

Home Automation and Security System Using Solar Energy

Mr. Rushikesh Narkhede¹ Prof. Chetan More² Ms. Sharvari More³ Mr. Aniket Jagtap⁴

^{1,3,4}Student ²Assistant Professor

^{1,2,3,4}Bharati Vidyapeeth Deemed University College of Engineering, Pune

Abstract— The Home Automation Using Solar Energy system implemented for to reduced human efforts therefore we used three different methods. This help to reduce the work as required. The first module is switching on the devices on basis of timer. Here the user inputs the timer from when he wants the device to start and also the terminating time. The timer is based on system clock (computer’s clock). The second module is switching ON the device through mobile. Here the mobile is used with internet to sending request for device ON to the computer (PC). For devices switching ON and OFF we used Visual Basic software through make a window on computer screen. The third module is switching ON the devices through manually. Here the user gives input in the command when he wants the devices ON and OFF as well as START and STOP. The gas detection also included in this system. The LPG gas detector detects the gas and at that time buzzer started and window of kitchen opened automatically through motor drive circuit. We add one more feature garden light is depends on the sunrise and sunset. The total circuitry required supply from two section one supply through solar panel and another supply through mains.

Key words: Solar Energy, Home Automation

I. INTRODUCTION

Home Automation Using Solar Energy system (also called demotic’s) is a field within the building the automation, specialization in the some specific automation requirements of private homes and the some professional big apartment in the application. Due to the some advancement in technology home automation using solar energy we can done through wireless remote, through existing telephone line, through PC as PC is available at each and every house and through internet is possible. So we can control the devices is available in home through the internet from any place from the world. The one useful features of this system is that we can control the devices from mobile connected to GPRS. So we can access the internet from GPRS or WAP and we can monitor and control our homes devices. This home automation is based on the internet connection through global computer network for monitoring and controlling the various devices and features. The homeowner can control the features of their home through the web page. This system utilizes the various hardware components like as relay, optocoupler, parallel port, transistors, photodiode, resistor etc and software like visual basic. The main working of our system is data transferred through the serial port to opt coupler IC then signal is transferred to the relay driver circuit. According to this signal the devices will ON and OFF. The serial communication is very common protocol for device communication that is standard on almost each and every PC. The most of computers include two RS232 based serial ports the serial port sends data as well as receive data in bytes of information one bit at a time. The bit is transfer in the parallel transmission entire byte is transmitting in serial communication. Typically the serial communication is used for transmit ASII data. The

serial communication is asynchronous there is the port available for transmit the data one line while receiving the data on another line. In this system we used the MQ6 sensor for detecting the LPG gas when leakage in our around space. After that LPG regulator OFF and window of kitchen is opened automatically and switched OFF light and fan at that present in kitchen. When gas is leakage that time buzzer will started till all gas moisture moved to outside. It is a very useful feature in this system. Then the next is garden light or light at present around the house. The garden light is depending on the sun moving. When the sunset is happening that time the garden light ON automatically as well as sunrise is happening at that time garden light automatically OFF. The required supply provided by the solar energy. We convert solar energy to the DC as well as AC power and for storing we used battery.

II. FEATURES

- Device control
 - Internet control
 - Manual control
 - Time control
- LPG
 - LPG Regulator off
 - Mains off
 - Window open
- Garden light
 - Work on AC and DC power supply

III. BLOCK DIAGRAM

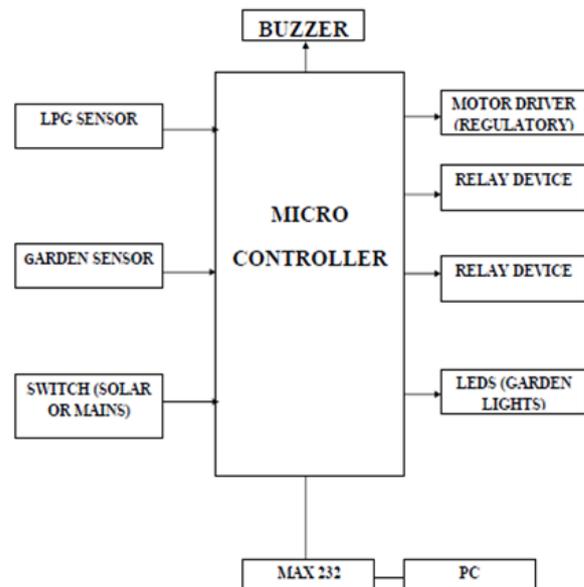


Fig. 1: Block Diagram Home Automation and Security System using Solar Energy

In that system we used AT89S52 a low-power, this CMOS microcontroller is high performing with 8kbyte programmable erasable flash RAM memory. Our device is manufacturing by the Atmel's high-density nonvolatile memory technology and is compatible with the industry standard 80C51 instruction set and pin out. In our system the two supplies is used to provide circuitry. One is solar power and second one is provided by the main supply. Buzzer is used for indicating the gas is leakage or not and then it decided the further operation. There we used some sensor for sensing and controlling the next features. We used LPG sensor, garden light sensor like. We used motor for controlling the LPG regulator. This regulator turn ON and OFF by using the motor driver. The relay device is most commonly used for the controlling high intensity devices. The relay is the one type of switch it acts automatically by the electromagnetic field and our devices controlling by this switch. The LED blub is used as a garden light they required some small amount of voltage supply through driver circuit. The MAX232 is used for serial communications. The computer is connected to circuit through the MAX232. The connection between the computer and device through RS232 sequence the space with the right timing, it does not decode the RS232 signal, and it does not provide a serial/parallel conversion. The computer is used for giving the input signal system likes window of visual basic. This window made through the visual basic software.

The data transmission steps are:

- 1) First we reset the T1 flag register.
- 2) Data to be transmitted must be written into SBUF.
- 3) This data is transmitted by the T1flag register when it is set and our main program is interrupted by ISR.
- 4) The ISR T1 flag is reset. Other data is written in SBUF register.

IV. VISUAL BASIC SOFTWARE

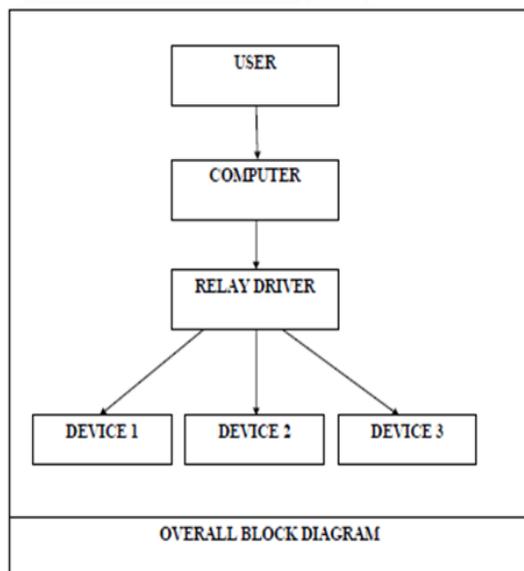


Fig. 2: of Block diagram of visual basic

The above diagram is the visual basic software. In the visual basic create the window on computer screen with the help of some software skills. This software is used to create the ON/OFF window. This window helps to user

switching the devices ON/OFF. The user creates his own file on the computer screen and gives the command through this window. Data access features allows you to create databases, front-end application. From this window user control the so many devices at a time. The visual basic scripting edition (VBScript) is widely used scripting language and a subnet of the visual basic language.

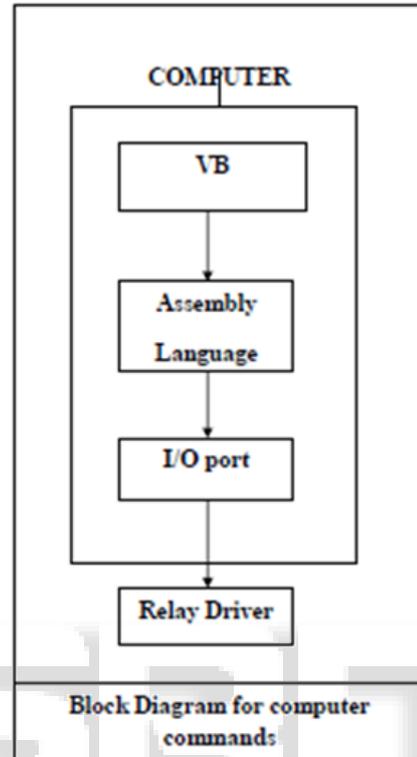


Fig. 3: of Block diagram for computer commands

In the computer commands computer gives the command to relay driver. In that case commands give through the visual basic software. We write the assembly language program in this software. We used I/O port such as port 0, port1; port2 and port3 for connect the relay driver. The relay driver is control through this 4 port.

V. PCB PREPARATION TECHNIQUE

In the PCB designing first we make a layout of the circuit. The PCB designing can we done through the EAGAL software. The good component place will make layout job easier and give best result of electrical parameter. Bad component can turn routing job and give poor result of electrical parameter. It may even make your board. Set your snap grid, visual grid, and default track/ pad sizes.

- Mount all the components onto the board.
- Divided and mount your components into functional "Building Block" where possible.
- Find out critical tracks on your circuit and route them.
- Mount and route each and every building block separately, off the board.
- Check the building block position on your main board.
- Route the remaining signal and power connection between blocks.
- Does a Design Rule Check (DRC)?
- Get someone to check it.

VI. POWER SUPPLY

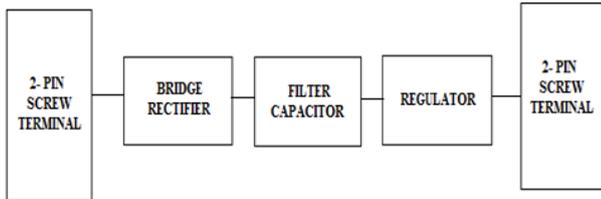


Fig. 4: of Block diagram of main power supply

Connector: 2-pin screw terminal is basically connector used to interface power supply section with other circuits through wires i.e. wires are inserted in connectors.

Bridge Rectifier: W10 full wave bridge rectifier is used to convert incoming AC signal into varying DC signal i.e. it consist of ripple at the output. As a result, varying DC signal is not suitable for electronic circuits unless they include a smoothing capacitor.

Filter Capacitor: Filter capacitor of at output of bridge rectifier is used to provide less ripple at the output which is suitable for most electronic circuits. But their output is not regulated hence we are using regulator at the output side.

Regulator: Regulator IC is used to provide constant DC or smooth output with no ripple. Regulator IC mainly used are 7805, 7809, 7812, 78XX represent positive voltage regulator and last two digits represent output voltage. 7805= +5v; 7809= +9v; 7812= +12v

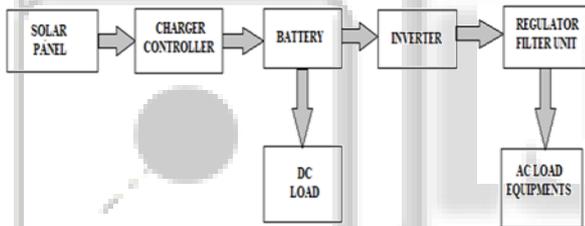


Fig. 5: of Block diagram of solar power to main AC power

Solar panels are connect assembly normally 6*10 photovoltaic solar cells. The photovoltaic modules use sun light energy to convert electricity through the photovoltaic effect. Efficiencies of solar panel can be calculated by MPP value of panels.

Charger controller is nothing but a battery regulator which added the electrical current in battery. It is perform controlled discharging depend upon the battery product and its technology of battery life.

Battery is used for storing the voltage and it decide to provide voltage each and every section of circuit. There will we use different types of batteries at that performance. In that battery store DC voltage it's required to DC load. The input voltage, output voltage and frequency and power handling depend on the design of device.

Filter used for filtering the signal from DC to AC. Filter block the unwanted signal which is not required for circuit. In that case we can use so many filters such as high pass, low pass filter. This filer convert the signal is constant AC signal. Then it provided to AC equipments.

VII. ADVANTAGES

- 1) This is a live monitoring service.
- 2) There we will use automatic sensors.

- 3) This system can be handling by internet, manually.
- 4) AC external port is available at the output.

VIII. APPLICATIONS

- 1) It is used in industrial automation.
- 2) It is used in home automation.
- 3) Aid for blind so as they can switch numerous things on and off by their speech by adding speech control.
- 4) It can monitor hone activity from a remote

IX. CONCLUSION

- The devices are properly working according to manually.
- Connection can be established easily provided that the server is on.
- The connection with the server takes time as it uses internet connection.
- Receiving data from the server takes time.

X. FUTURE SCOPE

- 1) The whole system can be designed by using controllers and embedded system for providing a wireless automation solution.
- 2) The speech control system can be further extending to other devices and appliances for user friendliness for blind people.
- 3) We can also add cameras at various positions and get a live video output on internet.

REFERENCES

- [1] Jinsoo Han, Chang-Sic Choi, Wan-Ki Park, Ilwoo Lee, and Sang-Ha Kim, —Smart Home Energy Management System Including Renewable Energy Based on ZigBee and PLC| IEEE Transactions on Consumer Electronics, Vol. 60, No. 2, May 2014.M. Young, The Technical Writer's Handbook. Mill Valley, CA: University Science, 1989.
- [2] Singamaneni Venkatesh Kumar, Mr.V.Prasannanjaneya Reddy, MTech, —Zigbee Based Home Energy Management System Using Renewable Energy Sources| International journal & magazine of engineering technology, management and research ISSN No.:2348-4845, volume no.2,January 2015, pp. 5-7.K. Elissa, "Title of paper if known," unpublished.
- [3] Khusvinder Gill, Shuang-Hua Yang, Fang Yao, and Xin Lu, —A ZigBee-Based Home Automation System|, IEEE Transactions on Consumer Electronics, Vol. 55, No. 2, MAY 2009.
- [4] 61 R. J. C. Nunes and J. C. M. Delgado, An Internet Application for Home Automation, 10th Mediterranean Electro technical Conference, MeleCon 2000, Vol. I
- [5] Chetana Sarode, Prof.Mr.H.S.Thakar ,” Intelligent Home Monitoring System”, International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 www.ijera.com Vol. 3, Issue 1, January - February 2013
- [6] Naresh P Jawarkar, Vasif Ahmed, Siddharth A Ladhake and Rajesh D Thakare (2008), “Micro-Controller Based Remote Monitoring Using Mobile Through Spoken Commands”, Journal of Networks, Vol. 3, No. 2.

- [7] Rajeev Piyare (2013), "Internet of Things: Ubiquitous Home Control and Monitoring System Using Android Based Smart Phone", International Journal of Internet of Things.

