AUTOMATIC DAY NIGHT SWITCHING WITH TIMER

This report submitted in partial fulfillment of the requirement for the Awared of degree of Bachelor of Science in Electrical and Electronics Engineering

Submitted By

Selim Reza

ID:151-33-2395

Name :Sabbir Ahmed

ID:133-33-1621

Supervise By

Dr. Md. Rezwanul Ahsan

Assistant Professor

Department of Electrical and Electronic Engineering

Faculty of Engineering

Department of Electrical and Electronic Engineering

Faculty of Engineering

DAFFODIL INTERNATIONAL UNIVERSITY

December 2018

©Daffodil International University

CERTIFICATION

This certify that this project entitled **"AUTOMATIC DAY NIGHT SWITCHING WITH TIMER "** is done by the following student under my direction supervision and this work has been carried by the laboratories of the Department of Electrical and Electronic Engineering under the Faculty of Engineering of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of Science in Electrical and Electronic Engineering .The presentation of the work was held on 10 January, 2019.

Signature of the candidates

15.1.2019

Name :Selim Reza

ID: 151-33-2395

Sabbir 15/01/19

Name :Sabbir Ahmed

ID:133-33-1621

Signature of the supervisor

R Ahsan 15/01/19

Dr. Md. Rezwanul Ahsan
Assistant Professor
Department of Electrical and Electronic Engineering
Faculty of Engineering
Daffodil International University.

©Daffodil International University

Dedicated

To

Our Parents & Teachers

©Daffodil International University

CONTENTS

LIST OF FIGURES		**vii**
LIST OF ABBREVITIONS		**viii**
ACKNOWLEDGEMENT		**ix**
ABSTRACT		**x**
CHAPTER 1	**INTRODUCTION**	1-2
1.1	Introduction	1
1.2	Objective	1
1.3	Problem Statement	1
1.4	Advantage	2
1.5	Application	2
CHAPTER 2	**OVERVIEW OF THE PROJECT**	3-17
2.1	Introduction	3
2.2	Testing of LDR	3
2.3	Relay	3
2.3.1	Factors for Selecting an appropriate Relay	4
2.4	Timer	4
CHAPTER 3	**HARDWARE COMPONENT**	5-18
3.1	Component and Accessories	5
3.2	Buzzer	6
3.3	Voltage Regulator	6
3.4	Transistor	7
3.5	Resistor	7
3.5.1	Variable Resistor	8
3.5.2	Resistor calculator Instructions	8
3.6	capacitor	9
3.6.1	The capacitance of a capacitor	9
3.6.2	Standard units of capacitance	9

©Daffodil International University

3.7	LDR	9
3.8	Diode	10
3.9	LED	10
3.9.1	Types of LED	11
3.10	Relay	11
3.11	LCD	12
3.12	Battery	12
3.12.1	Introduction of Battery	13
3.13	Connector	13
3.14	Oscillator	13
3.14.1	Application	14
3.15	BJT	14
3.16	ATmaga8 Microcontroller	14
3.16.1	ATmaga8 Microcontroller Pin diagram	15
3.17	Circuit Diagram	16
3.18	Block Diagram	17
CHAPTER 4	**DSIGN AND IMPLEMENTATION**	18
4.1	Design	18
CHAPTER 5	**RESULT AND DISCUSSION**	19
5.1	Discussion	19
5.2	Result	19
5.3	Summery	19
CHAPTER 6	**CONCLUSIONS**	20
6.1	Conclusion	20
6.2	Limitations of the Work	20
6.3	Future Aspects	20

©Daffodil International University

Reference 21
Appendix A 22

©Daffodil International University

LIST OF FIGURES

Fig 3.2	Buzzer	6
Fig 3.3	Pin Diagram of IC 7805	6
Fig 3.4	NPN transistor and symbol	7
Fig 3.4.1	I-V characteristics curve of NPN transistor	7
Fig 3.5	Resistor	8
Fig 3.5.11	Variable Resistor	8
Fig 3.6(a)	Electrolytic Capacitor	9
Fig 3.6.(b)	Ceramic capacitor	9
Fig 3.7(a)	LDR	9
Fig 3.7(b)	LDR Symbol	10
Fig 3.7(c)	Practical LDR	10
Fig 3.8	Diode	11
Fig 3.9(a)	LDE Function	11
Fig3.10	Rely	12
Fig 3.11	LCD Display	12
Fig3.12.1	Battery	13
Fig3.13	Connector	14
Fig3.15	BJT	15
Fig 3.16	ATMEGA8 Microcontroller	16
Fig 3.17	Circuit Diagram of Automatic Day night Switching With Timer	17
Fig 3.18	Block Diagram of Automatic Day night Switching	17

©Daffodil International University

List of Abbreviations

DC	Direct current
AC	Alternating Current
LED	Light emitting Diode
LCD	Liquid Crystal Display
NO	Normally Open
NC	Normally Close
nF	Nano Farad
pF	Pico Farad
mF	Micro Farad

©Daffodil International University

ACKNOWLEDGEMENT

First of all, we give thanks to allah. It is a great intention for authors to express their unfettered gratification, sincere appreciation and a great honor to our respective supervisor Dr. Md. Rezwanul Ahsan**,**Department of Electrical & Electronic Engineering, Daffodil International University, for his constructive suggestion, scholastic guidance, constant inspiration, valuable advices and kind cooperation for the successful completion of work on **"AUTOMATIC DAY NIGHT SWITCHING WITH TIMER"** This is could not be possible without his help. Space does not allow us to mention each person by name, but we are deeply grateful to everyone associated with this project and thesis. We also wish to complement all our respective concern teachers & staffs of our department of their direct and indirect assistance at different times.

©Daffodil International University

ABSTRACT

This paper aims at design and executing the advanced development in embedded system for energy saving of lights .Now a days human has become too busy and is unable to find time even to switch the lights where ever not necessary. But the actual timing for these lights to be switched on are when there is absolute darkness. The present system is like the lights will be switched on in the evening before the sun sets and they are switched off the next day morning after there is sufficient light on the outside With this, the power will be wasted up to some extent. This paper gives the best solution for electrical power wastage. Also the manual operation of the lighting system is completely eliminated.

©Daffodil International University

CHAPTER 1

INTRODUCTION

1.1 Introduction.

Save our energy because most of the energy source depend on such as disel,natural gas,coal cannot be replace it .power saving is very important, and similarly we use foil fossil and other things of the coal in the destroy. energy depend on the many source.

1.2 Objective.

This project are automatic light control system are automatically switch turns ON/OFF the light .when the ambient light are fall than the intensity is high. ambient light are control by LDR and microcontroller. Microcontroller and AVR ,IR sensor are used to truck the sunlight when the sensor is darke and LED will be made ON .When the sensor found light the LED will be made OFF

1.3 Problem Statement.

This project are main role “automatic day night switching with timer” no man power and low coast and save our electricity to control day night light ON/OFF.

1.4 Advantages

- Complete elimination of manpower
- Lower energy coast
- Green house gas emission reduce.
- Low maintained coast
- Big community satisfaction

©Daffodil International University

1.5 Applications

- varenda
- Stair case
- Parking Lightings
- Road light
- Parke
- Vegetable garden .

©Daffodil International University

CHAPTER 2

OVERVIEW OF THE PROJECT

2.1Introduction.

This project is all about to control the power consumption at the street and eliminates man power.This include controlling a circuit of strict light with specification sensor LDRand microcontroller during day night with specific Sensors, LDR and Microcontrollers during day and night lage people phobia of the darkness so the road light we can easily explin the topic made of the darkness and sav our energy low coast we use photo detector find out the darkness and automatically day night switching control .

2.2 Testing of LDR

The test of lighit emmiting diodes set the rang of multimeter in resstance measurement. Measure the resistance of LDR works properly or not so that in the light . on and once again measure the resistancce .it mustbe high .If you got satisfactory result then your Light emitting diodes is good to check whether a component. must be avoide you can in troubleshooting and consumption of the resistance.

.

2.3 Relay.

It provides microcontroller isolation between the device and DC device because as we know device many worke on AC receiver signal from the microcontroller as the rely .This device are very commonly use varaeties sector we are extremely use ful.the large amount of current control than we use the relay and small signal pass thro the circuit .

2.4.Tmer.

Timers in 8051 microcontroller. Timer is an important application in Embedded systems, it maintains the timing of an operation in sync with a system clock or an external clock. Timer has so many applications such as measure time generating delays, they can also be used for generating baud rates.

CHAPTER 3

HARDWARE COMPONENT

3.1 Component Accessories

- Lcd Display
- Capacitors
- Some Resistor
- Diode
- Buzzer
- Ldr
- Adapter
- Connector
- Voltage Regulator
- Varo Board
- Transistor
- Diode
- Led
- Rely
- Atmega8 Microcontroller
- Oscillator
- Varo Board
- Bjt
- DC Battery
- Push Switch

©Daffodil International University

3.2 Buzzer.

A audio signal device is known is buzzer .which may be electrical, mechanical device ,use of buzzer beepers include alarm device ,timer and conformation of user input .

Fig.3.2:Buzzer

3.3 Voltage Regulator.

Voltage regulator we are use many circuit .the unregulated power supply rang from 9 volt o 12 volt DCto make power supply This IC number 7805

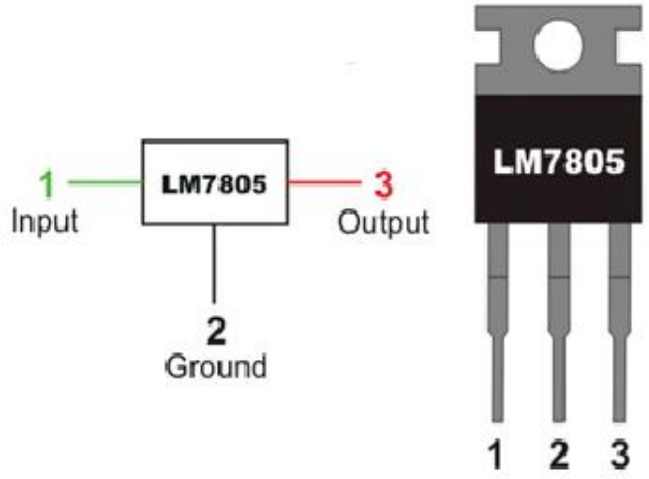

Fig. 3.3: Pin Diagram of IC 7805

©Daffodil International University

Out put voltage is fixed in the circuit .measure the voltage increase and decrease the voltage of the circuit.

3.4 Transistor

State solid switch is the main application for the uses of transistor switch can be controlling high power device jemon motor ,solinoide .The npn transistor pic shownin fig below.

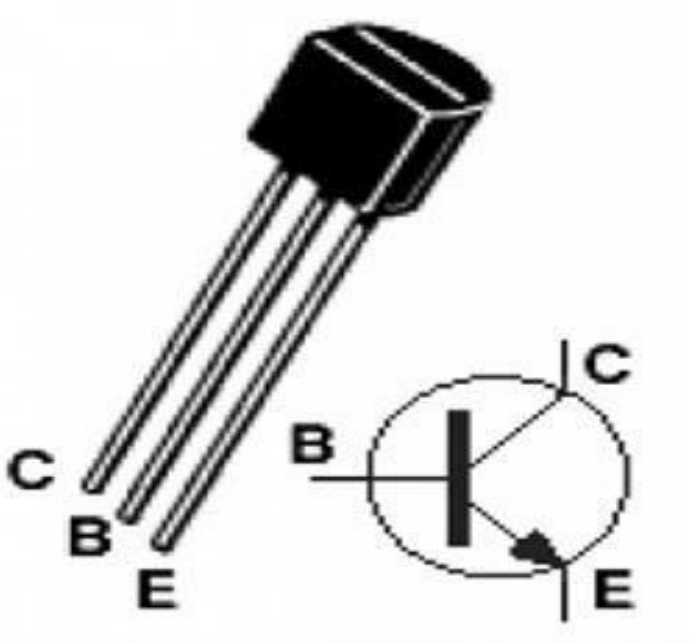

Fig. 3.4: NPN transistor and symbol

©Daffodil International University

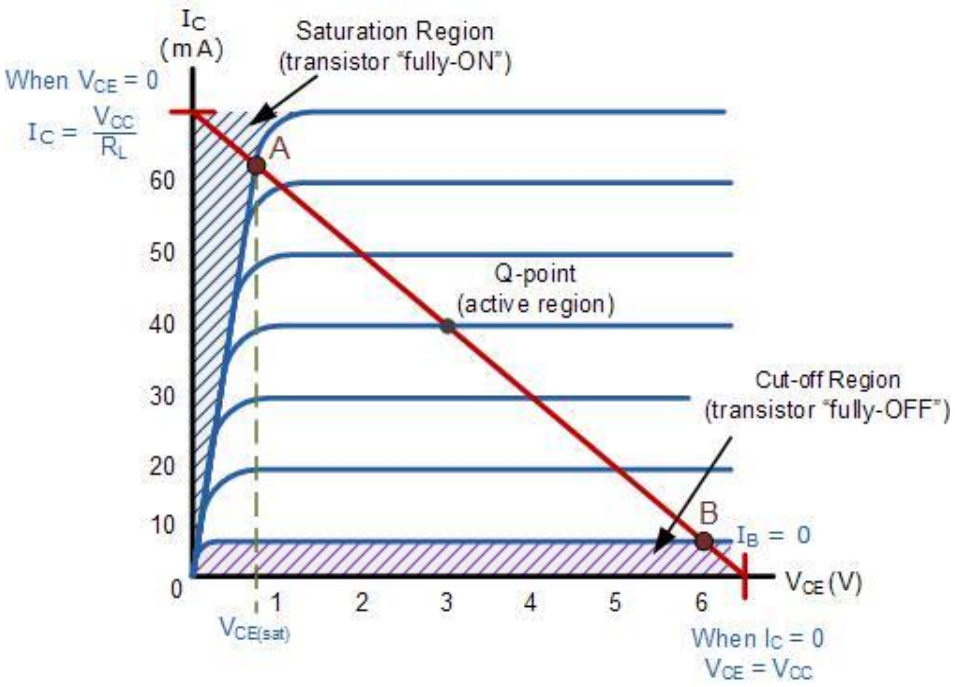

Fig. 3.4.1: I-V characteristics curve of NPN transistor.

3.5 Resistor.

Connect two terminal a resistance component that implements electrical resistance as a circuit ,a resistor is a passive .various type of resistance and many electrical device we made than use of resistance . some kinds of resistance four band ,five band and six band resistance.

3.5.1 FOUR BAND RESISTORS

©Daffodil International University

3.6 Capacitor.

The use of capacitor to storage charge and the electrical producing and a potential different static voltage one side the plate.

Fig. 3.6(a): Electrolytic Capacitor

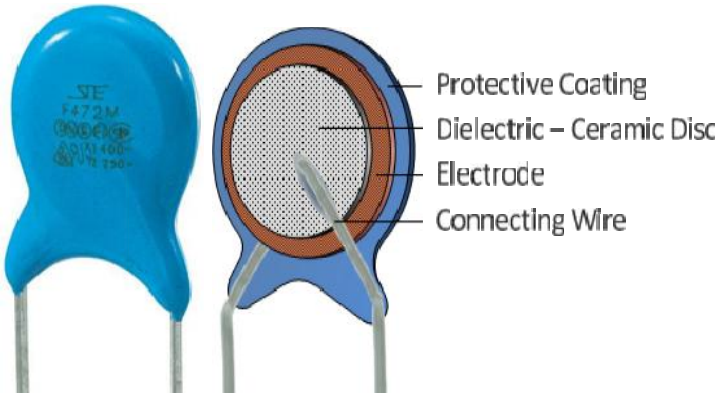

Fig. 3.6(b): Ceramic Capacitor

3.7 Light Dependent Resistor.

LDRs or Light dependent resistors light/ dark sensor very use ful in the circuit. Allowing the resistor of LDR falls the current so there are immortal role of the electronic device .

Fig. .3.7(a):LDR.

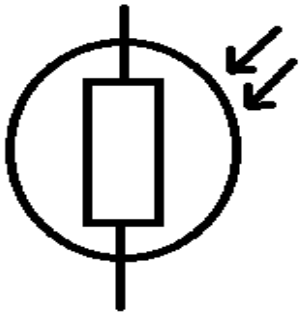

Fig3.7(b): Symbol of LDR

The basic construction and symbol for LDR are shown in above figures respectively. The device consists of a pair of metal film contacts separated by a snakelike track of

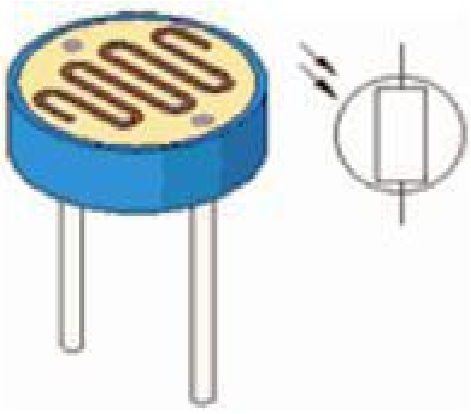

Fig. 3.7(c): Practical LDR

cadmium sulphide film, designed to provide the maximum possible contact area with the two metal films. The structure is housed in a clear plastic or resin case, to

3.8 Diode.

The anode and cathode are two terminal specialized electronic device is known as the diode. Huge of diode is semiconductor ,selicon materials,germanium,selenium. And the some diode are made are metal diode.

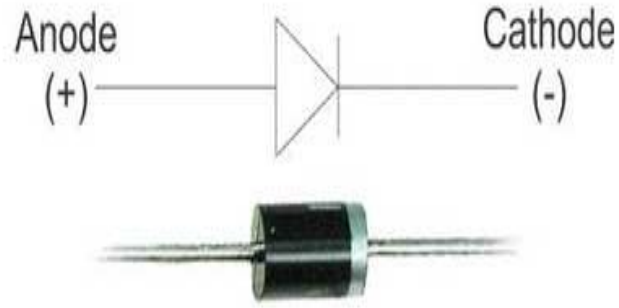

Fig. 3.8:Diode

3.9Light Emitting Diode(LED).

A light-emitting diode (LED) is a semiconductor device that emits visible light when an electric current passes through it. The output from an LED can range from red (at a wavelength of approximately 700 nanometers) to blue-violet (about 400 nanometers).

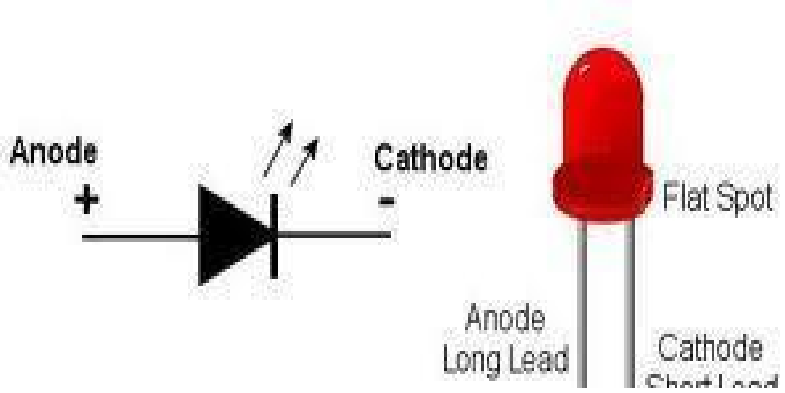

Fig.3.9(a):LED Function

©Daffodil International University

3.10 Relay

i.The electromagnetic conductor are usually ae use really by electrical current.

ii.Open or closing current flow and another circuit current flow

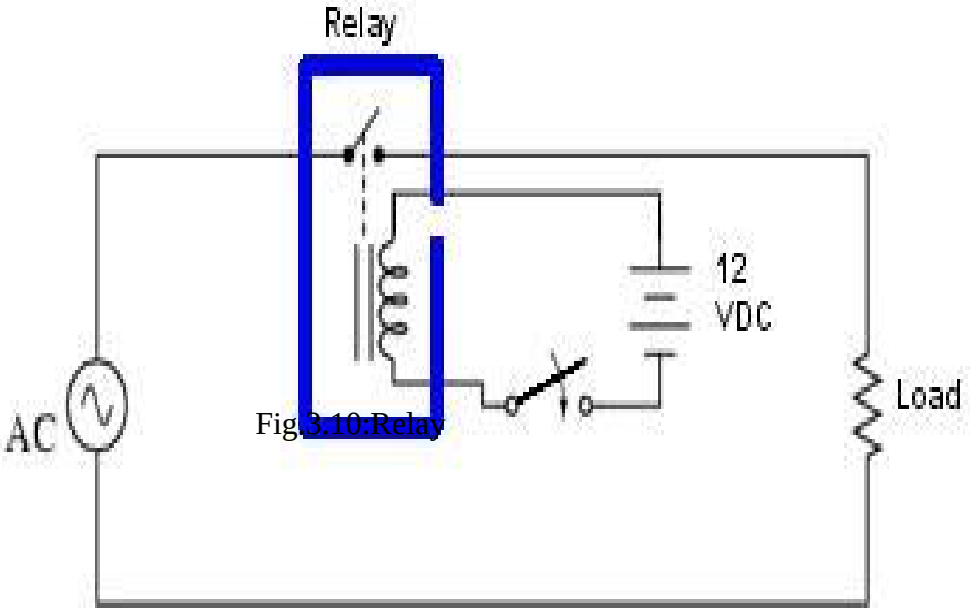

Fig.3.10:Relay

3.11 LCD.

Liquid crystal display(LCD) screen is an display module and five wide range of pplication.16*2 display shown the 16 character and two line

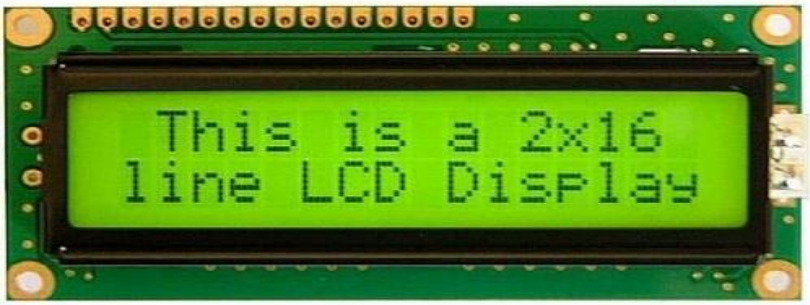

Fig.3.11:LCD Display

3.12 Battery

This the DC battery this battery works is storage of charge and various parches use of the the battery.

Figure 3.12.1: Battery

3.13 Connector.

The connector works is joint the electrical device and circuit and are also referred to as electrical connector.

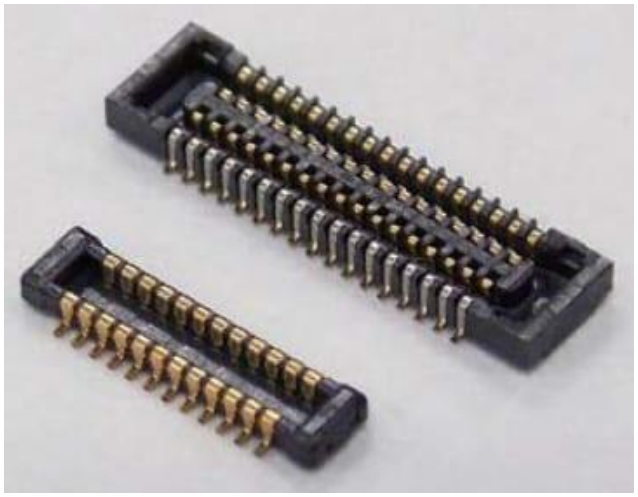

Fig 3.13:Pic Connector

3.14. Application.

Crystal oscillator is used to provide clock to micro-controller. Clock is used to carry all the function that micro controller provides. You need not give any separate voltage because the micro controller has dedicated pin which excites Crystal oscillator

3.15 BJT.

The semiconductor device means Bipolar junction transistor constructed with three doped semiconductor region,bass,collector,and emitter.

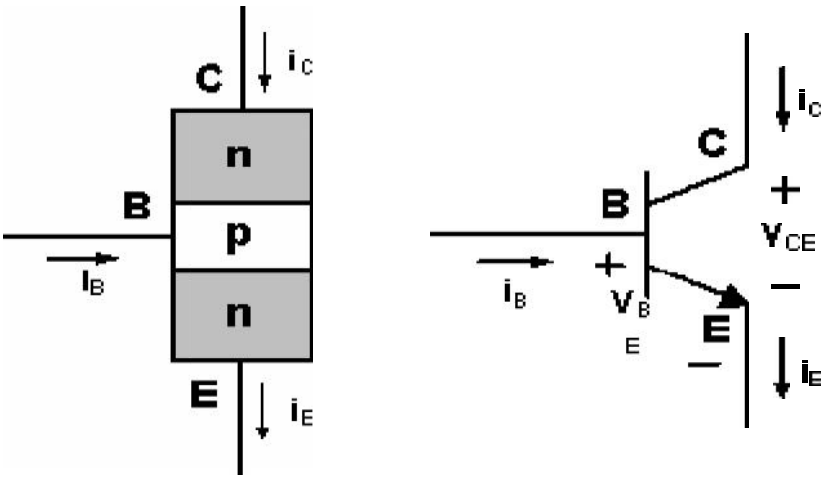

Fig.3.15:Bipolar Transistor

3.16 Atmega8 Microcontroller

Fig. 3.16: ATMEGA8 Microcontroller.

3.16.1 Atmega8 Microcontroller Pin Description

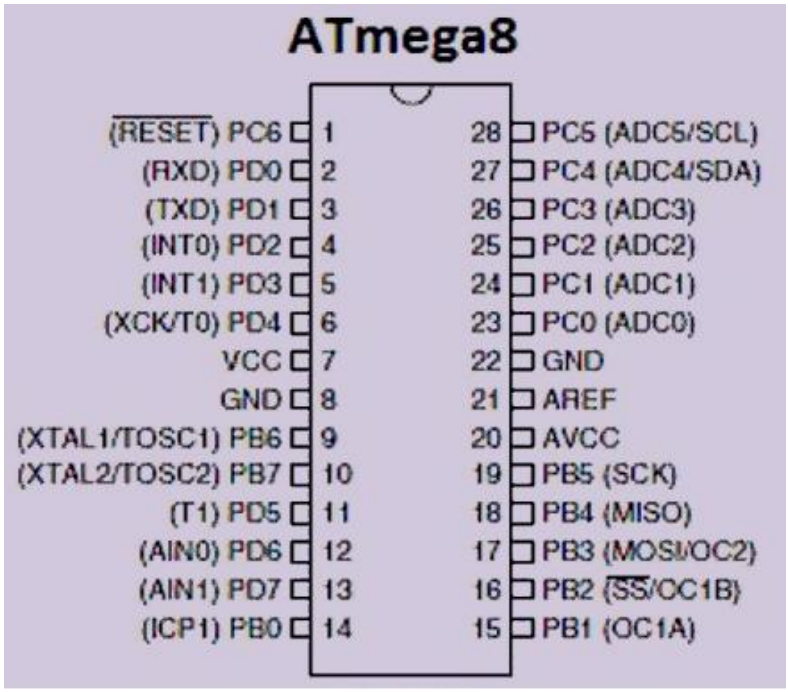

Fig.3.17:Atmega8 Microcontroller Pin Configuration

©Daffodil International University

3.17 Circuit Diagram.

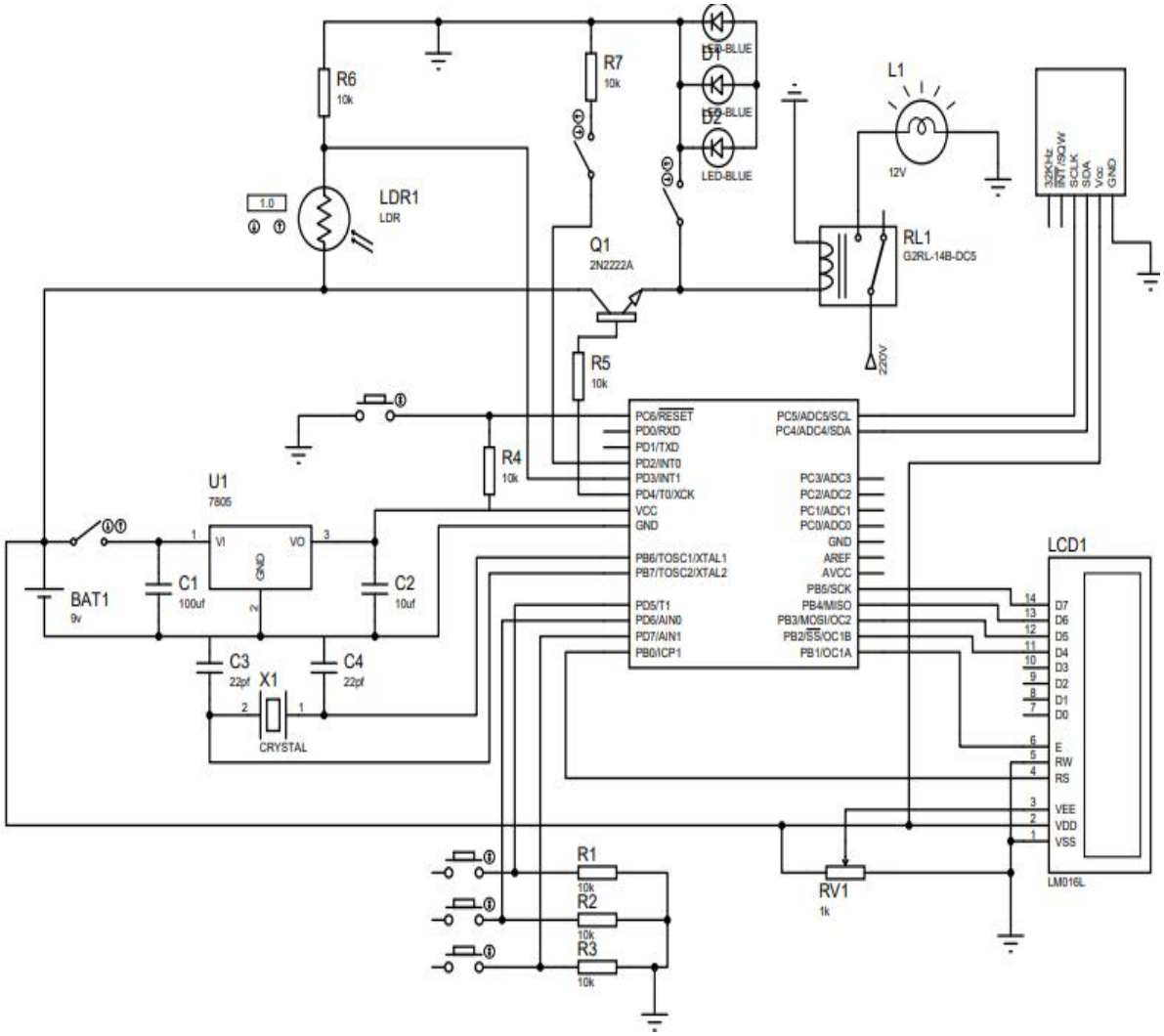

Fig 3.17 :Circuit Diagram of Automatic Day night Switching With Timer

©Daffodil International University

3.18 Block Diagram.

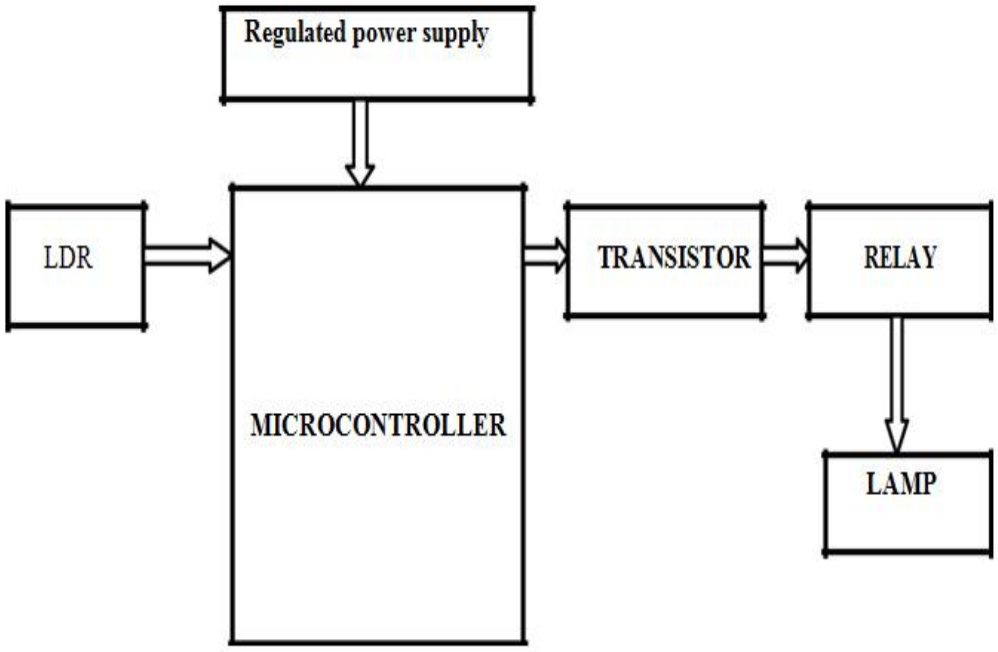

Fig.3.18:Block Diagram of Automatic Day night Switching

©Daffodil International University

CHAPTER 4

DESIGN AND IMPLEMENTATION

4.1 Design

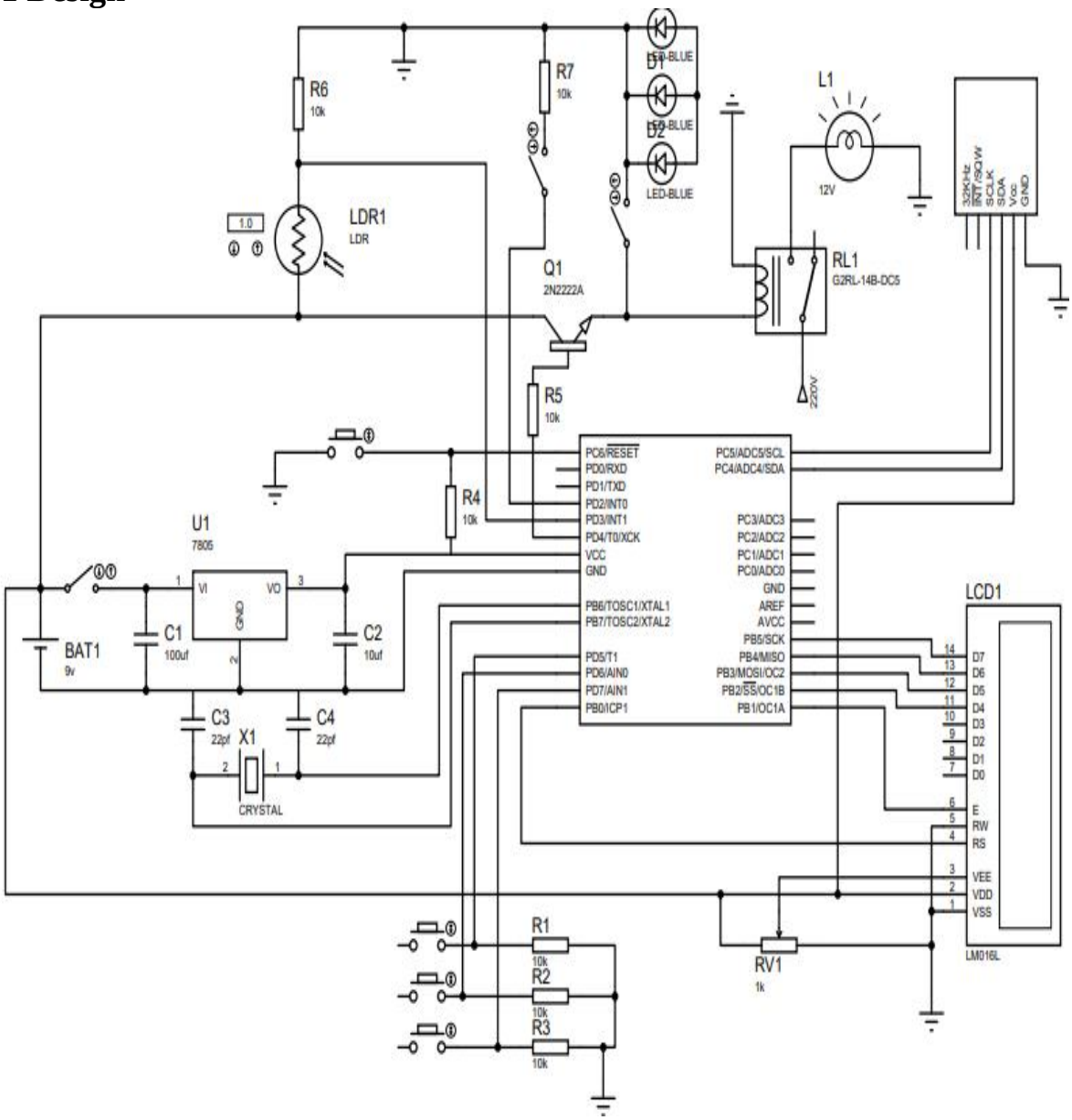

Fig4.1 :Circuit Diagram of Automatic Day night Switching

Light emitting diode when the current flow the circuit into working condition .IR sensor start emitting. IR rays via IR transmitters

©Daffodil International University

CHAPTER 5

RESULT AND DISCUSSION

5.1 Result.

Our project aims is to power consumption and reduce electricity bills and automatically control the strict. This includes controlling a circuit of day night lights with specific Sensors, LDR and Microcontrollers during the day and night.

5.2 Discussion.

.Elaborate the paper This paper design and contraction of light control circuit. this circuit automatically light turn ON/OFF the lamp sensor and timer is backbone of the part and main If the conditions have been satisfied the circuit will do the desired work according to specific program.

CHAPTER 6

CONCLUSIONS

6.1 Conclusion.

This project of AUTOMATIC DAY NIGHT SWITCHING WITH TIMER is a cost effective, maintenance and initially coast is very low. We can easily made this project because this project element are very low tan and initially easily made this project

6.2 Limitations of the Work.

The working procedure of this project is very easy but we are facing some limitation for doing this project. Such as coding problem, program writing, connecting to PCB board, commend following etc

.

©Daffodil International University

References

[1]The ATmega8 Microcontroller and Embedded systems by Muhammad Ali Mazidi and Janice Gillispie Mazidi , Pearson Education.

[2] Electronic Devices and Circuit Theory, Boylestad.

[3]Sensors: Advancements in Modeling, Design Issues, Fabrication and Practical by Subhas Chandra

[4] Handbook of Modern Sensors: Physics, Designs, and Applications by JacobFraden.

[5] The 8051 Microcontroller by Kenneth J. Ayala,

[6] Hand Book of Electronics by A.K. Maini.

[7]Digital Systems Principles and Application by Ronald Ltocci (Sixth Addition). [8]Digital Design by Moris Mano (Second Addition),

[9] Relays and Its Application Sharma, M.C. (BPB-Publishers)

[10]www.atmel.com,www.beyondlogic.org,www.wikipedia.org,www.howstuffwo rks.com, www.alldatasheets.com, www.wikipedia.com.

©Daffodil International University

APENDEX A

```
#include <LiquidCrystal.h>  //Libraries
#include <RTClib.h>
#include <Wire.h>
LiquidCrystal lcd(2, 3, 4, 5, 6, 7); //Arduino pins to lcd RTC_DS1307 RTC;
const int DOWN_BUTTONon =9;
const int UP_BUTTONon =8;
const int DOWN_BUTTONoff =11;
const int UP_BUTTONoff =10;
const int Relay =12;
boolean lastDownONButton = LOW;
boolean currentDownONButton = LOW;
boolean lastUpONButton = LOW;
boolean currentUpONButton = LOW;
boolean lastDownOFFButton = LOW;
boolean currentDownOFFButton = LOW;
boolean lastUpOFFButton = LOW;
boolean currentUpOFFButton = LOW;
int set_on = 12; //The default "ON" desired time int set_off= 12; //The default "OFF" desired
time void setup(){
pinMode(Relay, OUTPUT);
Wire.begin();
RTC.begin();
lcd.begin(16, 2);
lcd.setCursor(0,0); //Show "TIME" on the LCD
lcd.print("TIME");
lcd.setCursor(0,1);
lcd.print("ON");          //Show "ON" on the lcd
lcd.setCursor(6,1);
lcd.print("OFF"); //Show "OFF" on the lcd
```

©Daffodil International University

```
}
//----Debouncing function for all buttons----//
boolean debounce(boolean last, int pin)
{
boolean current = digitalRead(pin);
if (last != current)
{
delay(5);
current = digitalRead(pin);
}
return current;
}
void loop()
{
DateTime now = RTC.now();// Clock call
now = RTC.now();
lcd.setCursor(5,0);
if(now.hour() < 10)
{
lcd.print("0");
}
lcd.print(now.hour(), DEC); //Print hour
lcd.print(':');
if(now.minute() < 10)
{
lcd.print("0");
}
lcd.print(now.minute(), DEC); //Print min
lcd.print(':');
if(now.second() < 10)
{
```

```
lcd.print("0");

}
lcd.print(now.second(), DEC); //Print sec
//----Debounce buttons---//
currentDownONButton = debounce(lastDownONButton, DOWN_BUTTONon);
 currentUpONButton = debounce(lastUpONButton, UP_BUTTONon); currentDownOFFButton
= debounce(lastDownOFFButton, DOWN_BUTTONoff); currentUpOFFButton =
debounce(lastUpOFFButton, UP_BUTTONoff); if (lastDownONButton== LOW &&
currentDownONButton == HIGH)
{if(set_on>0)
{
set_on--;
}
else{ lcd.setCursor(3,1); lcd.print("0");}
else if (lastUpONButton== LOW && currentUpONButton == HIGH)
{ if(set_on<23){  //"ON" Set point up never higher than 23
set_on++;}
else{ lcd.setCursor(3,1);
lcd.print("23");}}
lcd.setCursor(3,1);
if(set_on < 10){
lcd.print("0");}
lcd.print(set_on);
lastDownONButton = currentDownONButton;
lastUpONButton = currentUpONButton;
if (lastDownOFFButton== LOW && currentDownOFFButton == HIGH)
{if(set_off>0){          //"OFF" Set point down never lower than 0
set_off--;}
else{ lcd.setCursor(10,1);
```

```
lcd.print("0");}}

else if (lastUpOFFButton== LOW && currentUpOFFButton == HIGH)

{ if(set_off<23){  //"OFF" Set point up never higher than 23

set_off++;}

else{lcd.setCursor(10,1);
lcd.print("23");}}
lcd.setCursor(10,1);
if(set_off < 10){
lcd.print("0");}
lcd.print(set_off);

lastDownOFFButton = currentDownOFFButton;

lastUpOFFButton = currentUpOFFButton;

if(set_on == set_off){

digitalWrite(Relay, LOW);

if(set_on < set_off){  if(now.hour() >= set_on && now.hour() <
set_off ){

digitalWrite(Relay, HIGH);
}
else if(now.hour() >= set_off)
 {
```

```
digitalWrite(Relay, LOW); }

else{
digitalWrite(Relay, LOW); }}
  if(set_on > set_off){if(now.hour() >= set_on && now.hour() <=
23){
  //Start
digitalWrite(Relay, HIGH); }
else if(now.hour() < set_off){
digitalWrite(Relay, HIGH) }
else if(now.hour() >= set_off && now.hour() < set_on){
digitalWrite(Relay, LOW);
```