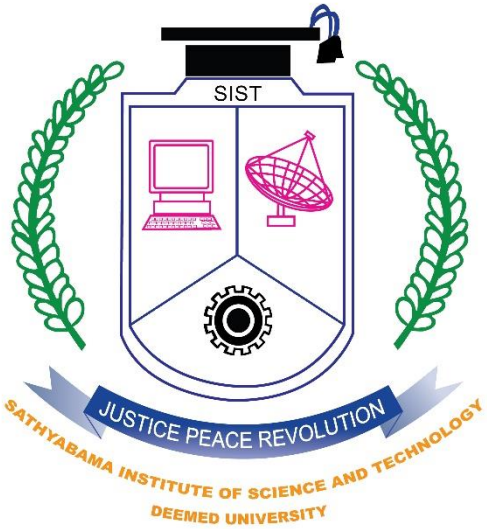
Transmission Line Fault Detection by Using Arduino

Submitted in partial fulfillment of the requirements for the award of
Bachelor of Engineering Degree in
Electrical and Electronics Engineering

BY
Y. Venugopal Reddy – 38140705
N. Sai deep - 38140034



DEPARTMENT
OF ELECTRICAL AND ELECTRONICS ENGINEERING
SCHOOL OF ELECTRICAL AND ELECTRONICS ENGINEERING

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY
(DEEMED TO BE UNIVERSITY)
Accredited with Grade "A" by NAAC
JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **Y. Venugopal Reddy – (38140705) N. Sai deep – (38140034**) who carried out the project entitled **"Transmission Line Fault Detection by Using Arduino"** under our supervision from November 2021 to May 2022.

Dr. M. KAVITHA
Internal Guide

Dr. V. SIVACHIDAMBARANATHAN
Head of the Department

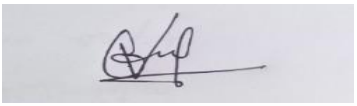
Submitted for Viva voce Examination held on_____

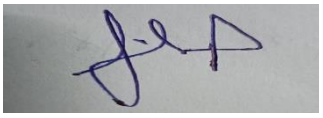
Name:
Signature:

Internal Examiner **External Examiner**

DECLARATION

Y. Venugopal Reddy – (38140705) N. Sai deep – (38140034) hereby declare that the Project Report entitled **"Transmission Line Fault Detection by Using Arduino"** done by me under the guidance of **Dr. M. KAVITHA** is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electrical and Electronics Engineering.

1. 

2. 

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ABSTRACT

Now a days transmission line protection is a key problem in power transmission lines because (85-87) percentage of power system disturbances are occurring in transmission lines. Identification of fault source is tedious task; fast fault detection can help to protect the equipment before any significant damage of the equipment. The exact fault location can help service man to remove persistent of the faults and locate the areas where the faults occur regularly, thus reducing the occurrence of fault and minimize the time of power outages. The paper is intended to detect the location of fault in transmission line using an Arduino board and the same is transmitted to control Centre using Arduino nano device. In this proposed thesis, we sense the current by placing the conducting wire inside the loop of the current transformer and is given to the protective circuit to avoid the high current. This is given to the Arduino Nano(microcontroller). The fire sensor (An IR Receiver) is given to the Arduino to detect the presence of any fire. In case there is a short circuit, the current in the series resistors modifies accordingly to the resistance that modifies with the distance and the load which is connected through a relay to the Arduino is turned OFF when the resistance is below threshold value. In addition, this thesis can also be empowered by using capacitor in the AC circuit to measures the impedance that could also locate the open circuit cable. An LCD display will indicate the status of the transmission lines and buzzer will sound when fault is detected. The SMS alerts will be going to be sent to the corresponding number through GSM Modem.

Keywords: Arduino Nano, Microcontroller, LCD, SMS.

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LIST OF SYMBOLS AND ABBREVIATIONS

Vs	–	Supply Voltage
Vee	–	Ground Voltage
GSM	–	Global System for Mobile Communication
LED	–	Light Emitting Diode
PIC	–	Programmable Interface Controller
DC	–	Direct Current
I/O	–	Input/output
volt	–	Voltage
ADC	–	Analog to Digital Converter
PCB	–	Printed Circuit Board

CHAPTER 1

INTRODUCTION

1.1 INTRODUCTION

The location and grouping of faults in the transmission is an important errand for shielding the framework of electrical power. A key part of the Defensive Transport is a selector module that characterizes the type of fault that has occurred as well as adjusts the 'typical state'. Choosing a solid stage for the condemned stage is inevitably important to avoid deviating from the wrong stage or one of the additional three stumbling blocks. Also, an important prerequisite for stage selectors is rapid activity, since the selection cycle needs to end after a rapid shortfall before the breaker opens. The complexity of the mediocre step-decision planning framework model, lack of information about its boundaries, influences of the far bast, defects, disorders, covalent bonds in adjacent same lines, etc. experience adverse effects of certain negative aspects Also if symptoms are suspected, settle on the right choice to strongly influence the working conditions of the framework.

Remote sensor-based transmission line observations are state-based, not conclusions, through continuous primary cardiac change, faster defect limitation, recognizable evidence and electrical fault isolation from mechanical problem. It offers answers to some concerns, such as cost savings through support. These applications, such as intermittent maintenance, show a serious need to quickly convey huge measurements of exceptionally robust information. The realization of these applications relies on a practical and robust organizational design plan with fast reaction times.

Organizations should provide options for transmitting sensitive information, such as current status and control data of transmission lines between transmission grids. This paper provides an advanced structure of costs for planning an organization of continuous Information delivery. To triage the situation in the force framework, sensors are placed in different parts of the force organization. These sensors are equipped to generate large amounts of data, making detailed estimates of various physical or electrical boundaries. Delivering this data to the control community productively and at an affordable cost is a fundamental test for building a fiercely outstanding network.

1.2 LITERATURE SURVEY

NIRANJAN L, et al. (2020) recommends many power transmission companies primarily rely on circuit indicators to detect faulty parts of their transmission lines. Even if sensors, breakers and other communication lines are used the system looks very expensive and consumes the same time in the wrong location and specification. However there are still challenges in finding the exact location of these errors. Although fault indicator technology has provided reliable methods of detecting permanent errors, the current state of error detection is very worrying and time consuming as the technical team and monitoring teams still have to physically monitor and inspect equipment for long hours to find faulty parts. of their transmission lines and then have to clear the error, which requires a lot of human effort in identifying the error location and removing the error. Wire-based monitoring of transmission lines provides a solution to many of these concerns such as real-time structural awareness, rapid error detection, accurate error detection and detection of electrical errors in mechanical errors, reduced costs due to conditional rather than occasional correction. care, etc. These applications define solid requirements such as faster delivery of large amounts of highly reliable data. The success of these applications depends on building an efficient and reliable network structure with fast response time.

S.SURESH, et al. (2019) suggested discovery of the wrong location has been the goal of the power system engineers, from the creation of distribution and transmission systems. Rapid error detection can help protect the device by allowing the fault lines to be cut before any major equipment damage. Accurate error location can help service personnel to eliminate persistent errors and locate areas where errors occur frequently, thus reducing the incidence of error and minimizing power outages. As a result, while error detection systems have been developed in the past, a variety of algorithms continue to be developed to perform this function more accurately and effectively. The detection and location of power transmission faults are important for the protection and maintenance of the power system. Many error and location detection methods are related to the voltage values provided by current and voltage transformers. These transformers can be expensive and require physical contact with high-power monitors.

Prof. Vikram Singh R. Parihar, et al. (2020) Electric Power System is divided into many different categories. One of them is the power transmission system, where

power is transferred to productive stations and smaller stations via transmission lines to consumers. Both methods can meet various types of malfunctions often referred to as "Error". An error is simply defined as a number of unpleasant but inevitable incidents that can temporarily disrupt a stable power system situation that occurs when a system installation fails at any time. GSM-based error detection and location system was used to adequately and accurately diagnose and error detection. This will ensure a short response time for technical personnel to correct these errors and thus help save transformers from damage and disaster. The system uses a current transformer, voltage transformer, PIC 16F877 Microcontroller, RS-232 connector, and GSM modem. The system automatically detects errors, analyzes and separates these errors and then calculates the error distance from the control room using an impedance-based algorithm method. Finally, the error details are transferred to the control room. In conclusion, the time required to detect an error has been greatly reduced, as the system automatically and accurately provides the location information for the error. By using this project, we can detect three-phase transmission lines that one can monitor Temperature, Voltage, Current using the GSM modem by sending a message.

Ahmed Hamed, et al. (2018) The problem of finding the fault location in the transmission line has become more complex and more expensive depending on the current method used to detect error in the transmission power lines measured by the calculation of the voltage detection and current data. The functions of this thesis are to find the solution to how to detect and detect error in the transmission line using GPS, GSM, microcontroller and power sensor the proposed system determines the location of the error as accurately and as quickly as possible. This process is performed when the power sensor detects the transmission line and detects an error, and sends a signal to the microcontroller (processing units) A warning of error occurring in the transmission line, after which the ground suspension system detects the location and the global. mobile communication system send a message to the manager This message includes location details and line number. At the end of the study we found that the results could be determined when the proposed power sensor determined the location of the error as accurately and as quickly as possible. This process is performed when the power sensor detects the transmission line and detects an error, and sends a signal to the microcontroller (processing units) A warning of error occurring in the transmission line, after which the ground suspension system detects the location and the global. mobile communication system send a message to the

manager This message includes location details and line number. At the end of the study we found the results that can be obtained when the error is high accuracy.

1.3 SCOPE OF THE PROJECT

The work proposed here is a very simple, fast efficient and cost-effective approach to identify the fault location in the transmission network. The proposed system uses to identify the four types of faults (“Over voltage fault, Short circuit fault, Open circuit fault, Fire fault “). In this proposed system use of any kind of sensor is absent. Based on the program coded, it senses the voltage drop in the fault line where in it compares with the predefined value for fault condition and sends information to the control center.

1.4 ADVANTAGES

The major advantages are as follows:

- Work in real time response.
- Coverage area is large compared with other existing system.
- Cost efficient.
- Devices enable by wireless communication.
- Economically reliable.
- Number of components used are compact in size.

CHAPTER 2

HARDWARE DESCRIPTION

2.1 BLOCK DIAGRAM

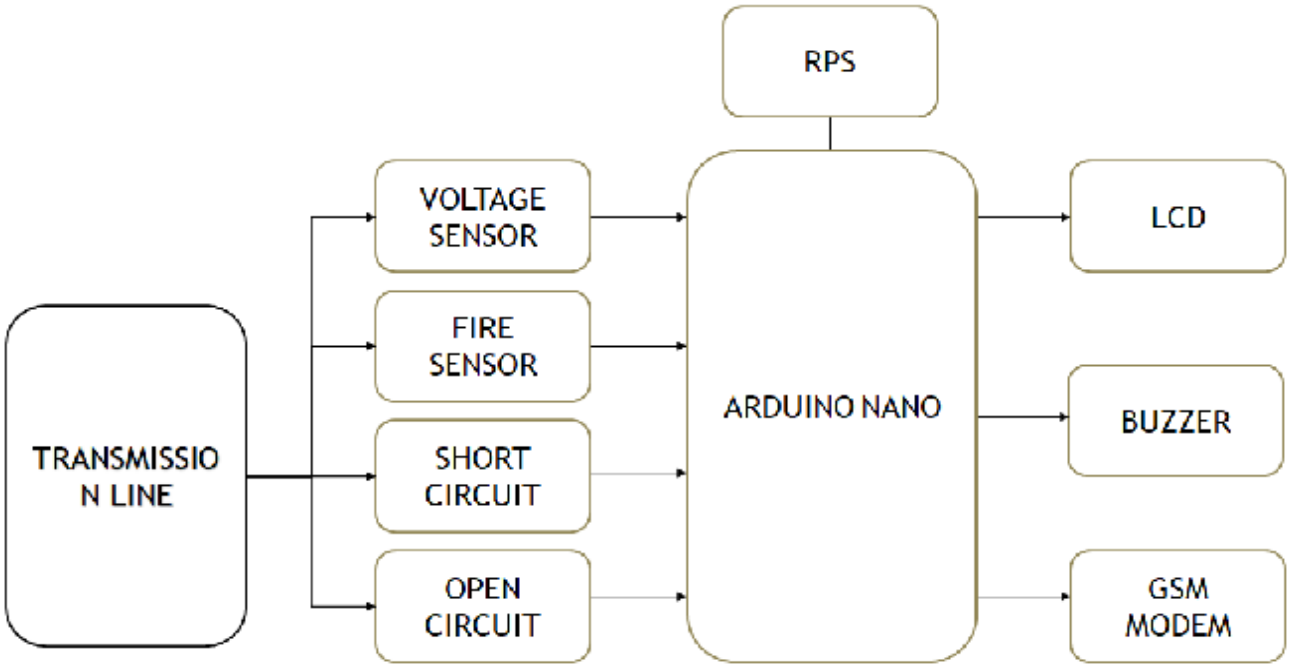

Figure 2.1: Block Diagram

2.2 Explanation

The voltage, fire, short, open circuit sensors are attached to both Arduino and transmissions lines maintaining the connection between them, meanwhile the Arduino is connected to RPS and the LCD, buzzer, GSM are connected to Arduino completing the circuit. When supply is given to the circuit, if there is any problem in the circuit like high voltage or low voltage the voltage sensor comes in to work and indicates the Arduino which sends signal to lcd to display that there is a short circuit at a specific area and also the buzzer will be alerted. Same process will be continued for all the sensors, if there is a fire at any of the transmission lines the fire sensor comes in to work, if there is any open and short circuit respective sensors come in to work.

2.3 HARDWARE COMPONENTS

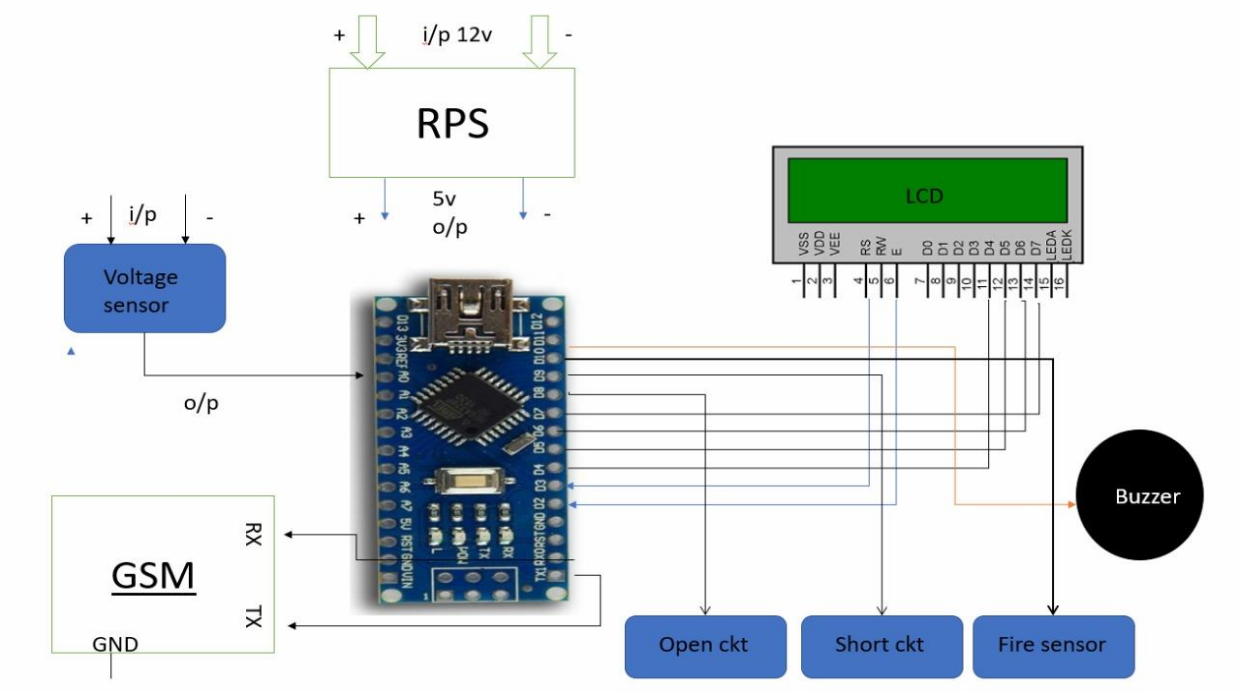

Figure 2.2: circuit diagram

The list of hardware components that are required are:

- Arduino Nano (Micro controller)
- RPS
- LCD
- Buzzer
- GSM
- Voltage Sensor

2.4 ARDUINO NANO

The Arduino Nano, as the name recommends it will be smaller, closed and bread-board cordial micro-controller module. The module weight could be 7grams includes measurements of 4.5CMS to 1.8CMS This section has the details about the specialized specifications in particular about pins also elements of each and each pin in the Nano board, while UNO has 6 ADC ports yet Nano has 8 ADC ports. The USB port is utilized for programming and sequential checking. The highlight in Nano is that it will pick the most grounded power supply with the possible distinction, and also force supply choosing jumper is not suitable.

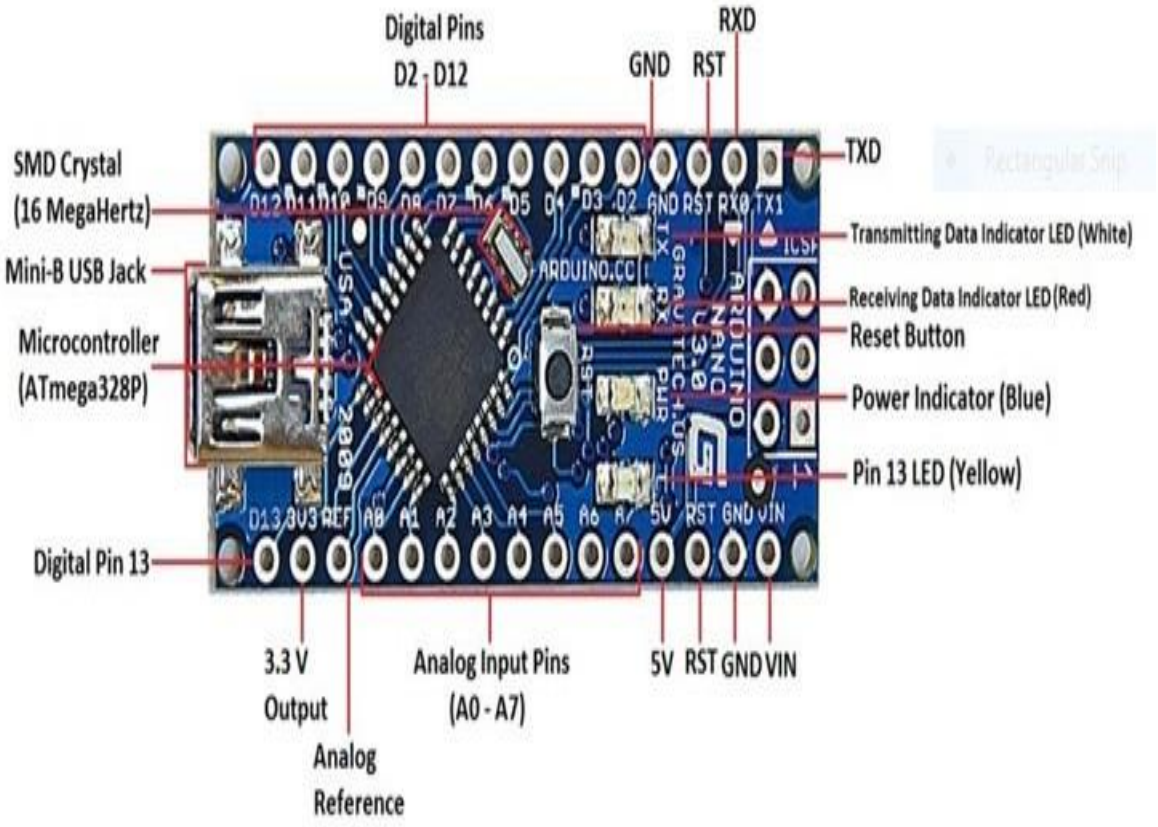

Figure 2.3: Arduino Nano

Arduino Nano	*Specifications*
Analog I/O Pins	8
Architecture	AVR
Clock Speed	16 MHz
DC Current per I/O Pins	40 milliamps
Digital I/O Pins	22
EEPROM	1KB
Flash Memory	32 KB of which 2 KB used by Bootloader
Input Voltage	(7-12)volts
Microcontroller	ATmega328p
Operating Voltage	5 volts
PCB Size	18 x 45 mm
Power Consumption	19 milliamps
PWM Output	6
SRAM	2KB
Weight	7gms

Table 2.1: Arduino Nano Specifications

2.5 PIN DESCRIPTION

i. Power

The Arduino Nano will able to controlled through the Mini-B USB association, 6-20V and also not required regulated outer force source, or also 5V directed outside power supply. The force supply highest voltage.

ii. Memory

The ATmega328P has 32 KB, (also with 2 KB used for the bootloader. The ATmega328P.

iii. Input and Output

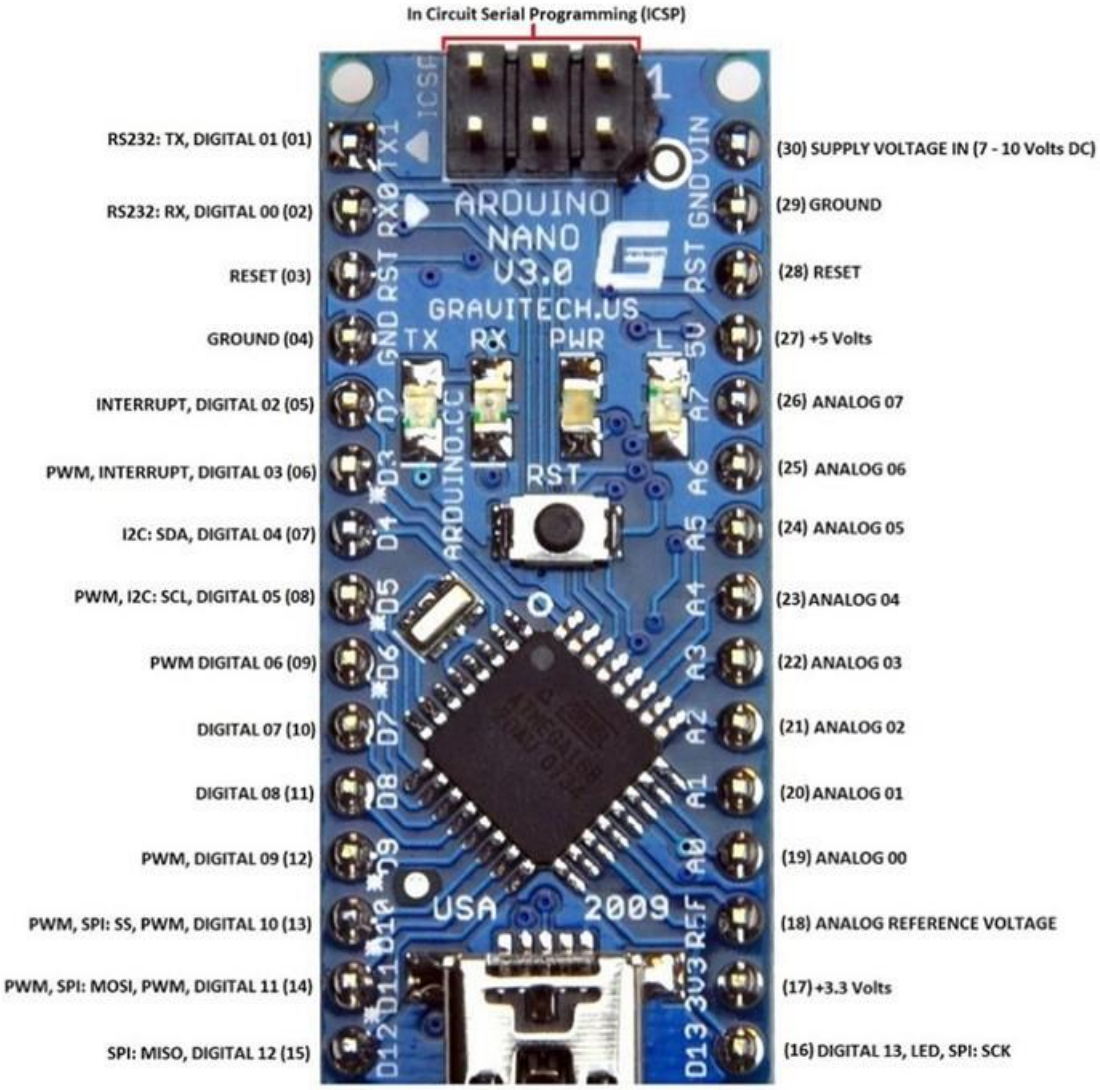

Figure 2.4: Pin Configuration of Atmega328

- Sequential: 0 (RX) and 1 (TX). Used to get (RX) and send (TX)TTL sequential information. This pins were associated with comparing pins of the FTDI USB-TTL Serial chip.
- PWM: 3-11 pins. Furnish 8-bit PWM yield with the analog Write () work.
- SPI: 10 (SS), 11 (MOSI), 12 (MISO), 13 (SCK). The above pins support SPI corresponding, despite the truth that gives by the fundamental equipment, isn't remembered for Arduino language.

Arduino Nano Pin	Pin Name	Type	Function
1	D1/TX	I/O	Digital I/O Pin Serial TX Pin
2	D0/RX	I/O	Digital I/O Pin Serial RX Pin
3	RESET	Input	Reset (Active Low)
4	GND	Power	Supply Ground
5	D2	I/O	Digital I/O Pin
6	D3	I/O	Digital I/O Pin
7	D4	I/O	Digital I/O Pin
8	D5	I/O	Digital I/O Pin
9	D6	I/O	Digital I/O Pin

Figure 2.5: Pin Names and Their Functions

The could be customized with the Arduino programming. Select “Arduino Duemilanove or ATmega328P” from the Tools Board menu. The ATmega328P on the Nano comes preboned with a bootloader that permits us to change new code without using of outside board software engineer.

Arduino Nano Pin	Pin Name	Type	Function
10	D7	I/O	Digital I/O Pin
11	D8	I/O	Digital I/O Pin
12	D9	I/O	Digital I/O Pin
13	D10	I/O	Digital I/O Pin
14	D11	I/O	Digital I/O Pin
15	D12	I/O	Digital I/O Pin
16	D13	I/O	Digital I/O Pin
17	3V3	Output	+3.3V Output (from FTDI)
18	AREF	Input	ADC reference
19	A0	Input	Analog Input Channel 0
20	A1	Input	Analog Input Channel 1
21	A2	Input	Analog Input Channel 2

Figure 2.6: Pin Names and Their Functions

Arduino Nano Pin	Pin Name	Type	Function
22	A3	Input	Analog Input Channel 3
23	A4	Input	Analog Input Channel 4
24	A5	Input	Analog Input Channel 5
25	A6	Input	Analog Input Channel 6
26	A7	Input	Analog Input Channel 7
27	+5V	Output or Input	+5V Output (From On-board Regulator) or +5V (Input from External Power Supply
28	RESET	Input	Reset (Active Low)
29	GND	Power	Supply Ground
30	VIN	Power	Supply voltage

Figure 2.7: Pin Names and Their Functions

- Arduino Nano Pinout contains 14 advanced pins, 8 simple Pins, 2 Reset Pins and 6 Power Pins.
- Each of these Digital and Analog Pins are allocated with various capacities yet their fundamental capacity is to be designed as information or yield.

- The general pins accomplish a complete goal of 10 bits while measuring the worth between 0-5V.
- Arduino consists a gem oscillator of 16 MHz This is required to deliver a clock of recurrence using consistent volts.
- There is one constraint using this board for example it doesn't accompany power jack, resembles we could not stockpile outside power supply besides a battery.
- These boards doesn't use USB for associations with a Computer, all things being equal, it accompany Mini USB support.
- The board is similar to Arduino boards accessible on the lookout, however the small shape made these boards stand apart with other boards.
- It is customized utilizing Arduino IDE means an Integrated Development Environment which will run on disconnected and over the web.
- Not in previous courses of action needed to run the chip. All we need is a circuit, small in size than general USB and Arduino IDE program introduction on the computer. USB cable is required to move the code from desktop to the chip.
- Each nail to the Nano board accompanies a particular capacity related to that.
- We could look the simple pin that can be utilized as a simple to computerized converting where A4 and A5 pin can likewise be utilized for I2C correspondence.
- Vin. Input power source voltage to the board when utilizing an outside voltage wellspring between 7V-12V. It is a managed power supply voltage of the board that is utilized to control the regulator and different segments put on the board.
- 3.3V. Is a base voltage created by the voltage controller on the chip.

- I2C. I2C correspondence is created utilizing pins A4 and A5 where A4 addresses the sequential information line that conveys the information and A5 addresses the sequential clock line that is a clock, produced through the expert gadget, utilized for information synchronizing the gadgets on the I2C transport.

2.6 RPS (Regulated Power Supply)

Regulating source is an inventory of electrical force. A device or system that allows electrical or different kinds of power to a yield burden or gathering of burdens is known as a force source unit or RPS. This word is normally applied to electrical energy supply, less regularly to mechanical, and infrequently to other members.

A force source might includes a force appropriation system just as essential or auxiliary well springs of energy,

- Conversion of any kind of electrical quantity to another ideal structure and power, normally includes changes over AC line voltage to an all around controlled low voltage dc for electronic devices. Low voltage, low force dc power source unit is usually incorporated with the devices they supply, like computers and hardware.
- Battery Management Systems.
- Chemical power modules and different types of energy stockpiling frame- works

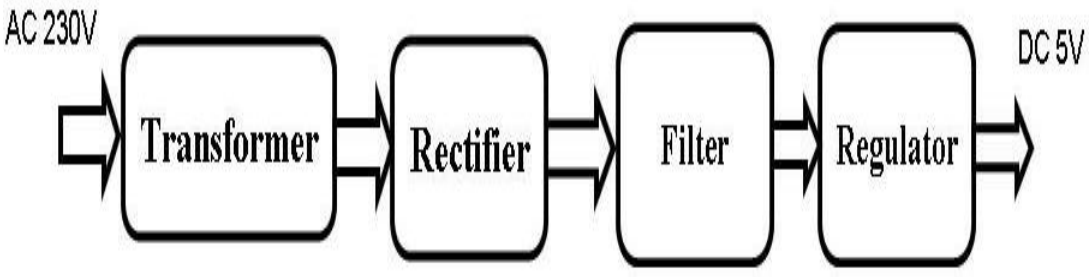

Figure 2.8: RPS

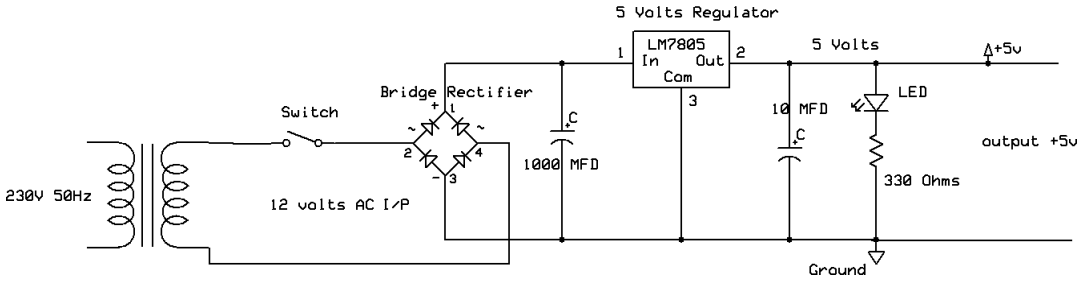

Figure 2.9: Circuit diagram of RPS with Led connection

The main components that are using in the above figure are

- AC SUPPLY MAINS (230V)
- TRANSFORMER
- BRIDGE RECTIFIER(DIODES)
- CAPACITORS
- VOLTAGE REGULATORS (IC 7805)
- RESISTORS
- LIGHT EMITTING DIODE(LED)

2.7 LCD

To display accurate messages, we use the LCD Module. Analyzing A smart two-line LCD display, 16 characters per line used to directors. The (handshake) presentation session is as follows it emerged. Although D0 to D7th bit are Data lines, RS, RW and EN pins only control rods and anchors remaining + 5V, - 5V and GND should be provided to feed. Where RS is the Select Register, RW is Read Write and EN pin Allow.

The most popular type t LCD regulator is a HITACHI 44780 that provides a visual interface in the middle controller and LCD. These LCDs are very easy to work with regulator as they have financial knowledge

The LCD requires three control lines (RS, R / W and EN) and 8 (or lines of information. The number in the information lines depends on the operating system. Whenever it works in 8-bit mode and then 8+ information lines and three

Figure 2.10: 2x16 Line Alphanumeric LCD Display

control lines for example 11 lines are required. In addition, whenever a 4-bit mode is used and then 4+ information lines and three control

lines for example 7 lines are required. How can we choose which mode to use? It is straightforward with the possibility that you have enough information lines to go in 8-digit mode and if there is a binding time.

The ENABLE pin is used to link existing information to information pins. A low-level signal is needed to connect the data. LCD deciphers also make our order right now the EN line is dropped down. If you do not lower EN, your lead will never be implemented.

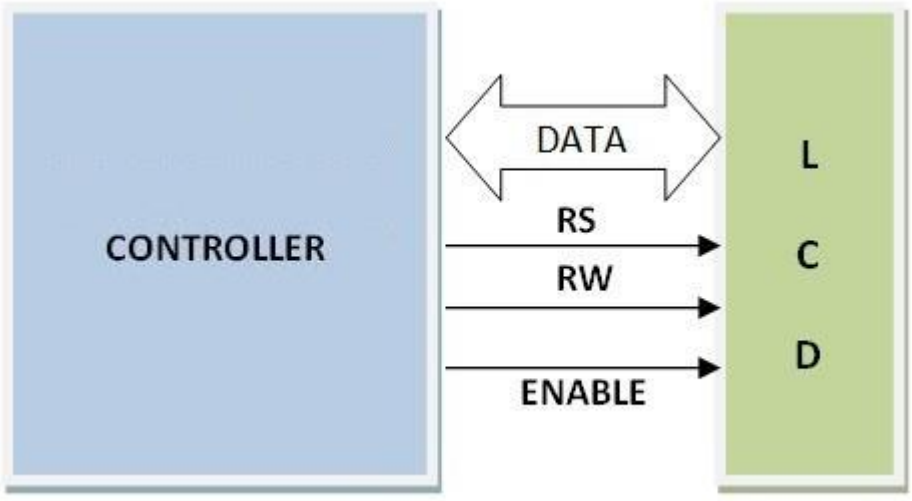

Figure 2.11: Basic LCD screen

i. Description:

This is the 16th feature in the 2-line display. Dark content on Green foundation. It uses the same HD44780 optical chipset. Interface code is clearly accessible. We will need 11 standard I / O pins to connect to this LCD screen. Includes LED backlight.

ii. Pin:

Most LCDs with 1 controller have 14 pins and LCDs with 2 regulators with 16 pins (two pins are added to both LED backlights). The display of the pin appears in the table below.

Figure 2.12: LCD screen

Figure 2.13: LCD Background

iii. LCD Background:

Fortunately, there is a popular standard that allows us to talk to many LCDs that do not pay much attention to their manufacturer. The standard is referred to as the HD44780U, which refers to the controller chip that receives data from an external source (8051) and communicates directly with the LCD.

Pin No.	Name	Description
Pin no. 1	**VSS**	Power supply (GND)
Pin no. 2	**VCC**	Power supply (+5V)
Pin no. 3	**VEE**	Contrast adjust
Pin no. 4	**RS**	0 = Instruction input 1 = Data input
Pin no. 5	**R/W**	0 = Write to LCD module 1 = Read from LCD module
Pin no. 6	**EN**	Enable signal
Pin no. 7	**D0**	Data bus line 0 (LSB)
Pin no. 8	**D1**	Data bus line 1
Pin no. 9	**D2**	Data bus line 2
Pin no. 10	**D3**	Data bus line 3
Pin no. 11	**D4**	Data bus line 4

Figure 2.14: Character LCD pins with 1 Controller

iv. Circuit Description:

Above is a very straightforward program. Control Port is an open source / open channel producer. While many of the same ports have internal pull-out pins, not much is missing. So by mixing two 10K external pull-outs, the circuit is more integrated with a wider range of PCs, some of which may not

Pin No.	Name	Description
Pin no. 1	**D7**	Data bus line 7 (MSB)
Pin no. 2	**D6**	Data bus line 6
Pin no. 3	**D5**	Data bus line 5
Pin no. 4	**D4**	Data bus line 4
Pin no. 5	**D3**	Data bus line 3
Pin no. 6	**D2**	Data bus line 2
Pin no. 7	**D1**	Data bus line 1
Pin no. 8	**D0**	Data bus line 0 (LSB)
Pin no. 9	**EN1**	Enable signal for row 0 and 1 (1^{st}controller)
Pin no. 10	**R/W**	0 = Write to LCD module 1 = Read from LCD module
Pin no. 11	**RS**	0 = Instruction input 1 = Data input

Figure 2.15: Character LCD pins with 2 Controller have internal drawing addresses

We made no effort to include data transfer in exchange. So we tightened the cords to the R / W line of the LCD board, into writing mode. This will not cause a conflict of interest in the transportation of information lines. We are therefore unable to reverse the interior of the LCD Busy Flag advising us

if the LCD consents and threatened to prepare for the final lead. This issue is being addressed by the known embedding of our system.

2.8 BUZZER:

A hoot or key fob is a physical, electrically or electronic acoustic tool. Standard uses of buzzers as well as walkie talkies include cautions, timers and customer data affirmations, e.g. a rodent clack or stroke.

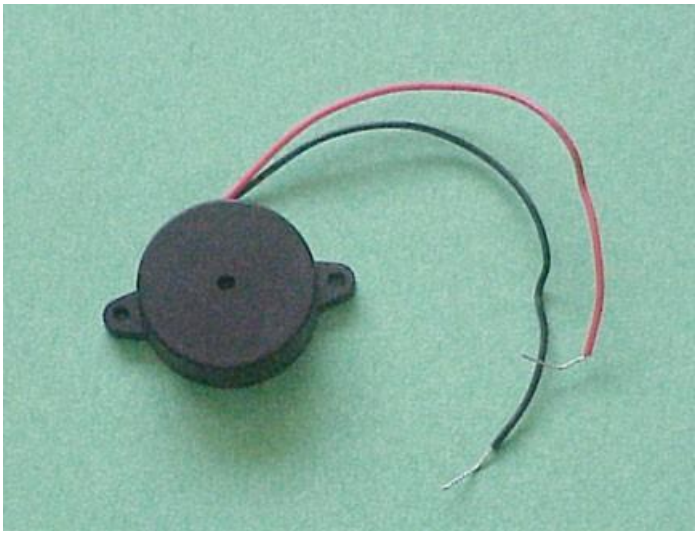

Figure 2.16: Buzzer

FEATURES:

- The PB arrangement are superior buzzers with a viscoelastic plus orphic component of the oscillator or an important inner system.
- In contrast to vibrational units, they display remarkably low force usage.
- Those who are created to provide indefinite period and small amounts disturbances without replacing connections.
- Mini, however with little voltage, produces outstanding incredible insulation.

i. Electromechanical:

Initial gimmicks rely on an industrial armature that could not be distinguished from a metal clang or chime. A hand-off can also be coupled with its own stimulating current, which might cause the contacts to stir. These units have been regularly secured for use as a sounding board by a splitter or roof.” Buzzer” stems from optoelectronic buzzer’s scratching disturbance.

ii. Voltage Buzzer Sound Controls:

At the point opposition is associated in arrangement (as demonstrated in outlines (a) and (b)), unusual wavering happens while changing the sound

. For this situation, embed a capacitor in corresponding to the voltage swaying board (as demonstrated in outline (c)). Thus, strange swaying can be forestalled by establishing one side. Nonetheless, the voltage VB added to the voltage wavering board should be inside the most extreme information voltage range, and as capacitance of 3.3F or more prominent ought to be associated.

APPLICATIONS:

- Annunciator boards
- Electronic metronomes
- Game shows
- Microwave stoves and other domestic devices
- Sporting occasions, for example, b-ball games

2.9 GSM

DEFINITIONS

For multi-task terminals that support Wireless services, the phrases “Versatile Facility” (MS) or ” Portable Gear” (ME) are used. A” foldable started visit” (MOC) or “engaged invite” from a Verizon location on the Landline is known and a ”handheld stopped invite” (MTC) or ”facing deem” from a fixed station to a multi-station WiMAX is known as a WiMAX

Board would be an innovative and improved cell innovation used to convey adaptable voice and information administrations. GSM is the global syste

Figure 2.17: GSM chip

GSM supports spoken conversations and transmission of files with a speed of up to MHz Ethernet functions in Europe with MHz and jam and in the Western World with Hz and MHz In Queensland, Scotland and other African Countries, Wireless communication is equally used with the segments and then concentrating spectrum. global rambling ability allows customers to access to similar administrations when travelling overseas as at home. With its mixed portfolio across the world.

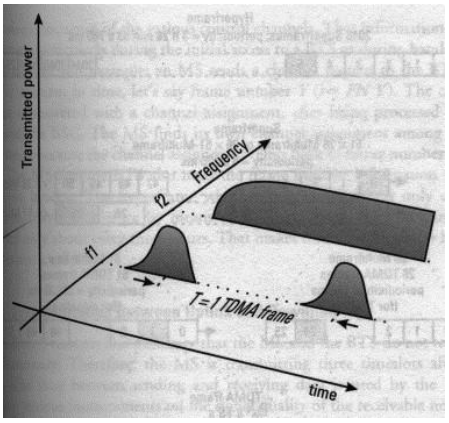

Figure 2.18: Description of a remaining energy Voice and data signal utilizing Ieee and Pulse width modulation

Umts was classified first for the 915 Infrared region but then, even for cell innovation the 1800 MHz range was used. The mm - wave range seems to have the same design and details as the 24 Ghz GSM invention but still manufactures the portable sector. The Synthesis effects add to the advantages of the 1500 Infrared region.

i. DESIGN AND BUILDING BLOCKS:

Umts is principally based on the three structure blocks.

- Umts ckt – Hand-over happens in the radio organization. Each BTS is designated a bunch of recurrence channels.
- Umts Mobiles exchanging ckt – This organization Is concerned with the information capability demanded for management and management arrangements.
- Umts Procedure and Repair - Completed task includes management and industry, board stability, conflict management, activity, management and based method.

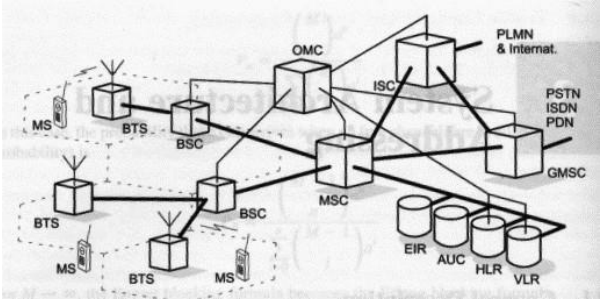

Figure 2.19: The basic blocks of the whole GSM system

ii. Signaling Schemes and Ciphering Codes Used:

Signaling Schemes:

Udms is automated yet, of fact, voice is easy. The basic signature must thus be tweaked and thereafter provided. The coding technique used by Umts is the Retinal pigment epithelium (Long term predicting of regular beat arousal).

This helps the Start implementing decrease the use of effort and draw standby time out. The lost features are replaced by an artificial earth turmoil caused by a comforting cry included into the framework of the Mute Signifiers (Fid). Assume that an accident occurs due to a noisy transmission and that the channel coding physical security can't change the banners of those cases with a dreadful impact signal (dis)

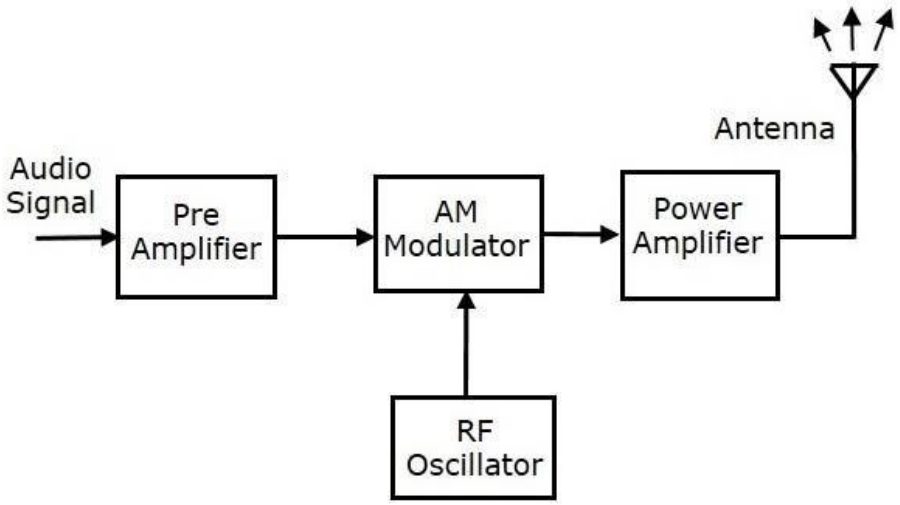

Figure 2.20: Transmitter for the voice signal

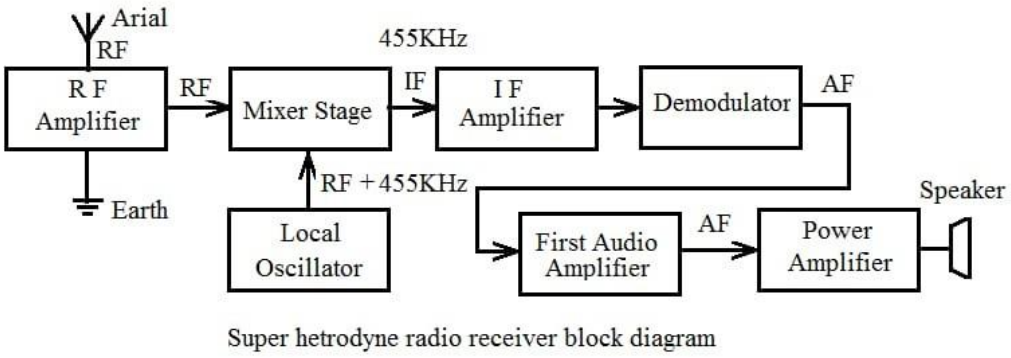

Figure 2.21: Receiver for the voice signal

- **A3/8:**

  The Flex provides the Emission scenario response from the aberrant test Scam, possibly generated by the Econ from the Cloud server. The A3 algorithms can provide neighbors and friends yield, the Emission scenario reaction, for input on the Ringgit from the MSF and the unexplained Meri from the Mobile. The Lineup has a capacity of 64 impulses.

- **A5/1:**

  The Am modulator redeon measurement is the current figure used for air communication embedding. Within each brink, the stream figure is displayed with the meeting key Indianapolis and the edges no. jumbled. A unique Houston key is used in all the 24-piece patterns of the phrase.

TWO MAIN INTERFACES

The two principal interfaces are the AIR and the ABIS interface. The figure shows the motioning between them.

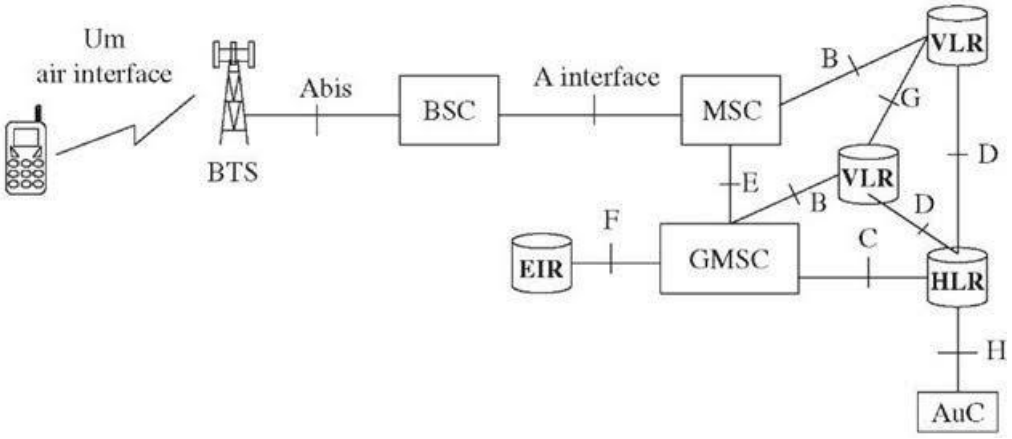

Figure 2.22: Signaling between Air and Abis Interface

i. AIR INTERFACE:

The data rate is similar to the current security system. In the Frequency spectrum, the identifying plans are as followed.

- D protocol DEVIEW Live coverage (BCCH) o

  Network of Radio Command (BCCH)

  This channel form of external progress to just the MSC, e.g. this same radio channel construction, the connectivity of data, etc.

  o Connection FRECTION CORRECTION (FCCH)

  Data concerning the propagation repeat transmitted to MS are delivered in this medium.

  o CHANNEL SYNCHRONICEE(SCH)

  The data for matching an MS is exchanged and BSCS is detected.

2.10 FIRE SENSOR:

- Infrared (FR) light is electromagnetic radiation with a wavelength longer than that of visible light, starting from the nominal edge of visible red light at 0.7 micro meters, and extending conventionally to 300 micro meters.
- These wavelengths correspond to a frequency range of approximately 430 to 1 THz, and include most of the thermal radiation emitted by objects near room temperature.
- Microscopically, IR light is typically emitted or absorbed by molecules when they change their rotational-vibration movements.

CHAPTER 3

SOFTWARE DESCRIPTION

3.1 ARDUINO C COMPILER

Draws were also dubbed composed projects using Ultrasonic Sensor (IDE). These would be edited in the tool and saved with the extension of the ion document. The reader does indeed have highlights to slashed but also search/supplant text. The message region provides information while saving and trading and also shows mistakes. Device Driver provides text for the control Centre and contains total notifications of blunder and perhaps info. The window's base right corner shows the designed board and sequence port. You can view and transfer strategies, create, create, but also maybe contours, and direct its persistent screen with the Catalog toolbar.

Eta: Nodemcu parts (Xml) saved expansion pde representations before . These records can be accessed with variant , guys can save the sketch with the .ino increase Draws are called composed projects using Arduino Software (IDE). This was compiled also in platform and secured mostly with lengthening of the
.ino manuscript. The reader has highlights to cut/paste and search/supplant text. The message region gathers details while saving and trading and also shows blunders.

- **Verify** - Examine their work before transferring it over to the platform that has been set up. Subtleties can be found in the relocating section below.
- **New** - New devise another adumbrate.
- **Open** -Open Displays a bar including its plethora of visualizations throughout clients moleskine. When you hit one, it could popup inside the preparation phase, accessing its material.
- **Save** - Saves your adumbrate.

- **audit** - The diagnostic blinking cursor. Extra orders can be accessed in the Preview, Annotate, Comic strip, Mechanisms, and Assist panels. The recipes are positioned tastefully, implying that somehow the items duties of the job now being done are displayed.

3.2 WORKING SKETCHES

1.SLOT:

- New - Creates a new administrative case, using the least of construction to efficiently put in place a sketch..
- Open - Allows to stack a sketch document perusing the PC drives and organizers.
- See Lately - Displays a list of the most frequent depictions that are ready to be viewed.
- Workbench - Displays the average expressions within the blank envelope framework; clicking on just about word opens the corresponding sketch in a different overseer event.
- Examples - This menu thing displays any model provided by the Boot Loader (Plugin) or package. So each model is structured in either a graph, making it easy to find what you're looking for by subject or category.

2.EDIT:

- Redo - Undoes at minimum one component of the changing process; so if users return, guests can proceed with Rewrite.
- Trim - Reduces the selected text again from manager and pastes it into the notepad.
- Duplicate - Makes a copy of the selected text in the supervisor and gels these into the notepad.

- Transfer for Board - Downloads complete script of our sketch to such notepad in a format suitable for displaying on the discussion board, including grammatical shading.
- Copy as HTML - Dumps this same content underlying this sketch here to notepad as Web pages, which may then be pasted onto web pages.

3. SKETCH:

- Register - Verifies any sketch against errors in the sequence in which it was created; it will also indicate space use for code other elements in the control center section.
- Upload - Compiles transfers the double record onto the intended device in through set-up Docks.
- Transfer Utilizing Coder - This will overwrite the board's bootloader; you'll need to use Tools Burn Windows installer to recover and still have the option to Post to Flash drive pertinence again. It does, however, allow you to use the whole Data storage allotment for your drawing. Although it 's n't yet too much bother, keep in mind that this arrangement will not eat the wires. A Tools -wip order is used to do this.

4. TOOLS:

- Dynamic Interface - The above makes current content seem nicer by adding custom something so that insertion wavy supports line up, and assertions inside wavy supports have been nested slightly.
- Export Drawing - Would save a document image in.zip version. The file is saved in the same directory as the drawing.
- Fix Packing and Recharge -Fixes discrepancies in the supervisor roast guide encoding and other working frameworks burn maps.

- Barcode Sensor - Opens the chronic screen bar and initiates data exchange with any attached gadget on the currently selected Port. If the board upholds, this usually resets the system.

5.HELP:

Also you can find easy access to several archives that come with the Proteus . Without an online connection, you access Reviewing, Reference, this handbook for the IDE, and other data locally. The archives are a near-duplicate of the ones online, and they may connect to our website.

- Seek in Allusion - This should be the Help menu's sole sophisticated capability: it finds the most significant page in the nearby copies of the Reference for the aptitude or order beneath the thumb..

6.SKETCH BOOK:

Records are saved with a.ino document augmentation starting with adaption. The.pde extension has been used in previous versions. In any case, in angular 6 however after, you can open.pde named records; the application will rename their enlargement to. Pde.

3.3 UPLOADING

You must first choose the appropriate items from the Products Boarding and Tools Container settings before transmitting this image. The sheets are depicted under. The sequential port on the Mac is probably /dev/tty.usbmodem241 (f or /dev/tty.usbserial, or/dev/tty.USA19QW1b1P1.1 (for a Duemilanove or previous USB board). On Windows, it's most likely Basal diets or Version
3 (for a successive deck) or Corporate banking, 3 m, Decision aid, or above (for a Scsi committee) - to find that, look in the bays tab of the Operating system Control Panel for Sata series gizmo. On Linux, it must be /dev/ttyACMx,/dev/ttyUSBx, or something equivalent. When you've found the suitable consecutive ports and circuit, click the file " button or go to the Drawings file menu Upload. The previous A rd uino sheets will promptly reset and started your transfer. You'll need to push the brake pedal on the board

not long beforehand performing the transferring with elderly sheets (which was before) that required app. As the sketch be loaded, the To be and TX Lighting will illuminate. When the development is finished, the Arduino Software (IDE) will trigger an alert or a blunder.

3.4 LIBRARIES:

Services provide extra functionality for use in drawings, such as interacting with equipment or managing information. Select a collection from the Shape ¿ Integrate Library submenu to use it in a design. It'll also place zero or more include statements there at top of something like the file and collect the library with your image. Libraries boost the number of available storage up on the board because they will be transported with your sketch. If a doodle does not require such library however at time, just erase its include statements from the top of your code.

In the history section, there is a list of institutions. With Uno programming, a few packages are included. Some may be not.

3.5 THIRD PARTY HARDWARE:

Outsider gadget backing may be added to your book catalog's firmware directory. Board defines (which appear in the board menu), center libraries, bootloaders, and computer engineer definitions is one of the stages that may be presented there. To begin, create the gear directory, then learn to tie the outer level and place it in that sub-index. (If you use "usb" as the sub-index name, you'll overwrite existing built-in Atmel stage.) To remove, you delete the book.

See the outsider Equipment description for the further information on how to construct packages for enemy machinery.

3.6 THE COMPILATION PROCESS:

In actuality, the avr code is plain old c sans the headers (the incorporates what not). The IDE stores the current record as arduino.c in the 'tory' index

when you push the ’bulk’ button, then runs a make file in the ’lib’ index. This motor reproduction or direct reinforcement copies Arduino’s as prog.c into ’repub,’ starting with ’wiringlite.inc.’ These activity converts the nodemcu code to a collin file (called prog.c).

Regarding that, it copies all of the records in the ’central’ index to ’dems’. Adding to these records adds instructions to the vernacular. These files represent the fulfillment of the various micro - controller directives.

Pascal Tang’s Procyon avr-lib, which is found in the ’coalition’ registry, protects the main documents. The code at lib/tmp is now ready to be processed with the script found in ’procedures.’ If the make activity goes well, you’ll have a function called prog.hex that can then be fed into graphics Card

CHAPTER 4

PROJECT DESCRIPTION

4.1: WORKING MODEL

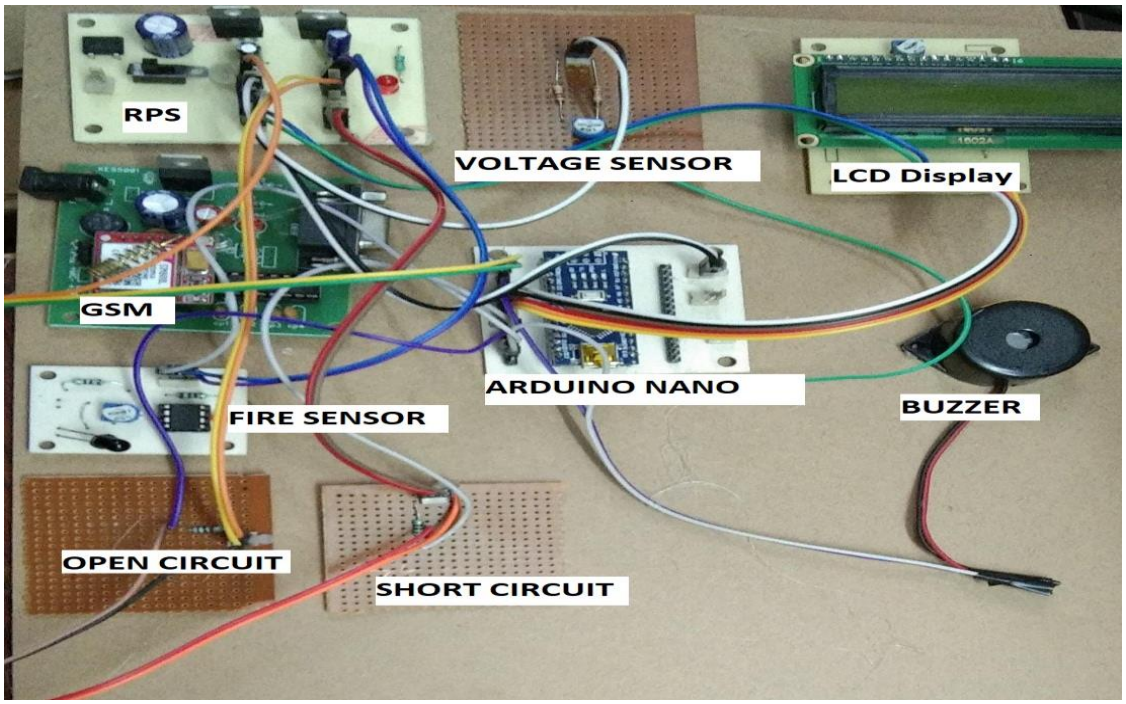

Figure 4.1: working model

4.2 WORKING

The set up or field device consists of 2 major components, GSM and microcontroller. The over voltage sensor, fire sensor, short circuit and open circuit sensors are attached to both microcontroller and transmissions lines maintaining the connection between them, meanwhile the Arduino is connected to RPS and the LCD, buzzer, GSM are connected to Arduino completing the circuit. When supply is given to the circuit, if there is any fault in the circuit like high voltage or over voltage the voltage sensor comes in to work and indicates the Arduino which sends signal to lcd to display that there is a short circuit at a specific area and also the buzzer will be alerted, and GSM sends SMS to mobile .Same process will be continued for all the sensors, if there is a fire at any of the transmission lines the fire sensor comes in to work, if there is any open and short circuit respective sensors come in to work. In this process we can detect four types of faults **They are: over voltage fault, fire fault, short circuit fault and open circuit fault**.

- **Over Voltage Fault:** It occurs whenever high current follows through transmission line and This system detects that and send SMS by GMS modem and displays the fault as showing in figures (4.2,4.3).
- **Fire Fault:** If fire accidents take place in transmission line and This system detects that by fire sensor and send SMS by GMS modem and displays the fault as showing in figures (4.2,4.3).
- **Short Circuit Fault:** When two lines touches each other in transmission line and This system detects that and send SMS by GMS modem and displays the fault as showing in figures (4.2,4.3).
- **Open Circuit Fault:** Whenever line is broken in transmission line and This system detects that and send SMS by GMS modem and displays the fault as showing in figures (4.2,4.3).

4.3 RESULT

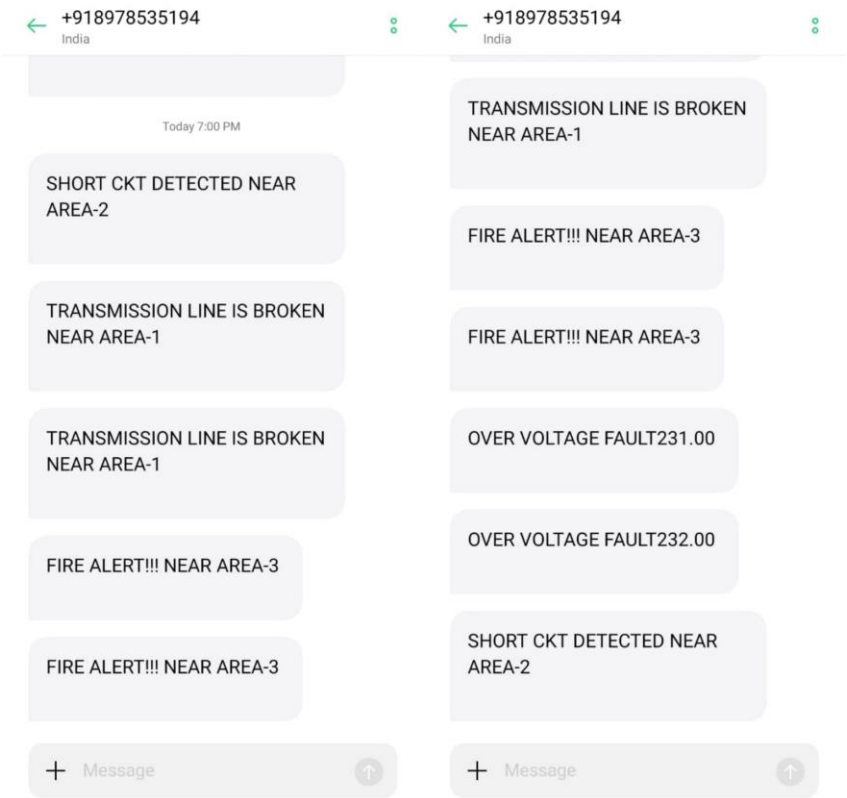

Figure 4.2: SMS alert

Figure 4.3: Hardware output

The continuous analyzing of fault indicating and locating the transmission line, in which either it will be any kind of shortcoming that can be informed and will be indicated. Generally, disturbance occurring on the transmitting lines the sign is send to controlling station or phone along a GSM module. Thus message received through the mobile will be the fault between line1 and line2 and the fault will be either open circuit or short circuit or fire circuit. The output that appeared on the controller station or mobile will be the open circuit or any other kind of fault occurred on transmitting line.

ADVANTAGES :

The major advantages are as follows :

- Work in real time response.
- Coverage area is large compared with other existing system.
- Cost efficient.
- Devices enable by wireless communication.
- Economically reliable.
- Number of components used are compact in size.

CHAPTER 5

CONCLUSION

5.1 SUMMARY

In our project we had designed an IOT based transmission line observing and fault raising framework that is able to send data with the equivalent to monitor room or mobile by means of SMS. The carried out framework configuration basically focuses on the transmission and distributing modules. It gives us best approach to identify those faults, for example, wasting of supply and power theft. This framework ceaselessly screens different boundaries of the framework. It likewise assists with distinguishing the shortcoming at the proper time and subsequently dodges illegal utilization of power. Programmed checking, examining and fault detection will be made through the mobile display over the hyper terminal. Our model has ceaseless observing module incorporating the GSM correspondence innovation along with GPS innovation. This likewise addresses the hardware equipment and the software process. Thus execution of this system can save huge measure of power and in this manner power could be accessible for huge numbers of customers on an exceptionally populated country like our country.

5.2 FUTURE SCOPE

This model can also adopted as,

- This system can be tested in the field for real time fault monitoring system.
- Underground line or cable fault locating.
- By implementing the model we will locate unsymmetrical faults.

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