LAMPIRAN A

KODE PROGRAM

Lampiran A1 : Kode program untuk mikrokontroler Arduino

```
#include <EEPROM.h>
#include <Wire.h>
#include "RTClib.h"

#define pinSnsrDaya A7
#define pinLdrAtap A1
#define pinLdrKoridor2A A2
#define pinLdrKelas4Depan A3
#define pinLdrKelas4Belakang A4
#define pinLdrKoridor1A A5
#define pinLdrKoridor1B A6
#define pinLdrKelas1Depan A8
#define pinLdrKelas1Belakang A9
#define pinLdrKelas2Depan A10
#define pinLdrKelas2Belakang A11
#define pinLdrKelas3Depan A12
#define pinLdrKelas3Belakang A13

#define pinIrTanggaAtas 2
#define pinPirKelas4 3
#define pinIrKelas3 4
#define pinPirKelas3 5
#define pinIrKelas2 6
#define pinPirKelas2 7
#define pinIrKelas1 8
#define pinPirKelas1 9
#define pinSwitchKelas1 10
#define pinSwitchKelas2 11
#define pinSwitchKelas4A 12
#define pinSwitchKelas4B 13
#define pinLampuKelas4A 22
#define pinLampuKelas4B 23
#define pinLampuKelas4C 24
#define pinLampuKelas4D 25
#define pinLampuKelas4E 26
#define pinAlarmKelas4 27
#define pinLampuTangga 28
#define pinLampuKelas1A 29
#define pinLampuKelas1B 30
#define pinLampuKelas1C 31
#define pinLampuKelas1D 32
#define pinLampuKelas1E 33
#define pinAlarmKelas1 34

#define pinLampuKelas2A 35
#define pinLampuKelas2B 36
#define pinLampuKelas2C 37
#define pinLampuKelas2D 38
#define pinLampuKelas2E 39
#define pinAlarmKelas2 40
#define pinLampuKelas3A 41
#define pinLampuKelas3B 42
#define pinLampuKelas3C 43
#define pinLampuKelas3D 44
#define pinLampuKelas3E 45
#define pinAlarmKelas3 46
#define pinLampuKoridor1A 48
#define pinLampuKoridor1B 47
#define pinLampuKoridor1C 49
#define pinLampuKoridor1D 50
#define pinLampuKoridor1E 51
#define pinLampuKoridor2A 52
#define pinSwitchKelas3 53


RTC_DS1307 RTC;
DateTime Sekarang;

int LdrAtap, LdrKoridor2A,
    LdrKoridor1A, LdrKoridor1B,
    SnsrDaya;
int LdrKelas1Depan,
    LdrKelas1Belakang;
int LdrKelas2Depan,
    LdrKelas2Belakang;
int LdrKelas3Depan,
    LdrKelas3Belakang;
int LdrKelas4Depan,
    LdrKelas4Belakang;
int SimpanLumensKoridor1A,
    TempLumensKoridor1A;
int SimpanLumensKoridor1B,
    TempLumensKoridor1B;
int SimpanLumensKoridor2A,
    TempLumensKoridor2A;
int VBLampuKoridor1A,
    VBLampuKoridor1D,
```

```
    VBLampuKoridor1E,
    VBLampuKoridor2A;
int SimpanLumensKelas1,
    TempLumensKelas1,
    VBLampuKelas1;
int SimpanLumensKelas2,
    TempLumensKelas2,
    VBLampuKelas2;
int SimpanLumensKelas3,
    TempLumensKelas3,
    VBLampuKelas3;
int SimpanLumensKelas4,
    TempLumensKelas4,
    VBLampuKelas4;
int i1, Akses1, Security1, VBID1;
int i2, Akses2, Security2, VBID2;
int i3, Akses3, Security3, VBID3;
int i4, Akses4, Security4, VBID4;
String TempID1, ID1;
String TempID2, ID2;
String TempID3, ID3;
String TempID4, ID4;
String Kirim;

void setup() {
  Wire.begin();
  RTC.begin();

  pinMode(pinSwitchKelas1, INPUT);
  pinMode(pinSwitchKelas2, INPUT);
  pinMode(pinSwitchKelas3, INPUT);
  pinMode(pinSwitchKelas4A,
          INPUT);
  pinMode(pinSwitchKelas4B,
          INPUT);

  pinMode(pinIrKelas1, INPUT);
  pinMode(pinPirKelas1, INPUT);
  pinMode(pinIrKelas2, INPUT);
  pinMode(pinPirKelas2, INPUT);
  pinMode(pinIrKelas3, INPUT);
  pinMode(pinPirKelas3, INPUT);
  pinMode(pinIrTanggaAtas, INPUT);
  pinMode(pinPirKelas4, INPUT);

  SimpanLumensKelas4 = 0;
  VBLampuKelas4 = 0;
  TempID4 = "0000000000";
  ID4 = "0000000000";
  pinMode(pinLampuKelas4A,
          OUTPUT);
  pinMode(pinLampuKelas4B,
          OUTPUT);
  pinMode(pinLampuKelas4C,
          OUTPUT);
  pinMode(pinLampuKelas4D,
          OUTPUT);
  pinMode(pinLampuKelas4E,
          OUTPUT);
  pinMode(pinAlarmKelas4,
          OUTPUT);
  digitalWrite(pinLampuKelas4A,
          LOW);
  digitalWrite(pinLampuKelas4B,
          LOW);
  digitalWrite(pinLampuKelas4C,
          LOW);
  digitalWrite(pinLampuKelas4D,
          LOW);
  digitalWrite(pinLampuKelas4E,
          LOW);
  digitalWrite(pinAlarmKelas4, LOW);

  SimpanLumensKelas1 = 0;
  VBLampuKelas1 = 0;
  TempID1 = "0000000000";
  ID1 = "0000000000";
  pinMode(pinLampuKelas1A,
          OUTPUT);
  pinMode(pinLampuKelas1B,
          OUTPUT);
  pinMode(pinLampuKelas1C,
          OUTPUT);
  pinMode(pinLampuKelas1D,
          OUTPUT);
  pinMode(pinLampuKelas1E,
          OUTPUT);
  pinMode(pinAlarmKelas1,
          OUTPUT);
```

```
digitalWrite(pinLampuKelas1A,
        LOW);
digitalWrite(pinLampuKelas1B,
        LOW);
digitalWrite(pinLampuKelas1C,
        LOW);
digitalWrite(pinLampuKelas1D,
        LOW);
digitalWrite(pinLampuKelas1E,
        LOW);
digitalWrite(pinAlarmKelas1, LOW);

SimpanLumensKelas2 = 0;
VBLampuKelas2 = 0;
TempID2 = "0000000000";
ID2 = "0000000000";
pinMode(pinLampuKelas2A,
        OUTPUT);
pinMode(pinLampuKelas2B,
        OUTPUT);
pinMode(pinLampuKelas2C,
        OUTPUT);
pinMode(pinLampuKelas2D,
        OUTPUT);
pinMode(pinLampuKelas2E,
        OUTPUT);
pinMode(pinAlarmKelas2,
        OUTPUT);
digitalWrite(pinLampuKelas2A,
        LOW);
digitalWrite(pinLampuKelas2B,
        LOW);
digitalWrite(pinLampuKelas2C,
        LOW);
digitalWrite(pinLampuKelas2D,
        LOW);
digitalWrite(pinLampuKelas2E,
        LOW);
digitalWrite(pinAlarmKelas2, LOW);

SimpanLumensKelas3 = 0;
VBLampuKelas3 = 0;
TempID3 = "0000000000";
ID3 = "0000000000";
```

```
pinMode(pinLampuKelas3A,
        OUTPUT);
pinMode(pinLampuKelas3B,
        OUTPUT);
pinMode(pinLampuKelas3C,
        OUTPUT);
pinMode(pinLampuKelas3D,
        OUTPUT);
pinMode(pinLampuKelas3E,
        OUTPUT);
pinMode(pinAlarmKelas3,
        OUTPUT);
digitalWrite(pinLampuKelas3A,
        LOW);
digitalWrite(pinLampuKelas3B,
        LOW);
digitalWrite(pinLampuKelas3C,
        LOW);
digitalWrite(pinLampuKelas3D,
        LOW);
digitalWrite(pinLampuKelas3E,
        LOW);
digitalWrite(pinAlarmKelas3, LOW);

SimpanLumensKoridor2A = 0;
pinMode(pinLampuKoridor2A,
        OUTPUT);
digitalWrite(pinLampuKoridor2A,
        LOW);
SimpanLumensKoridor1A = 0;
pinMode(pinLampuKoridor1A,
        OUTPUT);
digitalWrite(pinLampuKoridor1A,
        LOW);
SimpanLumensKoridor1B = 0;
pinMode(pinLampuKoridor1D,
        OUTPUT);
digitalWrite(pinLampuKoridor1D,
        LOW);
pinMode(pinLampuKoridor1E,
        OUTPUT);
digitalWrite(pinLampuKoridor1E,
        LOW);
```

```
  pinMode(pinLampuTangga,
          OUTPUT);
  digitalWrite(pinLampuTangga,
          HIGH);
  pinMode(pinLampuKoridor1B,
          OUTPUT);
  digitalWrite(pinLampuKoridor1B,
          HIGH);
  pinMode(pinLampuKoridor1C,
          OUTPUT);
  digitalWrite(pinLampuKoridor1C,
          HIGH);

  RTC.adjust(DateTime(__DATE__,
__TIME__));

  Serial.begin(9600);
  Serial1.begin(9600);
  Serial2.begin(9600);
  Serial3.begin(9600);

}

void loop() {
 Akses1 = EEPROM.read(0);
 if(Akses1 > 1){
   Akses1 = 0;
 }
 VBID1 = EEPROM.read(1);
TempID1 =
    KonvertVBkeRFID(VBID1);

 Akses2 = EEPROM.read(2);
 if(Akses2 > 1){
   Akses2 = 0;
 }
 VBID2 = EEPROM.read(3);
TempID2 =
    KonvertVBkeRFID(VBID2);

 Akses3 = EEPROM.read(4);
 if(Akses3 > 1){
   Akses3 = 0;
 }
 VBID3 = EEPROM.read(5);
```

```
 TempID3 =
   KonvertVBkeRFID(VBID3);

 Akses4 = EEPROM.read(6);
 if(Akses4 > 1){
  Akses4 = 0;
 }
 VBID4 = EEPROM.read(7);
 TempID4 =
   KonvertVBkeRFID(VBID4);


 //Pembacaan Sensor Analog
 LdrAtap = analogRead(pinLdrAtap);
 String VBLdrAtap =
   KirimInteger(LdrAtap);
 LdrKoridor1A =
   analogRead(pinLdrKoridor1A);
 String VBLdrKoridor1A =
   KirimInteger(LdrKoridor1A);
 LdrKoridor1B =
   analogRead(pinLdrKoridor1B);
 String VBLdrKoridor1B =
   KirimInteger(LdrKoridor1B);

 LdrKoridor2A =
   analogRead(pinLdrKoridor2A)-
   700;
 String VBLdrKoridor2A =
   KirimInteger(LdrKoridor2A)  ;

 LdrKelas1Depan =
   analogRead(pinLdrKelas1Depan);
 String VBLdrKelas1Depan =
   KirimInteger(LdrKelas1Depan);
 LdrKelas1Belakang =
   analogRead(pinLdrKelas1Belakang
   );
 String VBLdrKelas1Belakang =
   KirimInteger(LdrKelas1Belakang);

 LdrKelas2Depan =
   analogRead(pinLdrKelas2Depan);
 String VBLdrKelas2Depan =
   KirimInteger(LdrKelas2Depan);
```

```
 LdrKelas2Belakang =
   analogRead(pinLdrKelas2Belakang
   );
 String VBLdrKelas2Belakang =
   KirimInteger(LdrKelas2Belakang);

 LdrKelas3Depan =
   analogRead(pinLdrKelas3Depan)+
   400;
 String VBLdrKelas3Depan =
   KirimInteger(LdrKelas3Depan);
 LdrKelas3Belakang =
   analogRead(pinLdrKelas3Belakang
   )+200;
 String VBLdrKelas3Belakang =
   KirimInteger(LdrKelas3Belakang);

 LdrKelas4Depan =
   analogRead(pinLdrKelas4Depan);
 String VBLdrKelas4Depan =
   KirimInteger(LdrKelas4Depan);
 LdrKelas4Belakang =
   analogRead(pinLdrKelas4Belakang
   );
 String VBLdrKelas4Belakang =
   KirimInteger(LdrKelas4Belakang);

 //Waktu dan Program Koridor Lantai
2 – Tangga//

 Sekarang = RTC.now();
 if ((Sekarang.hour()) >= 19)
   //Malam Hari
   {SimpanLumensKoridor1A = 0;
    SimpanLumensKoridor1B = 0;
    SimpanLumensKoridor2A = 0;

digitalWrite(pinLampuKoridor1A,
            HIGH);
digitalWrite(pinLampuKoridor1D,
            HIGH);
digitalWrite(pinLampuKoridor1E,
            HIGH);
digitalWrite(pinLampuKoridor2A,
            HIGH);

 VBLampuKoridor1A = 1;
 VBLampuKoridor1D = 1;
 VBLampuKoridor1E = 1;
 VBLampuKoridor2A = 1;

 if(digitalRead(pinIrKelas1) ==
   HIGH)
 {digitalWrite(pinLampuKoridor1B,
   HIGH);
 }
 else if(digitalRead(pinIrKelas1) ==
   LOW)
 {digitalWrite(pinLampuKoridor1B,
            LOW);
   digitalWrite(pinLampuKoridor1B,
            HIGH);
 }

 if(digitalRead(pinIrKelas2) ==
   HIGH)
   {digitalWrite(pinLampuKoridor
            1C, HIGH);
 }
 else if(digitalRead(pinIrKelas2) ==
   LOW)
 {digitalWrite(pinLampuKoridor1
            C, LOW);
   digitalWrite(pinLampuKoridor1C,
            HIGH);
 }

 if(digitalRead(pinIrTanggaAtas)
   == HIGH)
   {digitalWrite(pinLampuTangga,
            HIGH);
 }
 Else
   if(digitalRead(pinIrTanggaAtas)
            == LOW)
   {digitalWrite(pinLampuTangga,
            LOW);
    digitalWrite(pinLampuTangga,
            HIGH);
 }
```

```
    if(digitalRead(pinIrKelas3) ==
      HIGH)
     {digitalWrite(pinLampuTangga,
              HIGH);
     }
    else if(digitalRead(pinIrKelas3) ==
         LOW)
     {digitalWrite(pinLampuTangga,
              LOW);
      digitalWrite(pinLampuTangga,
              HIGH);
     }
   }
  else
   //Siang Hari
   { if (SimpanLumensKoridor1A ==
1 && TempLumensKoridor1A > 600
&& LdrAtap > 600)

{digitalWrite(pinLampuKoridor1A,
HIGH);
       VBLampuKoridor1A = 1;
      }
   else if (SimpanLumensKoridor1A
== 1 && TempLumensKoridor1A >
600 && LdrAtap <= 600)

{digitalWrite(pinLampuKoridor1A,HI
GH);
       VBLampuKoridor1A = 1;
       TempLumensKoridor1A = 500;
      }
   else if (SimpanLumensKoridor1A
== 1 && TempLumensKoridor1A <=
600 && LdrAtap <= 600)

{digitalWrite(pinLampuKoridor1A,HI
GH);
       VBLampuKoridor1A = 1;
      }
   else if (SimpanLumensKoridor1A
== 1 && TempLumensKoridor1A <=
600 && LdrAtap > 600)
```

```
{digitalWrite(pinLampuKoridor1A,LO
W);
       VBLampuKoridor1A = 0;
       SimpanLumensKoridor1A = 0;
      }
    else if(SimpanLumensKoridor1A
== 0 && LdrKoridor1A > 500)

{digitalWrite(pinLampuKoridor1A,LO
W);
       VBLampuKoridor1A = 0;
      }
    else if (SimpanLumensKoridor1A
== 0 && LdrKoridor1A <= 500)
     {SimpanLumensKoridor1A = 1;
      TempLumensKoridor1A =
LdrAtap;

digitalWrite(pinLampuKoridor1A,HIG
H);
       VBLampuKoridor1A = 1;
      }

    if (SimpanLumensKoridor1B == 1
&& TempLumensKoridor1B > 600
&& LdrAtap > 600)

{digitalWrite(pinLampuKoridor1D,
HIGH);

digitalWrite(pinLampuKoridor1E,
HIGH);
       VBLampuKoridor1D = 1;
       VBLampuKoridor1E = 1;
      }
    else if (SimpanLumensKoridor1B
== 1 && TempLumensKoridor1B >
600 && LdrAtap <= 600)

{digitalWrite(pinLampuKoridor1D,
HIGH);

digitalWrite(pinLampuKoridor1E,
HIGH);
```

```
      VBLampuKoridor1D = 1;
      VBLampuKoridor1E = 1;
      TempLumensKoridor1B = 500;
      }
    else if (SimpanLumensKoridor1B
== 1 && TempLumensKoridor1B <=
600 && LdrAtap <= 600)

{digitalWrite(pinLampuKoridor1D,
HIGH);

digitalWrite(pinLampuKoridor1E,
HIGH);
      VBLampuKoridor1D = 1;
      VBLampuKoridor1E = 1;
      }
    else if (SimpanLumensKoridor1B
== 1 && TempLumensKoridor1B <=
600 && LdrAtap > 600)

{digitalWrite(pinLampuKoridor1D,
LOW);

digitalWrite(pinLampuKoridor1E,
LOW);
      VBLampuKoridor1D = 0;
      VBLampuKoridor1E = 0;
      SimpanLumensKoridor1B = 0;
      }
    else if(SimpanLumensKoridor1B
== 0 && LdrKoridor1B > 500)

{digitalWrite(pinLampuKoridor1D,LO
W);

digitalWrite(pinLampuKoridor1E,LO
W);
      VBLampuKoridor1D = 0;
      VBLampuKoridor1E = 0;
      }
    else if (SimpanLumensKoridor1B
== 0 && LdrKoridor1B <= 500)
      {SimpanLumensKoridor1B = 1;
      TempLumensKoridor1B =
LdrAtap;
```

```
digitalWrite(pinLampuKoridor1D,HIG
H);

digitalWrite(pinLampuKoridor1E,HIG
H);
      VBLampuKoridor1D = 1;
      VBLampuKoridor1E = 1;
      }

    if (SimpanLumensKoridor2A ==
1 && TempLumensKoridor2A > 600
&& LdrAtap > 600)

{digitalWrite(pinLampuKoridor2A,
HIGH);
      VBLampuKoridor2A = 1;
      }
    else if (SimpanLumensKoridor2A
== 1 && TempLumensKoridor2A >
600 && LdrAtap <= 600)

{digitalWrite(pinLampuKoridor2A,HI
GH);
      VBLampuKoridor2A = 1;
      TempLumensKoridor2A = 500;
      }
    else if (SimpanLumensKoridor2A
== 1 && TempLumensKoridor2A <=
600 && LdrAtap <= 600)

{digitalWrite(pinLampuKoridor2A,HI
GH);
      VBLampuKoridor2A = 1;
      }
    else if (SimpanLumensKoridor2A
== 1 && TempLumensKoridor2A <=
600 && LdrAtap > 600)

{digitalWrite(pinLampuKoridor2A,LO
W);
      VBLampuKoridor2A = 0;
      SimpanLumensKoridor2A = 0;
      }
```

```
    else if(SimpanLumensKoridor2A
== 0 && LdrKoridor2A > 500)

{digitalWrite(pinLampuKoridor2A,LO
W);
        VBLampuKoridor2A = 0;
        }
    else if (SimpanLumensKoridor2A
== 0 && LdrKoridor2A <= 500)
       {SimpanLumensKoridor2A = 1;
        TempLumensKoridor2A =
LdrAtap;

digitalWrite(pinLampuKoridor2A,HIG
H);
        VBLampuKoridor2A = 1;
        }

    }

  //Program RFID
  byte i       = 0;
  byte val      = 0;
  byte checksum  = 0;
  byte bytesRead = 0;
  byte tempByte  = 0;
  byte tagBytes[6];
  char tagValue[10];

  if(Serial.available() > 0)
    {delay(100);
    if((val = Serial.read()) == 2)
      {bytesRead = 0;
      while(bytesRead < 12)
          {val = Serial.read();
          if(bytesRead < 10)
            {tagValue[bytesRead] = val;
            }
          if((val == 0x0D)||(val ==
0x0A)||(val == 0x03)||(val == 0x02))
            {break;
            }
          if((val >= '0') && (val <= '9'))
            {val = val - '0';
            }
```

```
        else if((val >= 'A') && (val
<= 'F'))
          {val = 10 + val - 'A';
          }
        if (bytesRead & 1 == 1)
          {tagBytes[bytesRead >> 1]
= (val | (tempByte << 4));
          if (bytesRead >> 1 != 5)
            {checksum ^=
tagBytes[bytesRead >> 1];
            };
          }
        else
          {tempByte = val;
          };
        bytesRead++;
        }

    if(bytesRead == 12)
      {tagValue[10] = '\0';
      i4 = 0;
      ID4 = "";
      for(i4=0;i4<=9;i4++)
        {ID4 = ID4 + tagValue[i4];
        }
      }
    bytesRead = 0;
    }
  }

  if(Serial1.available() > 0)
   {delay(100);
   if((val = Serial1.read()) == 2)
     {bytesRead = 0;
     while(bytesRead < 12)
         {val = Serial1.read();
         if(bytesRead < 10)
           {tagValue[bytesRead] = val;
           }
         if((val == 0x0D)||(val ==
0x0A)||(val == 0x03)||(val == 0x02))
           {break;
           }
         if((val >= '0') && (val <= '9'))
           {val = val - '0';
```

```
          }
        else if((val >= 'A') && (val
<= 'F'))
          {val = 10 + val - 'A';
          }
        if (bytesRead & 1 == 1)
          {tagBytes[bytesRead >> 1]
= (val | (tempByte << 4));
          if (bytesRead >> 1 != 5)
            {checksum ^=
tagBytes[bytesRead >> 1];
            };
          }
        else
          {tempByte = val;
          };
        bytesRead++;
        }

      if(bytesRead == 12)
       {tagValue[10] = '\0';
        i1 = 0;
        ID1 = "";
        for(i1=0;i1<=9;i1++)
          {ID1 = ID1 + tagValue[i1];
          }
       }
      bytesRead = 0;

      }
   }

  if(Serial2.available() > 0)
  {delay(100);
   if((val = Serial2.read()) == 2)
     {bytesRead = 0;
      while(bytesRead < 12)
         {val = Serial2.read();
          if(bytesRead < 10)
            {tagValue[bytesRead] = val;
            }
          if((val == 0x0D)||(val ==
0x0A)||(val == 0x03)||(val == 0x02))
            {break;
            }
```

```
        if((val >= '0') && (val <= '9'))
          {val = val - '0';
          }
        else if((val >= 'A') && (val
<= 'F'))
          {val = 10 + val - 'A';
          }
        if (bytesRead & 1 == 1)
          {tagBytes[bytesRead >> 1]
= (val | (tempByte << 4));
          if (bytesRead >> 1 != 5)
            {checksum ^=
tagBytes[bytesRead >> 1];
            };
          }
        else
          {tempByte = val;
          };
        bytesRead++;
        }

      if(bytesRead == 12)
       {tagValue[10] = '\0';
        i2 = 0;
        ID2 = "";
        for(i2=0;i2<=9;i2++)
          {ID2 = ID2 + tagValue[i2];
          }
       }
      bytesRead = 0;

      }
   }

  if(Serial3.available() > 0)
  {delay(100);
   if((val = Serial3.read()) == 2)
     {bytesRead = 0;
      while(bytesRead < 12)
         {val = Serial3.read();
          if(bytesRead < 10)
            {tagValue[bytesRead] = val;
            }
          if((val == 0x0D)||(val ==
0x0A)||(val == 0x03)||(val == 0x02))
```

```
        {break;
        }
    if((val >= '0') && (val <= '9'))
      {val = val - '0';
      }
    else if((val >= 'A') && (val
<= 'F'))
        {val = 10 + val - 'A';
        }
    if (bytesRead & 1 == 1)
        {tagBytes[bytesRead >> 1]
= (val | (tempByte << 4));
        if (bytesRead >> 1 != 5)
          {checksum ^=
tagBytes[bytesRead >> 1];
          };
        }
      else
        {tempByte = val;
        };
      bytesRead++;
      }

   if(bytesRead == 12)
     {tagValue[10] = '\0';
      i3 = 0;
      ID3 = "";
      for(i3=0;i3<=9;i3++)
        {ID3 = ID3 + tagValue[i3];
        }
     }
    bytesRead = 0;
    }
  }


 if(Akses1 == 0 && ID1 !=
"0000000000")
   {Akses1 = 1;
    TempID1 = ID1;
    ID1 = "0000000000";
   }
 if(Akses1 == 1 && TempID1 ==
ID1)
   {Akses1 = 0;
```

```
    Security1 = 0;
    TempID1 = "0000000000";
    ID1 = "0000000000";
    }

  if(Akses2 == 0 && ID2 !=
"0000000000")
    {Akses2 = 1;
    TempID2 = ID2;
    ID2 = "0000000000";
    }
  if(Akses2 == 1 && TempID2 ==
ID2)
    {Akses2 = 0;
    Security2 = 0;
    TempID2 = "0000000000";
    ID2 = "0000000000";
    }

  if(Akses3 == 0 && ID3 !=
"0000000000")
    {Akses3 = 1;
    TempID3 = ID3;
    ID3 = "0000000000";
    }
  if(Akses3 == 1 && TempID3 ==
ID3)
    {Akses3 = 0;
    Security3 = 0;
    TempID3 = "0000000000";
    ID3 = "0000000000";
    }

  if(Akses4 == 0 && ID4 !=
"0000000000")
    {Akses4 = 1;
    TempID4 = ID4;
    ID4 = "0000000000";
    }
  if(Akses4 == 1 && TempID4 ==
ID4)
    {Akses4 = 0;
    Security4 = 0;
    TempID4 = "0000000000";
    ID4 = "0000000000";
```

```
    }

  //Program Kelas
  if (Akses1 == 0 &&
digitalRead(pinPirKelas1) == HIGH)

{digitalWrite(pinAlarmKelas1,HIGH);
    Security1 = 1;
    }
  if (Akses2 == 0 &&
digitalRead(pinPirKelas2) == HIGH)

{digitalWrite(pinAlarmKelas2,HIGH);
    Security2 = 1;
    }
  if (Akses3 == 0 &&
digitalRead(pinPirKelas3) == HIGH)

{digitalWrite(pinAlarmKelas3,HIGH);
    Security3 = 1;
    }
  if (Akses4 == 0 &&
digitalRead(pinPirKelas4) == HIGH)

{digitalWrite(pinAlarmKelas4,HIGH);
    Security4 = 1;
    }

  if(Akses1 == 1)
    {Security1 = 0;

digitalWrite(pinAlarmKelas1,LOW);
    if(digitalRead(pinSwitchKelas1)
== HIGH)
    //Manual Nyala

{LampuKelasNyala(pinLampuKelas1
A);
    SimpanLumensKelas1 = 0;
    VBLampuKelas1 = 3;
    }
    else{
    if(SimpanLumensKelas1 == 1
&& TempLumensKelas1 > 600)
```

```
    {if(LdrKelas1Depan <= 500 ||
LdrKelas1Belakang <= 500)

{LampuKelasNyala(pinLampuKelas1
A);
        VBLampuKelas1 = 3;
        }
     if(LdrAtap <= 600)
       {TempLumensKelas1 = 500;
       }
     }
   else if(SimpanLumensKelas1 ==
1 && TempLumensKelas1 <= 600)
     {if(LdrKelas1Depan <= 500 ||
LdrKelas1Belakang <= 500)

{LampuKelasNyala(pinLampuKelas1
A);
        VBLampuKelas1 = 3;
        }
      if(LdrAtap > 600)

{LampuKelasMati(pinLampuKelas1A
);
        VBLampuKelas1 = 0;
        SimpanLumensKelas1 = 0;
        }
      }
    if(SimpanLumensKelas1 == 0
&& LdrKelas1Depan <= 500 &&
LdrKelas1Belakang <= 500)

{LampuKelasNyala(pinLampuKelas1
A);
      VBLampuKelas1 = 3;
      SimpanLumensKelas1 = 1;
      TempLumensKelas1 =
LdrAtap;
      }
    else if(SimpanLumensKelas1 ==
0 && LdrKelas1Depan > 500 &&
LdrKelas1Belakang <= 500)

{LampuKelasNyalaDepan(pinLampu
Kelas1A);
```

```
      VBLampuKelas1 = 2;
      SimpanLumensKelas1 = 1;
      TempLumensKelas1 =
            LdrAtap;
      }
    else if(SimpanLumensKelas1 ==
0 && LdrKelas1Depan <= 500 &&
LdrKelas1Belakang > 500)

      {LampuKelasNyalaBelakang(pin
       LampuKelas1A);
       VBLampuKelas1 = 1;
       SimpanLumensKelas1 = 1;
       TempLumensKelas1 =
            LdrAtap;
      }
    else if(SimpanLumensKelas1 ==
0 && LdrKelas1Depan > 500 &&
LdrKelas1Belakang > 500)

      {LampuKelasMati(pinLampuKel
       as1A);
       VBLampuKelas1 = 0;
       SimpanLumensKelas1 = 0;
       }
     }
   }
  else if(Akses1 == 0)

    {LampuKelasMati(pinLampuKela
     s1A);
     VBLampuKelas1 = 0;
     SimpanLumensKelas1 = 0;
     }


 if(Akses2 == 1)
  {Security2 = 0;

digitalWrite(pinAlarmKelas2,LOW);
   if(digitalRead(pinSwitchKelas2) ==
HIGH)
   //Manual Nyala
```

```
   {LampuKelasNyala(pinLampuKel
    as2A);
   SimpanLumensKelas2 = 0;
   VBLampuKelas2 = 3;
   }
  else{
    if(SimpanLumensKelas2 == 1
&& TempLumensKelas2 > 600)
     {if(LdrKelas2Depan <= 500 ||
LdrKelas2Belakang <= 500)

     {LampuKelasNyala(pinLampuK
      elas2A);
       VBLampuKelas2 = 3;
       }
     if(LdrAtap <= 600)
      {TempLumensKelas2 = 500;
       }
     }
    else if(SimpanLumensKelas2 ==
1 && TempLumensKelas2 <= 600)
     {if(LdrKelas2Depan <= 500 ||
LdrKelas2Belakang <= 500)

     {LampuKelasNyala(pinLampu
      Kelas2A);
       VBLampuKelas2 = 3;
       }
     if(LdrAtap > 600)

    {LampuKelasMati(pinLampuKel
     as2A);
       VBLampuKelas2 = 0;
       SimpanLumensKelas2 = 0;
       }
     }
   if(SimpanLumensKelas2 == 0
&& LdrKelas2Depan <= 500 &&
LdrKelas2Belakang <= 500)

     {LampuKelasNyala(pinLampuK
      elas2A);
      VBLampuKelas2 = 3;
      SimpanLumensKelas2 = 1;
```

```
        TempLumensKelas2 =
            LdrAtap;
        }
      else if(SimpanLumensKelas2 ==
0 && LdrKelas2Depan > 500 &&
LdrKelas2Belakang <= 500)

{LampuKelasNyalaDepan(pinLampu
Kelas2A);
        VBLampuKelas2 = 2;
        SimpanLumensKelas2 = 1;
        TempLumensKelas2 =
LdrAtap;
        }
      else if(SimpanLumensKelas2 ==
0 && LdrKelas2Depan <= 500 &&
LdrKelas2Belakang > 500)

{LampuKelasNyalaBelakang(pinLamp
uKelas2A);
        VBLampuKelas2 = 1;
        SimpanLumensKelas2 = 1;
        TempLumensKelas2 =
            LdrAtap;
        }
      else if(SimpanLumensKelas2 ==
0 && LdrKelas2Depan > 500 &&
LdrKelas2Belakang > 500)

        {LampuKelasMati(pinLampuKel
         as2A);
         VBLampuKelas2 = 0;
         SimpanLumensKelas2 = 0;
         }
       }
     }
   else if(Akses2 == 0)

     {LampuKelasMati(pinLampu
      Kelas2A);
      VBLampuKelas2 = 0;
      SimpanLumensKelas2 = 0;
      }
```

```
  if(Akses3 == 1)
   {Security3 = 0;

digitalWrite(pinAlarmKelas3,LOW);
   if(digitalRead(pinSwitchKelas3) ==
HIGH)
   //Manual Nyala
   {LampuKelasNyala(pinLampu
    Kelas3A);
    SimpanLumensKelas3 = 0;
    VBLampuKelas3 = 3;
    }
   else{
    if(SimpanLumensKelas3 == 1
&& TempLumensKelas3 > 600)
      {if(LdrKelas3Depan <= 500 ||
LdrKelas3Belakang <= 500)

       {LampuKelasNyala(pinLampu
        Kelas3A);
        VBLampuKelas3 = 3;
        }
       if(LdrAtap <= 600)
        {TempLumensKelas3 = 500;
        }
       }
     else if(SimpanLumensKelas3 ==
1 && TempLumensKelas3 <= 600)
      {if(LdrKelas3Depan <= 500 ||
LdrKelas3Belakang <= 500)

       {LampuKelasNyala(pinLampu
        Kelas3A);
         VBLampuKelas3 = 3;
        }
       if(LdrAtap > 600)

       {LampuKelasMati(pinLampu
        Kelas3A);
         VBLampuKelas3 = 0;
         SimpanLumensKelas3 = 0;
        }
      }
```

```
      if(SimpanLumensKelas3 == 0
&& LdrKelas3Depan <= 500 &&
LdrKelas3Belakang <= 500)

        {LampuKelasNyala(pinLampu
         Kelas3A);
         VBLampuKelas3 = 3;
         SimpanLumensKelas3 = 1;
         TempLumensKelas3 =
              LdrAtap;
         }
      else if(SimpanLumensKelas3 ==
0 && LdrKelas3Depan > 500 &&
LdrKelas3Belakang <= 500)

        {LampuKelasNyalaBelakang(pin
         LampuKelas3A);
         VBLampuKelas3 = 2;
         SimpanLumensKelas3 = 1;
         TempLumensKelas3 =
              LdrAtap;
         }
      else if(SimpanLumensKelas3 ==
0 && LdrKelas3Depan <= 500 &&
LdrKelas3Belakang > 500)

        {LampuKelasNyalaDepan(pin
         LampuKelas3A);
         VBLampuKelas3 = 1;
         SimpanLumensKelas3 = 1;
         TempLumensKelas3 =
              LdrAtap;
         }
      else if(SimpanLumensKelas3 ==
0 && LdrKelas3Depan > 500 &&
LdrKelas3Belakang > 500)

        {LampuKelasMati(pinLampu
         Kelas3A);
         VBLampuKelas3 = 0;
         SimpanLumensKelas3 = 0;
         }
      }
    }
  else if(Akses3 == 0)
```

```
    {LampuKelasMati(pinLampu
     Kelas3A);
     VBLampuKelas3 = 0;
     SimpanLumensKelas3 = 0;
    }

  if(Akses4 == 1)
    {Security4 = 0;

digitalWrite(pinAlarmKelas4,LOW);
    if(digitalRead(pinSwitchKelas4A)
== HIGH &&
digitalRead(pinSwitchKelas4B) ==
LOW)
     //Manual Nyala

      {LampuKelasNyala(pinLampu
       Kelas4A);
       VBLampuKelas4 = 3;
       SimpanLumensKelas4 = 0;
       }
     else if
(digitalRead(pinSwitchKelas4A) ==
LOW &&
digitalRead(pinSwitchKelas4B) ==
HIGH)
      //Manual Mati

      {LampuKelasMati(pinLampu
       Kelas4A);
       VBLampuKelas4 = 0;
       SimpanLumensKelas4 = 0;
       }
     else{
      if(SimpanLumensKelas4 == 1
&& TempLumensKelas4 > 600)
       {if(LdrKelas4Depan <= 500 ||
LdrKelas4Belakang <= 500)

        {LampuKelasNyala(pinLampu
         Kelas4A);
          VBLampuKelas4 = 3;
          }
        if(LdrAtap <= 600)
```

```
        {TempLumensKelas4 = 500;
        }
    }
    else if(SimpanLumensKelas4 ==
1 && TempLumensKelas4 <= 600)
    {if(LdrKelas4Depan <= 500 ||
LdrKelas4Belakang <= 500)

    {LampuKelasNyala(pinLampu
     Kelas4A);
     VBLampuKelas4 = 3;
     }
    if(LdrAtap > 600)

    {LampuKelasMati(pinLampuK
     elas4A);
     VBLampuKelas4 = 0;
     SimpanLumensKelas4 = 0;
     }
    }
    if(SimpanLumensKelas4 == 0
&& (LdrKelas4Depan <= 500 &&
LdrKelas4Belakang <= 500))

    {LampuKelasNyala(pinLampu
     Kelas4A);
     VBLampuKelas4 = 3;
     SimpanLumensKelas4 = 1;
     TempLumensKelas4 =
          LdrAtap;
     }
    else if(SimpanLumensKelas4 ==
0 && (LdrKelas4Depan > 500 &&
LdrKelas4Belakang <= 500))

    {LampuKelasNyalaBelakang(pin
     LampuKelas4A);
     VBLampuKelas4 = 2;
     SimpanLumensKelas4 = 1;
     TempLumensKelas4 =
          LdrAtap;
     }
    else if(SimpanLumensKelas4 ==
0 && (LdrKelas4Depan <= 500 &&
LdrKelas4Belakang > 500))

    {LampuKelasNyalaDepan(pin
     LampuKelas4A);
     VBLampuKelas4 = 1;
     SimpanLumensKelas4 = 1;
     TempLumensKelas4 =
          LdrAtap;
     }
    else if(SimpanLumensKelas4 ==
0 && (LdrKelas4Depan > 500 &&
LdrKelas4Belakang > 500))

    {LampuKelasMati(pinLampu
     Kelas4A);
     VBLampuKelas4 = 0;
     SimpanLumensKelas4 = 0;
     }
    }
  }
  else if(Akses4 == 0)

  {LampuKelasMati(pinLampuKelas
   4A);
   VBLampuKelas4 = 0;
   SimpanLumensKelas4 = 0;
   }

  delay(200);
  SnsrDaya =
      analogRead(pinSnsrDaya);
  String VBSnsrDaya =
      KirimInteger(SnsrDaya);

  VBID1 =
    KonvertRFIDkeVB(TempID1);
  VBID2 =
    KonvertRFIDkeVB(TempID2);
  VBID3 =
    KonvertRFIDkeVB(TempID3);
  VBID4 =
    KonvertRFIDkeVB(TempID4);
  EEPROM.write(0,Akses1);
  EEPROM.write(1,VBID1);
  EEPROM.write(2,Akses2);
  EEPROM.write(3,VBID2);
  EEPROM.write(4,Akses3);
```

```
  EEPROM.write(5,VBID3);
  EEPROM.write(6,Akses4);
  EEPROM.write(7,VBID4);
 Kirim = String(Security1) +
     String(Security2) +
     String(Security3) +
     String(Security4) + ";" +
     String(VBID1) + String(VBID2)
     + String(VBID3) +
     String(VBID4) + ";" +
     String(VBLampuKelas1) +
     String(VBLampuKelas2) +
     String(VBLampuKelas3) +
     String(VBLampuKelas4) + ";" +
     String(VBLampuKoridor1A) +
     String(VBLampuKoridor1D) +
     String(VBLampuKoridor1E) +
     String(VBLampuKoridor2A) + ";"
     + VBLdrKelas1Depan +
     VBLdrKelas1Belakang +
     VBLdrKelas2Depan +
     VBLdrKelas2Belakang +
     VBLdrKelas3Depan +
     VBLdrKelas3Belakang +
     VBLdrKelas4Depan +
     VBLdrKelas4Belakang + ";" +
     VBLdrKoridor1A +
     VBLdrKoridor1B +
     VBLdrKoridor2A + VBLdrAtap +
     ";" + VBSnsrDaya;
 Serial.println(Kirim);
 delay(4800);


}// Kurung Akhir Void Loop

void LampuKelasMati(int x){
 digitalWrite(x,LOW);
 digitalWrite(x+1,LOW);
 digitalWrite(x+2,HIGH);
 digitalWrite(x+3,HIGH);
 digitalWrite(x+4,HIGH);
}

void LampuKelasNyala(int x){
```

```
  digitalWrite(x,HIGH);
  digitalWrite(x+1,HIGH);
  digitalWrite(x+2,LOW);
  digitalWrite(x+3,LOW);
  digitalWrite(x+4,LOW);
 }

 void LampuKelasNyalaDepan(int x){
  digitalWrite(x,HIGH);
  digitalWrite(x+1,HIGH);
  digitalWrite(x+2,LOW);
  digitalWrite(x+3,LOW);
  digitalWrite(x+4,HIGH);
 }

 void LampuKelasNyalaBelakang(int
 x){
  digitalWrite(x,HIGH);
  digitalWrite(x+1,HIGH);
  digitalWrite(x+2,HIGH);
  digitalWrite(x+3,LOW);
  digitalWrite(x+4,LOW);
 }

 int KonvertRFIDkeVB(String x){
  int y;
  if(x == "0000000000"){
   y = 0;
  }
  if (x == "01000717F9"){
   y = 1;
  }
  if (x == "01000825FF"){
   y = 2;
  }
  if (x == "3C00CC28B7"){
   y = 3;
  }
  if (x == "3C00CC7894"){
   y = 4;
  }
  return y;
 }

 String KonvertVBkeRFID(int x){
```

```
String y;                          String result;
if(x == 0){                        if (x<0)
  y = "0000000000";                {result = "0000";
}                                  }
if (x == 1){                       else if (x<10)
  y = "01000717F9";                {result = "000" + String(x);
}                                  }
if (x == 2){                       else if (x<100)
  y = "01000825FF";                {result = "00" + String(x);
}                                  }
if (x == 3){                       else if (x<1000)
  y = "3C00CC28B7";                {result = "0" + String(x);
}                                  }
if (x == 4){                       else
  y = "3C00CC7894";                {result = String(x);
}                                  }
return y;                          return result;
}                                  }

String KirimInteger(int x){
```

Lampiran A2 : Kode program untuk aplikasi sistem pemantauan

```vb
Imports System
Imports System.IO.Ports
Imports System.Globalization
Imports System.Threading
Public Class Form1
    Private mySerialPort As New SerialPort("COM3")
    Dim Arduino As String
    Dim Security1, Security2, Security3, Security4 As String
    Dim ID1, ID2, ID3, ID4 As String
    Dim LampuKelas1, LampuKelas2, LampuKelas3, LampuKelas4 As String
    Dim LampuKoridor1A, LampuKoridor1D, LampuKoridor1E, LampuKoridor2A As String
    Dim TeganganTemp As String
    Dim TeganganSensorDaya As Single
    Dim Arus As Single
    Dim Daya As Single
    Dim Init As Integer
    Dim CatatID1, CatatID2, CatatID3, CatatID4 As String
    Dim NewRow1 As TugasAkhirDataSet1.Kelas1Row
    Dim NewRow2 As TugasAkhirDataSet1.Kelas2Row
    Dim NewRow3 As TugasAkhirDataSet1.Kelas3Row
    Dim NewRow4 As TugasAkhirDataSet1.Kelas4Row
    Dim IntLastRow1, IntLastRow2, IntLastRow3, IntLastRow4 As Integer
    Dim LastRow1 As TugasAkhirDataSet1.Kelas1Row
    Dim LastRow2 As TugasAkhirDataSet1.Kelas2Row
    Dim LastRow3 As TugasAkhirDataSet1.Kelas3Row
    Dim LastRow4 As TugasAkhirDataSet1.Kelas4Row
    Dim NewRowDaya As TugasAkhirDataSet1.DayaRow
    Dim TempDelKelas1, TempDelKelas2, TempDelKelas3, TempDelKelas4 As Integer
    Dim TempDelDaya As Integer


    Private Sub btnClose_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnClose.Click
        mySerialPort.Close()
        Me.Close()
    End Sub

    Private Sub Form1_Load(ByVal sender As System.Object, ByVal e As System.EventArgs)
Handles MyBase.Load

        'TODO: This line of code loads data into the 'TugasAkhirDataSet1.Account' table.
You can move, or remove it, as needed.
        Me.AccountTableAdapter.Fill(Me.TugasAkhirDataSet1.Account)
        'TODO: This line of code loads data into the 'TugasAkhirDataSet1.Kelas4' table.
You can move, or remove it, as needed.
        Me.Kelas4TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas4)
        'TODO: This line of code loads data into the 'TugasAkhirDataSet1.Kelas3' table.
You can move, or remove it, as needed.
```

```vbnet
        Me.Kelas3TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas3)
        'TODO: This line of code loads data into the 'TugasAkhirDataSet1.Kelas2' table.
You can move, or remove it, as needed.
        Me.Kelas2TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas2)
        'TODO: This line of code loads data into the 'TugasAkhirDataSet1.Kelas1' table.
You can move, or remove it, as needed.
        Me.Kelas1TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas1)
        Me.DayaTableAdapter.Fill(Me.TugasAkhirDataSet1.Daya)
        'koneksi dengan serialport
        mySerialPort.BaudRate = 9600
        mySerialPort.Parity = Parity.None
        mySerialPort.StopBits = StopBits.One
        mySerialPort.DataBits = 8
        mySerialPort.Handshake = Handshake.None
        mySerialPort.Open()
        lblSecurity1.Visible = False
        lblSecurity2.Visible = False
        lblSecurity3.Visible = False
        lblSecurity4.Visible = False
        Init = 0
        pbLampuKoridor1ANyala.Visible = False
        pbLampuKoridor1DNyala.Visible = False
        pbLampuKoridor1ENyala.Visible = False
        pbLampuKoridor2ANyala.Visible = False
        pbLampuNyalaBelakangKelas1.Visible = False
        pbLampuNyalaBelakangKelas2.Visible = False
        pbLampuNyalaBelakangKelas3.Visible = False
        pbLampuNyalaBelakangKelas4.Visible = False
        pbLampuNyalaDepanKelas1.Visible = False
        pbLampuNyalaDepanKelas2.Visible = False
        pbLampuNyalaDepanKelas3.Visible = False
        pbLampuNyalaDepanKelas4.Visible = False
        pbLampuNyalaFullKelas1.Visible = False
        pbLampuNyalaFullKelas2.Visible = False
        pbLampuNyalaFullKelas3.Visible = False
        pbLampuNyalaFullKelas4.Visible = False
        pbAlarmOnKelas1.Visible = False
        pbAlarmOnKelas2.Visible = False
        pbAlarmOnKelas3.Visible = False
        pbAlarmOnKelas4.Visible = False
        btnLogin.Enabled = True
        btnLogout.Enabled = False
        btnBackupOnly.Enabled = False
        btnBackup.Enabled = False
        tbUsername.ReadOnly = False
        tbPassword.ReadOnly = False
    End Sub

    Private Sub TimerData_Tick(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles TimerData.Tick
```

```vb
Arduino = mySerialPort.ReadLine

'Pengambilan Data Dari Arduino
Security1 = Mid(Arduino, 1, 1)
Security2 = Mid(Arduino, 2, 1)
Security3 = Mid(Arduino, 3, 1)
Security4 = Mid(Arduino, 4, 1)
ID1 = Mid(Arduino, 6, 1)
ID2 = Mid(Arduino, 7, 1)
ID3 = Mid(Arduino, 8, 1)
ID4 = Mid(Arduino, 9, 1)
LampuKelas1 = Mid(Arduino, 11, 1)
LampuKelas2 = Mid(Arduino, 12, 1)
LampuKelas3 = Mid(Arduino, 13, 1)
LampuKelas4 = Mid(Arduino, 14, 1)
LampuKoridor1A = Mid(Arduino, 16, 1)
LampuKoridor1D = Mid(Arduino, 17, 1)
LampuKoridor1E = Mid(Arduino, 18, 1)
LampuKoridor2A = Mid(Arduino, 19, 1)
tbLdrKelas1Depan.Text = Mid(Arduino, 21, 4)
tbLdrKelas1Belakang.Text = Mid(Arduino, 25, 4)
tbLdrKelas2Depan.Text = Mid(Arduino, 29, 4)
tbLdrKelas2Belakang.Text = Mid(Arduino, 33, 4)
tbLdrKelas3Depan.Text = Mid(Arduino, 37, 4)
tbLdrKelas3Belakang.Text = Mid(Arduino, 41, 4)
tbLdrKelas4Depan.Text = Mid(Arduino, 45, 4)
tbLdrKelas4Belakang.Text = Mid(Arduino, 49, 4)
tbLdrKoridor1A.Text = Mid(Arduino, 54, 4)
tbLdrKoridor1B.Text = Mid(Arduino, 58, 4)
tbLdrKoridor2A.Text = Mid(Arduino, 62, 4)
tbLdrAtap.Text = Mid(Arduino, 66, 4)
TeganganTemp = Mid(Arduino, 71, 4)

If (Init = 0) Then
    CatatID1 = ID1
    CatatID2 = ID2
    CatatID3 = ID3
    CatatID4 = ID4
    Init = 1
End If

'Lampu On-Off
If (LampuKoridor1A = "0") Then
    pbLampuKoridor1ANyala.Visible = False
Else
    pbLampuKoridor1ANyala.Visible = True
End If
If (LampuKoridor1D = "0") Then
    pbLampuKoridor1DNyala.Visible = False
Else
```

```vb
            pbLampuKoridor1DNyala.Visible = True
        End If
        If (LampuKoridor1E = "0") Then
            pbLampuKoridor1ENyala.Visible = False
        Else
            pbLampuKoridor1ENyala.Visible = True
        End If
        If (LampuKoridor2A = "0") Then
            pbLampuKoridor2ANyala.Visible = False
        Else
            pbLampuKoridor2ANyala.Visible = True
        End If

        If (LampuKelas1 = "0") Then
            pbLampuNyalaBelakangKelas1.Visible = False
            pbLampuNyalaDepanKelas1.Visible = False
            pbLampuNyalaFullKelas1.Visible = False
        ElseIf (LampuKelas1 = "1") Then
            pbLampuNyalaBelakangKelas1.Visible = False
            pbLampuNyalaDepanKelas1.Visible = True
            pbLampuNyalaFullKelas1.Visible = False
        ElseIf (LampuKelas1 = "2") Then
            pbLampuNyalaBelakangKelas1.Visible = True
            pbLampuNyalaDepanKelas1.Visible = False
            pbLampuNyalaFullKelas1.Visible = False
        ElseIf (LampuKelas1 = "3") Then
            pbLampuNyalaBelakangKelas1.Visible = False
            pbLampuNyalaDepanKelas1.Visible = False
            pbLampuNyalaFullKelas1.Visible = True
        End If

        If (LampuKelas2 = "0") Then
            pbLampuNyalaBelakangKelas2.Visible = False
            pbLampuNyalaDepanKelas2.Visible = False
            pbLampuNyalaFullKelas2.Visible = False
        ElseIf (LampuKelas2 = "1") Then
            pbLampuNyalaBelakangKelas2.Visible = False
            pbLampuNyalaDepanKelas2.Visible = True
            pbLampuNyalaFullKelas2.Visible = False
        ElseIf (LampuKelas2 = "2") Then
            pbLampuNyalaBelakangKelas2.Visible = True
            pbLampuNyalaDepanKelas2.Visible = False
            pbLampuNyalaFullKelas2.Visible = False
        ElseIf (LampuKelas2 = "3") Then
            pbLampuNyalaBelakangKelas2.Visible = False
            pbLampuNyalaDepanKelas2.Visible = False
            pbLampuNyalaFullKelas2.Visible = True
        End If

        If (LampuKelas3 = "0") Then
```

```vbnet
            pbLampuNyalaBelakangKelas3.Visible = False
            pbLampuNyalaDepanKelas3.Visible = False
            pbLampuNyalaFullKelas3.Visible = False
        ElseIf (LampuKelas3 = "1") Then
            pbLampuNyalaBelakangKelas3.Visible = False
            pbLampuNyalaDepanKelas3.Visible = True
            pbLampuNyalaFullKelas3.Visible = False
        ElseIf (LampuKelas3 = "2") Then
            pbLampuNyalaBelakangKelas3.Visible = True
            pbLampuNyalaDepanKelas3.Visible = False
            pbLampuNyalaFullKelas3.Visible = False
        ElseIf (LampuKelas3 = "3") Then
            pbLampuNyalaBelakangKelas3.Visible = False
            pbLampuNyalaDepanKelas3.Visible = False
            pbLampuNyalaFullKelas3.Visible = True
        End If

        If (LampuKelas4 = "0") Then
            pbLampuNyalaBelakangKelas4.Visible = False
            pbLampuNyalaDepanKelas4.Visible = False
            pbLampuNyalaFullKelas4.Visible = False
        ElseIf (LampuKelas4 = "1") Then
            pbLampuNyalaBelakangKelas4.Visible = False
            pbLampuNyalaDepanKelas4.Visible = True
            pbLampuNyalaFullKelas4.Visible = False
        ElseIf (LampuKelas4 = "2") Then
            pbLampuNyalaBelakangKelas4.Visible = True
            pbLampuNyalaDepanKelas4.Visible = False
            pbLampuNyalaFullKelas4.Visible = False
        ElseIf (LampuKelas4 = "3") Then
            pbLampuNyalaBelakangKelas4.Visible = False
            pbLampuNyalaDepanKelas4.Visible = False
            pbLampuNyalaFullKelas4.Visible = True
        End If

        'Nama Pengajar
        Dim ID1RowMasalah As TugasAkhirDataSet1.AccountRow
        Dim ID2RowMasalah As TugasAkhirDataSet1.AccountRow
        Dim ID3RowMasalah As TugasAkhirDataSet1.AccountRow
        Dim ID4RowMasalah As TugasAkhirDataSet1.AccountRow
        ID1RowMasalah = TugasAkhirDataSet1.Account.FindByID(ID1)
        ID2RowMasalah = TugasAkhirDataSet1.Account.FindByID(ID2)
        ID3RowMasalah = TugasAkhirDataSet1.Account.FindByID(ID3)
        ID4RowMasalah = TugasAkhirDataSet1.Account.FindByID(ID4)
        tbNamaPengajar1.Text = ID1RowMasalah.Nama.ToString
        tbNamaPengajar2.Text = ID2RowMasalah.Nama.ToString
        tbNamaPengajar3.Text = ID3RowMasalah.Nama.ToString
        tbNamaPengajar4.Text = ID4RowMasalah.Nama.ToString

        'Security Kelas
```

```vb
If (Security1 = "0") Then
    lblSecurity1.Visible = False
    pbAlarmOnKelas1.Visible = False
    pbAlarmOffKelas1.Visible = True
ElseIf (Security1 = "1") Then
    lblSecurity1.Visible = True
    pbAlarmOnKelas1.Visible = True
    pbAlarmOffKelas1.Visible = False
End If
If (Security2 = "0") Then
    lblSecurity2.Visible = False
    pbAlarmOnKelas2.Visible = False
    pbAlarmOffKelas2.Visible = True
ElseIf (Security2 = "1") Then
    lblSecurity2.Visible = True
    pbAlarmOnKelas2.Visible = True
    pbAlarmOffKelas2.Visible = False
End If
If (Security3 = "0") Then
    lblSecurity3.Visible = False
    pbAlarmOnKelas3.Visible = False
    pbAlarmOffKelas3.Visible = True
ElseIf (Security3 = "1") Then
    lblSecurity3.Visible = True
    pbAlarmOnKelas3.Visible = True
    pbAlarmOffKelas3.Visible = False
End If
If (Security4 = "0") Then
    lblSecurity4.Visible = False
    pbAlarmOnKelas4.Visible = False
    pbAlarmOffKelas4.Visible = True
ElseIf (Security4 = "1") Then
    lblSecurity4.Visible = True
    pbAlarmOnKelas4.Visible = True
    pbAlarmOffKelas4.Visible = False
End If

'Konversi Tegangan ke Daya
TeganganSensorDaya = (TeganganTemp / 1024) * 5
TeganganTemp = TeganganSensorDaya / 76.2
Arus = TeganganTemp / 0.1
If (TeganganSensorDaya >= 740 Or TeganganSensorDaya <= 741) Then
    Daya = 5 * Arus * 0.94
ElseIf (TeganganSensorDaya >= 742 And TeganganSensorDaya <= 745) Then
    Daya = 5 * Arus * 0.97
ElseIf (TeganganSensorDaya >= 746 And TeganganSensorDaya <= 749) Then
    Daya = 5 * Arus * 0.99
ElseIf (TeganganSensorDaya >= 750 And TeganganSensorDaya <= 754) Then
    Daya = 5 * Arus * 1.01
ElseIf (TeganganSensorDaya >= 755 And TeganganSensorDaya <= 757) Then
```

```vbnet
            Daya = 5 * Arus * 1.03
        ElseIf (TeganganSensorDaya >= 758 And TeganganSensorDaya <= 759) Then
            Daya = 5 * Arus * 1.05
        ElseIf (TeganganSensorDaya >= 760 And TeganganSensorDaya <= 763) Then
            Daya = 5 * Arus * 1.07
        ElseIf (TeganganSensorDaya >= 764 And TeganganSensorDaya <= 766) Then
            Daya = 5 * Arus * 1.09
        ElseIf (TeganganSensorDaya >= 767 And TeganganSensorDaya <= 769) Then
            Daya = 5 * Arus * 1.11
        ElseIf (TeganganSensorDaya >= 770 And TeganganSensorDaya <= 771) Then
            Daya = 5 * Arus * 1.12
        ElseIf (TeganganSensorDaya >= 772 And TeganganSensorDaya <= 775) Then
            Daya = 5 * Arus * 1.14
        ElseIf (TeganganSensorDaya >= 776 And TeganganSensorDaya <= 778) Then
            Daya = 5 * Arus * 1.15
        End If

        tbDaya.Text = Daya.ToString

        'Database Daya
        NewRowDaya = TugasAkhirDataSet1.Daya.NewRow()
        NewRowDaya.Jam = Now.ToString("HH:mm:ss")
        NewRowDaya.Daya = Daya.ToString
        TugasAkhirDataSet1.Daya.Rows.Add(NewRowDaya)

        'Database ID

        If (CatatID1 = "0" And (ID1 = "1" Or ID1 = "2" Or ID1 = "3" Or ID1 = "4" Or ID1
= "5")) Then
            NewRow1 = TugasAkhirDataSet1.Kelas1.NewRow()
            NewRow1.ID = ID1
            NewRow1.Nama = ID1RowMasalah.Nama.ToString
            NewRow1.Masuk = Now.ToString("HH:mm:ss")
            TugasAkhirDataSet1.Kelas1.Rows.Add(NewRow1)
            CatatID1 = ID1
        ElseIf ((CatatID1 = "1" Or CatatID1 = "2" Or CatatID1 = "3" Or CatatID1 = "4"
Or CatatID1 = "5") And ID1 = "0") Then
            IntLastRow1 = TugasAkhirDataSet1.Kelas1.Rows.Count - 1
            If (IntLastRow1 = -1) Then
                NewRow1 = TugasAkhirDataSet1.Kelas1.NewRow()
                TugasAkhirDataSet1.Kelas1.Rows.Add(NewRow1)
                IntLastRow1 = 0
            End If
            LastRow1 = TugasAkhirDataSet1.Kelas1.Rows(IntLastRow1)
            LastRow1.Keluar = Now.ToString("HH:mm:ss")
            CatatID1 = ID1
        Else
            CatatID1 = ID1
        End If
```

```vbnet
        If (CatatID2 = "0" And (ID2 = "1" Or ID2 = "2" Or ID2 = "3" Or ID2 = "4" Or ID2
= "5")) Then
            NewRow2 = TugasAkhirDataSet1.Kelas2.NewRow()
            NewRow2.ID = ID2
            NewRow2.Nama = ID2RowMasalah.Nama.ToString
            NewRow2.Masuk = Now.ToString("HH:mm:ss")
            TugasAkhirDataSet1.Kelas2.Rows.Add(NewRow2)
            CatatID2 = ID2
        ElseIf ((CatatID2 = "1" Or CatatID2 = "2" Or CatatID2 = "3" Or CatatID2 = "4"
Or CatatID2 = "5") And ID2 = "0") Then
            IntLastRow2 = TugasAkhirDataSet1.Kelas2.Rows.Count - 1
            If (IntLastRow2 = -1) Then
                NewRow2 = TugasAkhirDataSet1.Kelas2.NewRow()
                TugasAkhirDataSet1.Kelas2.Rows.Add(NewRow2)
                IntLastRow2 = 0
            End If
            LastRow2 = TugasAkhirDataSet1.Kelas2.Rows(IntLastRow2)
            LastRow2.Keluar = Now.ToString("HH:mm:ss")
            CatatID2 = ID2
        Else
            CatatID2 = ID2
        End If

        If (CatatID3 = "0" And (ID3 = "1" Or ID3 = "2" Or ID3 = "3" Or ID3 = "4" Or ID3
= "5")) Then
            NewRow3 = TugasAkhirDataSet1.Kelas3.NewRow()
            NewRow3.ID = ID3
            NewRow3.Nama = ID3RowMasalah.Nama.ToString
            NewRow3.Masuk = Now.ToString("HH:mm:ss")
            TugasAkhirDataSet1.Kelas3.Rows.Add(NewRow3)
            CatatID3 = ID3
        ElseIf ((CatatID3 = "1" Or CatatID3 = "2" Or CatatID3 = "3" Or CatatID3 = "4"
Or CatatID3 = "5") And ID3 = "0") Then
            IntLastRow3 = TugasAkhirDataSet1.Kelas3.Rows.Count - 1
            If (IntLastRow3 = -1) Then
                NewRow3 = TugasAkhirDataSet1.Kelas3.NewRow()
                TugasAkhirDataSet1.Kelas3.Rows.Add(NewRow3)
                IntLastRow3 = 0
            End If
            LastRow3 = TugasAkhirDataSet1.Kelas3.Rows(IntLastRow3)
            LastRow3.Keluar = Now.ToString("HH:mm:ss")
            CatatID3 = ID3
        Else
            CatatID3 = ID3
        End If

        If (CatatID4 = "0" And (ID4 = "1" Or ID4 = "2" Or ID4 = "3" Or ID4 = "4" Or ID4
= "5")) Then
            NewRow4 = TugasAkhirDataSet1.Kelas4.NewRow()
            NewRow4.ID = ID4
```

```vbnet
                NewRow4.Nama = ID4RowMasalah.Nama.ToString
                NewRow4.Masuk = Now.ToString("HH:mm:ss")
                TugasAkhirDataSet1.Kelas4.Rows.Add(NewRow4)
                CatatID4 = ID4
            ElseIf ((CatatID4 = "1" Or CatatID4 = "2" Or CatatID4 = "3" Or CatatID4 = "4"
Or CatatID4 = "5") And ID4 = "0") Then
                IntLastRow4 = TugasAkhirDataSet1.Kelas4.Rows.Count - 1
                If (IntLastRow4 = -1) Then
                    NewRow4 = TugasAkhirDataSet1.Kelas4.NewRow()
                    TugasAkhirDataSet1.Kelas4.Rows.Add(NewRow4)
                    IntLastRow4 = 0
                End If
                LastRow4 = TugasAkhirDataSet1.Kelas4.Rows(IntLastRow4)
                LastRow4.Keluar = Now.ToString("HH:mm:ss")
                CatatID4 = ID4
            Else
                CatatID4 = ID4
            End If

            'ID Arduino
            tbID1.Text = ID1
            tbID2.Text = ID2
            tbID3.Text = ID3
            tbID4.Text = ID4

    End Sub

    Private folderdate As String = "D:\" & Date.Now.ToString("MM dd yy")

    Private Sub btnBackup_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnBackup.Click
        If MessageBox.Show("Database akan disimpan dan mulai baru, lanjutkan?",
"Update", MessageBoxButtons.YesNo, MessageBoxIcon.Warning) = DialogResult.No Then
            MsgBox("Operation Cancelled")
        Else
            btnBackup.Enabled = False
            btnBackupOnly.Enabled = False

            Me.Kelas1TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas1)
            Me.Kelas2TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas2)
            Me.Kelas3TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas3)
            Me.Kelas4TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas4)
            Me.DayaTableAdapter.Update(Me.TugasAkhirDataSet1.Daya)
            My.Computer.FileSystem.CreateDirectory(folderdate)
            My.Computer.FileSystem.CopyDirectory("D:\DatabaseVB", (folderdate), True)
            My.Computer.FileSystem.CopyDirectory("D:\DatabaseVBBlank", "D:\DatabaseVB",
True)

            TempDelKelas1 = (TugasAkhirDataSet1.Kelas1.Rows.Count - 1)
            For f As Integer = TempDelKelas1 To 0 Step -1
```

```vbnet
                    TugasAkhirDataSet1.Kelas1.Rows(f).Delete()
            Next
            TugasAkhirDataSet1.Kelas1.AcceptChanges()
            Me.Kelas1TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas1)

            TempDelKelas2 = (TugasAkhirDataSet1.Kelas2.Rows.Count - 1)
            For g As Integer = TempDelKelas2 To 0 Step -1
                    TugasAkhirDataSet1.Kelas2.Rows(g).Delete()
            Next
            TugasAkhirDataSet1.Kelas2.AcceptChanges()
            Me.Kelas2TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas2)

            TempDelKelas3 = (TugasAkhirDataSet1.Kelas3.Rows.Count - 1)
            For h As Integer = TempDelKelas3 To 0 Step -1
                    TugasAkhirDataSet1.Kelas3.Rows(h).Delete()
            Next
            TugasAkhirDataSet1.Kelas3.AcceptChanges()
            Me.Kelas3TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas3)

            TempDelKelas4 = (TugasAkhirDataSet1.Kelas4.Rows.Count - 1)
            For i As Integer = TempDelKelas4 To 0 Step -1
                    TugasAkhirDataSet1.Kelas4.Rows(i).Delete()
            Next
            TugasAkhirDataSet1.Kelas4.AcceptChanges()
            Me.Kelas4TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas4)

            TempDelDaya = (TugasAkhirDataSet1.Daya.Rows.Count - 1)
            For j As Integer = TempDelDaya To 0 Step -1
                    TugasAkhirDataSet1.Daya.Rows(j).Delete()
            Next
            TugasAkhirDataSet1.Daya.AcceptChanges()
            Me.DayaTableAdapter.Fill(Me.TugasAkhirDataSet1.Daya)

            btnBackupOnly.Enabled = True
            btnBackup.Enabled = True

            MsgBox("Harap tutup aplikasi dan jalankan aplikasi kembali untuk
resinkronisasi")
        End If
    End Sub

    Private Sub btnBackupOnly_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnBackupOnly.Click
        btnBackup.Enabled = False
        btnBackupOnly.Enabled = False

        Me.Kelas1TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas1)
        Me.Kelas2TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas2)
        Me.Kelas3TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas3)
        Me.Kelas4TableAdapter.Update(Me.TugasAkhirDataSet1.Kelas4)
```

```vb
        Me.DayaTableAdapter.Update(Me.TugasAkhirDataSet1.Daya)
        My.Computer.FileSystem.CreateDirectory(folderdate)
        My.Computer.FileSystem.CopyDirectory("D:\DatabaseVB", (folderdate), True)

        Me.Kelas1TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas1)
        Me.Kelas2TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas2)
        Me.Kelas3TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas3)
        Me.Kelas4TableAdapter.Fill(Me.TugasAkhirDataSet1.Kelas4)
        Me.DayaTableAdapter.Fill(Me.TugasAkhirDataSet1.Daya)

        btnBackupOnly.Enabled = True
        btnBackup.Enabled = True

    End Sub

    Private Sub btnLogin_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnLogin.Click
        Dim login = Me.LoginTableAdapter1.UsernamePasswordString(tbUsername.Text,
tbPassword.Text)

        If login Is Nothing Then
            MsgBox("Incorrect Username or Password")
        Else
            MsgBox("Login Successful")
            btnLogin.Enabled = False
            btnLogout.Enabled = True
            btnBackup.Enabled = True
            btnBackupOnly.Enabled = True
            tbUsername.ReadOnly = True
            tbPassword.ReadOnly = True
        End If
    End Sub

    Private Sub btnLogout_Click(ByVal sender As System.Object, ByVal e As
System.EventArgs) Handles btnLogout.Click
        btnLogin.Enabled = True
        btnLogout.Enabled = False
        btnBackup.Enabled = False
        btnBackupOnly.Enabled = False
        tbUsername.ReadOnly = False
        tbPassword.ReadOnly = False
        tbUsername.Text = ""
        tbPassword.Text = ""
    End Sub
End Class
```

LAMPIRAN B

DATASHEET

Lampiran B1 : Datasheet LM741

National Semiconductor

LM741
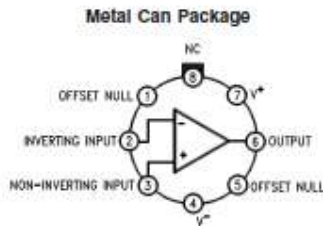## Operational Amplifier

General Description

The LM741 series are general purpose operational amplifiers which feature improved performance over industry standards like the LM709. They are direct, plug-in replacements for the 709C, LM201, MC1439 and 748 in most applications. The amplifiers offer many features which make their application nearly foolproof: overload protection on the input and output, no latch-up when the common mode range is exceeded, as well as freedom from oscillations.

The LM741C is identical to the LM741/LM741A except that the LM741C has their performance guaranteed over a 0°C to +70°C temperature range, instead of −55°C to +125°C.
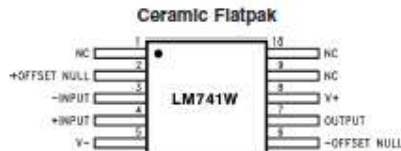
Features

Connection Diagrams

Metal Can Package

Dual-In-Line or S.O. Package

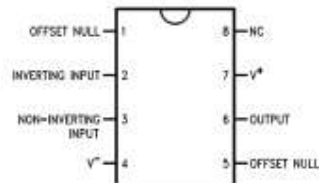Note 1: LM741H is available per JM38510/10101
Order Number LM741H, LM741H/883 (Note 1),
LM741AH/883 or LM741CH
See NS Package Number H08C

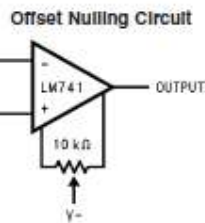Order Number LM741J, LM741J/883, LM741CN
See NS Package Number J08A, M08A or N08E

Ceramic Flatpak

Order Number LM741W/883
See NS Package Number W10A

Typical Application

Offset Nulling Circuit

LM741 Operational Amplifier

LM741

Electrical Characteristics (Note 5) (Continued)

Parameter	Conditions	LM741A			LM741			LM741C			Units
		Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	
Large Signal Voltage Gain	$T_A = 25°C$, $R_L \geq 2$ kΩ										
	$V_S = \pm20V$, $V_O = \pm15V$	50									V/mV
	$V_S = \pm15V$, $V_O = \pm10V$				50	200		20	200		V/mV
	$T_{AMIN} \leq T_A \leq T_{AMAX}$,										
	$R_L \geq 2$ kΩ,										
	$V_S = \pm20V$, $V_O = \pm15V$	32									V/mV
	$V_S = \pm15V$, $V_O = \pm10V$				25			15			V/mV
	$V_S = \pm5V$, $V_O = \pm2V$	10									V/mV
Output Voltage Swing	$V_S = \pm20V$										
	$R_L \geq 10$ kΩ	±16									V
	$R_L \geq 2$ kΩ	±15									V
	$V_S = \pm15V$										
	$R_L \geq 10$ kΩ				±12	±14		±12	±14		V
	$R_L \geq 2$ kΩ				±10	±13		±10	±13		V
Output Short Circuit Current	$T_A = 25°C$	10	25	35		25			25		mA
	$T_{AMIN} \leq T_A \leq T_{AMAX}$	10		40							mA
Common-Mode Rejection Ratio	$T_{AMIN} \leq T_A \leq T_{AMAX}$										
	$R_S \leq 10$ kΩ, $V_{CM} = \pm12V$				70	90		70	90		dB
	$R_S \leq 50\Omega$, $V_{CM} = \pm12V$	80	95								dB
Supply Voltage Rejection Ratio	$T_{AMIN} \leq T_A \leq T_{AMAX}$,										
	$V_S = \pm20V$ to $V_S = \pm5V$										
	$R_S \leq 50\Omega$	86	96								dB
	$R_S \leq 10$ kΩ				77	96		77	96		dB
Transient Response	$T_A = 25°C$, Unity Gain										
Rise Time			0.25	0.8		0.3			0.3		μs
Overshoot			6.0	20		5			5		%
Bandwidth (Note 6)	$T_A = 25°C$	0.437	1.5								MHz
Slew Rate	$T_A = 25°C$, Unity Gain	0.3	0.7			0.5			0.5		V/μs
Supply Current	$T_A = 25°C$					1.7	2.8		1.7	2.8	mA
Power Consumption	$T_A = 25°C$										
	$V_S = \pm20V$		80	150							mW
	$V_S = \pm15V$					50	85		50	85	mW
LM741A	$V_S = \pm20V$										
	$T_A = T_{AMIN}$			165							mW
	$T_A = T_{AMAX}$			135							mW
LM741	$V_S = \pm15V$										
	$T_A = T_{AMIN}$					60	100				mW
	$T_A = T_{AMAX}$					45	75				mW

Note 2: "Absolute Maximum Ratings" indicate limits beyond which damage to the device may occur. Operating Ratings indicate conditions for which the device is functional, but do not guarantee specific performance limits.

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Lampiran B2 : Datasheet ICNE555

Timer

NE/SA/SE555/SE555C

DESCRIPTION

The 555 monolithic timing circuit is a highly stable controller capable of producing accurate time delays, or oscillation. In the time delay mode of operation, the time is precisely controlled by one external resistor and capacitor. For a stable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled with two external resistors and one capacitor. The circuit may be triggered and reset on falling waveforms, and the output structure can source or sink up to 200 mA.

FEATURES

- Turn-off time less than 2 μs
- Max. operating frequency greater than 500 kHz
- Timing from microseconds to hours
- Operates in both astable and monostable modes
- High output current
- Adjustable duty cycle
- TTL compatible
- Temperature stability of 0.005% per °C

APPLICATIONS

- Precision timing
- Pulse generation
- Sequential timing
- Time delay generation
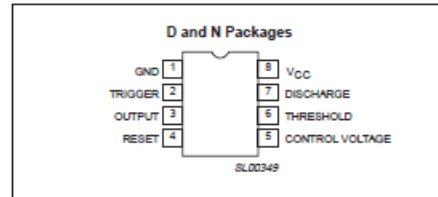- Pulse width modulation

PIN CONFIGURATION

D and N Packages

GND 1	8 V$_{CC}$
TRIGGER 2	7 DISCHARGE
OUTPUT 3	6 THRESHOLD
RESET 4	5 CONTROL VOLTAGE

SL00349

Figure 1. Pin configuration

BLOCK DIAGRAM

SL00350

Figure 2. Block Diagram

ORDERING INFORMATION

DESCRIPTION	TEMPERATURE RANGE	ORDER CODE	DWG #
8-Pin Plastic Small Outline (SO) Package	0 to +70 °C	NE555D	SOT96-1
8-Pin Plastic Dual In-Line Package (DIP)	0 to +70 °C	NE555N	SOT97-1
8-Pin Plastic Small Outline (SO) Package	–40 °C to +85 °C	SA555D	SOT96-1
8-Pin Plastic Dual In-Line Package (DIP)	–40 °C to +85 °C	SA555N	SOT97-1
8-Pin Plastic Dual In-Line Package (DIP)	–55 °C to +125 °C	SE555CN	SOT97-1
8-Pin Plastic Dual In-Line Package (DIP)	–55 °C to +125 °C	SE555N	SOT97-1

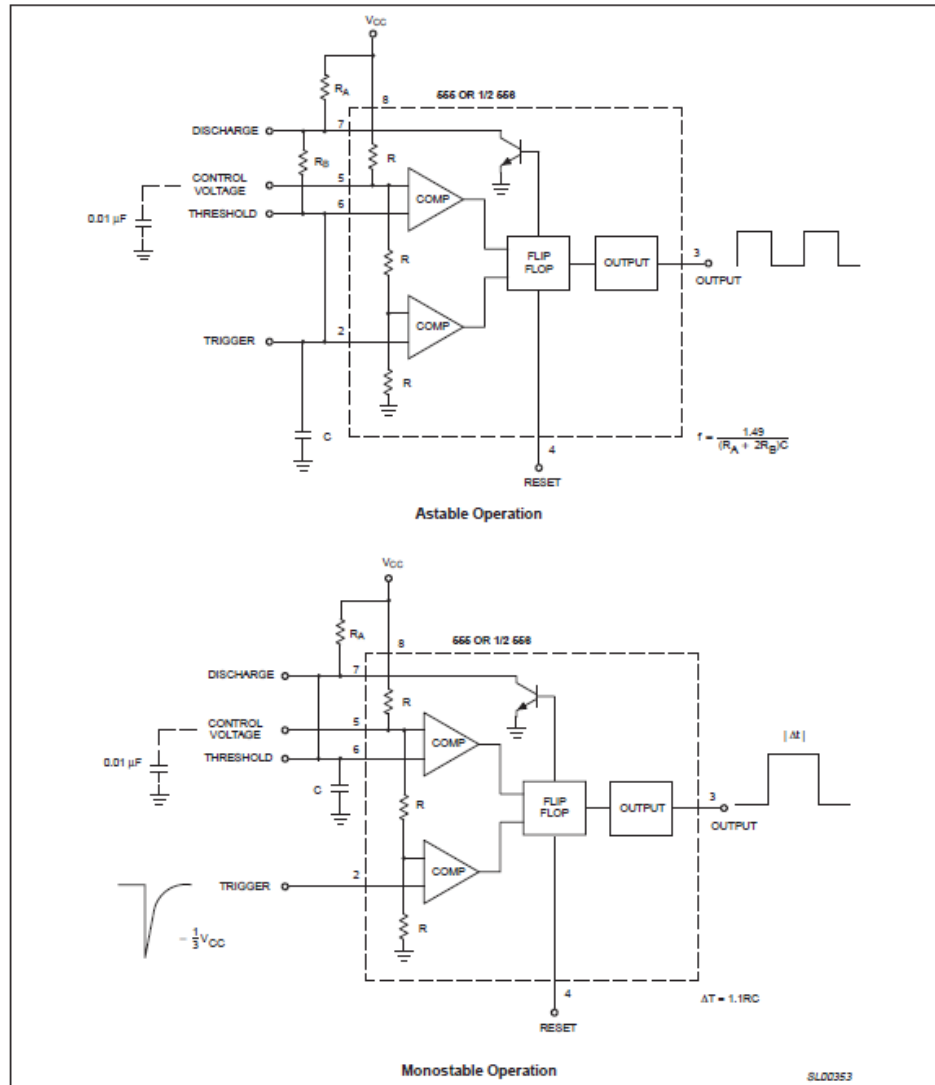2003 Feb 14

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LAMPIRAN B

Timer

NE/SA/SE555/SE555C

TYPICAL APPLICATIONS

Figure 5. Typical Applications

B-5

Lampiran B3 : Datasheet BISS0001 (PIR)

BISS0001
Micro Power PIR Motion Detector IC
===

Features
- Low power CMOS technology   (ideal for battery operated PIR devices)
- CMOS high input impedance operational amplifiers
- Bi-directional level detector / Excellent noise immunity
- Built-in Power up disable & output pulse control logic
- Dual mode : retriggerable & non-retriggerable

Pin description

Pin Number	Symbol	Description
1	A	Retriggerable & non-retriggerable mode select (A=1 : re-triggerable)
2	VO	Detector output pin (active high)
3	RR1	Output pulse width control (Tx) * See definition below
4	RC1	Output pulse width control (Tx) *
5	RC2	Trigger inhibit control (Ti) *
6	RR2	Trigger inhibit control (Ti) *
7	Vss	Ground
8	VRF	RESET & voltage reference input (Normally high. Low=reset)
9	VC	Trigger disable input (VC >0.2Vdd=enable; Vc<0.2Vdd =disabled)
10	IB	Op-amp input bias current setting
11	Vdd	Supply voltage
12	2OUT	2nd stage Op-amp output
13	2IN-	2nd stage Op-amp inverting input
14	1IN+	1 st stage Op-amp non-inverting input
15	1IN-	1 st stage Op-amp inverting input
16	1OUT	1 st stage Op-amp output

*
Tx = The time duration during which the output pin (Vo) remains high after triggering.
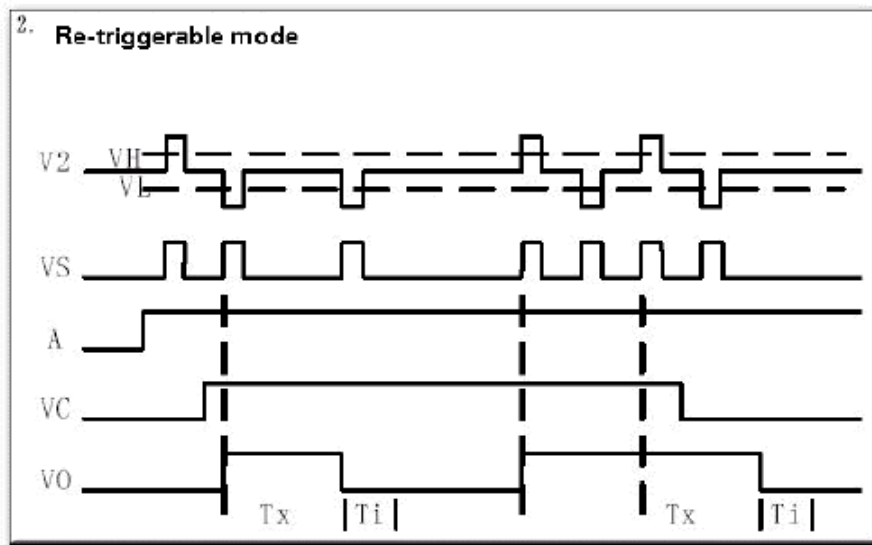Ti = During this time period, triggering is inhibited. See timing charts for details.

Tx ≈ 24576 x R10 x C6;   **Ti** ≈ 24 x R9 x C7。 (ref to schematic)

Absolute max. ratings

Description	Condition	Range	Unit
Supply voltage	--	3 ~ 5	V
Input voltage	--	Vss-0.3~ Vdd+0.3	V
Output current	Vdd=5V	10	mA
Operating temperature	--	-20 ~ +70	°C
Storage temperature	--	-40 ~ +125	°C

Retrigerrable waveform
(NOTE : VH=0.7Vdd,   VL=0.3Vdd)

2. Re-triggerable mode

Lampiran B4 : Datasheet ATMega 1280

Features

- High Performance, Low Power Atmel® AVR® 8-Bit Microcontroller
- Advanced RISC Architecture
  - 135 Powerful Instructions – Most Single Clock Cycle Execution
  - 32 × 8 General Purpose Working Registers
  - Fully Static Operation
  - Up to 16 MIPS Throughput at 16MHz
  - On-Chip 2-cycle Multiplier
- High Endurance Non-volatile Memory Segments
  - 64K/128K/256KBytes of In-System Self-Programmable Flash
  - 4Kbytes EEPROM
  - 8Kbytes Internal SRAM
  - Write/Erase Cycles:10,000 Flash/100,000 EEPROM
  - Data retention: 20 years at 85°C/ 100 years at 25°C
  - Optional Boot Code Section with Independent Lock Bits
    - In-System Programming by On-chip Boot Program
    - True Read-While-Write Operation
  - Programming Lock for Software Security
    - Endurance: Up to 64Kbytes Optional External Memory Space
- Atmel® QTouch® library support
  - Capacitive touch buttons, sliders and wheels
  - QTouch and QMatrix® acquisition
  - Up to 64 sense channels
- JTAG (IEEE std. 1149.1 compliant) Interface
  - Boundary-scan Capabilities According to the JTAG Standard
  - Extensive On-chip Debug Support
  - Programming of Flash, EEPROM, Fuses, and Lock Bits through the JTAG Interface
- Peripheral Features
  - Two 8-bit Timer/Counters with Separate Prescaler and Compare Mode
  - Four 16-bit Timer/Counter with Separate Prescaler, Compare- and Capture Mode
  - Real Time Counter with Separate Oscillator
  - Four 8-bit PWM Channels
  - Six/Twelve PWM Channels with Programmable Resolution from 2 to 16 Bits (ATmega1281/2561, ATmega640/1280/2560)
  - Output Compare Modulator
  - 8/16-channel, 10-bit ADC (ATmega1281/2561, ATmega640/1280/2560)
  - Two/Four Programmable Serial USART (ATmega1281/2561, ATmega640/1280/2560)
  - Master/Slave SPI Serial Interface
  - Byte Oriented 2-wire Serial Interface
  - Programmable Watchdog Timer with Separate On-chip Oscillator
  - On-chip Analog Comparator
  - Interrupt and Wake-up on Pin Change
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby, and Extended Standby
- I/O and Packages
  - 54/86 Programmable I/O Lines (ATmega1281/2561, ATmega640/1280/2560)
  - 64-pad QFN/MLF, 64-lead TQFP (ATmega1281/2561)
  - 100-lead TQFP, 100-ball CBGA (ATmega640/1280/2560)
  - RoHS/Fully Green
- Temperature Range:
  - -40°C to 85°C Industrial
- Ultra-Low Power Consumption
  - Active Mode: 1MHz, 1.8V: 500µA
  - Power-down Mode: 0.1µA at 1.8V
- Speed Grade:
  - ATmega640V/ATmega1280V/ATmega1281V:
    - 0 - 4MHz @ 1.8V - 5.5V, 0 - 8MHz @ 2.7V - 5.5V
  - ATmega2560V/ATmega2561V:
    - 0 - 2MHz @ 1.8V - 5.5V, 0 - 8MHz @ 2.7V - 5.5V
  - ATmega640/ATmega1280/ATmega1281:
    - 0 - 8MHz @ 2.7V - 5.5V, 0 - 16MHz @ 4.5V - 5.5V
  - ATmega2560/ATmega2561:
    - 0 - 16MHz @ 4.5V - 5.5V

8-bit Atmel Microcontroller with 64K/128K/256K Bytes In-System Programmable Flash

ATmega640/V
ATmega1280/V
ATmega1281/V
ATmega2560/V
ATmega2561/V

Preliminary

2549N–AVR–05/11

31. Electrical Characteristics

Absolute Maximum Ratings*

Operating Temperature	-55°C to +125°C
Storage Temperature	-65°C to +150°C
Voltage on any Pin except RESET with respect to Ground	-0.5V to V_{CC}+0.5V
Voltage on RESET with respect to Ground	-0.5V to +13.0V
Maximum Operating Voltage	6.0V
DC Current per I/O Pin	40.0mA
DC Current V_{CC} and GND Pins	200.0mA

*NOTICE: Stresses beyond those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. This is a stress rating only and functional operation of the device at these or other conditions beyond those indicated in the operational sections of this specification is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

31.1 DC Characteristics

T_A = -40°C to 85°C, V_{CC} = 1.8V to 5.5V (unless otherwise noted)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
V_{IL}	Input Low Voltage, Except XTAL1 and Reset pin	V_{CC} = 1.8V - 2.4V V_{CC} = 2.4V - 5.5V	-0.5 -0.5		$0.2V_{CC}$[1] $0.3V_{CC}$[1]	V
V_{IL1}	Input Low Voltage, XTAL1 pin	V_{CC} = 1.8V - 5.5V	-0.5		$0.1V_{CC}$[1]	
V_{IL2}	Input Low Voltage, RESET pin	V_{CC} = 1.8V - 5.5V	-0.5		$0.1V_{CC}$[1]	
V_{IH}	Input High Voltage, Except XTAL1 and RESET pins	V_{CC} = 1.8V - 2.4V V_{CC} = 2.4V - 5.5V	$0.7V_{CC}$[2] $0.6V_{CC}$[2]		V_{CC} + 0.5 V_{CC} + 0.5	
V_{IH1}	Input High Voltage, XTAL1 pin	V_{CC} = 1.8V - 2.4V V_{CC} = 2.4V - 5.5V	$0.8V_{CC}$[2] $0.7V_{CC}$[2]		V_{CC} + 0.5 V_{CC} + 0.5	
V_{IH2}	Input High Voltage, RESET pin	V_{CC} = 1.8V - 5.5V	$0.9V_{CC}$[2]		V_{CC} + 0.5	
V_{OL}	Output Low Voltage[3], Except RESET pin	I_{OL} = 20mA, V_{CC} = 5V I_{OL} = 10mA, V_{CC} = 3V			0.9 0.6	
V_{OH}	Output High Voltage[4], Except RESET pin	I_{OH} = -20mA, V_{CC} = 5V I_{OH} = -10mA, V_{CC} = 3V	4.2 2.3			
I_{IL}	Input Leakage Current I/O Pin	V_{CC} = 5.5V, pin low (absolute value)			1	µA
I_{IH}	Input Leakage Current I/O Pin	V_{CC} = 5.5V, pin high (absolute value)			1	
R_{RST}	Reset Pull-up Resistor		30		60	kΩ
R_{PU}	I/O Pin Pull-up Resistor		20		50	

T_A = -40°C to 85°C, V_{CC} = 1.8V to 5.5V (unless otherwise noted) (Continued)

Symbol	Parameter	Condition	Min.	Typ.	Max.	Units
I_{CC}	Power Supply Current[5]	Active 1MHz, V_{CC} = 2V (ATmega640/1280/2560/1V)		0.5	0.8	mA
		Active 4MHz, V_{CC} = 3V (ATmega640/1280/2560/1L)		3.2	5	
		Active 8MHz, V_{CC} = 5V (ATmega640/1280/1281/2560/2561)		10	14	
		Idle 1MHz, V_{CC} = 2V (ATmega640/1280/2560/1V)		0.14	0.22	
		Idle 4MHz, V_{CC} = 3V (ATmega640/1280/2560/1L)		0.7	1.1	
		Idle 8MHz, V_{CC} = 5V (ATmega640/1280/1281/2560/2561)		2.7	4	
	Power-down mode	WDT enabled, V_{CC} = 3V		<5	15	μA
		WDT disabled, V_{CC} = 3V		<1	7.5	
V_{ACIO}	Analog Comparator Input Offset Voltage	V_{CC} = 5V V_{In} = V_{CC}/2		<10	40	mV
I_{ACLK}	Analog Comparator Input Leakage Current	V_{CC} = 5V V_{In} = V_{CC}/2	-50		50	nA
t_{ACID}	Analog Comparator Propagation Delay	V_{CC} = 2.7V V_{CC} = 4.0V		750 500		ns

Notes: 1.   "Max" means the highest value where the pin is guaranteed to be read as low.

2.   "Min" means the lowest value where the pin is guaranteed to be read as high.

3.   Although each I/O port can sink more than the test conditions (20mA at VCC = 5V, 10mA at VCC = 3V) under steady state conditions (non-transient), the following must be observed:
ATmega1281/2561:
1.)The sum of all IOL, for ports A0-A7, G2, C4-C7 should not exceed 100mA.
2.)The sum of all IOL, for ports C0-C3, G0-G1, D0-D7 should not exceed 100mA.
3.)The sum of all IOL, for ports G3-G5, B0-B7, E0-E7 should not exceed 100mA.
4.)The sum of all IOL, for ports F0-F7 should not exceed 100mA.
ATmega640/1280/2560:
1.)The sum of all IOL, for ports J0-J7, A0-A7, G2 should not exceed 200mA.
2.)The sum of all IOL, for ports C0-C7, G0-G1, D0-D7, L0-L7 should not exceed 200mA.
3.)The sum of all IOL, for ports G3-G4, B0-B7, H0-B7 should not exceed 200mA.
4.)The sum of all IOL, for ports E0-E7, G5 should not exceed 100mA.
5.)The sum of all IOL, for ports F0-F7, K0-K7 should not exceed 100mA.
If IOL exceeds the test condition, VOL may exceed the related specification. Pins are not guaranteed to sink current greater than the listed test condition.

4.   Although each I/O port can source more than the test conditions (20mA at VCC = 5V, 10mA at VCC = 3V) under steady state conditions (non-transient), the following must be observed:
ATmega1281/2561:
1)The sum of all IOH, for ports A0-A7, G2, C4-C7 should not exceed 100mA.
2)The sum of all IOH, for ports C0-C3, G0-G1, D0-D7 should not exceed 100mA.
3)The sum of all IOH, for ports G3-G5, B0-B7, E0-E7 should not exceed 100mA.
4)The sum of all IOH, for ports F0-F7 should not exceed 100mA.
ATmega640/1280/2560:
1)The sum of all IOH, for ports J0-J7, G2, A0-A7 should not exceed 200mA.
2)The sum of all IOH, for ports C0-C7, G0-G1, D0-D7, L0-L7 should not exceed 200mA.
3)The sum of all IOH, for ports G3-G4, B0-B7, H0-H7 should not exceed 200mA.
4)The sum of all IOH, for ports E0-E7, G5 should not exceed 100mA.

Lampiran B5 : Datasheet Infra Red LED

EVERLIGHT

Technical Data Sheet
5mm Infrared LED , T-1 3/4

IR323/H0-A

Features
- High reliability
- High radiant intensity
- Peak wavelength $\lambda_p=940nm$
- 2.54mm Lead spacing
- Low forward voltage
- Pb free

Descriptions
- EVERLIGHT'S Infrared Emitting Diode(IR323/H0-A) is a high intensity diode , molded in a blue transparent plastic package.
- The device is spectrally matched with phototransistor , photodiode and infrared receiver module.

Applications
- Free air transmission system
- Infrared remote control units with high power requirement
- Smoke detector
- Infrared applied system

Device Selection Guide

LED Part No.	Chip Material	Lens Color
IR	GaAlAs	Blue

EVERLIGHT

Electro-Optical Characteristics (Ta=25℃)

Parameter	Symbol	Condition	Min.	Typ.	Max.	Units
Radiant Intensity	Ee	I_F=20mA	2.0	3.5	--	mW/sr
		I_F=100mA Pulse Width≦100 μ s ,Duty≦1%	--	15	--	
		I_F=1A Pulse Width≦100 μ s ,Duty≦1%.	--	160	--	
Peak Wavelength	λ p	I_F=20mA	--	940	--	nm
Spectral Bandwidth	$\Delta \lambda$	I_F=20mA	--	45	--	nm
Forward Voltage	V_F	I_F=20mA		1.2	1.5	V
		I_F=100mA Pulse Width≦100 μ s ,Duty≦1%	--	1.4	1.8	
		I_F=1A Pulse Width≦100 μ s ,Duty≦1%.	--	2.6	4.0	
Reverse Current	I_R	V_R=5V	--	--	10	μ A
View Angle	$2\theta 1/2$	I_F=20mA	--	60	--	deg

Rank

Condition : I_F=20mA

Unit : mW/sr

Bin Number	H	J	K
Min	2.0	2.8	4.0
Max	3.2	4.5	6.4

Everlight Electronics Co., Ltd.   http:\\www.everlight.com   Rev 2.0   Page: 3 of 7
Device No : DIR-032-085   Prepared date : 07-20-2004   Prepared by : Jaine Tsai

B-12

Lampiran B6 : Datasheet Power LED

LITEON® LITE-ON TECHNOLOGY CORP.
Property of Lite-On Only

1. Description

The LOPL (LiteOn Power LED) Emitter I is a 1W power LED package which is a point light source with more energy efficient than incandescent and halogen lamps. It gives you total design freedom and unmatched brightness, creating a new opportunities for solid state lighting to displace conventional lighting technologies.
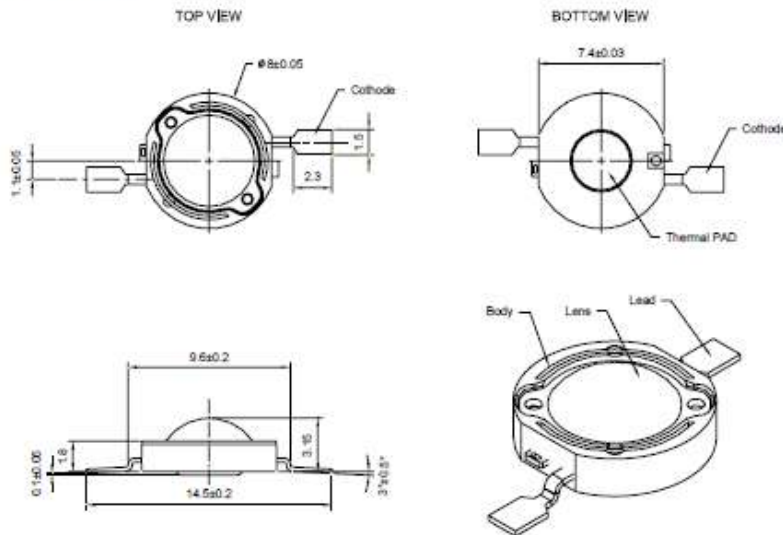
Features

- High power LED light source
- Long life, up to 100k hours
- Instant light (less than 100 ns)
- Low voltage DC operated
- 110° Lambertian radiation pattern.
- Low thermal resistance

Applications

- Portable lights
- Traffic signaling
- Backlighting
- Interior & exterior automotive lighting
- Decorative and landscape lighting
- Medical illumination

2. Outline Dimensions

Notes

1. All dimensions are in millimeters.
2. Tolerance is ±0.2 mm (.008") unless otherwise noted.

Part No.: LOPL-E011M DATA SHEET	Page: 2 of 12

BNC-OD-C131/A4

LITEON® LITE-ON TECHNOLOGY CORP.

Property of Lite-On Only

3.2 Electro-Optical Characteristics at Ta=25°C

Parameter	Symbol	MIN.	TYP.	MAX.	Test Condition	Unit
Forward Voltage	V_F	3.03	3.80	4.23	I_F= 350mA	V
Reverse Current	I_R			100	V_R = 5V	µA
Luminous Flux [1, 4]	Φ_V	23.5	35		I_F = 350mA	lm
Color Rendering Index	CRI		80		I_F = 350mA	%
Viewing Angle [2]	$2\theta_{1/2}$		110		I_F = 350mA	°
Chromaticity Coordinates [3, 4]	x		0.405		I_F = 350mA	
	Y		0.391			
Temperature Coefficient of Chromaticity Coordinates [3, 4]	TC_x		-0.1		I_F = 350mA, T_{opr}	10^{-3}/°C
	TC_y		-0.2			
Temperature Coefficient of V_F	TC_V		-2.0		I_F = 350mA, T_{opr}	mV/°C
Optical Efficiency	η_{opt}		26.3		I_F = 350mA	lm/W

Notes

1. Luminous flux is the total luminous flux output as measured with an integrating sphere.
2. Viewing angle is the off-axis angle at which the luminous intensity is half the axial luminous intensity.
3. The chromaticity coordinates (x, y) is derived from the CIE 1931 chromaticity diagram.
4. IS CAS140B is for the luminous flux (lm) and the CIE1931 chromaticity coordinates (x, y) testing. The chromaticity coordinates (x, y) guarantee should be added ± 0.01 tolerance.

Part No.: LOPL-E011M DATA SHEET	Page: 4 of 12

BNC-OD-C131/A4