power to relay.

In this project is utilized two functional components. They are the engine/water pump and the dampness sensors. Following schematic chart associated with dampness sensor and engine driver with engine pump. A 9 volt battery is used for driving the motor, and the battery life is shown by measurement the current. Utilizing the Arduino IDE programming the Arduino Board is customized. The temperature dimension of dampness in the dirt measures by moisture sensor and on the off chance that watering is required, sends the signal to the Arduino. The plants until the point when the ideal dampness level is being come to by the motor/water siphon pump water.

Table 4.1 Parts list of water irrigation system

Arduino UNO R3	1p
Soil Moisture Sensor-	1p
2Channel 5v Relay-	1p
12v DC Water Pump	1p
Water Pipe	1p
Soil With Soil Pot	1p
12 V Dc Adapter	1p
9v Dc Adapter	1p
Two Pin Plug	1p
Transformer (12v,1A)	1p
PCB board	1p

4.4 Complete Hardware Setup

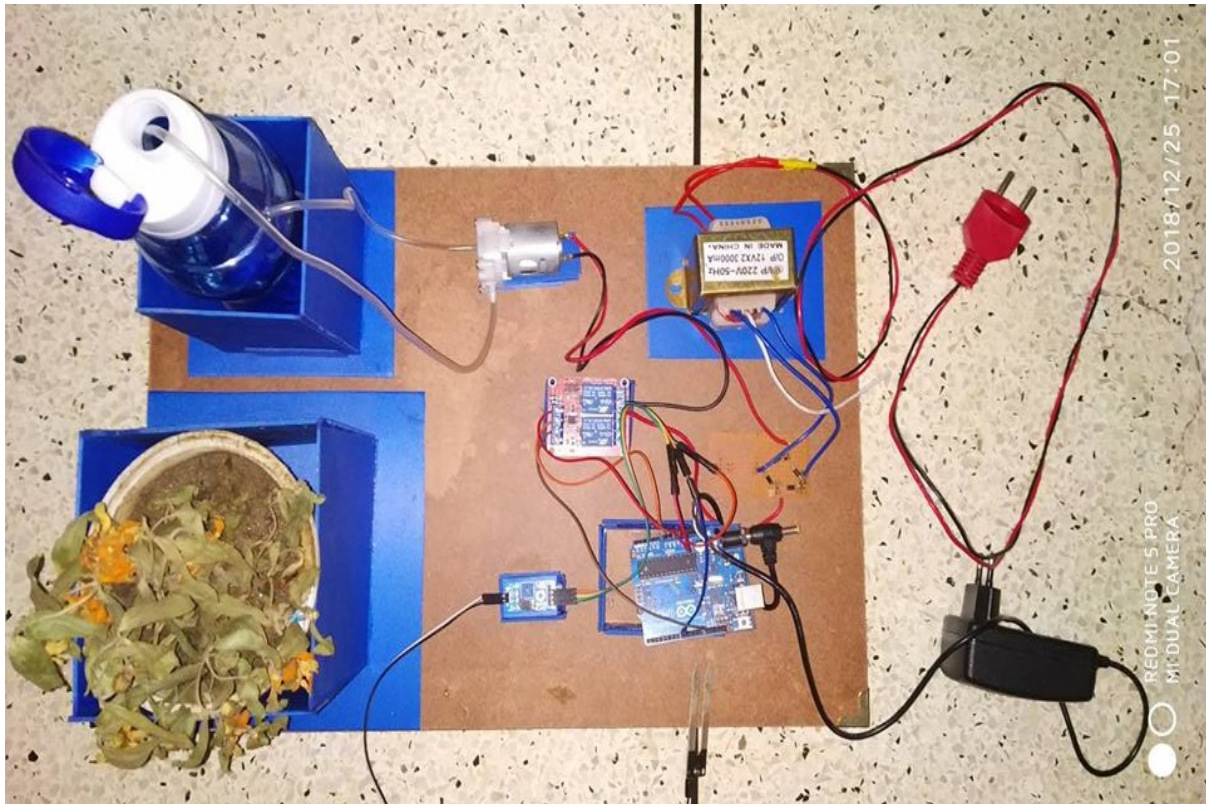


Fig. 4.4: Complete hardware setup

4.5 Working principle

Behind this framework the dirt dampness sensor is associated the circuit this the primary working rule in this plant, which was prior inserted into the plant, other electronic parts recorded above as indicated in Figure 4.4 which are likewise associated with the Arduino Microcontroller. The dirt dampness to the microcontroller which controls the siphon when Measurement of soil dampness is finished by the sensor which advances the data and parameters with respect to. The sensor associated with Microcontroller when the dirt dampness dips under a specific esteem. At that point the transfer module get a flag from the microcontroller as an outcomes begin the siphon and need measure of water provided to the plant .when the required water is provided, the siphon stops its Action.

Power supply has an undertaking to control the entire framework and the prescribed voltage should regard the info supply go for the microcontroller, that is, from 7V to 12V. Hand-off module is a basic circuit comprising of a solitary transistor, a few resistors, diodes and a hand-off and it is controlled carefully by microcontroller. Arduino Neon is an ideal microcontroller for this reason in view of its measurements and its work execution since the entire framework ought to be inserted in a little box, this is comprise the two sections: tests and amplifier circuit. Simple and advanced yields has in this module, the edge is actuated where computerized output logical 1 is set. When. Potentiometer is set the limit. The constant and with respect to data given by Analog yield. This yield and the dampness in the plant is utilized in the framework. With transfer module, Water siphon is associated. At the point when the microcontroller gives an order to transfer module at that point works the water siphon, we can compose its working standard from stream outline when soil temperature is underneath then soil dampness sensor send a flag to microcontroller then microcontroller gives a direction to hand-off module at that point begins the engine siphon generally stop the motor.

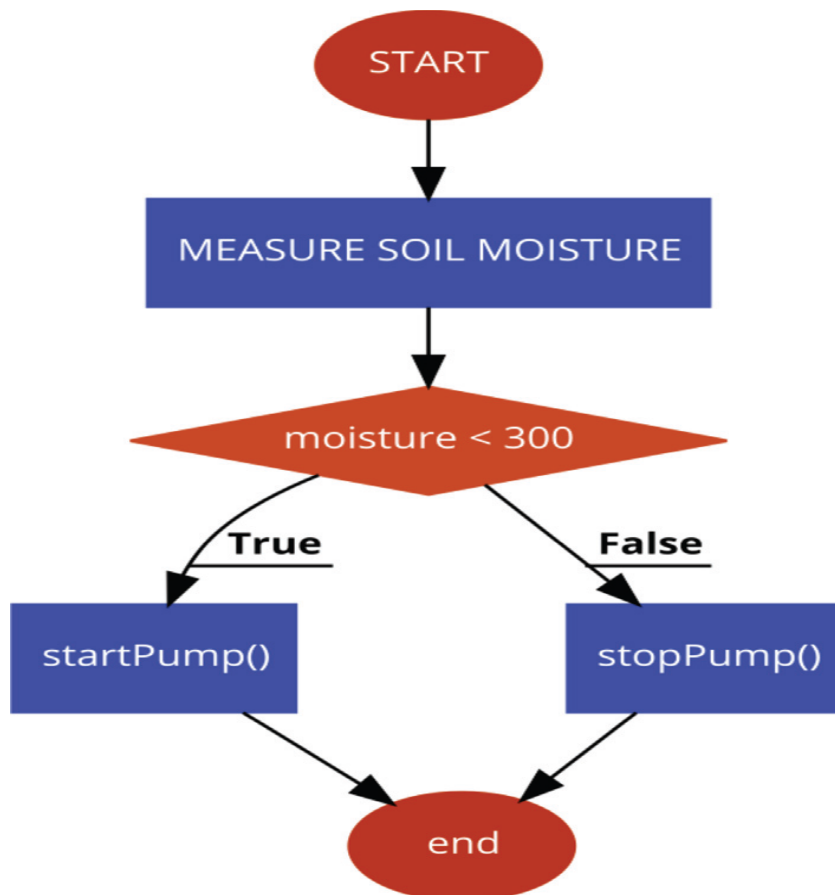


Fig.4.5:Flow chart diagram of microcontroller

4.6 Summary

A circuit chart (electronic schematic, electrical outline, crucial design,) is a graphical portrayal of an electrical circuit. The introduction of the interconnections between circuit areas in the schematic chart does not using any and all means relate to the physical methodologies in the completed device. A pictorial circuit plot utilizes fundamental pictures of parts, while a schematic graph displays the segments and interconnections of the circuit utilizing managed emblematic delineations.

CHAPTER 5

RESULTS AND DISCUSSIONS

5.1 Introduction

In this section is discussed about results of works. We can see the flow chart the when the soil temperature has gone below then the pump only start the point and when the soil temperature has reach minimum to the point the pump will be stop. The system operate on using several possibilities and including power

5.2 TOOLS AND TIPS FOR MEASURING THE FULL SOIL MOISTURE RELEASE CURVE

5.2.a COLLECTING SAMPLES

Collect samples for both the WP4C and the HYPROP. In samples drier than -40 kPa, sample disturbance does not contribute significantly to measurement uncertainty (see “Effects of Sample Disturbance on Soil Water Potential Measurements” later in this guide). In making the complete curve, however, measure samples wetter than -40 kPa using the WP4C, and use stainless steel sample cups to collect minimally-disturbed samples.

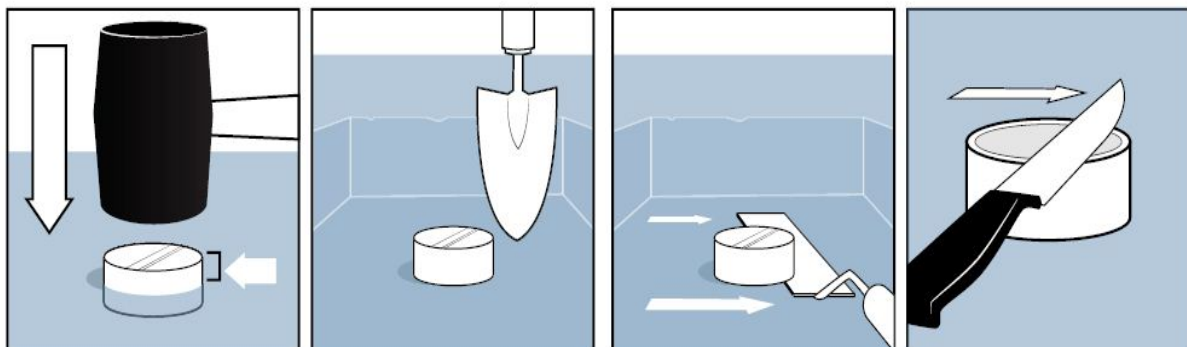


Fig.5.2.a: Soil Moisture Collection Diagram

5.2.b SAMPLE PREPARATION: FINE-TEXTURED SOILS

Finer-textured soils such as clays and silt loams may show hysteresis and require a drying method for WP4C samples to improve the match between WP4C and HYPROP curves. Saturate the samples until they glisten and water begins to pond on the surface. Then allow the samples to dry, capping them at intervals and allowing them to re-equilibrate to achieve different moisture contents.

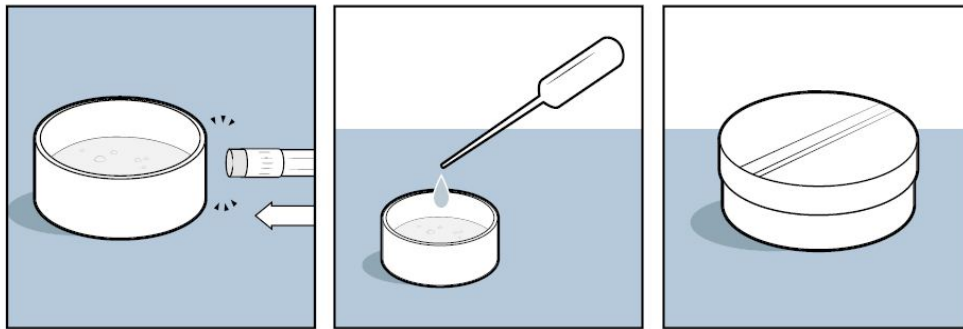


Fig.5.2.b: Fine-Textured Soils

5.3 CUT-OFF POINTS FOR PRECISE AND CONTINUOUS MODES

The WP4C's precise mode repeats water potential measurements on a sample until successive readings agree within 0.3 MPa (0.03 MPa for water potential greater than -40 MPa). This should be the default measurement mode. For wet-end samples (wetter than -2 MPa), use continuous mode with extremely careful measurement techniques. For samples drier than -40 MPa, fast mode is recommended. In this mode, the WP4C only takes one measurement to minimize errors due to water loss.

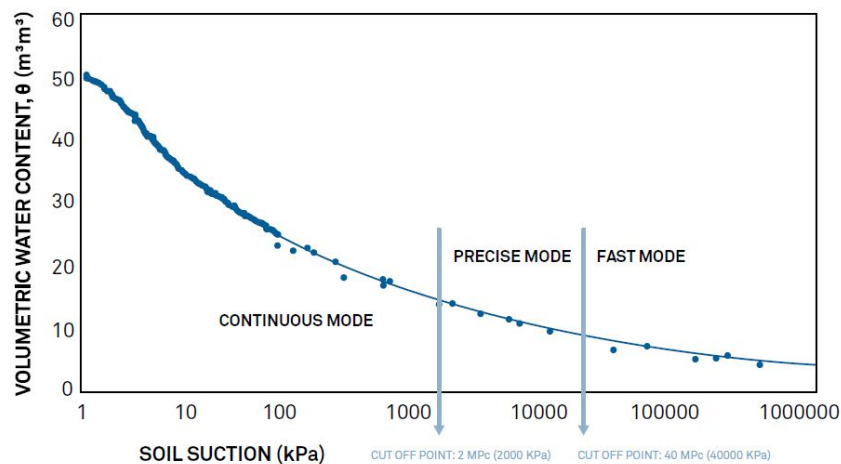


Fig5.3: Volumetric Water Content & Soil Suction Curve

5.3.a GETTING STABLE WP4C MEASUREMENTS INTO TENSIO METER RANGE

Measuring in the wettest range possible for a vapor pressure method (wetter than -2 MPa) requires an extremely careful experimental method.

For details on helpful experimental techniques, see “Measuring Water Potential into Tensiometer Range with the WP4C” later in this guide.

5.3.b DETERMINE MOISTURE CONTENT

Once the water potential has been measured, samples are weighed and put into the drying oven to find the moisture content. The weigh-dry-weigh method determines gravimetric water content, which must be converted to volumetric water content before making a moisture release curve using this equation

$$\theta = \frac{\omega \times \rho_b}{\rho_w}$$

where ω is gravimetric water content, ρ_b is soil bulk density ρ_w and is the density of water.

5.4 Results

According to the circuit diagram the experimental model was made and the results were as prospective. When the OHT was about to go dry the motor pump switched ON and switched OFF when the OHT was about to overflow. We can see the figure 5.1 below this is based on the Arduino microcontroller and sensor technology. The system has been designed and tested successfully in a successful manner. Represents results of our experiment in the form of the overall representation of our tested automatic plant watering system. As it can be concluded from the picture below,

The system is also functionality, the overall behavior as well as of the plant, has been observed in the next 1 weeks as a results we have got expected and required results. As result of our observation we noticed that plant maintained its homeostasis in desired, without any deficiencies observed with Regular and health manner. When need the water the sensor sent a signal to microcontroller after that microcontroller sent a signal to the pump to until enough quantity of water was not delivered, Start watering the plant.

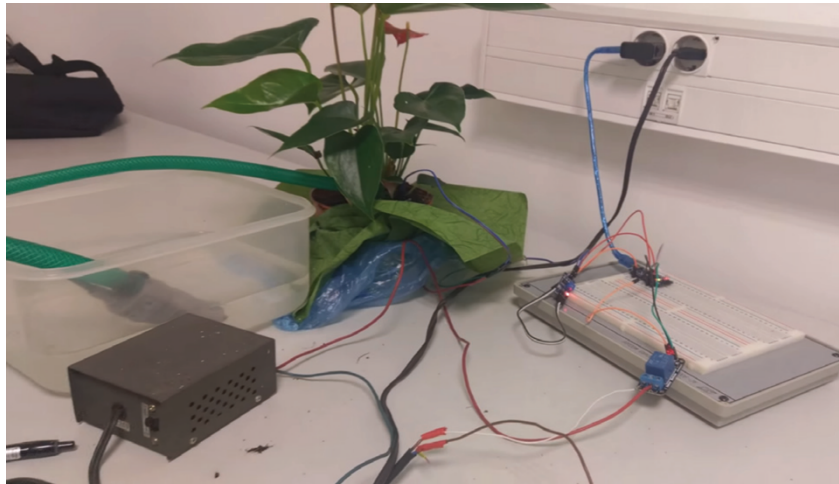


Fig. 5.4: Plant watering system and Testing

5.5 Advantages of this plant

Reduced labor: here no need many labor for working. Because it works automatically. Only one labor is required in the system.

Life style will improved: since it works automatically .so no need check the water progress again and again. The motor no need start and stop by any person. So the people can sleep through the night and live relax with a family.

More timely irrigation: when the plants need water that time Irrigators with automation are more inclined to irrigate, not when it suits the irrigator. It works perfect timely

Assists in the management of higher flow rates: the irrigation flow rate want to increase by the many irrigators. They receive through installing bay outlets and bigger channels. Such flow rates require an increase in labor as the time taken to irrigate a bay is reduced thus requiring more frequent change over. Automation allows for these higher flows to be managed without an increase in the amount of labor.

Most perfect cut-off: when the sufficient water is delivered to the land then automatically cut-off it. Automation of the irrigation system allows cut-off of water at the appropriate point in the bay. This is usually more accurate than manual checking because mistakes can occur if the operator is too late or too early in making a change of water flow.

Decrease nutrients and runoff of water: Holding compost on ranch has both monetary and natural advantages. Mechanization can help keep manure on ranch by adequately diminishing keep running off from the property.

Decrease costs of used irrigation vehicles: As the irrigator is not required to constantly check progress of an irrigation, motor bikes, four wheelers and other vehicles are used less.

Since we can give water supply in right time so this reduces the running costs of these vehicles and they require less frequent replacement.

5.6 Disadvantages

Cost: there are various costs like installing, maintaining automatic and purchasing cost.

Equipment Reliability: as an automatic system sometimes it does not work accurately failures will occur. This is occurs by human error in setting and it's maintain system. To collect any excess runoff when failures occur by a re-use system is good insurance

Maintaining channel Increased: There is a need to expand support of channels and hardware to guarantee the framework works accurately. Channels ought to be fenced to shield the programmed units from stock harm.

5.7 different kind of Automatic irrigation system

Pneumatic system: a bay sensor located at the cut-off point activate permanent system is called pneumatic system. When water enters the sensor, it pressurize the air, which is piped to a mechanism that activates the opening and closing of irrigation structures.

Portable timer system: this is used electronic clocks to activate the opening and closing of the irrigation structures. And portable timer system is a temporary system. Landowners usually buy 4 or 5 units to move around the whole property. Because of its portable nature.

Timer/ Sensor Hybrid: this framework is a half breed of compact clock and sensor frameworks. It utilizes an electronic gadget to initiate the opening and shutting of the water system structures this framework has an extra element of the irrigator having the capacity to put a moveable sensor down the cove. . Like a versatile clock, when interacts with water, transmits radio signs to the clock gadgets at the outlets to open or close the structures and sends a radio message to a collector to tell the landowner water has achieved the chopped off focuses down the inlet.

SCADA: Computerization frameworks that utilization Supervisory Control and Data Acquisition (SCADA) comprise of a PC and programming bundle to timetable and control

water system by means of a radio connection. Signs are sent from the PC to control modules in the enclosure to open and close water system structures with straight actuators. Inlets are opened and shut on a period premise, a few frameworks have the ability to consequently change the time a narrows outlet is open if the channel supply is conflicting. SCADA based frameworks have the extra advantage of having the capacity to begin and stop water system siphons and engines.

5.8 Cost Estimation of the Project

Table 5.1 Cost Estimation

Sr. No.	Particular	Cost in TK
01	Arduino UNO R3- 1 p	450
02	Soil Moisture Sensor-1p	250
03	2 Channel 5v Relay-1p	250
04	12v DC Water Pump-1p	350
05	Water Pipe	60
06	Soil With Soil Pot-1p	100
07	Water Tank-1p	120
08	Pvc Board	120
09	Jumper Wires	60
10	12 V Dc Adapter-1p	120
11	12v Transformer	150
12	Two pin plug	20
	Total cost	2050

The auxiliary components of the system are Centrifugal submersible pump and relay. As a part of the control circuit these are not considered. According to load connected to the system varying cost and ratings of the pump. A larger pump will have to use when increase the load. As a results, increase the current flowing through the circuit. Therefore, a higher rated relay we would require. For our project, we had to pump a small volume of water for demonstration purpose so we used a low rated pump.

5.9 Discussion

Extraordinary and expected aftereffects of our investigation were finished up from the way that our plant has effectively maintained a strategic distance from lack of hydration and continued developing with no issues

Furthermore, lacks, because of the sensor that is inserted inside the plant estimating the dirt dampness level and controlling the water siphon. The framework deals with the rule of estimating the dirt dampness level by methods for the sensor innovation which thus controls the water siphon by means of microcontroller with the end goal to give the plant enough measures of water when essential. Next couple of sections talk about the conceivable utilizations of this framework. Computerized plant watering framework can be utilized to understand numerous issues on the planet giving both restricted and wide applications and arrangements, where for the previous there is a case of robotized watering of plant at whatever point somebody takes some time off and disregards plants at home, which empowers the plants to get the correct measure of required water and counteracts unpredictable watering which prompts mineral misfortune in the dirt; and for the last application, there is a case of utilizing this framework for restorative and rural purposes to take care of some greatest human-related issues like undernourishment, air contamination and event of respiratory illnesses. Being perfect for reasons for having huge patio nurseries, estates or explicit plants with possess watering needs, this framework can be extremely useful in agribusiness to keep vegetable plants watered for greater gather with negligible misfortune because of water vanishing and spillover.

CHAPTER 6

CONCLUSIONS

6.1 Conclusions

Thus the “**ARDUINO BASED AUTOMATIC PLANT WATERING SYSTEM**” has been designed and tested successfully. The hardware components and of all integrated features has used to developed the system. All of the Presence of each module has been placed carefully and reasoned out, as the unit can contribute for best working. Thus, Watering System of the Arduino Based Automatic Plant as designed and tested successfully. Automatically tested the function of this system. The moisture level (water content) of the different plants measured by the moisture sensors. The moisture sensor sends the signal to the Arduino board when the moisture level is found to be below the desired level, and triggers the Water Pump to turn ON and supply the water to respective plant using the Rotating Platform/Sprinkler. At the point when the coveted dampness level is achieved, the framework ends without anyone else and the Water Pump is killed. Consequently, the usefulness of the whole framework has been tried altogether and it is said to work effectively.

6.2 Limitations of the Work

It is significant to know that in this design we used metallic contacts as sensor which is becomes rusty in the presents of water and makes the sensors less sensitive. So we need to clean the sensors after certain time period.

- a. Start motor when soil will be dry
- b. It cannot Soil water measurement
- c. Soil water balance

6.3 Future scopes of the Work

To reduce much of human labor and at the same time minimize on water usage Agricultural monitoring is very much needed. Predicting the soil condition for irrigating and Wireless Sensor in monitoring the field for Lot of system been developed employing. Moreover machine learning strategies been utilized product sickness expectation just and towards harvest yield. Presently with the appearance of Machine to Machine correspondence (M2M) which includes gadgets to impart among themselves in making a move, we here have built up a condition for watering the field this water system framework was observed to be possible and financially savvy for upgrading water assets for horticultural creation. The water system framework can be acclimated to an assortment of explicit yield needs and requires least support. In addition, the Internet interface allows the supervision through adaptable media transmission contraptions, for instance, a Smartphone. Other than the cash related save assets in water use, the noteworthiness of the preservation of this normal resource legitimize the use of this kind of water framework structure. there are numerous different conceivable outcomes like making complex associations of plants of comparable assortment or alleged Internet of Plants Also, Although it is by all accounts all the more requesting and testing, utilizing more than one sensor is another thought for a trial adventure, yet there are additionally numerous other trial and test like thoughts, for example, clock for setting water system framework utilizing sun oriented power supply and so forth. Nonetheless, autonomously of the route used to build it, there is no uncertainty that this framework can be exceptionally useful in taking care of numerous issues, from those that appear to be innocuous to those that are on the size of the most vital and most risky ones for human populace. By means of this system, from the process of watering the plant that is possible to control the amount of water released. Despite the fact that it very well may be extremely useful for mankind when all is said in done, botanists, agriculturists, and experts, are the general population who could have the greatest advantage of utilizing this framework.

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APPENDIX

```
int ACWATERPUMP = 13;
int sensor = 8;
int val; //This variable stores the value received from soil moisture sensor.
Void setup() {
    Pin Model(13,OUTPUT);//Set pin 13 as OUTPUT pin, to send signal to relay
    Pin Model(8,OUTPUT);//Set pin 8 as in output pin, to receive data from soil moisture
    sensor.
}
Void loop() {
    Val = digital Read(8); //Read data from soil moisture sensor
    If(val==LOW)
    {
        Digital Write(13,LOW);//if soil moisture sensor provides LOW value send LOW value to
        relay
    }
    Else
    Digital Write(13,HIGHT);//if soil moisture sensor provides HIGHT value send HIGHT value
    to relay
}
Delay(400);//Wait for few second and then continue the loop
```