

International Journal of Innovative Research in Science, Engineering and Technology

(A High Impact Factor & UGC Approved Journal)

Website: www.ijirset.com

Vol. 6, Issue 8, August 2017

VLSI Based Automated Digital Person Counter and Smart Appliances Control System for Energy Conservation Using CPLD Chip

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ABSTRACT: In this project every room will be monitored by a single CPLD which will keep the record of the number of persons in every room and when it finds the no of persons in a room to be zero then it automatically cut the power line for that room. We can also use a SEVEN SEGMENT, which will display the status of every room. The project can be subdivided into three main parts. First:- The one that will detect the entry or exit of a person in the room this module will be applied at the door of each room. Second:- Which will further differentiate between entry or exit and then accordingly increase or decrease the count of each room and display the count of each room on the timesharing bases on the seven segment, will be installed at a single central room. Third:- will be used to control the power line of each room which will work jointly with the second module to control the switching of power of each room.

KEYWORDS: Analog & Digital Sensors, Featured Projects, VLSI , FPGA , CPLD

I. INTRODUCTION

For nowadays, we will switch OFF the light when we are going out from the Office or sleep in the bedroom. Therefore, if they have a motion detection system to switch ON the light automatically, it is easier for them to avoid cannot find a switch and occur accident. With this system, users do not have to turn ON the light or fan manually. Once users entered the room, light will turn ON and fan is depends on the temperature. It is convenient to the old people and some handicapped people who are sitting on the wheelchair. This project is basically a very great application of the CPLD in daily life. In our daily life we normally forget or don't care to switch off the electrical devices used at our homes i.e. fans, tubes, bulbs etc. Every device has a particular power ratings according to which it consumes electricity now the working of these devices without any use will lead to wastage of power and ultimately to the electricity bills. Intelligent Energy Saving System can be used in places like where lighting is very important.

II. LITERATURE REVIEW

In Existing system The Project 'Automatic Room Light Controller Using microcontroller ATMEGA16A and bidirectional visitor counter' controls a room light as well as count the number of individuals entering and leaving a room. When an individual enters into a room then one counter is incremented by one and one light in a room will be switched ON and when the individuals leaves a room then the counter is decremented by one. When the number of individuals in a room is greater than 5 then 2 lights will be switched ON. When the individuals in a room are more than 10 then 3 lights will be switched ON. Similarly on increase of every 5 individuals one more light will switched ON. Lights will turn OFF when all the individuals go out of a room. The total number of individuals present inside a room is also displayed on the LCD display. IR sensors and microcontroller does above job. IR sensors sense the obstruction and microcontroller receives the signals produced by the obstruction from the sensors. The received signal is operated via program stored in ROM of Microcontroller.[1,2]

In this digital word we need every possible thing around us to be automatic which reduces human efforts. There are increasing electronic circuits that make today's life easier and simple. Nowadays Energy Crisis is the big problem faced

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by everyone. So there is a need to conserve energy. This project is very useful for such problems as one generally forgets to turn off lights and fans while leaving a room. The aim of this is to make an automatic controller based prototype to count the number of individuals entering in the particular room and accordingly light up a room. This project has two parts. One is “Individual count” and other is “Automatic room light Controller” We use IR sensors to detect number of individuals entering in a room. This circuit counts the number of individuals and displays the count on the seven segment LCD display to avoid congestion. This project is very helpful in schools and colleges for their auditorium. “AUTOMATIC ROOM LIGHT CONTROLLER USING MICROCONTROLLER AND VISITOR COUNTER” as the name specifies that it controls the task of counting the number of individuals and lights of a room with accuracy. When an individual enters into a room then one counter is incremented by one and one light in a room will be switched ON and when the individuals leaves a room then the counter is decremented by one. When there is no individual in a room then lights will be switched off automatically.[3,5]

Digital Visitor Counter is device or system that can read the incoming and outgoing agents or traffics that tends to visit or physically visit a place and. The system is proposed and designed in this paper that is the visitor counter that is bidirectional in feature which can read both the incoming and outgoing traffic and agents at same time securely. In this system, up to 999 incoming or outgoing visitors can be counted using microcontroller. Microcontroller is used here to make a secure count over a large number of visitors. This system is essentially required in many places where count for the visitors is needed by the administrator of that system. The design and demonstrations are produced in this paper.[6,7]

In recent era, the count for the visitors become essential in many cases like in shopping mall, Hotels, restaurants etc. where the count is required to make a satisfaction of the administrators who relies on electronics system for the count of the incoming or outgoing visitors or traffics[1]

[2][3]. The system proposed and designed here is bidirectional in nature that is it can count up by one when someone get enter into some place. When someone exits that place, the system decrease the count by one so to adjust the total count. The Digital Visitor Counter is available in market but it is necessary to be the system with bidirectional in nature [2][3][4][5]. The system includes a microcontroller for making complete control over the system for controlling its sub devices as well as counting the visitors. The output is set to be show on LED connected with it.

Three 7-Segment display are connected with the system so that it can count up to 999 visitors [1][3][5][7][8].

III. PROPOSED SYSTEM ARCHITECTURE

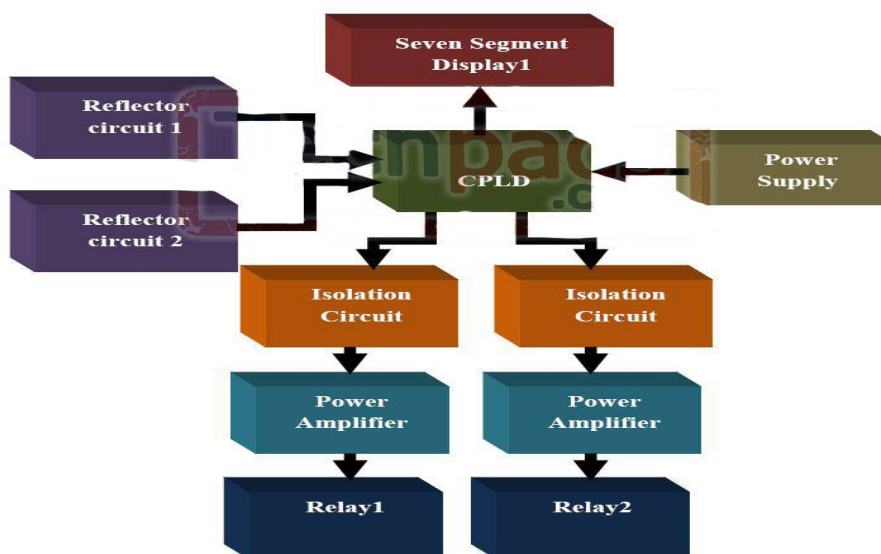


Fig No 01 Proposed System Architecture

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Explanation-

In this project every room will be monitored by a single CPLD and the CPLD will keep the record of the number of persons in every room and when it finds the no of persons in a room to be zero then it automatically cut the power line for that room. We can also use a SEVEN SEGMENT, which will display the status of every room. The project can be subdivided into three main parts. First is the one which will detect the entry or exit of a person in the room this module will be applied at the door of each room. The second part, which will further differentiate between entry and exit and then accordingly increase or decrease the count of each room and display the count of each room on the timesharing bases on the seven segment, will be installed at a single central room. Third and the last module will be used to control the power line of each room which will work jointly with the second module to control the switching of power of each room.

IV. EXPERIMENTAL RESULT

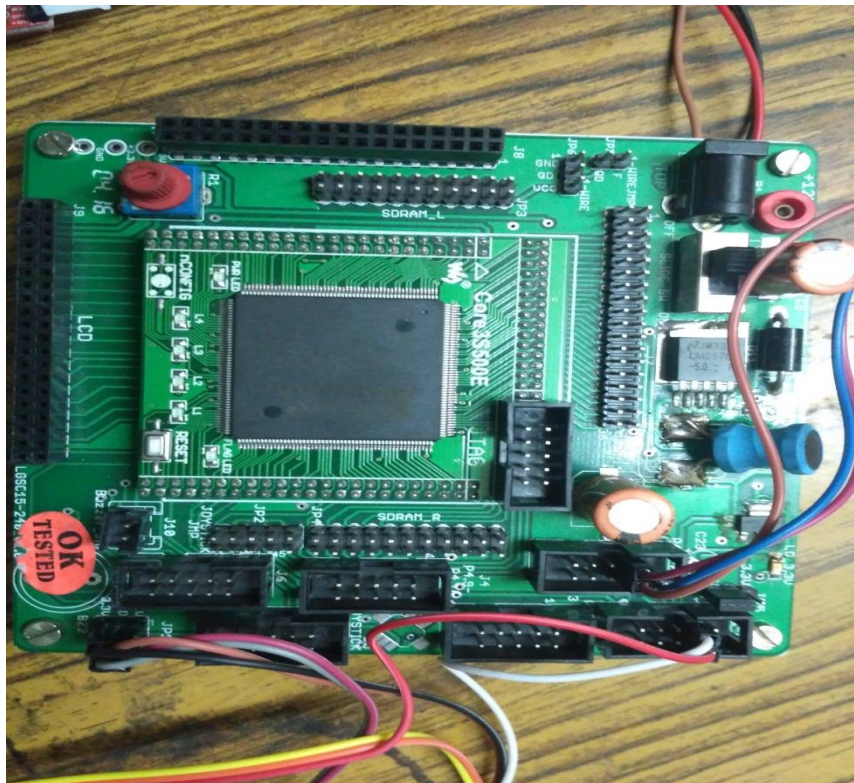


Fig 1- FPGA Spartan 3 kit

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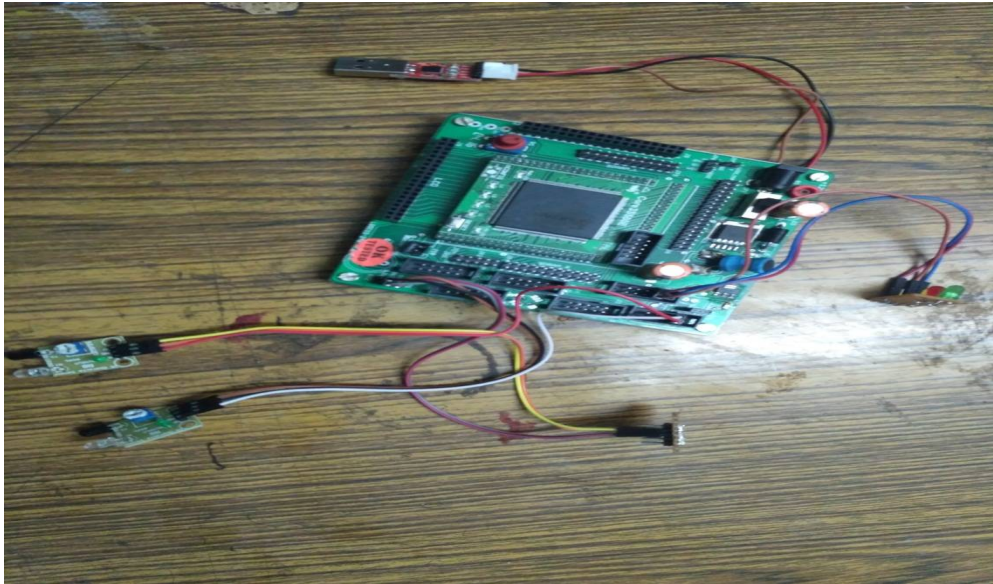


Fig 2 - When the circuit is off

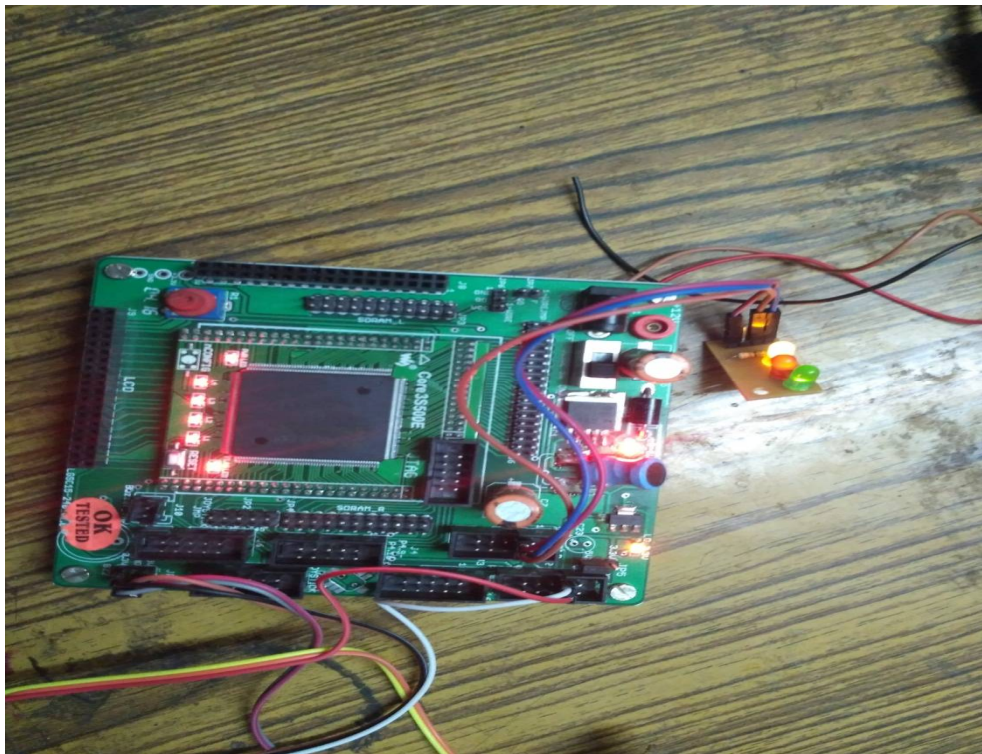


Fig 3- The led glows when a person passes through the IRsensor.

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V. CONCLUSION

From the consideration of all the above points we conclude that every room will be monitored by a single CPLD which will keep the record of the number of persons in every room and when it finds the no of persons in a room to be zero then it automatically cut the power line for that room. We can also use a SEVEN SEGMENT, which will display the status of every room. The project can be subdivided into three main parts. First:- The one that will detect the entry or exit of a person in the room this module will be applied at the door of each room. Second:- Which will further differentiate between entry or exit and then accordingly increase or decrease the count of each room and display the count of each room on the timesharing bases on the seven segment, will be installed at a single central room. Third:- will be used to control the power line of each room which will work jointly with the second module to control the switching of power of each room.

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