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# Soldier Monitoring System Using Zigbee

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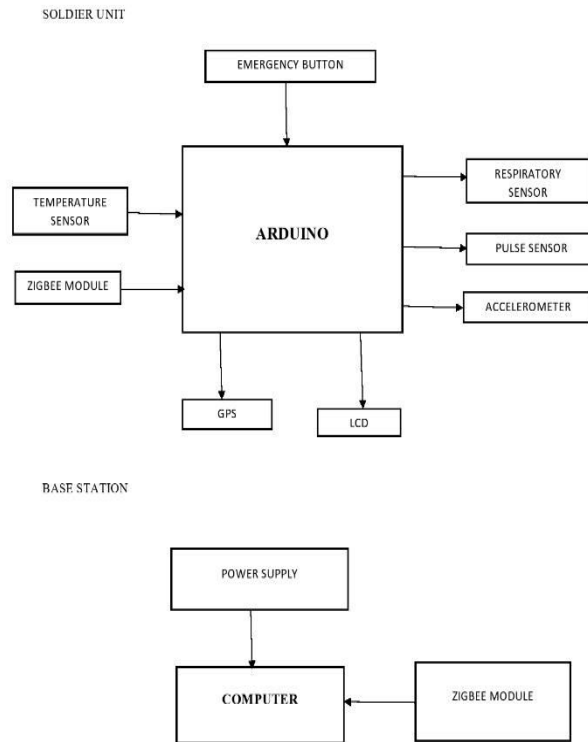
**ABSTRACT:** The military is a very important part of any national security program. Over time, wars and military searches are wounded and many of them are lost. As such, the life of the military is important because it is the saviour of our country who protects us from enemy attacks, terrorist activities and many other suspicious things that could harm us and our nation as well. The project provides the ability to track local tracks and monitor the lives of real-time soldiers who are lost and injured on the battlefield. It helps to reduce the time, search and rescue operations of the military control unit. The program assists the military station to track the location and monitor the health of soldiers using GPS modules and wireless sensor networks (WBASNs), such as temperature sensor, pulse sensor, etc. If a person is seriously injured or dies, this system includes a heart rate calculator that continues to follow the heart rate of the soldier. When a soldier is shot dead, the system indicates that there is no longer any use of wireless communication. The heartbeat system consists of an Infra-red transmitter and a receiver pair that detects a soldier's heartbeat with occasional interruptions to IR reception. The output of the IR receiver is fed to a small controller that calculates the total interruption for a specified period of time. The controller takes care of the wireless connection between the base station and the military module. When the soldiers are in danger, they will approach the others by pressing the panic button. The Zigbee module will send an alert to an authorized person and to your area with local alarms.

## I. INTRODUCTION

In today's world, science and technology are rapidly evolving with new, innovative and advanced applications. This immersion technology is being used extensively by security services to provide security systems for our troops. There are many restrictions on which security services can provide security for soldiers. In our project, we are trying to provide an unused wireless system where military channels can monitor heart rate and body temperature of soldiers using wireless nerve networks (WBASNs) such as temperature sensor, heart rate sensor, etc. Base stations can also detect where troops are by using the Global positioning system (GPS) and can guide them to any safe place. The military unit has a Micro controller, GPS tracking device, Zigbee, heart rate sensor, temperature sensor, etc. There, the GPS device is used to track the location of the military with the help of a satellite communication system. A pulse rate sensor also called a pulse rate sensor is used to sense a person's heartbeat or heart rate, and a temperature sensor is used to sense a person's body temperature. All used and audible data is transmitted via the Zigbee module, which is a low power, low-cost data transceiver used to transmit and receive data wirelessly. In this project, our main goal is to improve communication between the military and the military control chamber through the most advanced and efficient, most effective methods.



II. BLOCK DIAGRAM



III. COMPONENTS DECSRPTION

3.1 POWER SUPPLY

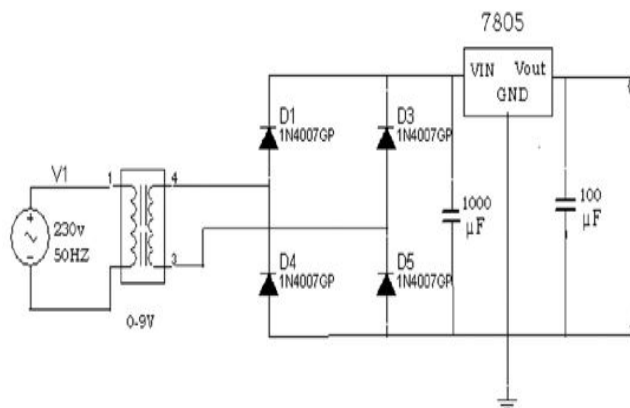


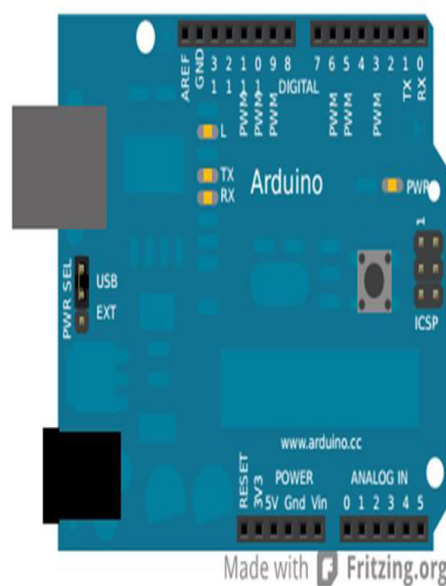
Fig 1. Circuit Diagram for Power Supply



Power Supply is essential for every system. Here we need a continuous power supply with + 5V power supply, supply voltages for input to microcontroller RS232, LM311 and an LCD display that requires a supply of 5 volts. Next is a circuit diagram of the power supply Every power supply has the following parts,

- Resistor
- Capacitor
- Rectifier
- Regulator

**3.2 ARDUINO UNO**



*Fig 2. Arduino Board*

Arduino is an open-source computer and software company, project and user community that builds and manufactures kits for building digital devices and interactive objects that can detect and control the physical world. These systems provide sets of digital and analog I / O pins that can be connected to various expansion boards and other circuits. Boards include multiple communication connections, including USB in some models, for downloading programs from your computers. By setting up microcontrollers, the Arduino platform provides an integrated development environment (IDE) based on the Processing project, which includes support for C and C ++ system languages.

**3.3 ZIGBEE TX RX**

ZigBee operates a 2.4 GHz ISM (Industrial Scientific Medical) global band. Related radio stations are the main competitors to ZigBee today. ZigBee is based on the IEEE 802.15.4 network. The protocol stack can be divided into two parts: IEEE 802.15.4 and ZigBee Alliance. Physical layer (PHY) and MAC (Medium Access Control) layer are defined in IEEE 802.15.4 data. ZigBee's NWK (Network) layer of the ZigBee stack and all its layers are under ZigBee Alliance.



Fig 3. ZigBee Module

### 3.4 PULSE SENSOR

The pulse wave is a volume change in the blood vessel that occurs when the heart is pumping blood, and a detector that detects this change in volume is called a pulse sensor. Measurement methods are two types, transmission and display.

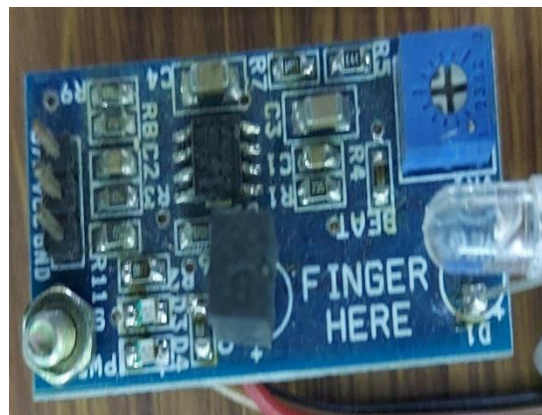


Fig 4. Pulse Sensor

### 3.5 TEMPERATURE SENSOR

The LM35 is an IC temperature sensor with its output equal to the temperature (in °C). The nerve circulation is closed and as a result is not subject to oxidation and other processes. With the LM35, the temperature can be measured more accurately than with a thermistor. It also has a low temperature and does not cause a temperature rise above 0.1°C with precision in the air. The operating temperature range is from -55 °C to 150 °C. The output power varies by 10mV in response to all °C rises at appropriate temperatures, i.e., its range is 0.01V / °C



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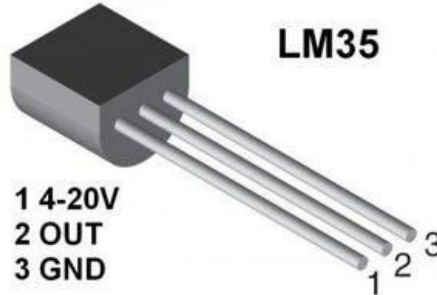


Fig 5. Pin Diagram of Temperature Sensor

### 3.6 RESPIRATORY SENSOR

The respiratory monitoring system helps to assess the soldier’s breathing rate with the help of an Arduino-based system. If there is any deviation from the normal respiratory rate, this sensor senses and give information to the buzzer alarm.

### 3.7 GPS



Fig 6. GPS Module

The Global Positioning System (GPS) is a space navigation system that provides location and time information for all weather conditions, anywhere on or near the earth where there is an unstopable line of sight on four or more GPS satellites. The program provides critical skills to military, civilian and commercial users worldwide. The United States government created, maintained, and made it accessible to anyone with a GPS receiver.

### 3.8 Arduino IDE

Arduino is an open-source computer and software company, project and user community that builds and manufactures microcontroller-based kits to build digital devices and compatible devices that can see and control objects in the physical world. The project is based on microcontroller board designs, made by several vendors, using various



microcontrollers. These systems offer sets of digital and analog I / O anchors that can be connected to various expansion boards ("shields") and other circuits.

### 3.9 FALL DETECTION SENSOR

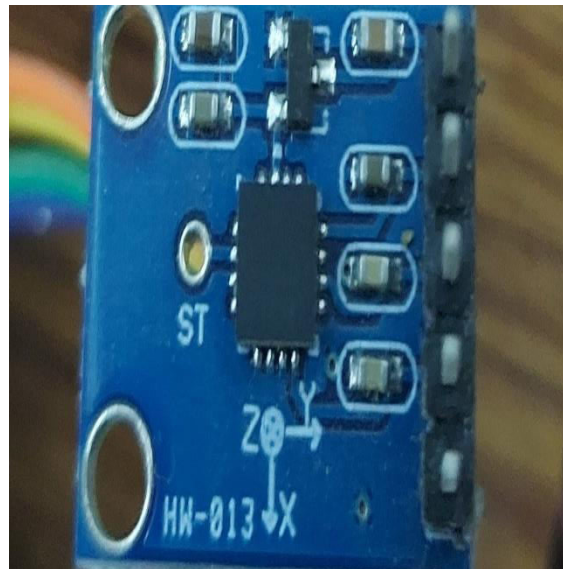


Fig 7. Fall Detection Sensor

Accelerometer sensors measure speed by measuring changes in capacitance. Its structure has a spring-attached weight that moves in one direction and sets the outer plates. Therefore, when speed is applied in any direction, the force between the plates and the size will change. This change in capacitance is measured and is accompanied by a acceleration value.

### 3.10 LCD DISPLAY

The display of liquid crystal cells (LCDs) is used in the same systems where LEDs are used. These applications display the alphabetical numbers and numbers displayed on the matrix dots and in the display.



Fig 8. LCD Display

## IV. RESULT AND CONCLUSION

The "Soldier Monitoring System using ZigBee" project has been successfully completed and the release results are guaranteed. The results are consistent with the expected product. The project has been tested with software and hardware testing tools. In this function "Temperature sensor, Heart rate monitor, GPS, Micro controller, power supply and Zigbee" selected is shown. This project will be very much helpful to the army people when they are in trouble. The project has enough ways to improve in the future. The project is a model that meets all logical needs. A project with minimal improvement can work directly on real-time applications. The project is also accompanied by continuous performance and high-level statistics. This function can be used for a variety of industrial and commercial applications.



The Following Figures are the result of our system which are sensed in various conditions,



Fig 9. Output from LCD Display (i)



Fig 10. Output from LCD Display (ii)

The Data transmitted from the Soldier Unit is sent to the Base Station, which is received by using ZigBee Module (Fig 11) and it will be displayed in the Personal Computer in the Base Station.



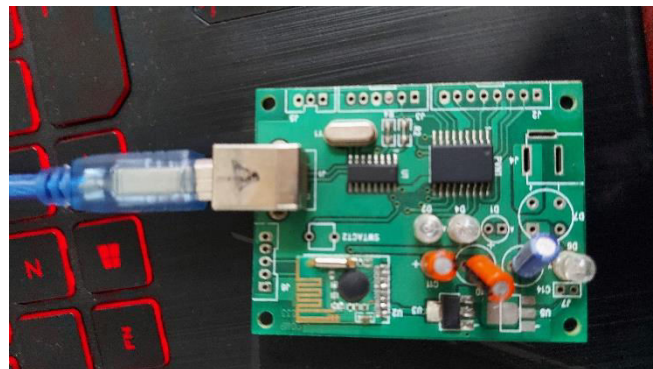


Fig 11. ZigBee Module in Base Station

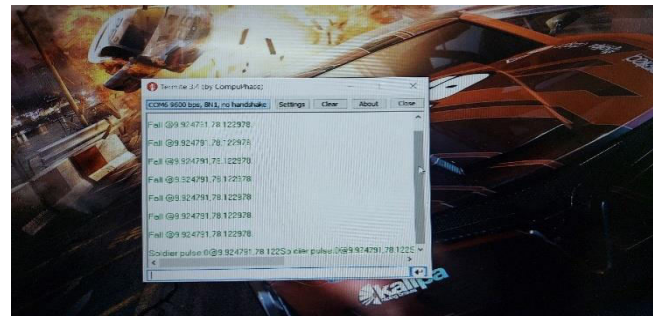


Fig 12. Output displayed in the Computer

The overall hardware module of Soldier Monitoring System is shown in the figure.

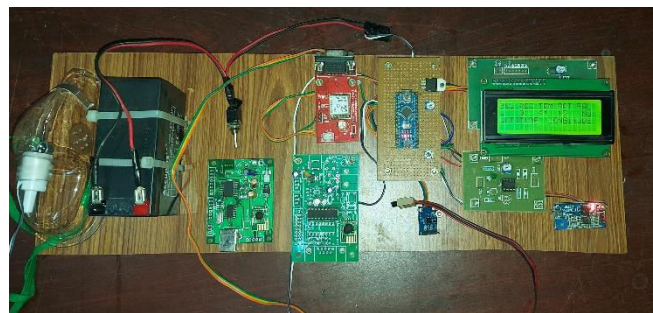
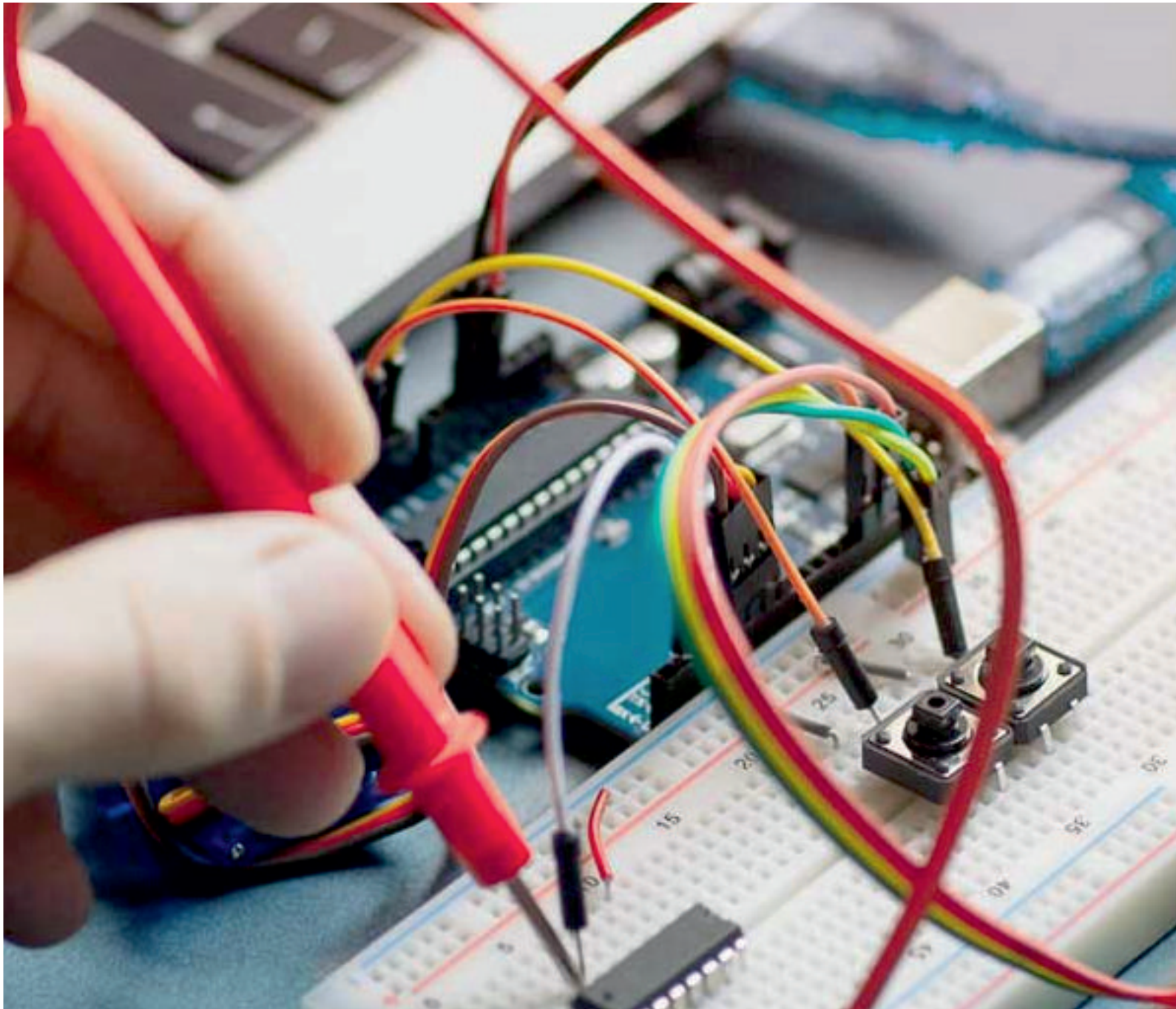


Fig 11. Soldier Unit Module

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