

Remote Control of Electrical Appliance using Wireless Technology “GSM”

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Abstract: This paper presents an idea of automatic switching ON/OFF of electrical appliance using GSM (Global System for Mobile Communication). Now a days to lead a healthy, tense less life it is very important that we have clarity in mind about the house. So this paper mainly helps in automating the appliance like fan, light and other house hold appliances from any part of the world using GSM technology. It is designed such that a single SMS code ‘on’ will switch ON the device and ‘off’ will switch OFF the device, it also gives the status of the appliance as a feed back. This requires a GSM modem, SIM, micro controller, relay, mobile. The system can be operated from a handset of the individual. Hence it is very comfortable and economical to maintain.

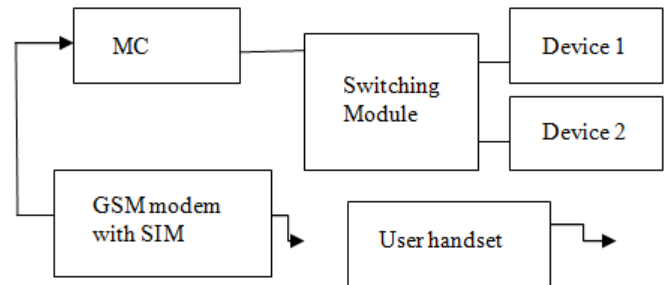
Keywords: GSM, Automatic switching, Remote Control, Electrical Appliance, SMS, Modem, SIM, Micro Controller, Relay, Mobile.

1. Introduction

Wide growth of wireless communication made me think of using the mobile phones for controlling the electrical appliance. This can be done simply by sending an SMS from the users handset. The system do not require any wired connections for the automatic control of electrical appliance it can just be done with the help of a Micro controller interfaced with the GSM modem. A system being proposed is economical, robust to use and portable. An individual to perform his job easily at workplace he/she should be comfortable with the costly electrical/electronic appliances at home; the idea in this paper relieves them from such problems and also saves power. There are many ways of automatic control mechanisms using Bluetooth automation, voice commands. This paper describes a GSM SMS based automation system.

2. System Description

The system proposed in his paper consists of both hardware and software components. The hardware components are GSM modem handset with a driver, 8051 microcontroller (AT89C51), input/output peripherals, SIM, power circuit, timer, crystal oscillator. The software parts include the microcontroller embedded c programming and other GSM modem commands to communicate with the public network and receive/send the SMS. Micro controller programming helps to communicate the hardware components and the modem. The SMS format is totally pre defined. Whenever the modem receives command from the user it communicates with the controlling system and then operates the switching system. The detailed explanation of the different modules is discussed below.



2.1. SIM Card and Handset

Mobile consists of SIM (Subscribers Identifying Module), every user has specific number and the communication occurs through this specified number, the communication takes place in wireless mode using GSM technology. The appliance is controlled by the user via SMS.

2.1.1 Receiver Modem

Modem placed at home receives the message from the user via public network. The received SMS is processed using Micro controller programming. Micro controller is interfaced with the input peripheral that is receiving modem. Micro controller is interfaced with the modem via UART. Then it communicates with hardware system and works over the switching module i.e., switching ON/OFF the target device. Any hand set that supports attenuation commands can interface with the GSM modem. The GSM modem used here is SIM 300 which supports these commands, AT commands is used to control the modem.

2.1.2 Power Circuit Module

A 230V power is given to the step down transformer. Then it is stepped down to 12V AC. Then it is rectified using bridge rectifier. From here the supply is given to the micro controller which helps in performing the switching operation.

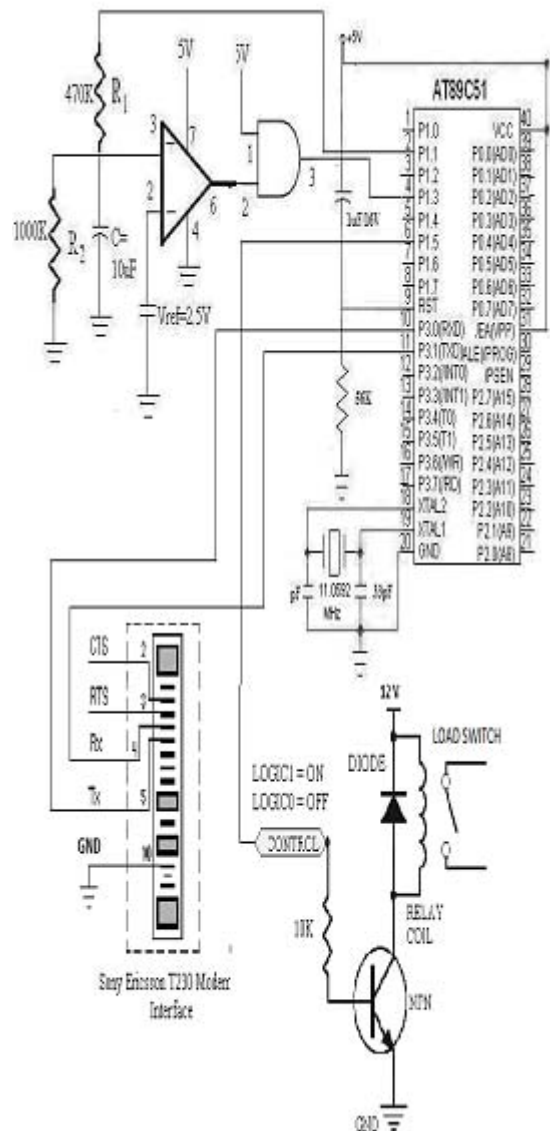
2.1.3 Micro Controller

This system is designed with the micro-controller (AT89C51) and a timeout generator circuit. This works as the heart of the system. On receipt of the SMS message, text words are checked with predetermined format which includes desired device ON/OFF commands. To read a message the microcontroller sends the appropriate AT command to the Receiver GSM Modem through UART. The Modem then responds with the message and the microcontroller stores the message in the RAM. When the message ends there is no way to know by the microcontroller. The time-out generator circuit performs the vital function of providing the microcontroller board with the ability to detect the end of a message from the receiver GSM mobile. The output of the time-out generator circuit (connected to port1_3 of the microcontroller) is low until the message is being received and becomes high at the end of the message. The microcontroller then processes the command and sends the appropriate controlling signal to the switching module.

2.5 Switching Module

This module drives (switches ON/OFF) the appliance according to the command sent in the SMS. The switching module is controlled by the microcontroller. The switching module may be in the form of a relay which allows a low power circuit to switch a relatively high current on or off for example a bulb connected to the 220V mains supply. This module drives (switches ON/OFF) the appliance according to the command sent in the SMS. The switching module is monitored and controlled by the microcontroller. The switching module may be in the form of a relay which allows a low power circuit to switch a relatively high current on or off for example a bulb connected to the 220V mains supply.

2.6 Circuit



3. Algorithm

The system operates as per the algorithm shown. Upon power up the microcontroller initializes the AT Modem. During initialization the microcontroller configures the Modems UART speed, message format etc. to be used. After the initialization is complete the microcontroller continuously checks the Modem for any new message. Upon receipt of a message the microcontroller reads the message and extracts the command and authentication information. The authentication information may be the remote user's mobile phone number or a text string sent along with the message for command. After the authentication is verified the microcontroller then sends the appropriate control signal to the switching module to control the appliance. The command is executed and the devices are switched ON or OFF according to the command. The microcontroller then sends an SMS to the user through the AT modem stating the Status of the appliance as an acknowledgement. The system software is developed using Programming language in the compiler micro c for 8051 from Microelectronics.

4. Conclusion

In the paper very economical, secure affordable, auto configurable, remotely controlled solution for automation of homes has been proposed. The approach discussed in the paper has achieved the target to control home appliances remotely using the SMS-based system satisfying user needs and requirements. The extensive capabilities of this system are what make it so interesting. From the convenience of a simple cell phone, a user is able to control and monitor virtually any electrical device in a household. By connecting all the appliances with the system through power line communication or wireless to the system, all electrical household appliances can be controlled by sending a message from a mobile handset.

5. References

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