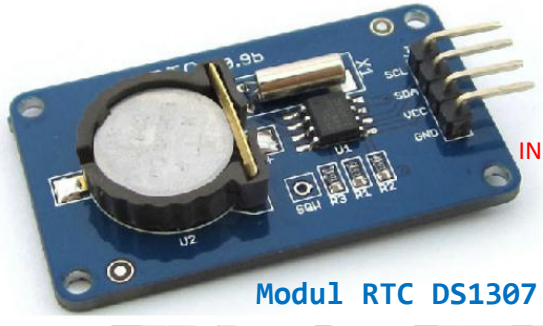
Alarm otomatis

Sistem Kerja Alat:

Alarm akan berbunyi sesuai dengan jam yang telah dibuat sebelumnya. Disamping menapilkan display tersebut jam dapat diseting dengan 4 tombol yaitu tombol Next, Back, Up dan Down.

Kebutuhan Hardware :

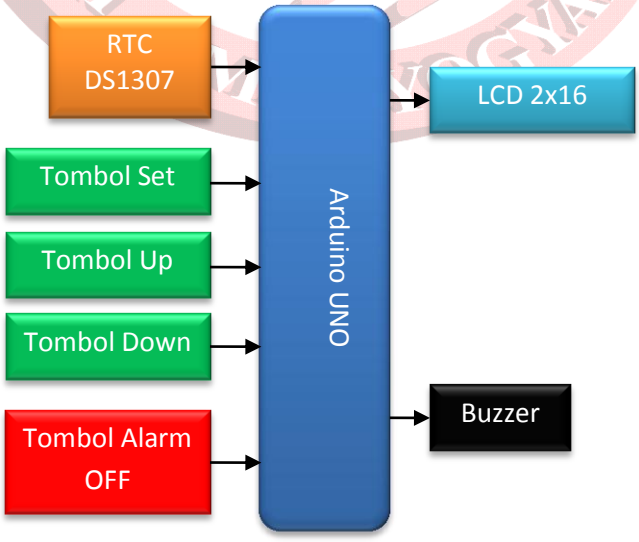
- Modul RTC DS1307
- 4 Tombol push ON
- LCD 2x16
- Buzzer
- Modul Arduino UNO
- Power supply +9Volt



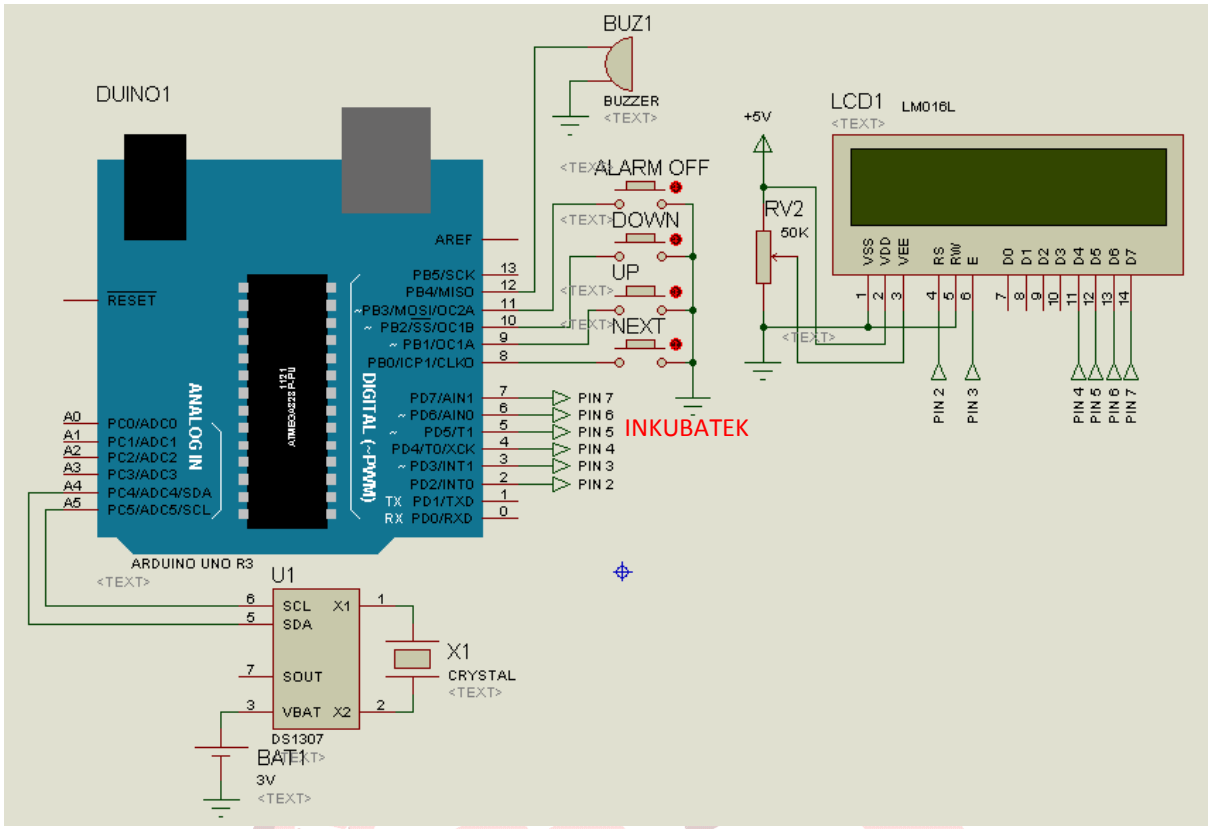
Modul RTC DS1307

Buzzer

Diagram Blok:



Schematics



Koneksi Arduino UNO dengan LCD:

Pin ARDUINO	LCD
2	RS
3	EN
4	D4
5	D5
6	D6
7	D7

Koneksi RTC:

Pin RTC	Pin ARDUINO
VCC	+5V
GND	GND
SDA	Pin A4
SCL	Pin A5

Koneksi Tombol:

Tombol	Pin ARDUINO
NEXT	Pin 8
BACK	Pin 9
UP	Pin 10
DOWN	Pin 11

Koneksi ARDUINO:

Pin ARDUINO	Koneksi
Pin 12	Buzzer +

Source Code/Sketch :

```
/************************************
 * Program : Project 6. Alarm otomatis
 * Input   : 4 Tombol push on, Module RTC DS1307
 * Output  : LCD 2x16, BUZZER
 * 125 Proyek Arduino Inkubatek
 * www.tokotronik.com
 * ************************************/
#include <EEPROM.h>
#include <LiquidCrystal.h>
#include "Wire.h"
#define DS1307_ADDRESS 0x68
byte zero = 0x00;

LiquidCrystal lcd(2, 3, 4, 5, 6, 7);

byte second ,minute,hour, weekDay;
byte monthDay,month,year;
byte minuteOn,hourOn,minuteOff,hourOff;
byte f_tombol, f_alarm, f_key, menu;
byte keluar=1;
byte setRTC;

boolean up=false;
boolean down=false;

void setup(){
  pinMode(8,INPUT);
```

```
 pinMode(9,INPUT);
 pinMode(10,INPUT);
 pinMode(11,INPUT);
 digitalWrite(8,HIGH);
 digitalWrite(9,HIGH);
 digitalWrite(10,HIGH);
 digitalWrite(11,HIGH);
 pinMode(12,OUTPUT);
 lcd.begin(16, 2);
 lcd.print(" Alarm ARDUINO");
 delay(2000);
 lcd.clear();
 Wire.begin();
 //----------baca alarm
 hourOn = EEPROM.read(0);
 minuteOn = EEPROM.read(1);
 hourOff = EEPROM.read(2);
 minuteOff = EEPROM.read(3);
 //----------jika belum ada alarm
 if(hourOn==255)hourOn=0;
 if(minuteOn==255)minuteOn=0;
 if(hourOff==255)hourOff=0;
 if(minuteOff==255)minuteOff=0;

/*
//-------------- seting jam
 hour=12;
 minute=30;
 second=0;
 weekDay=1;
 monthDay=29;
 month=4;
 year=16;
 setingRTC();
 */

}
void loop(){
 bacaRTC();
 lcdDisplay();
 lcd.setCursor(0,1);
 lcd.print("Alarm ");
 lcd.print(hourOn);
 lcd.print(":");
 lcd.print(minuteOn);
```

```
 lcd.print(":0  ");
 //---------- jika waktu sama dengan jam alarm ON maka alarm ON
 if(hourOn==hour && minuteOn==minute && f_alarm==0){
  digitalWrite(12,HIGH);
  f_key=1;
 }
 //---------- jika waktu sama dengan jam alarm OFF maka alarm OFF
 else if(hourOff==hour && minuteOff==minute){
  digitalWrite(12,LOW);
  f_alarm=0;
  f_key=0;
 }
 //---------- jika Tombol matikan alarm di tekan maka alarm OFF
 if(digitalRead(11)==0){
  digitalWrite(12,LOW);
  f_alarm=1;
  f_key=0;
 }
 delay(200);
 if(f_key==0){
  cekTombol();
 }
}

void cekTombol(){
  if (digitalRead(8)==0){
    do{
     f_tombol++;
     delay(100);
     if(f_tombol>20)goto lanjut;
    }
    while(!digitalRead(8));

    lanjut:
    if(f_tombol<20){
     setRTC=1;
     lcd.clear();
     lcd.print("Set Alarm");
     delay(2000);
     lcd.clear();
    }
    else{
     lcd.clear();
     lcd.print("Seting Jam");
     delay(2000);
```

```
    lcd.clear();
    setRTC=0;
   }
   f_tombol=0;
   lcdDisplay();
   menu++;
   lcd.blink();
   lcd.setCursor(7,0);
   do{
    //-----------------------next
    if (digitalRead(8)==0){
     delay(300);
     menu++;
    }
    //--------------------------up
    else if(digitalRead(9)==0){
     delay(200);
     up=true;
    }
 //--------------------------down
    else if(digitalRead(10)==0){
     delay(200);
     down=true;
    }
//------------------------edit data jam
    if (menu==1){
     if (up==true && hour < 24){
        hour++;
        lcdDisplay();
     }
     else if (down==true && hour>0){
        hour--;
        lcdDisplay();
     }
     up=false;
     down=false;
     if (hour<10){
      lcd.setCursor(6,0);
     }
     else  {
      lcd.setCursor(7,0);
     }
    }

//------------------------edit data menit
```

```
  else if (menu==2){
   if (up==true && minute < 59){
      minute++;
      lcdDisplay();
    }
   else if (down==true && minute>0){
     minute--;
     lcdDisplay();
   }
     up=false;
     down=false;

   if (hour<10 && minute<10){
    lcd.setCursor(8,0);
   }
   else if (hour<10 && minute>9){
    lcd.setCursor(9,0);
   }
   else if (hour>9 && minute<10){
    lcd.setCursor(9,0);
   }
   else if (hour>9 && minute>9){
    lcd.setCursor(10,0);
   }
  }

//-------------------------edit data detik
  else if (menu==3){
   if (up==true && second < 59){
      second++;
      lcdDisplay();
    }
   else if (down==true && second>0){
     second--;
     lcdDisplay();
   }
   up=false;
   down=false;

   if (hour<10 && minute<10 && second<10){
    lcd.setCursor(10,0);
   }
   else if (hour<10 && minute<10 && second>9){
    lcd.setCursor(11,0);
   }
```

```
      else if (hour<10 && minute>9 && second<10){
       lcd.setCursor(11,0);
      }
      else if (hour>9 && minute<10 && second<10){
       lcd.setCursor(11,0);
      }
      else if (hour<10 && minute>9 && second>9){
       lcd.setCursor(12,0);
      }
      else if (hour>9 && minute>9 && second<10){
       lcd.setCursor(12,0);
      }
      else if (hour>9 && minute<10 && second>9){
       lcd.setCursor(13,0);
      }
      else if (hour>9 && minute>9 && second>9){
       lcd.setCursor(13,0);
      }
    }

//-------------------------simpan data Jam
    if (setRTC==0 && menu==4){
     setingRTC();
     lcd.clear();
     lcd.noBlink();
     lcd.print("Seting Jam OK!");
     delay(1000);
     lcd.clear();
     keluar=0;
    }
//-------------------------simpan data Alarm
//----------------------selisih alarm Off adalah 5 menit
    if(menu==3 && setRTC==1){
       hourOn=hour;
       minuteOn=minute;
       hourOff=hour;
       minuteOff=minute+5;  //penambahan jeda alarm off
       if(minuteOff>60){
        hourOff=hourOff+1;
        minuteOff=minuteOff-60;
       }
       lcd.noBlink();
       lcd.clear();
       lcd.print("On =");
       lcd.print(hourOn);
```

```
          lcd.print(":");
          lcd.print(minuteOn);
          lcd.setCursor(0,1);
          lcd.print("Off=");
          lcd.print(hourOff);
          lcd.print(":");
          lcd.print(minuteOff);
          //------------simpan EEPROM
          EEPROM.write(0, hourOn);
          EEPROM.write(1, minuteOn);
          EEPROM.write(2, hourOff);
          EEPROM.write(3, minuteOff);
          delay(3000);
          lcd.clear();
          lcd.print("Set Alarm OK!");
          delay(1000);
          lcd.clear();
          setRTC=0;
          keluar=0;
        }
      }
      while(keluar);
      keluar=1;
      menu=0;
    }
}

byte decToBcd(byte val){
  return ( (val/10*16) + (val%10) );
}

byte bcdToDec(byte val)  {
  return ( (val/16*10) + (val%16) );
}

void bacaRTC(){
  Wire.beginTransmission(DS1307_ADDRESS);
  Wire.write(zero);
  Wire.endTransmission();
  Wire.requestFrom(DS1307_ADDRESS, 7);
  second = bcdToDec(Wire.read());
  minute = bcdToDec(Wire.read());
  hour = bcdToDec(Wire.read() & 0b111111);
  weekDay = bcdToDec(Wire.read());
  monthDay = bcdToDec(Wire.read());
```

```
  month = bcdToDec(Wire.read());
  year = bcdToDec(Wire.read());
}

void lcdDisplay(){
  if (setRTC==1){
    lcd.setCursor(0,0);
    lcd.print("Jam   ");
    lcd.print(hour);
    lcd.print(":");
    lcd.print(minute);
    lcd.print("  ");
  }
  else{
    lcd.setCursor(0,0);
    lcd.print("Jam   ");
    lcd.print(hour);
    lcd.print(":");
    lcd.print(minute);
    lcd.print(":");
    lcd.print(second);
    lcd.print("    ");
  }
}

void setingRTC(){
  Wire.beginTransmission(DS1307_ADDRESS);
  Wire.write(zero); //stop RTC
  Wire.write(decToBcd(second));
  Wire.write(decToBcd(minute));
  Wire.write(decToBcd(hour));
  Wire.write(decToBcd(weekDay));
  Wire.write(decToBcd(monthDay));
  Wire.write(decToBcd(month));
  Wire.write(decToBcd(year));
  Wire.write(zero); //start
  Wire.endTransmission();
}
```

Jalannya Alat :

1. Koneksikan antara sistem Arduino dengan peripheral lain seperti pada rangkaian (skematik).

2. Pasang power supply (adaptor 9 V) dan hidupkan (colokkan ke sumber PLN 220V) sehingga lampu LED indikator nyala, LCD juga nyala.
3. Tampilan pertama pada LCD :

Alarm ARDUINO

4. Setelah 2 detik tampil menjadi tampilan normal yaitu menampilkan jam dan Alarm:

Jam 12:30:51 Alarm 13:30:0

5. Selanjutnya jika ingin merubah waktu alarm ON tekan tombol set:

Jam 12:30

6. Tekan tombol UP/DOWN untuk seting jam alarm.
7. Kemudian tekan tombol SET untuk seting menit, tekan tombol UP/DOWN untuk seting menit.
8. Tekan tombol SET untuk menyimpannya, sehingga tampilanya sebagai berikut:

On =13:30 Off =13:35

9. Waktu OFF alarm secara otomatis di tambah 5menit.
10. Selanjutnya LCD menampilkan:

Set Alarm OK!

11. Kemudian program kembali pada tampilan normal:

Jam 12:30:51 Alarm 13:30:0

12. Selanjutnya jika ingin merubah/seting jam, tekan dan tahan tombol **SET** sampai muncul tulisan “Seting Jam”:

Seting Jam

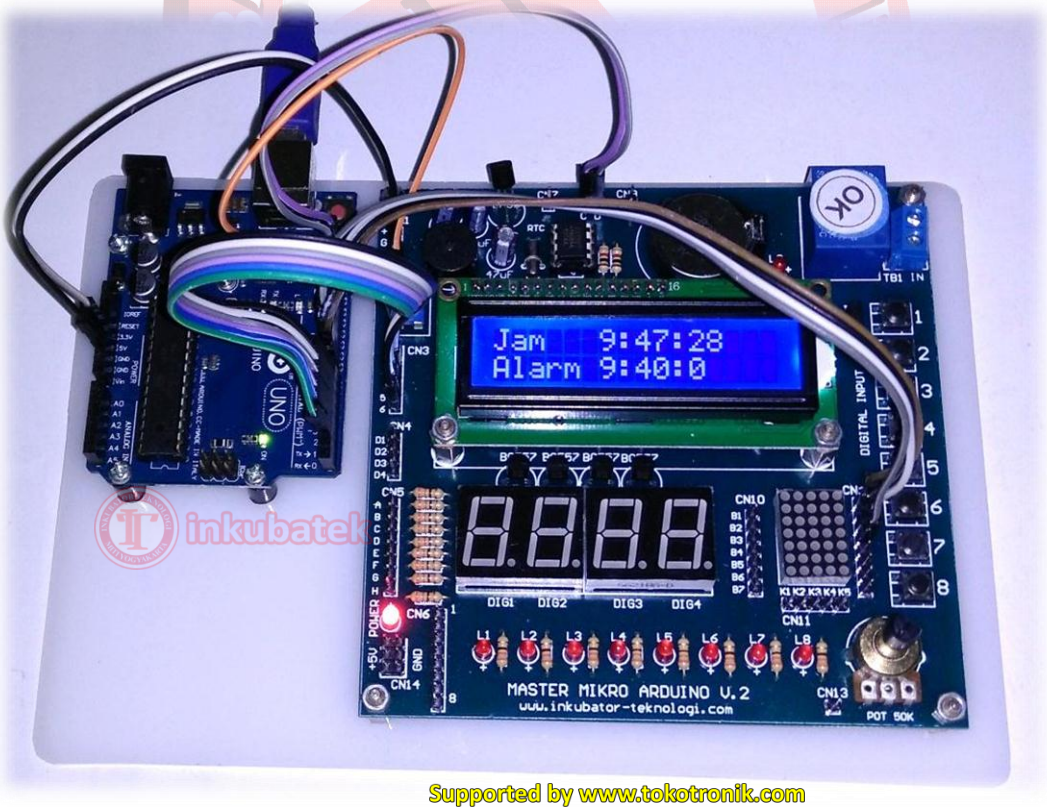
13. Setelah 2 detik, kemudian menampilkan:

Jam 13:30:51

14. Tekan tombol **UP** untuk menambah jam, sedangkan untuk mengurangi tekan tombol **Down**.
15. Jika sudah sesuai tekan tombol **SET**, selanjutnya seting menit dan detik prosesnya sama dengan seting jam.
16. Setelah semua di seting tekan tombol **SET** untuk menyimpan data tersebut, sehingga LCD menampilkan "Seting Jam OK!":

Seting Jam OK!

17. Tampilan LCD kembali ke tampilan Normal.
18. Alarm akan berbunyi sesuai dengan seting waktu alarm yang telah di simpan tadi.
19. Alarm mati setelah 5 menit alarm ON, sedangkan tombol Alarm OFF juga bisa untuk mematikan alarm.
20. OK!



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