SECURITY SYSTEM: ACTIVATION OF ALARM ON UNAUTHORIZED ACCESS USING 8051

Project Report

Submitted in the partial fulfillment of the requirements for the

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CONTROLLERS

Course code: 22EC2106

submitted by

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Declaration

The Project Report entitled "**Security System: Activation of alarm on unauthorized access using 8051** " is a record of Bonafede work of N. Ashish, Nithin Deshmukh, K. Umesh Chandra followed by IDNO 2200032978, 2200033025, 2200030042 submitted in partial fulfillment for the subject titled 22EC2106 - PROCESSORS AND CONTROLLERS in Dept of ECE, KL University. The results embodied in this reporthave not been copied from any other departments/University/ Institute.

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Certification

This is to certify that the Project Report entitled "**The Stepper Motor Control Using 8051 Microcontroller**" is being submitted by N. Ashish, Nithin Deshmukh , K Umesh Chandra followed by IDNO 2200032978, 2200033025 , 2200030042 in partial fulfillment for the subject titled (22EC2106 - PROCESSORS AND CONTROLLERS) in Dept of ECE, KL University is a record of Bonafede work carried out under our guidance andsupervision. The results embodied in this report have not been copied from any other departments/ University/ Institute.

Signature of Examiner **Signature of Supervisor**

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ABSTRACT

The Security System utilizing the 8051 microcontroller is designed to swiftly respond to unauthorized access. Through strategically placed sensors, including proximity detectors and motion sensors, the system continuously monitors the environment. Once unauthorized access is detected, the 8051 microcontroller, acting as the system's core, triggers an alarm system. This alarm can be a blend of visual and auditory alerts, ensuring immediate attention and deterring intruders effectively. The system's programming logic defines the activation criteria, offering flexibility and customization options. The 8051 microcontroller's real-time processing capabilities, low power consumption, and seamless sensor integration make it an ideal choice. Additionally, the system can be expanded to include remote monitoring and event logging features for enhanced security management. Overall, this Security System with 8051 microcontroller integration stands as a reliable and scalable solution for bolstering security across various settings.

The integration of the 8051 microcontroller offers several advantages, including real-time processing, low power consumption, and ease of interfacing with various sensors and actuators. Additionally, the system can be expanded with additional features such as remote monitoring, logging of intrusion events, and integration with other security protocols.

In conclusion, the Security System: Alarm Activation on Unauthorized Access using 8051 Microcontroller provides an effective and scalable solution for enhancing security in residential, commercial, and industrial environments. Its ability to detect and respond to unauthorized access swiftly makes it a valuable asset in comprehensive security strategies.

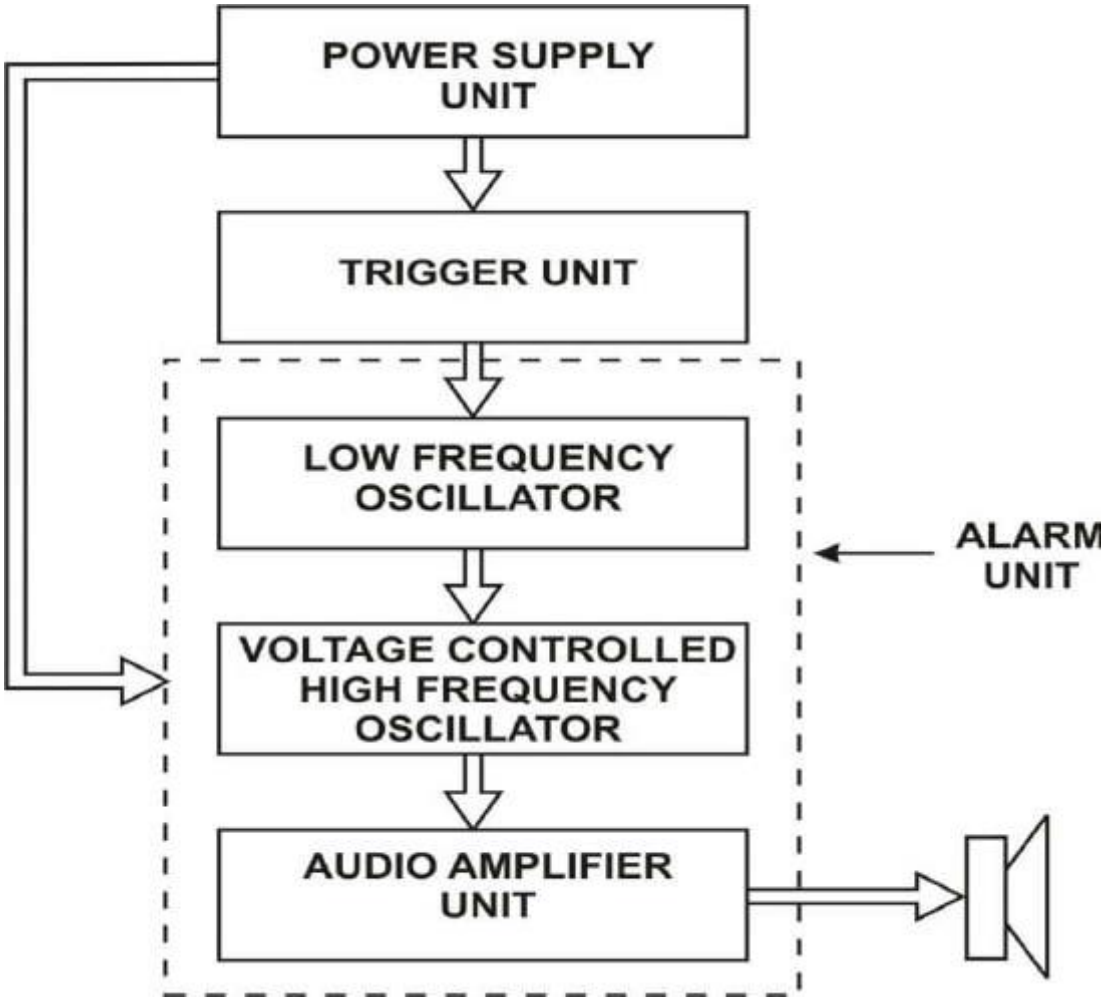
CHAPTER 1: INTRODUCTION

The Security System employing the 8051 microcontroller represents a modern approach to enhancing security against unauthorized access. By leveraging advanced sensors and real-time processing capabilities, this system can detect intrusions swiftly and trigger appropriate responses. The 8051 microcontroller serves as the central processing unit, orchestrating the integration of sensors and alarm mechanisms. Its efficient use of power and seamless sensor interfacing make it a practical choice for robust security solutions. This system's ability to customize activation criteria and expand with additional features underscores its versatility in addressing diverse security needs. Overall, the integration of the 8051 microcontroller marks a significant advancement in creating effective and scalable security systems.

Chapter 2: Block Diagram

Here is the circuit diagram and working of simple stepper motor control using 8051 microcontroller

Fig.1. block diagram



Chapter 3: Requirements

SlNo	Name of component	quantity
1	AT89C51(8051 Microcontroller)	1
2	Proximity Sensors (PIR)	2
3	Motion Detectors (Ultrasonic).	1
4	16X2 LCD Display.	1
5	Auditory Alarm (Piezo Buzzer)	1
6	Power Supply (DC Adapter or Battery Pack).	1
7	Relays (5V Relay Module)	1

8	Keypad Interface (4x4 Matrix Keypad).	1
9	Cables and Connectors (Jumper Wires,	20

Chapter 4: Theoretical Analysis

The security system leveraging the 8051 microcontroller represents a comprehensive approach to intrusion detection and alarm activation. By integrating proximity sensors and motion detectors strategically, the system ensures thorough surveillance of entry points and critical areas. The 8051 microcontroller's real-time data processing capabilities, coupled with programmed algorithms, enable swift analysis of sensor inputs to differentiate between authorized and unauthorized access. The system's logic for alarm activation sets precise thresholds, taking into account sensor sensitivity and predefined intrusion criteria to minimize false alarms. Swift response time is a priority, achieved through efficient power management and reliable component selection. Optional user interfaces like keypad controls and LCD displays enhance user interaction and system monitoring, empowering authorized personnel to manage security settings effectively. The system's modular design allows for scalability and integration with existing security infrastructure, ensuring adaptability to various environments and security protocols. Continuous evaluation and improvement mechanisms ensure ongoing optimization of detection accuracy, response time, and overall system reliability, making it a robust and adaptable solution for enhanced security needs.

Code:

```
ORG 0H       ; Start of program memory

; Define I/O port addresses
PIR_SENSOR equ P1.0  ; PIR motion sensor input
ALARM_OUT  equ P1.1  ; Auditory alarm output

 ; Define constants
ON         equ 1     ; Logical HIGH
OFF        equ 0     ; Logical LOW

MAIN:
  MOV ALARM_OUT, OFF  ; Initialize alarm output as OFF
  MOV PIR_SENSOR, OFF ; Initialize PIR sensor input as OFF

LOOP:
  MOV A, PIR_SENSOR   ; Read PIR sensor input
  CJNE A, ON, NO_ALARM ; If PIR sensor is OFF, jump to NO_ALARM
  CALL ACTIVATE_ALARM  ; If PIR sensor is ON, call ACTIVATE_ALARM subroutine
  SJMP LOOP           ; Continue looping

NO_ALARM:
  SJMP LOOP  ; Continue looping
```

```
ACTIVATE_ALARM:
  MOV ALARM_OUT, ON     ; Activate alarm (turn ON auditory alarm)
  CALL DELAY            ; Call delay subroutine to keep alarm ON for a period
  MOV ALARM_OUT, OFF    ; Deactivate alarm (turn OFF auditory alarm)
  RET

DELAY:
  MOV R2, #20     ; Load R2 with delay value (adjust for desired delay)
DELAY_LOOP:
  NOP             ; No operation (delay loop)
  DJNZ R2, DELAY_LOOP  ; Decrement R2 and loop until R2 becomes zero
  RET

END
```

Chapter 5: Simulation and Results

Simulating the provided 8051 code using Keil µVision allows for a thorough evaluation of the security system's functionality. Within the simulation environment, you can configure input and output states, observing how the system responds to simulated events. For instance, setting the PIR_SENSOR input to a logic HIGH simulates motion detection, triggering the ACTIVATE_ALARM subroutine and activating the ALARM_OUT output to simulate the auditory alarm. The delay subroutine, with its adjustable delay value, demonstrates the alarm's duration before deactivation. Through step-by-step debugging and register value observation in µVision, you can verify the code's logic, timing, and response accuracy. While simulation provides a controlled environment for initial testing and debugging, real-world testing on hardware is crucial to confirm the system's behavior under practical conditions.

Furthermore, the simulation in Keil µVision aids in verifying the code's logic flow, ensuring that the alarm activation and deactivation sequences function as intended. Debugging tools like breakpoints and variable watch windows offer insights into register values and program execution, facilitating efficient troubleshooting.

Chapter 6: Hardware implementation

Step 1: Gather components including 8051 microcontroller, PIR sensor, piezo buzzer, resistors, transistors, power supply, breadboard/PCB, and wiring tools.

Step 2: Design circuit layout outlining connections between microcontroller, PIR sensor, and buzzer, considering power requirements and signal flow.

Step 3: Connect microcontroller's VCC and GND pins to power supply, ensuring correct polarity and voltage levels.

Step 4: Interface PIR sensor output to microcontroller's digital input pin (e.g., P1.0) with appropriate resistors for stability.

Step 5: Interface piezo buzzer to microcontroller's digital output pin (e.g., P1.1) using a transistor driver circuit for current amplification.

Step 6: Assemble components on breadboard/PCB following circuit diagram, ensuring secure connections and proper insulation.

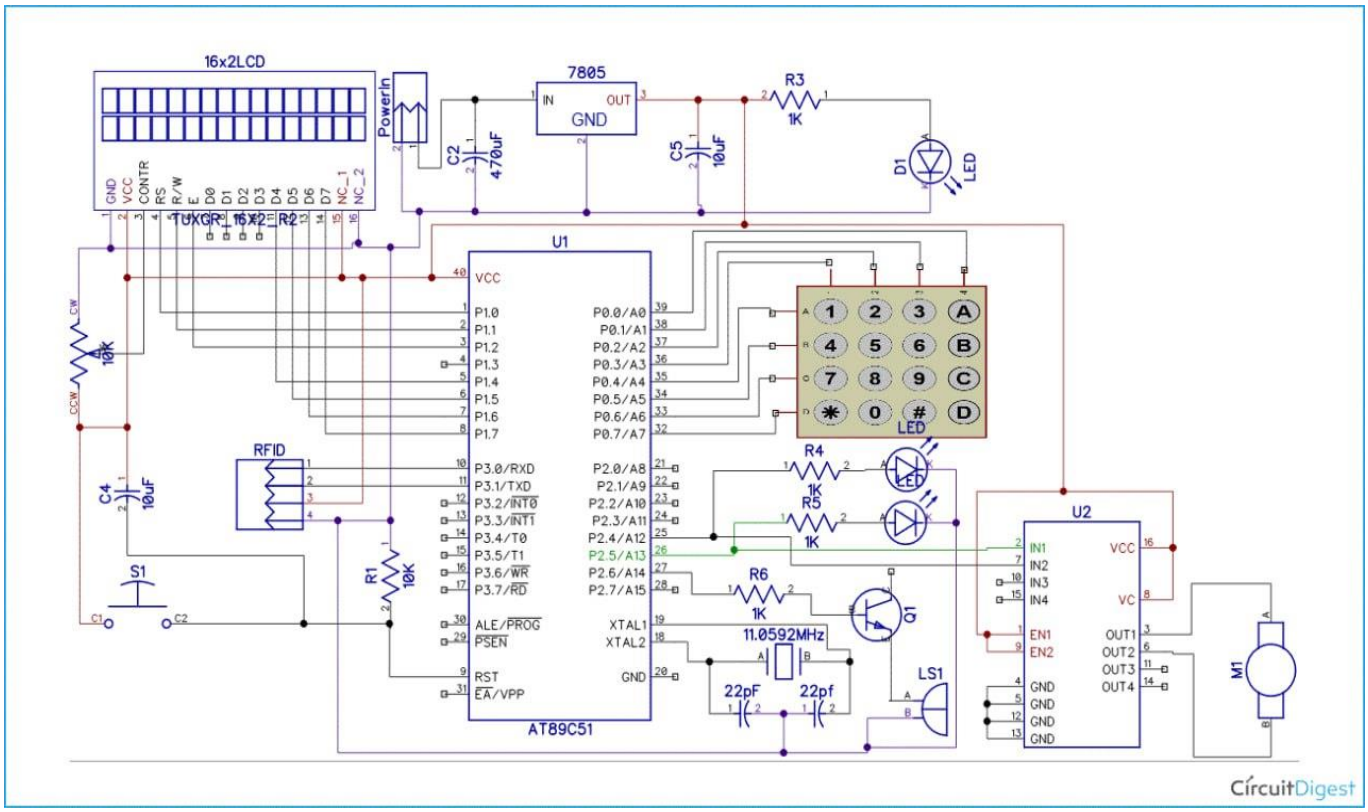
Step 7: Power up circuit and test individual components (PIR sensor, buzzer) for functionality and wiring errors.

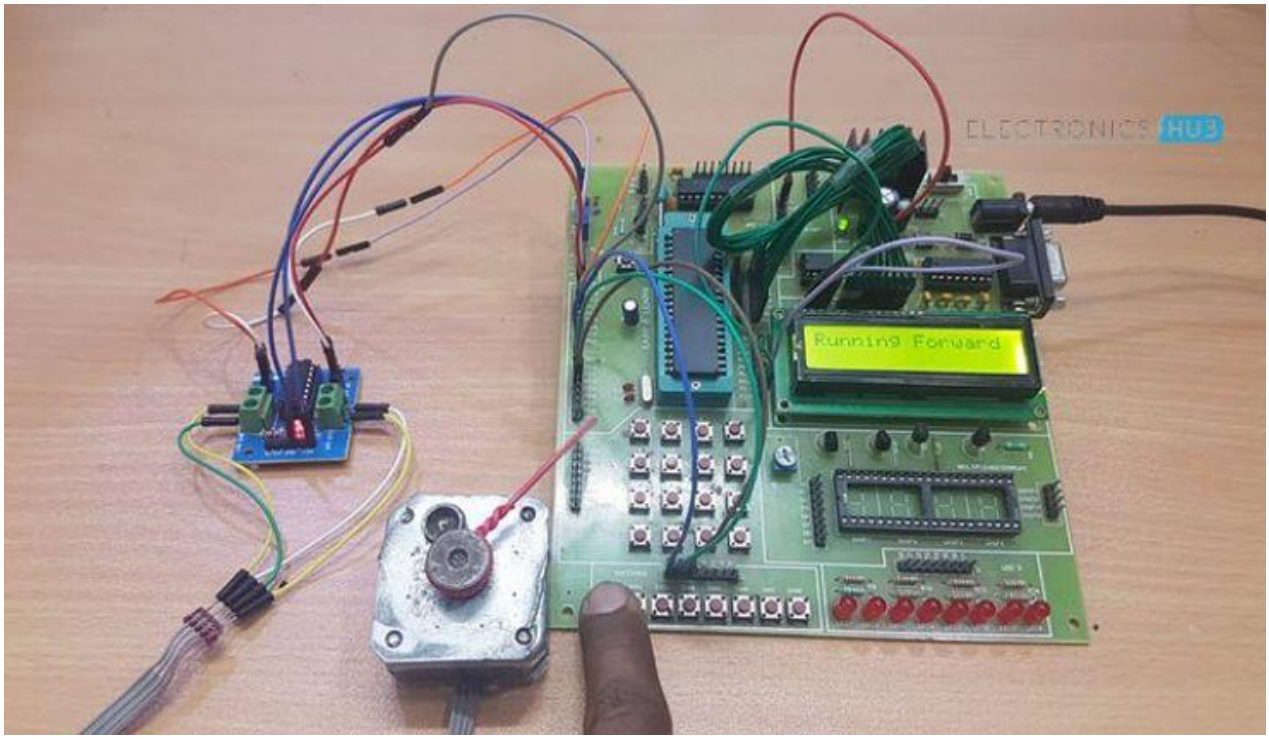
Step 8: Write code (assembly/C) for security system logic, incorporating sensor reading and alarm activation/deactivation routines.

Step 9: Compile code using Keil µVision and upload to microcontroller using compatible programmer.

Step 10: Test circuit functionality by simulating motion near PIR sensor to activate buzzer based on programmed logic.

Step 11: Integrate additional features (optional) like user interfaces or additional sensors, mount components securely, and document setup for future reference.


16x2LCD
7805
IN
OUT
GND
R3
1K
C2
470uF
C5
10uF
D1
LED
PowerIn
U1
VCC
P1.0
P1.1
P1.2
P1.3
P1.4
P1.5
P1.6
P1.7
P3.0/RXD
P3.1/TXD
P3.2/INT0
P3.3/INT1
P3.4/T0
P3.5/T1
P3.6/WR
P3.7/RD
ALE/PROG
PSEN
RST
EA/VPP
P0.0/A0
P0.1/A1
P0.2/A2
P0.3/A3
P0.4/A4
P0.5/A5
P0.6/A6
P0.7/A7
P2.0/A8
P2.1/A9
P2.2/A10
P2.3/A11
P2.4/A12
P2.5/A13
P2.6/A14
P2.7/A15
XTAL1
XTAL2
GND
AT89C51
RFID
R4
1K
R5
1K
R6
1K
Q1
11.0592MHz
22pF
22pf
LS1
U2
IN1
IN2
IN3
IN4
EN1
EN2
VCC
VC
OUT1
OUT2
OUT3
OUT4
M1
C4
10uF
S1
R1
10K
CW
CCW
10K
CircuitDigest


ELECTRONICS HUB
Running Forward

Chapter 7: Conclusion and Future scope

The implementation of the security system using the 8051 microcontroller marks a significant step towards bolstering security measures. Its successful deployment showcases the potential for integrating advanced technologies into security solutions. Looking ahead, the project's future scope includes exploring wireless communication protocols for remote monitoring and control, implementing machine learning algorithms for intelligent threat detection, and integrating with smart home automation systems for seamless security management. Additionally, expanding the system's capabilities to include biometric authentication, video surveillance, and cloud-based analytics can enhance its effectiveness in safeguarding various environments. Continuous research and development efforts will ensure that the security system remains adaptive, reliable, and capable of meeting evolving security challenges in the digital age, precise control over the motor's speed, direction, and position, making it suitable for a wide range of applications.