



Remotely Secured Device Access Using GSM

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ABSTRACT

Home Automation industry is growing rapidly this is fuelled by provide supporting systems for the elderly and the handicapped, especially those people who live alone. Home automation systems must come with the household standard and ease to use. This paper includes the overall design of a wireless GSM Based Secured home automation system which has been built and implemented. The automation system will work on detection of SMS commands and uses Text Message communication through GSM module SIM 900 which is relatively cheap. This automation system is intended to control all lights and electrical appliances in a home or office. The system has been tested and verified. For Command Sending purpose we have Developed Android Application through which we can communicate with system in GUI Mode. The System will also give Acknowledgement Signal when any Devices will on or off.

KEYWORDS : Automation, GSM: Global System for Mobile PIC: Peripheral Interface Controller

INTRODUCTION

Nowadays, people's expectations in their life quality are increasing as the technology is continuously improving. People required an intelligent & affordable system that can make their lives more comfortable & sophisticated, and more safety is also required. This Automation System is an electrical and electronic system designed to control home appliances with a mobile phone. The two main technologies applied in the system are GSM and PIC from Microchip. GSM stands for Global System for Mobile Communication. In this system, SIM 900 GSM Module is chosen as the GSM receiver command and transfers it to controller. Due to rapidly advancing of mobile communication technology and widely availability make it possible to incorporate mobile technology into home automation systems. GSM AT command is used to communication between GSM modem and microcontroller.

The backbones of the study are the control circuits which consist of the microcontrollers and integrated modem. The modem is used to send and receive AT commands. The control circuits can be divided in two parts which are master unit and slave units. Master unit is connected to the GSM modem to receive SMS or command. User can control corresponding appliances connected to slave unit when command is received.

SYSTEM OVERVIEW

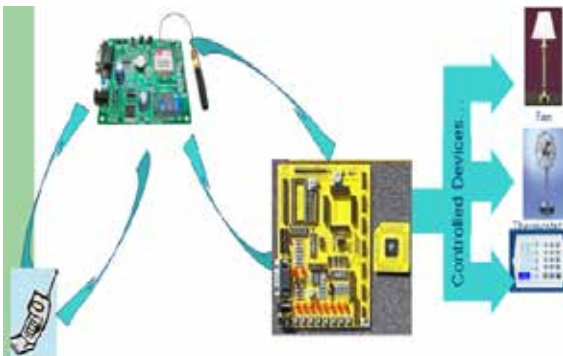


Figure1: System Overview

The main system is based on PIC microcontroller which is pic16f877a. GSM Module SIM900 is connected through Tx & Rx pin in TTL mode. Both can communicate using at commands. And using relay board we can control electrical appliances.

With GSM Module in this system for SMS Communication Using GUI mode Android Mobile Application is used. Using this application simple one click we can send SMS as Pre stored in Application we can on – off Devices using simple one click.

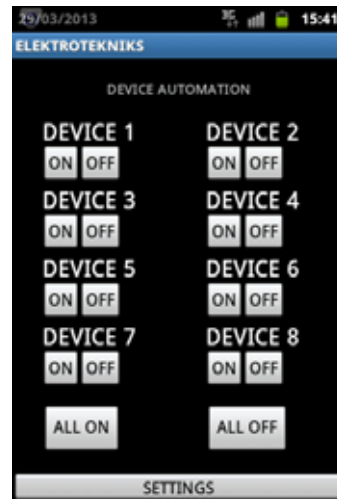


Figure2: Android Application Activity

Presorted SMS String for on – off 8 devices

SMS	DEVICE	SMS	DEVICE
*a	1-ON	*e	1-OFF
*b	2-ON	*f	2-OFF
*c	3-ON	*g	3-OFF
*d	4-ON	*h	4-OFF
*i	5-ON	*m	5-OFF
*j	6-ON	*n	6-OFF
*k	7-ON	*o	7-OFF
*l	8-ON	*p	8-OFF
*r	ALL-ON	*q	ALL-OFF

Table1: SMS String

HARDWARE ARCHITECTURE

In this part we discuss the hardware design in modules that constitute the System.

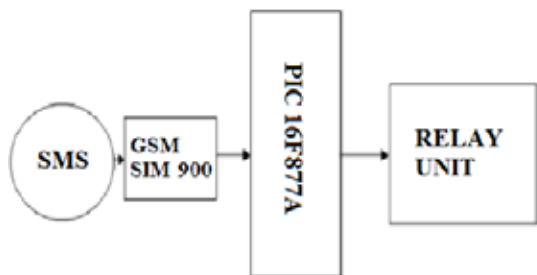


Figure3: System Architecture

The Text message is captured through GSM Module. It is matched with the message previously stored in PIC16f877a. If it matches stored string the corresponding signals are send to relay unit.

The actual circuit is shown with interface with GSM Module and LCD Screen 16*2 with PIC16f877A

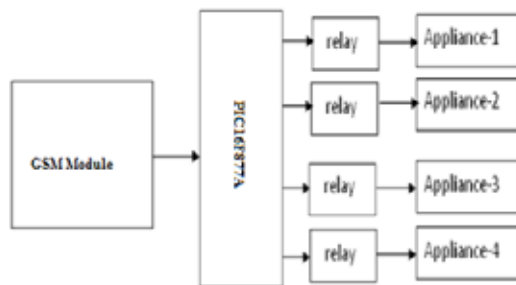


Figure7: Block Diagram

All the relay input pin is connected to pic microcontroller when SMS will come and signal received corresponding Pin will High and relay will toggle and connected appliances will on

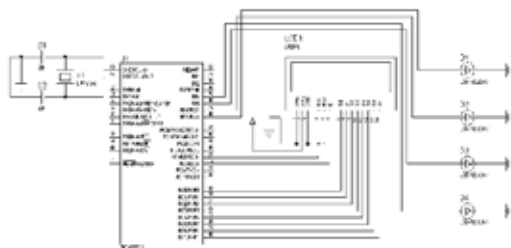


Figure 4: circuit connection

This Is the Hardware Interface with LCD Module. Port D Is connected with PIC16F877A. Pin no 25 and 26 is TX & RX Pin for GSM Module. 12 MHz crystal is used. And Port B is connected with relay unit here LED is shown for testing purpose.

SEQUENCE OF ACTIVITIES

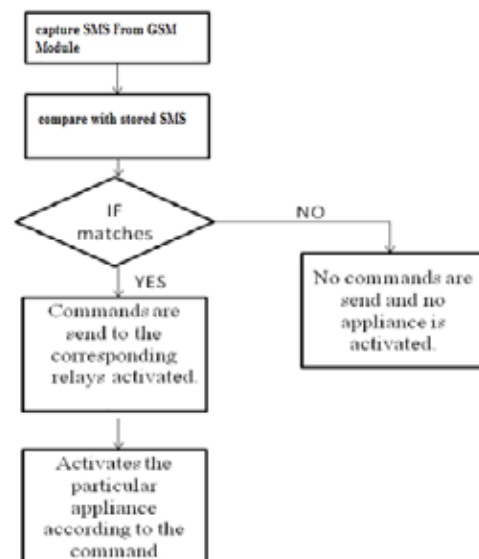


Figure8: flow chart

This is the sequence of activities in the Home Automation System. The SMS is received using a GSM SIM -900 and compared with stored command in PIC. Upon recognition of the commands, control signals are sent to the specified appliance address through relay unit corresponding, appliances can be turned ON or OFF

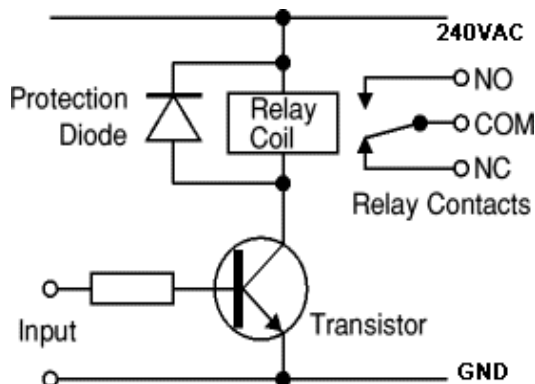


Figure 5: Relay Unit

Here Switching unit with relay is shown here when input gets from microcontroller the transistor get shorted and relay will grounded. And switching terminal of relay will toggle.

CONCLUSION AND FUTUREWORK

A Remotely Secured Device Access System based on GSM was built and implemented. The system is targeted for comfort and sophisticated switching and also targeted for elderly and handicapped people. This system can control electrical devices in a home or office.

Future work:

- Adding Security commands to the GSM recognition system.
- Integrating variable control functions to improve the system functionality such as providing control commands other than automation commands. For example Temperature Control , Lights Control etc.
- Integration of Infrared server to operate within a small distance.
- Design and integration of GPRS based home automation Control



Figure6: Actual Circuit

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