Super Sensitive Industrial Security System With 60db Loud Siren And Monitoring Over GSM

Rambhoopal Reddy B, Associate Professor,   Mr. M. Ramesh, Associate Professor

Nallavelly Sowmya, Shrungare Rohan, Kandikonda Ganesh, Kappari Shirisha,

Department of Electronics and Communication Engineering

AVN Institute of Engineering and technology

Abstract— Security is primary concern for everyone. This Project describes a design of effective security alarm system that can monitor home with eight different sensors. Unauthorized access, Fire accident, wall braking, 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. The alarm is also fitted with a so-called 'panic button'. The burglar alarm is built around the ATMEGA328 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, 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.

Keywords/ Index Term: HOME Security, Auto-dialer, Siren ATMEGA 328 microcontroller, sensors etc.

I.   INTODUCTION

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.[1]] Bhagyshree Waghmare Department of Computer Engineering, International Institute of InformationTechnology,une.waghmarebhagyshree2@gmail.com Saurabh Bidkar Department of Computer Engineering, International Institute of Information Technology, Pune. idkar08@gmail.com Manoj Ubale Department of Computer Engineering, International Institute of Information Technology, Pune. manojubale7282@gmail.com Madhuri Harane Department of Computer Engineering, International Institute of Information Technology, Pune. madhuriharane95@gmail.com 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. This microcontroller 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. 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.[3] HOME security is the most significant one

for every area either in an individual. This 8051 microcontroller Bases HOME security system can be used to provide security system for residential, industrial, and for all domestic and commercial purposes using auto dialer technique. Security systems are certain electronic devices which areused to detect intrusions in home or .The basic components of this automation security system are Magnetic sensor, IR sensor, LDR, Panic switch LPG, Temp slot sensor. It is cheaper and can be maintained easily than any other security device. 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. [4] 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.

II.   SYSTEM CONFIGURATION

Every embedded system consists of custom-built hardware built around a Central Processing Unit (CPU). This hardware also contains memory chips onto which the software is loaded. The software residing on the memory chip is also called the 'firmware'. The embedded system architecture can be represented as a layered architecture as shown in Fig. The operating system runs above the hardware, and the application software runs above the operating system. The same architecture is applicable to any computer including a desktop computer. However, there are significant differences. It is not compulsory to have anoperating system in every embedded system. For small appliances such as remote control units, air conditioners, toys etc., there is no need *for* an operating system and you can write only the software specific to that application. For applications involving complex processing, it is advisable to have an operating system. In such a case, you need to integrate the application software with the operating system and then transfer the entire software on to the memory chip. Once the software is transferred to the memory chip, the software will continue to run *for* a long time you don't need to reload new software.

Now, let us see the details of the various building blocks of the hardware of an embedded system. As shown in Fig. the building blocks are;
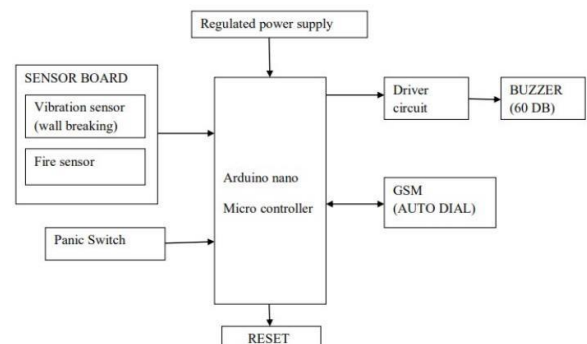
Central Processing Unit (CPU)
· Memory (Read-only Memory and RandomAccess Memory)Input Devices
· Output devices
· Communication interfaces
· Application-specific circuitry

III.   DESIGN OF THE PROPOSED SYSTEM

REQUIRED MODULES:
1) RPS
2) ARDUINO NANO CONTROLLER
3) 60 DB SIREN
4) PANIC SWITCH
5) SENSOR BOARD
6) GSM

A.   REGULATED POWER SUPPLY

The power supply section is the section which provide +5V for the components to work. IC LM7805 is used for providing a constant power of +5V.The ac voltage, typically 220V, is connected to a transformer, which steps down that ac voltage down to the level of the desired dc output. A diode rectifier then provides a full-wave rectified voltage that is initially filtered by a simple capacitor filter to produce a dc voltage. This resulting dc voltage usually has some ripple or ac voltage variation. A regulator circuit removes the ripples and also retains the same dc value even if the input dc voltage varies, or the load connected to the output dc voltage changes. This voltage regulation is usually obtained using one of the popular voltage regulator IC units. The Arduino Nano can be powered via the Mini- B USB connection, 6 -20V unregulated

external power supply (pin 30), or 5V regulated external power supply (pin 27). The power source is automatically selected to the highest voltage source.

B.   ARDUINO NANO BOARD

The Arduino Nano is a small, complete, and breadboard-friendly board based on the ATmega328P (Arduino Nano 3.x). It has more or less the same functionality of the Arduino Duemilanove, but in a different package. It lacks only a DC power jack, and works with a Mini- B USB cable instead of a standard one.

The Nano board is the first in a series of USB Arduino boards, and the reference model for the Arduino platform; for an extensive list of current, past or outdated boards see the Arduino index of boards.

C.   PANIC SWITCH

A **panic alarm** is an electronic device that can easily be activated to request help during an emergency situation where danger to persons orproperty exists. It is designed to minimize time untilassistance can arrive. [1]

A panic alarm is frequently but not always controlled by a concealed **panic alarm button**. These buttons can be connected to a monitoring center or locally via a silent alarm or an audible bell/siren. The alarm can be used to request emergency assistance from local security, police or emergency services. Some systems can also activate closed-circuit television to record or assess the event.[2]

Many panic alarm buttons lock on when pressed, and require a key to reset them. Others may have a short delay during which time the request of help can be cancelled.

D.   BUZZER

A buzzer or beeper is a signaling device, usually electronic, typically used in automobiles, house hold appliances such as a microwave oven, or game shows.

It most commonly consists of a number of switches or sensors connected to a control unit that determines if and which button was pushed or a preset time has lapsed, and usually illuminates a light on the appropriate button or control panel, and sounds a warning in the form of a continuous or intermittent buzzing or beeping sound. Initially this device was based on an electromechanical system which was identical to an electric bell without the metal gong (which makes the ringing noise). Often these units were anchored to a wall or ceiling and used the ceiling or wall as a sounding board. Anotherimplementation with some AC-connected devices was to implement a circuit to make the AC current into a noise loud enough to drive a loudspeaker and hook this circuit up to a cheap 8-ohm speaker. Nowadays, it is more popular to use a ceramic-basedpiezoelectric sounder like a Sonalert which makes ahigh-pitched tone. Usually these were hooked up to"driver" circuits which varied the pitch of the soundor pulsed the sound on and off.

E.   PIN DESCRIPTION

- **Arduino Nano Pinout** contains 14 digital pins, 8 analog Pins, 2 Reset Pins & 6 Power Pins.

- Each of these Digital & Analog Pins are assigned with multiple functions but their main function is to be configured as input or output.

- They are acted as input pins when they are interfaced with sensors, but if you are driving some load then use them as output.

- Functions like pinMode() and digitalWrite() are used to control theoperations of digital pins while analogRead() is used to control analog pins.

- The analog pins come with a total resolution of 10bits which measure the value from zero to 5V.

- Arduino Nano comes with a crystal oscillator of frequency 16 MHz. It is used to produce a clock of precise frequency using constant voltage.

- There is one limitation using Arduino Nano i.e. it doesn't come with DC power jack, means you can not supply external power source through a battery.

- This board doesn't use standard USB for connection with a computer, instead, it comes with Mini USB support.

- Tiny size and breadboard friendly nature make this device an ideal choice for most of the applications where a size of the electronic components are of great concern.

- Flash memory is 16KB or 32KB that all depends on the Atmega board i.e Atmega168 comes with 16KB of flash memory while Atmega328 comes with a flash memory of 32KB. Flash memory is used for storing code. The 2KB of memory out of total flash memory is used for a bootloader.

- The SRAM can vary from 1KB or 2KB and EEPROM is 512 bytes or 1KB for Atmega168and Atmega328 respectively.

- This board is quite similar to other Arduino boards available in the market, but the small size makes this board stand out from others.

- It is programmed using Arduino IDE which is an Integrated Development Environment that runs both offline and online.

- No prior arrangements are required to run the board. All you need is board, mini USB cable and Arduino IDE software installed on the computer. USB cable is used to transfer the program from computer to the board.

- No separate burner is required to compile and burn the program as this board comes with a built-in boot-loader.

- Each pin on the Nano board comes with a specific function associated with it.

- We can see the analog pins that can be used as an analog to digital converter where A4 and A5 pins can also be used for I2C communication. Similarly, there are 14 digital pins, out of which 6 pins are used for generating PWM.

- **3.3V:** This is a minimum voltage generated by the voltage regulator on the board.

- **GND:** These are the ground pins on the board. There are multiple ground pins on the board that can be interfaced accordingly when more than one ground pin is required.

- **Reset:** Reset pin is added on the board that resets the board. It is very helpful when running program goes too complex and hangs up the board. LOW value to the reset pin will reset the controller.

- **Analog Pins:** There are 8 analog pins on the board marked as A0 – A7. These pins are used to measure the analog voltage ranging between 0 t 5V.

- **Rx, Tx:** These pins are used for serial communication where Tx represents the transmission of data while Rx represents the data receiver.

- **13:** This pin is used to turn on the built-in LED.

- **AREF:** This pin is used as a reference voltage for the input voltage.

- **PWM:** Six pins 3,5,6,9,10, 11 can be used for providing 8-pit PWM (Pulse Width Modulation) output. It is a method used for getting analog results with digital sources.

- **SPI:** Four pins10(SS),11(MOSI),12(MISO), 13(SCK) are used for SPI (Serial Peripheral Interface). SPI is an interface bus and mainly used to transfer data between microcontrollers and other peripherals like sensors, registers,

and SD card.

- **External Interrupts:** Pin 2 and 3 are used asexternal interrupts which are used in case of

emergency when we need to stop the main program and call important instructions at thatpoint. The main program resumes once interrupt instruction is called and executed.

- **I2C:** I2C communication is developed using A4 and A5 pins where A4 represents the serialdata line (SDA) which carries the data and A5represents the serial clock line (SCL) which isa clock signal, generated by the master device, used for data synchronization between the devices on an I2C bus.

- **RESET:** There are two ways to reset the board i.e. electronically or programmatically.In order to reset the board electronically, youneed to connect the reset pin of the board withany of digital pins on the controller. Don'tforget to add 1K or 2K Ohm resistor whilesetting up this connection. Now, use the digitalpin as an output and keep it HIGH before thereset. Once the reset is required, set this digitalpin to LOW. This method is very usefulbecause using it sends a hardware reset signalto the controller once the digital pin is set toLOW.

- You can use the following program to reset the controller electronically.Another method we can use to reset the board is by software only without using any hardware pin. Nano board comes with a built-in function known as resetFunc(). The board will reset automatically as we define this function and then call it. Without using any hardware pin you can upload the following program to resetthe board programmatically.

- However, this method comes with some limitations. Once the board is connected to the computer, the board will be reset each time the connection is laid out between the board and the computer. So, it is preferred to reset the controller electronically using a digital pin.

F.   GSM MODEM

Global System for Mobile communications) is an open, digital cellular technology used for transmitting mobile voice and data services.

GSM supports voice calls and data transfer speeds of up to 9.6 kbit/s, together with the transmission of SMS (Short Message Service).
GSM operates in the 900MHz and 1.8GHz bands in Europe and the 1.9GHz and 850MHz bands in the US. The 850MHz band is also used for GSM and 3G in Australia, Canada and many South American countries. By having harmonised spectrum across most of the globe, GSM's international roaming capability allows users to access the same services when travelling abroad as at home. This gives

consumers seamless and same number connectivity in more than 218 countries.
Terrestrial GSM networks now cover more than 80% of the world's population. GSM satellite roaming has also extended service access to areas where terrestrial coverage is not available.

IV.   WORKING METHOD

Super sensitive home security system is mainly depends on controller used i.e.ATEMGA 328P.To sense the condition, we are using sensors which arerelated to our security. Eight LEDs indicate the status of the corresponding sensors. When any security constraints get break, then alarm will be blow. 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. After the exit- delay, the LED will light continuously. The 'Alarmtriggered 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 switchSw1. When an alarm has taken place, it can be determined afterwards which sensor (or tamper input) caused the alarm to trigger is only because of LED connected to that sensor. This LED will also continue to be on until the alarm is switched off.

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

V.   APPLICATIONS

Arduino Nano is a very useful device that comes with a wide range of applications and coversless space as compared

to other Arduino board.Breadboard friendly nature makes it stand out from other board. Following are the main applications of the board.

- Arduino Metal Detector
- Medical Instruments
- Industrial Automation
- Android Applications
- GSM Based Projects
- Automation and Robotics
- Home Automation and Defense Systems

VI.   Virtual Reality ApplicationsHISTORY

In 1980's the analog cellular telephone systems were growing rapidly all throughout Europe, France and Germany. Each country defined its own protocols and frequencies to work on. For example UK used the Total Access Communication System (TACS), USA used the AMPS technology and Germany usedthe C-netz technology. None of these systems were interoperable and also they were analog in nature.In 1982 the Conference of European Posts and Telegraphs (CEPT) formed a study group called theGROUPE SPECIAL MOBILE (GSM) The main
area this focused on was to get the cellular system working throughout the world, and ISDN compatibility with the ability to incorporate any future enhancements. In 1989 the GSM transferred the work to the European Telecommunications Standards Institute (ETSI.) the ETS defined all the standards used in GSM.

VII.   CONCLUSION AND FUTURESCOPE

In the general sense, security is a concept similar to safety. Individuals or actions that encroach upon the condition of protection are responsible for the breach of security. As safety is priority for everyone,this system is useful for every individual. Hence by using this system home will be secure and safe from all

danger. Various future enhancements can be given to the proposed security system. Additionally the Person Identification Function (PIDF) can be executed by utilizing remote camera which makes utilization of the Wi-Fi innovation. The camera can be set outside the house and the confirmation can be given by mindful individual.

VIII.   ACKNOWLEDGEMENT

IX.   REFERENCES

[1] M.Sravan Kumar, M.Mounika, L.Ramya Pavani, E.Ranadeep, B. Siddhartha, K.B.V.S.R. Subramanyam" GSM BASED industrial SECURITY SYSTEM ." ISSN (PRINT): 2393-8374, (ONLINE): 2394-0697, VOLUME-2, ISSUE- 5, 2015 .