Abstract — In this paper we are discussing the monitoring and controlling of household appliances using SMS based control. This system allows the home owner to monitor and control his house appliances via his mobile phone set by sending commands in the form of SMS, messages and receiving the appliances status as well. The system uses GSM technology thus providing ubiquitous access to the system for appliance control.

Keywords: GSM model, Microcontroller, SMS

1. INTRODUCTION

SMS allows text to send or receive to and from mobile telephone. This feature can be implemented for a variety of industrial purpose. The rapid growth of wireless communication motivated us to use mobile phones to remotely control a household appliance [6]. The system was integrated with microcontroller and GSM network. It reads message from the mobile phone and response to control the devices according to the received message [4]. The microcontroller would then control and device base on the information given to it. A remote household appliances control has been discuss using internet [6]. The system is capable enough to instruct user via SMS from a specific cell number to change the condition of the home appliances according to user need and requirements. The second aspect is that security alerts which is achieved in a way that on the detection of the intrusion the system allows Automatic generation of SMS. Thus alerting the user against security risk [5]. The proposed solution will need to be easy to use, simple, secure, robust and be useful on most mobile phones [6].

Fig1. Various home appliances control

2. WORKING

The system has two parts namely hardware and software. The hardware architecture consists of a stand-alone embedded system that is based on 8 bit microcontroller (AT89C51), a GSM handset with GSM modem and a driver circuit. The SMS message consists of command to be executed [6]. It makes use of GSM for control of the appliances. This is an SMS based system. GSM has been used due to its high availability, coverage and security. The control of home appliances is done primarily
through SMS codes. AT commands can be sent through the GSM network and this controls the home devices.[8] In case of remote monitoring other appliances can also be monitored such that if the level of temperature rises above certain level then it should generate SMS or sensors can also be applied that can detect gas, smoke or fire in case of emergency the system will automatically generate SMS[5]

A. GSM:
The Global System for Mobile communication (GSM) is a TDMA based wireless network technology developed in Europe that is used throughout most of the world. Cellular phone containing SIM (Subscriber’s Identifying Module) card has a specific number through which communication takes place. Here, The user transmit instruction to the system to control the appliance in the form of SMS [6]. GSM modem receives the information signal with the help of AT command the SMS is read by microcontroller then microcontroller recognize the data and provides appropriate action to the relay to control the specified devices [1].

A. Cell phone
Cellular phone containing SIM card has a specific number through which communication takes place. The device communicates with the GSM Modem via radio frequency. Mobile user transmits SMS using GSM technology [4].

B. Microcontroller
This contains the micro-controller (AT89C51) and a timeout generator circuit. This is the main module 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.[6]

3. METHODOLOGY
GSM hardware tests are run in order to check the hardware support. The system will call GSM modem and it will get activated. After activation the Modem will check for hardware support. If the hardware is missing or some other hardware problem there will be error, resulting in communication failure and the application will be terminated. If hardware responds then the serial port will be opened for communication and GSM hardware will allow transmission of SMS. The system will then connect and after connection establishment the system will be able to detect intrusion and will alert user about the breach and similarly the system will update status of appliances by receiving SMS from the pre-defined cell number. SMS will be silently ignored if number is unauthorized [5]
Fig3: flowchart of sending and reading the SMS

The home server is built upon a SMS/GPRS mobile cell module and a microcontroller. This allows the user to monitor and control any appliances at home using any Java enabled cell phone. The GSM based appliance control system will start functioning once the system is ready for application through when the authenticated user sends messages ON or OFF along with the desired switching circuits to be switched on or off. According to the desired command by the user the message will be decoded once received by the GSM modem and then the Microcontroller will further execute the command for final operation. The final operation through the controller is based upon the program being compiled into the same via programmer.

<table>
<thead>
<tr>
<th>APPLIACES</th>
<th>SYSTEM ACTION</th>
<th>ALERT SMS RECEIVED BY USER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Main gate</td>
<td>Intrusion detected on main gate,</td>
<td>SMS received “Breach on the main gate”</td>
</tr>
<tr>
<td></td>
<td>SMS generated to user</td>
<td></td>
</tr>
<tr>
<td>Entrance door</td>
<td>Intrusion detected on entrance</td>
<td>SMS received “Breach on the entrance door”</td>
</tr>
<tr>
<td></td>
<td>door, SMS generated to user</td>
<td></td>
</tr>
<tr>
<td>Living room</td>
<td>Intrusion detected on living room</td>
<td>SMS received “Breach on the living room window.”</td>
</tr>
<tr>
<td>windows</td>
<td>window, SMS generated to user</td>
<td></td>
</tr>
</tbody>
</table>

Table1. Result of security alerts
4. APPLICATION

- GPS and SMS based tracking system
- SMS based motor monitoring and control system (speed as well as on or off)
- SMS based air conditioner monitoring and control system.
- SMS based valve monitoring and control system.
- SMS based temperature monitoring and control system.
- SMS based liquid level monitoring and control system.
- SMS based current/voltage monitoring and control system.
- GSM mobile phone (SMS) based automobile security system.
- SMS based LPG gas leakage detection system using GSM.

5. ADVANTAGES:

- There are numerous handsets and service providers available in the market. Hence the buyers can choose from a variety of options.
- They come with variety of plans with cheaper call rates free messaging facilities and limited free calls and so on.
- The consumption of power is less in GSM mobile.
- With the try-band GSM, one can use phone anywhere around the world.

6. DISADVANTAGES

- The per unit charge on roaming calls is higher in GSM than in CDMA.
- Calls made through GSM mobiles can be tempered.
- If SIM gets lost, one can lose all the data, if the same is not saved in the phone

7. CONCLUSION

SMS based remote control for general purpose is beneficial for the human generation because mobile is most recently used technology. GSM technology capable solution has proved to be controlled remotely, provide home security and is cost effective as compare to previously existing system. SMS services provide an economical and convenient way to control the electrical devices, and are sometimes provided for free. Controlling any appliance remotely, and provides saving in time and in energy. Reliable, low power consumption, available components, and even PC are not needed.

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