Jam Digital display 7 segment 6 digit seting jam dengan 3 tombol

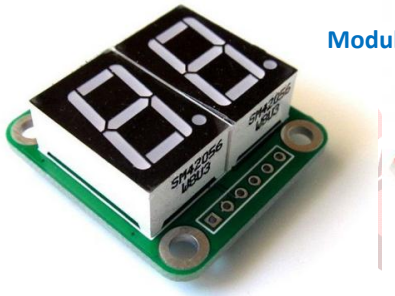
Sistem Kerja Alat:

Arduino membaca data RTC (Real Time Clock) data yang diperoleh berupa jam, menit, detik, hari ke-, tanggal, bulan dan tahun.

Pada project kali ini kita membuat jam digital dengan tampilan seven segment 6 digit dengan sistem scanning data 7 segment. Angka yang ditampilkan pada masing masing digit ditampilkan secara bergantian dari digit 1 sampai digit 6 dengan jeda penampilan 3mS/digit sehingga seolah olah angkanya tampil secara bersamaan. RTC yang digunakan DS1307 sebagai sumber clock-nya. Sedangkan untuk seting jam, menit dan detik menggunakan 3 tombol push ON yang terhubung dengan pin Arduino.

Kebutuhan Hardware :

- Modul Jam Digital display 7 segment 6 digit
- Modul RTC DS1307
- 3 Tombol push ON (tack switch)
- Modul Arduino UNO
- Power supply +9Volt



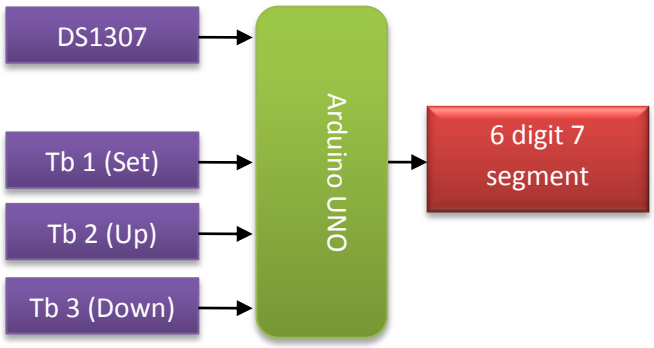
Modul 7 segment 2 digit

Module RTC DS1307

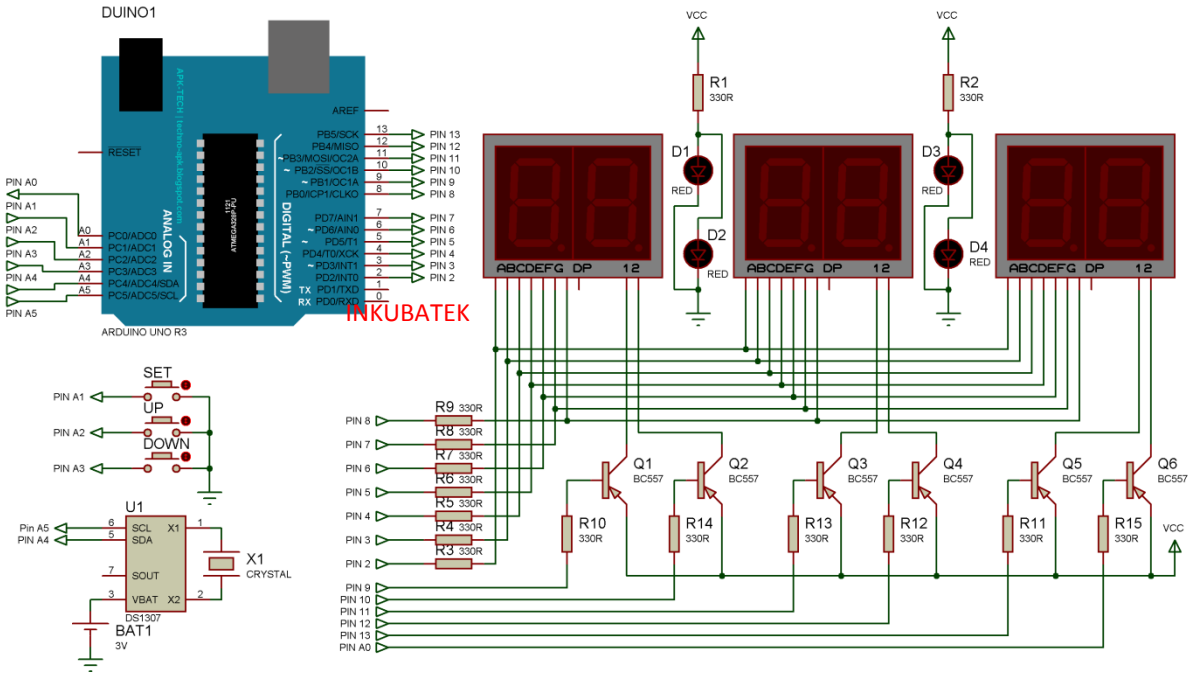
INKUBATE

Tombol tack switch

Diagram Blok:



Schematics



Koneksi Arduino UNO dengan 7 segment:

Pin ARDUINO	Segment	Pin ARDUINO	Koneksi
2	A	9	Digit 1
3	B	10	Digit 2
4	C	11	Digit 3
5	D	12	Digit 4
6	E	13	Digit 5
7	F	A0	Digit 6
8	G		

Koneksi RTC:

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

Koneksi Tombol:

Tombol	Pin ARDUINO

SET	Pin A1
UP	Pin A2
DOWN	Pin A3

Source Code/Sketch :

```
/************************************
 * Program : Project 45. Jam Digital 7 segment 6 digit seting 3 tombol
 * 125 Proyek Arduino Inkubatek
 * www.inkubator-teknologi.com
 * www.tokotronik.com
 * ************************************/
#include <Wire.h>
#define DS1307_ADDRESS 0x68
byte zero = 0x00;

byte nilai, i, f_kpd, menu;
byte second ,minute,hour, weekDay;
byte monthDay,month,year;
word kedip;
long lastButton = 0;
long delayAntiBouncing = 50;

byte seven_seg_digits[10][7] = { { 0,0,0,0,0,0,1 },  // = 0
                                 { 1,0,0,1,1,1,1 },  // = 1
                                 { 0,0,1,0,0,1,0 },  // = 2
                                 { 0,0,0,0,1,1,0 },  // = 3
                                 { 1,0,0,1,1,0,0 },  // = 4
                                 { 0,1,0,0,1,0,0 },  // = 5
                                 { 0,1,0,0,0,0,0 },  // = 6
                                 { 0,0,0,1,1,1,1 },  // = 7
                                 { 0,0,0,0,0,0,0 },  // = 8
                                 { 0,0,0,0,1,0,0 }  // = 9
                                };

void setup()
{
  pinMode(2, OUTPUT); //a
  pinMode(3, OUTPUT);//b
  pinMode(4, OUTPUT);//c
  pinMode(5, OUTPUT);//d
  pinMode(6, OUTPUT);//e
  pinMode(7, OUTPUT);//f
```

```
  pinMode(8, OUTPUT);//g
  pinMode(9, OUTPUT);//dig 1
  pinMode(10, OUTPUT);//dig 2
  pinMode(11, OUTPUT);//dig 3
  pinMode(12, OUTPUT);//dig 4
  pinMode(13, OUTPUT);//dig 5
  pinMode(A0, OUTPUT);//dig 6

  pinMode(A1,INPUT);
  pinMode(A2,INPUT);
  pinMode(A3,INPUT);
  digitalWrite(A1,HIGH);
  digitalWrite(A2,HIGH);
  digitalWrite(A3,HIGH);

  Wire.begin();
}


void loop(){
  bacaRTC();
  tampilJam();
  tampilMenit();
  tampilDetik();
  cekTombol();
}

void tampilJam(){
  digitalWrite(9,LOW);    digitalWrite(10,HIGH);
  digitalWrite(11,HIGH);  digitalWrite(12,HIGH);
  digitalWrite(13,HIGH);  digitalWrite(A0,HIGH);
  sevenSegWrite(hour/10);
  delay(3);
  digitalWrite(9,HIGH);   digitalWrite(10,LOW);
  digitalWrite(11,HIGH);  digitalWrite(12,HIGH);
  digitalWrite(13,HIGH);  digitalWrite(A0,HIGH);
  sevenSegWrite(hour%10);
  delay(3);
}
void tampilMenit(){
  digitalWrite(9,HIGH);   digitalWrite(10,HIGH);
  digitalWrite(11,LOW);   digitalWrite(12,HIGH);
  digitalWrite(13,HIGH);  digitalWrite(A0,HIGH);
  sevenSegWrite(minute/10);
  delay(3);
```

```
  digitalWrite(9,HIGH);   digitalWrite(10,HIGH);
  digitalWrite(11,HIGH);  digitalWrite(12,LOW);
  digitalWrite(13,HIGH);  digitalWrite(A0,HIGH);
  sevenSegWrite(minute%10);
  delay(3);
}
void tampilDetik(){
  digitalWrite(9,HIGH);   digitalWrite(10,HIGH);
  digitalWrite(11,HIGH);  digitalWrite(12,HIGH);
  digitalWrite(13,LOW);   digitalWrite(A0,HIGH);
  sevenSegWrite(second/10);
  delay(3);
  digitalWrite(9,HIGH);   digitalWrite(10,HIGH);
  digitalWrite(11,HIGH);  digitalWrite(12,HIGH);
  digitalWrite(13,HIGH);  digitalWrite(A0,LOW);
  sevenSegWrite(second%10);
  delay(3);
}

void sevenSegWrite(byte segment) {
  byte pin = 2;
  for (byte segCount = 0; segCount < 7; ++segCount) {
    digitalWrite(pin, seven_seg_digits[segment][segCount]);
    ++pin;
  }
}

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

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

void cekTombol(){
    do{
      //------------------------SET
      if (digitalRead(A1)==0){
        if ((millis() - lastButton) > delayAntiBouncing){
          f_kpd=1;
          menu++;
        }
        lastButton = millis();
      }
```

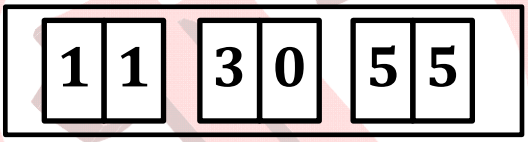
```
  //---------------------------up
  else if(digitalRead(A2)==0){
   if ((millis() - lastButton) > delayAntiBouncing){
    if (menu==1){
     ++hour;
     if (hour==24){
      hour=0;
     }
    }
    else if(menu==2){
     ++minute;
     if (minute==60){
      minute=0;
     }
    }
    else if(menu==3){
     ++second;
     if (second==60){
      second=0;
     }
    }
   }
   lastButton = millis();
  }

//---------------------------DOWN
  else if(digitalRead(A3)==0){
   if ((millis() - lastButton) > delayAntiBouncing){
    if (menu==1){
     --hour;
     if (hour==255){
      hour=23;
     }
    }
    else if(menu==2){
     --minute;
     if (minute==255){
      minute=59;
     }
    }
    else if(menu==3){
     --second;
     if (second==255){
      second=59;
     }
```

```
      }
     }
     lastButton = millis();
    }

    if (menu==1 && kedip<30){
     tampilMenit();
     tampilDetik();
    }
    else if (menu==2 && kedip<30){
     tampilJam();
     tampilDetik();
    }
    else if (menu==3 && kedip<30){
     tampilJam();
     tampilMenit();
    }
    else{
     tampilJam();
     tampilMenit();
     tampilDetik();
     if(kedip>60)kedip=0;
    }
    ++kedip;

    if (menu==4){
     setingRTC();
     f_kpd=0;
    }
   }
   while(f_kpd);
   menu=0;
}

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());
```

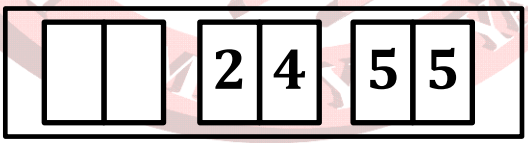
```
  year = bcdToDec(Wire.read());
}

void 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 :

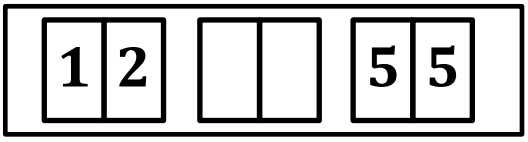
1. Tampilan pertama seven segment langsung menampilkan jam sesuai setingan RTC:



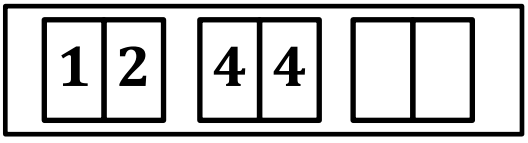
2. Untuk merubah jam pertamakali tekan tombol “SET”, sehingga pada digit jam berkedip, kemudian tekan tombol UP untuk menambah jam atau tekan tombol DOWN untuk mengurangi jam:



3. Selanjutnya jika jam sudah sesuai tekan tombol set lagi untuk seting menu, tekan tombol UP/DOWN untuk menyesuaikan menit:

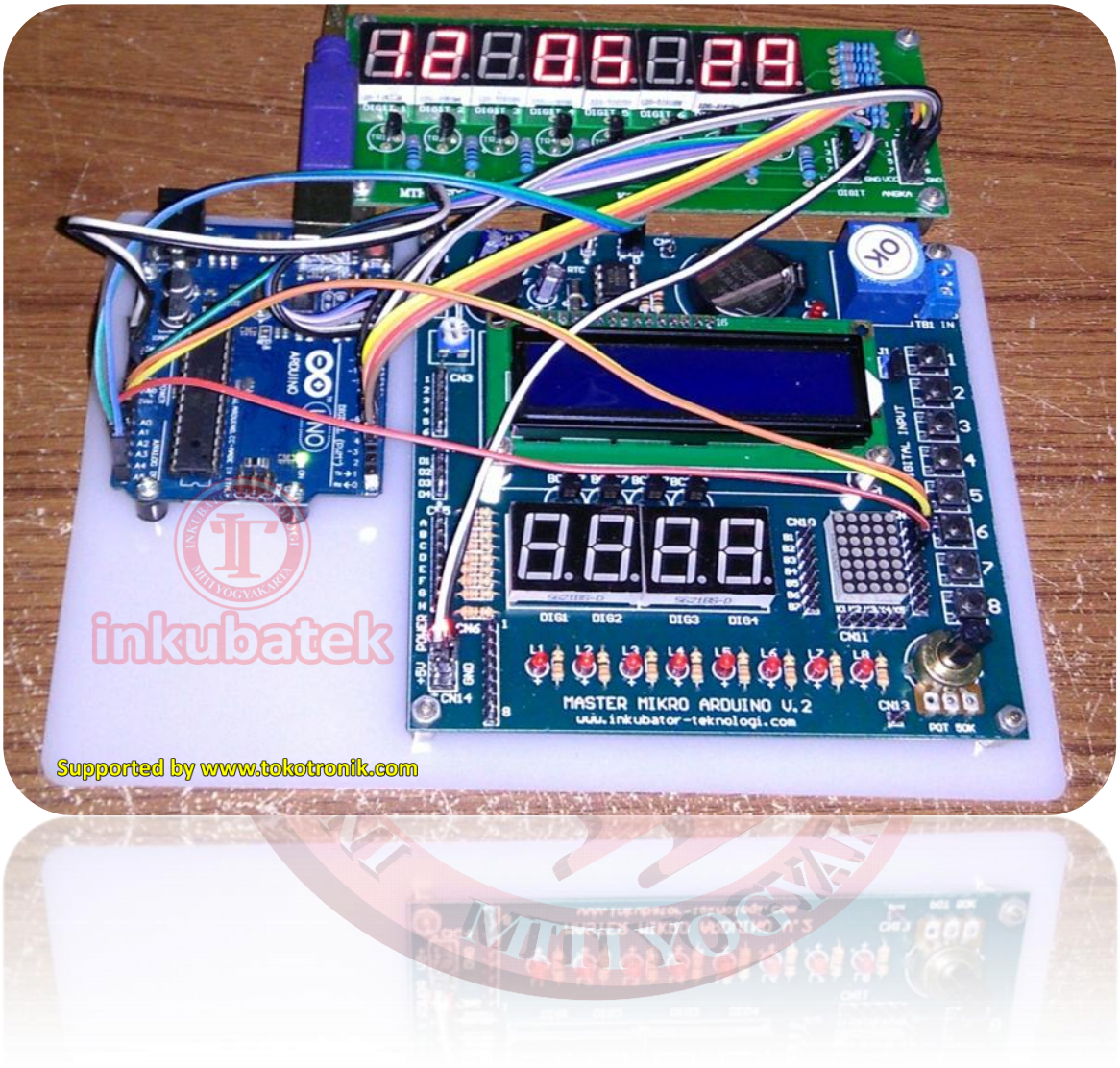


4. Selanjutnya tekan tombol “SET” lagi untuk seting detik:



5. Terakhir tekan tombol “SET”, sehingga seting jam selesai dan seven segment menampilkan setingan jam terakhir:

1	2	4	4	0	0



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http://tokotronik.com/master-mikro-arduino-v2/]