EMBEDDED BASED INDUSTRIAL SECURITY SYSTEM WITH AUTO DIALER

A project report

BACHELOR OF TECHNOLOGY

In

ELECTRONICS & COMMUNICATION ENGINEERING

ABSTRACT

Embedded Industrial Security System with Auto-Dialer using 89C51 Microcontroller

Security is primary concern for every one. This Project describes a design of effective security alarm system that can monitor an industry with eight different sensors. Unauthorized access, Fire accident, wall braking, IR detection, and fire detection can be monitored by the status of each individual sensor and is indicated with an LED. This LED shows whether the sensor has been activated and whether the wiring to the sensor is in order. Obviously, this burglar alarm also has an input to 'arm' the alarm, a tamper input and a couple of outputs to control a siren and Auto dialing system. The alarm is also fitted with a so-called 'panic button'.

The burglar alarm is built around the AT89C51 micro controller from Atmel. This micro controller provides all the functionality of the burglar alarm. It also takes care of filtering of the signals at the inputs. Only after an input has remained unchanged for 30 milliseconds, is this new signal level passed on for processing by the micro controller program. This time can be varied by adopting small changes in the source code.

A maximum of 8 sensors can be connected to the burglar alarm. These sensors need to have their contacts closed when in the inactive state (i.e. Normally Closed). In addition, each sensor needs to have its tamper connection wired as well. A power supply voltage of +5 VDC is available for each sensor at the corresponding wiring terminals.

Eight LEDs indicate the status of the corresponding sensors. When the alarm has been activated, the LED of the sensor that caused the alarm will light up, or flash in the event of a cable failure.

When the alarm is armed, the LED 'alarm armed' will flash during the exit-delay. After the exit-delay, the LED will light continuously. The LED 'alarm triggered LED' flashes during the entry-delay and will turn on continuously once an actual alarm has been generated. 'Alarm triggered LED' turns off only when the alarm is switched off with key switch Sw1. When an alarm has taken place, it can be determined afterwards which sensor (or tamper input) caused the alarm to trigger. The LED 'tamper' lights up when the tamper input is opened. This LED will also continue to be on until the alarm is switched off.

The uniqueness of this project is not only alerting the neighbors by siren, it also dials a mobile number which is already programmed into the system. A mobile number or a land line number can be programmed into the system. As this system works on existing telephone line, it can dial the number even the subscriber is out of station.

This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

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CHAPTER 1

This chapter consists of general introduction and organization of the project. In general introduction, the need of the project and literature survey of the project are discussed. The organization of the project deals with the description of the contents of different chapters in the thesis.

1.1GENERAL INTRODUCTION:

Aim of the design is to develop a prototype of developing a secured wireless data communication system, which is being used for security application using an Embedded microcontroller both at the transmitting and receiving sections

This project design makes use of 8051 microcontroller for interfacing to various hardware interfaces. Technology today is seeing its heights in all the areas, especially in the area of Embedded Systems. It is true that every electronic gadget that is used in daily life right from a PC keyboard to a refrigerator is an Embedded System. This itself shows how vastly the technology is expanding. This design is one of such application.

The Micro controller which we are using in our Project is 8051 manufactured by ATMEL Corporation. It is a 40 pin DIP plastic packaging CMOS technology having inbuilt ROM of 4K, RAM of 128 bytes, 32 I/O pins (of which two I/O pins P3.0 and P3.1 can be used for serial communication i.e., pins 10 & 11), 2 Timers and 6 Interrupts. It has an inbuilt Crystal Oscillator generating 12 MHz connected to 18 & 19 pins which is indicated for speed of 8051. When the Micro Controller is at initial condition or got switched ON, the I/O pins are at high indicating as input pins. The 40^{th} pin is given Vcc supply of +5V and 20^{th} to GND.

Security is the condition of being protected against danger or loss. In the general sense, security is a concept similar to safety.The nuance between the two is an added emphasis on being protected from dangers that originate from outside. Individuals or actions that encroach upon the condition of protection are responsible for the breach of security. The word "security" in general usage is synonymous with "safety," but as a technical term "security" means that something not only *is secure* but that it *has been secured.* One of the best options for providing good security is by using a technology named EMBEDDED SYSTEMS.

when people become more and more attach importance ton the quality of life,the security and

service is important.Security has arguably become the prime mover of global politics today.it is the basic common denominator for any successful societyany where in the world.Now a days the security system can identify potential hazards to protect human.A typical intelligent security system consists of intruders,fire,gas,environment sensors and more veriety sensors to be installed.

Business and industry today requires security systems that are the fact of life.Your company simply must have them to protect your employees,your equioment and the very buildings themselves.There is only one thing more important than the selection of the security systems to protect your facilities.That is why you should consider reliable fire equipment for your security system requirements.

security and fire protection are closely related to energy management in so far as they present tractable goals for automated systems.It has been considered relatively easy for machine based systems to recognize anomalous activity around the home which could be interpreted as possible security breaches,accidents or fires.Damage done to humans by vandalism,pollution or pests can usually be repaired.Fire damage,however can be permanent and involves the entire life of human.Much can be done to minimize the chance of a fire stating or spreading.

Progress in fire technologies has been substantial over last decade due to advances in sensor,microelectronics and information technologies,as well as a greater understanding of fire physics.This paper provides a review of progress in fire detection technologies over the last decades some problems & a future research efforts related to current fire detection technologies are discussed.

Generally in any industry,there are several blocks and there is an administrative block which controls all blocks.If any problem is created in any one of the blocks,at first the persons in that particular block has to inform to the administrative block and then the action will be taken.

So if we consider a fire accident in any one of the blocks the person on that incident generally they makes a call to the administrative block or security block as took over and they has to call the ambulance,fire station etc.it will be a long process,so in the mean the damage may increase in huge extent.

The most basic fire protection methods include fire prevention,detection and control.Buildings should be constructed using fire rated walls,doors,ceilings and floors.The use of combustible

materials in interior furnishing should be kept to a minimum.there are several types of detection devices.

Automatic fire detection systems,when combined with other elements of an emergency response and evacuation plan,can significantly reduce property damage,personal injuries,and loss of life from fire in the work place.Their main function is to quickly identify a developing fire and alert building occupants and emergency response personnel before extensive damage occurs.Automatic fire detection systems do this by using electronic sensors to detect the smoke,heat or flames and providing an early warning.

Flame detectors which respond to the flame stage of the fire:heat detectors which respond to heat generated in the flame stage of a fire and smoke detectors which respond to the particles of cumbersion produced in a fire.

A fire alarm control panel,normally referred to as a panel within the active fire protection industry is cental control device for detecting,reporting and actiong on occurances of fire with in a building.there are two types of panel's fallen conventional panels and analogue addressable panels.In a conventional panel,fire detection devices including,but not limited to smoke detectors,heat detectors and manual call points are joined up with a number connected to the circuit.When a device on the circuit is activated the panel recognizes an alarm on that circuit and could be setup to take a number of actions including directly calling the fire department via an alarm transportation system.

An addressable panel ia a more modern type of panel and has a greater flexibility than a conventional panel.An addressable panel has a number of loops where anumber of devices are to be connected,each with its own address.

The lessons of continuing false alarms should not go unnoticed and will serve as a reminderto those who wish to address other areas of automation that even the most well defined,well bounded areas of activity must admit flexibility.Bad experiences with early systems have left the police reluctant to allow domestic security system to call for assistance directly,except on high risk situations.security systems can noe be configured to call several telephones in the event of an alarm so that the occupants are nominated care takers can be alerted before caling the police.

Monitoring of the security system ensures an effective response to an electronic activation or in

times of personal duress.The response opions are customized to suitthe individual risk security requirements in cost effective manner.Monitoring is done through a telephone line and dependng on the security task it will involve a basic digital dialer or a security interface.The most common method of monitoring is achieved via the basic dialer.This is for low to medium security risk and is connected to the existing telephoneline through a special socket.The system will communicate when an alarm condition needs to be reported or when a call is made to test the system.This test is made as often as required to ensure more or less security.the security interface provides the same service but it involves a scanning of the existing telephone line by the telephone company to ensure greater security.should the telephone line be damaged accidentally or on purpose the monitoring station will detect the alarm condition with in seconds.

Now a days trend in network communication leads to replacing the cables, providing mobility and freedom of movement for the user's. The utilization of wireless techniques has spread its scope on to different application fields. one of such spheres is industry. With the addition of wireless connectivity to most embedded designs, zones of security will be needed around each critical system MCU, in addition to the one traditionally surrounding the gateway to the broader network. (Source: Atmel)."Beyond the huge cost savings incurred by eliminating wires, are the continuing costs in maintenance that will be eliminated, as well as the flexibility that gives the manufacturer who wants to recognize the factory floor, add new systems and eliminate others. No wires to connect and disconnect eliminates a lot of costs and will make the factory floor a much more dynamic environment".

This Project describes a design of effective security alarm system that can monitor an industry with eight different sensors. Unauthorized access, Fire accident, wall braking, IR detection, and fire detection can be monitored by the status of each individual sensor and is indicated with an LED. This LED shows whether the sensor has been activated and whether the wiring to the sensor is in order. Obviously, this burglar alarm also has an input to 'arm' the alarm, a tamper input and a couple of outputs to control a siren and Auto dialing system. The alarm is also fitted with a so-called 'panic button'.

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As the operation of microcontroller-based system is inherently based on the stored program concept, the software plays a very crucial role. The relationship between the hardware and software is similar to the relation between body and soul. One has an meaningful existence without the other. The hardware is the body, which is used as the medium of software. In order to develop the software for microcontroller based system, one must acquire knowledge about the set of instructions which are used as a building blocks in writing a program and learn the art of program that is the tools and techniques of putting instructions together in a logic manner to form a program implementing the desired operations. The Keil 8051 development tools are designed to solve the complex problems facing embedded software developed.

CHAPTER 2

This chapter deals with the general introduction of all the components used in this thesis. So we can have a general idea about all the components. Also some computer aided instructions and their operation is also discussed in this chapter. As these instructions are assembly language instructions, these are useful to acquire more knowledge about the embedded system code.

2.1 GENERAL THEORY:

An embedded system can be defined as a computing device that does a specific focused job. Appliances such as the air-conditioner, VCD player, DVD player, printer, fax machine, mobile phone etc. are examples of embedded systems. Each of these appliances will have a processor and special hardware to meet the specific requirement of the application along with the embedded software that is executed by the processor for meeting that specific requirement. The embedded software is also called "firm ware". The desktop/laptop computer is a general purpose computer. You can use it for a variety of applications such as playing games, *word* processing, accounting, software development and so on. In contrast, the software in the embedded systems is always fixed listed below:

1 Embedded systems do a very specific task; they cannot be programmed to do different things. . Embedded systems have very limited resources, particularly the memory. Generally, they do not have secondary storage devices such as the CDROM or the floppy disk. Embedded systems have to work against some deadlines. A specific job has to be completed within a specific time. In some embedded systems, called real-time systems, the

deadlines are stringent. Missing a deadline may cause a catastrophe-loss of life or damage to property. Embedded systems are constrained for power. As many embedded systems operate through a battery, the power consumption has to be very low.

2.2 PRIMARY COMPONENTS:

2.2.1 AT89C51 Micro controller

2.2.2 Sensor board

2.2.3 LED array

2.2.4 Driver circuit

2.2.5 ARM switch

2.2.6 PANIC switch

2.2.7 Reset circuit

2.2.8 ALARM

2.2.9 Relays

2.2.10 Crystal oscillator

2.2.11 Auto dialer

2.2.12 Power supply

2.2.1 AT89C51 Micro controller:

8051 is one of the most popular micro controllers in use today. Many derivative micro controller have since been developed that are based on and compatible with the 8051.Thus, the ability to program an 8051 is an important skill for any one who plans to develop products that will take advantage of micro controller. P89C51 is same as the INTEL 8051 except that 89C51 has internal flash ROM, which can be programmed more than 1000 times.

The AT89C51 is a low power, high-performance CMOS 8-bit micro controller with 8K bytes of in system programmable flash memory. The P89C51 is designed with static logic for operation down to zero frequency and supports two software selectable power saving modes. The 89C51 micro controller unit is a fast, single chip micro controller family.

2.2.2 Sensor Board:

The different sensors used in this project are as follows:

1. REED SWITCHES or MAGNETIC SENSORS
2. LED & LDR section

3. VIBRATION DETECTOR
4. TEMPERATURE SENSOR
5. PANIC SWITCH
6. IR tx AND IR rx.
7. SMOKE DETECTOR

2.2.3 LED array:

Light-emitting diodes are elements for light signalization in electronics. They are manufactured in different shapes, colors and sizes. For their low price, low consumption and simple use, they have almost completely pushed aside other light sources- bulbs at first place. They perform similar to common diodes with the difference that they emit light when current flows through them.

2.2.4 Driver circuit:

A driver circuit is used for driving the LEDs.An open-drain output can drive an LED. if either of the input to the driver circuit is LOW, the corresponding n-channel transistors is off and the LED is off. When both the inputs are High, both transistors are ON. Then the output is LOW.

2.2.5 ARM switch:

This is the simplest way of controlling appearance of some voltage on micro controller's input pin. . It is about contact bounce- a common problem with mechanical switches. If contact switching does not happen so quickly, several consecutive bounces can be noticed prior to maintain stable state. The reasons for this are: vibrations, slight rough spots and dirt. Anyway, whole this process does not last long (a few micro- or milliseconds), but long enough to be registered by the micro controller

2.2.6 PANIC switch:

This is nothing but a simple switch, which is connected in the sensor board. The response of this switch is monitored by the micro controller and the corresponding action takes place.

2.2.7 Reset circuit:

For proper system operation, the hardware design of a state machine should ensure that it enters a known initial state on power-up. Most systems have a RESET signal that is asserted during

power-up. If a state machine is built using discrete flip-flops with asynchronous preset and clear inputs, the RESET signal can be applied to these inputs to force the machine in to the desired initial state.

2.2.8 ALARM:

An ALARM is used to indicate any intruder enters in to industry. When smoke is detected by the smoke detector and the buzzer is activated. If the window is opened then the buzzer is activated. If any one removes the box the light falls on the LDR and then the microcontroller detects it and the buzzer will be activated.

2.2.9Relays:

A relay is an electrically controllable switch widely used in industrial controls, automobiles and appliances. A relays are widely used electronics circuits as remote controlled mechanical switches turn a sequence of events ON and OFF. Relays are provided some mechanical contacts and with their help they control operation of other circuits. The terminology of both relays and switches is identical that is similar to switches.

2.2.10 Crystal oscillator:

To stabilize the frequency of the internal oscillator we have to add an external oscillator of frequency 11.0592MHZ.certain crystalline materials, namely Rochelle salt, quartz and tourmaline exhibit the piezoelectric effects are called piezoelectric crystals. Of the various piezoelectric crystals, quartz is more commonly used because it is inexpensive and readily available in nature.

2.2.11 Auto Dialer:

A telephone is used in the system in order to convey the alert message to the concerned authorities. In the system, telephone plays a vital role, because even if the alarm is not heard by anyone present in the vicinity of the system, the message can be intimated to the required destination by the number which is already stored in it.

2.2.12 Power supply:

The input to the circuit is applied from the regulated power supply. The a.c input i.e., 230V from the mains supply is step down by the transformer to 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating d.c voltage. So in order to get a pure d.c voltage, the output voltage from the rectifier is fed to a filter to remove any a.c components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

2.3 COMPUTER AIDED INSTRUCTION:

Compilers produce hex files that we download in to the ROM of the micro controller.the size of the hex file produced by the compiler is one of the main concerns of micro controller programmers for two reasons:

1. Micro controllers have limited on-chip ROM
2. the code space for the 8051 is limited to 64k bytes.

While assembly language produces a hex file that is much smaller than C.programming in assembly language is tedious and time consuming.C programming,on the other hand,is less time consuming and much easier to write.one statement in C belongs to several statements in assembly language.however if we learn easily instructions we can easily deal with C programming.some of the assembly instructions are discussed below**.**

2.3.1 Instruction Definition:

ACALL addr11:

Function: Absolute call

Description: ACALL unconditionally calls a subroutine located at the indicated address. The instruction increments the PC twice to obtain the address of the following instruction, then pushes the 16-bit result on to the stack(low-order byte first) and increments the stack pointer twice. The destination address is obtained by successively concatenating the five high-order bits of the incremented PC, epode bits 7-5,and the second byte of the instruction. The subroutine called must therefore start within the same 2K block of the program memory as the first byte of the instruction following ACALL.No flags are affected.

CLR A:

Function: clear accumulator

Description: The accumulator is cleared (all bits reset to zero). No flags are affected.

CPL A:

Function: complement accumulator

Description: Each bit of the accumulator is logically complemented (one's complemented). Bits which previously contained a one are changed to a zero and vice-versa. No flags are affected**.**

DJNZ <byte>, <rel-addr>;

Function: Decrement and jump if not zero.

Description: DJNZ decrements the location indicated by 1,and branches to the address indicated by the second operand if the resulting value is not zero. An original value of 00H wills underflow to 0FFH.No flags are affected. The branch destination would be computed by adding the signed relative-displacement value in the last instruction byte to the PC, after incrementing the PC to the first byte of the following instruction. The location decremented may be a register or directly addressed byte.

JB bit, real:

Function: jump if bit set

Description: if the indicated bit is one, jump to the address indicated; otherwise proceed with the next instruction. The branch destination is computed by adding the signed relative-displacement in the third instruction byte to the PC, after incrementing the PC to the first byte of the next instruction. The bit tested is not modified. No flags are affected.

JNB bit, rel:

Function: jump if bit not set

Description: if the carry bit is zero, branch to the indicated address; otherwise proceed with the next instruction. The branch destination is computed by adding the signed relative-displacement in the third instruction byte to the PC, after incrementing the PC to the first byte of the next instruction. The bit tested is modified. No flags are affected.

MOV <dest-byte>, <src-byte>:

Function: Move byte variable

Description: The byte variable indicated by the second operand is copied into the location specified by the first operand. The source byte is not affected. No other register or flag is affected. This is by far the most flexible operation. Fifteen combinations of source and destination addressing modes are allowed.

SETB <bit>:

Function: set bit

Description: SETB sets the indicated bit to one. SETB can operate on the carry flag or any directly addressable bit. No other flags are affected.

SJMP rel:

Function: short jump

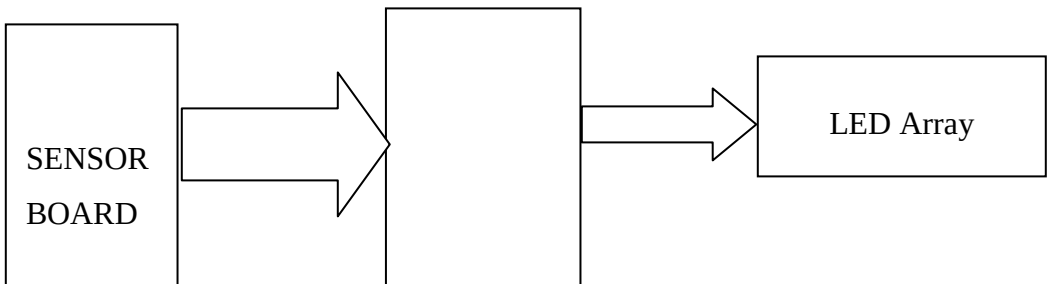
Description: program control branches unconditionally to the address indicated. The branch destination is computed by adding the signed displacement in the second instruction byte to the PC, after incrementing the PC twice. Therefore, the range of destinations allowed is from 128 bytes preceding this instruction to 127 bytes following it.

CHAPTER-3

In this chapter we are discussing about the complete block diagram or line diagram description with actual specifications and aims. In this chapter we are mainly concentrated on the complete design details, algorithm details and flow chart.

3.1 GENERAL BLOCK DIAGRRAM:

In this section we discuss about the basic block diagram and the components used in Industrial security system with auto dialer.



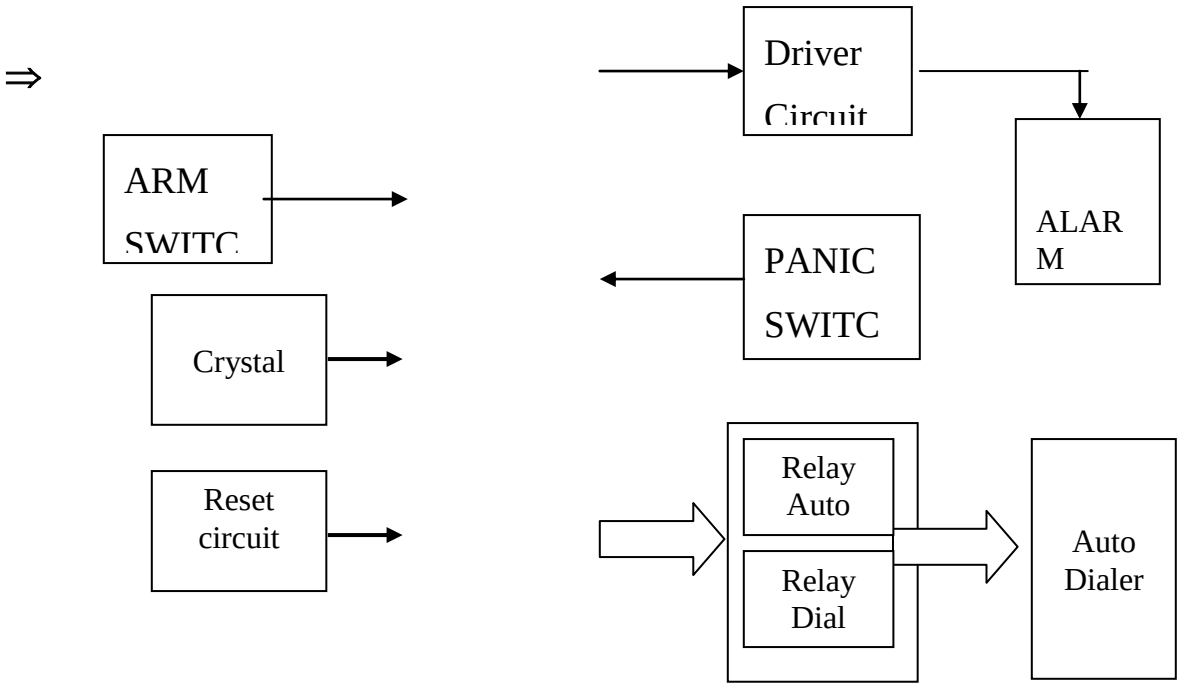


Fig 3.1 Block Diagram

This above block diagram is just a lone diagram or layout diagram. This line diagram gives a brief introduction about the parts or components used in this project. This above diagram clearly shows that the main part is the micro controller.

When all the hardware required to run the applications is provided on the chip. It is referred to as an embedded microcontroller; all that is typically required to operate this device is power, reset and a clock. Digital I/O pins are provided to allow interfacing with external devices.

Basically micro controller is a device, which integrates a number of components of a microprocessor system on to an on-chip memory, microcontroller is designed to execute only a single specific task to control a single system and hence they are small and sophisticated and simplified.

Relays are widely used electronics circuits as remote controlled mechanical switches turn a sequence of events ON and OFF. Relays are provided some mechanical contacts and with their help they control operation of other circuits. The terminology of both relays and switches is identical that is similar to switches.

Light-emitting diodes are elements for light signalization in electronics. They are manufactured in different shapes, colors and sizes.They perform similar to common diodes with the difference that they emit light when current flows through them.

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number, which is already stored in it.

3.2 AT89C51 MICROCONTROLLER:

3.2.1 Features:

2 4K Bytes of Re-programmable Flash Memory.
3 RAM is 128 bytes.
4 2.7V to 6V Operating Range.
5 Fully Static Operation: 0 Hz to 24 MHz.
6 Two-level Program Memory Lock.
7 128 x 8-bit Internal RAM.
8 32 Programmable I/O Lines.
9 Two 16-bit Timer/Counters.
10 Six Interrupt Sources.
11 Programmable Serial UART Channel.
12 Low-power Idle and Power-down Modes

Description:

The AT89C51 is a low-power, high performance CMOS 8-bit micro controller with 4K bytes of In-system programmable flash memory. The device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the industry-standard 80C51 instruction set and pinout. The on-chip flash allows the program memory to be reprogrammed in-system or by a conventional non-volatile memory pro-grammar. By combining a versatile 8-bit CPU with In-system programmable flash on a monolithic chip, the atmel AT89C51 is a powerful micro controller, which provides a highly flexible and cost-effective solution to many embedded control applications.

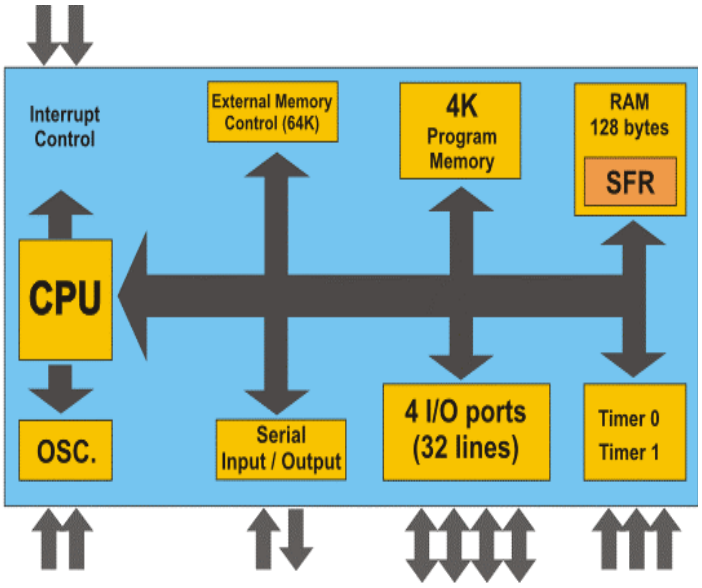


Fig 3.2:Block diagram of AT89C51 micro controller

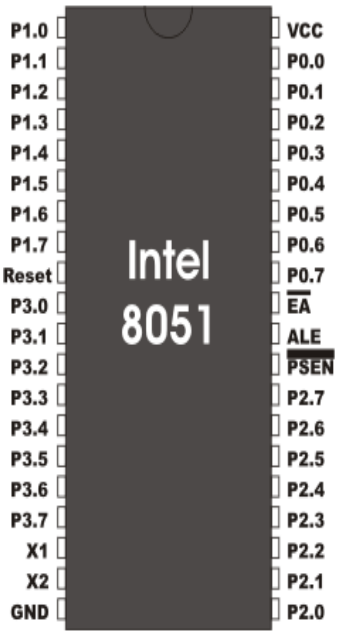


Fig 3.3 pin diagram AT89C51 micro controller

3.2.2 Pin description:

VCC: Supply voltage.

VSS (GND): Ground.

PORT0:

Port 0 is an 8-bit open drain bi-directional I/O port,each pin can sink eight TTL inputs.when 1's are written to port0 pins,the pins can be used as high-impedance inputs.port0 can also be configured to be the multiplexed low-order address/data bus during accesses to external program and data memory.in this mode,p0 has internal pull-ups.port0 also recieves the code bytes during flash programming and outputs the code bytes during program verification.external pull-up's are required during program verification.

PORT1:

port1 is an 8-bit bi-directional I/O port with internal pull-ups.the port1 output buffers can sink/source four TTL inputs.When 1's are written to port1 pins,they are pulled high by the internal pull-ups and can be used as inputs.as inputs,port1 pins that are externally being pulled low will source current(IIL) because of the internal pull-ups.port1 also recieves the low-order address bytes during flash programming and verification.

PORT2:

.port2 is an 8-bit bi-directional I/O port with internal pull-ups.the port2 output buffers can sink/source four TTL inputs.when !'s are written to port2 pins,they are pulled high by the inter-nil-pull-ups and can be used as inputs.as inputs,port2 pins that are externally being pulled low will source current(IIL) because of the internal pull-ups.port2 emits the higher-order addres byte during fetches from external program memory and during accessesto external data memory that use 16-bit addresses(MOV X @ DPTR).in this application,port2 uses strong internal pull-ups when emitting 1's.during accesses to external data memory that use 8-bit addresses(MOV X@ R1),port2 emits the contents of the P2 special function register.port2 also recieves the higher-order address bits and some control signals during flash programming and verification.

PORT3:

port3 is an 8-bit bi-directional I/O port with internal pull-ups.the port3 output buffers can sink/source four TTL inputs.when 1's are written to port3 pins,they are pulled high by the internal pull-ups and can be used as inputs.As inputs,port3 pins that are externally being pulled low will source current(IIL) because of the pull-ups.port3 recieves some control signals for flash programming and verification.port3 also serves the functions of various special features of the AT89C51.

RST:

reset input.a highon this pin for two machine cycles while the oscillator is running resets the device.this pin drives high for 98 oscillator periods after the watchdog times out.the DIS-RTO bit in SFR AUXR(address 8EH) can be used to disable this feature.in this default state of bit DISRTO,the RESET HIGH out feature is enabled.

ALE/PROG:

address latch enable(ALE) is an output pulse for latching the low byte of the address during accesses to external memory.this pin is also the program pulse input(PROG) during flash programming.

PSEN:

program store enable(PSEN) is the read strobe to external program memory.when the AT89C51 is executing code from external program memory,PSEN is activated twice each machine cycle,except that two PSEN activations are skipped during each acess to external data memory.

EA/VPP:

external access enable.EA must be strapped to GND in order to enable the device to fetch code from external program memorylocations starting at 0000H up to FFFFH.Note,however,that if lock bit 1 is programmed,EA will be internally latched on reset.EA should be strapped to vcc for internal program executions.this pin also recieves the 12-volt programming enable voltage(PP) during flash programming.

XTAL1:

input to the inverting oscillator amplifier and input to the internal clock operating circuit.

XTAL2:

output from the inverting oscillator amplifier

Oscillator characteristics:

XTAL1 and XTAL2 are the input and output, respectively, of an inverting amplifier that can e configured for use as an on-chip oscillator. Either a quartz crystal or ceramic resonator may be used. To drive the device from an external clock source, XTAL2should be left unconnected while XTAL1 is driven.

3.2.3 Special function registers:

SFRs are a kind of control table used for running and monitoring microcontroller's operating. Each of these registers, even each bit they include, has its name, address in the scope of RAM and clearly defined purpose (for example: timer control, interrupt, serial connection etc.). Even though there are 128 free memory locations intended for their storage, the basic core, shared by all types of 8051 controllers, has only 21 such registers. Rest of locations are intentionally left free in order to enable the producers to further improved models keeping at the same time compatibility with the previous versions. It also enables the use of programs written a long time ago for the micro controllers, which are out of production now.

Table 3.1 special function registers

F8									FF
F0	B								F7
E8									EF
E0	ACC								E7
D8									DF
D0	PSW								D7
C8									CF
C0									C7
B8	IP								BF
B0	P3								B7
A8	IE								AF
A0	P2								A7
98	SCON	SBUF							9F
90	P1								97
88	TCON	TMOD	TL0	TL1	TH0	TH1			8F
80	P0	SP	DPL	DPH				PCON	87

Bit-addressable Registers

A Register (Accumulator):

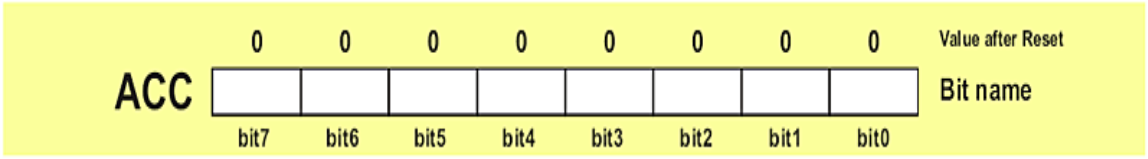


Fig 3.4 A register

This is a general-purpose register which serves for storing intermediate results during operating. A number (an operand) should be added to the accumulator prior to execute an instruction upon it. Once an arithmetical operation is preformed by the ALU, the result is placed into the accumulator.

B Register:

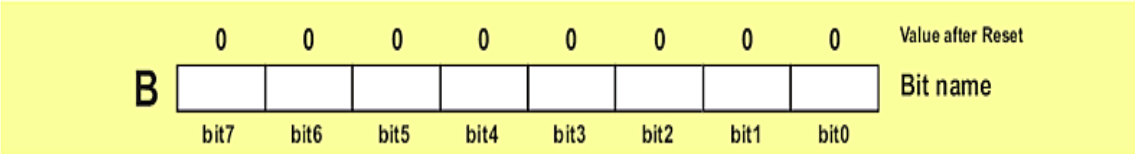


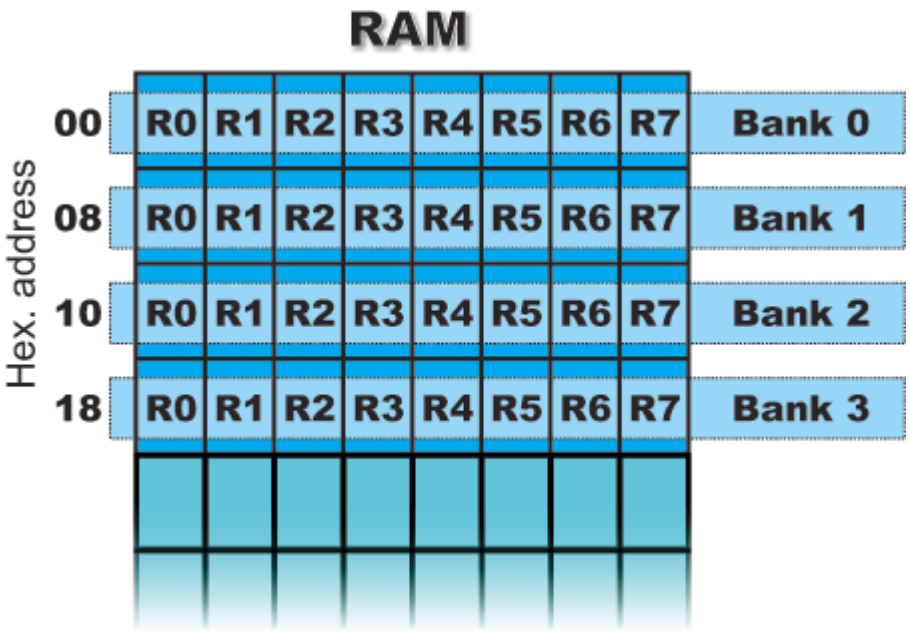
Fig 3.5 B register

B register is used during multiply and divide operations which can be performed only upon numbers stored in the A and B registers. All other instructions in the program can use this register as a spare accumulator (A).

R Registers (R0-R7):

This is a common name for the total 8 general purpose registers (R0, R1, R2 ...R7). Even they are not true SFRs, they deserve to be discussed here because of their purpose. The bank is active when the R registers it includes are in use. Similar to the accumulator, they are used for temporary storing variables and intermediate results. Which of the banks will be active depends on two bits included in the PSW Register. These registers are stored in four banks in the scope of RAM.

Table 3.2 R registers



3.2.4 Memory organization:

MCS-51 devices have a separate address space for program and data memory. Up to 64K bytes each of external program and data memory can be addressed.

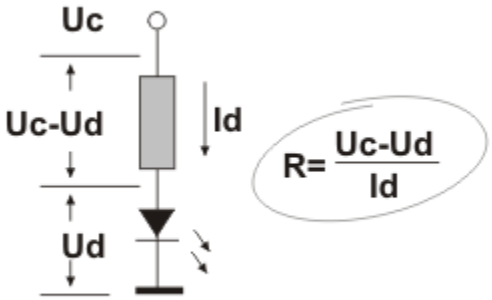
Program memory: if the EA pin is connected to GND, all program fetches are directed to

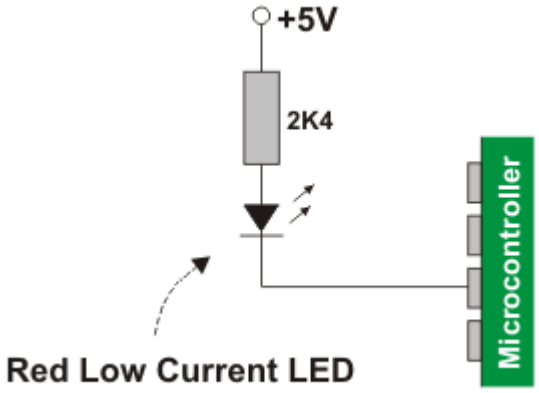
external memory. On the AT89C51, if EA is connected to VCC, program fetches to addresses 0000H through FFFFH are directed to internal memory and fetches to addresses 1000H through FFFFH are directed to external memory.

Data memory: The AT89C51 implements 128 bytes of on-chip RAM. The 128 bytes are accessible via direct and indirect addressing modes. Stack operations are examples of indirect addressing, so the 128 bytes of data RAM are available as stack space.

3.3 LIGHT-EMITTING DIODE (LED):

Light-emitting diodes are elements for light signalization in electronics. They are manufactured in different shapes, colors and sizes. They perform similar to common diodes with the difference that they emit light when current flows through them. As seen, there are three main types of LEDs. *Standard* ones get full brightness at current of 20mA. *Low Current* diodes get full brightness at ten times lower current while *Super Bright* diodes produce more intensive light than Standard ones.



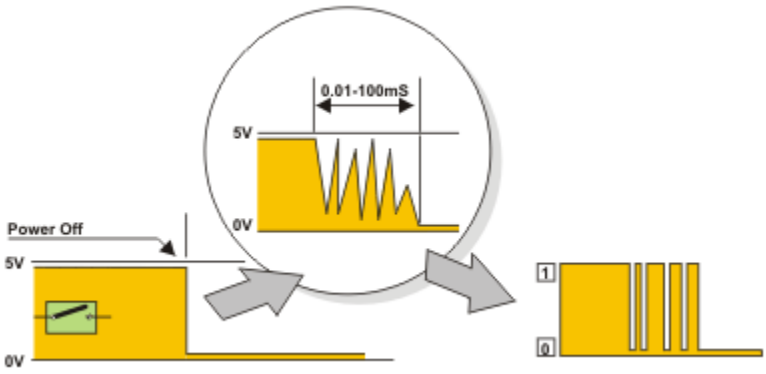


Fiog 3.6 Light Emitting Diode symbol

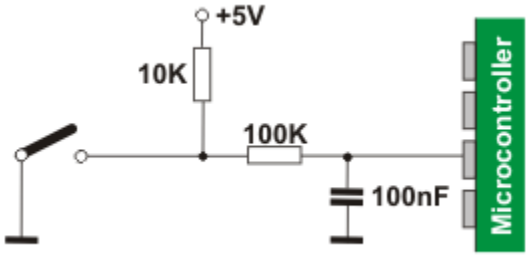
Fig 3.7 Operation of LED

3.4SWITCHES AND PUSHBUTTONS:

This is the simplest way of controlling appearance of some voltage on microcontroller's input pin. There is also no need for additional explanation of how these components operate. It is about contact bounce- a common problem with mechanical switches.



Nevertheless, it is not so simple in practice... This is about something commonly unnoticeable when using these components in everyday life. It is about contact bounce- a common problem with m e c h a n i c a l switches. If contact switching does not happen so quickly, several consecutive bounces can be noticed prior to maintain stable state. The reasons for this are: vibrations, slight rough spots and dirt. Anyway, whole this process does not last long (a few micro- or miliseconds), but long enough to be registered by the microcontroller. Concerning pulse counter, error occurs in almost 100% of cases!

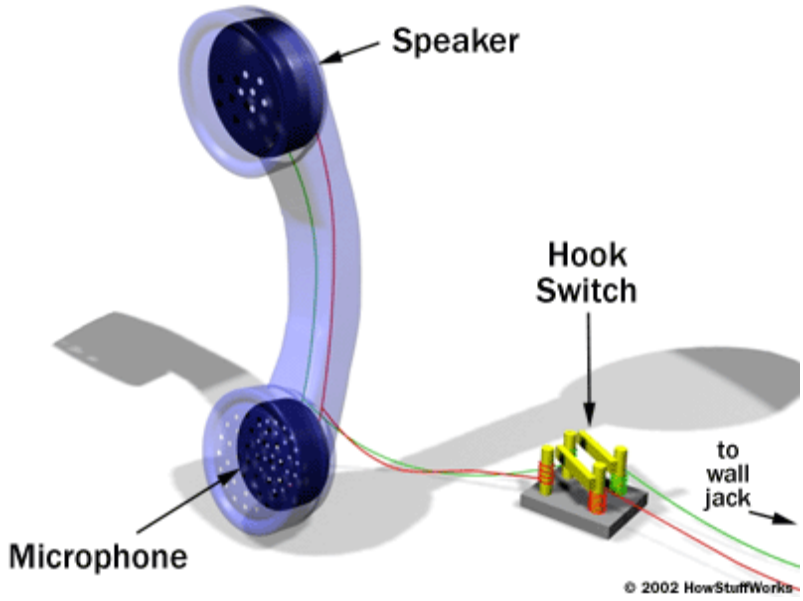


The simplest solution is to connect simple RC circuit which will “suppress” each quick voltage change. Since the bouncing time is not defined, the values of elements are not strictly determined. In the most cases, the values shown on figure are sufficient.

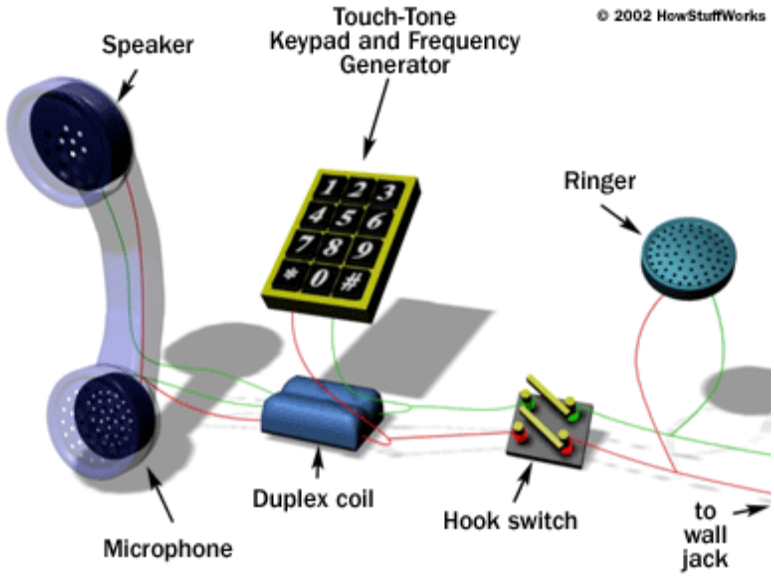
If complete safety is needed, radical measures should be taken! The circuit, shown on the figure (RS flip-flop), changes logic state on its output with the first pulse triggered by contact bounce. Even though this is more expensive solution (SPDT switch), the problem is definitely resolved! Besides, since the condensator is not used, very short pulses can be also registered in this way. In addition to these hardware solutions, a simple software solution is commonly applied too: when a program tests the state of some input pin and finds changes, the check should be done one more time after certain time delay. If the change is confirmed it means that switch (or pushbutton) has changed its position. The advantages of such solution are obvious: it is free of charge, effects of disturbances are eliminated too and it can be adjusted to the worst-quality contacts.

AUTO DIALER:

The very simplest working telephone would look like this inside:



As you can see, it only contains three parts and they are all simple:
A **switch** to connect and disconnect the phone from the network - This switch is generally called the **hook switch**. It connects when you lift the handset.
A **speaker** - This is generally a little 50-cent, 8-ohm speaker of some sort.
A **microphone** - In the past, telephone microphones have been as simple as carbon granules compressed between two thin metal plates. Sound waves from your voice compress and decompress the granules, changing the resistance of the granules and modulating the current flowing through the microphone.
Most people find that annoying, so any "real" phone contains a device called a **duplex coil** or something functionally equivalent to block the sound of your own voice from reaching your ear. A modern telephone also includes a **bell** so it can ring and a **touch-tone keypad** and **frequency generator**. A "real" phone looks like this:



A "real" telephone

Still, it's pretty simple. In a modern phone there is an electronic microphone, amplifier and circuit to replace the carbon granules and loading coil. The mechanical bell is often replaced by a speaker and a circuit to generate a pleasant ringing tone.

Here in our project we will be replacing the HOOK SWITCH with a RELAY so that the switching can be controlled with the microcontroller itself. That is nothing but we are connecting to the telephone line when ever we want by just activating that relay.

Redial:

The telephone stores in memory the last number you called. The number will remain in the Redial memory until you dial another number.

To dial the same number again

1. Lift the handset or press your telephone's Hands free button.

2. Listen for the dial tone, and press Redial.

This is done manually but as we want all this to be done automatically we will be replacing the redial button with another RELAY. Here we are using two relays for controlling the ON and OFF of the phone and for redialing. So now every thing is automatic as the relays are being controlled by the microcontroller itself.

RELAYS:

A relay is an electrically controllable switch widely used in industrial controls, automobiles and appliances.

The relay allows the isolation of two separate sections of a system with two different voltage sources i.e., a small amount of voltage/current on one side can handle a large amount of voltage/current on the other side but there is no chance that these two voltages mix up.

Inductor

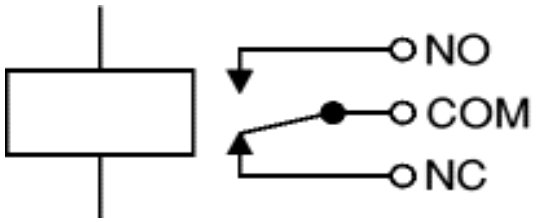


Fig: Circuit symbol of a relay

Operation:

When current flows through the coil, a magnetic field is created around the coil i.e., the coil is energized. This causes the armature to be attracted to the coil. The armature's contact acts like a switch and closes or opens the circuit. When the coil is not energized, a spring pulls the armature to its normal state of open or closed. There are all types of relays for all kinds of applications.

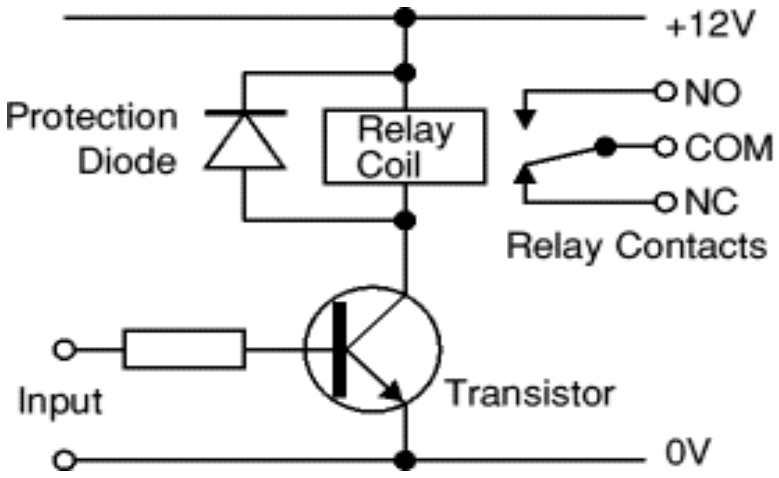


Fig: Relay Operation and use of protection diodes

Transistors and ICs must be protected from the brief high voltage 'spike' produced when the relay coil is switched off. The above diagram shows how a signal diode (eg 1N4148) is connected across the relay coil to provide this protection. The diode is connected 'backwards' so that it will normally not conduct. Conduction occurs only when the relay coil is switched off, at this moment the current tries to flow continuously through the coil and it is safely diverted through the diode. Without the diode no current could flow and the coil would produce a damaging high voltage 'spike' in its attempt to keep the current flowing.

In choosing a relay, the following characteristics need to be considered:

1. The contacts can be normally open (NO) or normally closed (NC). In the NC type, the contacts are closed when the coil is not energized. In the NO type, the contacts are closed when the coil is energized.

2. There can be one or more contacts. i.e., different types like SPST (single pole single throw), SPDT (single pole double throw) and DPDT (double pole double throw) relays.

3. The voltage and current required to energize the coil. The voltage can vary from a few volts to 50 volts, while the current can be from a few milliamps to 20milliamps. The relay has a minimum voltage, below which the coil will not be energized. This minimum voltage is called the "pull-in" voltage.

4. The minimum DC/AC voltage and current that can be handled by the contacts. This is in the range of a few volts to hundreds of volts, while the current can be from a few amps to 40A or more, depending on the relay.

SENSOR BOARD:

The different sensors used in this project are as follows:

1. REED SWITCHES or MAGNETIC SENSORS
2. LED & LDR section
3. VIBRATION DETECTOR
4. TEMPERATURE SENSOR
5. PANIC SWITCH
6. IR tx AND IR rx.
7. SMOKE DETECTOR

3.5 REED SWITCHES OR MAGNETIC SENSORS:

The **reed switch** is an electrical switch operated by an applied magnetic field. The basic reed switch consists of two identical flattened ferromagnetic reeds, sealed in a dry inert-gas atmosphere within a glass capsule, thereby protecting the contact from contamination. The reeds are sealed in the capsule in such a way that their free ends overlap and are separated by a small air gap.

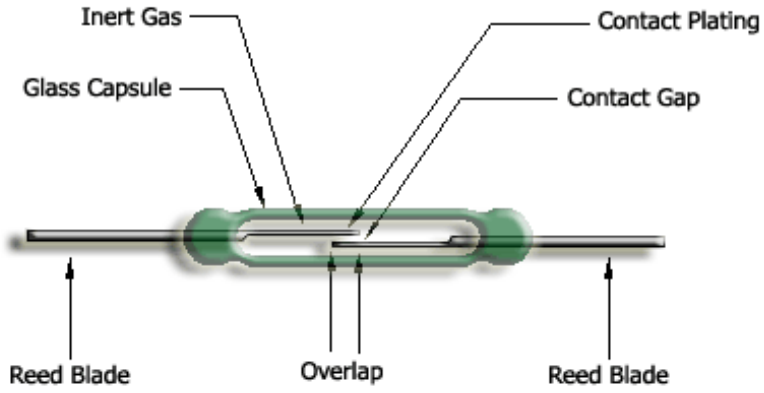


Fig 3.9 Schematic of magnetic sensor

The contacts may be normally open, closing when a magnetic field is present, or normally closed and opening when a magnetic field is applied.

A magnetic field from an electromagnet or a permanent magnet will cause the contacts to pull together, thus completing an electrical circuit. The stiffness of the reeds causes them to separate, and open the circuit, when the magnetic field ceases. Good electrical contact is assured by plating a thin layer of precious metal over the flat contact portions of the reeds.

Since the contacts of the reed switch are sealed away from the atmosphere, they are protected against atmospheric corrosion. The hermetic sealing of a reed switch makes them suitable for use in explosive atmospheres where tiny sparks from conventional switches would constitute a hazard.

REED SENSOR:

A reed sensor is a device built using a reed switch with additional functionality like ability to withstand higher shock, easier mounting, additional intelligent circuitry, etc.

In production, a metal reed is inserted in each end of a glass tube and the end of the tube heated so that it seals around a shank portion on the reed. Infrared-absorbing glass is used, so an infrared heat source can concentrate the heat in the small sealing zone of the glass tube. The thermal coefficient of expansion of the glass material and metal parts must be similar to prevent breaking the glass-to-metal seal. The glass used must have a high electrical resistance and must not contain volatile components such as lead oxide and fluorides. The leads of the switch must be handled carefully to prevent breaking the glass envelope.

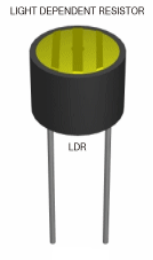
3.5.1 Description:

When a magnetic force is generated parallel to the reed switch, the reeds become flux carriers in the magnetic circuit. The overlapping ends of the reeds become opposite magnetic poles, which attract each other. If the magnetic force between the poles is strong enough to overcome the restoring force of the reeds, the reeds will be drawn together.

One important quality of the switch is its sensitivity, the amount of magnetic energy necessary to actuate it. Sensitivity is measured in units of Ampere-turns, corresponding to the current in a coil multiplied by the number of turns. Typical pull-in sensitivities for commercial devices are in the 10 to 60 AT range.

3.6 LED AND LDR SECTION:

LDR: LDRs or Light Dependent Resistors are very useful especially in light/dark sensor circuits. Normally the resistance of an LDR is very high, sometimes as high as 1000 000



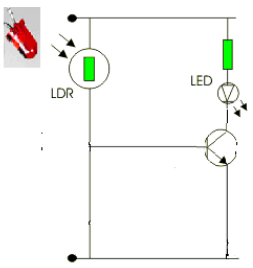


Fig 3.10 LDR symbol **Fig 3.11 operation of LDR**

Ohms,but when they are illuminated with light resistance drops dramatically.

3.6.1 description:

When the light level is low the resistance of the LDR is high. This prevents current from flowing to the base of the transistors. Consequently the LED does not light. However, when light shines onto the LDR its resistance falls and current flows into the base of the first transistor and then the second transistor. The LED lights.

Here in our project to avoid the light from led to fall on to LDR we place a box in which we will keep our jewelry. If any one removes the box the light from led falls directly on to the LDR and then the transistor will be on which is monitored by the microcontroller.

3.7 VIBRATION DETECTOR:

Here we use a ceramic piezoelectric buzzer plate for vibration detection.Piezoceramic buzzers generate sound through the bending vibrations of a thin metal plate adhered to a piezoceramic disc.

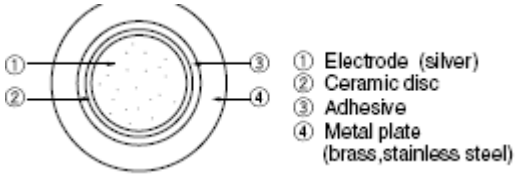


Fig 3.12 schematic of vibration detector

3.7.1 description:

These buzzers feature low power consumption, a safe, spark-free and non-contact structure, and a small size and lightweight for an easy mounting to printed circuit boards. As a result, an increasing number of piezoceramic buzzers are now used to generate an artificial voice in combination with voice synthesizing ICs. We will be placing it at the door so that a small vibration at the door also can be detected.

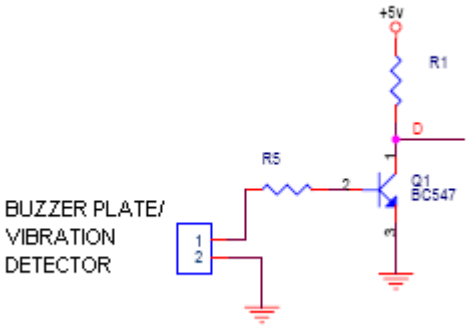


Fig 3.13 ckt diagram of vibration detector

The arrangement of this sensor in our project is as shown in the figure above which is sensed by the micro controller. After sensing the signal the corresponding action is done by the micro controller, which is preprogrammed.

3.8 TEMPERATURE SENSOR (LM35):

A sensor can be defined as a device, which can convert one form of energy into electrical energy. Here we are using a sensor to sense the temperature around us. For this purpose we will be taking help of LM 35, which is a temperature sensor.

3.8.1 description: The LM35 series are precision integrated-circuit temperature sensors, whose output voltage is linearly proportional to the Celsius (Centigrade) temperature. The LM35 thus has an advantage over linear temperature sensors calibrated in ° Kelvin, as the user is not required to subtract a large constant voltage from its output to obtain convenient Centigrade scaling.

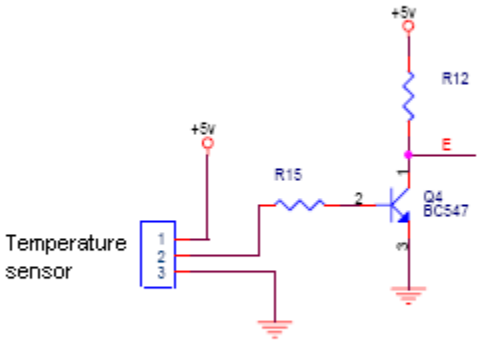


Fig 3.14 Ckt diagram of LM35

In this we directly connect the output of the sensor to the base of the transistor as of LM35 for every 1˚C rise of temperature the output will increase for 10mV. Now if the temperature reaches 70˚C the output voltage will be 0.7V which is enough for the transistor junction to be biased. Hence the transistor gets on and the output is sensed by the microcontroller.

3.8.2 Features:

- Calibrated directly in ° Celsius (Centigrade)
- Rated for full −55° to +150°C range
- Suitable for remote applications
- Operates from 4 to 30 volts

3.9 PANIC SWITCH:

This is nothing but a simple switch, which is connected in the sensor board. The arrangement of this is as shown in the figure below. The response of this switch is monitored by the microcontroller and the corresponding action takes place.

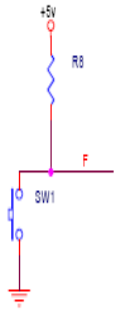


Fig 3.15 schematic of panic switch

3.10 IR SECTION:

3.10.1 IR Tx.:

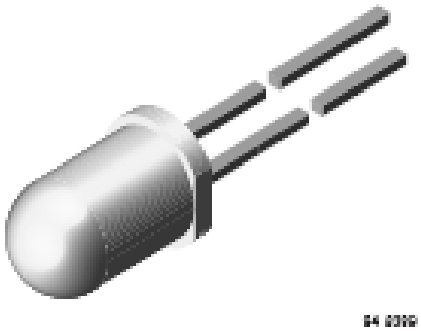


Fig 3.16 schematic of IR Tx

TSAL6200 is a high efficiency infrared emitting diode in GaAlAs on GaAs technology, molded in clear, bluegrey tinted plastic packages. In comparison with the standard GaAs on GaAs technology these emitters achieve more than 100 % radiant power improvement at a similar wavelength. The forward voltages at low current and at high pulse current roughly correspond to the low values of the standard technology. Therefore these emitters are ideally suitable as high performance replacements of standard emitters.

3.10.1.1 Features:

- Extra high radiant power and radiant intensity
- High reliability
- Low forward voltage
- Suitable for high pulse current operation

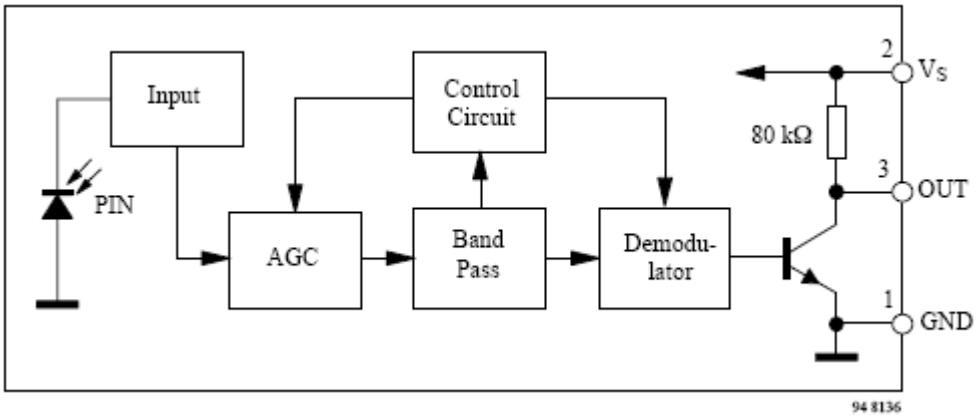
3.10.2 IR Rx:

3.10.2.1 Description:

The TSOP17.. – Series are miniaturized receivers for infrared remote control systems. PIN diode and preamplifier are assembled on lead frame, the epoxy package is designed as IR filter. The demodulated output signal can directly be decoded by a microprocessor. TSOP17XX is the standard IR remote control receiver series, supporting all major transmission codes.

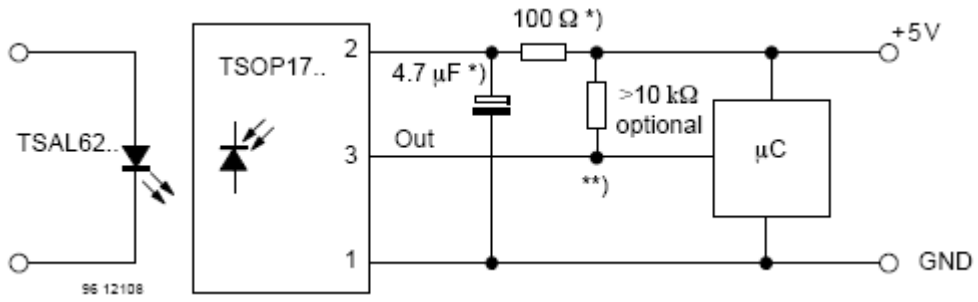
3.10.2.2 Features:

- Photo detector and preamplifier in one package
- Internal filter for PCM frequency
- Improved shielding against electrical field disturbance
- TTL and CMOS compatibility
- Output active low
- Low power consumption
- High immunity against ambient light
- Continuous data transmission possible (up to 2400 bps)
- Suitable burst length .10 cycles/burst.



Block Diagram

Application Circuit



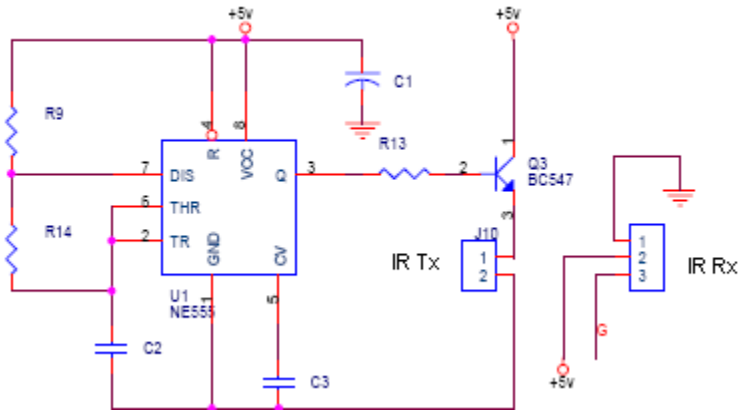
The circuit of the TSOP17.. is designed in that way that unexpected output pulses due to noise or

disturbance signals are avoided. A bandpassfilter, an integrator stage and an automatic gain control are used to suppress such disturbances. The distinguishing mark between data signal and disturbance signal are carrier frequency, burst length and duty cycle. The data signal should fullfill the following condition:

- Carrier frequency should be close to center frequency of the band pass (e.g. 38kHz).
- Burst length should be 10 cycles/burst or longer.
- After each burst which is between 10 cycles and 70 cycles a gap time of at least 14 cycles is necessary.
- For each burst which is longer than 1.8ms a corresponding gap time is necessary at some time in the data stream. This gap time should have at least same length as the burst.
- Up to 1400 short bursts per second can be received continuously.

When a disturbance signal is applied to the TSOP17.. it can still receive the data signal. However the sensitivity is reduced to that level that no unexpected pulses will occur.

The arrangement of this sensors is as shown below.



3.11 SMOKE DETECTOR:

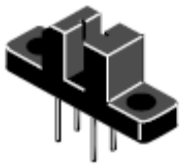


Fig 3.17 Smoke detector symbol

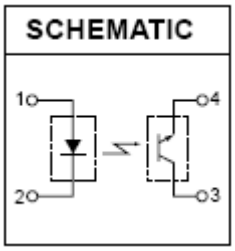


Fig 3.18 schematic of Smoke detector

3.11.1 description:

The H21A1, H21A2 and H21A3 consist of a gallium arsenide infrared emitting diode coupled with

a silicon phototransistor in a plastic housing. The packaging system is designed to optimize the mechanical resolution, coupling efficiency, ambient light rejection, cost and reliability. The gap in the housing provides a means of interrupting the signal with an opaque material, switching the output from an "ON" to an "OFF" state.

3.11.2 features:

- Opaque housing
- Low cost
- High IC (ON)

3.14 POWER SUPPLY:

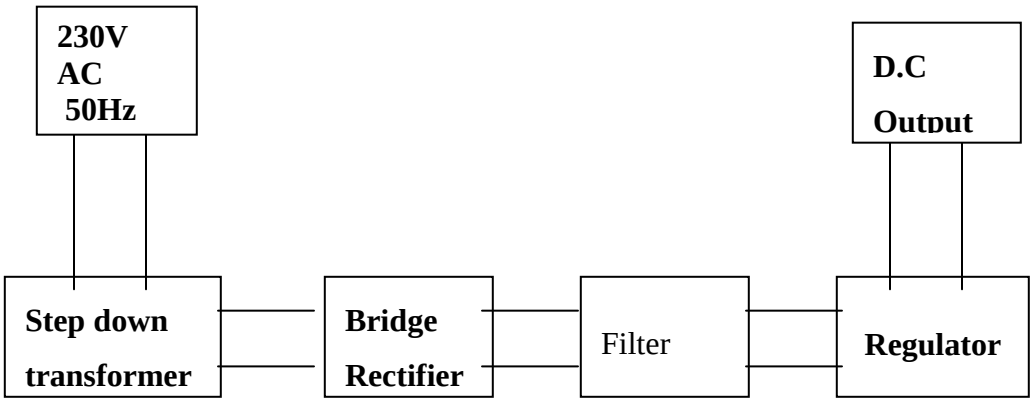


Fig 3.20 block diagram of power supply

3.14.1 Rectifier:

The output from the transformer is fed to the rectifier. It converts A.C. into pulsating D.C. The rectifier may be a half wave or a full wave rectifier. In this project, a bridge rectifier is used because of its merits like good stability and full wave rectification.

3.14.2 Filter:

Capacitive filter is used in this project. It removes the ripples from the output of rectifier and smoothens the D.C. Output received from this filter is constant until the mains voltage and load is maintained constant. However, if either of the two is varied, D.C. voltage received at this point changes. Therefore a regulator is applied at the output stage.

3.14.3 Voltage regulator:

As the name itself implies, it regulates the input applied to it. A voltage regulator is an electrical regulator designed to automatically maintain a constant voltage level. In this project, power supply of 5V and 12V are required. In order to obtain these voltage levels, 7805 and 7812 voltage regulators are to be used. The first number 78 represents positive supply and the numbers 05, 12 represent the required output voltage levels.

3.14.4 Transformer:

Usually, DC voltages are required to operate various electronic equipment and these voltages are 5V, 9V or 12V. But these voltages cannot be obtained directly. Thus the a.c input available at the mains supply i.e., 230V is to be brought down to the required voltage level. This is done by a transformer. Thus, a step down transformer is employed to decrease the voltage to a required level.

CHAPTER 4

In this chapter complete procedure, working process and software description are discussed. Complete procedure describes the circuit operation whereas working procedure deals with the real time operation of the circuit. In software description the advantages and procedure for processing the micro controller code by using Keil □vision are discussed in detail.

4.1 COMPLETE PROCEDURE:

Embedded industrial security system with auto-dialer serves the best in case of fire accidents, wall breaking, IR detction, fire detection and unauthorized access. It has a number of real time applications, which can be used at industries, Banks, Jeweler Shops, Home security, schools etc.it consists of AT89C51 microcontroller & 8 sensors.

This Project describes a design of effective security alarm system that can monitor an industry with eight different sensors. Unauthorized access, Fire accident, wall braking, IR detection, and fire detection can be monitored by the status of each individual sensor and is indicated with an LED. This LED shows whether the sensor has been activated and whether the wiring to the sensor is in order. Obviously, this burglar alarm also has an input to 'arm' the alarm, a tamper input and a couple of outputs to control a siren and Auto dialing system. The alarm is also fitted with a so-called 'panic button'.

The burglar alarm is built around the AT89C51 micro controller from Atmel. This micro controller provides all the functionality of the burglar alarm. It also takes care of filtering of the

signals at the inputs. Only after an input has remained unchanged for 30 milliseconds, is this new signal level passed on for processing by the micro controller program. This time can be varied by adopting small changes in the source code.

A maximum of 8 sensors can be connected to the burglar alarm. These sensors need to have their contacts closed when in the inactive state (i.e. Normally Closed). In addition, each sensor needs to have its tamper connection wired as well. A power supply voltage of +5 VDC is available for each sensor at the corresponding wiring terminals.

Eight LEDs indicate the status of the corresponding sensors. When the alarm has been activated, the LED of the sensor that caused the alarm will light up, or flash in the event of a cable failure. When the alarm is armed, the LED 'alarm armed' will flash during the exit-delay. After the exit-delay, the LED will light continuously. The LED 'alarm triggered LED' flashes during the entry-delay and will turn on continuously once an actual alarm has been generated. 'Alarm triggered LED' turns off only when the alarm is switched off with key switch Sw1. When an alarm has taken place, it can be determined afterwards which sensor (or tamper input) caused the alarm to trigger. The LED 'tamper' lights up when the tamper input is opened. This LED will also continue to be on until the alarm is switched off.

The uniqueness of this project is not only alerting the neighbors by siren, it also dials a mobile number, which is already programmed into the system. A mobile number or a landline number can be programmed into the system. As this system works on existing telephone line, it can dial the number even the subscriber is out of station.

This project uses regulated 5V, 500mA power supply. 7805 three terminal voltage regulator is used for voltage regulation. Bridge type full wave rectifier is used to rectify the ac out put of secondary of 230/12V step down transformer.

4.2 WORKING PROCESS:

This is a stand-alone project to provide security to industries using an advanced technology called embedded systems. In this we are providing security by taking 8 different sensors. They are namely:

1. Reed sensor
2. LED & LDR
3. Vibration Detector
4. Temperature Sensor
5. Panic Switch
6. IR Tx & IR Rx.

7. Smoke Detector

The working of all these sensors will start only when the arm key which is connected to the main board is made on.

Here we will be using Reed switches at two different places viz. At doors and at windows. When using at doors we have two conditions to be checked, they are, whether the person is leaving outside or coming inside. We call these two conditions as EXIT DELAY and ENTRY DELAY.

Exit Delay:
This case arises when the microcontroller detects that the door is opened for the first time. In this case the controller will wait for some time giving the user to close the door or to off the key. If the user closes the door within the given delay the controller will not ring the buzzer or the alarm and will wait again for another sensor to be activated. If the user can't close the door in the given time the controller will enter into the next case, which is called as the entry delay.

Entry Delay:
The controller will enter into this case if the door is opened for the second time or if the door is not closed in the exit delay. In this case the only option available with the user is to off the arm key. The controller will wait for some time giving the user to make the arm key off. If the arm key is not made off within the given time the controller will ring a buzzer continuously and go for auto-dialer by making the relays on and off for the corresponding action.
Another reed sensor is placed at the window. If the window is opened then the buzzer is activated and then the auto-dialer action is performed.
After this comes the LED & LDR section. In this we will be placing all important things in a box and place that box on the LDR such that it objects the light falling from the LED. If any one removes the box the light falls on the ldr and then the microcontroller detects it and the buzzer will be activated and then the auto-dialer.
After this comes the Vibration detector. This can be placed to the doors because it can detect the vibrations. If any one intruder wants to break the door and bangs on the door this sensor gets activated and then the alarm followed by auto-dialer.
The next sensor is Temperature sensor. This sensor gets activated only when the temperature in the room exceeds 70 degrees. This is because of the hardware connections we have made. When this sensor is activated the buzzer followed by auto-dialer is also activated.
The next one is the panic switch. This can be activated by pressing this switch, which will lead to the activation of buzzer and auto-dialer.

Next comes the IR section. This contains a IR Tx. and IR Rx. This is arranged in such a manner that the IR signal falls continuously on the IR Rx. Whenever an obstacle is passed through this pair this sensor gets activated. When this sensor is activated the alarm is on and auto-dialer is activated.

The final sensor is the Smoke detector. Internally this has a pair of IR Tx. and Rx.This sensor is activated when there is a fire accident, which results in smoke. This smoke is detected by this sensor and then the buzzer is activated followed by auto-dialer.

4.3 SOFTWARE DESCRIPTION:

4.3.1 keil software:

This software is used for execution of microcontroller programs.keil development tools for the MC architecture support every level of software developer from the professional applications engineer to the student just learning about embedded software development. The industry-standard keil C compilers, macro assemblers, debuggers, real time kernels, single-board computers and emulators support all AVR derivatives and help you to get more projects completed on schedule.

The keil software development tools are designed to solve the complex problems facing embedded software developers.

- when starting a new project,simply select the microcontroller you the device database and the □vision IDE sets all compiler,assembler,linker and memory options for you.
- numerous example programs are included to help you get started with the most popular embedded AVR devices.
- the keil□ □vision3 debugger accurately simulates on-chip peripherals(PC,CAN,UART,SPI,Interrupts,I/O ports,A/D converter,D/A converter and PWM modules) of your AVR device.simulation helps you understand H/W configurations and avoids time wasted on setup problems.Additionally,with simulation,you can write and test applications before target H/W is available.
- when you are ready to begin testing your S/W application with target H/W,use the MON51,MON390,MONADI,or flash MON51 target monitors,the ISD51insystem debugger,or the ULINK USB-JTAG adapter to download and test program code on your target system.

4.3.2 keil □vision3:

□ vision3 is IDE (Integrated Development Environment) that helps you write,compile and debug embedded program.it encapsulates the following components:

- A project manager
- A make facility
- Tool configuration
- Editor
- A powerfull debugger

4.3.3 Advantages:

New dialog for project component management under project components,environment and books that allows changing the order of project target and file groups.

- Docking windows have now a descriptive text in the navigation bar
- new configuration file for microsoft source safe6.0 added
- in some cases,projets that include user libraries were always linked even when the library was up to date.the problem was corrected.
- added listing of files include in each C source file to the project window-file tab
- added flash menu commands and configuration dialog under options for target utilities
- added ability to automatically copy start up code in to the project.creating applications in □ □vision3.

□ □vision3 includes a project manager that makes it easy to design applications for the 8051 family**.**

you need to perform the following steps to create a new project:

- start □ □vision3,create a project file and select a CPU from the device database.
- create a new source file and add this source file to the project.
- add and configure the startup code for the 8051 device.
- set tooloptions for target hardware
- build project and create a HEX file for PROM programming

4.3.4 Debugging an application in □ □vision3:

To debug an application created using □ □vision3 you must:

- select debug-start,stop debug section
- use the step tool bar buttons to single step to your program.you may enter G,main in the output window to execute in the main C function.
- open the serial window using serial #1 button on the tool bar.

- Debug your program using standard options like step,go,break,and so on.

CHAPTER 5

In this chapter we mainly discuss about the parameters used in our project,so this parameters are very useful to know about our project and plays a key role.and also mention theoretical results about our project.this theoretical results can be useful know about our project results.these are useful to compare those practical and theoretical results.

5.1 PARAMETERS USED:

In our project we use the microcontroller AT89C51 to do the operations.microcontroller is the heart of our project because we will connect all other components to microcontroller only.

- P0.0 to P0.7 is used as the data lines to LED
- P1 to sensors(Normally closed)
- P2 to LED
- P3.6 pin used for entry delay LED
- P3.7 pin is used for exit delay
- P3.4 pin is used for buzzer
- P0.0 pin is used for main door LED(Normally open)
- P2.6 pin is used for phone hook up RELAY
- P2.7 pin is used for redial RELAY
- 9^{th} pin is used for reset.
- 19^{th} and 18^{th} pins are used to connect the crystal oscillator.
- 20^{th} pin is connected to ground
- the power supply is connected to 40^{th} pin

5.2 THEORETICAL RESULT

CHAPTER 6

This chapter use an overview of the previous thesis in three sub topics.conclusion,discussion,and future scope of work.conclusion explains how the goals and requirements of the thesis are achieved.In discussions the further improvements of the thesis to previous thesis when compared to previous thesis are discussed future scope of work gives an idea about further extensions of this thesis.

6.1.DISCUSSIONS:

Here in our project we overcome the above mentioned drawbacks by using the present technology called "EMBEDDED SYSTEMS". In this we use the micro controller operated by a specified application code.

Q: Why we use microcontroller rather than the microprocessor?

Ans: Microcontroller is a computer implemented on a single Very Large Scale Integration (VLSI) chip. Device, which integrates a number of components of a microprocessor system on to a single microchip, which includes

1.CPU core

2.Memory (ROM and RAM)

3.some parallel digital I/O

some micro controllers also include

1.Timer module

2.serial I/O ports

3.ADC module

4.SCI, SPI, CAN bus interface etc

CPU is the heart of the microcontroller. It can be 8-bit, 32-bit etc.it carries out the task of decision making. It consists of ALU, control unit and registers takes instructions from memory and interpretes them. In memory place software and data are stored. here microcontroller has connects to i/o ports which are timer modules,PWM,SCI,,SPI,IIC,CAN,external memory interface etc.In this way microcontroller is additional interfacing capabilities compared with the microprocessor, so microcontroller can use.

By discussing above problems are reasons to use microcontrolleer rather than microprocessor.

Q: why we are using LEDs rather than incandescent lamps?

Ans: Unlike conventional incandescent lamps which need to convert the electricity into thermal energy first and then to light, LED illumination is achieved when a semiconductor crystal is activated so that it directly produces visible light in a desired wavelength range. With the continuous development of lighting technologies, more possible future applications of LEDs will

be seen. Advantages of using LEDs are to be discussed as follows:

1. Long Life Span:

The lifetime of conventional incandescent lamps is usually 3,000~4,000 hours. The ETTF (Estimated Time To Failure) of a LED is as long as 100,000 hours, which is much longer than that of incandescent lamps. Suppose we let a LED work four hours a day, we may have it work for us for more than 60 years.

2. Energy saving and Low Cost:

Generally speaking, LEDs are designed to operate only with 12~24V, and LEDs produce more light per watt than incandescent bulbs. High efficacy with low voltage makes LEDs easily over-take that of conventional incandescent lamps, consuming 80% less electrical power. Although High-Brightness single-color LEDs are more expensive than conventional incandescent lamps at present, they save much more electrical power, which can offset the price gap. Suppose a LED requires 15W to reach a certain luminance; for a conventional incandescent lamp, to reach the same level of luminance, it may require up to 150W.

3. Far More Environmentally Friendly:

Unlike incandescent bulbs and fluorescent lamps, LEDs emit light in a different way. LEDs needn't a filament that will burn out, and they don't get especially hot, and no venomous gas will be yielded. Being solid-state components, LEDs are difficult to damage with eternal shock. They are illuminated solely by the movement of electrons in a semiconductor material, and they last just as long as a standard transistor.

4. Good Environmental Adaptability:

LEDs operate well in a large range of temperatures, -40℃~+85℃, with the humidity below 65%. So LEDs can be used in relatively harsh environment.

5. A Variety of Application:

LEDs have advanced from use in numeric displays and indicator lights to a range of new and potential new applications, including architectural lights, exit signs, accent lights, task lights, traffic lights, signage, cove lighting, wall sconces, outdoor lighting and down lighting, etc.

Q: what are the advantages of embedded based industrial security system with auto-dialer compared to the previous implementations?

Ans: "embedded based industrial security system with auto-dialer" have some advantage when compared to the previous implementations. They are discussed as follows:

The industrial security system is previously implemented by using DTMF technology phones and using GSM Modem which is used to send and receive messages with a computer.it is very cost.

This thesis provides security in case of Unauthorized access, Fire accident, wall braking, IR detection, and fire detection can be monitored by the status of each individual sensor and is indicated with an LED.so by this all the components in the system are effectively and efficiently used that is these all securities are provided at almost the same cost.

An IR pair is used to ensure the occurance of intrusion.so that any kind of intrusions can be detected.

6.2CONCLUSION:

We conclude that we have 100% successfully fulfilled our project and we have confidence that our project will provide full security for Industries, Banks, Jeweler Shops, Homes. It is most advantageous as compared to other alternatives available for providing security since it is an integrated system, which covers every section of an industry. And this can be used by any industry or bank or institutions Where security plays an important role with low cost and with many Advantages. For the developing countries like India industries or banks are playing Important role in economic aspects. The system is simple, secure, reliable and fast. It can be operated by anyone who knows nothing about its software and effective.

So, our project will help a lot in industry, banks etc. for its security and Alertness. We will still develop and extend our project to maximum level to safegaurd the industry and extend the service with good response.

6.3 FUTURE SCOPE:

- A relay contact may be used to operate a camera when it detects an intruder which helps in finding the intruder's identity easily.
- As the system is flexible to dial any previously stored number, this system can be used in any places wherever security is needed like industries, banks, houses, and shopes.
- A more advancement can be brought to the system using the computer control, so the entire process can be analyzed effectively

- By adding LCD display and with slight changes, we can update information, which was dumped in microcontroller.
- **I**nstead of the 1K emitters and detectors FM transmission can be used for long distances.
- Entry faces identification with web camera .