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GSM BASED ATM SECURITY SYSTEM WITH GPS

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Abstract – *This project deals with prevention of ATM theft from robbery. Whenever robbery occurs, vibration sensor is used here which senses vibration produced from ATM machine. When someone tries to stealing the money from the ATM machine by destroying the machine then the vibration sensor will sense the vibration produce from ATM machine, microcontroller will get an interrupt and then GSM modem sends the alert messages continuously to the nearest police station. They receives the alert messages that will indicate there robbery is going on in particular area, then the police force can easily track the address of that place using GPS and they will immediately reach there to handle the situation and they will catch the robbers as early as possible.*

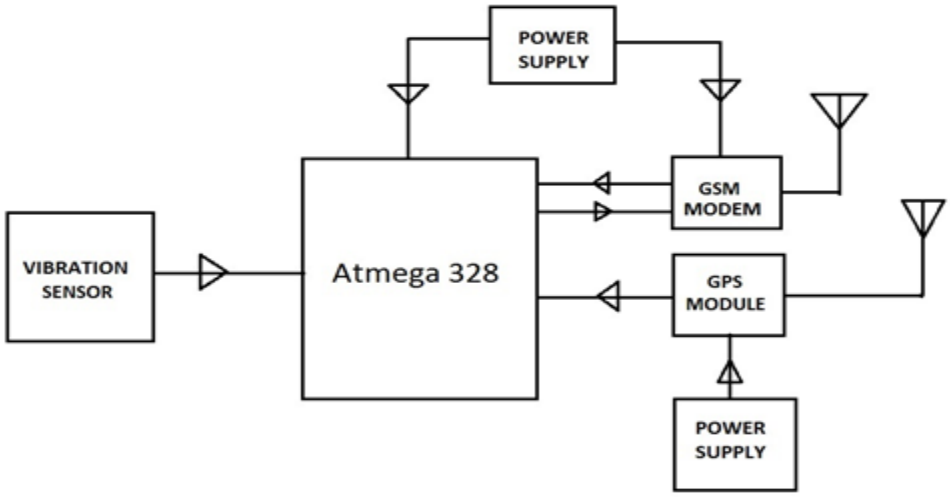
***Key Words**: Atmega 328, GSM modem, GPS module, Piezoelectric Sensor, LCD.*

1. INTRODUCTION

Automated Teller Machine (ATM) now a days extensively used all over the world for the withdrawal of the cash. A unique card is issued for each user along with the unique code provided to him so as to the person can do all his transactions a personally without knowing anyone. Since transactions are extensively secured but the cash of the ATM is not fully secured. The ATM center already has the basic security features like security guards, CCTV cameras, etc. But there are many ATM robberies are still happening in our country. So it very necessary to have a more security to the machine.

This project deals with the prevention of AM theft from robbery. So to overcome the drawback found in existing technology. We add some extra security features i.e. whenever robbery will occur, then this system will immediately sends the alert to the authorized person i.e. the nearest police station. So instantly the police force can trace the exact location of that place through the GPS which is attached in the machine and they will catch the robbers.

1.1 Block Diagram



1.2 Working

The project uses a GSM modem duly interfaced to the Arduino. Upon a missed call to the GSM modem, the caller's number will get store in the arduino for further communication to the number only. This gives the unique flexibility of changing number by the user at will without going through the cumbersome process of writing the number while burning the program on to the arduino. Thus in that case only that number can use for communication and the user has no option to change that. When the ATM is hit by any person, the vibration sensor sense those vibrations produced from the ATM and at specific range of force it will generate the voltage level and will give as interrupt to the arduino, then the arduino will send interrupt to the GSM modem, so GSM modem will immediately send the alert message to the authorize person. Hence

that authorize person can easily track the address of that place by using the GPS location which is attached in the system. By the GPS module the exact location of that place can be easily trace hence the situation will handle.

2. COMPONENNTS

1. ARDUINO NANO (Atmega 328)
2. GSM MODEM
3. GPS MODULE
4. PIEZOELECTRIC SENSOR
5. LCD

2.1 ATMEGA 328

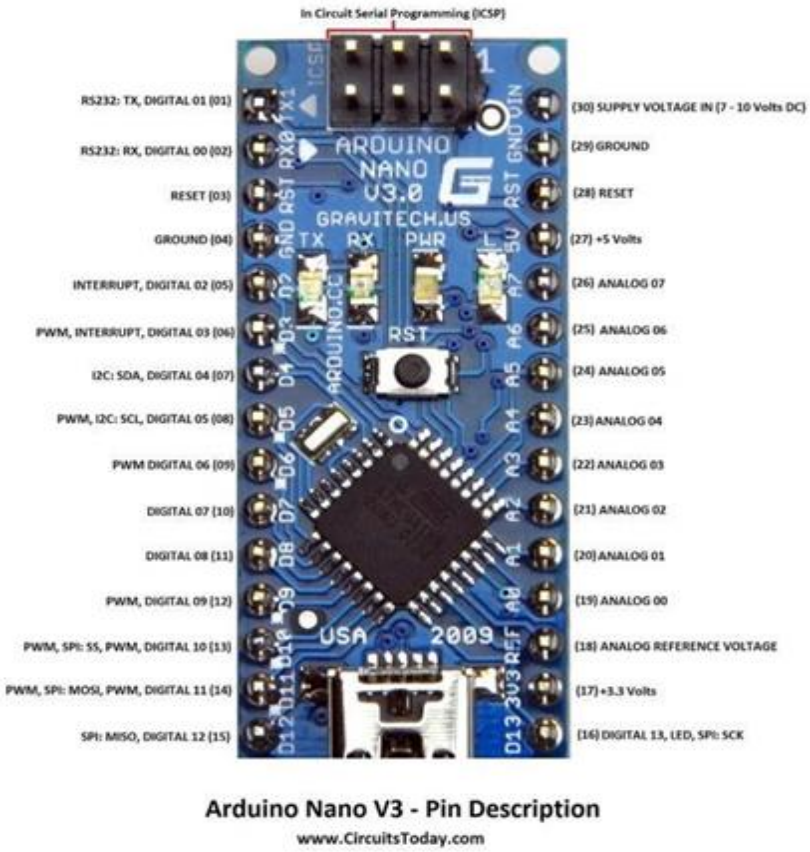


Fig -2.1: Atmega 328

FEATURES

- It has 22 input/output pins in total.
- 14 of these pins are digital pins.
- Arduino Nano has 8 analogue pins.
- It has 6 PWM pins among the digital pins.
- It has a crystal oscillator of 16MHz.
- It's operating voltage varies from 5V to 12V.
- It also supports different ways of communication,

Which are:

- ✓ Serial Protocol.
- ✓ I2C Protocol.
- ✓ SPI Protocol.
- It also has a mini USB Pin which is used to upload
- code.
- It also has a Reset button on it.

PIN CONFIGURATION

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	**Vin:** Input voltage to Arduino when using an external power source (6-12V). **5V:** Regulated power supply used to power microcontroller and other components on the board. **3.3V:** 3.3V supply generated by on- board voltage regulator. Maximum current draw is 50mA. **GND:** Ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A7	Used to measure analog voltage in the range of 0-5V
Input/Output Pins	Digital Pins D0 - D13	Can be used as input or output pins. 0V (low) and5V (high)
Serial	Rx, Tx	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10(SS),11(MOSI), 12(MISO)and13(SCK)	Used for SPI communication.
Inbuilt LED	**13**	To turn on the inbuilt LED.
IIC AREF	A4(SDA), A5(SCA) AREF	Used for TWI communication. To provide reference voltage for input voltage.

2.2 GSM MODEM

Fig -2.2: GSM SIM 900

GSM (Global System for Mobile Communication) is the most popular standard for mobile telephony systems in the world. GSM is used by over 1.5 billion people across more than 212 countries and territories. Its ubiquity enables international roaming arrangements between mobile network operators, providing subscribers the use of their phones in many parts of the world. GSM differs from its predecessor technologies in that both signaling and speech channels are digital, and thus GSM considered a second generation (2G) mobile phone system.

This is also facilitates the wide-spread implementation of data communication applications into the system. GSM also pioneered low-cost implementation of the short message service (SMS), also called text messaging, which has since been supported on other mobile phone standards as well. The standard includes a world-wide emergency telephone number feature. GSM is a cellular network, which means that mobile phones connect to it by searching for cells in the immediate vicinity. There are five different cell sizes in a GSM network macro, micro, pico, fento and umbrella cells. The coverage area of each cell varies according to the implementation environment.

2.3 GPS MODULE (SIM 28)

Fig -2.3: GPS MODULE

Features

- Support EASY self-generated orbit prediction
- Support SBAS ranging (WAAS, EGNOS, GAGAN MSAS)
- Support EPO orbit prediction
- Power supply 2.9V~3.6V
- Backup power 3.0Vtypical
- Power consumption
  - Acquisition: 23 Ma
  - Tracking: 17mA
  - Always Locate 3 mW
- Antenna type Active and Passive

2.4 PIEZO ELECTRIC SENSOR

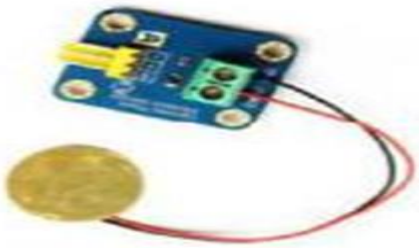


Fig -2.4: Piezoelectric sensor

A piezoelectric sensor is a device that uses the piezoelectric effect to measure changes in pressure, acceleration, temperature, strain or force by converting them to an electrical charge. It has very high DC output impedance and can be model as a proportional voltage source and filter network. The voltage V at the source is directly proportional to the applied force.

Principle	Strain Sensitivity [V/με]	Threshold [με]	Span to threshold ratio
Piezo electric	5.0	0.00001	100,000,000
Piezo resistive	0.0001	0.0001	2,500,000
Inductive	0.001	0.0005	2,000,000
Capacitive	0.005	0.0001	750,000
Resistive	0.000005	0.01	50,000

2.5 LIQUID CRYSTAL DISPLAY (LCD)

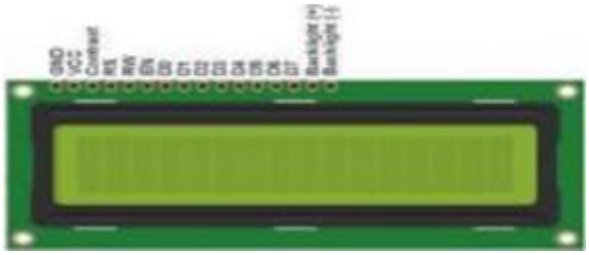


Fig -2.5: LCD

Pin Configuration:-

- **VSS (Ground):** Ground pin connected to system ground.
- **VCC (+5 Volt):** Powers the LCD with +5V (4.7V – 5.3V).
- **VEE (Contrast V):** Decides the contrast level of the display. Ground to get maximum contrast.
- **Register Select (RS):** Connected to Microcontroller to shit between command/data register.
- **Read/Write (RW):** Used to read or write data. Normally grounds to write data to LCD.
- **Enable (EN):** Connected to Microcontroller Pin and toggled between 1 and 0 for data acknowledgement.
- **D0-D7:** Data pins 0 to 7 forms A 8-bit data line. They can be connected to Microcontroller to send bit data. These LCD's can also operate on 4-bit mode in such case Data pin 4,5,6 and 7 will left free.
- **LED Positive:** Backlight LED pin positive terminal.
- **LED Negative:** Backlight LED pin negative terminal.

3. CONCLUSION

This system can be use for prevention of ATM security. By using this system we can highly prevent the robberies of ATM. To implement the system which is more secure by using GSM module. It sends the alert message to the authorized person. The thief tries to open the machine the vibration sensor will activate and gives signal to the microcontroller.

4. ACKNOWLEDGEMENT

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