

Remote household appliance control system using gsm

[Technology](#), [Mobile Phone](#)



Remote Household Appliance Control System Using GSM R. Chutia, D. Sonowal and S. Sharma Department of Electronics and Communication Engineering Tezpur Central University Tezpur, Assam, India GSM handset with GSM Modem and a driver circuit. The GSM modem provides the communication media between the homeowner and the system by means of SMS messages. The SMS message consists of commands to be executed. The format of the message is predefined. The SMS message is sent to the GSM modem via the GSM public networks as a text message with a definite predefined format. Once the GSM modem receives the message, the commands sent will be extracted and executed by the microcontroller. The system will interpret the commands and turn the appliances ON/OFF accordingly via the switching module. The detail description of individual modules in the system is as follows. A. User GSM mobile Handset Cellular phone containing SIM (Subscriber's Identifying Module) card has a specific number through which communication takes place. The mode of communication is wireless and mechanism works on the GSM (Global System for Mobile communication) technology. Here, the user transmits instructions to the system to control the appliance in the form of SMS. Device 1 Device 2

Abstract- In this paper, we describe the design and development of a remote household appliance control system using mobile handset through GSM technology. The advantages of cellular communications like GSM technology is a potential solution for such remote controlling activities. GSM-SMS technology can be used to control household appliances from remote places. Remotely, the system allows the homeowner 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. This system provides ideal solution to the problems caused in situations when a wired connection between a remote appliance/device and the control unit might not be feasible. The system is wireless and uses the user's mobile handset for control and therefore the system is more adaptable and cost-effective. The system uses GSM technology thus providing ubiquitous access to the system for appliance control. Index Terms- GSM modem, microcontroller, remote control, appliance control.

I. INTRODUCTION The rapid growth of wireless communication, motivated us to use mobile phones to remotely control a household appliance. In this paper we describe a remote appliance control system which can control different household appliances by sending an SMS message from a mobile phone. This controller is extremely handy at places where we have to control the ON and OFF switching of the devices but no wired connection to that place is available. The microcontroller would then control and device based on the information given to it. The proposed solution will need to be easy to use, simple, secure, robust and be useful on most mobile phones. A remote household appliance control has been described in [1]-[4] using internet. A Bluetooth based home automation control is described in [5]. In [6] a GSM based system for home automation is described which uses voice commands for control. In [7] voice commands for home automation is being described. In this paper we describe a simple remote home appliance control using GSM SMS (Short Messaging Service).

UART Terminal Microcontroller Board Switching Module Device N Receiver GSM Handset (in the System) User GSM Handset

Fig. 1 Block Diagram of the System

II. SYSTEM DESCRIPTION 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 B. Receiver GSM Handset This receiver GSM handset is used to receive the SMS sent by the user and then to transmit an acknowledgement or status to the user's mobile. The receiver handset has to be equipped with an AT Modem and a valid SIM card. In our design we have used a sony-ericsson GSM handset model T230. The handset has a built in AT modem Proc. of the International Conference on Advanced Computing and Communication Technologies (ACCT 2011) Copyright © 2011 RG Education Society ISBN: 978-981-08-7932-7 540 Proc. of the International Conference on Advanced Computing and Communication Technologies (ACCT 2011) with UART interface and supports most of the AT command instructions. This handset is attached with the microcontroller used to control the appliance through UART. AT Modem is a Modem which supports AT commands, also known as Hayes command. The Hayes command set is a specific command language originally developed for the Hayes Smart modem. The command set consists of a series of short text strings which combine together to produce complete commands for operations such as dialing, hanging up, and changing the parameters of the connection. Most modems follow the specifications of the Hayes command set. AT commands are instructions used to control a modem. AT is the abbreviation of ATtention. Every command line starts with " AT" or " at". C. Microcontroller Board 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. 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. D. 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 lowpower circuit to switch a relatively high current on or off for example a bulb connected to the 220V mains supply.

Fig. 2 Circuit Diagram of the Complete System III. ALGORITHM The system operates as per the algorithm shown in fig. 3. 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 541 Proc. of the International Conference on Advanced Computing and Communication Technologies (ACCT 2011) 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 users mobile phone number

or a text string sent along with the message for command. START AT modem stating the Status of the appliance as an acknowledgement. The system software is developed using C programming language in the compiler mikroC for 8051 from mikroelektronika. IV. CONCLUSION In the paper low cost, secure, ubiquitously accessible, autoconfigurable, remotely controlled solution for automation of homes has been introduced. 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. Modem Initialization Extract Commands New Message No Received yes From the Message Execute As Per Request Acknowledge To the User Fig. 3 Algorithm of Microcontroller System REFERENCES [1] J. C. Nunes and J. C. M. Delgado, "An Internet application for home automation," Electrotechnical Conference, 2000. MELECON 10th Mediterranean, Vol. 1, pp. 298 -301, 2000. Neng-Shiang Liang; Li-Chen Fu; Chao-Lin Wu; "An integrated, flexible, and Internet-based control architecture for home automation System in the Internet era," Proceedings ICRA 2002. IEEE International Conference on Robotics and Automation, Vol. 2, pp. 1101 —1106, 2002 Alkar, A. Z., & Buhur, U. (2005). An Internet Based Wireless Home Automation System for Multifunctional Devices. IEEE Consumer Electronics, 51(4), 1169-1174. Rifat

Shahriyar, Enamul Hoque, S. M. Sohan, Iftexhar Naim; Remote Controlling of Home Appliances using Mobile Telephony, International Journal of Smart Home, Vol. 2, No. 3, July, 2008 N. Sriskanthan and Tan Karande, " Bluetooth Based Home Automation Systems, " Journal of Microprocessors and Microsystems, Vol. 26, pp. 281-289, 2002. Yuksekkaya, B.; Kayalar, A. A.; Tosun, M. B.; Ozcan, M. K.; Alkar, A. Z.; , " A GSM, internet and speech controlled wireless interactive home automation system," Consumer Electronics, IEEE Transactions on , vol. 52, no. 3, pp. 837-843, Aug. 2006 Jia-Ching Wang; Hsiao-Ping Lee; Jhing-Fa Wang; Cai-Bei Lin; , " Robust Environmental Sound Recognition for Home Automation," Automation Science and Engineering, IEEE Transactions on , vol. 5, no. 1, pp. 25-31, Jan. 2008 [2] [3] [4] [5] Fig. 4 Photo of the Complete System 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 [6] [7] 542