Emergency Alert System for Women

# Abstract

This project presents an Emergency Alert System for Women built using an 8051 microcontroller and a GSM module (SIM800L). The system is designed to send an SMS and make a phone call to a predefined contact when activated, enabling quick communication in emergency situations.

# Introduction

The Emergency Alert System for Women is a GSM-based embedded project designed to provide rapid emergency communication using a microcontroller and GSM module. In emergency situations, the device sends a predefined SMS and initiates a phone call to a designated contact number using AT commands sent over UART communication.

# Hardware Components

- AT89C51 Microcontroller (8051-based)

- SIM800L GSM Module (Supports SMS & Call functionality)

- 12V Power Supply for the Microcontroller

- Regulated Power Supply (~4V) for the GSM module

- Jumper Wires

- SIM Card with Active Balance

- Common Grounding Connections

# Module and Power Connections

Power Configuration:  
- The microcontroller is powered using a 12V DC supply.  
- A regulated output of around 4V is tapped from the power supply and connected to the VCC pin of the GSM module (SIM800L), matching its required voltage range (3.4V to 4.4V).  
- The GND pin of the GSM module is connected to both the ground of the power supply and the microcontroller.  
- The GSM module receives no VCC connection directly from the microcontroller—only power from the 4V regulated source.

Signal Connections:  
- TX (P3.1) of 8051 → RX of SIM800L  
- RX (P3.0) of 8051 → TX of SIM800L  
- Ensure common ground between all devices for reliable communication.

# Software Overview

The software is written in Embedded C and compiled using the Keil uVision IDE. The 8051 communicates with the GSM module over UART (9600 baud rate), and AT commands are used to trigger SMS and call functionality.

# Core Functionalities

1. Send SMS: Automatically sends a predefined emergency message to a specific number.

2. Make Call: Initiates a voice call to the same predefined number after sending the message.

# Embedded C Code Snippet

#include <reg52.h>  
  
sbit TX = P3^1;  
sbit RX = P3^0;  
  
void delay(unsigned int time);  
void uart\_init();  
void uart\_tx(unsigned char ch);  
void send\_string(char \*str);  
void send\_sms();  
void make\_call();  
  
void main() {  
 uart\_init();  
 delay(1000);  
 send\_sms();  
 delay(5000);  
 make\_call();  
 while(1);  
}

# Working Explanation

When powered on, the device waits for activation. Once activated, the microcontroller sends AT commands to the SIM800L module to send an emergency SMS and then place a call to the designated number. Proper voltage regulation is ensured to prevent damage to the GSM module, and UART communication is used for data exchange.

# Applications

- Personal safety alert system for women

- Emergency communication device

- Portable GSM alert device for high-risk situations

# Conclusion

The Emergency Alert System for Women successfully provides basic GSM-based communication functionality using SMS and voice calls. It is a reliable, efficient, and deployable solution built using the 8051 microcontroller and SIM800L module.