Smart Home Automated Control System Using Bluetooth Based on Solar Panel

Tripurantaka Swamy Garlapati, P.S.H.S. Lakshmi

***Abstract*—Smart home system is dealing incorporating a communication network that connect electric appliance and service allowing them remotely by a Bluetooth device controlled monitored of accessed the main thing for system is which are home automation and remote monitoring including humidity temperature the system is design on microcontroller by LPC 2148 by the power absorbed from solar panel and store in battery. The paper presents the hardware implementation of a multiple from control system for house automation and combine both hard ware and soft ware technologies. The system results shows that I can be classified as a comfortable, secure, economic and private system and it is flexible an reliable**

Keywords— LPC2148, IR Sensor, HUMIDITY Sensor, Bluetooth Solar panel.

I. INTRODUCTION

Smart home is an emerging concept that attracts the synergy of several areas of science and engineering. The main feature of this project is to increase the power efficiency at the consumer level. The smart house technology is one realization of home automation ideals using a specific set of technology. It is house that that has highly advanced automatic system for lighting and temperature in house..

II. MICROCONTROLLER

A. General Description

Arm 7 is one which is widely used microcontroller family in embedded system. Arm is a family instruction set which reduce instruction set computing (RISC). In this arm 7 widely used is LPC 2148, 8 to 40 kB of on chip static RAM 32 to 512 kB of on chip flash program memory. 128-bit wide memory interface and a unique accelerator architecture enable 32-bit code execution at the maximum clock rate.

B. Specifications

- 16-bit/32-bit ARM7TDMI-S microcontroller in a tiny LQFP64 package.
- 8kB to 40kB of on-chip static RAM and 32kB to 512kB of on-chip flash memory.
- In-System Programming /In Application Programming (ISP/IAP) via on-chip boot loader software. Single flash sector or full chip erase in 400 ms and programming of 256 bytes in 1ms.
- Embedded ICE RT and Embedded Trace interfaces offer real-time debugging with the on-chip Real Monitor software and high-speed tracing of instruction execution.
- USB 2.0 Full-speed compliant device controller with 2kB of endpoint RAM. In addition, the LPC2146/48 provides 8kB of on-chip RAM accessible to USB by DMA.
- Vector interrupt controller with configurable priority and vector address
- Up to 21 external interrupt pin available
- One or two (LPC2141/42 vs. LPC2144/46/48) 10-bit ADCs provide a total of 6/14 analog inputs, with conversion times as low as 2.44µs per channel.
- Power saving mode include idle power down
- Single 10-bit DAC provides variable analog output (LPC2142/44/46/48 only).
- Two 32-bit timers/external event counters (with four capture and four compare channels each), PWM unit (six outputs) and watchdog.
- Low power Real-Time Clock (RTC) with independent power and 32 kHz clock input.
- Processor make up from power down mode via external interrupt or BOD
- CPU operating voltage range of 3.0 volts o 3.6v with 5v tolerant i/o pads

III. HARDWARE IMPLEMENTATION

Hardware implementation deals in drawing the schematic on the plane paper according to the application, testing the schematic design over the breadboard using the various IC's to find if the design meets the objective, carrying out the PCB layout of the schematic tested on breadboard, finally preparing the board and testing the designed hardware.

A. Block Diagram:

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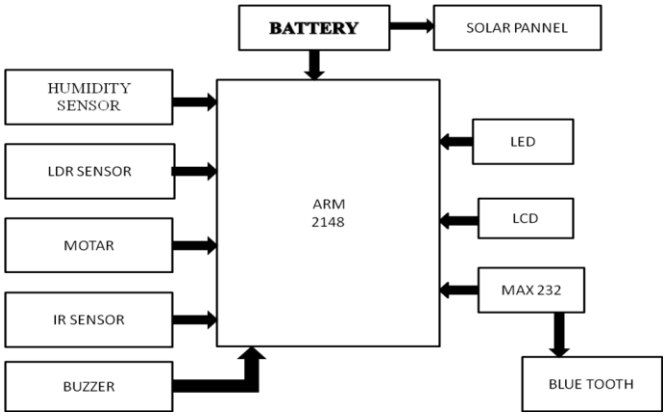

B. Units

Solar panel:

A solar panel (also solar module, photovoltaic module or photovoltaic panel) is a packaged, connected assembly of photovoltaic cells. The solar panel can be used as a component of a larger photovoltaic system to generate and supply electricity in commercial and residential applications. Each panel is rated by its DC output power under standard test conditions, and typically ranges from 100 to 320 watts. The efficiency of a panel determines the area of a panel given the same rated output - an 8% efficient 230 watt panel will have twice the area of a 16% efficient 230 watt panel

Power Supply:

The input to the circuit is applied from the regulated **Power Supply**. The ac. input i.e., 230V from the solar panel which is absorbed and stored in battery 12V and is fed to a rectifier. The output obtained from the rectifier is a pulsating dc voltage. So in order to get a pure dc voltage, the output voltage from the rectifier is fed to a filter to remove any ac components present even after rectification. Now, this voltage is given to a voltage regulator to obtain a pure constant dc voltage.

IR Sensors:

IR Sensors are placed in room so that if any one enter into room automatically led will on LEDs are efficiency used as light emitters in visual display units and in optically coupled circuits, The efficiency of light generation increases with the increase of injected current and with decreases in temperature

Bluetooth:

Bluetooth was selected as our way of communication mobile with central system. Bluetooth module receives the data serially in RS232 format from controller and sends it to wireless network. For interfacing it with microcontroller we need to build the circuit because Bluetooth module under stands data in RS232 standard and controller understands data in ttl format Bluetooth radio and software that makes it easy to connect when two Bluetooth devices want to talk to each other they need to pair communication between Bluetooth devices happens over short range and HOC network device connected using Bluetooth technology.

Humidity Sensor:

Humidity control is also necessary in chemical gas purification, dryers, ovens, film desiccation, paper and textile production, and food processing. In agriculture, measurement of humidity is important for plantation protection (dew prevention), soil moisture monitoring, etc. For domestic applications, humidity control is required for living environment in buildings, cooking control for microwave ovens, etc. In all such applications and many others, **humidity sensors** are employed to provide an indication of the moisture levels in the environment.

LCD:

The alphanumeric 16character X 2line **LCD** requires 8data lines and also 3 control signals and they are interfaced to 3664.By using 2 ports, port 0&3 data pins are connected to LCD as data bus. Port0 can be basically used as I/O port i.e. it can be programmed as an input or as an output port.

L293D:

L293D is a dual H-Bridge motor driver, So with one IC we can interface two DC motors which can be controlled in both clockwise and counter clockwise direction and if you have motor with fix direction of motion the you can make use of all the four I/Os to connect up to four DC motors. L293D has output current of 600mA and peak output current of 1.2A per channel. Moreover for protection of circuit from back EMF output diodes are included within the IC. The output supply (VCC2) has a wide range from 4.5V to 36V, which has made L293D a best choice for DC motor driver.

Buzzers:

These **buzzers** feature low power consumption, a safe, spark-free, non-contact structure, a small size and light weight for an easy mounting to printed circuit boards. As a result, an increasing number of piezo ceramic buzzers are now used to generate an artificial voice in combination with voice synthesizing ICs. To produce high quality piezo ceramic buzzers, FDK has capitalized on many years of piezo ceramics production and outstanding ceramic processing technologies and thin film forming techniques. By adding a sophisticated audio know-how to this manufacturing expertise, FDK offers a large array of electronic tone generating products, such as piezo ceramic diaphragms, sounders and buzzers, to meet loud sound outputs, wide frequency ranges and many other requirements.

IV. SYSTEM MODULE

security or home automation can be achieved by adopting central controllers to control home devices or appliances that sense different variables using appropriate sensors. The main aspect of such a system is a sensory system that collects the

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parameter information like temperature, fire, human presence, gas, etc., and sends the corresponding data to the microcontroller or any other processor. This controller is programmed such that when these parameters cross their prescribed limits, it sends the command signals to various final controlling devices like relays, motors and buzzer devices.

Bluetooth Module: Bluetooth Module allows the Android mobile to communicate over the network through AT commands. It chip and operates over a subscription through a wireless network. It is a highly flexible plug-and-play device capable of connecting to a PC or any microcontroller's serial port through MAX232IC. This IC is used to convert the TTL logic levels of the microcontroller to a RS232 logic level for enabling serial communication.

We propose an intelligent household LED lighting system and HUMIDITY sensor various sensor and wireless communication technology. Using various sensor and wireless Communication technology.

The project deals in two modes to control the home appliances with wireless technology Bluetooth system.

- Automatic mode
- Manuel mode

Automatic mode

The lights will be on when the person enter into room with the sense of LDR sensor when the person leaves the room automatically lights off with the sense of LDR sensor.

The fan will on automatically when the temperature rise in room on the base of humidity sensor. Temperature goes down automatically fan will off.

Manuel mode

We can switch on lights and fans in the room with the Bluetooth module connected to our smart phone with the android app stored in our smart phone. So we can switch on and off according to our need.

V. SOFTWARE IMPLEMENTATION

a. KEIL µVISION SOFTWARE

The u vision2 debugger provides complete simulation for the CPU and on chip peripherals of most embedded devices. To discover which peripherals of a device are supported, in u vision2. Select the Simulated Peripherals item from the Help menu. You may also use the web-based device database. We are constantly adding new devices and simulation support for on-chip peripherals so be sure to check Device Database often. User Windows, only one application may have access the COM Port at any one time, preventing other applications from using the COM Port. Flash Magic only obtains access to the selected COM Port when ISP operations are being performed. This means that other applications that need to use the COM Port, such as debugging tools, may be used while Flash Magic is loaded.

b. FLASH MAGIC

NXP Semiconductors produce a range of Microcontrollers that feature both on-chip Flash memory and the ability to be reprogrammed using In-System Programming technology. Flash Magic is Windows software from the Embedded Systems Academy that allows easy access to all the ISP features provided by the devices.

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VI. RESULTS

By Using the Basic components in Electronics and ARM Processor (LPC2148) This can be acting as a prototype model for Real environment**.** In this case are discussed about IR Sensor, Humidity Sensor and Bluetooth module data from sensors are continuously verified through the Bluetooth connection any occurrence in this sensors will send data to microcontroller with Bluetooth device. So that the system has been successfully tested using Hardware Module. The system has been successfully implemented using softwares like KeilµVision and flash magic. The Implementation was done in KeilµVision and it is successfully verified. The verified data has been dumped into IDE using Flash Magic. The system has been successfully tested using Hardware Module. The system meets desired requirements.

VII. CONCLUSION

As per the abstract design and implementation of a control and Bluetooth based on solar panel for smart home has been established. Smart home automatic control system using Bluetooth based on solar panel consists of many sub system that controlled by microcontroller software as a main control system . smart home automatic control system supported by control system as sub control system.

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