

# “AUTOMATIC ROOM LIGHT CONTROLLER WITH BIDIRECTIONAL VISITOR COUNTER”.

## Introduction Of Project :-

### ➤ Project Definition:-

Project title is “Automatic Room Light Controller With Bidirectional Visitor Counter”.

The objective of this project is to make a controller based model to count number of persons visiting particular room and accordingly light up the room. Here we can use sensor and can know present number of persons.

In today's world, there is a continuous need for automatic appliances. With the increase in standard of living, there is a sense of urgency for developing circuits that would ease the complexity of life.

Also if at all one wants to know the number of people present in room so as not to have congestion, this circuit proves to be helpful.

This project "automatic room light controller with visitor counter using microcontroller" is a reliable circuit that takes over the task of persons/visitor in the room very accurately. When somebody enters into the room will be switched ON and when any one. The light in room will be only switched OFF until all the persons in the room go out. The total number of person inside the room also displayed on the seven segment displays. The microcontroller does the above job. it receives the signals from the sensors, and this signal is operated under the control of software which is stored in rom.

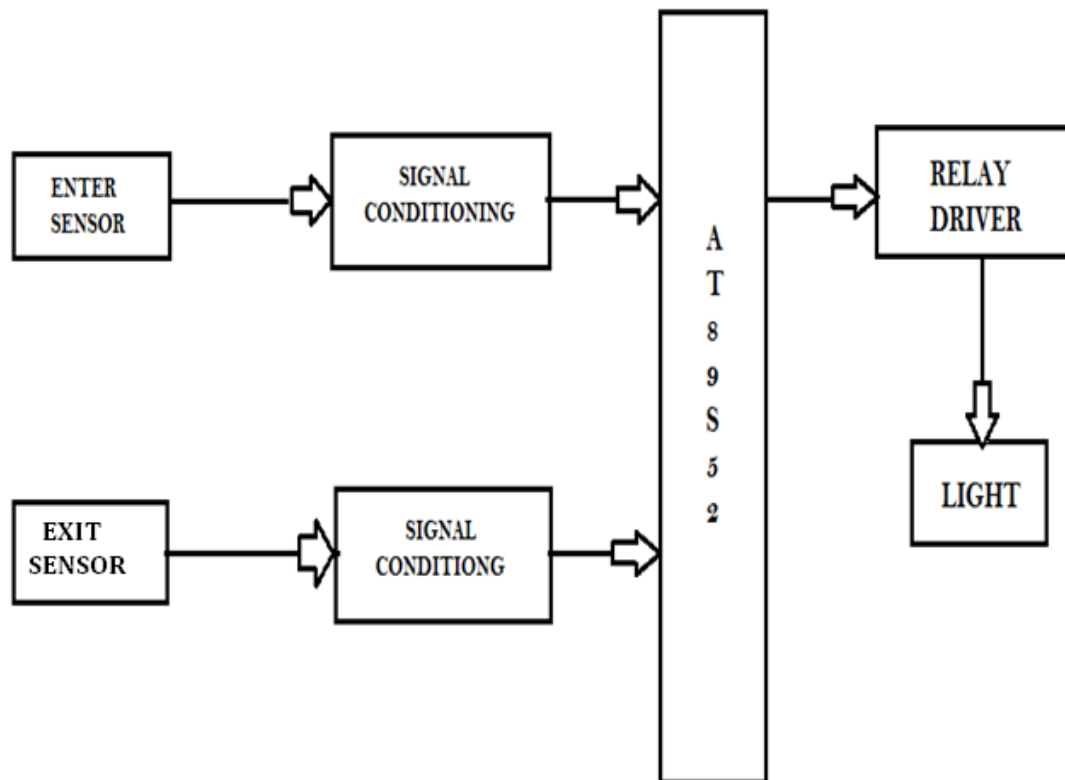
Micron roller AT89S52 continuously monitor the infrared receivers, when any object pass through the IR rays falling on the receivers are obstructed this obstruction is sensed by the microcontroller.

## ➤ Project Overview:-

This Project —Automatic Room Light Controller with Visitor Counter using Microcontroller is a reliable circuit that takes over the task of controlling the room lights as well as counting number of persons/ visitors in the room very accurately. When somebody enters into the room then the counter is incremented by one and the light in the room will be switched ON and when any one leaves the room then the counter is decremented by one. The light will be only switched OFF until all the persons in the room go out. The total number of persons inside the room is also displayed on the seven segment displays.

The microcontroller does the above job. It receives the signals from the sensors, and this signal is operated under the control of software which is stored in ROM. Microcontroller AT89S52 continuously monitor the Infrared Receivers, When any object pass through the IR Receiver's then the IR Rays falling on the receiver are obstructed, this obstruction is sensed by the Microcontroller.

### BLOCKDIAGRAM AND ITS DESCRIPTION



## ➤ **Block Diagram Description:-**

The basic block diagram of the bidirectional visitor counter with automatic light controller is shown in the above figure. Mainly this block diagram consists of the following essential blocks.

1. Power Supply
2. Entry and Exit sensor circuit
3. AT 89S52 micro-controller
4. Relay driver circuit

### 1. **Power Supply:-**

Here we used +12V and +5V dc power supply. The main function of this block is to provide the required amount of voltage to essential circuits. +12V is given to relay driver. To get the +5V dc power supply we have used here IC 7805, which provides the +5V dc regulated power supply.

### 2. **Enter and Exit Circuits:-**

This is one of the main parts of our project. The main intention of this block is to sense the person. For sensing the person and light we are using the light dependent register (LDR). By using this sensor and its related circuit diagram we can count the persons.

### 3. **89S52 Microcontroller:-**

It is a low-power, high performance CMOS 8-bit microcontroller with 8KB of Flash Programmable and Erasable Read Only Memory (PEROM). THE device is manufactured using Atmel's high-density nonvolatile memory technology and is compatible with the MCS-51TMinstruction set and pin out. The on-chip Flash allows the program memory to be reprogrammed in-system or by a conventional nonvolatile memory programmer. By combining a versatile 8-bit CPU with Flash on a monolithic chip, the Atmel AT89S52 is a powerful.

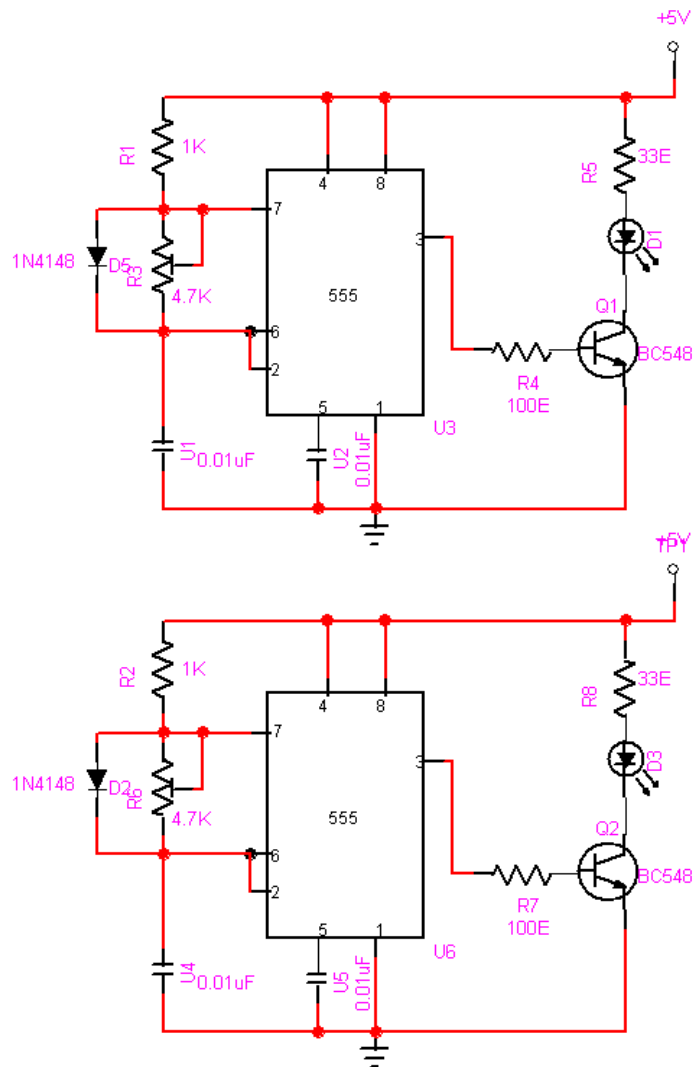
#### 4. **Relay Driver Circuit:-**

This block has the potential to drive the various controlled devices. In this block mainly we are using the transistor and the relays. One relay driver circuit we are using to control the light. Output signal from AT89S52 is given to the base of the transistor, which we are further energizing the particular relay. Because of this appropriate device is selected and it do its allotted function.

#### ❖ **CIRCUIT DESCRIPTION:-**

- There are two main parts of the circuits.
- ❖ .Transmission Circuit (Infrared LEDs)
- ❖ Receiver Circuit (Sensors)

#### ➤ **Transmission circuit:-**



This circuit diagram shows a 555 timer IC, configured to function as a basic astable multivibrator. The astable multivibrator generates a square wave, the period of which is determined by the circuit external to IC 555. The astable multivibrator does not require any external trigger to change the state of the output. Hence the name free running oscillator. The time during which the output is either high or low is determined by the two resistors and a capacitor which are externally connected to the 555 timer.

In this circuit, a negative pulse applied at pin 2 triggers an internal flip-flop that turns off pin 7's discharge transistor, allowing C1 to charge up through R1. At the same time, the flip-flop brings the output (pin 3) level to 'high'. When capacitor C1 is charged up to about  $\frac{2}{3} V_{cc}$ , the flip-flop is triggered once again, this time making the pin 3 output 'low' and

IR Transmission circuit is used to generate the modulated 36 kHz IR signal. The IC555 in the transmitter side is to generate 36 kHz square wave. Adjust the preset in the transmitter to get a 38 kHz signal at the o/p. Then you point it over the sensor and its o/p will go low when it senses the IR signal of 38 kHz

The diagram illustrates an Automatic Room Light Controller. It consists of two infrared sensors (U2, U3) that detect motion. Each sensor is connected to a 555 timer IC (U8, U9) configured as a monostable multivibrator. The outputs of these timers are connected to a central microcontroller IC1 (AT89S52). The microcontroller controls two relays (Q1, Q2) which switch the light bulbs (B1, B2) on or off. The circuit is powered by a 230V AC source (B1) through a transformer (Q1) and a 12V regulator (U4). The circuit includes various passive components such as resistors (R1-R14), capacitors (C1-C5), and diodes (D1, D2).

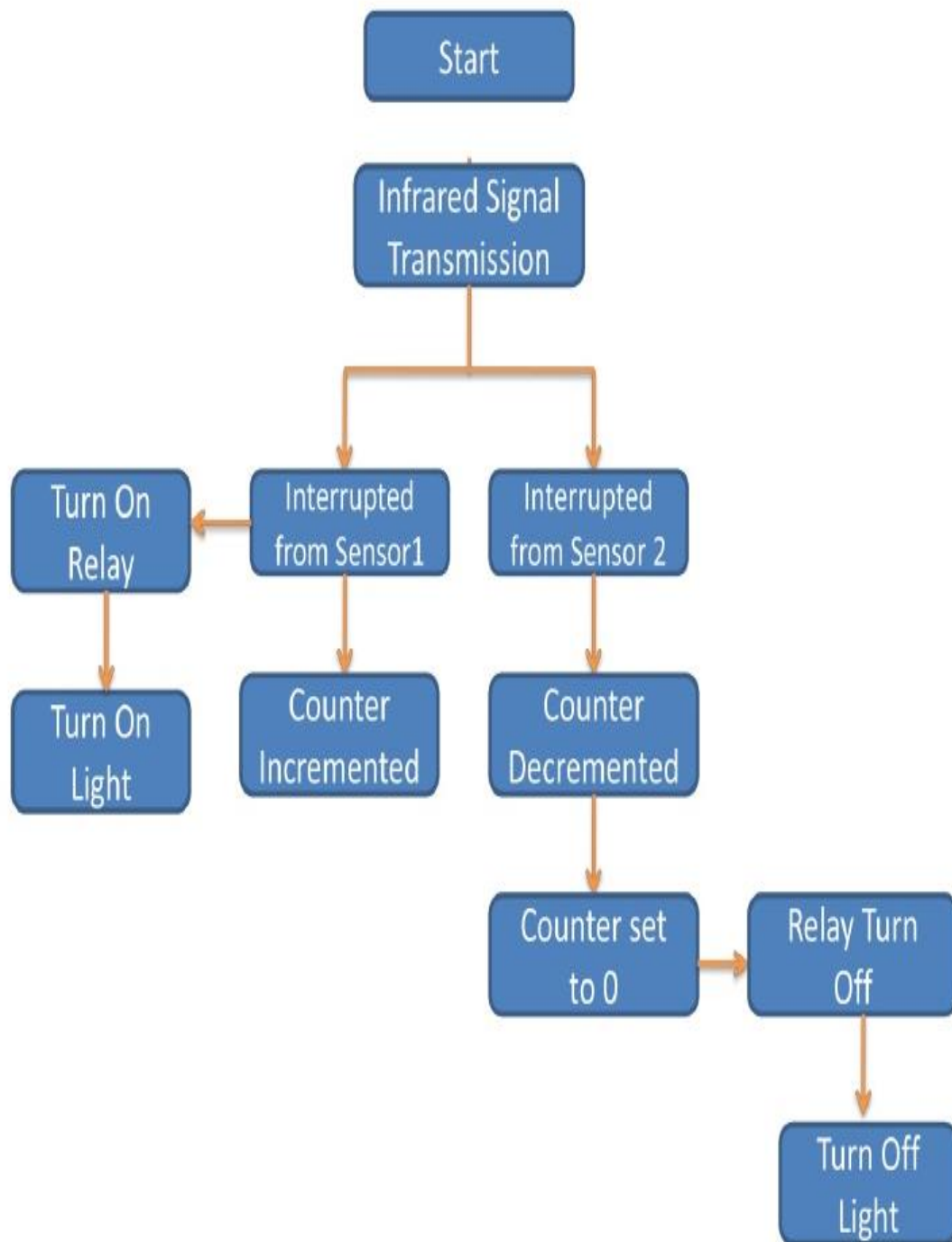
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for the Relay Turn On and Turn off Purpose.LTS 542 (Common Anode) is used for 7-Segment display and that time Relay will get voltage and triggered, so light will get voltage and it will turn on and when counter will be 00 and at that time Relay will be turned off. Reset button will reset the microcontroller.

## **LIST OF COMPONENTS**

1. Microcontroller – AT89S52
2. IC – 7805
3. Sensor – TSOP 1738 (Infrared Sensor)
4. Transformer – 12-0-12, 500 mA
5. Preset – 4.7K
6. Disc capacitor – 104,33pF
7. Reset button switch
8. Rectifier diode – IN4148
9. 9.Transistor – BC 547, 2N2222
- 10.7-Segment Display

## PROJECT FLOW CHART





- If the sensor 1 is interrupted first then the microcontroller will look for the sensor 2, and if it is interrupted then the microcontroller will increment the count and switch on the relay, if it is first time interrupted.
- If the sensor 2 is interrupted first then the microcontroller will look for the sensor 1, and if it is interrupted then the microcontroller will decrement the count.
- When the last person leaves the room then counter goes to 0 and that time the relay will turn off, and light will be turned off.

## FUTURE EXPANSION

1. By using this circuit and proper power supply we can implement various applications Such as fans, tube lights, etc.
2. By modifying this circuit and using two relays we can achieve a task of opening and closing the door.

## ADVANTAGES & DISADVANTAGES & APPLICATION,

### ➤ Advantages:-

1. Low cost
2. Easy to use
3. Implement in single door

### ➤ Disadvantages:-

1. It is used only when one single person cuts the rays of the sensor hence it cannot be used when two person cross simultaneously.

- **Application:-**

1. For counting purposes
2. For automatic room light control

## **REFERENCE BOOKS & WEBSITE**

- **Reference Books**

1. Programming in ANSI C: E BALAGURUSAMY
2. The 8051 microcontroller and embedded systems: MUHAMMAD ALI MAZIDI
3. JANICE GILLISPIE MAZIDI
4. The 8051 microcontroller: KENNETH J. AYALA

- **Website**

1. [www.datasheets4u.com](http://www.datasheets4u.com)
2. [www.8051.com](http://www.8051.com)