ISSN (Online) 2321-2004
ISSN (Print) 2321-5526

IJIREEICE *INTERNATIONAL JOURNAL OF INNOVATIVE RESEARCH IN ELECTRICAL, ELECTRONICS, INSTRUMENTATION AND CONTROL ENGINEERING*
Vol. 3, Issue 3, March 2015

Design of Cost Effective Home Automation System

M.Prabhakaran[1], K.Kathirvel[2], S.Mohan kumar[3], S.Vignesh[4]

Assistant professor, Control and Instrumentation Engg., Sri Ramakrishna Engineering College, Coimbatore, India[1]

Student, Final year, Electronics and Instrumentation Engg., Sri Ramakrishna Engg., College, Coimbatore, India[2,3,4]

Abstract: The rapidly advancing mobile communication technology and the decrease in costs make it possible to incorporate mobile technology into home automation systems. We propose a mobile-based home automation system that consists of a mobile phone with Java capabilities, a cellular modem, and a home server. The home appliances are controlled by the home server, which operates according to the user commands received from the mobile phone via the cellular modem. In our proposed system the home server is built upon an SMS/GPRS (short message service/general packet radio service) mobile cell module and a microcontroller, allowing a user to control and monitor any variables related to the home by using any Java capable cell phone.

Keywords: Mobile phone, Cellular modem, Microcontroller.

1. INTRODUCTION

This work mainly focuses on the controlling of home appliances remotely and providing security. When the user is away from the place of the system, it can be SMS based and uses wireless technology to revolutionize the standards of living. This system provides ideal solution to the problems faced by home owners in daily life. The system is wireless therefore more adaptable and cost-effective. The Home Appliances Control System (HACS) provides security against intrusion as well as automates various home appliances using SMS. This system uses GSM technology thus providing ubiquitous access to the system for security and automated appliance control.

HACS is based on Global System for Mobile communication (GSM) technology for transmission of SMS from sender to receiver. SMS sending and receiving is used for ubiquitous access of appliances and allowing breach control at home.Appliance control subsystem enables the user to control home appliances remotely.In this paper low cost, secure, ubiquitously accessible, auto-configurable, remotely controlledsolution forautomation of home has been introduced.The main aim of this project is to control home appliances using GSM Technology which serves for global.

Now a day's every system is automated in order to face new challenges. In the present days, automated systems have less manual operations, as they are flexible, reliable and accurate. Due to this, every one prefers automated control systems. Especially in home and industrial electronics, an automated system is performance effective and requires no human intervention. Hence it is very useful to do operations like liquid dispensing.

This paper mainly focuses on the controlling of home appliances remotely and providing security. When the user is away from the place of the system, it can be SMS based and uses wireless technology to revolutionize the standards of living. This system provides ideal solution to the problems faced by home owners in daily life. The system is wireless therefore more adaptable and cost-effective. The HACS provides security against intrusion as well as automates various home appliances using SMS. This system uses GSM technology thus providing ubiquitous access to the system for security and automated appliance control.

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2. BLOCK DIAGRAM EXPLANATION

The circuit shows the interfacing of LCD display, GSM modem and gas sensor with the microcontroller PIC16F877A. The major role play component such as microcontroller was discussed in previous chapter.

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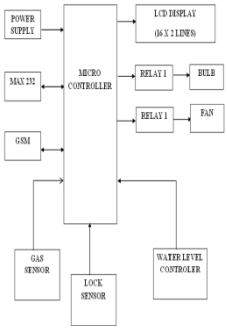

Fig.1.Block diagram of hardware setup

The concept of GSM module and alarm circuitry has been briefly discussed in forthcoming chapter. The gas sensor used here is a MQ-6 LPG gas sensor which will detect only the LPG gas. When the leakage level exceeds above the limit it will give alarm through the buzzer and give emergency interrupt to microcontroller. Door sensor is a proximity sensor which will get activated after an authorized entry when an unauthorized entry occurs it will indicate to the microcontroller

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3. HARDWARE DESCRIPTION

A Power-on Reset pulse is generated on-chip when VDD rise is detected (in the range of 1.2V - 1.7V). To take advantage of the POR, tie the MCLR pin to VDD, A maximum rise time for VDD is specified. When the device starts normal operation (exits the RESET condition), device-operating parameters (volt-age, frequency, temperature,) must be met to ensure operation. If these conditions are not met, the device must be held in RESET until the operating conditions are met.

The Power-up Timer provides a fixed 72ms nominal time-out on power-up only From the POR. The Power-up Timer operates on an internal RC oscillator. The chip is kept in RESET as long as the PWRT is active. The PWRT's time delay allows VDD to rise to an acceptable level A configuration bit is provided to enable/ disable the PWRT. The power-up time delay will vary from chip to chip due to VDD, temperature and process variation. The Oscillator Start-up Timer (OST) provides 1024 oscillator cycles (from OSC1 input) delay after the PWRT delay is over (if enabled). This helps to ensure that the crystal oscillator or resonator hasstarted and stabilized. The OST time-out is invoked only for XT, LP and HS modes and only on Power-on Reset or wake-up from SLEEP.

Fig.2.Setup of cost effective home automation system hardware

The configuration bit, BOREN, can enable or disable the Brown-out Reset circuit. If VDD falls below VBOR (parameter D005, about 4V) for longer than TBOR (parameter #35, about 100 µs), the brown-out situation will reset the device. If VDD falls below VBOR for less than TBOR, a RESET may not occur. Once the brown-out occurs, the device will remain in Brown-out Reset until VDD rises above VBOR. The Power-up Timer then keeps the device in RESET for TPWRT (parameter #33, about 72ms). If VDD should fall below VBOR during TPWRT, the Brown-out Reset process will restart when VDD rises above VBOR, with the Power-up Timer Reset. The Power-up Timer is always enabled when the Brown-out Reset circuit is enabled, regardless of the state of the PWRT configuration bit.

The Power Control/Status Register, PCON, has two bits to indicate the type of RESET that last occurred. Bit0 is Brown-out Reset Status bit, BOR. Bit BOR is unknown on a Power-on Reset. It must then be set by the user and checked on subsequent RESETS to see if bit BOR cleared, indicating a Brown-out Reset occurred.

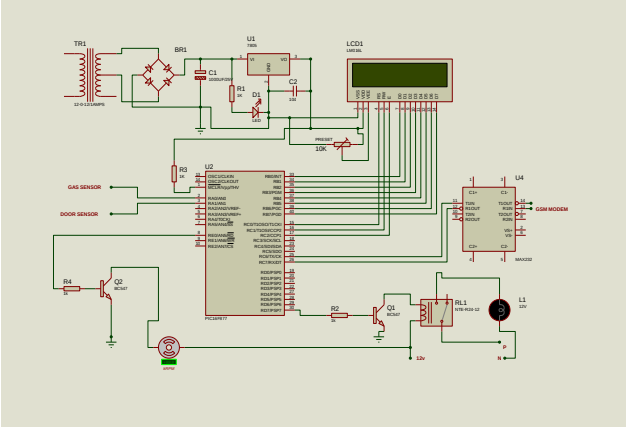

Fig.3.Circuit diagram of cost effective home automation system

Microcontrollers are silent workers in many apparatus, ranging from the washing machine to the video recorder. Nearly all of these controllers are mask programmed and therefore are of very little use for applications that require the programs to be changed during the course of execution.Even if the programs could be altered, the information necessary to do so an instruction set, an assembler language and description for the basic hardware is either very difficult to obtain or are in adequate when it came to the issue of accessibility.

A marked exception to the above category is the PIC 877 micro controller belonging to the PIC family. This microcontroller has features that seem to make it more accessible than any other single chip microcontroller with a reasonable price tag.The PIC 16F877A is an 16 bit single chip microcontroller has got a powerful CPU optimized for control applications. The PIC I6F877a is an 8 – bit single chip microcontroller. The 16F877A provides a significantly more powerful architecture, a more powerful instruction set and a full serial port.

The PIC I6F877A is a complete micro controller. There are 40 pins needed by the five-bidirectional ports. Pins provide power, allow you to connect a crystal clock and provide a few timing and control signals.

The architecture includes the ALU, W register, the stack; a block of registers. All these devices are connected to via internal 8-bit data bus. Each I/O port is also connected to the 8-bit internal data bus through a series of registers. These registers hold data during I/O transfers and control the I/O ports. The architectural block diagram also shows the PIC I6F877a ROM and RAM.The concept of GSM module and alarm circuitry has been briefly discussed in forthcoming chapter.

DOI 10.17148/IJIREEICE.2015.3316

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Vol. 3, Issue 3, March 2015

4. CONCLUSION

Thus implementation of this project gives an effective control over the home appliances. It also gives secured and sophisticated environment. Maximum number of home appliance can be controlled by this system.

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