

PASSWORD BASED CIRCUIT BREAKER WITH GSM MODULE

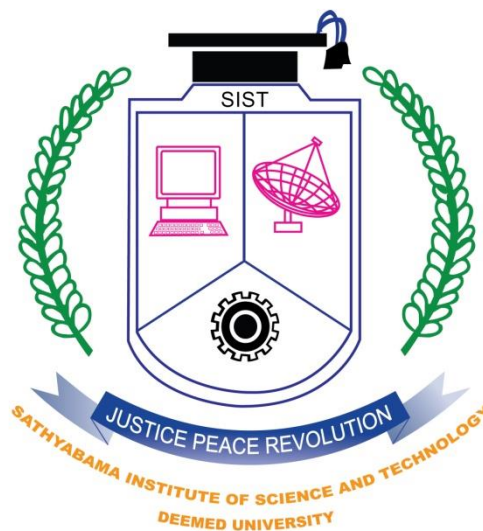
Submitted in partial fulfillment of the requirements for the award of

Bachelor of Engineering Degree in
Electrical and Electronics Engineering

by

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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

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APRIL 2021



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BONAFIDE CERTIFICATE

This is to certify that this Project Report is the bonafide work of **R.S.SAI MANI TEJA** (Reg. No. 37140069) and **SAYYAD SHAHID AFRIDI** (Reg. No. 37140076) who carried out the project entitled "**PASSWORD BASED CIRCUIT BREAKER WITH GSM MODULE**" under our supervision from December 2020 to April 2021.

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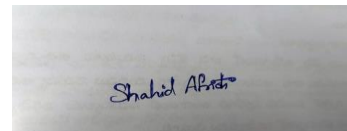
DECLARATION

We **R.S.SAI MANI TEJA** (Reg. No. 37140069) and **SAYYAD SHAHID AFRIDI** (Reg. No. 37140076) hereby declare that the Project Report entitled “**PASSWORD BASED CIRCUIT BREAKER WITH GSM MODULE**” done by us under the guidance of Dr.S.D.SUNDARSINGH JEBASEELAN is submitted in partial fulfillment of the requirements for the award of Bachelor of Engineering degree in Electrical and Electronics Engineering.

DATE: 15.04.2021

PLACE: Chennai

SIGNATURE OF TCANDIDATES

A rectangular box containing a handwritten signature in blue ink that reads "Rssmteja".A rectangular box containing a handwritten signature in black ink that reads "Shahid Afridi".

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We convey our thanks to **Dr. N. M. Nandhita., Dean, School of Electrical and Electronics Engineering** and **Dr. V.Sivachidambaranathan, Head of the Department, Dept. of Electrical and Electronics Engineering** for providing us necessary support and details at the right time during the progressive reviews.

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ABSTRACT

A electrical fuse is an mechanically operated switch designed to safeguard an electric circuit from injury caused by overload or short. Its basic perform is to discover a fault condition and interrupt current flow. Unlike a fuse, that operates once and so should get replaced, a electrical fuse is reset (either manually or automatically) to resume traditional operation. once operated manually we have a tendency to see fatal electrical accidents to the road man square measure increasing throughout the electrical line repair because of the dearth of communication and coordination between the upkeep employees and therefore the electric station employees. This project focuses on the protection of the lineman whereas operating in order that they don't feel the abrupt electrical shock. As lineman needs to influence live wires fairly often, the possibilities of important accidents area unit already terribly high. However, with the correct quantity of coordination among lineman and station, tons of those accidents may be avoided. The project aimed toward providing the answer that ensures the protection of service staff. Here, as shortly because the lineman notice the fault within the electrical line, AN SMS are going to be sent to the station employees, WHO would flip the road and switch it on once the fault is being resolved, so reducing the possibilities of accidents and saves the facility in addition. The planned system is totally operated on a small controller. The system is totally controlled by ATMEGA32 microcontroller. A input device is employed to enter the password to open or shut the circuit breakers, that is indicated by a lamps. the worldwide system for mobile (GSM) circuit enables remote of the system.

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CHAPTER 1

INTRODUCTION

1.1 GENERAL INTRODUCTION

The project relies on Embedded Systems. In this project, small controller is employed that controls all the operations in concerning the positive identification system. For this method, we tend to need the part like small managementler control electronic equipment, power provide like keyboard. This keyboard is employed for getting into a positive identification for in operation totally different load that is connected to the controller. This project offers an answer to the current downside to make sure lineman safety. Its maintenance could be a terribly low because of this it's terribly helpful for the lineman. today there's a numerous product that is out there within the market however they're terribly pricey and conjointly they're terribly long devices. Our device reduces the time that is needed for the lineman for repairing. The elements that are needed for our model is definitely on the market within the market. the most construct of our project is to scale back the time of the lineman. the most a part of our project is that the GSM module that is needed for causing associate SMS. However, with the proper amount of coordination among lineman and station, heaps of those accidents will be avoided. The project aimed toward providing the solution that ensures the security of staff. Here, as presently because the lineman observe the fault within the electrical line, an SMS are sent to the station employees, UN agency would turn off the road and switch it on once the fault is being resolved, thus reducing the probabilities of accidents and saves the ability furthermore. The planned system is totally operated on a microcontroller. The system is fully controlled by AT89C51 microcontroller. A keypad is used to enter the password to open or close the circuit breakers, which is indicated by the lamps. The global system for mobile (GSM) circuit enables remote control of the system.

1.2 LITERATURE SURVEY

Electric lineman protection exploitation user changeable watchword based breaker: A breaker is associate automatically operated management designed to protect associate electrical device from injury caused by overload or contact. Its basic perform is to sight a fault condition and interrupt current flow. in distinction to a fuse, that operates once then ought to get replaced, a breaker are reset (either manually or automatically) to resume ancient operation. once operated manually we tend to tend to check fatal electrical accidents to the road man are increasing throughout the electrical line repair due to the dearth of communication and coordination between the maintenance workers and so the electric station workers. thus on avoid such accidents, the breaker are so designed such exclusively approved person can operate it with a watchword. Here, there is in addition a provision of fixing the watchword. The system is completely controlled by the eight bit little controller of 8051 family. The watchword is hold on in associate EEPROM, interfaced to the small-controller and so the watchword are changed any time in distinction to a collection one burnt permanently on to the small controller. a knowledge data input device is utilized to enter the watchword and a relay to open or shut breaker, that's indicated by a lamp. Any wrong attempt to open the breaker (by coming back into the inaccurate password) associate alert are motivated , indicated by another lamp.

Electric line man safety exploitation little controller with gsm module: very important electrical accidents to line men are on the rise throughout electrical line repair due to lack of communication and co-ordination between the maintenance workers and electric station workers. This projected system provides a solution that ensures safety of maintenance staff, i.e., line man on investigating a fault in electrical line the road man sends sms and therefore|and thus|and thus the itinerary is transitioned that's another time switched on once resolution the fault it will even prove a boon many to avoid wasting lots of power so it saves the lifespan of lineman acting on electrical line. The projected system is completely operated on little controller.

watchword based breaker: A breaker is associate automatically operated management designed to protect associate electrical device from injury caused by overload or contact. Its basic perform is to sight a fault condition and interrupt current flow. in distinction to a fuse, that operates once then ought to get replaced, a breaker are reset (either manually or automatically) to resume ancient operation. once operated manually we tend to tend to check fatal electrical accidents to the road man are increasing throughout the electrical line repair due to the dearth of communication and coordination between the maintenance workers and so the electric station workers. thus on avoid such accidents, the breaker are so designed such exclusively approved person can operate it with a watchword. Here, there is in addition a provision of fixing the watchword. The watchword is hold on in associate EEPROM, interfaced to the tiny

controller and so the watchword are changed any time in distinction to a collection one burnt permanently on to the tiny controller. a knowledge data input device is utilized to enter the watchword and a relay to open or shut breaker, that's indicated by a lamp. Any wrong attempt to open the breaker (by coming back into the inaccurate password) associate alert are motivated , indicated by another lamp. Index terms: Resistors, Capacitors, Diodes, Transistors, electrical device, Rectifier, little controller, EEPROM, Relay, Relay Drive.

1.3 SCOPE OF THE PROJECT

The scope of this project is to save the line man when he went to repair the line fault. There are many accidents are happening in present days so many members are loosing there life because of the improper communication. The password to operate can be changed and system can be operated efficiently with the changed password. No other person can re close the breaker once the changed password is given into system other than the person who had changed it. It gives no scope of password stealing.

1.4 PROBLEM IDENTIFICATION

Nowadays, electrical accidents to the road man area unit increasing, whereas repairing the electrical lines thanks to the dearth of communication between the electrical station and service staff. This project offers an answer to the present drawback to make sure line man safety. during this planned system, the management (ON/OFF) of the electrical lines lies with line man. This project is organized in such how that service staff or line man needs to enter the watchword to ON/OFF the electrical line. Now, if there's any fault in electrical line, then the road man can cut the ability offer to the road by getting into watchword and well repair the electrical line, and once returning to the station line man turn on the provision to the actual line by getting into the watchword. Separate passwords area unit allotted for every electrical lines.

CHAPTER 2

EXISTING SYSTEM AND PROPOSED SYSTEM

2.1 EXISTING BLOCK DIAGRAM

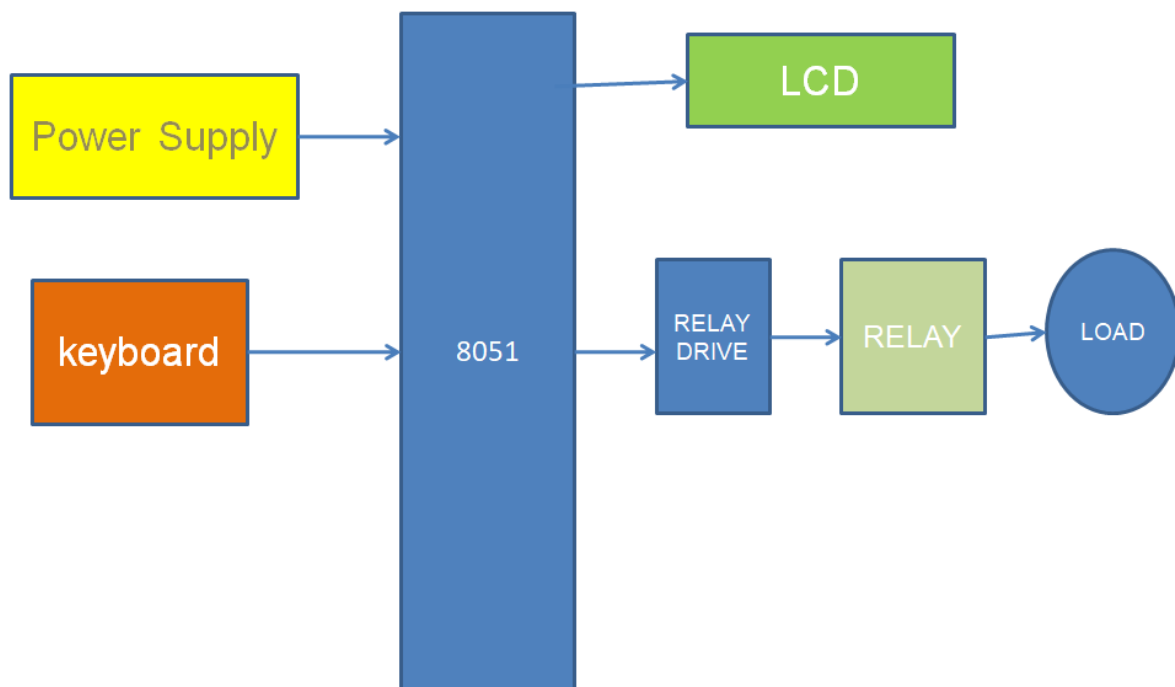


Fig 2.1 Block diagram of existing password based circuit breaker

2.2 BLOCK DIAGRAM OF PROPOSED PASSWORD BASED CIRCUIT BREAKER

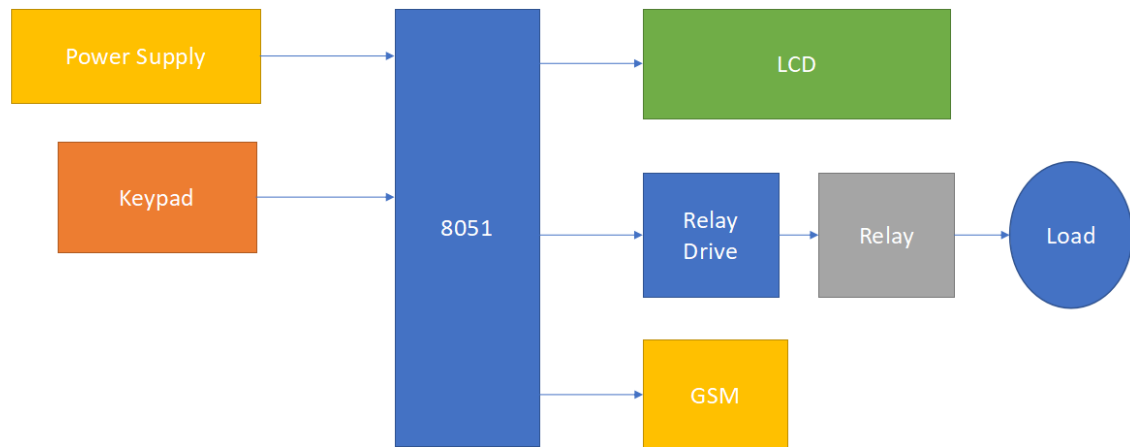


Fig 2.2 Block diagram of Proposed of Password Based Circuit Breaker

2.3 ADVANTAGES

- It Avoids the electrical accidents to line man
- The Project is simple and easy to do.
- It Uses the common available components

2.4 APPLICATIONS

- Used in electrical substations to make sure line man safety □
- This system is employed in buildings and homes
- Used in hotels and searching malls to avoid wasting the facility.

- ■ Can even be used as secret based mostly} electrical appliance management or secret based Load system.

CHAPTER 3

SIMULATION RESULT

3.1 EXISTING SYSTEM SIMULATION

In the existing method of the password based circuit breaker it consists of microcontroller, liquid crystal display, lamp, resistors and the motor to check the wheather the system is working or not. In the existing simulation with help of the motor we can check wheather bulb is glowing or not. We use the proteus software for the simulation to check the system working or not. First after writing the code and creating hex file and we have to give connections in the proteus to check the system working or not. After giving all the connections in the proteus we have to run the program after running the program in the LCD it displays as password based circuit breaker and it asks to enter the password after entering the password the circuit breaker opens and the motor will rotate in anticlockwise direction and the lamp will not glow and stop the program. Again start running the program again it shows in the LCD password based circuit breaker and it asks to enter the password after entering the password the circuit breaker closes and the motor will rotate in clockwise direction the lamp will glow. This is the existing method of password based circuit breaker.

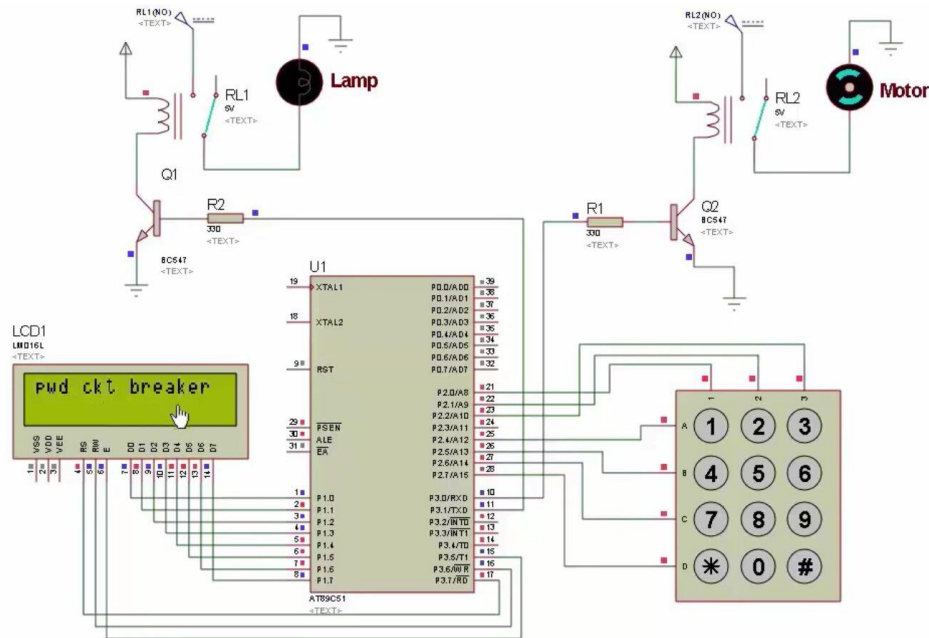


Fig:3.1 Existing System Simulation Circuit

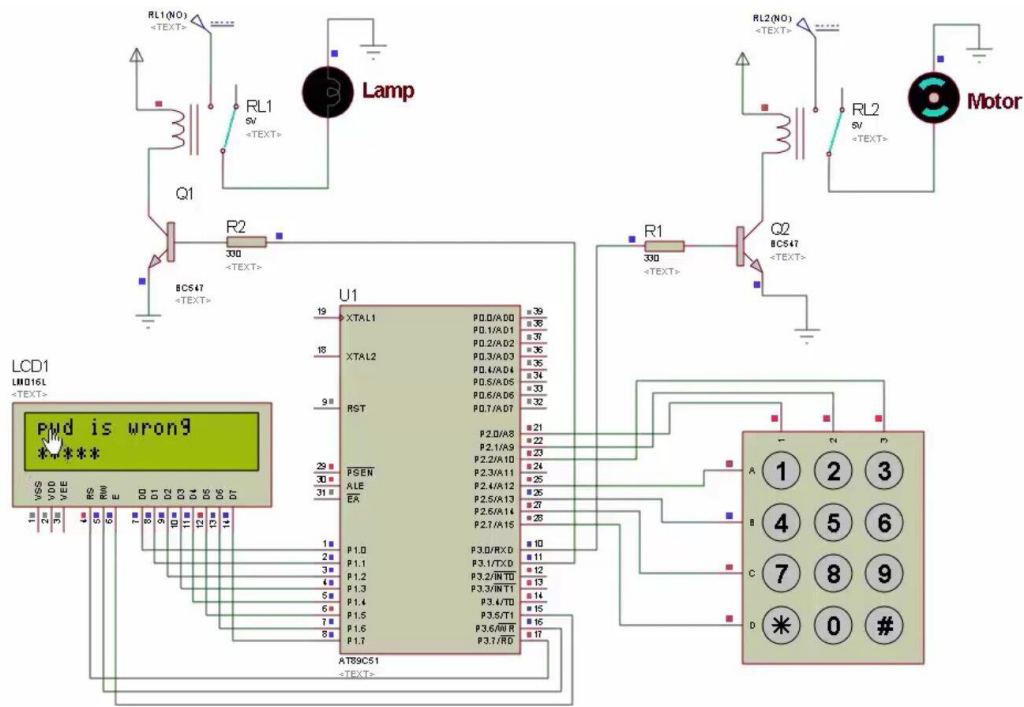


Fig:3.2 Existing System Simulation Circuit when we enter a wrong password

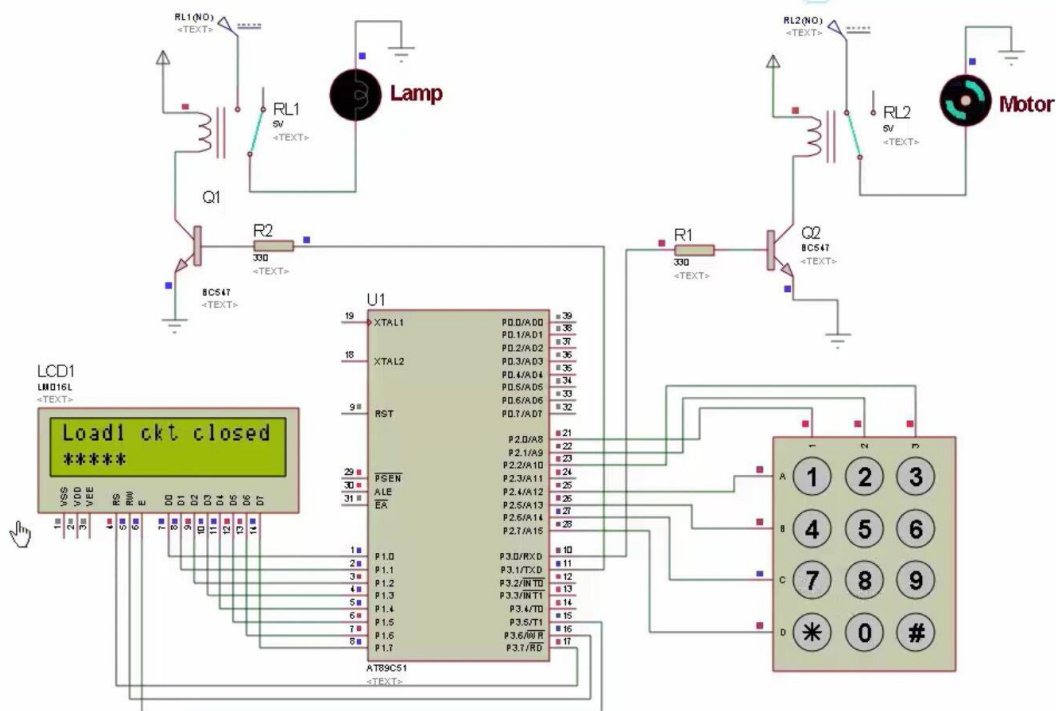


Fig:3.3 Existing System Simulation Circuit when Load 1 Is Closed

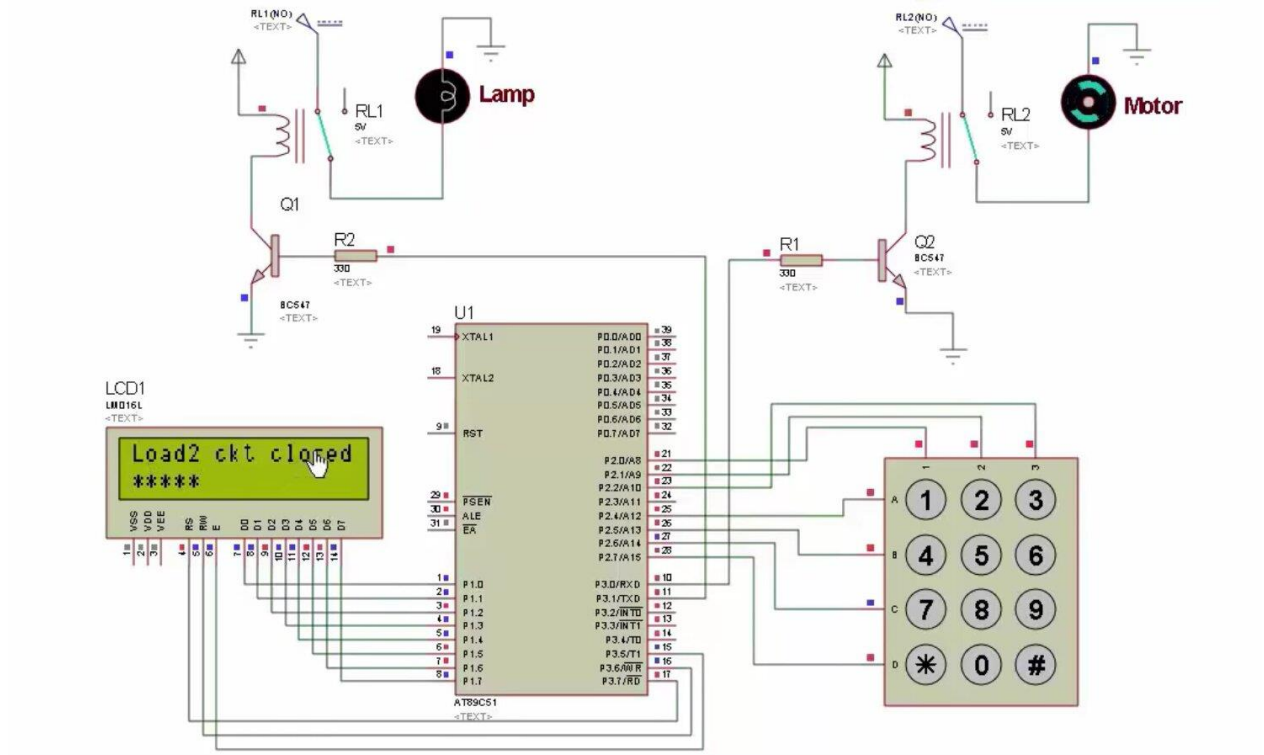


Fig:3.4 Existing System Simulation Circuit when Load 2 Is Closed

3.2 PROPOSED SYSTEM SIMULATION

In the proposed system simulation we used the AT89C51 microcontroller and voltage and resistors and a keyboard and led lights and the liquid crystal display. Keyboard is used to enter the specified password. After writing the code and creating the hex file we have to open the proteus and we should give connections in the proteus software by choosing the components. After that we have to run the program after running the program in LCD it displays as PASSWORD BASED CIRCUIT BREAKER after it will ask to enter the password after entering the password it shows access granted first led 1 will glow. After that it will again asks to enter the password after that it shows access granted and led 2 will glow. After that it will again asks to enter the password after entering the password it shows access granted and the led 2 will glow. Suppose if we enter the password wrong no led will glows and the process remains unchanged.

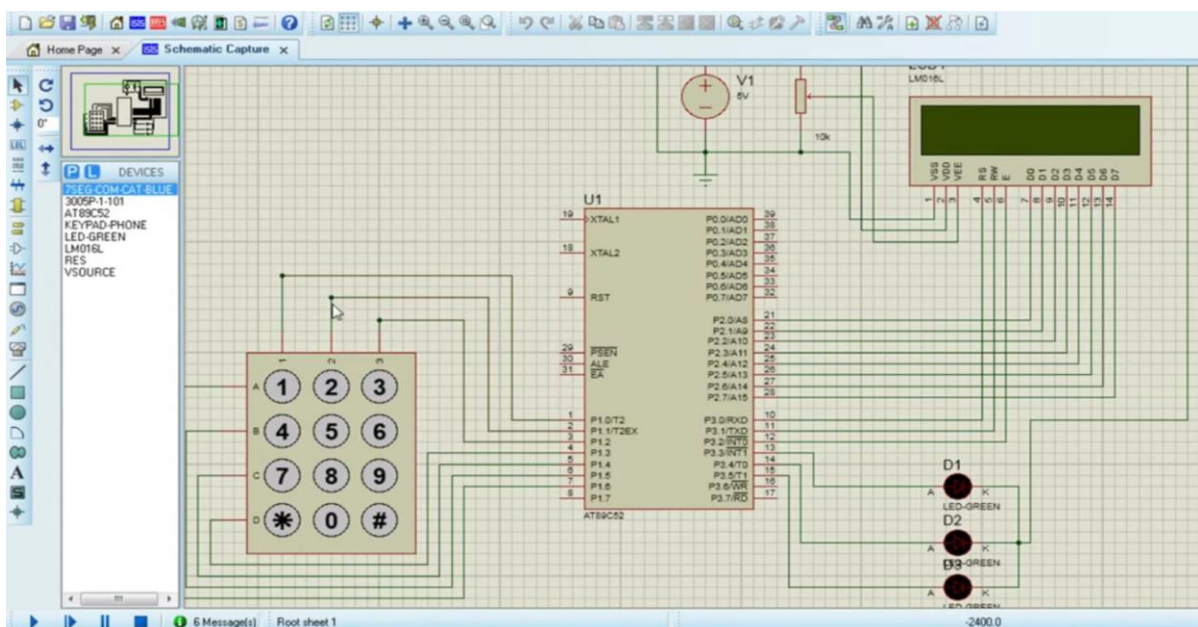


Fig:3.5 Proposed System Simulation circuit

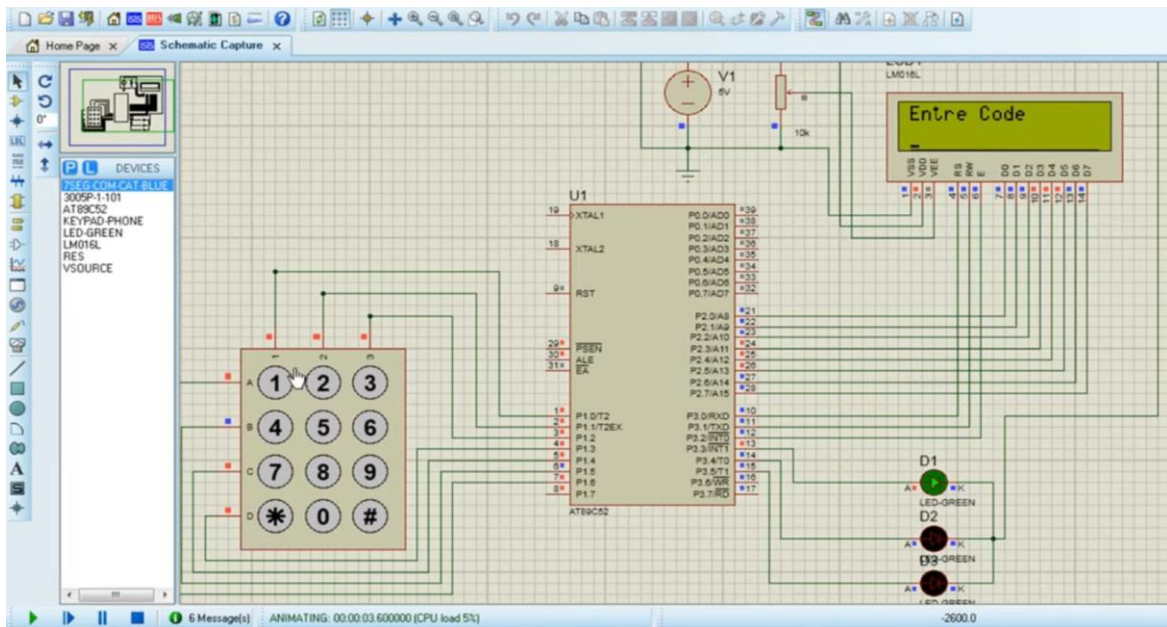


Fig:3.6 Proposed System when first led is on

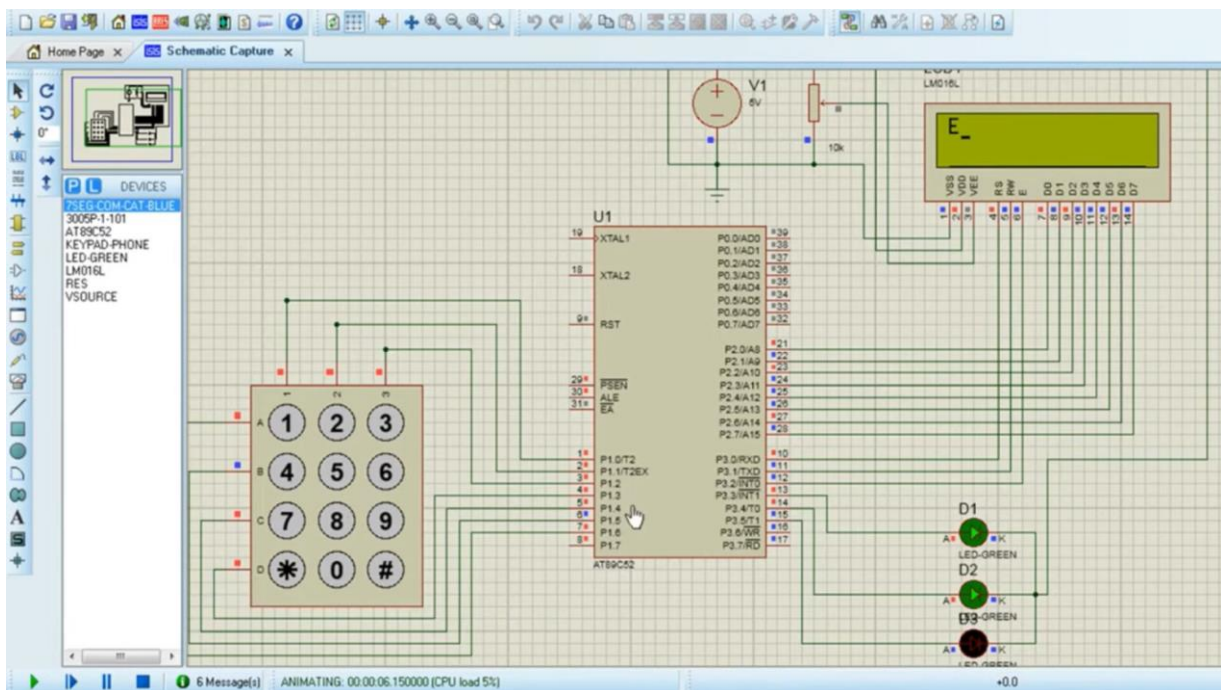


Fig:3.7 Proposed System when second led is on

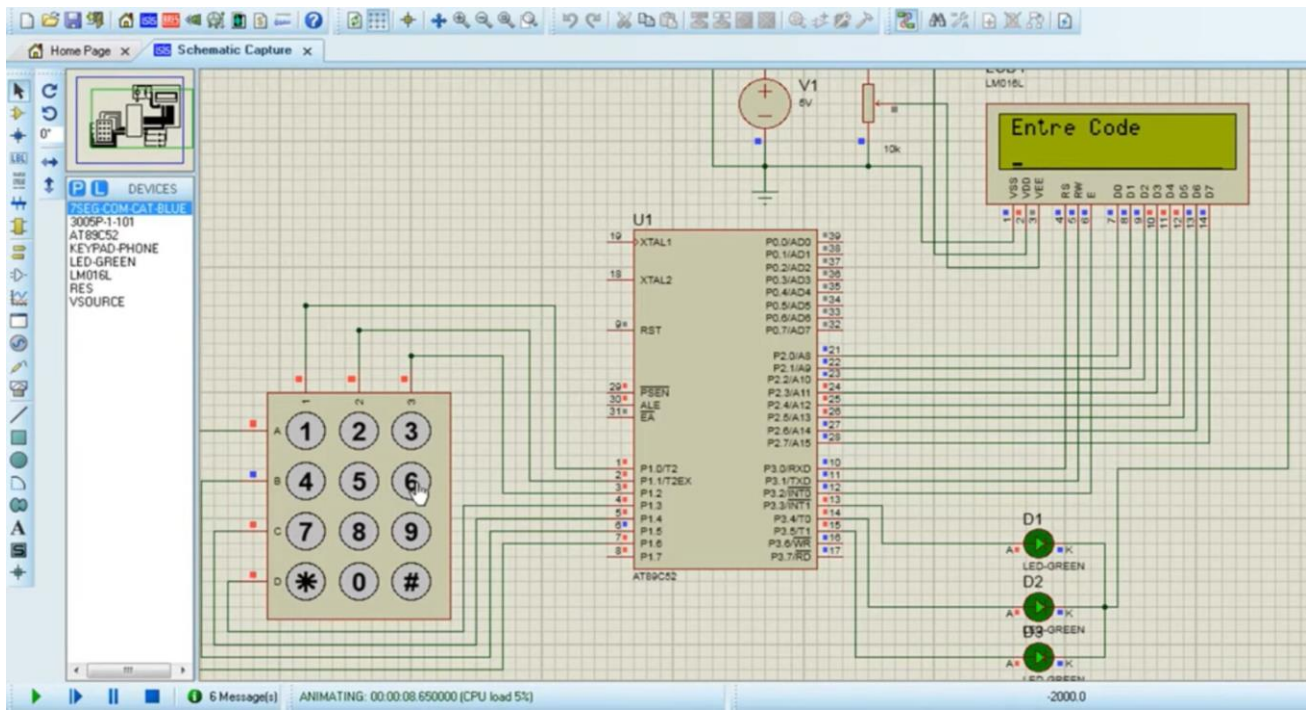


Fig:3.8 Proposed System when third led is on

CHAPTER 4

HARDWARE RESULTS

4.1 POWER SUPPLY

What is very desired is to convert the pulsing output of the rectifier to a continuing DC provide. Thus, we might prefer to 'filter' the pulsing input. we are able to try this by rendering the input wave into AC (high frequency) and also the DC elements (very low frequency) and by then 'rejecting' the high frequency elements. From our filtering experiments we've seen that the best quite filter which will perform the filtering task simply delineated could be a electrical device. Thus, if we have a tendency to connect a electrical device directly across the output of a rectifier, the AC elements can 'see' an occasional electrical resistance path to ground and can not, so seem within the output. The sleeking electrical device converts the full-wave rippled output of the rectifier into a smooth DC output voltage. The smoothing capacitor acts as a tank. Assuming a finite electrical device is connected, since a brand new charging pulse happens each 0.5 cycle the electrical device charges and discharges terribly oftentimes. we are able to observe that smaller the V_{pp} , the a lot of the wave can fit a pure dc voltage. The variable portion is understood as 'ripple' and also the worth V_{pp} is understood because the ripple voltage. more the quantitative relation of the ripple voltage to the DC or average voltage is understood because the ripple issue.

4.1.1 CIRCUIT DIAGRAM

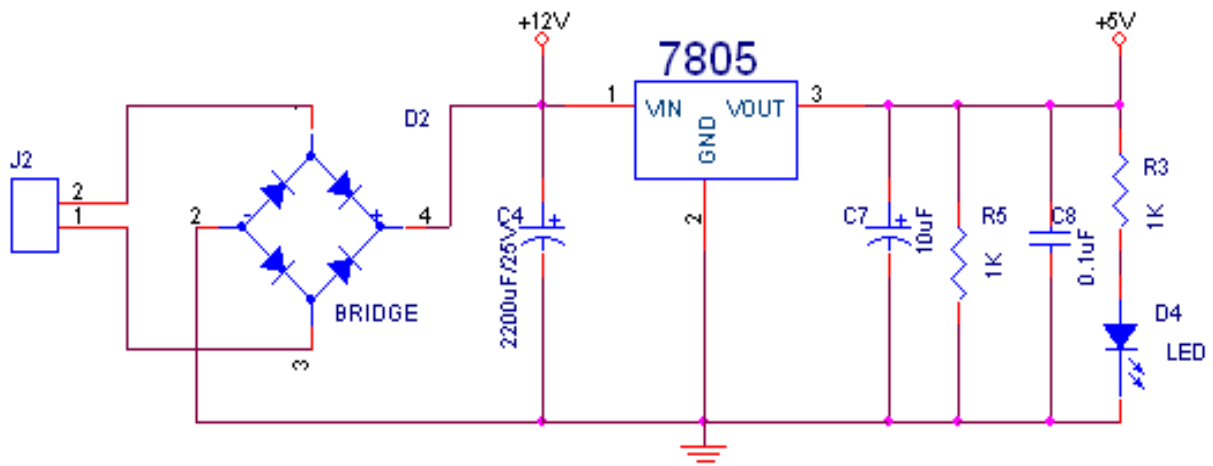


Fig 4.1 Circuit Diagram of Power Supply

4.1.2 WORKING PRINCIPLE

The AC voltage, generally 220rms, is connected to a electrical device, that steps that ac voltage all the way down to the amount of the required DC output. A diode rectifier then provides a full-wave corrected voltage that's at first filtered by a straightforward electrical condenser filter to supply a dc voltage. This ensuing dc voltage sometimes has some ripple or ac voltage variation. A regulator circuit removes the ripples and additionally remains constant dc price not withstanding the input dc voltage varies, or the load connected to the output dc voltage changes.

4.1.3 BLOCK DIAGRAM

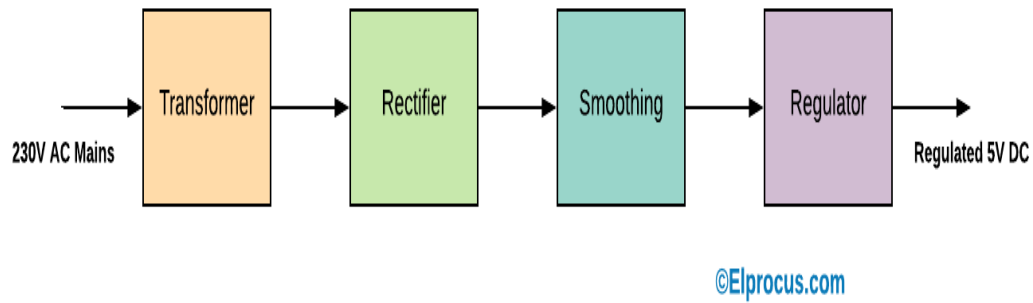


Fig 4.2 Block Diagram of power supply

4.1.4 TRANSFORMER

The potential electrical device can step down the ability provide voltage (0-230V) to (0-6V) level. Then the secondary of the potential electrical device are connected to the exactitude rectifier, that is built with the assistance of op-amp. the benefits of victimization exactitude rectifier square measure provide peak voltage output as DC; remainder of the circuits will provide solely RMS output.

4.1.5 RECTIFIER

A rectifier is AN device that converts electricity to electrical energy or a minimum of to current with solely positive price, a method referred to as rectification. Rectifiers square measure used as parts of power provides and as detectors of radio signals.

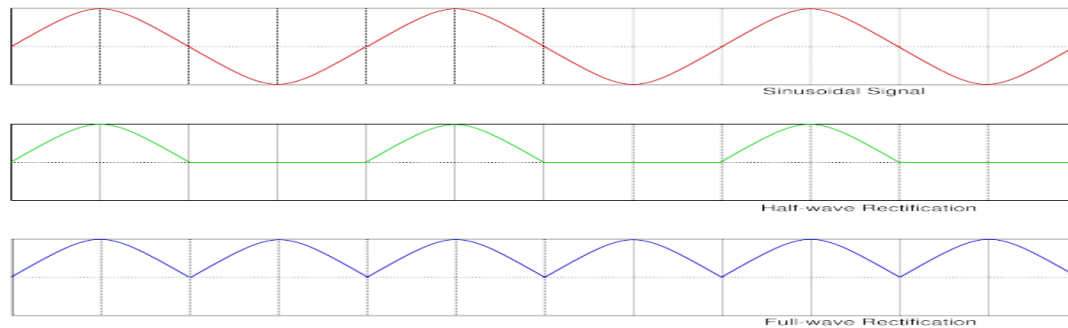


Fig 4.3 WAVE FORM OF RECTIFIER

4.1.6 BRIDGE RECTIFIER

When four diodes are connected as shown among the circuit diagram, is assumed as Bridge rectifier. The input to the circuit is applied to the diagonally opposite corners of the network, then the output is taken from the remaining a pair of corners. Let us assume that the device is functioning properly and there is a positive potential, at purpose A and a negative potential at purpose B. The positive potential at purpose A will forward bias D3 and reverse bias D4. The negative potential at purpose B will forward bias D1 and reverse D2. At presently D3 and D1 are forward biased and will change current flow to suffer them; D4 and D2 are reverse biased and will block current flow. The path for current flow is from purpose B through D1, up through RL, through D3, through the secondary of the device back to purpose B, this path is indicated by solid arrows. Wave forms (1) and (2) is prepared across D1 and D3. One-half cycle later the polarity across the secondary of the device reverse, forward biasing D2 and D4 and reverse biasing D1 and D3. Current flow will presently be from purpose A through D4, up through RL, through D2; through the wave forms (3) and (4) is prepared across D2 and D4. this flow through RL is typically among a similar direction. In flowing through RL this current develops a voltage admire that shown undulation (5). Since current flows through the load throughout every cycles of the applied voltage, this bridge rectifier may even be a rectifier. One advantage of a bridge rectifier over a standard rectifier is that with a given device the bridge rectifier produces a voltage output that is nearly doubly

that of the quality full-wave circuit. This may be shown by assignment values to make of the weather shown in views A and B. Assume that identical device is used in every circuits. the peak voltage developed between points X and Y is 1000volts in every circuits. among the quality full-wave circuit shown-in browse A, the peak voltage from the center regulator to either X or Y is 5 hundred volts. Since just one diode can conduct at any instant, the utmost voltage which might be corrected at any instant is 5 hundred volts. The maximum voltage that seems across the load device is nearly-but never exceeds 5 hundred volts, as a results of the miscroscopic free fall across the diode. among the bridge rectifier shown visible B, the utmost voltage which might be corrected is that the full secondary voltage, that's one thousand volts. Therefore, the peak output voltage across the load device is type of one thousand volts. With every circuits victimization identical device, the bridge rectifier circuit produces sequent output voltage than the quality rectifier circuit.

4.1.7 VOLTAGE REGULATORS

Voltage regulators comprise a class of wide used ICs. Regulator IC units contain the equipment for reference provide, comparator equipment, management device, and overload protection beat one IC. IC units provide regulation of either a tough and quick positive voltage, a tough and quick negative voltage, or associate adjustably set voltage. The regulators area unit usually elect for operation with load currents from several milli amperes to tens of amperes, similar to power ratings kind milliwatts to ten watts. A fixed three-terminal electrical device has associate unregulated dc input voltage, V_i , applied to a minimum of one input terminal, a regulated dc output voltage, V_o , from a second terminal, with the third terminal connected to ground. The series seventy eight regulators provide mounted positive regulated voltages from 5 to twenty four volts. Similarly, the series seventy 9 regulators provide mounted negative regulated voltages from 5 to twenty four volts.

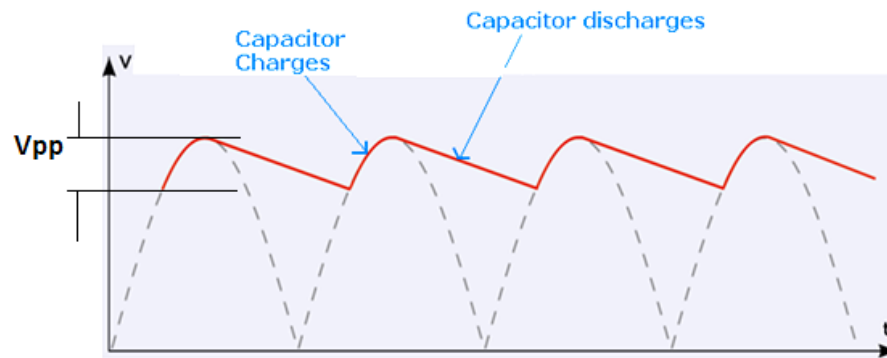


Fig 4.4 WAVE FORM OF CAPACITOR CHARGING AND DISCHARGING

So, we've got a bent to envision that, a capacitor-input filter will charge and discharge nominal it fills inside the “gaps” between each peak. This reduces variations of voltage. As we have seen, the remaining voltage variation is termed ripple voltage.

4.2 LCD Display



Fig 4.5 16x2 line Hitachi HD44780 display

More small controller devices are victimization 'smart LCD' displays, as shown in fig four.8 to output visual info. the subsequent discussion covers the association of a Hitachi show LCD digital display alphanumeric display display to a PIC small controller. Hitachi liquid crystal display displays have a typical ASCII set of characters and Japanese, Greek and mathematical symbols.

Table 4.1 Character LCD pins

PIN NO	FUNCTION	NAME
1	Ground (0V)	Ground
2	Supply voltage; 5V (4.7V – 5.3V)	V _{CC}
3	Contrast adjustment; through a variable resistor	V _{EE}
4	Selects command register when low; and data register when high	Register Select
5	Low to write to the register; High to read from the register	Read/write
6	Sends data to data pins when a high to low pulse is given	Enable
7	8-bit data pins	DB0
8		DB1
9		DB2
10		DB3
11		DB4
12		DB5
13		DB6

14		DB7
15	Backlight V_{CC} (5V)	Led+
16	Backlight Ground (0V)	Led-

For associate 8-bit knowledge bus, the show needs a +5V offer and eleven I/O lines. For a 4-bit knowledge bus it solely needs the availability lines and seven further lines. once the show LCD digital display|alphanumeric display display isn't enabled, knowledge lines are tri-state which suggests they're in a very state of high state (as they're disconnected) and this suggests they are doing not interfere with the operation of the small controller once the show isn't being addressed . The liquid crystal display conjointly needs three "control" lines from the small controller. Reading knowledge from the liquid crystal display is completed within the same approach, however management line R/W has got to be high. after we send a high to the liquid crystal display, it'll reset and look ahead to directions. Typical directions sent to show LCD digital show alphanumeric display display once a reset are: turning on a display, turning on a pointer and writing characters from left to right. once the liquid crystal display is initialized, it's able to continue receiving knowledge or directions. If it receives a personality, it'll write it on the show and move the pointer one house to the correct. The pointer marks ensuing location wherever a personality are written. after we need to put in writing a string of characters, 1st we'd like to line up the beginning address, and so send one character at a time. Characters which will be shown on the show are keep in knowledge show (DD) RAM. the scale of DDRAM is eighty bytes.

4.3 8051 Microcontroller

Intel 8051 microcontroller is one among the foremost standard all-purpose microcontrollers in use nowadays. The success of the Intel 8051 spawned variety of clones that square measure jointly said because the MCS-51 family of microcontrollers, which incorporates chips from vendors like Atmel, Philips, Infineon, and Texas Instruments.

4.3.1 About 8051

The Intel 8051 is associate degree 8-bit microcontroller which implies that almost all obtainable operations area unit restricted to eight bits. There area unit three basic "sizes" of the 8051: Short, Standard, and Extended. The Short and normal chips area unit typically obtainable in DIP (dual in-line package) type, however the Extended 8051 models typically have a special type issue, and aren't "drop-in compatible". of these things area unit known as 8051 as a result of they will all be programmed victimisation 8051 programming language, and that they all share bound options (although the various models all have their own special features).

4.3.2 Some of the features that have made the 8051 popular are:

- .64 KB on chip program memory.
- .128 bytes on chip data memory (RAM).
- .4 reg banks.
- .128 user defined software flags.
- .3 internal and 2 external interrupts.
- . Bit as well as byte addressable RAM area of 16 bytes.

. Four 8-bit ports, (short models have two 8-bit ports).

.16-bit program counter and data pointer.

.1 Microsecond instruction cycle with 12 MHz Crystal.

.8-bit data bus

.16-bit address bus

.32 general purpose registers each of 8 bits

.16-bit timers (usually 2, but may have more, or less).

.1 Microsecond instruction cycle with 12 MHz Crystal.

8051 models may also have a number of special, model-specific features, such as UARTs, ADC, OpAmps, etc....

4.3.3 Typical applications

8051 chips are used in a wide variety of control systems, telecom applications, and robotics as well as in the automotive industry. By some estimation, 8051 family chips make up over 50% of the embedded chip market.

4.3.4 PIN DIAGRAM

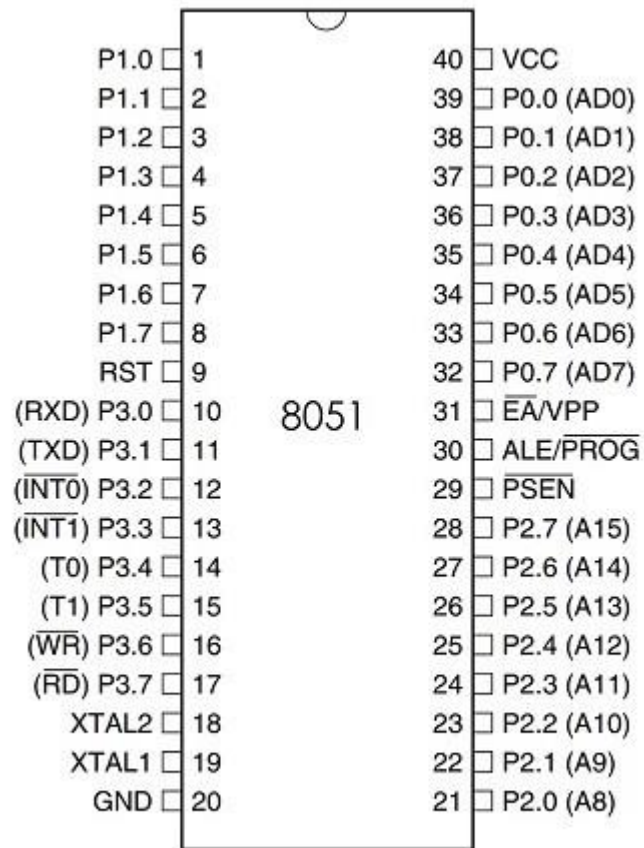


Fig 4.6 Pin Diagram

4.3.5 Basic pins

PIN 9: PIN 9 is that the reset pin that is employed reset the microcontrollers internal registers and ports upon kicking off. (Pin ought to be command high for two machine cycles.)

PINS 18 & 19: The 8051 incorporates a constitutional generator electronic equipment thence we want to solely connect a crystal at these pins to produce clock pulses to the circuit.

PIN 40 and twenty: Pins forty and 20 are VCC and ground severally. The 8051 chip desires +5V 500mA to perform properly, though there are lower power-driven versions just like the Atmel 2051 that could be a scaled down version of the 8051 that runs on +3V.

PINS 29, 30 & 31: As represented within the options of the 8051, this chip contains a constitutional nonvolatile storage. so as to program this we want to produce a voltage of +12V at pin thirty one. If external memory is connected then PIN thirty one, additionally referred to as EA/VPP, ought to be connected to ground to point the presence of external memory. PIN thirty is named beer (address latch enable), that is employed once multiple memory chips are connected to the controller and just one of them has to be designated. we'll manage this exhaustive within the later chapters. PIN twenty nine is named PSEN. this can be "program store enable". so as to use the external memory, it's needed to produce the low voltage (0) on each PSEN and Semitic deity pins.

4.3.6 Ports

There are four 8-bit ports: P0, P1, P2 and P3. PORT P1 (Pins one to 8): The port P1 is additionally a general input/output port that might be used for a range of interfacing tasks. the choice ports P0, P2 and P3 have twin roles or further functions related to them primarily based altogether upon the context of their usage.

PORT P3 (Pins 10 to 17): PORT P3 acts as a standard IO port, however Port P3 has further functions like, serial transmit and receive pins, two external interrupt pins, two external counter inputs, scan and write pins for operation. PORT P2 (pins twenty one to 28): PORT P2 can even be used as a general purpose eight bit port once no external memory is gift, however if external operation is needed then PORT P2 can act as Associate in Nursing address bus in conjunction with PORT P0 to access external memory. PORT P2 acts as A8-A15, as is seen from figure. PORT P0 (pins thirty two to 39) PORT P0 is used as a general purpose 8-bit port once no external memory is gift, however if external operation is needed then PORT P0 acts as a multiplexed address and knowledge bus which is able to be accustomed access external memory in conjunction with PORT P2. P0 acts as AD0-AD.

4.4.3.7 Oscillator circuits

The 8051 needs the existence of Associate in Nursing external generator circuit. The generator circuit sometimes runs around 12MHz, though the 8051 (depending on that specific model) is capable of running at a most of 40MHz. every machine cycle within the 8051 is twelve clock cycles, giving a good cycle rate at 1MHz (for a 12MHz clock) to three.33MHz (for the most 40MHz clock).

4.3.8 Data and program memory

The 8051 silicon chip is programmed in PL/M, 8051 Assembly, C and variety of different high-level languages. several compilers even have support for collection C++ for associate degree 8051. Program memory within the 8051 is read-only, whereas the info memory is taken into account to be read/write accessible. once keep on EEPROM or Flash, the program memory is rewritten once the microcontroller is within the special computer user circuit.

4.3.9 Program starts address

The 8051 start executing program instructions from the address 0000 in the program memory.

4.3.10 Direct memory

The 8051 has 256 bytes of internal available RAM, though solely the primary 128 bytes square measure obtainable for general use by the coder. the primary 128 bytes of RAM (from 0x00 to 0x7F) square measure known as the Direct Memory, and may be accustomed store knowledge.

4.3.11 Special function registers

The Special Function Register (SFR) is that the higher space of available memory, from address 0x80 to 0xFF. A, B, PSW, DPTR area unit referred to as SFR. This space of memory can not be used for information or program storage, however is instead a series of memory-mapped ports and registers. All port input and output will so be performed by heart move operations on specific addresses within the SFR. Also, totally different standing registers area unit mapped into the SFR, to be used in checking the standing of the 8051.

4.3.12 General Purpose Registers

The 8051 has four selectable banks of 8 available 8-bit registers, R0 to R7. this implies that there square measure primarily thirty two offered all-purpose registers, though solely eight (one bank) is directly accessed at a time. To access the opposite banks, we want to vary the present bank range within the flag standing register.

4.3.13 A and B Registers

The A register is found within the SFR memory location 0xE0. The A register works in a very similar fashion to the AX register of x86 processors. The A register is termed the accumulator, and by default it receives the results of all arithmetic operations. The B register is employed in a very similar manner, except that it will receive the extended answers from the multiply and divide operations. once not getting used for multiplication and Division, the B register is on the market as an additional all-purpose register.

4.3.14 BLOCK DIAGRAM:

The 8051 Block Diagram

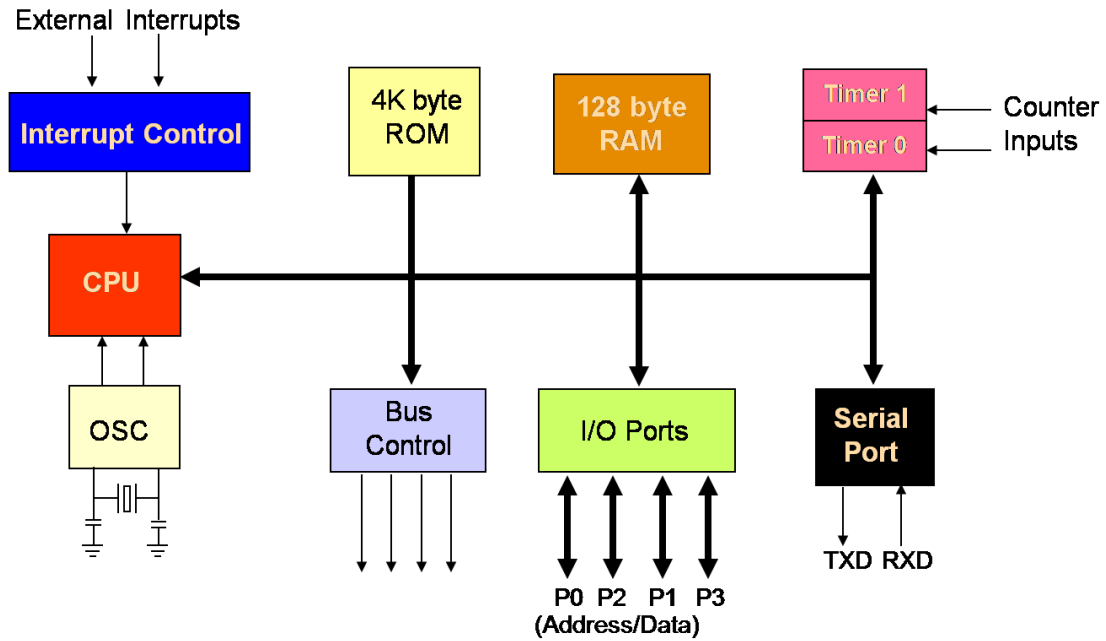


Fig 4.7 Block Diagram of 8051

4.3.15 INTERNAL ARCHITECTURE OF 8051

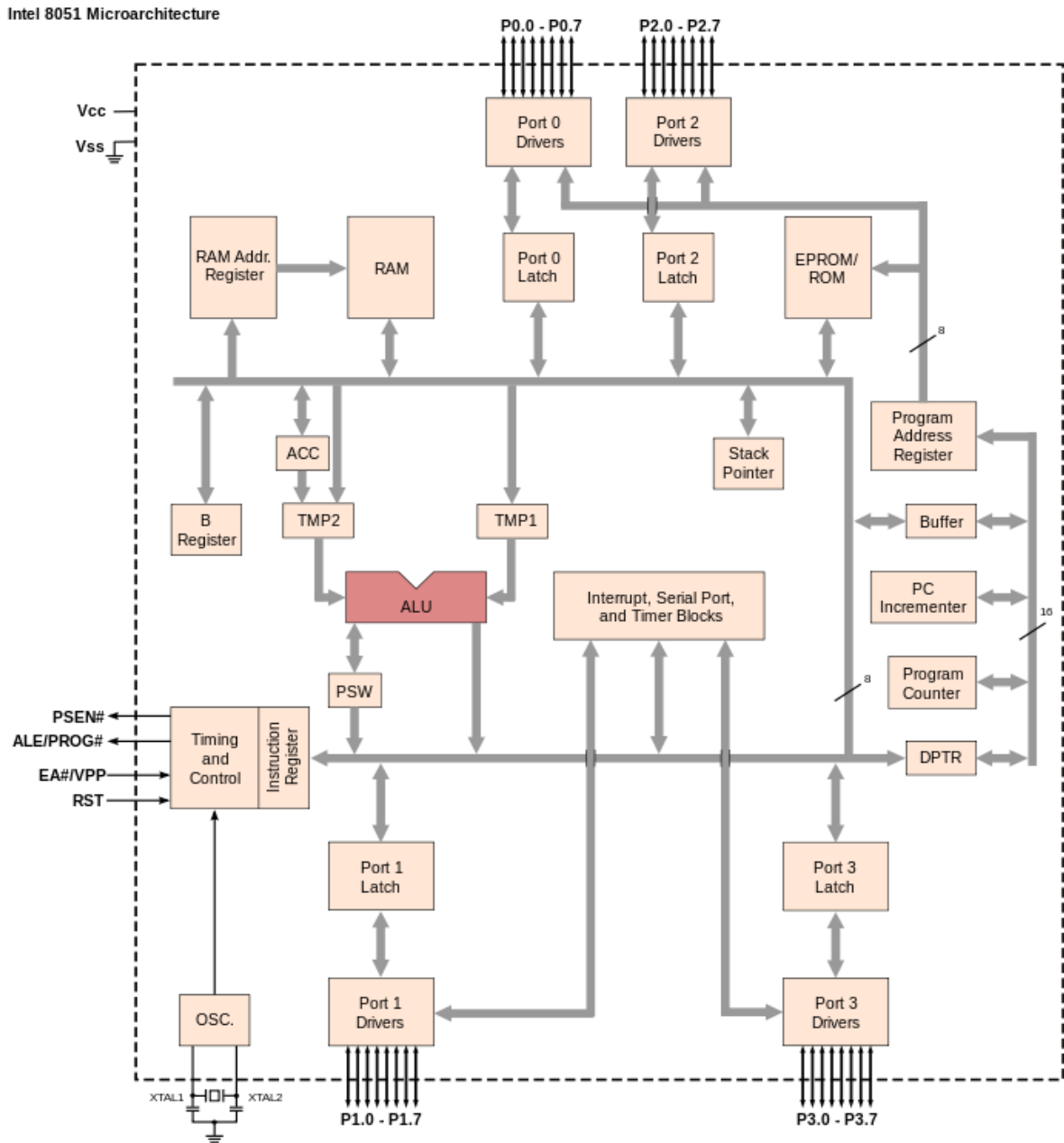


Fig 4.8 Architecture Of 8051

4.4 RELAY AND DRIVER

4.4.1 RELAY

The first relay was fictional by Henry in 1835. The name relay springs from the French noun relays that indicates the horse exchange place of the mail carrier. Generally, a relay is associate degree electrical hardware device having associate degree input and output gate. The output gate consists in one or additional electrical contacts that switch once the input gate is electrically excited. It will implement a decoupler, a router or breaker for the power, a negation, and, on the bottom of the wiring, sophisticated logical functions containing and, or, flip-flop. within the past relays had a large use, for example the phone phone shift or the railway routing and crossing systems. In spite of electronic progresses, relays square measure still utilized in applications wherever toughness, simplicity, long life and high dependability square measure vital factors.

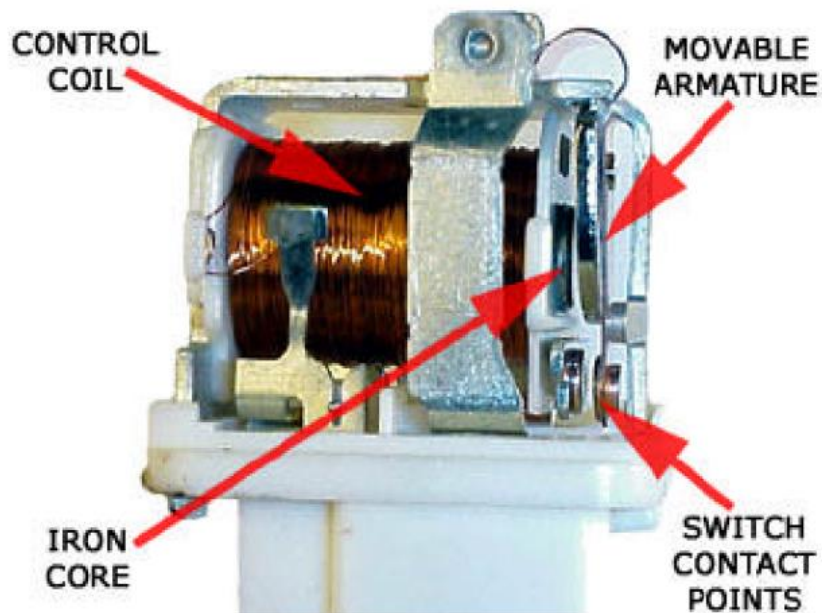


Fig 4.9 Pictorial Representation of Relay

4.4.2 OPERATION

When a current flows through the coil, the ensuing magnetic flux attracts an armature coil that's automatically coupled to a moving contact. The movement either makes or breaks a reference to a set contact. Once this is transitioned, the coil is returned by a force roughly as sturdy because the attraction to its relaxed position. Typically this can be a spring, however gravity is additionally used unremarkably in industrial motor starters. Most relays square measure factory-made to control quickly. During a low voltage application, this can be to cut back noise. During a high voltage or high current application, this can be to cut back arcing.

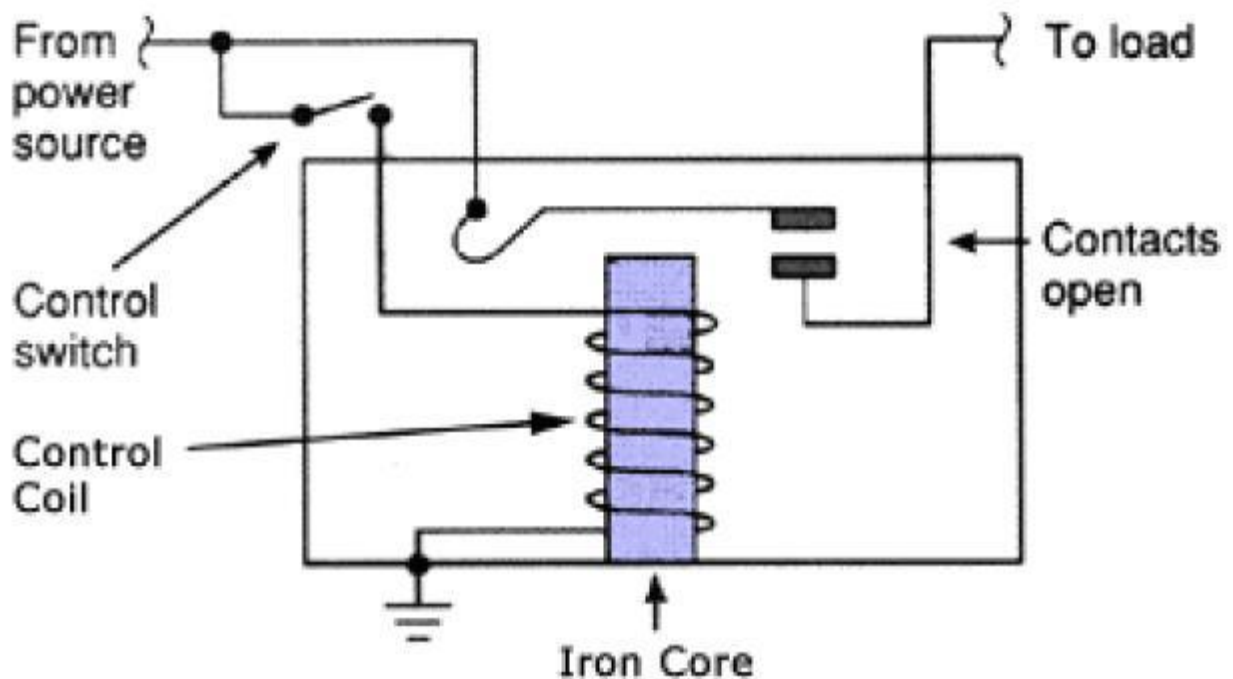


Fig 4.10 Operation of Relay

If the coil is energized with DC, a diode is usually put in across the coil, to dissipate the energy from the collapsing magnetic flux at deactivation, would possibly} otherwise generate a spike of voltage and might cause harm to circuit elements. If the coil is meant to be energized with AC, a tiny low copper ring are often crimped to the tip of the magnet. This “shading ring” creates a tiny low out-of- section current, that will increase the minimum pull on the coil throughout the AC cycle.

4.4.3 ELECTROMECHANICAL RELAY

Has galvanic insulation between the input and output gate and between the telt consists during a fastened coil, automatically joined to a moving contact. Feeding the coil by means that of electrical current a magnetic flux arises. Then the moving coil is interested in the coil and, consequently the contact are often affected. The movement of the contact either makes or breaks associate degree electrical reference to a hard and fast contact. once the feeding current of the coil is removed, the coil and also the feed contact come to their relaxed position by means that of a spring or of the snap of the contact. associate degree mechanical device relay terminal of the contacts after they are in break position.

4.4.4 USES

- To management a high –voltage circuit with a low-tension signal, as in some sorts of modems. □
- To management a high-current circuit with a low-current signal, as within the starter magnet of associate degree automobile.
- To observe and isolate faults on transmission and distribution lines by gap and shutting circuit breakers.

- To isolate the dominant circuit from the controlled circuit once the 2 are at completely different potentials, as an example once dominant a mains-powered device from a

voltage wires are simply put in in partitions, which can be typically affected as wants modification. they'll even be controlled by area occupancy detectors in an attempt to conserve energy.

4.4.5 ULN2003

ULN2003 is high voltage and the high current Darlington array IC. It contains seven open collector Darlington pair with common emitters. A Darlington is a briefing of to bipolar transistors. ULN2003 belong to the family of ULN200X series of ICs totally different versions of this family interface to different logic families. ULN2003 is for 5V TTL, CMOS logical devices. These ICs area unit used once driving a good vary of masses and area unit used as relay drivers, show drivers, line drivers etc. ULN2003 is additionally usually used whereas driving

The Darlington junction transistor electronic transistor semiconductor device semiconductor unit semiconductor could be a compound structure consisting of 2 bipolar transistors connected in such the way that the present amplified by the primary transistor is amplified any by the second. This configuration on offers a way higher current gain than every semiconductor unit taken severally and, within the case of integrated devices, will take less area than 2 individual transistors as a result of they will use a shared collector. Integrated Darlington pairs return repacked in transistor-like packages.

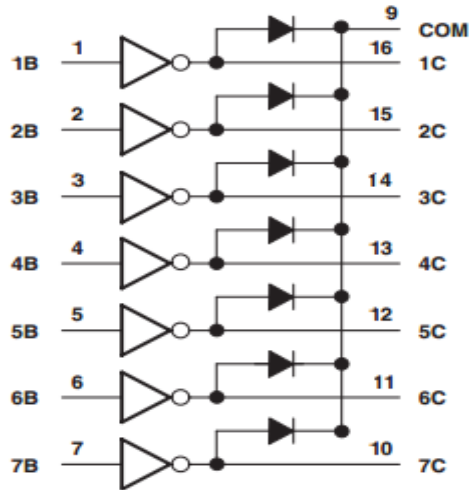


Fig 4.11 Simplified Block Diagram

Each channel or Darlington pair in ULN2003 is rated at 500mA and might stand up to peak current of 600mA. The inputs and outputs are unit provided opposite to every alternative within the pin layout. every driver additionally contains a suppression diode to dissipate voltage spikes whereas driving inductive masses. The schematic for every driver is given below

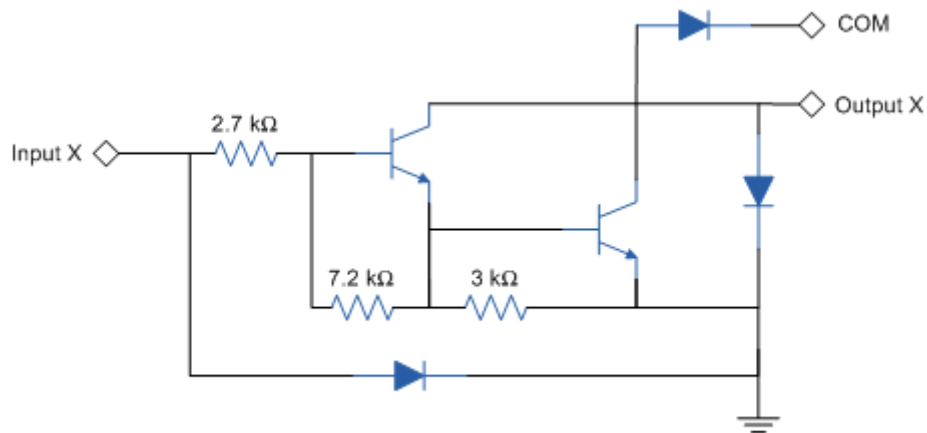


Fig 4.12 Schematic Diagram of Driver

4.4.6 Pin Diagram

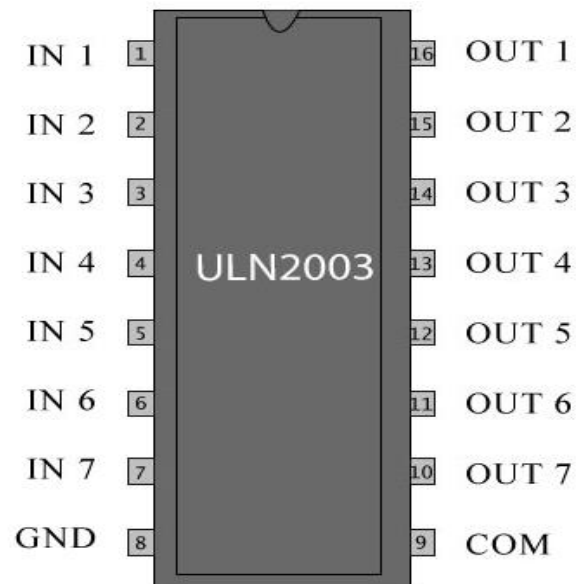


Fig 4.13 Pin Diagram

4.4.7 FEATURES

- 500mA rated collector current
- High-voltage outputs:50V
- Inputs compatible with various types of logic

4.5 7805 REGULATORS

4.5.1 VOLTAGE REGULATOR

A regulated power provide is extremely a lot of essential for many electronic devices thanks to the semiconductor material used in them have a hard and fast rate of current furthermore as voltage. The device might get broken if there's any deviation from the fastened rate. The AC power provide gets born-again into constant DC by this circuit. By the assistance of a transformer DC, unregulated output are fastened to a relentless voltage. The circuit created|is formed|is created} of linear transformer 7805 along side capacitors and resistors with bridge rectifier made up from diodes. From giving associate unchanging voltage provide to putting together assured that output reaches uninterrupted to the appliance, the diodes along side capacitors handle elevated economical signal sent. As we've antecedently talked this regulated power provide could be a device that mechanized on DC voltages and additionally it will uphold its output accurately at a hard and fast voltage all the time though if there's a major alteration within the DC input voltage. ICs regulator is especially employed in the circuit to keep up the precise voltage that is followed by the facility provide. A regulator is especially used with the capacitance connected in parallel to the input terminal and also the output terminal of the IC regulator. For the checking of mammoth alterations within the input furthermore as within the output filter, capacitors are used. whereas the bypass capacitors are wont to check the tiny amount spikes on the input and output level. Bypass capacitors are principally of little values that are wont to bypass the tiny amount pulses straightly into the world. A circuit diagram having regulator IC and every one the on top of mentioned elements arrangement unconcealed within the figure below

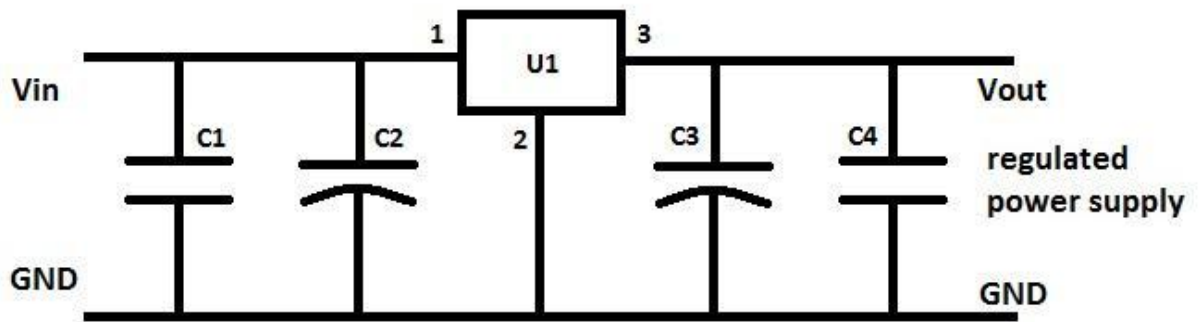


Fig 4.14 Arrangement of Components

Table 4.2 Components and Functions of The Voltage Regulator

Components	Function
C1	This capacitor is known as bypass capacitor and is employed to bypass extremely tiny duration spikes to the ground with no distress the other components.
C2	C2 is the filter capacitor employed to steady the slow changes in the voltage applied at the input of the circuit. Escalating the value of the capacitor amplify the stabilization as well as the declining value of the capacitor reduces the stabilization. More over this capacitor is not alone capable to ensure very constricted period spikes emerge at the input.

C3	C3 is known as a filter capacitor employed in the circuit to steady the slow alterations in the output voltage. Raising the value of the capacitor enlarges the stabilization furthermore declining the value of the capacitor declined the stabilization. More over this capacitor is not alone capable to ensure very fine duration spikes happen at the output.
C4	C4 is known as bypass capacitor and worked to bypass very small period spikes to the earth with no influence the other components.
U1	U1 is the IC with positive DC and it upholds the output voltage steady exactly at a constant value even although there is major deviation in the input voltage.

As we've created the full circuit until currently to be operated on the 5V DC provide, thus we've to use AN IC regulator for 5V DC. and therefore the most typically used IC regulators get into the marketplace for 5V DC regulation use is 7805. So, we have a tendency to area unit connecting the similar IC within the circuit as U1. IC 7805 could be a DC regulated IC of 5V. This IC is incredibly versatile and is wide utilized all told styles of circuit sort of a transformer. it's a 3 terminal device and chiefly known as input, output and ground. Pin diagram of the IC 7805 is shown within the diagram below.

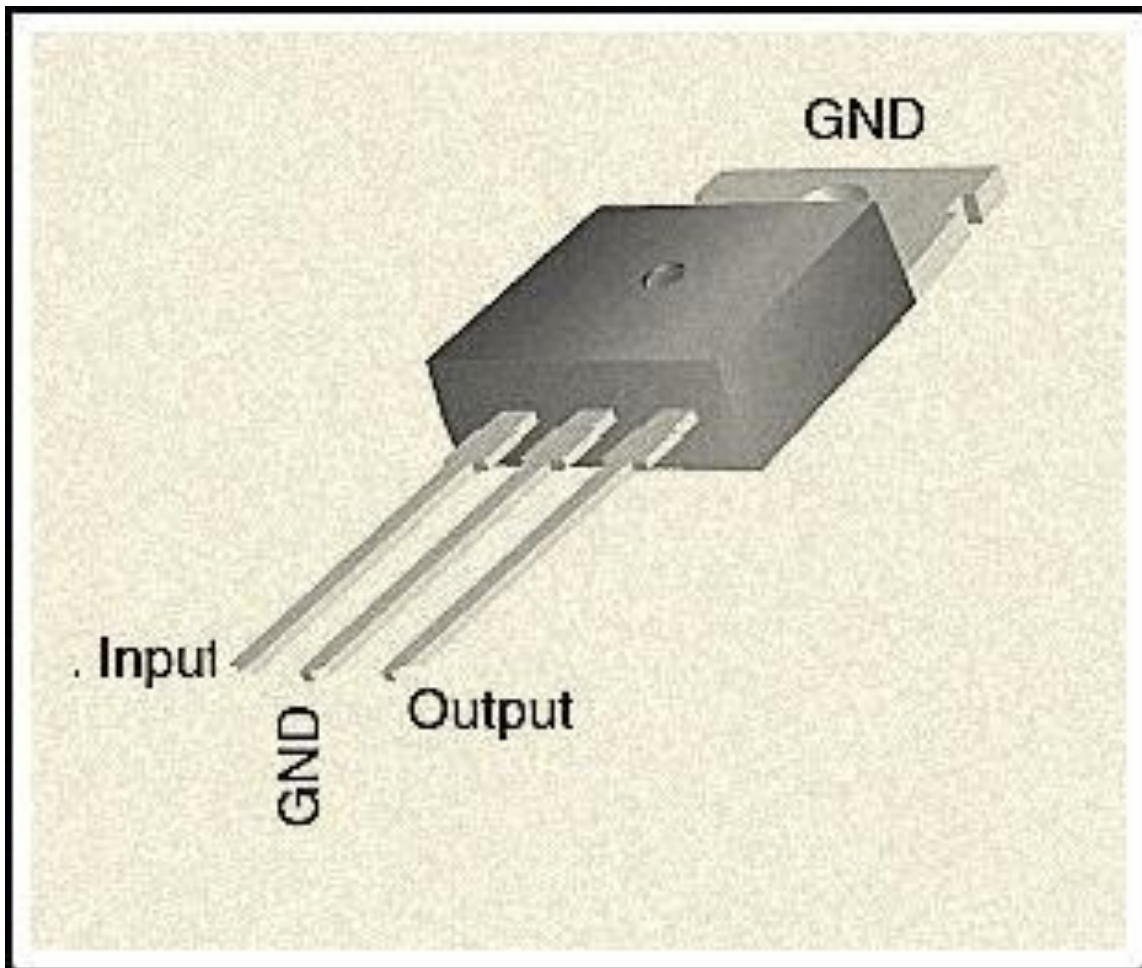


Fig 4.15 Pin diagram of the IC 7805

The pin explanation of 7805 is explained in the following table:

Table 4.3 Description Of PINS

PIN NO	PIN	DESCRIPTION
1	INPUT	This capacitor is known as bypass capacitor and is employed to bypass extremely tiny duration spikes to the ground with no distress the other components.

2	GROUND	In this pin where the ground is given. This pin is neutral for equally the input and output.
3	OUTPUT	The output of the regulated 5V volt is taken out at this pin of the IC regulator.

In the circuit diagram C2 similarly as C3 square measure filter capacitance whereas bypass capacitors square measure the C1 and C4. The electrolytic polarized capacitors square measure used for this purpose. For the aim of filter capacitances commonly 10mfd worth of the capacitor used. And in these comes, we tend to conjointly used 100mfd worth of the capacitance. whereas all told types of circuit the worth of capacitor is zero.1mfd. And in typically un-polarized principally disc capacitors used for this purpose. presently we've the circuit for the 5V DC positive regulation and that we also are aware of the element values employed in the circuit. within the table below we've mentioned the worth intimately of all the elements employed in the circuit of 5V DC positive regulator.

4.5.2 Constant DC Power Supply from AC

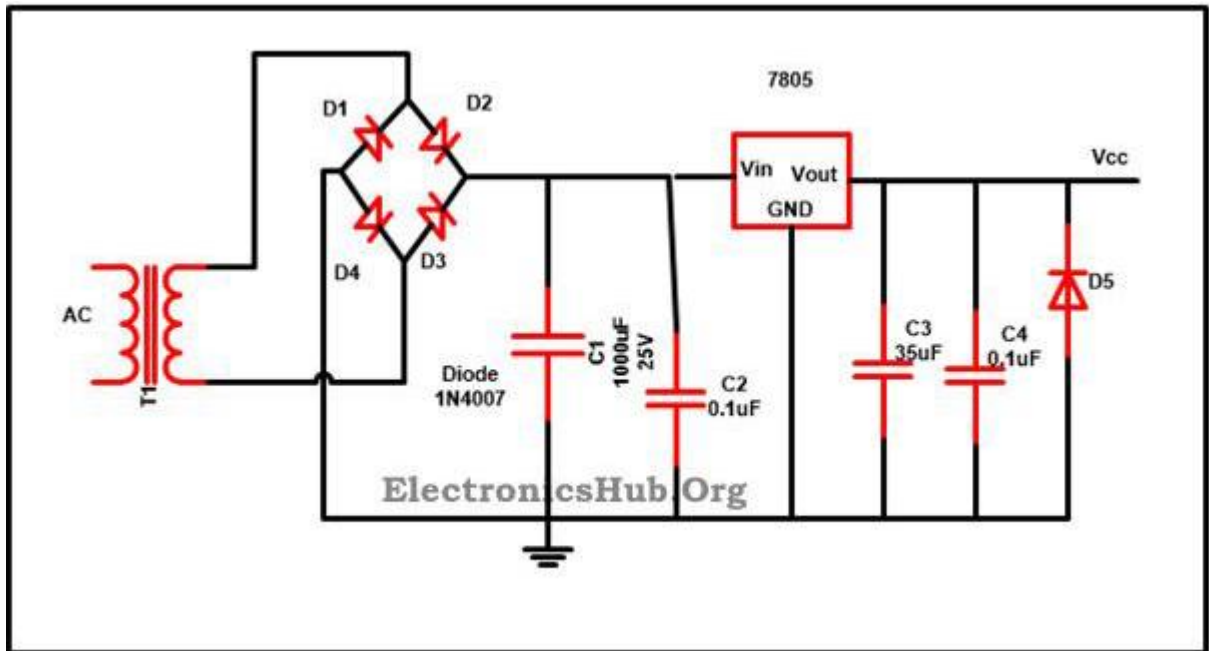


Fig 4.16 Circuit Diagram Of constant DC Power Supply From AC

The output generated from the unregulated DC output is vulnerable to the fluctuations of the signal. IC transformer is connected with bridge rectifier nonparallel within these comes thus to steady the DC output against the variations in the input DC voltage. to get a stable output of 5V, IC 7805 is hooked up with 6-0-6V at the side of 500mA step down electrical device also like rectifier. To suppress the oscillation which could generate within the regulator IC, C2 electrical condenser of zero.1 uF worth is employed. once the facility offer filter is way faraway from the regulated IC electrical condenser C2 is employed. Ripple rejection within the regulator is been improved by C4 capacitor(35uf) by avoiding the ripple voltage to be amplified at the regulator output. The output voltage is strengthening and deduction of the output voltage is finished electrical condenser C3(0.1uF). To avoid the possibility of the input, get shorted D5 diode is employed to avoid wasting the regulator. If D5 isn't bestowed within the circuit, the output electrical condenser will leave its charge straight off throughout low ohmic resistance course within the regulators.

4.6 GSM MODEM

4.6.1 About GSM

A GSM equipment may be a wireless equipment that works with a GSM wireless network. A wireless equipment behaves style of a dial-up equipment. the foremost distinction between them is that a dial-up equipment sends and receives information through a tough and quick phone line whereas a wireless equipment sends and receives information through radio waves. The operational of GSM equipment is based on commands, the commands forever begin with AT (which suggests that Attention) and finish with a character. as Associate in Nursing example, the dialing command is ATD; ATD3314629080; here the dialing command ends with punctuation. The AT commands unit given to the GSM equipment with the help of laptop computer or controller. The GSM equipment is serially interfaced with the controller with the help of liquid ecstasy 232. Here liquid ecstasy 232 acts as driver that converts TTL levels to the RS 232 levels. For serial interface GSM equipment wants the signal supported RS 232 levels. The T1_OUT and R1_IN pin of liquid ecstasy 232 is connected to the Lone-Star State and RX pin of GSM.

4.6.2 GSM Architecture

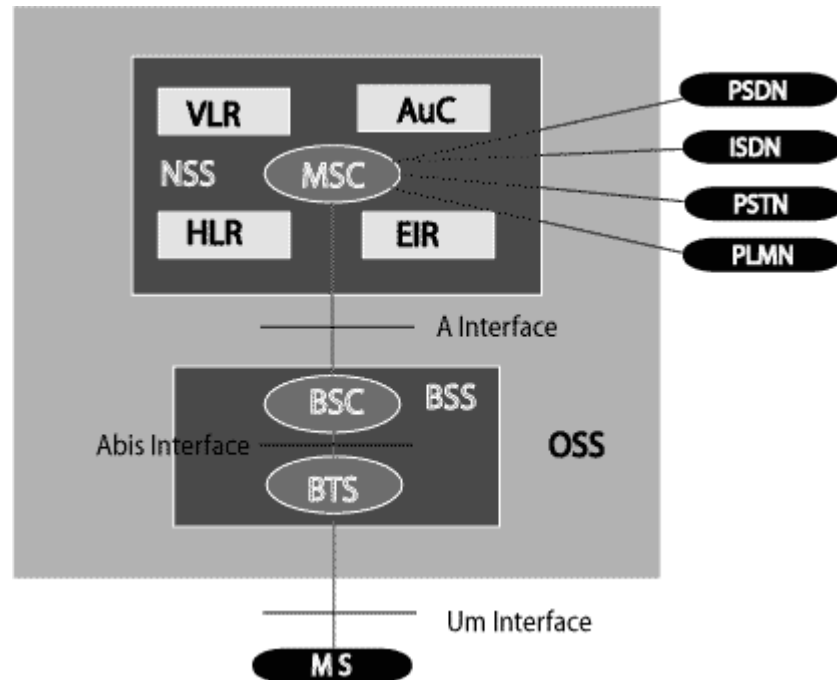


Fig 4.17 Architecture of GSM

The additional components of the GSM architecture describes the database and message system functions.

The following diagram shows the GSM network with the added elements:

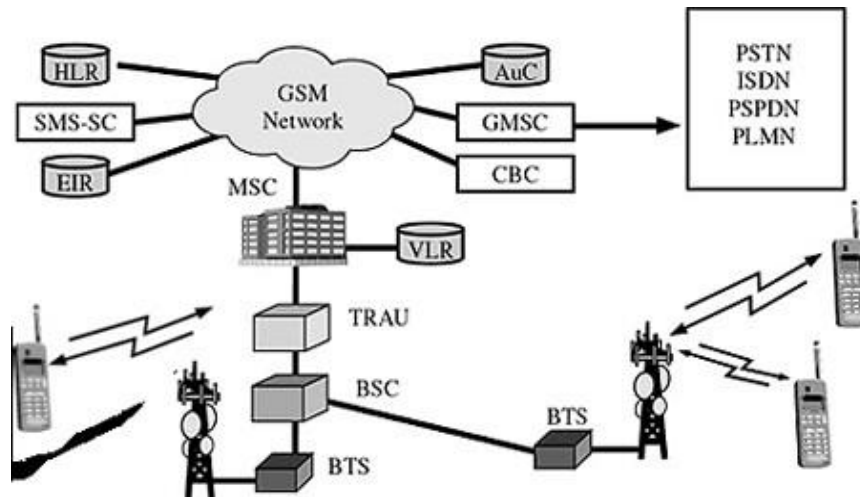


Fig 4.18 Pictorial Representation of GSM Network

The MS and therefore the BSS communicates across the Um interface. It's jointly best-known for air interface or the communication system. The BSS communicates with the Network Service switch (NSS) center across the A interface.

4.6.3 GSM NETWORK AREAS

In a GSM network, the following areas square measure defined: Cell: Cell is that the essential service area; one BTS covers one cell. each cell is given a Cell international Identity (CGI), selection that unambiguously identifies the cell. Location space: a bunch of cells group A Location space (LA). usually|this can be} often the realm that is paged once a subscriber gets Associate in Nursing incoming call. each LA is appointed a Location house Identity (LAI). each LA is served by one or heaps of BSCs. MSC/VLR Service Area: the realm lined by one academic degree is termed the MSC/VLR spot.

PLMN: the realm lined by one network operator is termed the final public Land Mobile Network (PLMN). A PLMN can contain one or heaps of MSCs.

4.6.4 GSM Specification

The requirements for disagreeent the various Personal Communication Services (PCS) systems dissent for every of the PCS network. necessary characteristics of the GSM specification unit of measure listed below: Modulation Modulation is that the

maneuver of remodeling the input file into a suitable format for the transmission medium. The transmitted knowledge is demodulated back to its original kind at the receiving finish. The GSM uses man of science Minimum Shift Keying (GSM) modulation technique. Access ways in which Radio spectrum being a restricted resource that's consumed and divided among all the users, GSM devised a mixture of TDMA/FDMA as a results of the technique to divide the information live among the users. throughout this method, the FDMA divides the frequency of the final twenty five rate system of measure into 124 carrier frequencies of two hundred kHz system of measure. Each Bachelor of Science is appointed with one or multiple frequencies, and every of this frequency is split into eight time slots employing a TDMA theme. every of those slots unit of measure used for each transmission to boot as reception of knowledge. These slots unit of measure separated by time so a mobile unit doesn't transmit and receive knowledge at identical time. Transmission Rate The total image rate for GSM at one bit per image in GSM produces 270.833 K symbols/second. The gross transmission rate of a amount is twenty a pair of.8 Kbps. GSM could also be a digital system with Associate in Nursing over-the-air bit rate of 270kbps. Frequency Band The transmission frequency vary nominative for GSM is 933–960 rate (basic 900 rate band only). The downlink band is 890–915 rate (basic 900 rate band only). Channel Spacing Channel spacing provides the spacing between the adjacent carrier frequency. For GSM, it is 200KHZ.

4.6.5 GSM INTERFACING DIAGRAM

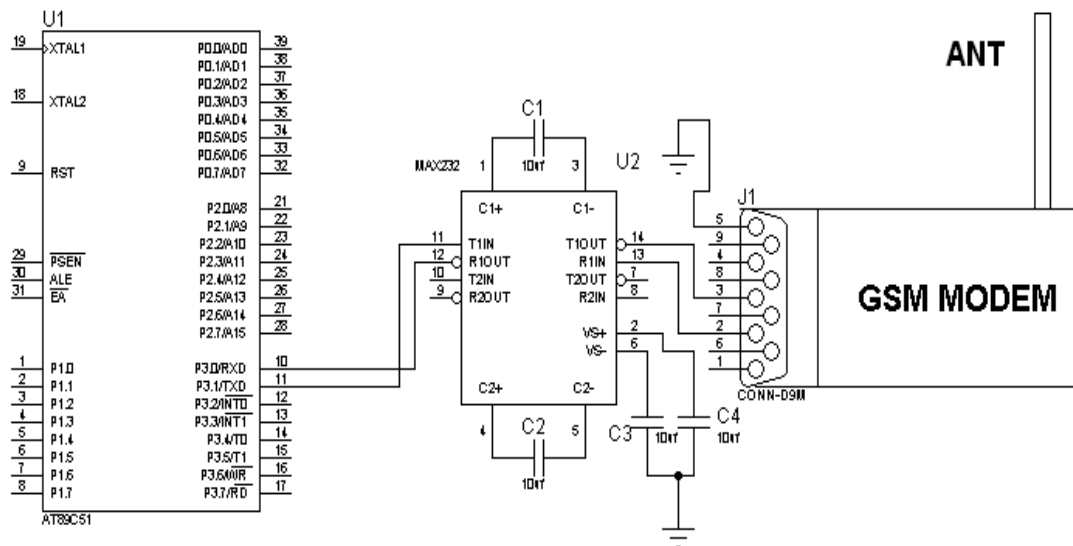


Fig 4.19 INTERFACING DIAGRAM

4.6.6 Over view of AT Commands

Command	Description
AT+CMGD	DELETE SMS MESSAGE
AT+CMGF	SELECT SMS MESSAGE FORMAT
AT+CMGL	LIST SMS MESSAGES FROM PREFERRED STORE
AT+CMGR	READ SMS MESSAGE
AT+CMGS	SEND SMS MESSAGE
AT+CMGW	WRITE SMS MESSAGE TO MEMORY
AT+CMSS	SEND SMS MESSAGE FROM STORAGE
AT+CMGC	SEND SMS COMMAND

4.7 PROPOSED HARDWARE

The hardware prototype is shown in the below figures.

Now we see how the project works. First, when the power is turned on, the LCD displays a welcome screen as password-based circuit breaker,

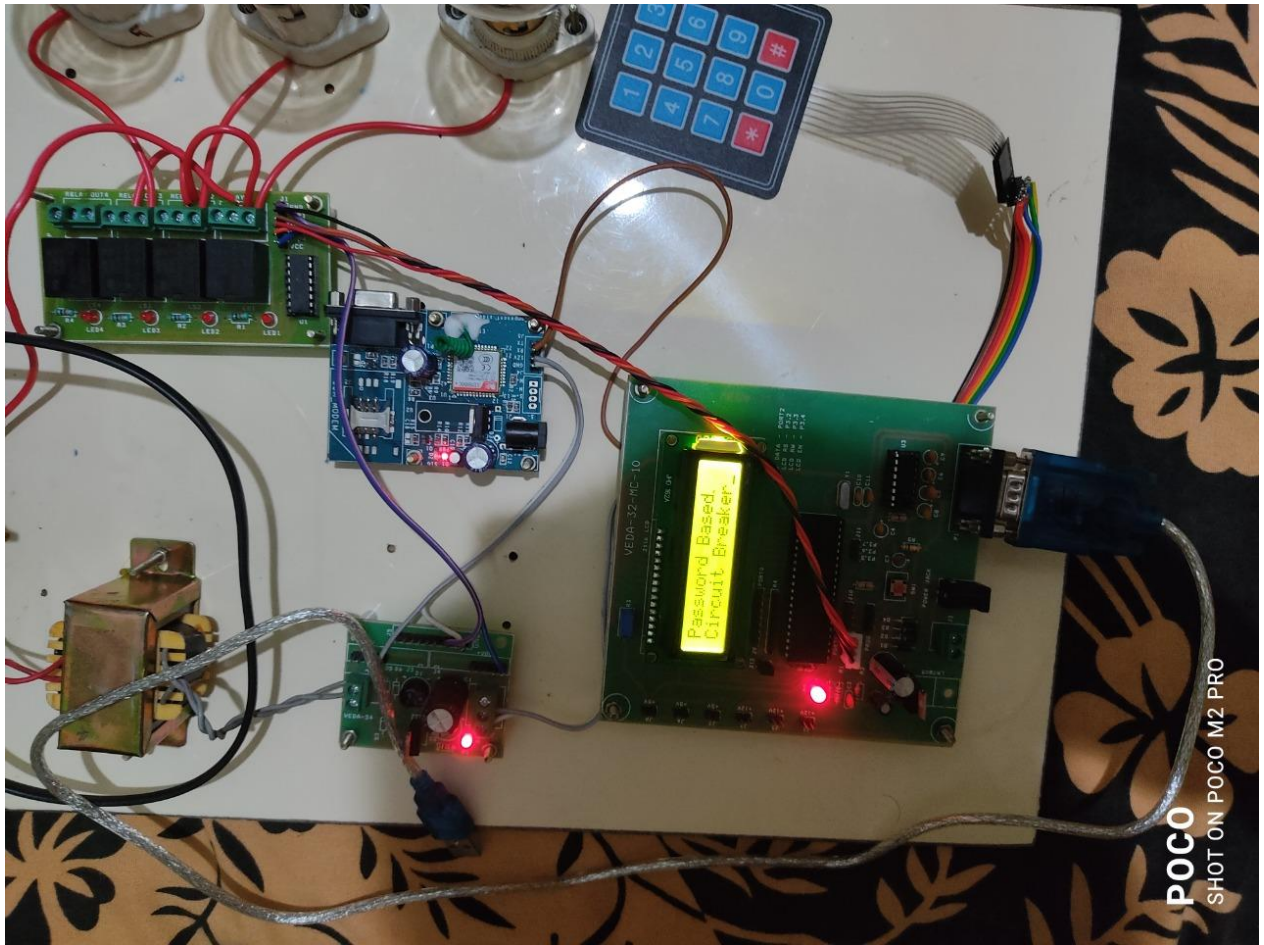


Fig. 4.20 Operation Begin

Then asks you to enter the password to unlock it as shown in Figure below.

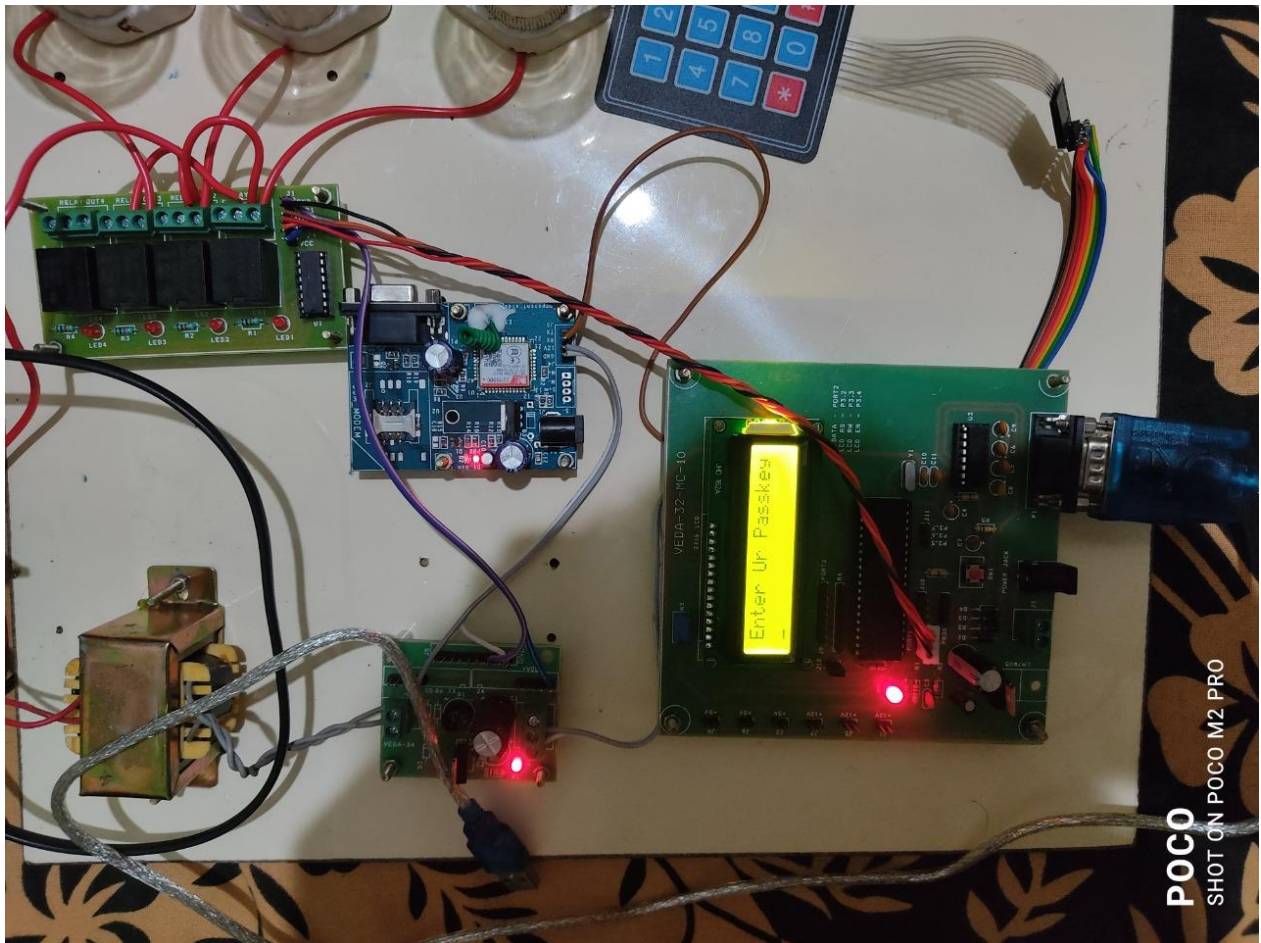


Fig. 4.21 Desiring of Password

After entering the password, it shows the status of the respective loads like

Load 1 is ON, Load 2 is ON, Load 3 is ON.

TO switch of the loads separate password is given after entering the password it shows like Load 1 is OFF, Load 2 is OFF, Load 3 is OFF.

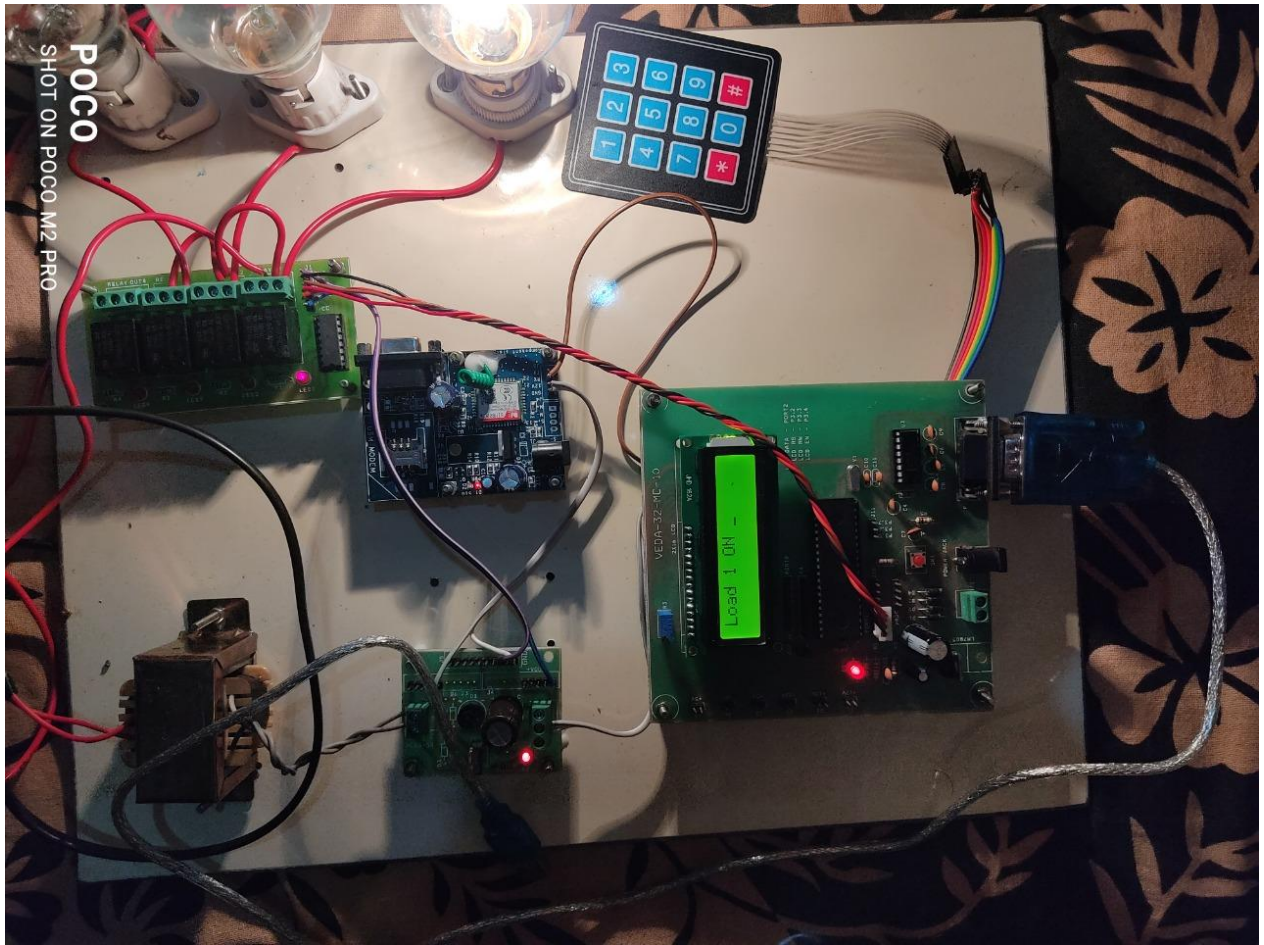


Fig. 4.22 Status of the Load 1

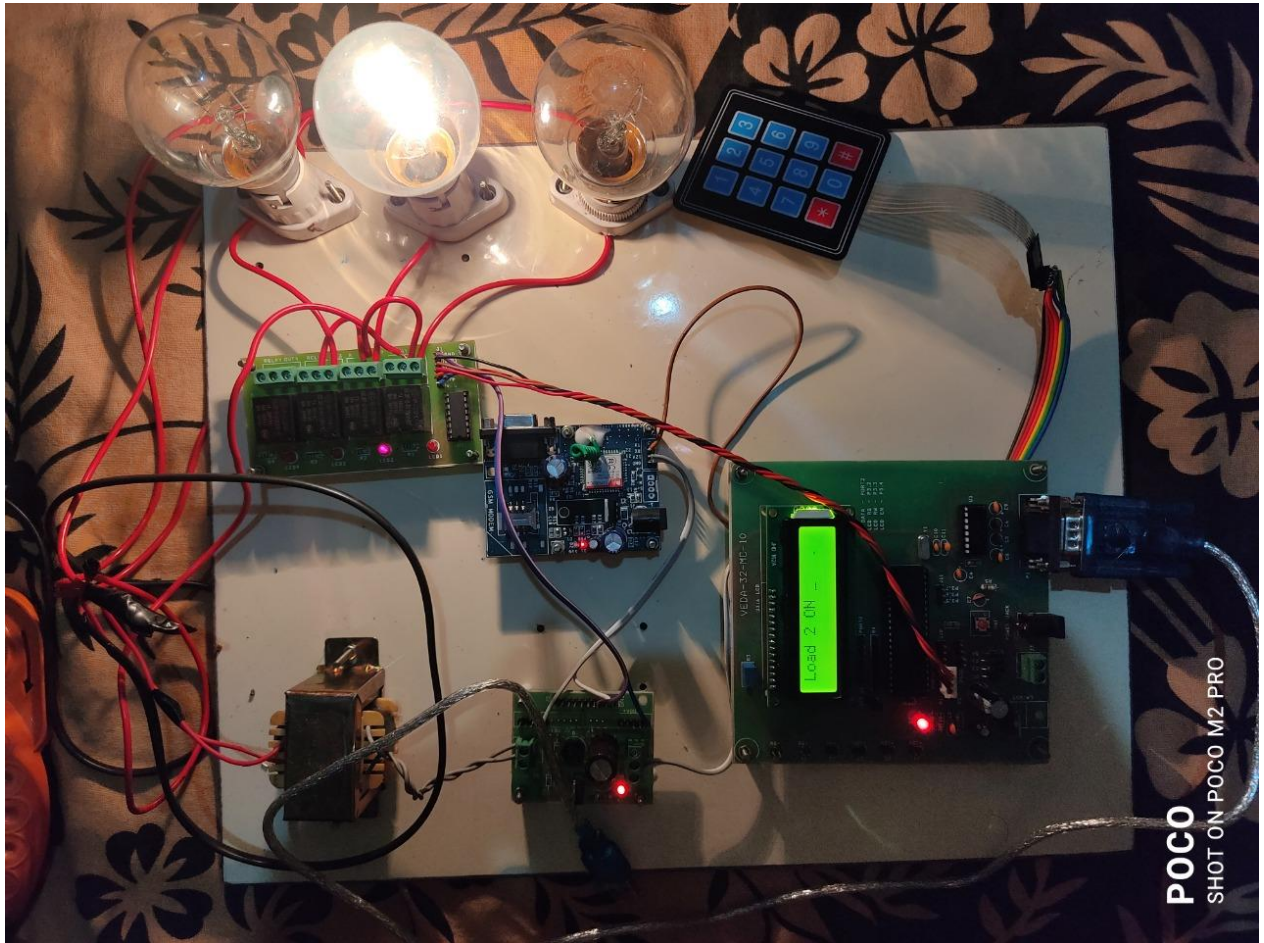


Fig. 4.23 Status of the Load 2

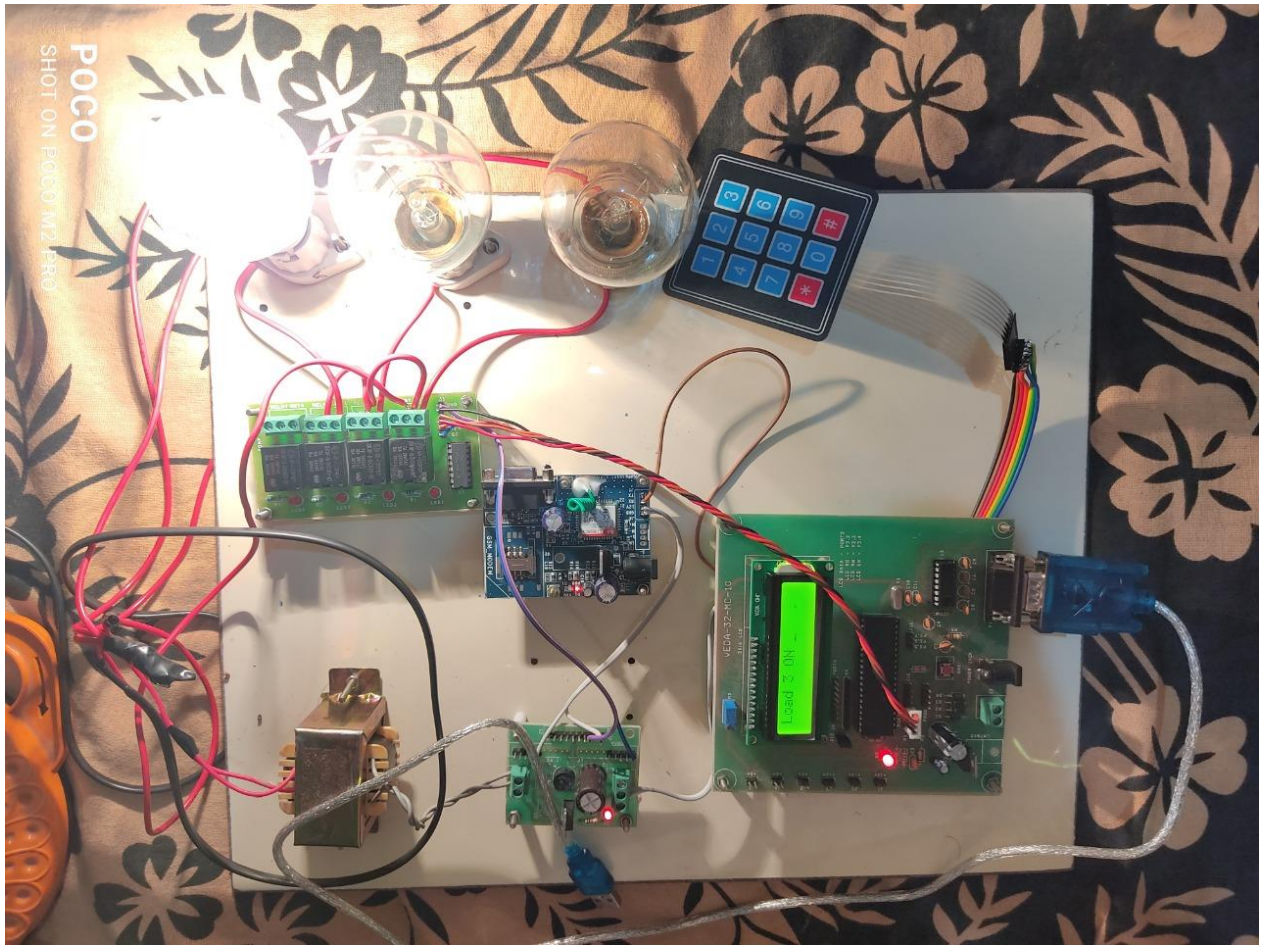


Fig. 4.24 Status of the Load 3

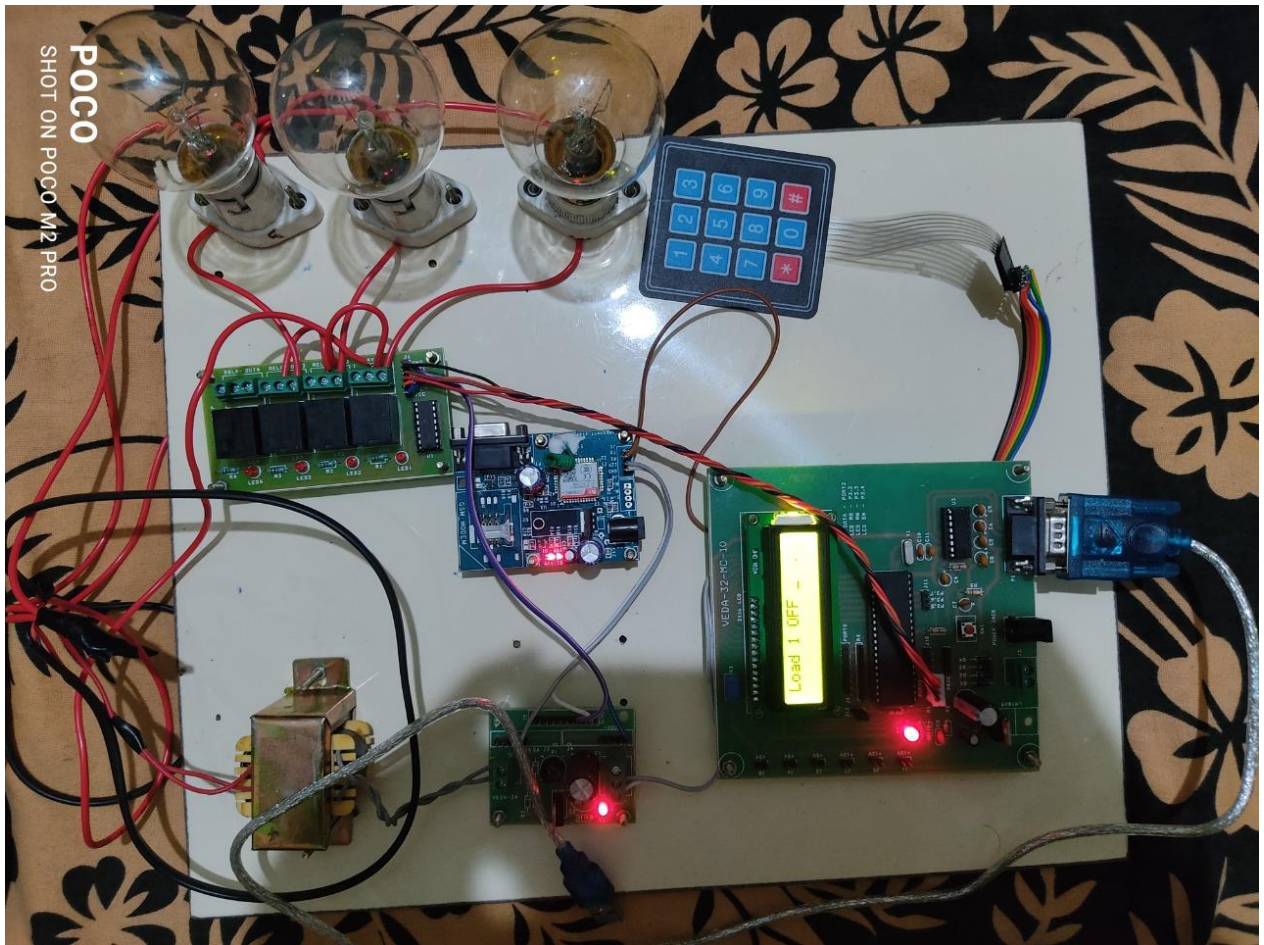


Fig. 4.25 Status of the Load 1 in OFF Position

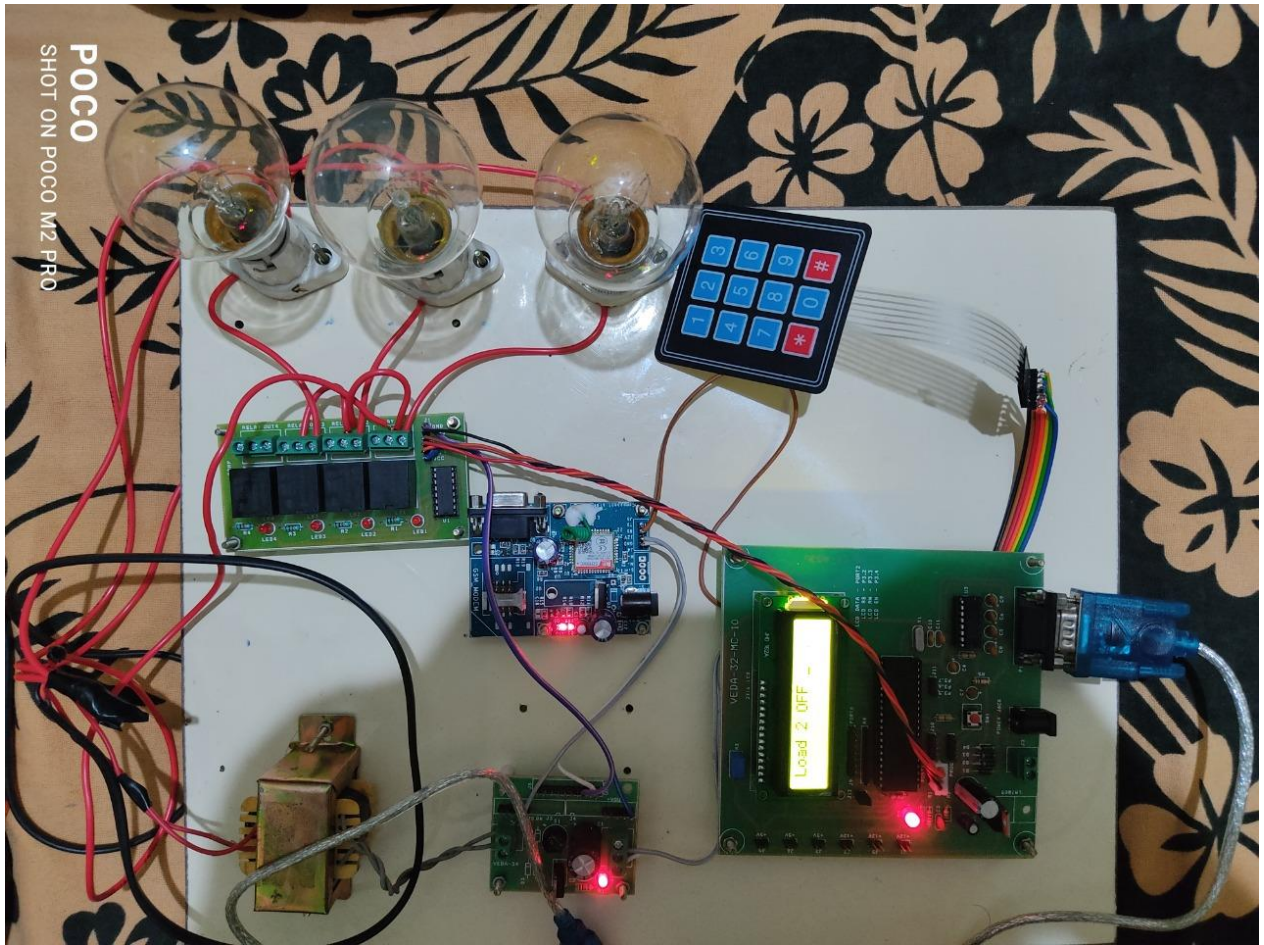


Fig. 4.26 Status of the Load 2 in OFF Position



Fig. 4.27 Status of the Load 3 in OFF Position

The status of the load can also be seen in the registered mobile like which load is on and which load is off.

The status of the load is sent by message by the GSM module.

GSM module is used to send the acknowledgement to the registered mobile.

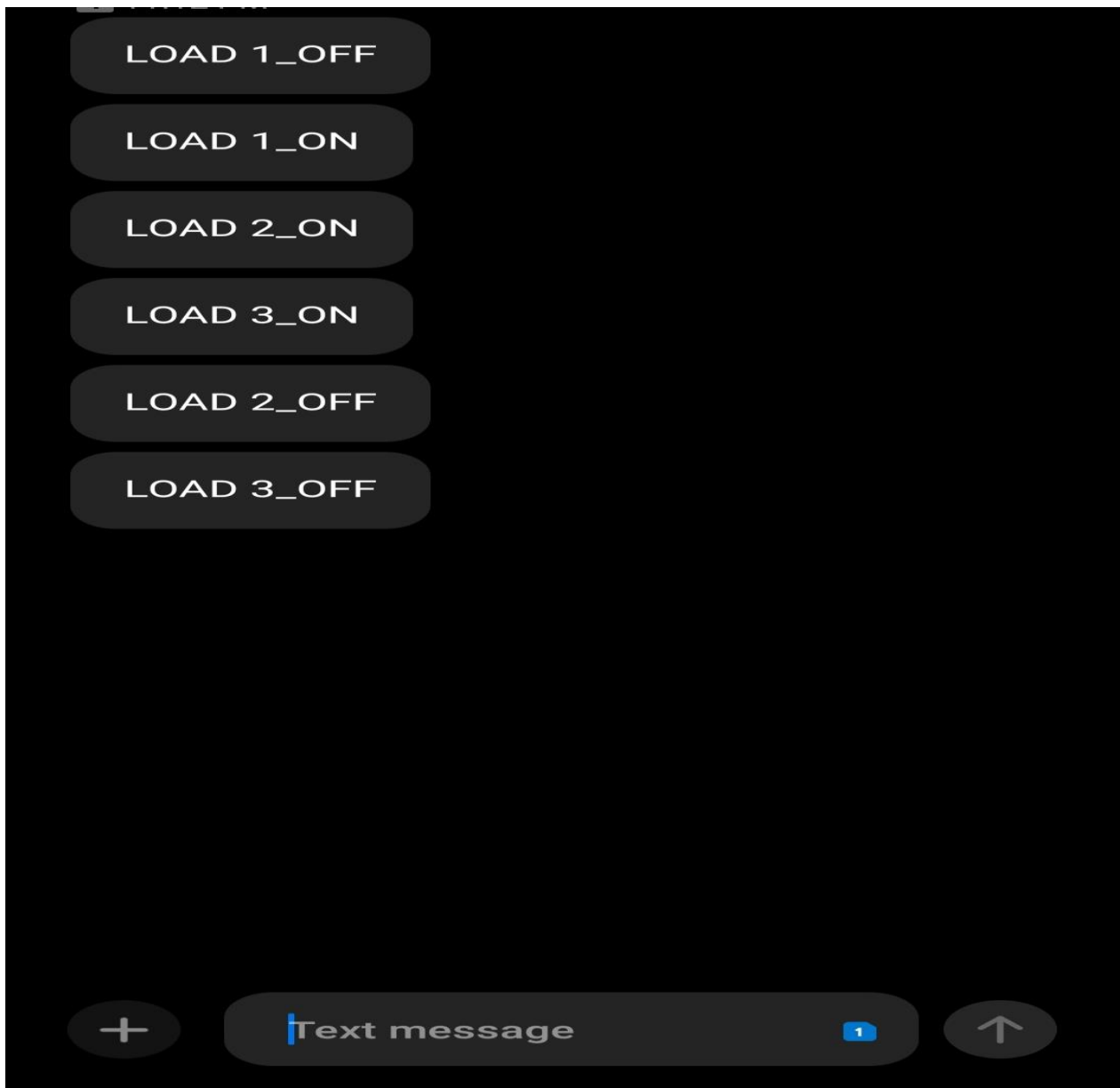


Fig. 4.28 Messages displayed in mobile

CHAPTER 5

CONCLUSION

5.1 CONCLUSION

The project titled “PASSWORD BASED CIRCUIT BREAKER WITH GSM MODULE” is a model for reducing fatal accidents with the help of microcontroller and GSM modem. For repairing the electric lines, the lineman and his safety plays a major role. Human safety is the most important factor. The project is designed in a way that allows control of three different lines, in addition to the protection against over current for each line. The project completed as per the requirement. Finally, the aim of the project i.e., to avoid the fatal accidents for line man.

5.2 FUTURE SCOPE

We advocate developing this project thus on build it doable to be connected to SCADA management management and information acquisition system, or digital system DCS to watch incoming messages in change case. Besides recording the history of operational time ON/OFF for maintenance functions. Develop the system to be able to send message to denotes the CB standing as opened, closed, or tripped. We will conjointly use EEPROMS than is interfaced to the system therefore the electrical fuse can, not solely operate from the station, however conjointly from distance through wireless communication. The project is interfaced with the GSM electronic equipment for the remote of electrical fuse via SMS.

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