

## Bank Security System by Using Wireless Sensor with Arm7



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### Abstract:

The Bank Monitoring system consists of IR Sensors, LCD, GSM Module. The IR Sensors helps to maintain the track of the number of persons entering and exiting the bank a switch is used trigger an emergency status at the bank, the microcontroller continuously monitors the incoming and outgoing persons from the bank and displays on LCD. Along with this depending upon the customers inside the bank we can maintain the number of persons inside the bank. With the help of DC motor & sensors When robbery occurs at bank, the piezoelectric sensor sends a message with the help of GSM to the Head Office & closes the doors. Day/night mode is sensed using LDR to activate the sensors. IR sensors are activated in day time and Piezo sensor is activated in night time only.

### Introduction:

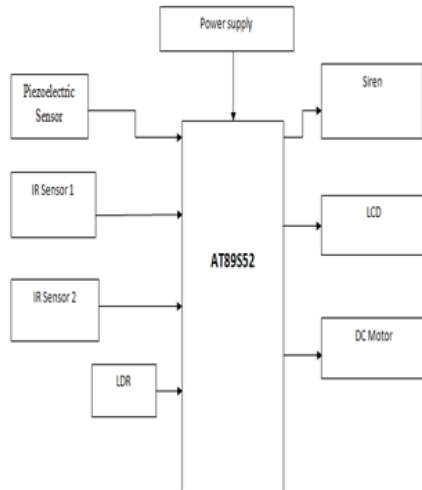
In the current existing projects of bank automation and monitoring systems, uses traditional methods of automation such as manual operation of switches, wired communication interfaces, manually control of persons entering and exiting from the bank etc. these features can lag a bank from the other in sophisticated IT Services. As mentioned above a bank with lag in sophistication and unsatisfied customer response experiences a considerable decrease in its business activities. Hence to maintain the customer satisfaction and earn good returns banks should be automated with latest trends in IT sectors.



### Existing Method:

The IR Sensors counts of the number of persons entering and exiting the bank a switch is used trigger an emergency status at the bank, the microcontroller continuously monitors the incoming and outgoing persons from the bank and displays on LCD. When robbery occurs at bank, the piezoelectric sensors gets activated and a siren alert will be given to intimate neighbors. Day/night mode is sensed using LDR to activate the sensors. IR sensors are activated in day time and Piezo sensor is activated in night time.

Block Diagram:-



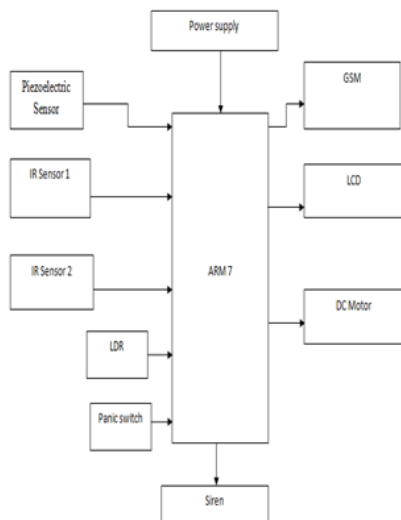
**Drawback:**

There is no remote alert using any wireless network.

**Proposed Method:**

The current project discusses the trends in the technology that tends to provide automatic quick and automatic response. Whenever an emergency condition is issued the microcontroller stops monitoring the IR Sensors and forwards a SMS to the GSM intimating an emergency status at the bank. The message on the other hand is received by the Main Head Office and performs suitable actions.

Block Diagram:-



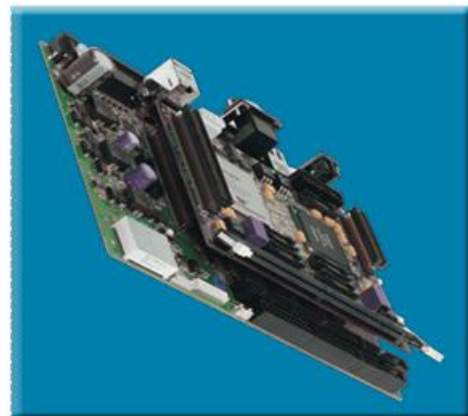
**Brief Description:**

The Bank Monitoring system consists of IR Sensors, LCD , GSM Module. The IR Sensors helps to maintain the track of the number of persons entering and exiting the bank a switch is used trigger an emergency status at the bank, the microcontroller continuously monitors the incoming and outgoing persons from the bank and displays on LCD. When robbery occurs at bank, the piezoelectric sensors sends a message with the help of GSM to the Head Office & closes the doors. Day/night mode is sensed using LDR to activate the sensors. IR sensors are activated in day time and Piezo sensor is activated in night time.

**Modules used in this project**

**ARM7TDMI Processor Core:**

- Current low-end ARM core for applications like digital mobile phones
- TDMI
  - T: Thumb, 16-bit compressed instruction set
  - D: on-chip Debug support, enabling the processor to halt in response to a debug request
  - M: enhanced Multiplier, yield a full 64-bit result, high performance
  - I: Embedded ICE hardware
- Von Neumann architecture.



**GSM**

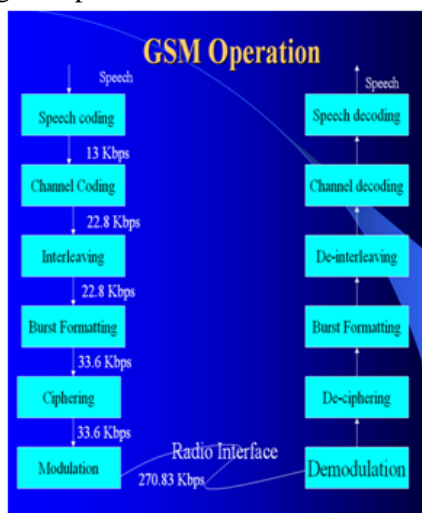
**Definition:**

GSM, which stands for Global System for Mobile communications, reigns (important) as the world's most widely used cell phone technology. Cell phones use a cell phone service carrier's GSM network by searching for cell phone towers in the nearby area.

Global system for mobile communication (GSM) is a globally accepted standard for digital cellular communication. GSM is the name of a standardization group established in 1982 to create a common European mobile telephone standard that would formulate specifications for a pan-European mobile cellular radio system operating at 900 MHz. It is estimated that many countries outside of Europe will join the GSM partnership.

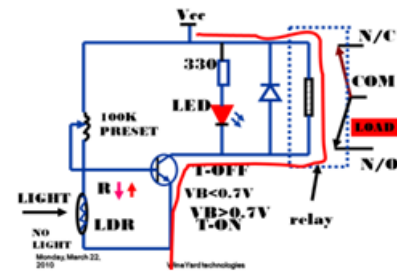
### General Features:

- Tri-band GSM/GPRS900/1800/1900Mhz
- GPRS multi-slot class 10
- GPRS mobile station class B
- Complaint to GSM phase 2/2+
  - class 4(2W @900MHz)
  - class 1(1W @/18001900MHz)
- Dimensions: 40x33x2.85 mm
- Weight: 8gm
- 7. Control via AT commands
- (GSM 07.07, 07.05 and SIMCOM enhanced AT commands)
- SIM application tool kit
- supply voltage range 3.5.....4.5 v
- Low power consumption
- Normal operation temperature: -20 °C to +55 °C
- Restricted operation temperature : -20 °C to -25 °C and +55 °C to +70 °C
- storage temperature: -40 °C to +80 °C



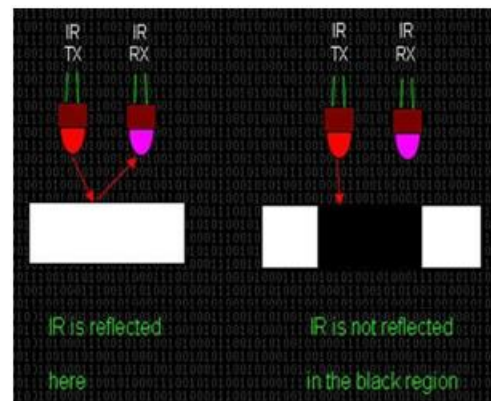
### LDR:

An LDR is an input transducer (sensor) which converts brightness (light) to resistance. It is made from cadmium sulphide (CdS) and the resistance decreases as the brightness of light falling on the LDR increases.



### IR Sensor:

IR reflectance sensors contain a matched infrared transmitter and infrared receiver pair. These devices work by measuring the amount of light that is reflected into the receiver. Because the receiver also responds to ambient light, the device works best when well shielded from ambient light, and when the distance between the sensor and the reflective surface is small (less than 5mm).



### Piezoelectric Sensor (Vibration Sensor):

Piezoceramic buzzers generate sound through the bending vibrations of a thin metal plate adhered to a piezoceramic disc. These buzzers feature low power consumption, a safe, spark-free and non-contact structure, and a small size and light weight 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. To produce high-quality

piezoceramic buzzers, FDK has capitalized on many years of piezoceramics production and outstanding ceramic processing technologies and thin film forming techniques. We will be placing it at the door so that a small vibration at the door also can be detected.



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

**Working:**

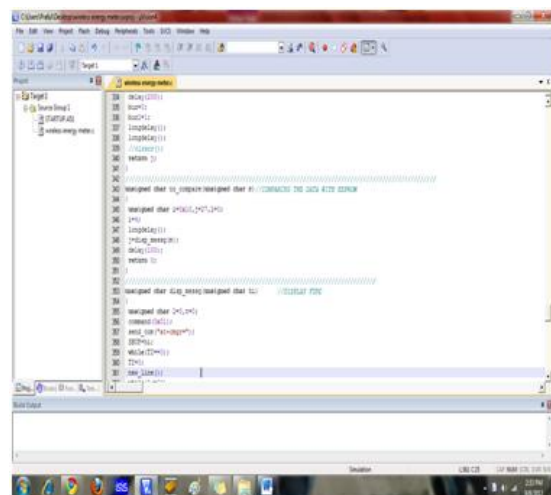
In my project first of all step down transformer will make a conversion from 230V to 18V and bridge rectifier receives this 18V and sends a pure DC to filters from AC current. Filter reduces a remained AC current and then pure DC sends to voltage regulators like 5V for LPC 2148 & 3.3V to ARM controller. So totally the controller will get the power supply by the above process. Here in order to work ARM controller it should get 60MHz frequency from crystal oscillator, but this crystal oscillator we can get only 12MHz so that here by using phased locked loop we can supply 60MHz frequency to the ARM processor. By using IR sensors we can calculate number of persons entering into bank & number of persons existing from bank. Here IR sensors have receiver, transmitter and triple for timer to send an information to LPC 2148 and then it will visible on LCD display. Here that we are using GSM, Piezoelectric sensor as the modules in this project. When the bank attacked by the robbery at the day time then the panic switch inside the bank can pressed by the head.

Then the main doors of the bank will close automatically and a siren will attached at the outside of the bank it will activate automatically and through GSM an SMS sends to the main head of bank who is at

outside, so we can take a particular action from outside. If it is a night time there is no chance of employees inside the bank to press panic switch, so that when the thieves are attempts to lockers inside the bank in those lockers there is a piezoelectric sensor which is a vibration sensor by activating this the main doors will closes automatically. Here for closing the main doors of bank I am using H-Bridge because of applying high voltage to the door. In GSM first of all we have to enroll our head mobile number into that serial communication. This is main working process of Bank Security System.

**Software Tools:**

Keil compiler is a software used where the machine language code is written and compiled. After compilation, the machine source code is converted into hex code which is to be dumped into the microcontroller for further processing. Keil compiler also supports C language code.

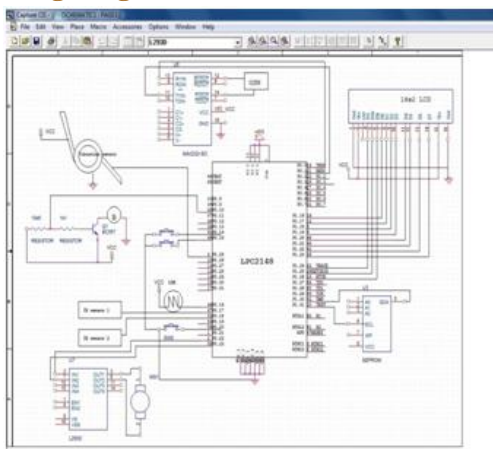


**Flash Magic:**

Flash Magic is a tool which is used to program hex code in EEPROM of micro-controller. It is a freeware tool. It only supports the micro-controller of Philips and NXP. It can burn a hex code into that controller which supports ISP (in system programming) feature. Flash magic supports several chips like ARM Cortex M0, M3, M4, ARM7 and 8051.



**Interfacing Diagram**



**Advantages:**

- 1) Sophisticated security
- 2) Monitors all hazards and threats
- 3) Alert message to mobile phone for remote information
- 4) Mobile number can be changed at any time

**Applications:**

- 1) Banks
- 2) Offices
- 3) Industries
- 4) Jeweler Shops and Home Applications

**RESULT:**

By this project we are getting an alert from Bank if it was attacked by any robbery at day or night mode. By enrolling a particular head mobile number into this process, If it is day time robbery then getting an alert SMS as “Alert! Panic Switch detected” when the manager pressed the panic switch inside the bank, similarly at night mode “Alert! robbery attacked” when the Piezoelectric sensor activated by getting a

vibration inside the lockers of the bank. According to that we can take a suitable actions for that situation. And we can calculate the number of persons entering and existing in the bank by using the IR sensors. Totally by this we can calculate how many persons are visited the bank per a day



**CONCLUSION:**

In this project work, we have studied and implemented a complete working model using a Microcontroller. The programming and interfacing of microcontroller has been mastered during the implementation. This work includes the study of GSM modem using sensors.

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