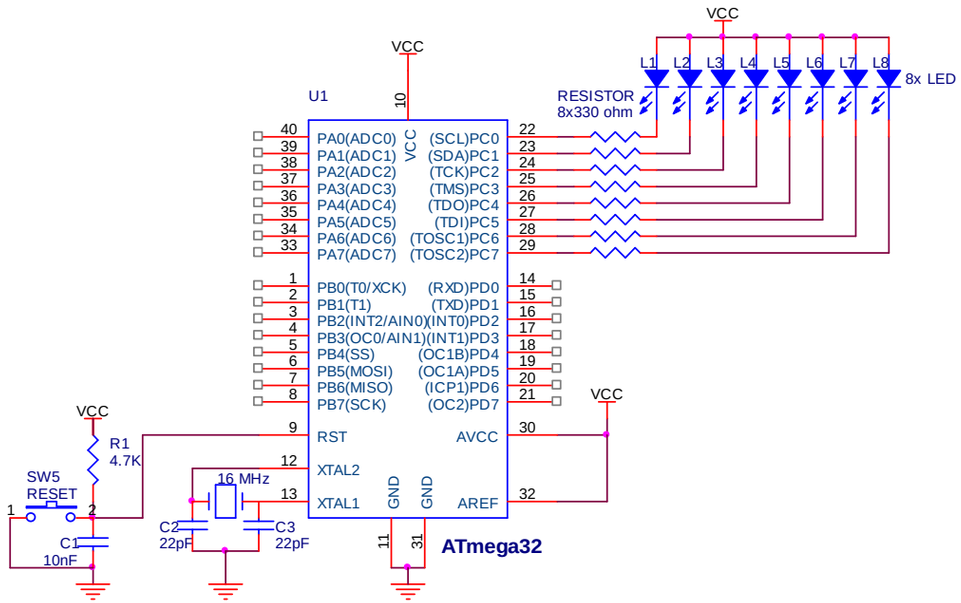
DAFTAR ISI

Perhatikan :

1. Semua aplikasi dibuat dengan bahasa yang tidak sama. Untuk :
   - Bahasa C dengan CodeVisionAVR, pada judul diberi kode (C)
   - Bahasa BASIC dengan BASCOM-AVR, pada judul diberi kode (B)
   - Untuk mikrokontroler Arduino, kode (A)

2. Untuk aplikasi yang tidak ada gambar rangkaiannya berarti rangkaian menyesuaikan dengan aplikasi sebelumnya yang se-model. Atau menyesuaikan dengan program/software.

1. Menghidupkan LED (B)




```
$regfile = "m32def.dat"
$crystal = 16000000
Config PORTC = Output
PORTC = &B10101010
End
```

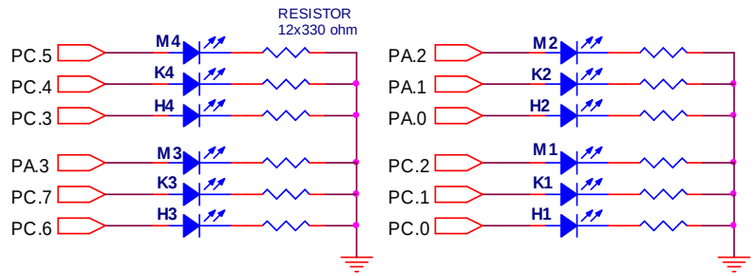
2. LED blink (B)

```
$regfile = "m32def.dat"
$crystal = 16000000
Config PORTC = Output
Do
PORTC = &B00000000
Wait  1
PORTC = &B11111111
Wait  1
Loop
End
```

3. LED berjalan (B)

```
$regfile = "m32.dat"
$crystal = 16000000
Ddrc = &B11111111
Do
Portc = &B11111110
Waitms 500
Portc = &B11111101
Waitms 500
Portc = &B11111011
Waitms 500
Portc = &B11110111
Waitms 500
Portc = &B11101111
Waitms 500
Portc = &B11011111
Waitms 500
Portc = &B10111111
Waitms 500
Portc = &B01111111
Waitms 500
Loop
End
```

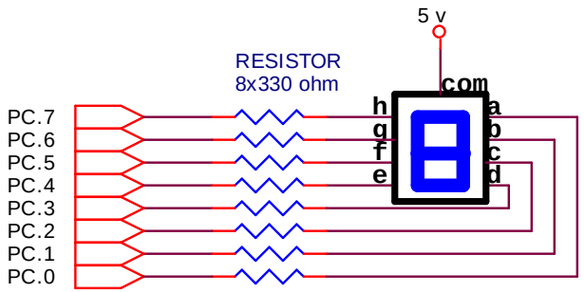
4. Traffic Light Simulator (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
```

```
Config Porta = Output
Do
   Portc = &B11011110
   Porta = &B11110011
   Wait 3
   Portc = &B11011101
   Porta = &B11110011
   Wait 1
   Portc = &B11011011
   Porta = &B11110110
   Wait 3
   Portc = &B11011011
   Porta = &B11110101
   Wait 1
   Portc = &B10011011
   Porta = &B11111011
   Wait 3
   Portc = &B01011011
   Porta = &B11111011
   Wait 1
   Portc = &B11110011
   Porta = &B11110011
   Wait 3
   Portc = &B11101011
   Porta = &B11110011
   Wait 1
Loop
End
```

5. Menampilkan angka 0 (B)

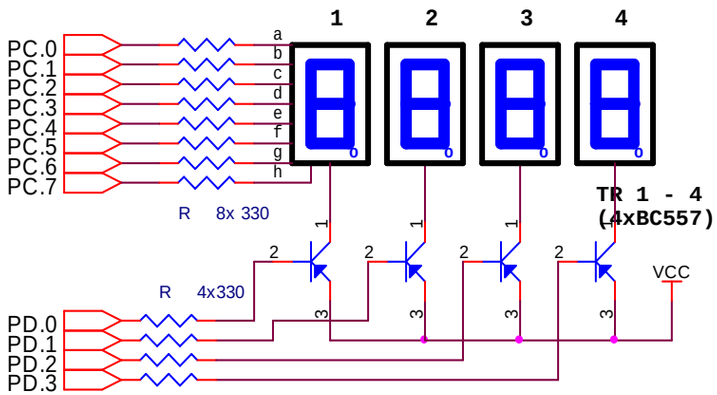



```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Portc = &B11000000
End
```

6. Counting down 1 digit (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Dim Count As Integer
Config Portc = Output
Count = 9
Do
   Portc = Lookup(count , Angka)
   Wait 1
   Decr Count
   If Count < 0 Then Count = 9
Loop
End
Angka:
Data &HC0 , &HF9 , &HA4 , &HB0 , &H99 , &H92 , &H82 , &HF8 , &H80 ,
&H90
```

7. Menampilkan angka 4 digit dg tampilan 0123 (B)



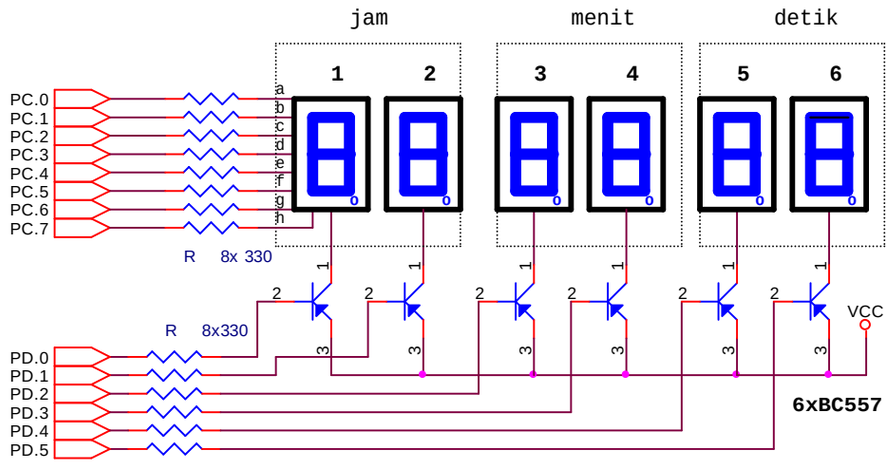

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte
Do
   For I = 0 To 3
```

```
      Portd = Lookup(i , Digit)
      Portc = Lookup(i , Angka)
      Waitms 5
   Next
Loop
Digit:
   Data &HFE , &HFD , &HFB , &HF7
Angka:
   Data &HC0,&HF9,&HA4,&HB0,&H99,&H92,&H82,&HF8,&H80,&H9
```

8. Counting down 4 digit (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte , J As Byte, Count As Integer , Tem1 As Integer , Tem2
As Integer
Dim Rib As Integer , Rat As Integer , Pul As Integer , Sat As
Integer
Count = 9999
Do
 Rib = Count / 1000
 Tem1 = Count Mod 1000
 Rat = Tem1 / 100
 Tem2 = Tem1 Mod 100
 Pul = Tem2 / 10
 Sat = Tem2 Mod 10
 For J = 0 To 50
      Portd = &HFE
      Portc = Lookup(rib , Angka)
      Waitms 5
      Portd = &HFD
      Portc = Lookup(rat , Angka)
      Waitms 5
      Portd = &HFB
      Portc = Lookup(pul , Angka)
      Waitms 5
      Portd = &HF7
      Portc = Lookup(sat , Angka)
      Waitms 5
 Next
 Decr Count
 If Count < 0 Then Count = 9999
Loop
End

Angka:
   Data &HC0 , &HF9 , &HA4 , &HB0 , &H99 , &H92 , &H82 , &HF8 , &H80
, &H90
```

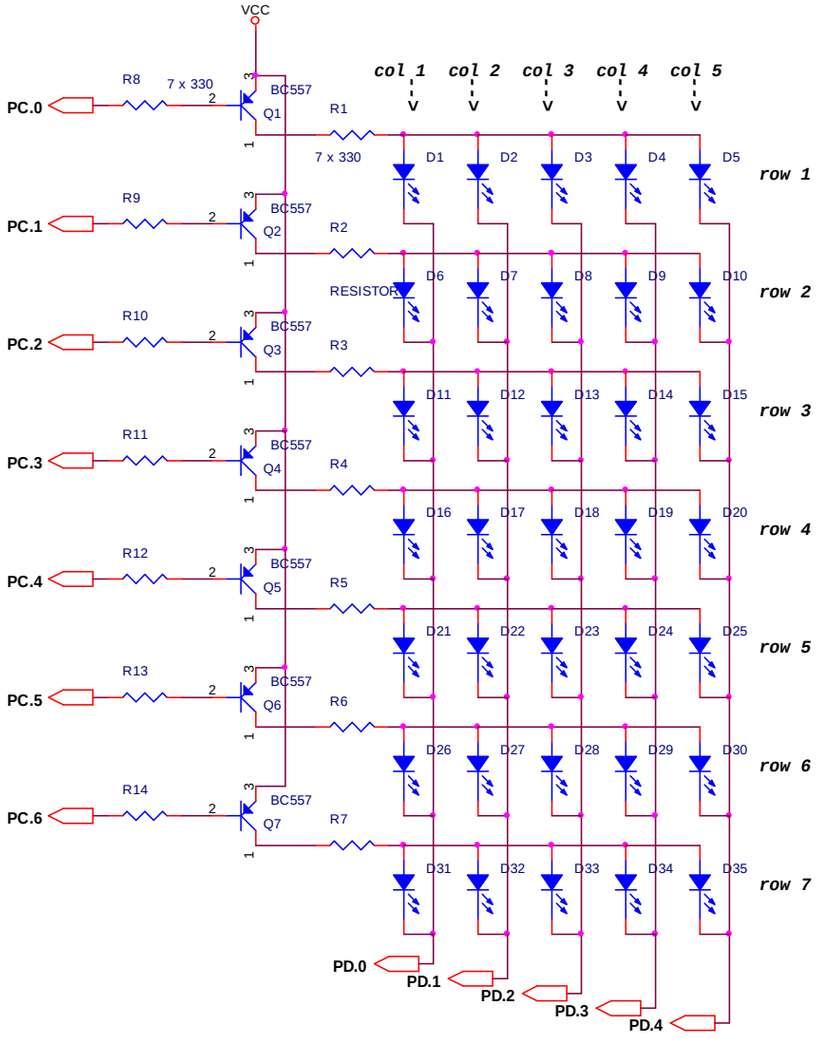
9. Membuat jam digital sederhana (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte
Dim Jam As Byte , Menit As Byte , Detik As Byte
Dim Men_pul As Byte,Men_sat As Byte,Det_pul As Byte,Det_sat As Byte
Dim Jam_pul As Byte , Jam_sat As Byte

Jam = 10
Menit = 58
Detik = 50
Do
 Jam_pul = Jam / 10
 Jam_sat = Jam Mod 10
 Men_pul = Menit / 10
 Men_sat = Menit Mod 10
 Det_pul = Detik / 10
 Det_sat = Detik Mod 10
 For I = 0 To 75
```

```
      Portd = &HFE
      Portc = Lookup(jam_pul , Angka)
      Waitms 2
      Portd = &HFD
      Portc = Lookup(jam_sat , Angka)
      Waitms 2
      Portd = &HFB
      Portc = Lookup(men_pul , Angka)
      Waitms 2
      Portd = &HF7
      Portc = Lookup(men_sat , Angka)
      Waitms 2
      Portd = &HEF
      Portc = Lookup(det_pul , Angka)
      Waitms 2
      Portd = &HDF
      Portc = Lookup(det_sat , Angka)
      Waitms 2
 Next
 Incr Detik
 If Detik > 59 Then
    Detik = 0
    Incr Menit
    If Menit > 59 Then
       Menit = 0
       Incr Jam
       If Jam > 23 Then
         Jam = 0
       End If
    End If
 End If
Loop

End
Angka:
   Data &HC0,&HF9,&HA4,&HB0,&H99,&H92,&H82,&HF8,&H80,&H90
```

10. Menampilkan 1 titik di pojok kanan atas (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Portd = &B11101111
Portc = &B11111110
End
```

11. Menampilkan garis horizontal pada baris ke 4 (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Portd = &B11100000
Portc = &B11110111
End
```

12. Menampilkan garis vertical pada kolom ke 4 (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Portd = &B11110111
Portc = &B10000000
End
```

13. Menampilkan huruf S (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte
Do
   For I = 0 To 4
      Portd = Lookup(i , Kolom)
      Portc = Lookup(i , Baris)
      Waitms 5
   Next
Loop
End

Kolom:
      Data &HFE , &HFD , &HFB , &HF7 , &HEF
Baris:
      Data &B10111001,&B10110110,&B10110110,&B10110110,&B11001110
```

14. Menampilkan karakter ? (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte
Do
   For I = 0 To 4
      Portd = Lookup(i , Kolom)
      Portc = Lookup(i , Baris)
      Waitms 5
   Next
Loop
End
Kolom:
      Data &HFE , &HFD , &HFB , &HF7 , &HEF
Baris:
      Data &B11111001,&B11111110,&B10001110,&B1110110, &B11111001
```

15. Animasi Dot Matrik (titik berjalan dari pojok kiri bawah keatas trus kedalam sampai pusat) (B).

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte , J As Byte
Do
   For I = 0 To 33
      Portd = Lookup(i , Kolom)
      Portc = Lookup(i , Baris)
      Waitms 100
   Next
   For J = 0 To 20
   For I = 34 To 36
      Portd = Lookup(i , Kolom)
      Portc = Lookup(i , Baris)
      Waitms 5
   Next
   Next
   For J = 0 To 20
   For I = 37 To 41
      Portd = Lookup(i , Kolom)
      Portc = Lookup(i , Baris)
```

```
      Waitms 5
   Next
   Next
Loop
End
Kolom:
      Data &HFE , &HFE , &HFE , &HFE , &HFE , &HFE , &HFE
      Data &HFD , &HFB , &HF7 , &HEF
      Data &HEF , &HEF , &HEF , &HEF , &HEF , &HEF
      Data &HF7 , &HFB , &HFD
      Data &HFD , &HFD , &HFD , &HFD , &HFD
      Data &HFB , &HF7
      Data &HF7 , &HF7 , &HF7 , &HF7
      Data &HFB , &HFB , &HFB
      Data &HFD , &HFB , &HF7
      Data &HFE , &HFD , &HFB , &HF7 , &HEF

Baris:
      Data &HBF , &HDF , &HEF , &HF7 , &HFB , &HFD , &HFE
      Data &HFE , &HFE , &HFE , &HFE
      Data &HFD , &HFB , &HF7 , &HEF , &HDF , &HBF
      Data &HBF , &HBF , &HBF
      Data &HDF , &HEF , &HF7 , &HFB , &HFD
      Data &HFD , &HFD
      Data &HFB , &HF7 , &HEF , &HDF
      Data &HDF , &HEF , &HF7
      Data &B11100011 , &B11101011 , &B11100011
      Data &B11000001,&B11011101,&B11011101,&B11011101,&B11000001
```

16. Moving sign sederhana dengan BASCOM (‘YES’ berjalan kekiri) (B)

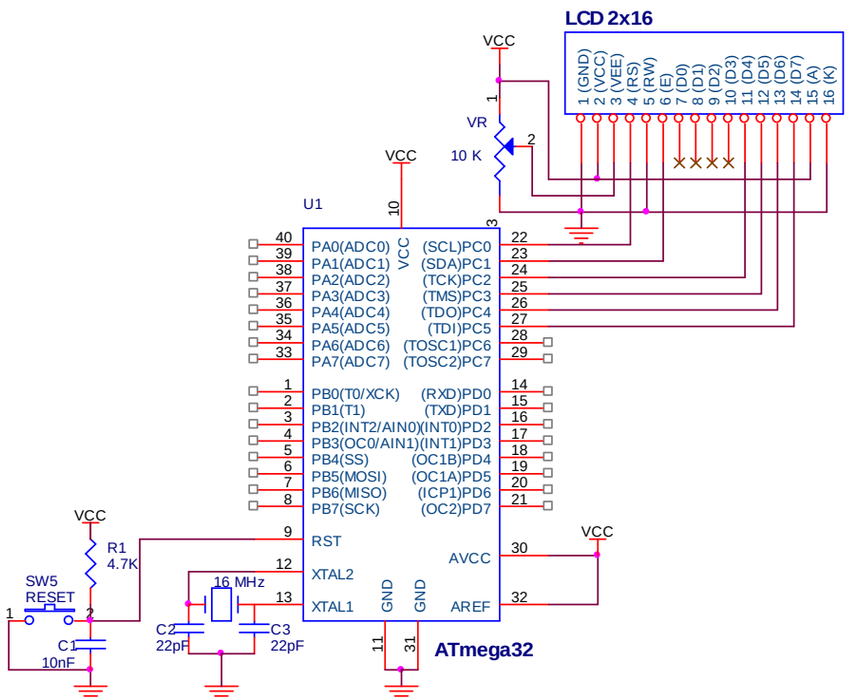
```
$regfile = "m8535.dat"
$crystal = 16000000
Config Portc = Output
Config Portd = Output
Dim I As Byte , J As Byte , B As Byte , K As Byte
Dim Geser As Byte , Tem As Byte
Geser = 1
Do
    For I = 0 To 20
      B = Geser - 1
      For K = 0 To 4
         Portd = Lookup(k , Kolom)
         Portc = Lookup(b , Baris)
         Waitms 2
         Incr B
         Tem = Geser + 3
         If B > Tem Then B = Geser - 1
      Next
   Next
  Incr Geser
  If Geser > 18 Then Geser = 1
Loop
End
Kolom:
      Data &HFE , &HFD , &HFB , &HF7 , &HEF
Baris:
      Data &B11111000,&B11110111,&B10000111,&B11110111,&B11111000
      Data &B11111111
      Data    &B11000001,&B10110110,&B10110110,&B10110110,&B10110110
Data &B11111111
      Data    &B10111001,&B10110110,&B10110110,&B10110110,&B11001110
Data &B11111
      Data &B11111000,&B11110111,&B10000111,&B11110111,&B11111000
```

17. Moving sign sederhana dengan CodeVisionAVR (‘YES’ berjalan kekiri) (C)

```
#include <mega8535.h>
#include <delay.h>

char i,j,k,b,Geser,Tem;
char kolom[5]= {0xFE , 0xFD , 0xFB , 0xF7 , 0xEF };
char
baris[23]={0B11111000,0B11110111,0B10000111,0B11110111,0B11111000
0B11111111,
0B11000001,0B10110110,0B10110110,0B10110110,0B10110110,
0B11111111,
0B10111001,0B10110110,0B10110110,0B10110110,0B11001110,
0B11111111,
0B11111000,0B11110111,0B10000111,0B11110111,0B11111000};
void main(void)
{
PORTC=0xFF;
DDRC=0xFF;
PORTD=0xFF;
DDRD=0xFF;
while (1)
      {
```

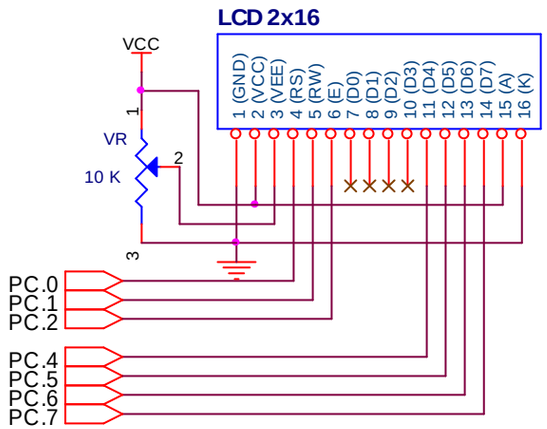
```
    for(i=0;i<21;i++)
    {
     b=Geser-1;
      for(k=0;k<5;k++)
       {
        PORTC=kolom[k];
        PORTD=baris[b];
        delay_ms(2);
        b++;
        Tem=Geser+3;
        if(b>Tem) b=Geser-1;
       }
     }
     Geser++;
     if(Geser>18) Geser=1;

       };
}
```

18. LCD 16x2 dengan BASCOM (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "99 Aplikasi uC"
Lowerline
Lcd "LCD Text 16x2"
End
```

19. LCD 16x2 dengan CodeVision AVR (C)




```
#include <mega8535.h>
#include <alcd.h>

void main(void)
{
lcd_init(16);
lcd_clear();
lcd_putsf("99 Aplikasi uC");
lcd_gotoxy(0,1);
lcd_putsf("LCD Text 16x2");
while (1)
      {

      }
}
```

20. LCD 20x4 (BASCOM) (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 20 * 4
Cursor Off

Cls
Lcd "Baris 1"
Locate 2 , 1
Lcd "Baris 2"
Thirdline
Lcd "Baris 3"
Fourthline
Lcd "Baris 4"
End
```

21. Menggeser tulisan LCD 16x2 (BASCOM) (B)

```
$regfile = "m8535.dat"
$crystal = 16000000

Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 20 * 4
Cursor Off
Dim I As Byte
Cls
Lcd "Coba Geser Tulisan LCD"
Do
   Shiftlcd Left
   Waitms 500
Loop
End
```

22. Menampilkan kursor (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 16 * 2
Cursor Off
Do
   Cls
   Lcd "Cursor tampil"
   Cursor On
   Wait 2
   Cls
   Lcd "Cursor off"
   Cursor Off
   Wait 2
Loop
End
```

23. Menampilkan isi variabel (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 16 * 2
Cursor Off
Dim Var1 As Byte , Var2 As Byte
Cls
Lcd "Variabel 1="
Lowerline
Lcd "Variabel 2="
Do
  Locate 1 , 12
  Lcd Var1
  Lcd "  "
  Locate 2 , 12
  Lcd Var2
  Lcd "  "
  Incr Var1
  Decr Var2
  wait 1
Loop
End
```

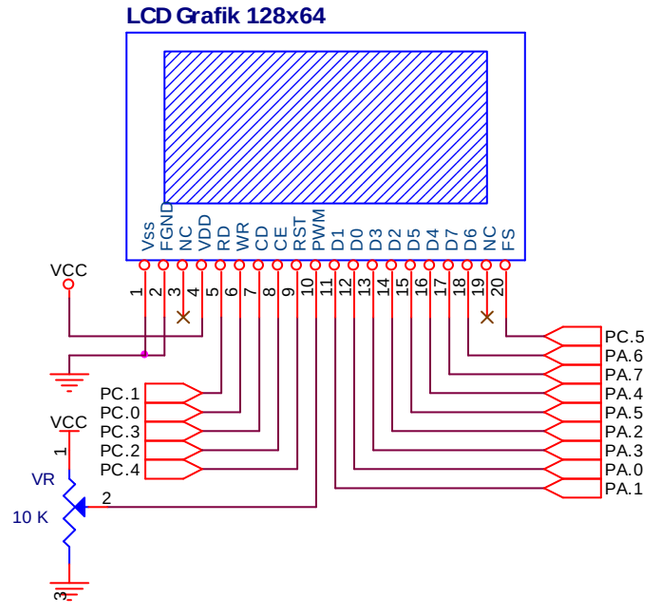
24. Membuat karakter khusus pada LCD (lambang kapasitor non polar) (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Deflcdchar 1 , 4 , 4 , 4 , 31 , 32 , 31 , 4 , 4
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Karakter Khusus"
Locate 2 , 8
Lcd Chr(1)
End
```

25. Animasi dengan LCD 2x16 (B)

```
$regfile = "m8535.dat"
$crystal = 16000000
Deflcdchar 0 , 7 , 14 , 28 , 24 , 28 , 14 , 7 , 32
Deflcdchar 1 , 32 , 12 , 30 , 31 , 30 , 12 , 32 , 32
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Dim I As Byte , J As Byte , K As Byte , L As Byte
Do
   Cls
   Lcd "Contoh Animasi.."
   Wait 1
   For I = 1 To 16
      Locate 1 , I
      Lcd Chr(0)
      J = I - 1
      Locate 1 , J
      Lcd " "
      Waitms 300
      K = I + 1
      Locate 1 , K
      Lcd Chr(1)
      Locate 1 , I
      Lcd " "
      Waitms 300
   Next
Loop
End
```

26. Menampilkan tulisan pada LCD Grafik (B)




```
$crystal = 8000000
$regfile = "m32def.dat"
Config Graphlcd = 128 * 64 , Dataport = Porta , Controlport = Portc
, Ce = 2 , Cd = 3 , Wr = 0 , Rd = 1 , Reset = 4 , Fs = 5 , Mode = 6
Cls
Cursor Off
Wait 1
Locate 1 , 1 : Lcd "99 Aplikasi uC"
Locate 2 , 1 : Lcd "LCD Grafik 128 x 64"
Locate 3 , 1 : Lcd "Baris 3"
Locate 4 , 1 : Lcd "Baris 4"
Locate 5 , 1 : Lcd "Baris 5"
Locate 6 , 1 : Lcd "Baris 6"
Locate 7 , 1 : Lcd "Baris 7"
Locate 8 , 1 : Lcd "Baris 8"
End
```

27. Menampilkan gambar pada LCD grafik 128x64 (B)

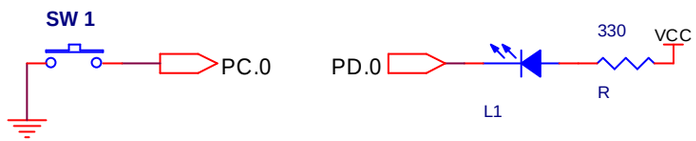
```
$crystal = 8000000
$regfile = "m32def.dat"
```

```
Config Graphlcd = 128 * 64 , Dataport = Porta , Controlport = Portc
, Ce = 2 , Cd = 3 , Wr = 0 , Rd = 1 , Reset = 4 , Fs = 5 , Mode = 6
Cls
Cursor Off
Wait 1
Showpic 0 , 0 , Gambar
End
gambar:
$bgf "gambar.bgf"
```

28. Menggambar garis horisontal pada LCD Grafik 128x64 (B)

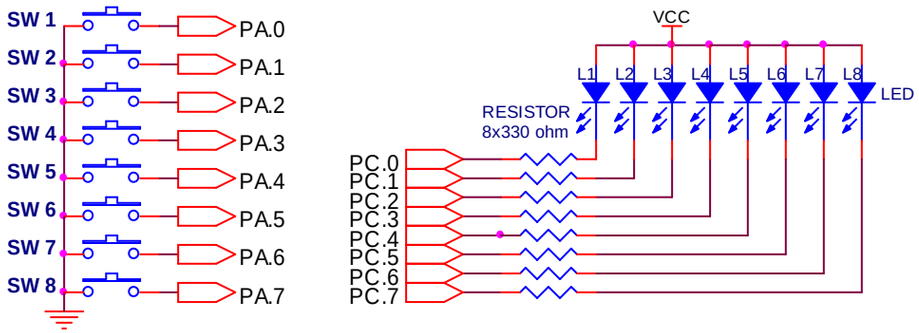
```
$crystal = 8000000
$regfile = "m32def.dat"
Config Graphlcd = 128 * 64 , Dataport = Porta , Controlport = Portc
, Ce = 2 , Cd = 3 , Wr = 0 , Rd = 1 , Reset = 4 , Fs = 5 , Mode = 6
Dim X As Byte
Cls
Cursor Off
Wait 1
Locate 1 , 1 : Lcd "Garis Horizontal"
For X = 8 To 120
   Pset X , 32 , 255
Next
End
```

29. Membaca 1 tombol (B)



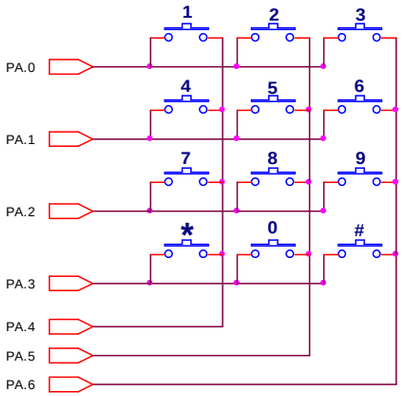

```
$regfile = "m8535.dat"
$crystal = 11059200
Ddrc.0 = 0
Portc.0 = 1
Ddrd.0 = 1
Do
 Portd.0 = Pinc.0
Loop
End
```

30. Membaca 8 tombol (B)



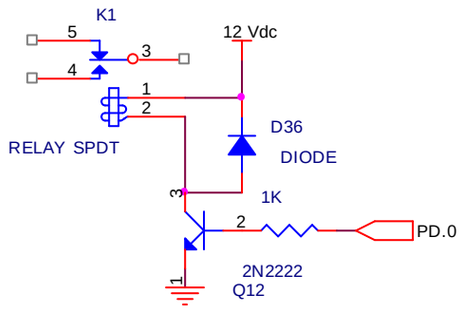

```
$regfile = "m8535.dat"
$crystal = 16000000
Config Porta = Input
Porta = &HFF
Config Portc = Output
Portc = &HFF
Do
   If Pina.0 = 0 Then
      Portc = &B11111110
   Elseif Pina.1 = 0 Then
      Portc = &B11111101
   Elseif Pina.2 = 0 Then
      Portc = &B11111011
   Elseif Pina.3 = 0 Then
      Portc = &B11110111
   Elseif Pina.4 = 0 Then
      Portc = &B11101111
   Elseif Pina.5 = 0 Then
      Portc = &B11011111
   Elseif Pina.6 = 0 Then
      Portc = &B10111111
   Elseif Pina.7 = 0 Then
      Portc = &B01111111
   End If
Loop
End
```

31. Membaca keypad 3x4 (Bascom) (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Tombol="
Config KBD = Porta
Dim keypad as Byte
Do
   keypad = getkbd()
   If keypad <> 16 then
      Gosub Display_lcd
      waitms 350
   End IF
Loop
End
Display_lcd:
   Locate 1 , 8
   Select case keypad
      Case 19 : Lcd "0"
      case 0 : lcd "1"
      Case 4 : Lcd "2"
      Case 8 : Lcd "3"
      Case 1 : Lcd "4"
      case 5 : lcd "5"
      Case 9 : Lcd "6"
      Case 2 : Lcd "7"
      Case 18 : Lcd "8"
      case 10 : lcd "9"
      Case 3 : Lcd "*"
      Case 11 : Lcd "#"
   end SELECT
Return
End
```

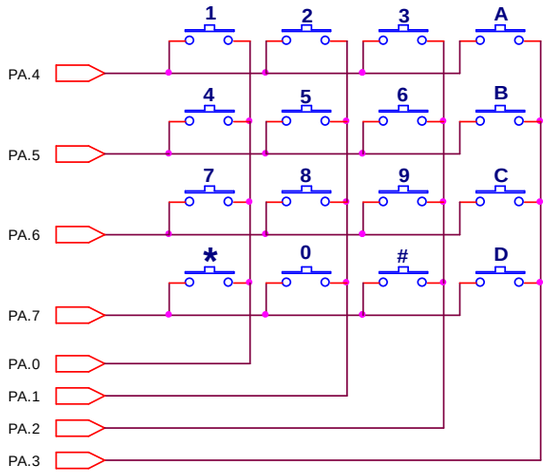
32. Peralatan dengan Password (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Masukan Password"
Relay Alias Portd.0
Ddrd.0 = 1
Relay = 0
Config Kbd = Porta
Dim Keypad As Byte , C As Byte
Dim Pw As String * 5 , Key As String * 1
Const Password = "1230"
Locate 2 , 4
Do
   Keypad = Getkbd()
   If Keypad <> 16 Then
      Gosub get_keypad
      Incr C
      'If C <= 4 Then
         Pw = Pw + Key
```

```
      If C >= 4 Then
         If Pw <> Password Then
            Cls
            Lcd "Password Salah"
            Wait 2
            Cls
            Lcd "Masukan Pasword"
            Locate 2 , 4
            Pw = ""
            C = 0
          Else
            Cls
            Lcd "Password Benar"
            Lowerline
            Lcd "Relay ON"
            Relay = 1
          End If
      End If
      Waitms 350
   End If
Loop
End
Get_keypad:
   Lcd "*"
   Select Case Keypad
      Case 19 : Key = "0"
      Case 0 : Key = "1"
      Case 4 : Key = "2"
      Case 8 : Key = "3"
      Case 1 : Key = "4"
      Case 5 : Key = "5"
      Case 9 : Key = "6"
      Case 2 : Key = "7"
      Case 18 : Key = "8"
      Case 10 : Key = "9"
      Case 3 : Key = "*"
      Case 11 : Key = "#"
   End Select
Return
End
```

33. Membaca keypad 4x4 dengan BASCOM (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Tombol="
Ddra = &B00001111
Porta = &B11111111
Do
   Porta = &B11111110
   If Pina.4 = 0 Then
      Locate 1 , 8
      Lcd "1"
   Elseif Pina.5 = 0 Then
      Locate 1 , 8
      Lcd "4"
   Elseif Pina.6 = 0 Then
      Locate 1 , 8
      Lcd "7"
   Elseif Pina.7 = 0 Then
      Locate 1 , 8
      Lcd "*"
   End If
      Porta = &B11111101
```

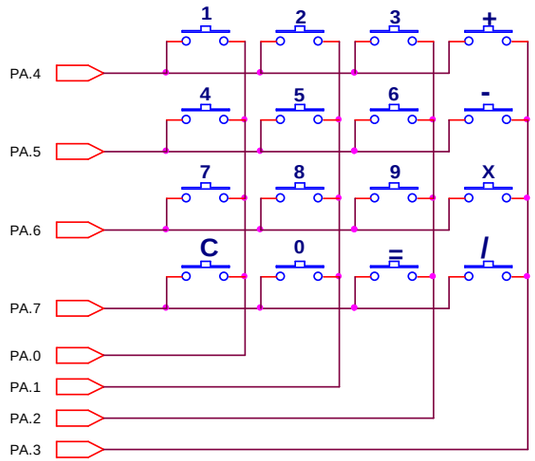
```
   If Pina.4 = 0 Then
      Locate 1 , 8
      Lcd "2"
   Elseif Pina.5 = 0 Then
      Locate 1 , 8
      Lcd "5"
   Elseif Pina.6 = 0 Then
      Locate 1 , 8
      Lcd "8"
   Elseif Pina.7 = 0 Then
      Locate 1 , 8
      Lcd "0"
   End If
   Porta = &B11111011
   If Pina.4 = 0 Then
      Locate 1 , 8
      Lcd "3"
   Elseif Pina.5 = 0 Then
      Locate 1 , 8
      Lcd "6"
   Elseif Pina.6 = 0 Then
      Locate 1 , 8
      Lcd "9"
   Elseif Pina.7 = 0 Then
      Locate 1 , 8
      Lcd "#"
   End If
   Porta = &B11110111
   If Pina.4 = 0 Then
      Locate 1 , 8
      Lcd "A"
   Elseif Pina.5 = 0 Then
      Locate 1 , 8
      Lcd "B"
   Elseif Pina.6 = 0 Then
      Locate 1 , 8
      Lcd "C"
   Elseif Pina.7 = 0 Then
      Locate 1 , 8
      Lcd "D"
   End If
Loop
End
```

34. Membaca keypad 4x4 dengan bahasa C (C)

```
#include <alcd.h>
#include <delay.h>
#include <mega8535.h>

void keypad()
{
 PORTA=0b11111110;
 delay_us(5);
 if(PINA.4==0){
  lcd_gotoxy(7,0);
  lcd_putchar('1');}
 else if(PINA.5==0){
  lcd_gotoxy(7,0);
  lcd_putchar('4');}
 else if(PINA.6==0){
  lcd_gotoxy(7,0);
  lcd_putchar('7');}
 else if(PINA.7==0){
  lcd_gotoxy(7,0);
  lcd_putchar('*');}
 //----kolom 2
 PORTA=0b11111101;
 delay_us(5);
 if(PINA.4==0){
  lcd_gotoxy(7,0);
  lcd_putchar('2');}
 else if(PINA.5==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('5'); }
 else if(PINA.6==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('8'); }
 else if(PINA.7==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('0'); }
 //-----kolom 3
 PORTA=0b11111011;
 delay_us(5);
 if(PINA.4==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('3'); }
 else if(PINA.5==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('6'); }
```

```
 else if(PINA.6==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('9'); }
 else if(PINA.7==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('#'); }
 //kolom 4
 PORTA=0b11110111;
 delay_us(5);
 if(PINA.4==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('A'); }
 else if(PINA.5==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('B'); }
 else if(PINA.6==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('C'); }
 else if(PINA.7==0) {
  lcd_gotoxy(7,0);
  lcd_putchar('D'); }
}
void main()
{
DDRA = 0B00001111;
PORTA = 0B11111111;
lcd_init(16);
lcd_putsf("Tombol=");
while(1)
{
 keypad();
}
}
```

35. Membuat kalkulator (BASCOM) (B)

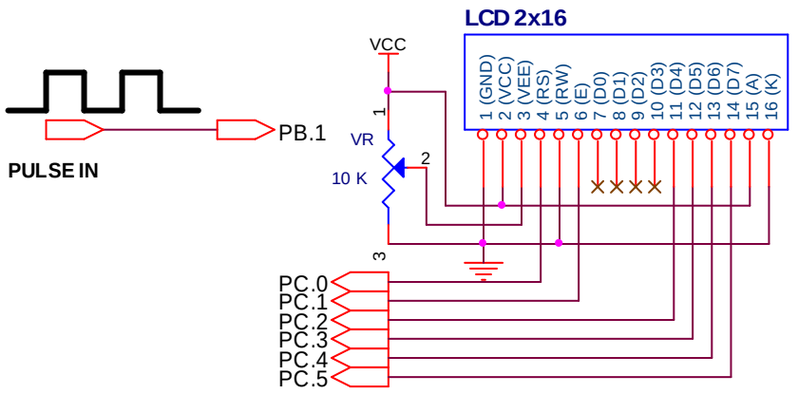



```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "mega Calculator"
Dim Angka As Byte , Tombol As Long , Nilai As Long , C As Byte
Dim Var1 As Long , Var2 As Long , Hasil As Long , U As Byte
Dim Op As String * 1

Ddra = &B00001111
Porta = &B11111111
C = 1
Lowerline
Do
  Gosub Scan_keypad
Loop

Entri:
   If Op = "=" Then
     Lowerline
     Lcd "                "
     Lowerline
     Op = ""
   End If
```

```
   Lcd Tombol
   Nilai = 10 ^ U
   If C = 1 Then
      Var1 = Var1 * Nilai
      Var1 = Var1 + Tombol
   Else
      Var2 = Var2 * Nilai
      Var2 = Var2 + Tombol
   End If
   Incr U
   Waitms 250
Return
Proses:
  Select Case Op
  Case "+" : Hasil = Var1 + Var2
  Case "-" : Hasil = Var1 - Var2
  Case "x" : Hasil = Var1 * Var2
  Case "/" : Hasil = Var1 / Var2
  End Select
Return
Scan_keypad:
Do
   Porta = &B11111110
   If Pina.4 = 0 Then
      Tombol = 1
      Gosub Entri
   Elseif Pina.5 = 0 Then
      Tombol = 4
      Gosub Entri
   Elseif Pina.6 = 0 Then
      Tombol = 7
      Gosub Entri
   Elseif Pina.7 = 0 Then
      Lowerline
      Lcd "                "
      Lowerline
      Var1 = 0
      Var2 = 0
      C = 1
      U = 0
    Waitms 250
   End If
   Porta = &B11111101
   If Pina.4 = 0 Then
      Tombol = 2
      Gosub Entri
   Elseif Pina.5 = 0 Then
      Tombol = 5
      Gosub Entri
   Elseif Pina.6 = 0 Then
      Tombol = 8
      Gosub Entri
   Elseif Pina.7 = 0 Then
      Tombol = 0
      Gosub Entri
    Waitms 200
   End If
   Porta = &B11111011
   If Pina.4 = 0 Then
      Tombol = 3
      Gosub Entri
   Elseif Pina.5 = 0 Then
      Tombol = 6
      Gosub Entri
   Elseif Pina.6 = 0 Then
      Tombol = 9
      Gosub Entri
   Elseif Pina.7 = 0 Then
      Lowerline
      Lcd "=               "
      Lowerline
      Gosub Proses
      Lcd Hasil
      Var1 = 0
      Var2 = 0
      C = 1
      U = 0
      Op = "="
     Waitms 250
   End If
   Porta = &B11110111
   If Pina.4 = 0 Then
      Lcd "+"
      Op = "+"
      C = 2
      U = 0
       Waitms 250
   Elseif Pina.5 = 0 Then
      Lcd "-"
      Op = "-"
      C = 2
       U = 0
```

```
      Waitms 250
   Elseif Pina.6 = 0 Then
      Lcd "x"
      Op = "x"
      C = 2
       U = 0
       Waitms 250
   Elseif Pina.7 = 0 Then
      Lcd "/"
      Op = "/"
      C = 2
       U = 0
     Waitms 250
   End If
Loop
End
```

36. Membaca pulsa dengan counter (B)

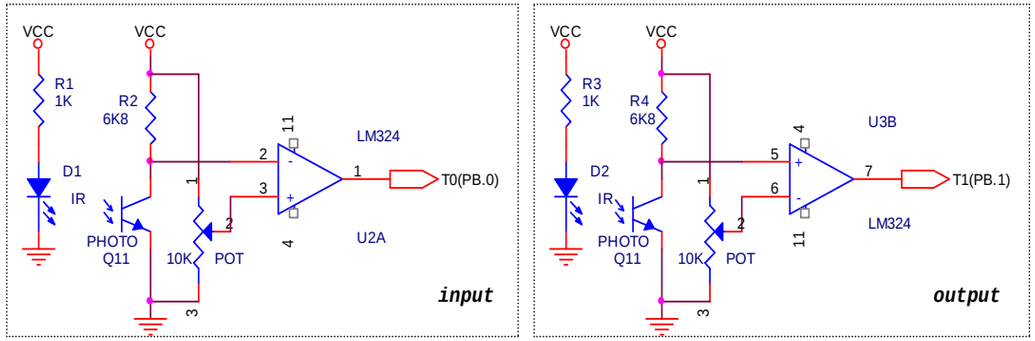



```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 , Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 16 * 2
Ddrb.1 = 0
Portb.1 = 1
Config Timer1 = Counter , Edge = Falling
Start Timer1
Cursor Off
Cls
Lcd "Counter 1"
Do
 Locate 2 , 1
 Lcd Counter1
Loop
End
```

37. Frequency counter dengan mikrokontroler (C)

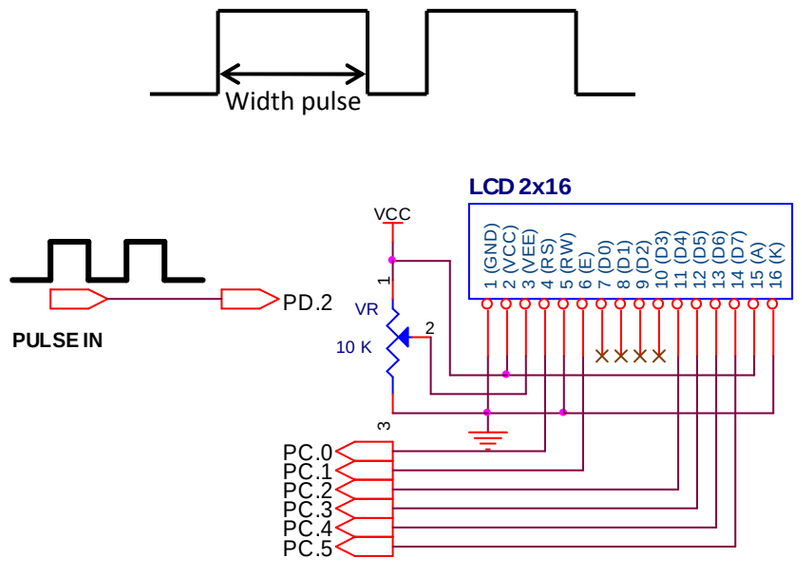
```
#include <mega8535.h>
#include <alcd.h>
#include <delay.h>
#include <stdlib.h>

unsigned int counter1;
unsigned char string[10];
void main(void)
{
lcd_init(16);
lcd_clear();
lcd_putsf("  Freq Counter");
lcd_gotoxy(0,1);
while (1)      {
      TCCR1B=0x06;
      delay_ms(1000);
      TCCR1B=0x0;
      counter1=(256*TCNT1H)+TCNT1L;
      itoa(counter1,string);
      lcd_gotoxy(0,1);
      lcd_puts(string);
      TCNT1H=0;
      TCNT1L=0;
      }
}
```

38. Membuat penghitung jumlah orang dalam ruangan (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Ddrb.0 = 0
Portb.0 = 1
Ddrb.1 = 0
Portb.1 = 1
Config Timer1 = Counter , Edge = Falling
Config Timer0 = Counter , Edge = Falling
Start Timer0
Start Timer1
Dim Total As Word
Cursor Off
Cls
Lcd "IN=0    OUT="
Lowerline
Lcd "Total="
Do
 Locate 1 , 4
 Lcd Counter0
 Locate 1 , 13
 Lcd Counter1
 Total = Counter0 - Counter1
 Locate 2 , 7
 lcd total
Loop
End
```

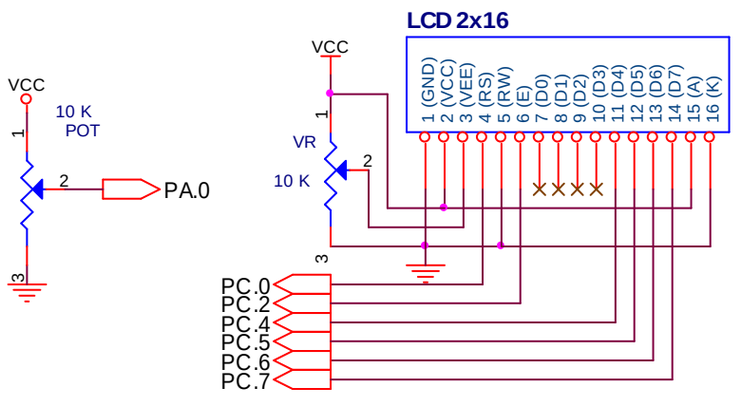
39. Menghitung lebar pulsa (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Dim Pulsa As Long , Arah As Byte
Dim Pulsa_high As Long
Dim S As String * 10
Const _rising = 11
Const _falling = 22
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.1 , Db4 = Portc.2
Config Lcdpin = Pin , Db5 = Portc.3 ,Db6 = Portc.4 , Db7 = Portc.5
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Lebar Pulsa"
Config Timer1 = Timer , Prescale = 1024
Config Int0 = Rising
On Int0 Int_x0
Enable Int0
Enable Interrupts
Arah = _rising
Portd.2 = 1
Ddrd.2 = 0
Do
```

```
  Pulsa_high = Pulsa * 64
  Locate 2 , 6
  Lcd Pulsa_high ; " us  "
Loop
End
Int_x0:
   Gicr = 0
   If Arah = _rising Then
      Start Timer1
      Arah = _falling
      Mcucr = &H02
   Elseif Arah = _falling Then
      Stop Timer1
      Pulsa = Timer1

      Timer1 = 0
      Arah = _rising
      Mcucr = &H03
   End If
   Gicr = &H40
Return
```

40. Digital Voltmeter dengan BASCOM (B)

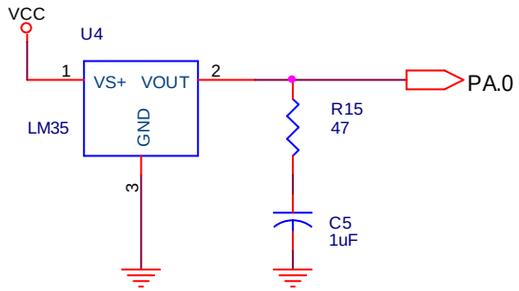



```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Config Adc = Single , Prescaler = Auto , Reference = Avcc
Dim W As Word , Volt As Word
Start Adc
Cls
Lcd "V="
Do
 W = Getadc(0)
 Volt = W * 5
 Locate 1 , 3
 Lcd Volt ; " mV  "
 wait 1
Loop
```

41. Digital Voltmeter dengan CodeVisionAVR (C)

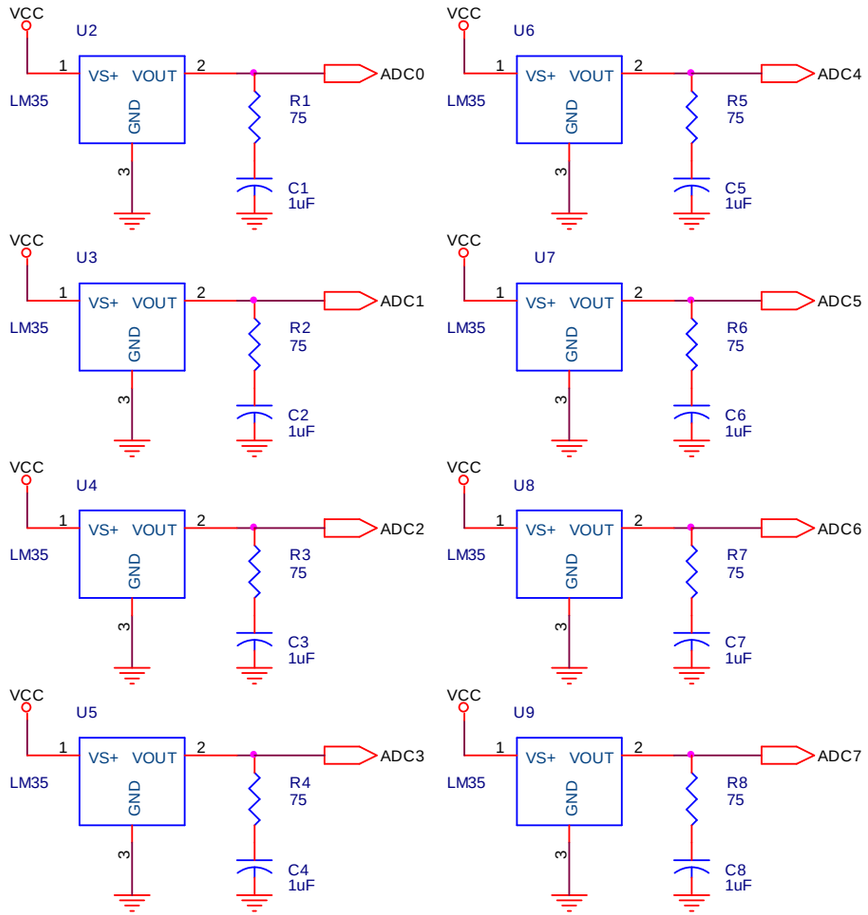
```
#include <alcd.h>
#include <delay.h>
#include <mega8535.h>
#include <stdlib.h>
#define ADC_VREF_TYPE 0x40
unsigned int adc,v;
unsigned char string[10];
unsigned int read_adc(unsigned char adc_input){
ADMUX=adc_input | (ADC_VREF_TYPE & 0xff);
delay_us(10);
ADCSRA|=0x40;
while ((ADCSRA & 0x10)==0);
ADCSRA|=0x10;
return ADCW; }
void main() {
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x87;
SFIOR&=0xEF;
lcd_init(16);
while(1)
{
 adc=read_adc(0);
 v=adc*5;
 itoa(adc,string);
 lcd_clear();
 lcd_putsf("V=");
 lcd_puts(string);
 delay_ms(1000);
}}
```

42. Membuat thermometer digital dengan LM35 (C)




```
#include <mega8535.h>
#include <alcd.h>
#include <delay.h>
#include <stdlib.h>
unsigned int adc,v,temp;
unsigned char string[10];
#define ADC_VREF_TYPE 0x40
unsigned int read_adc(unsigned char adc_input){
ADMUX=adc_input | (ADC_VREF_TYPE & 0xff);
delay_us(10);
ADCSRA|=0x40;
while ((ADCSRA & 0x10)==0);
ADCSRA|=0x10;
return ADCW;
}

void main(void) {
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x87;
SFIOR&=0xEF;
lcd_init(16);
lcd_clear();
lcd_putsf(" Digital Temp");
lcd_gotoxy(0,1);

while (1) {
 adc=read_adc(0);
 v=adc*5;
 temp=v/10;
 itoa(temp,string);
 lcd_clear();
 lcd_putsf("T=");
 lcd_puts(string);
 lcd_putchar(' ');
 lcd_putchar(0xdf);
 lcd_putchar('C');
 delay_ms(1000);
 }}
```

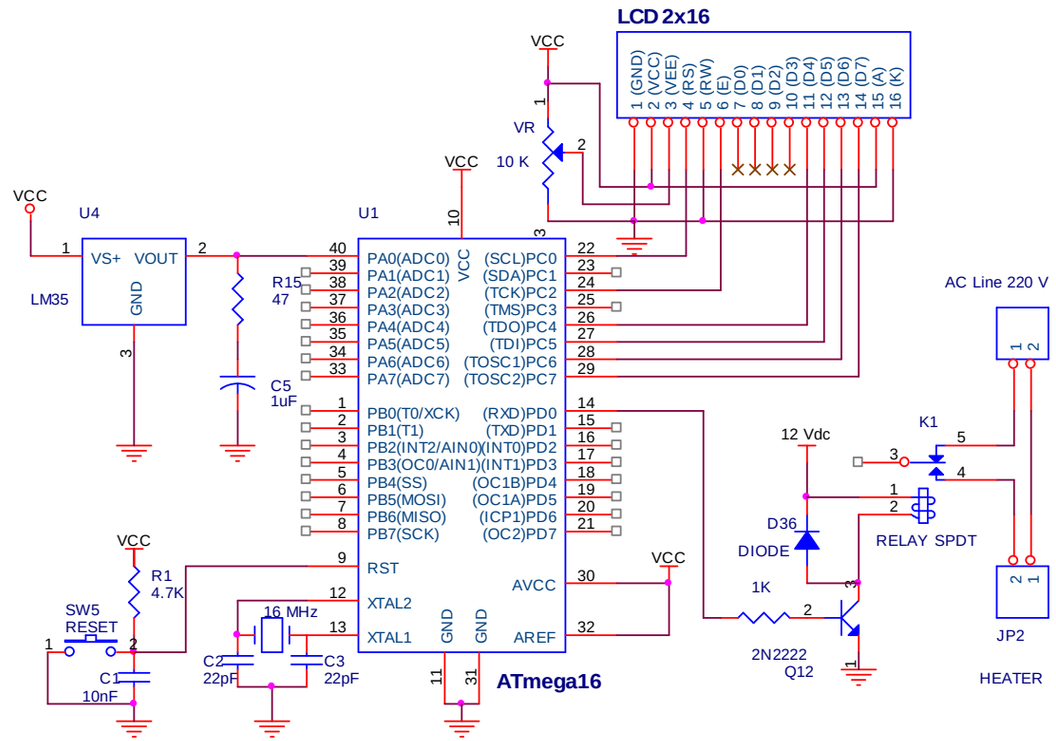
43. 8 channel temperature display (sensor suhu LM 35) (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
```

```
Dim Data_adc As Word , T1 As Word , T2 As Word , T3 As Word , T4 As
Word
Dim T5 As Word , T6 As Word , T7 As Word , T8 As Word
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 20 * 4
Cursor Off
Cls

Config Adc = Single , Prescaler = Auto , Reference = Avcc
Lcd "T1="
Start Adc
Do
   Data_adc = Getadc(0)
   T1 = Data_adc * 5
   T1 = T1 / 10
   Data_adc = Getadc(1)
   T2 = Data_adc * 5
   T2 = T2 / 10
   Data_adc = Getadc(2)
   T3 = Data_adc * 5
   T3 = T3 / 10
   Data_adc = Getadc(3)
   T4 = Data_adc * 5
   T4 = T4 / 10
   Data_adc = Getadc(4)
   T5 = Data_adc * 5
   T5 = T5 / 10
   Data_adc = Getadc(5)
   T6 = Data_adc * 5
   T6 = T6 / 10
   Data_adc = Getadc(6)
   T7 = Data_adc * 5
   T7 = T7 / 10
   Data_adc = Getadc(7)
   T8 = Data_adc * 5
   T8 = T8 / 10

   Cls
   Lcd "T1=" ; T1 ; Chr(&Hdf) ; "C " ; "T2=" ; T2 ; Chr(&Hdf) ; "C "
   Locate 2 , 1
   Lcd "T3=" ; T3 ; Chr(&Hdf) ; "C " ; "T4=" ; T4 ; Chr(&Hdf) ; "C "
   Locate 3 , 1
   Lcd "T5=" ; T5 ; Chr(&Hdf) ; "C " ; "T6=" ; T6 ; Chr(&Hdf) ; "C "
   Locate 4 , 1
   Lcd "T7=" ; T7 ; Chr(&Hdf) ; "C " ; "T8=" ; T8 ; Chr(&Hdf) ; "C "
   Wait 1
Loop
End
```

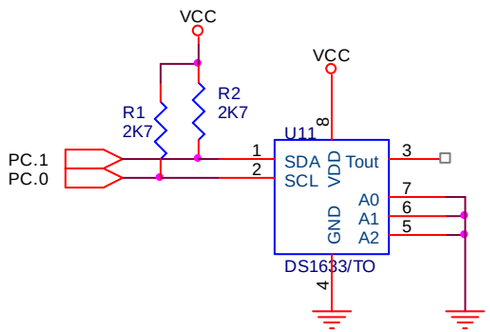
44. Kontrol Suhu Otomatis (B)




```
$regfile = "m16def.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Relay Alias Portd.0
Ddrd.0 = 1
Relay = 0
Config Adc = Single , Prescaler = Auto , Reference = Avcc
Dim W As Word , Volt As Word , Temp As Word
Dim Ch As Byte , Sp_uper As Byte , Sp_lower As Byte
```

```
Start Adc
Cls
Sp_uper = 45
Sp_lower = 40
Do
 W = Getadc(0)
 Volt = W * 5
 Temp = Volt / 10
 Temp = 50
 Locate 1 , 1
 Lcd "Suhu=" ; Temp ; Chr(&Hdf) ; "C"
 If Temp > Sp_uper Then
    Relay = 0
    Locate 2 , 1
    Lcd "HEATER OFF"
 Elseif Temp < Sp_lower Then
   Relay = 1
   Locate 2 , 1
    Lcd "HEATER ON "
 End If
 Wait 1
Loop
End
```

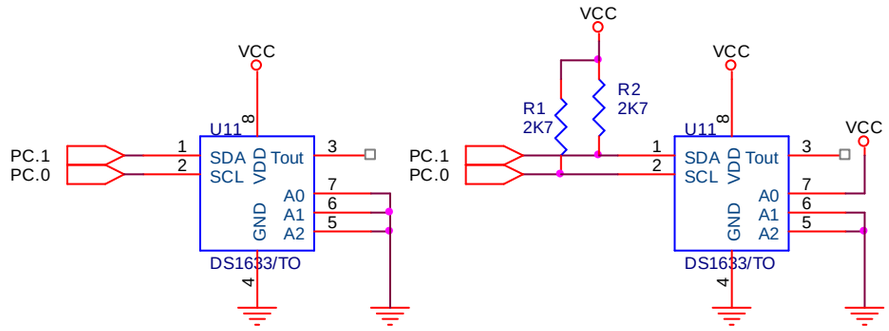
45. Membuat thermometer digital dengan DS1621 (C)




```
#include <mega32.h>
#include <delay.h>
#asm
   .equ __i2c_port=0x15 ;PORTC
   .equ __sda_bit=1
   .equ __scl_bit=0
#endasm
```

```
#include <i2c.h>
#include <ds1621.h>
#include <alcd.h>
#include <stdio.h>
#include <stdlib.h>
char display_buffer[33];
int t0;
void main(void)
{
i2c_init();
ds1621_init(0,50,55,0);
lcd_init(16);
lcd_putsf("--DS1621--");
lcd_gotoxy(0,1);
lcd_puts("Temp=");
while (1)
      {
      t0=ds1621_temperature_10(0)/10;
      itoa(t0,display_buffer);
      lcd_gotoxy(5,1);
      lcd_puts(display_buffer);
      lcd_putchar(0xdf);
      lcd_putchar('C');
      }
}
```

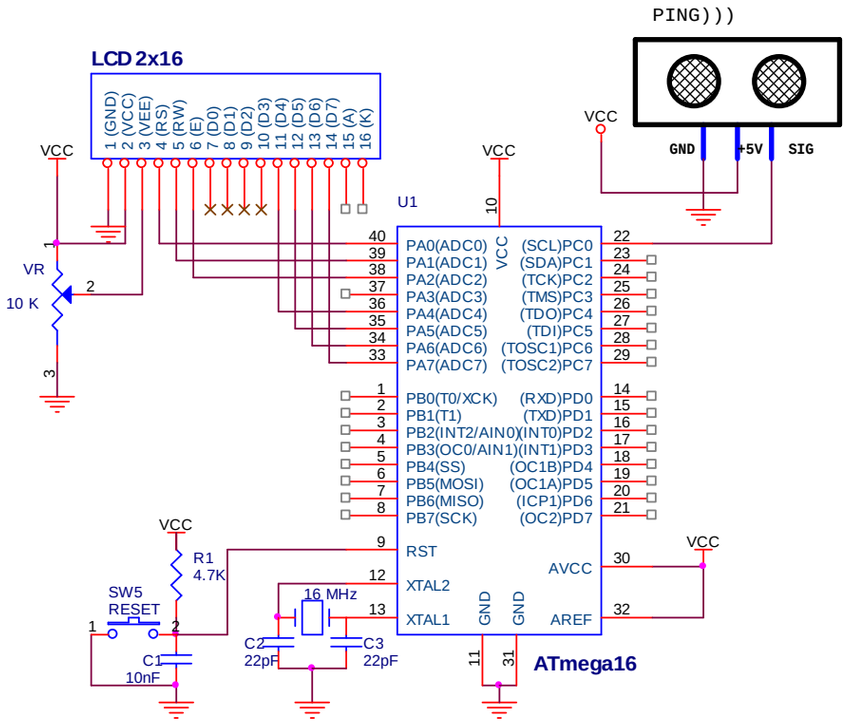
46. Dua channel thermometer digital dengan DS1621(C)




```
#include <mega32.h>
#include <delay.h>
#asm
   .equ __i2c_port=0x15 ;PORTC
   .equ __sda_bit=1
```

```
   .equ __scl_bit=0
#endasm
#include <i2c.h>
#include <ds1621.h>
#include <alcd.h>
#include <stdio.h>
#include <stdlib.h>
char display_buffer[33];
int t0;
void main(void){
i2c_init();
ds1621_init(0,50,55,0);
lcd_init(16);
lcd_putsf("Temp1 =");
lcd_gotoxy(0,1);
lcd_puts("Temp2 =");
while (1)
      {
      t0=ds1621_temperature_10(0)/10;
      itoa(t0,display_buffer);
      lcd_gotoxy(7,0);
      lcd_puts(display_buffer);
      lcd_putchar(0xdf);
      lcd_putchar('C');
      t0=ds1621_temperature_10(1)/10;
      itoa(t0,display_buffer);
      lcd_gotoxy(7,1);
      lcd_puts(display_buffer);
      lcd_putchar(0xdf);
      lcd_putchar('C');
      }
}
```

47. Pengukur jarak dengan sensor ultrasonic (PING))) tanpa timer (CodeVision) (C)




```
#include <mega32.h>
#include <delay.h>
#include <stdio.h>
#define ping PINC.0
unsigned int jarak;
char buf[33];
#asm
   .equ __lcd_port=0x1B ;PORTA
#endasm
#include <lcd.h>
void ukur_jarak(){
 unsigned int i;
 jarak=0;
 DDRC.0=1;
 PORTC.0=0;
 delay_us(100);
 PORTC.0=1;  //tout, H=5 us
```

```
 delay_us(5);
 PORTC.0=0;
 delay_us(750);//tHOLDOFF L=750 us
 PORTC.0=1;
 DDRC.0=0;
 for (i=0;i<=1000;i++) {
    if (ping) {jarak++;}
    delay_us(58);
 }
}
void main(void){
lcd_init(16);
lcd_clear ();
lcd_putsf ("PING tanpa timer");
lcd_gotoxy(0,1);
lcd_putsf ("Jarak=");
while (1)      {
       ukur_jarak();
       sprintf (buf,"%3i cm",jarak);       lcd_gotoxy (6,1);
       lcd_puts (buf);
       }
}
```

48. Pengukur jarak dengan sensor ultrasonic (PING))) dengan timer (CodeVision) (C)

```
#include <mega32.h>
#include <delay.h>
#include <stdio.h>
#define ping PINC.0
unsigned int jarak;
char buf[33];
bit flag;
#asm
   .equ __lcd_port=0x1B ;PORTA
#endasm
#include <lcd.h>
interrupt [TIM1_OVF] void timer1_ovf_isr(void)
  {
  flag=0;
  TIFR=0b00000100;             //clear TOV1
  TCCR1B=0x00;                 //Timer 1 off
  TCNT1=0;
  jarak=0;
  }
```

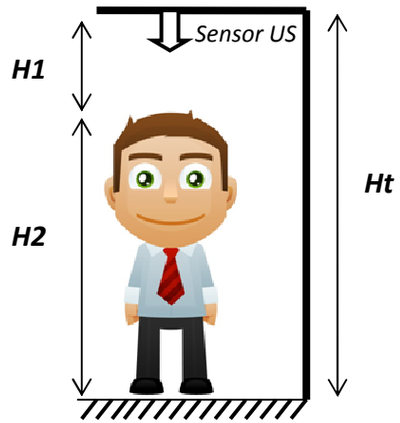
```
 void ukur_jarak(){
  DDRC.0=1;
  PORTC.0=0;      //PortC=ultra out (PC.0)
  TIMSK=0b00000100;  //timer 1 interupsi aktif
  TCNT1=0x00;     //clear reg timer 1
  PORTC.0=1;      //trigger signal
  delay_us(5);   //5 us high
  PORTC.0=0;
  delay_us(750);  //hold off =750 us
  TCCR1B=0x01;    //START TIMER 1 no prescaling
  DDRC.0=0;
  PORTC.0=1;      //PortC=input pull-up.
  while(flag)         //flag_1=1-> Timer 1 belum overflow
     {
       if (ping==0)
         {
          TCCR1B=0x00;
          jarak=TCNT1/58;
          flag=0;
         }
     }

  flag=1;
  TCCR1B=0;
}
void main(void){
lcd_init(16);
lcd_clear ();
lcd_putsf ("PING dg timer");
lcd_gotoxy(0,1);
lcd_putsf ("Jarak=");
while (1)  {
       ukur_jarak();
       sprintf (buf,"%3i cm",jarak);
       lcd_gotoxy (6,1);
       lcd_puts (buf);
       }
}
```

49. Membuat pengukur jarak ultrasonic dengan BASCOM (B)

```
$regfile = "m32def.dat"
$crystal = 1000000

Dim Flag As Bit
```

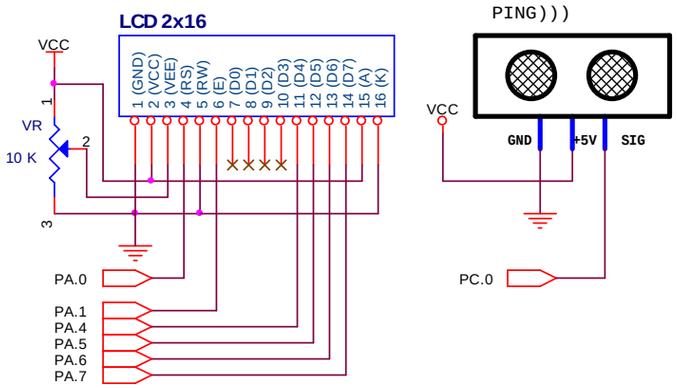
```
Dim Jarak As Word
Config Lcdpin = Pin , Db4 = Porta.4 , Db5 = Porta.5 , Db6 = Porta.6
Config Lcdpin = Pin , Db7 = Porta.7 , E = Porta.1 , Rs = Porta.0
Config Lcd = 16 * 2
Cursor Off
Cls
Config Timer1 = Timer , Prescale = 1
On Timer1 Jarak_over
Enable Interrupts
Sig Alias Portc.0
Pin_sig Alias Ddrc.0
Sig_in Alias Pinc.0
Lcd "PING dg Timer"
Lowerline
Lcd "Jarak="
Do
   Gosub Ukur_jarak
   Locate 2 , 7
   Lcd Jarak ; " cm"
Loop
End
Ukur_jarak:
   Flag = 1
   Pin_sig = 1
   Sig = 0
   Enable Timer1
   Timer1 = 0
   Sig = 1
   Waitus 5
   Sig = 0
   Waitus 760
   Start Timer1
   Pin_sig = 0
   Sig = 1
   While Flag = 1
      If Sig_in = 0 Then
         Stop Timer1
         Jarak = Timer1
         Flag = 0
      End If
   Wend                                                    '
   Jarak = Jarak / 58
Return
Jarak_over:
   Flag = 0
   Stop Timer1
   Timer1 = 0
   Jarak = 0
Return
```

50. Membuat pengkur tinggi badan digital (B)



Tinggi Badan (H2)=Ht-H1

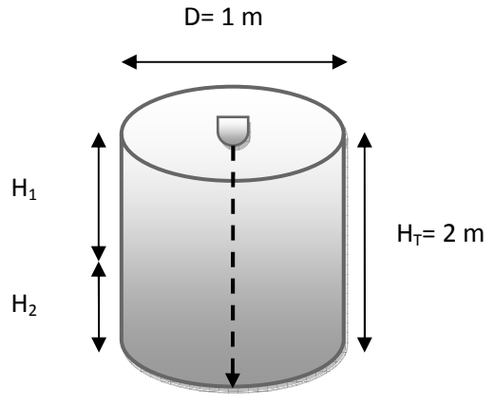
H1=jarak sensor ke kepala objek

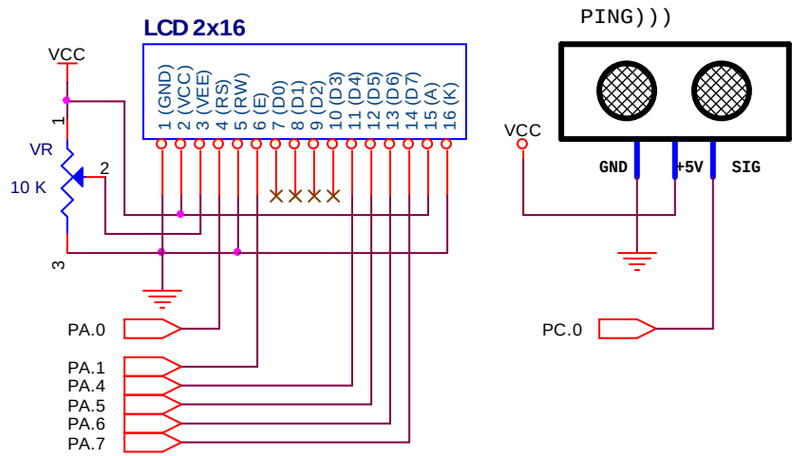



```
$regfile = "m32def.dat"
$crystal = 1000000
Dim Flag As Bit
Dim Jarak As Word , H1 As Word , H2 As Word , Ht As Word
Config Lcdpin = Pin , Db4 = Porta.4 , Db5 = Porta.5 , Db6 = Porta.6
Config Lcdpin = Pin , Db7 = Porta.7 , E = Porta.1 , Rs = Porta.0
Config Lcd = 16 * 2
Cursor Off
```

```
Cls
Config Timer1 = Timer , Prescale = 1
On Timer1 Jarak_over
Enable Interrupts
Sig Alias Portc.0
Pin_sig Alias Ddrc.0
Sig_in Alias Pinc.0
Lcd "Tinggi Badan"
Lowerline
Lcd "TB="
Ht = 200
Do
   Gosub Ukur_h1
   H2 = Ht - H1
   Locate 2 , 4
   Lcd H2 ; " cm"
Loop
End
Ukur_h1:
   Flag = 1
   Pin_sig = 1
   Sig = 0
   Enable Timer1
   Timer1 = 0
   Sig = 1
   Waitus 5
   Sig = 0
   Waitus 760
   Start Timer1
   Pin_sig = 0
   Sig = 1
   While Flag = 1
      If Sig_in = 0 Then
         Stop Timer1
         Jarak = Timer1
         Flag = 0
      End If
   Wend
   H1 = Jarak / 58
Return
Jarak_over:
   Flag = 0
   Stop Timer1
   Timer1 = 0
   Jarak = 0
Return
```


51. Membuat pengukur volume air (B)





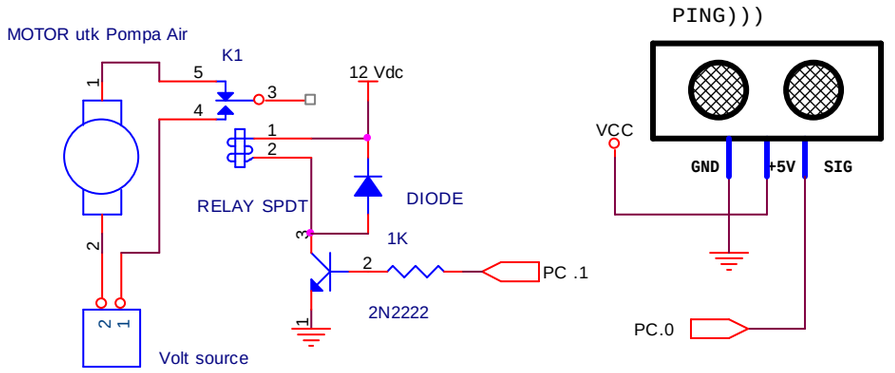

```
$regfile = "m32def.dat"
$crystal = 1000000
Dim Flag As Bit
Dim Jarak As Word , H1 As Word , H2 As Word , Ht As Word
Dim Vol As Long , C As Single , D As Single
Const Phi = 3.14
Config Lcdpin = Pin , Db4 = Porta.4 , Db5 = Porta.5 , Db6 = Porta.6
Config Lcdpin = Pin , Db7 = Porta.7 , E = Porta.1 , Rs = Porta.0
Config Lcd = 16 * 2
```

```
Cursor Off
Cls
Config Timer1 = Timer , Prescale = 1
On Timer1 Jarak_over
Enable Interrupts
Sig Alias Portc.0
Pin_sig Alias Ddrc.0
Sig_in Alias Pinc.0

Lcd "Pengukur Volume"
Lowerline
Lcd "Vol="
Ht = 200
D = 100
'  Volume=0.25*phi*(D^2)*t
D = D * D
C = Phi * D
C = C / 4
Do
   Gosub Ukur_H1
   H2 = Ht - H1
   Vol = C * H2
   Locate 2 , 5
   Lcd Vol ; " cm3"
Loop
End
Ukur_h1:
   Flag = 1
   Pin_sig = 1
   Sig = 0
   Enable Timer1
   Timer1 = 0
   Sig = 1
   Waitus 5
   Sig = 0
   Waitus 760
   Start Timer1
   Pin_sig = 0
   Sig = 1
   While Flag = 1
      If Sig_in = 0 Then
         Stop Timer1
         Jarak = Timer1
         Flag = 0
      End If
   Wend                                                    '
```



```
    H1 = Jarak / 58
Return
Jarak_over:
   Flag = 0
   Stop Timer1
   Timer1 = 0
   Jarak = 0
Return
```

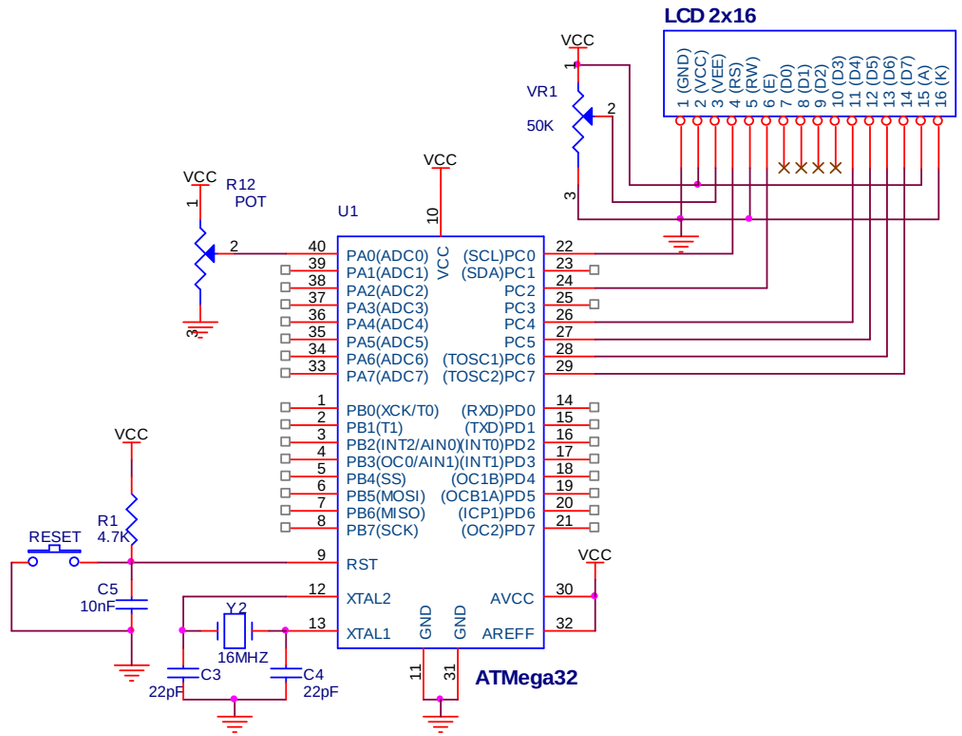
52. Pengisian Tangki Air Otomatis (B)




```
$regfile = "m16def.dat"
$crystal = 16000000
Dim Flag As Bit
Dim Jarak As Word , H1 As Word , H2 As Word , Ht As Word
Dim Vol As Long , C As Single , D As Single
Dim Sp As Word
Ddrc.1 = 1
Portc.1 = 0
Config Timer1 = Timer , Prescale = 1
On Timer1 Jarak_over
Enable Interrupts
Sig Alias Portc.0
Pin_sig Alias Ddrc.0
Sig_in Alias Pinc.0
Pump Alias Portc.1
Ht = 200
Sp = 150                                                'cm
Do
   Gosub Ukur_H1
   H2 = Ht - H1
```

```
   If H2 > Sp Then
      Pump = 1
   Else
      Pump = 0
   End If
Loop
End
Ukur_h1:
   Flag = 1
   Pin_sig = 1
   Sig = 0
   Enable Timer1
   Timer1 = 0
   Sig = 1
   Waitus 5
   Sig = 0
   Waitus 760
   Start Timer1
   Pin_sig = 0
   Sig = 1
   While Flag = 1
      If Sig_in = 0 Then
         Stop Timer1
         Jarak = Timer1
         Flag = 0
      End If
   Wend                                    '
   'hitung dlm cm
   H1 = Jarak / 58
Return
Jarak_over:
   Flag = 0
   Stop Timer1
   Timer1 = 0
   Jarak = 0
Return
```

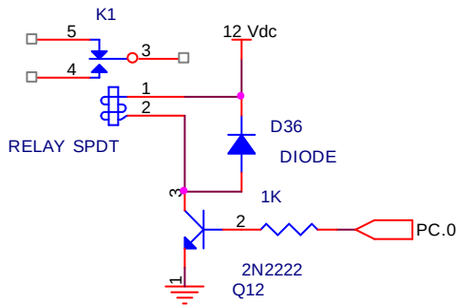
53. Timbangan digital (dengan potensio) (B)




```
$regfile = "m32def.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Config Adc = Single , Prescaler = Auto , Reference = Avcc
Dim Adc0 As Word , Berat As Single
Lcd "Berat:"
Start Adc
Do
Adc0 = Getadc(0)
'rumus Berat = 1.019ADC - 0.283
'rumus didapat dari perbandingan adc dgn berat
Berat = Adc0 + 0.283
Berat = Berat / 1.019
```

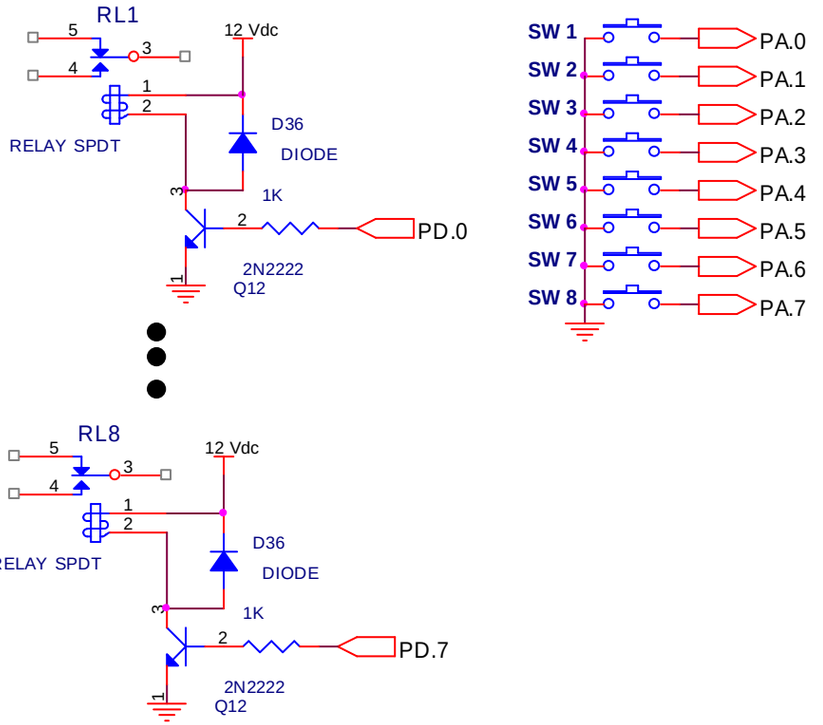
```
Locate 1 , 7
Lcd Fusing(berat , "#.##") ; " gram    "
Waitms 300
Loop
```

54. Mengontrol 1 buah relay (B)




```
$regfile = "m32def.dat"
$crystal = 1000000

Ddrc.0 = 1
Portc.0 = 0
Relay Alias Portc.0
Const _on = 1
Const _off = 0
Do
 Relay = _on ‘relay ON
 Wait 1
 Relay = _off ‘relay OFF
 Wait 1
Loop
End
```

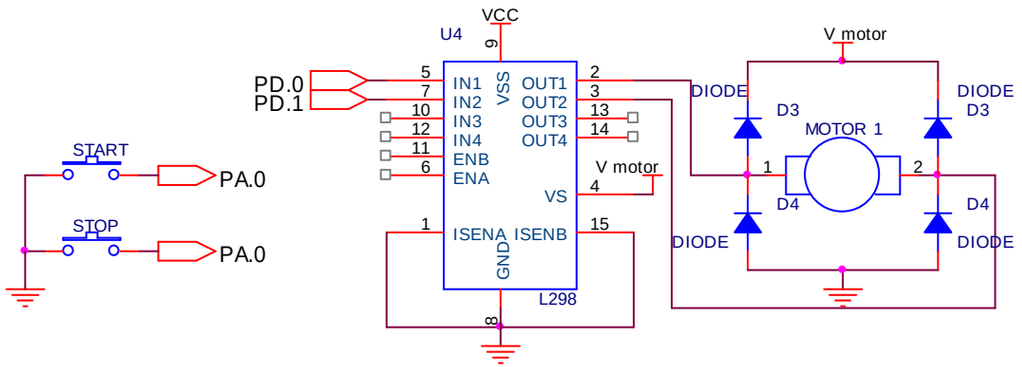
55. Mengontrol 8 buah relay (B)




```
$regfile = "m161def.dat"
$crystal = 16000000

Config Porta = Input
Porta = 255
Config Portd = Output
Portd = 0
Do
   If Pina.0 = 0 Then
      Portd.0 = Not Portd.0
      waitms 300
   Elseif Pina.1 = 0 Then
      Portd.1 = Not Portd.1
      Waitms 300
   Elseif Pina.2 = 0 Then
      Portd.2 = Not Portd.2
      Waitms 300
   Elseif Pina.3 = 0 Then
```

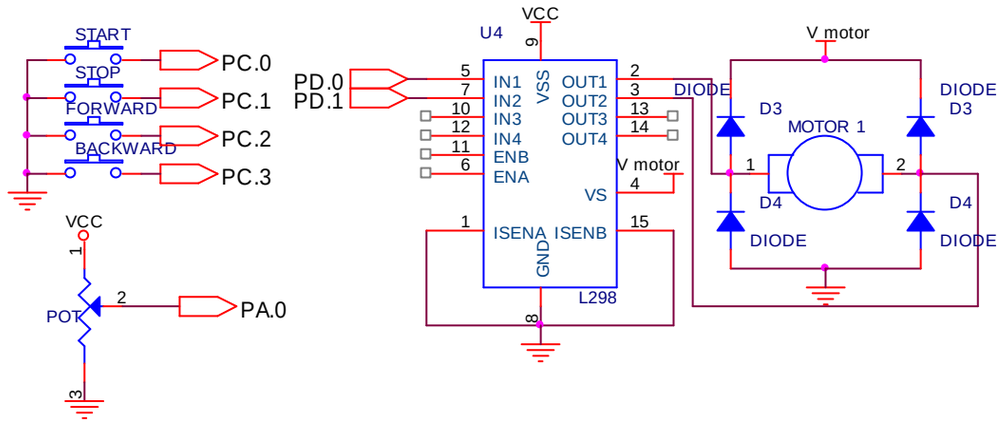
```
      Portd.3 = Not Portd.3
      Waitms 300
   Elseif Pina.4 = 0 Then
      Portd.4 = Not Portd.4
      Waitms 300
   Elseif Pina.5 = 0 Then
      Portd.5 = Not Portd.5
      Waitms 300
   Elseif Pina.6 = 0 Then
      Portd.6 = Not Portd.6
      Waitms 300
   Elseif Pina.7 = 0 Then
      Portd.7 = Not Portd.7
      Waitms 300
   End If

Loop
End
```

56. Mengontrol motor DC (ON-OFF) (B)




```
$regfile = "m16def.dat"
$crystal = 16000000

In1 Alias Portd.0
In2 Alias Portd.1
Sw_start Alias Pinb.0
Sw_stop Alias Pinb.1

Portb = &HFF
Config Portb = Input
Config Portd = Output

Config Timer1 = Pwm , Pwm = 8 , Compare A Pwm = Clear Down ,
Prescale = 1
Pwm1a = 240
Do
  If Sw_start = 0 Then
   In1 = 1
   In2 = 0
  Elseif Sw_stop = 0 Then
   In1 = 0
   In2 = 0
  End If
Loop
End
```

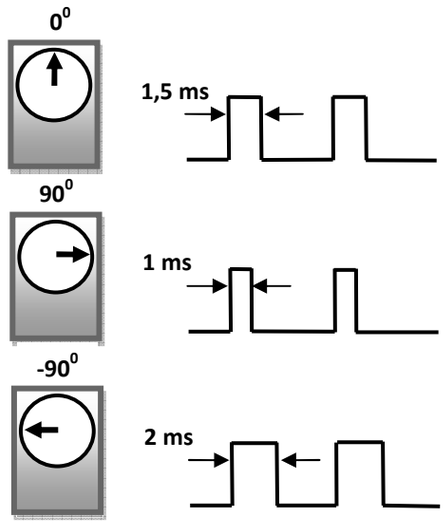
57. Mengontrol kecepatan dan arah motor DC (B)

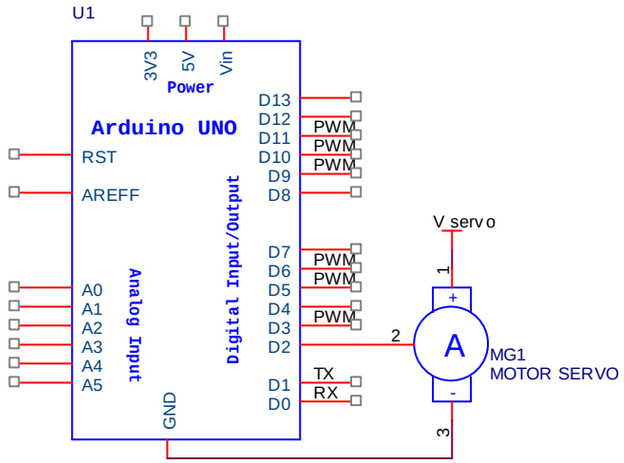



```
#include <mega8535.h>
#include <delay.h>
#define ADC_VREF_TYPE 0x60
#define IN1 PORTD.0
#define IN2 PORTD.1
#define SW_START PINC.0
#define SW_STOP PINC.1
#define SW_FORWARD PINC.2
#define SW_BACKWARD PINC.3

unsigned char speed;
unsigned char read_adc(unsigned char adc_input)
```

```
{
ADMUX=adc_input | (ADC_VREF_TYPE & 0xff);
delay_us(10);
ADCSRA|=0x40;
while ((ADCSRA & 0x10)==0);
ADCSRA|=0x10;
return ADCH;
}


void main(void)
{
PORTA=0x00;
DDRA=0x00;
PORTB=0x00;
DDRB=0x00;
PORTC=0xFF;
DDRC=0x00;
PORTD=0x00;
DDRD=0b00100011;
TCCR1A=0x81;
TCCR1B=0x02;
ADMUX=ADC_VREF_TYPE & 0xff;
ADCSRA=0x84;
SFIOR&=0xEF;
while (1)
      {
      if (SW_START==0){
        IN1=1;
        IN2=0;}
      else if (SW_STOP==0){
        IN1=0;
        IN2=0;}
      else if (SW_FORWARD==0){
        IN1=1;
        IN2=0;}
      else if (SW_BACKWARD==0){
        IN1=0;
        IN2=1;}

      speed= read_adc(0);
      OCR1A = speed;
      }
}
```

58. Mengontrol posisi motor servo (A)

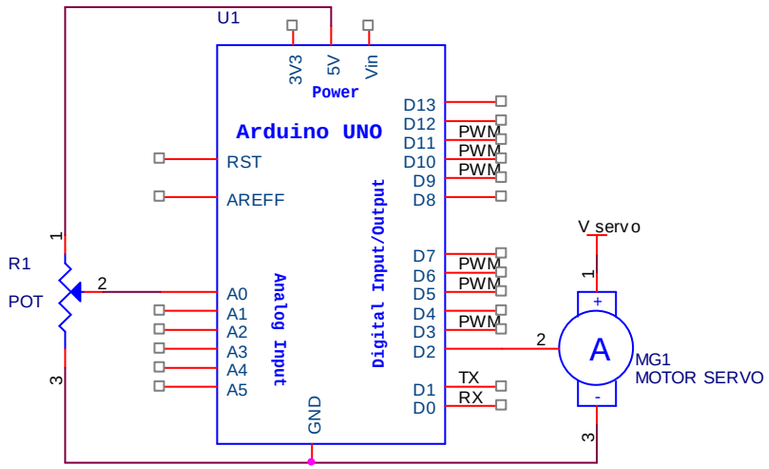





```
#include <Servo.h>
Servo servo1; //nama object motor servo:servo1
unsigned int sudut;
String inString="";
void setup() {
 servo1.attach(2);  //pin 2 terhubung ke servo1
  Serial.begin(9600);
```

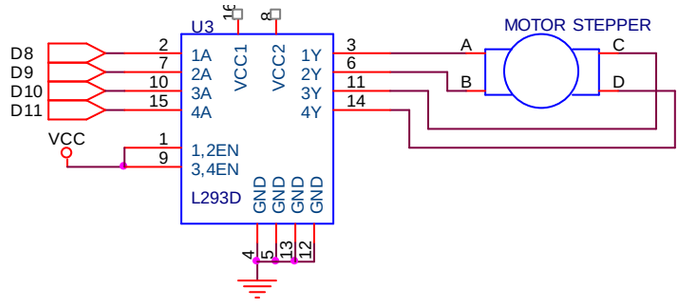
```
}
void loop(){
  while(Serial.available()>0) {
  int inChar = Serial.read();
  if (isDigit(inChar)) {
      inString += (char)inChar;
    }
    if (inChar == '\n') {
      sudut=inString.toInt();
      servo1.write(sudut);
      delay(15);
      inString = "";
      }
  }
}
```

59. Mengontrol kecepatan motor servo (A)




```
#include <Servo.h>
Servo servo1;
int val;
void setup() {
  servo1.attach(2);  }
void loop() {
  val = analogRead(0);
  val = map(val, 0, 1023, 0, 179);
  servo1.write(val);
  delay(15);
}
```

60. Motor stepper half step (A)



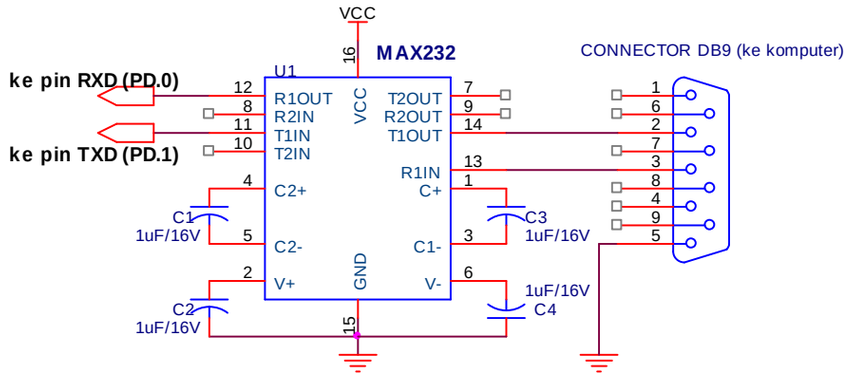

```
void setup(){
  pinMode(8,OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(11, OUTPUT);
}
void loop(){
  digitalWrite(8,1);
  digitalWrite(9,0);
  digitalWrite(10,0);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,1);
  digitalWrite(9,1);
  digitalWrite(10,0);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,1);
  digitalWrite(10,0);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,1);
  digitalWrite(10,1);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,0);
  digitalWrite(10,1);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
```

```
  digitalWrite(9,0);
  digitalWrite(10,1);
  digitalWrite(11,1);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,0);
  digitalWrite(10,0);
  digitalWrite(11,1);
  delay(50);
  digitalWrite(8,1);
  digitalWrite(9,0);
  digitalWrite(10,0);
  digitalWrite(11,1);
  delay(50);
}
```

61. Motor stepper full step (A)

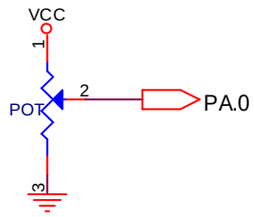
```
void setup(){
  pinMode(8,OUTPUT);
  pinMode(9, OUTPUT);
  pinMode(10, OUTPUT);
  pinMode(11, OUTPUT);
}
void loop(){
  digitalWrite(8,1);
  digitalWrite(9,0);
  digitalWrite(10,0);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,1);
  digitalWrite(10,0);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,0);
  digitalWrite(10,1);
  digitalWrite(11,0);
  delay(50);
  digitalWrite(8,0);
  digitalWrite(9,0);
  digitalWrite(10,0);
  digitalWrite(11,1);
  delay(50);
}
```

62. Mengirim data ke serial/usb computer dengan BASCOM-AVR (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
$baud = 9600
Print "test Serial"
Print "Communication OK"
End
```

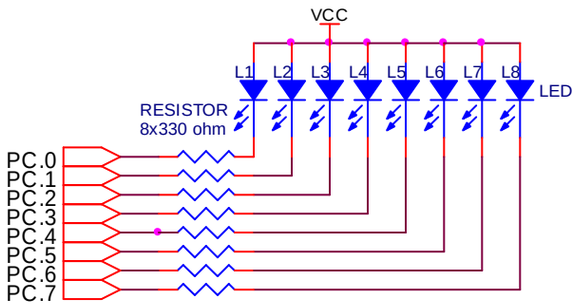
63. Mengirim data ADC ke serial/usb computer dengan CodeVision AVR (C)




```
#include <mega8535.h>
#include <stdio.h>
#include <delay.h>
#define ADC_VREF_TYPE 0x40
unsigned int read_adc(unsigned char adc_input)
{
ADMUX=adc_input|ADC_VREF_TYPE;
ADCSRA|=0x40;
while ((ADCSRA & 0x10)==0);
```

```
ADCSRA|=0x10;
return ADCW;
}

unsigned int adc;
void main(void)
{
UCSRA=0x00;
UCSRB=0x08;
UCSRC=0x86;
UBRRH=0x00;
UBRRL=0x33;
ADMUX=ADC_VREF_TYPE;
ADCSRA=0x87;
SFIOR&=0xEF;
while (1)
      {
       adc=read_adc(0);
       printf("ADC=%d\n\r",adc);
       delay_ms(1000);
      }
}
```

64. Mengontrol LED via PC (B)

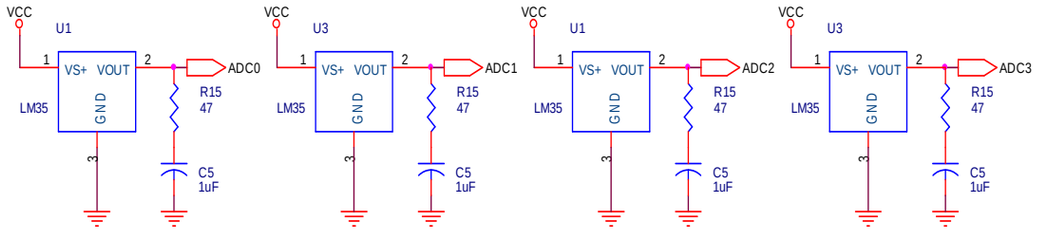



```
$regfile = "m32def.dat"
$crystal = 16000000
$baud = 19200
Dim Tombol As Byte
Config Portc = Output
Portc = &HFF
Print "Tekan sembarang tombol keyboard !"
Do
  Tombol = Waitkey()
  If Tombol > 47 And Tombol < 57 Then
   Print "LED " ; Chr(tombol) ; " ON"
  End If
  Select Case Tombol
   Case "1" : Portc = &B11111110
   Case "2" : Portc = &B11111101
   Case "3" : Portc = &B11111011
   Case "4" : Portc = &B11110111
   Case "5" : Portc = &B11101111
   Case "6" : Portc = &B11011111
   Case "7" : Portc = &B10111111
   Case "8" : Portc = &B01111111
   Case Else : Portc = &HFF
  End Select
Loop
End
```

65. Menyimpan data ke EEPROM (B)

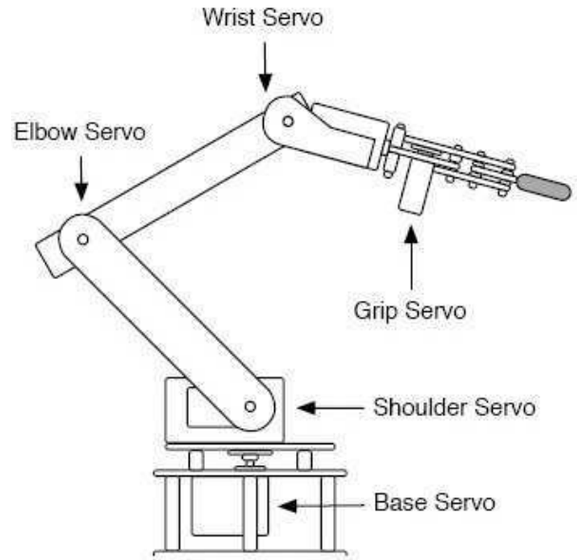
```
$regfile = "m32def.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
'-------menyimpan data eeprom-----
Dim Data_eeprom As Byte
Data_eeprom = &H20
Writeeeprom Data_eeprom , 0
Data_eeprom = &H02
Writeeeprom Data_eeprom , 1
'-------membaca data eeprom-------
Readeeprom Data_eeprom , 0
Lcd "data 1:" ; Data_eeprom
Readeeprom Data_eeprom , 1
Locate 2 , 1
Lcd "data 2:" ; Data_eeprom
End
```

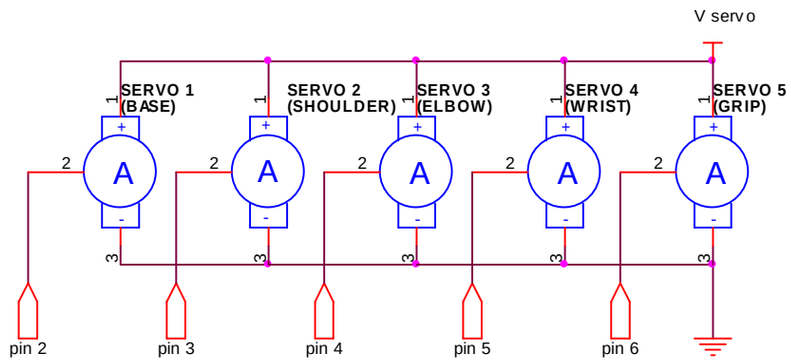
66. Monitoring 4 titik temperature dikirim ke PC (B)




```
$regfile = "m16def.dat"
$crystal = 16000000
$baud = 9600

Config Adc = Single , Prescaler = Auto , Reference = Avcc
Dim W As Word , Volt As Word , Temp As Word
Dim Ch As Byte
Start Adc

Do
For Ch = 0 To 3
 W = Getadc(ch)
 Volt = W * 5
 Temp = Volt / 10
 Print "T" ; Ch ; "=" ; Temp ; Chr(&Ha7) ;
 If Ch < 3 Then
     Print "C ";
 Else
     Print "C"
 End If
 Wait 1
Next
Loop
End
```

67. Kontrol robot lengan via PC (A)

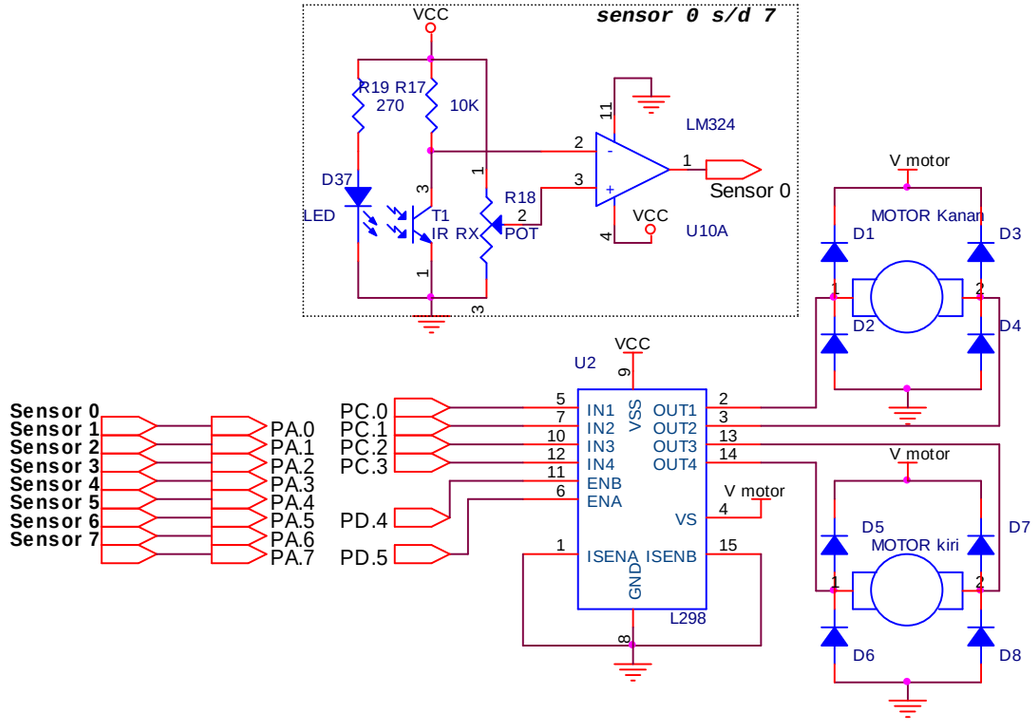





```
#include <Servo.h>
Servo servo1;
Servo servo2;
Servo servo3;
Servo servo4;
Servo servo5;
unsigned int sudut;
String inString="",temStr;
char str;
unsigned int nomor,l,i;
```

```
void setup(){
  Serial.begin(9600);
  servo1.attach(2);//pin 2=servo1
  servo2.attach(3);//pin 3=servo2
  servo3.attach(4);//pin 4=servo3
  servo4.attach(5);//pin 5=servo4
  servo5.attach(6);//pin 6=servo5
  servo1.write(90);
  servo2.write(90);
  servo3.write(90);
  servo4.write(90);
  servo5.write(90);
  Serial.println("ROBOT ARM CONTROLLER");
 }
void loop(){
 if(Serial.available()>0)
   {
      str = Serial.read();
      if(str!='\n')
        {
          inString += (char)str;
        }
      else if (str == '\n')
        {
         temStr=inString.substring(0,1);
         nomor=temStr.toInt();
         temStr=inString.substring(2);
         sudut=temStr.toInt();
         Serial.print(nomor);
         Serial.print(" : ");
         Serial.println(sudut);
         switch(nomor){
            case 1:servo1.write(sudut); break;
            case 2:servo2.write(sudut); break;
            case 3:servo3.write(sudut); break;
            case 4:servo4.write(sudut); break;
            case 5:servo5.write(sudut); break;
         }
         inString = "";
        }
   }
}
```

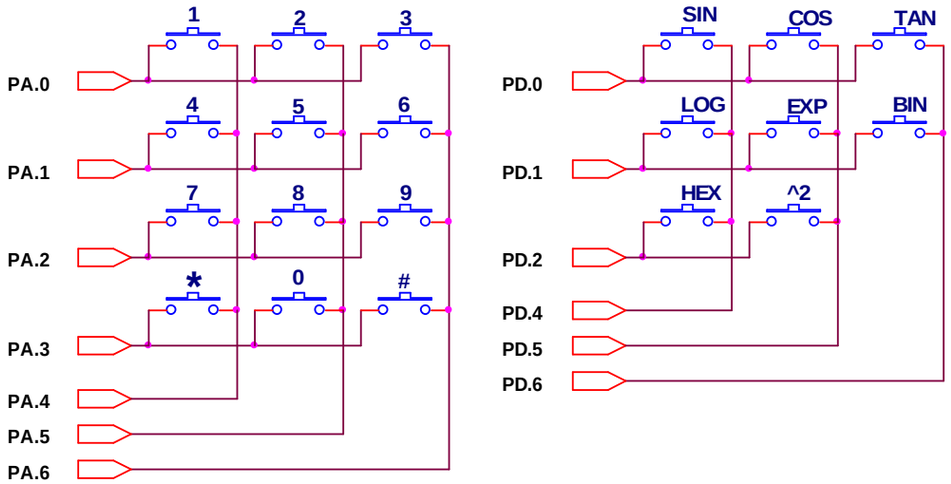
68. Line Follower Robot (C)




```
#include <mega16.h>
#include <delay.h>
#ifdef debug
#include <stdio.h>
#endif

#define FWD 0xAA
#define REV 0x55
#define R 0x22
#define L 0x88
#define CW 0x99
#define CCW 0x66
#define STOP 0x00
#define B 0xFF
#define RSPEED OCR1AL
#define LSPEED OCR1BL
#define SPEED0 255
#define SPEED1 0
```

```
#define SPEED2 0
#define SPEED3 0
#define MAX 7
#define HMAX 3

void move(unsigned char dir,unsigned char delay,unsigned char
power);
unsigned                                                    char
i,rdev,ldev,ip,delay,dir,power,dirl,history[MAX],hcount=0,rotpow;

#ifdef debug
unsigned char rep=0,prev=0;
#endif

void main(void){

PORTC=0x00;
DDRC=0xFF;

PORTD=0x00;
DDRD=0x30;

TCCR1A=0xA1;
TCCR1B=0x0A;
OCR1AH=0x00;
OCR1AL=0xFF;
OCR1BH=0x00;
OCR1BL=0xFF;

#ifdef debug
UCSRA=0x00;
UCSRB=0x18;
UCSRC=0x86;
UBRRH=0x00;
UBRRL=0x07;
#endif
TIMSK=0x00;
ACSR=0x80;
SFIOR=0x00;
while (1){
#ifdef debug
if(rep<255)
rep++;
if(prev!=PINA) {
prev=PINA;
printf("%u\r",rep);
for(i=0;i<8;i++)
printf("%u\t",(prev>>i)&0x01);
rep=0;
}
#endif

if(PINA!=255){
        rotpow=255;
        ldev=rdev=0;
        if(PINA.3==0)  rdev=1;
        if(PINA.2==0)  rdev=2;
        if(PINA.1==0)  rdev=3;
        if(PINA.0==0)  rdev=4;
        if(PINA.4==0)  ldev=1;
        if(PINA.5==0)  ldev=2;
        if(PINA.6==0)  ldev=3;
        if(PINA.7==0)  ldev=4;
        if(rdev>ldev)  move(R,0,195+12*rdev);
        if(rdev<ldev)  move(L,0,195+12*ldev);
        if(rdev==ldev) move(FWD,0,200);
        }

else    {
        for(i=0,dirl=0;i<MAX;i++) {
        if(history[i]==L)
        {dirl++;}
        }
         if(rotpow<160) {rotpow=160;}
         if(rotpow<255) {rotpow++;}
        if(dirl>HMAX)
        {move(CW,0,rotpow);}
        else
        {move(CCW,0,rotpow);}
        }
};
}

void  move  (unsigned  char  dir,unsigned  char  delay,unsigned  char
power) {
PORTC=dir;
if(dir==L || dir==R) {
        hcount=(hcount+1)%MAX;
        history[hcount]=dir;
        }
LSPEED=RSPEED=255;//power;
}
```

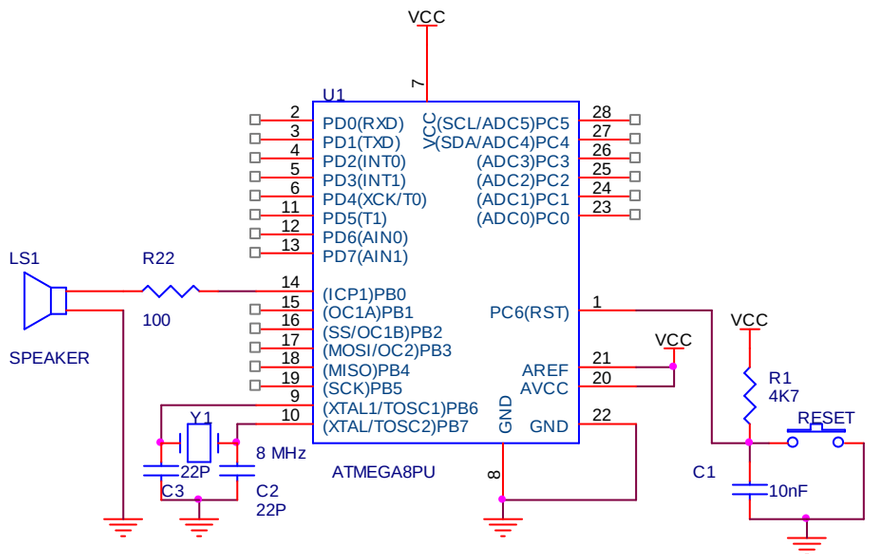
69. Scientific Calculator (B)




```
$regfile = "m16def.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd " Scientific"
Lowerline
Lcd " Calculator"
Wait 2
Cls
Dim Nilai As Single , U As Byte , Angka As Byte , Hasil As Single
Dim S As String * 16 , W As Word
Ddra = &B11110000
Porta = &B11111111
Ddrd = &B11110000
Portd = &B11111111
W = 45
S = Bin(w)
Lcd S
Do
   Porta = &B11101111
   If Pina.0 = 0 Then
      Angka = 1
      gosub entri
      Waitms 250
   Elseif Pina.1 = 0 Then
      Angka = 4
      gosub entri
      Waitms 250
   Elseif Pina.2 = 0 Then
      Angka = 7
      gosub entri
      Waitms 250
   Elseif Pina.3 = 0 Then
   End If
      Porta = &B11011111
   If Pina.0 = 0 Then
      Angka = 2
      gosub entri
      Waitms 250
   Elseif Pina.1 = 0 Then
      Angka = 5
      gosub entri
      Waitms 250
   Elseif Pina.2 = 0 Then
      Angka = 8
      gosub entri
      Waitms 250
   Elseif Pina.3 = 0 Then
      Angka = 0
      gosub entri
      Waitms 250
   End If
   Porta = &B10111111
   If Pina.0 = 0 Then
       Angka = 3
       gosub entri
      Waitms 250
   Elseif Pina.1 = 0 Then
      Angka = 6
      gosub entri
      Waitms 250
   Elseif Pina.2 = 0 Then
      Angka = 9
      gosub entri
      Waitms 250
   Elseif Pina.3 = 0 Then

   End If
   Portd = &B11101111
```

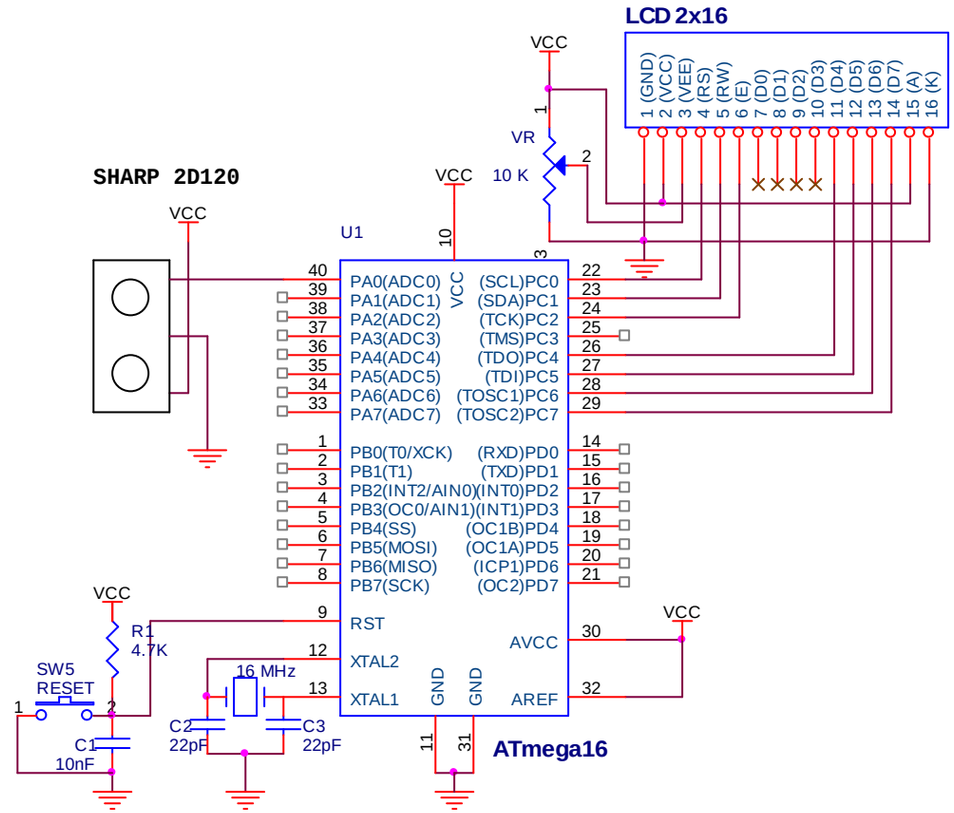
```
If Pind.0 = 0 Then
   Hasil = Sin(nilai)
   Cls
   Lcd Hasil
   Waitms 250
   U = 0
Elseif Pind.1 = 0 Then
   Hasil = Log(nilai)
   Cls
   Lcd Hasil
   Waitms 250
   U = 0
Elseif Pind.2 = 0 Then
   S = Hex(nilai)
   Cls
   Lcd S
   Waitms 250
   U = 0
End If
Portd = &B11011111
If Pind.0 = 0 Then
   Hasil = Cos(nilai)
   Cls
   Lcd Hasil
   Waitms 250
   U = 0
Elseif Pind.1 = 0 Then
   Hasil = Exp(nilai)
   Cls
   Lcd Hasil
   Waitms 250
   U = 0
Elseif Pind.2 = 0 Then
   Hasil = Nilai * Nilai
   Cls
   Lcd Hasil
   Waitms 250
   U = 0
End If
Portd = &B10111111
If Pind.0 = 0 Then
   Hasil = Tan(nilai)
   Cls
   Lcd Hasil
   Waitms 250
   U = 0
   Elseif Pind.1 = 0 Then
      S = Bin(nilai)
      Cls
      Lcd S
      Waitms 250
      U = 0
   End If
Loop
End
Entri:
   Incr U
   Select Case U
   Case 1 : Nilai = Angka
            Cls
            Lcd Angka
   Case Else : Nilai = Nilai * 10
            Nilai = Nilai + Angka
            Lcd Angka
   End Select
Return
```

70. Digital Melody Player dengan ATmega8 (B)



```
$regfile = "m8def.dat"
$crystal = 8000000
Config Portb.0 = Output
Speaker Alias Portb.0
Do
'Europe :: Final Countdown
Sound Speaker , 124 , 675
Sound Speaker , 110 , 758
Sound Speaker , 248 , 675
Waitms 125
Sound Speaker , 165 , 1011
Waitms 250
Waitms 125
Sound Speaker , 131 , 637
Sound Speaker , 124 , 675
Sound Speaker , 131 , 637
Waitms 125
Sound Speaker , 124 , 675
Waitms 125
Sound Speaker , 220 , 758
Waitms 125
Waitms 250
Sound Speaker , 131 , 637
Sound Speaker , 124 , 675
Sound Speaker , 262 , 637
Waitms 125
Sound Speaker , 165 , 1011
Waitms 250
Waitms 125
Sound Speaker , 110 , 758
Sound Speaker , 98 , 850
Sound Speaker , 110 , 758
Waitms 125
Sound Speaker , 98 , 850
Waitms 125
Sound Speaker , 92 , 901
Waitms 125
Sound Speaker , 110 , 758
Waitms 125
Sound Speaker , 196 , 850
Wait 2
Loop
```

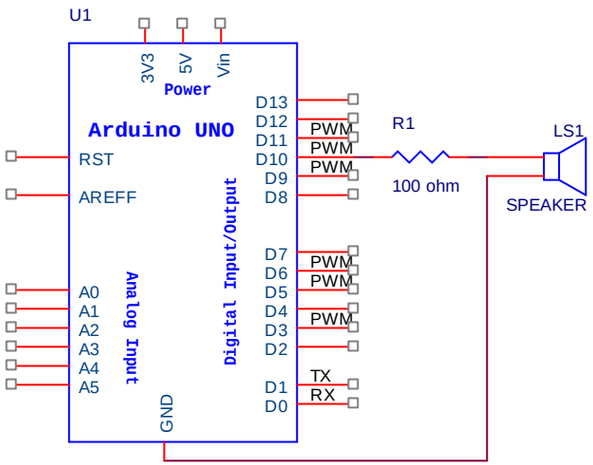
71. Pengukur jarak dengan sensor sharp GP2D120 (C)




```
#include <mega16.h>
#include <math.h>
#asm
   .equ __lcd_port=0x15 ;PORTC
#endasm
#include <lcd.h>
#include <delay.h>
#include <stdio.h>

#define ADC_VREF_TYPE 0x40
unsigned int jarak,volt;
char buff[16];
unsigned int read_adc(unsigned char adc_input){
ADMUX=adc_input|ADC_VREF_TYPE;
ADCSRA|=0x40;
```

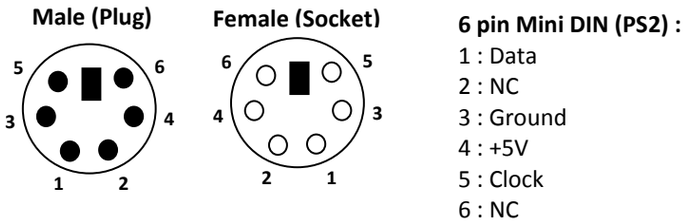
```
while ((ADCSRA & 0x10)==0);
ADCSRA|=0x10;
return ADCW;
}

void main(void){
ADMUX=ADC_VREF_TYPE;
ADCSRA=0x87;
lcd_init(16);
lcd_clear();
lcd_putsf("Sensor GP2D120");
lcd_gotoxy(0,1);
lcd_putsf("Jarak=");
while (1)   {
      volt=read_adc(0);
      jarak = (1611/volt)-3;
      sprintf(buff,"%d cm ",jarak);
      lcd_gotoxy(6,1);
      lcd_puts(buff);
      delay_ms(1000);
      };
}
```

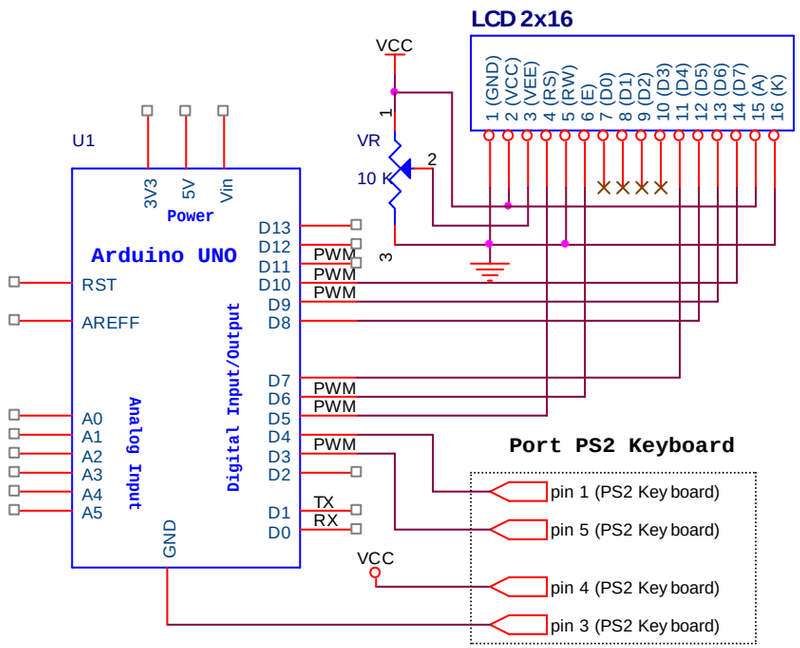
72. Membuat tone 3x dengan Arduino (A)




```
int i;
void setup(){
 for(i=0;i<3;i++){
  tone(10, 440);
  delay(2000);
  noTone(10);
  delay(1000);
  }
}
void loop(){
}
```

73. Membaca Keyboard PC dengan Arduino (A)






```
#include <PS2Keyboard.h>
```

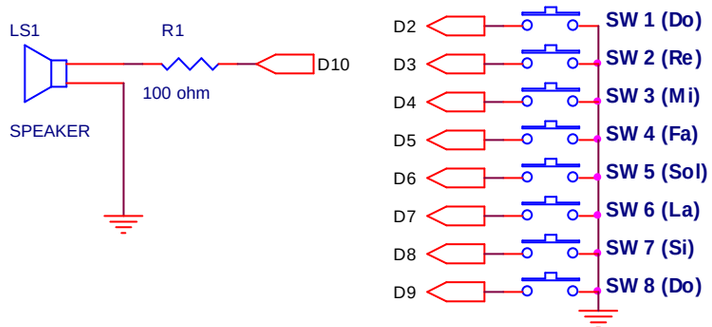
```
#include <LiquidCrystal.h>
LiquidCrystal lcd(5, 6, 7, 8, 9, 10);
#define DATA_PIN 4
PS2Keyboard keyboard;
void setup(){
  keyboard.begin(DATA_PIN);
  lcd.begin(16, 2);
  lcd.print("TES KEYBOARD");
  delay(1000);
}

void loop(){
  if(keyboard.available()) {
    byte data = keyboard.read();
    if(data == PS2_KC_BREAK) {
      lcd.clear();
      lcd.print("[BREAK]");
    } else if(data == PS2_KC_ENTER) {
      lcd.clear();
      lcd.print("[ENTER]");
    } else if(data == PS2_KC_ESC) {
      lcd.clear();
      lcd.print("[ESC]");
    } else if(data == PS2_KC_KPLUS) {
      lcd.clear();
      lcd.print("+");
    } else if(data == PS2_KC_KMINUS) {
      lcd.clear();
      lcd.print("-");
    } else if(data == PS2_KC_KMULTI) {
      lcd.clear();
      lcd.print("*");
    } else if(data == PS2_KC_NUM) {
      lcd.clear();
      lcd.print("[NUM LOCK]");
    } else if(data == PS2_KC_BKSP) {
      lcd.clear();
      lcd.print("[BACK SPACE]");;
    } else {
      lcd.clear();
      lcd.print(data);
    }
  }
}
```


74. Membaca Keyboard PC dengan ATmega16 (BASCOM-AVR) (B)


```
$regfile = "8535def.dat"
$crystal = 16000000

Config Keyboard = Pind.2 , Data = Pind.4 , Keydata = Keydata

Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "PS2 Keyboard"
Lowerline

Dim B As Byte , I As Byte
Do
Do
   B = Getatkbd()
Loop Until B <> 0
Incr I
If I = 17 Then
   Lowerline
   Lcd "                "
   Lowerline
End If

Lcd Chr(b)

Loop
End

Kbdinput:
$asm
push r16
push r25
push r26
push r27
Kbdinput1:
rCall _getatkbd
tst r24
```

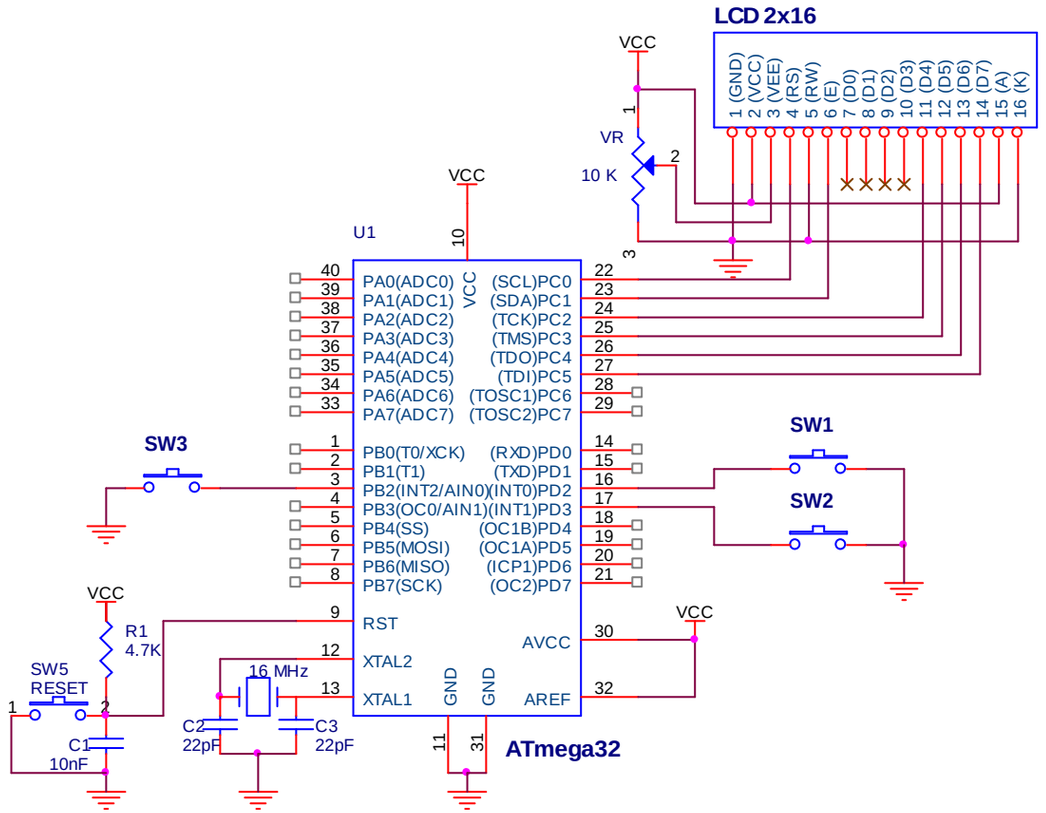
```
breq Kbdinput1
pop r27
pop r26
pop r25
pop r16
$end Asm
Return
Keydata:
'normal keys lower case
Data 0,0,0,0,0,200,0,0,0,0,0,0, 0 , 0 , &H5E , 0
Data 0,0,0,0,0,113,49,0,0,0,122 , 115 , 97 , 119 , 50 , 0
Data 0,99,120,100,101,52,51,0,0,32,118,102,116,114,53,0
Data 0,110,98,104,103,121,54,7,8,44,109,106,117,55,56,0
Data 0,44,107,105,111,48,57,0,0,46,45,108,48,112,43,0
Data 0,0,0,0,0,92,0,0, 0 , 0 , 13 , 0 , 0 , 92 , 0 , 0
Data 0,60,0,0, 0 , 0 , 8 , 0 , 0 , 49 , 0 , 52 , 55 , 0 , 0 , 0
Data 48,44,50,53,54,56,0,0,0 , 43 , 51 , 45 , 42 , 57 , 0 , 0
'shifted keys UPPER case
Data 0,0,0,0 , 0 , 0 , 0 , 0 , 0 , 0 , 0 , 0 , 0 , 0 , 0 , 0
Data 0,0,0,0,0  81 , 33 , 0 , 0 , 0 , 90 , 83 , 65 , 87 , 34 , 0
Data 0,67,88,68,69,0,35 , 0 , 0 , 32 , 86 , 70 , 84 , 82 , 37 , 0
Data 0,78,66,72,71,89,38,0,0,76,77 , 74 , 85 , 47 , 40 , 0
Data 0,59,75,73,79,61,41,0,0,58,95,76, 48 , 80 , 63 , 0
Data 0,0,0,0,0,96,0 , 0 , 0 , 0 , 13 , 94 , 0 , 42 , 0 , 0
Data 0,62,0,0,0,8,0,0,49,0,52,55,0,0,0 , 0
Data 48,44,50,53,54,56,0,0,0,43,51 , 45 , 42 , 57 , 0 , 0
```

75. Membuat piano dengan tombol (Arduino) (A)




```
void setup(){
  pinMode(2,INPUT);
  pinMode(3,INPUT);
  pinMode(4,INPUT);
  pinMode(5,INPUT);
  pinMode(6,INPUT);
  pinMode(7,INPUT);
  pinMode(8,INPUT);
  pinMode(9,INPUT);
  digitalWrite(2,HIGH);
  digitalWrite(3,HIGH);
  digitalWrite(4,HIGH);
  digitalWrite(5,HIGH);
  digitalWrite(6,HIGH);
  digitalWrite(7,HIGH);
  digitalWrite(8,HIGH);
  digitalWrite(9,HIGH);
}
void loop(){
  if(digitalRead(2)==LOW)
    {tone(10,264); //Do
    }
  else if(digitalRead(3)==LOW)
    {tone(10,297);   //Re
    }
  else if(digitalRead(4)==LOW)
    {tone(10,330);  //Mi
    }
  else if(digitalRead(5)==LOW)
    {tone(10,352);  //Fa
    }
   else if(digitalRead(6)==LOW)
    {tone(10,396);  //Sol
    }
   else if(digitalRead(7)==LOW)
    {tone(10,440);  /La
    }
   else if(digitalRead(8)==LOW)
    {tone(10,495);  //Si
    }
   else if(digitalRead(9)==LOW)
    {tone(10,528);  //Do
    }
   else
   {
     noTone(10);
   }
}
```

76. Interupsi Eksternal (ATmega) (B)




```
$regfile = "m8535.dat"
$crystal = 11059200
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Config Int0 = Low Level
Config Int1 = Low Level
Config Int2 = Falling
On Int0 Int_ekst_0
On Int1 Int_ekst_1
On Int2 Int_ekst_2
Enable Interrupts
Enable Int0
Enable Int1
Enable Int2

Portd.2 = 1
Portd.3 = 1
Portb.2 = 1
Lcd "Sistem Interupsi"
Do
Loop
End

Int_ekst_0:
   Cls
   Lcd "Int Ext0 Request"
   Lowerline
   Lcd "Please Wait....."
   Wait 3
Return

Int_ekst_1:
   Cls
   Lcd "Int Ext1 Request"
   Lowerline
   Lcd "Please Wait....."
   Wait 3
Return

Int_ekst_2:
   Cls
   Lcd "Int Ext2 Request"
   Lowerline
   Lcd "Please Wait....."
   Wait 3
Return
```

77. Interupsi Timer 1 pada ATmega8535 (C)

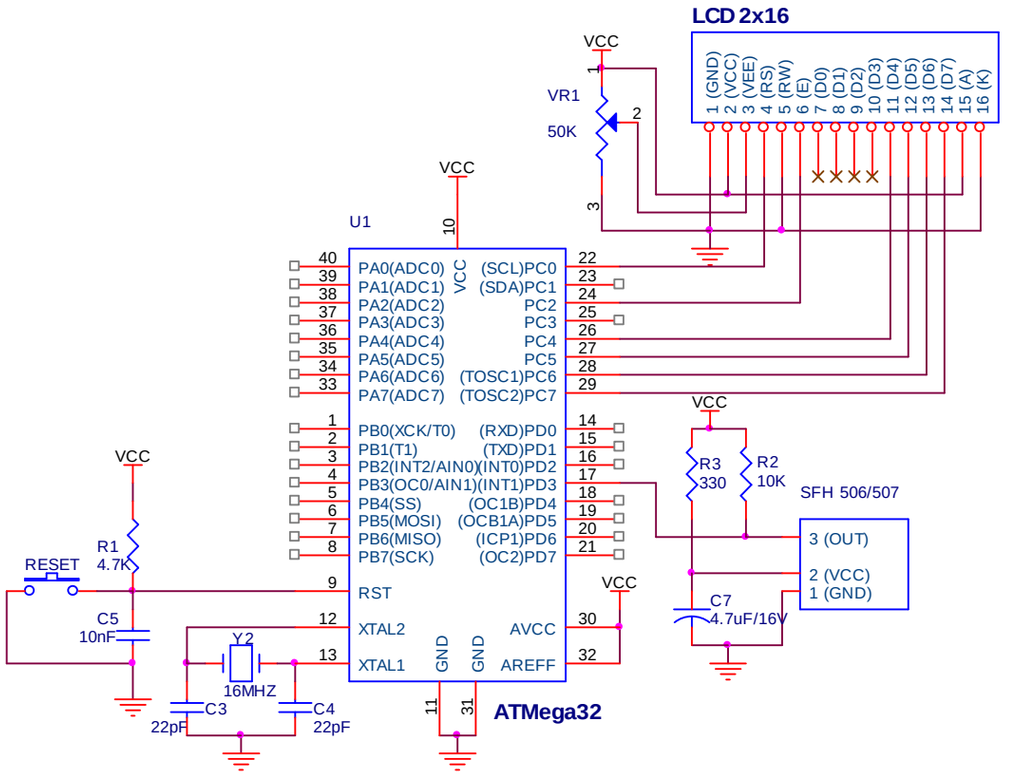
```
#include <mega8535.h>#asm
   .equ __lcd_port=0x15 ;PORTC
#endasm
#include <lcd.h>
#include <stdio.h>
char buff[16];
unsigned int i;
interrupt [TIM1_OVF] void timer1_ovf_isr(void)
```

```
{
 TCCR1B=0;
 TCNT1H=0xB;
 TCNT1L=0xDB;
 i++;
 sprintf(buff,"%d",i);
 lcd_gotoxy(8,1);
 lcd_puts(buff);
 TCCR1B=0x04;
}

void main(void)
{
TIMSK=0x04;
lcd_init(16);
#asm("sei")
lcd_clear();
lcd_putsf("Int Timer 1");
lcd_gotoxy(0,1);
lcd_putsf("Jml Int=");
TCNT1H=0xB;
TCNT1L=0xDB;
TCCR1B=0x04;
while (1)
      {
      };
}
```

78. Membaca remote control sony (B)

Data remote sony Trinitron RM-687C

Tombol	Data	Tombol	Data	Tombol	Data	Tombol	Data
5	132	2-	141	MUTE	148	5	132
6	133	SLEEP	182	STANDBY	149	6	133
7	134	SELECT	252	DISPLAY	186	7	134
8	135	NORMAL	150	1	128	8	135
9	136	+	244	2	129	9	136
0	137	-	245	3	130	0	137
1-	140	VOL +	146	4	131	1-	140

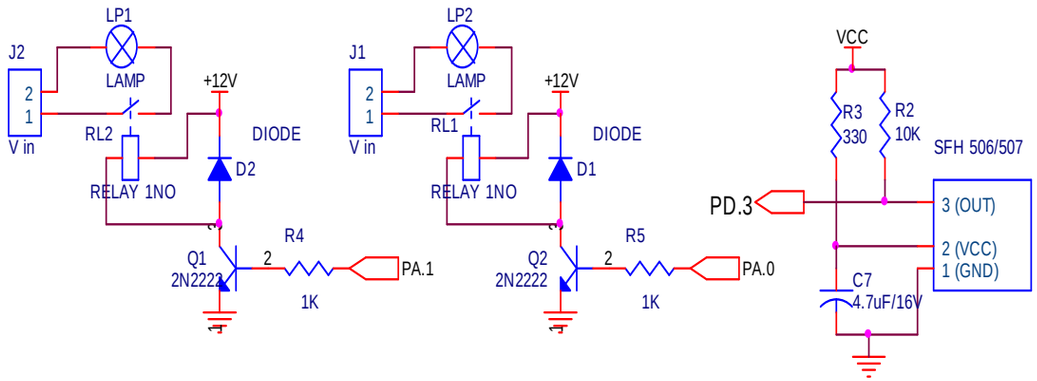



```
$regfile = "m32def.dat"
$crystal = 16000000
Config Timer0 = Timer , Prescale = 256
Stop Timer0

Config Pind.3 = Input
Set Portd.3
Pin_ir Alias Pind.3
Config Int1 = Falling
On Int1 Isr_int1
Dim Data_ir As Word
Dim Cnt_ir As Byte
Dim Flag_ir_start As Bit
Dim Flag_ir_ok As Bit
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
```

```
Cursor Off
Cls
Lcd "  SONY REMOTE"
Lowerline
Lcd "    DECODER"
Enable Interrupts
Enable Int1
Wait 1
Cls
Do
 If Flag_ir_ok = 1 Then
    Reset Flag_ir_ok
    Disable Int1
    Reset Flag_ir_ok
    Select Case Data_ir
     Case 148 : Cls
      Lcd "MUTE"
     Case 149 : Cls
      Lcd "STANDBY"
     Case 186 : Cls
      Lcd "DISPLAY"
     Case 128 : Cls
      Lcd "1"
     Case 129 : Cls
      Lcd "2"
     Case 130 : Cls
      Lcd "3"
     Case 131 : Cls
      Lcd "4"
     Case 132 : Cls
      Lcd "5"
     Case 133 : Cls
      Lcd "6"
     Case 134 : Cls
      Lcd "7"
     Case 135 : Cls
      Lcd "8"
     Case 136 : Cls
      Lcd "9"
     Case 137 : Cls
      Lcd "0"
     Case 140 : Cls
      Lcd "1-"
     Case 141 : Cls
      Lcd "2-"
     Case 182 : Cls
      Lcd "SLEEP"
     Case 252 : Cls
      Lcd "SELECT"
     Case 150 : Cls
      Lcd "NORMAL"
     Case 244 : Cls
      Lcd "+"
     Case 245 : Cls
      Lcd "-"
     Case 146 : Cls
      Lcd "VOL+"
     Case 147 : Cls
      Lcd "VOLT-"
     Case 144 : Cls
      Lcd "PROGR+"
     Case 145 : Cls
      Lcd "PROGR-"
     Case 165 : Cls
      Lcd "TV/VIDEO"
     End Select

    Enable Int1
 End If
 Wait 1
Loop

Isr_int1:
 Timer0 = 0
 Start Timer0
 Bitwait Pin_ir , Set
 Stop Timer0

 If Cnt_ir = 0 Then
   If Timer0 > 152 And Timer0 < 159 Then
     Set Flag_ir_start
     Incr Cnt_ir
   End If
 End If

 If Flag_ir_start = 1 And Cnt_ir > 0 Then
   Decr Cnt_ir
   If Timer0 < 45 Then
      Data_ir.cnt_ir = 0
   Else
      Data_ir.cnt_ir = 1
   End If
```

```
   Cnt_ir = Cnt_ir + 2
   If Cnt_ir > 11 Then
      Shift Data_ir , Right , 1
      Reset Flag_ir_start
      Set Flag_ir_ok
      Cnt_ir = 0
   End If
 End If
Return
```

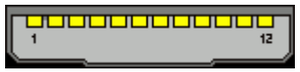
79. Mengontrol lampu dengan remote control (B)




```
$regfile = "m32def.dat"
$crystal = 16000000

Ddra = &B11111111
Porta = 0

Config Timer0 = Timer , Prescale = 256
Stop Timer0

Config Pind.3 = Input
Set Portd.3
Pin_ir Alias Pind.3

Config Int1 = Falling
On Int1 Isr_int1

Dim Data_ir As Word
Dim Cnt_ir As Byte
Dim Flag_ir_start As Bit
Dim Flag_ir_ok As Bit

Enable Interrupts
Enable Int1
Wait 1

Do
 If Flag_ir_ok = 1 Then
    Reset Flag_ir_ok
    Disable Int1
    Reset Flag_ir_ok

    Select Case Data_ir
     Case 128 : Porta.0 = 1    'lampu 1 ON
     Case 129 : Porta.1 = 1    'lampu 2 ON
     Case 130 : Porta.0 = 0    'lampu 1 OFF
     Case 131 : Porta.1 = 0    'lampu 2 OFF
    End Select

    Enable Int1
 End If
 Wait 1
Loop

Isr_int1:
 Timer0 = 0
 Start Timer0
 Bitwait Pin_ir , Set
 Stop Timer0

 If Cnt_ir = 0 Then
   If Timer0 > 152 And Timer0 < 159 Then
     Set Flag_ir_start
     Incr Cnt_ir
   End If
 End If

 If Flag_ir_start = 1 And Cnt_ir > 0 Then
   Decr Cnt_ir
   If Timer0 < 45 Then
      Data_ir.cnt_ir = 0
   Else
      Data_ir.cnt_ir = 1
   End If
```

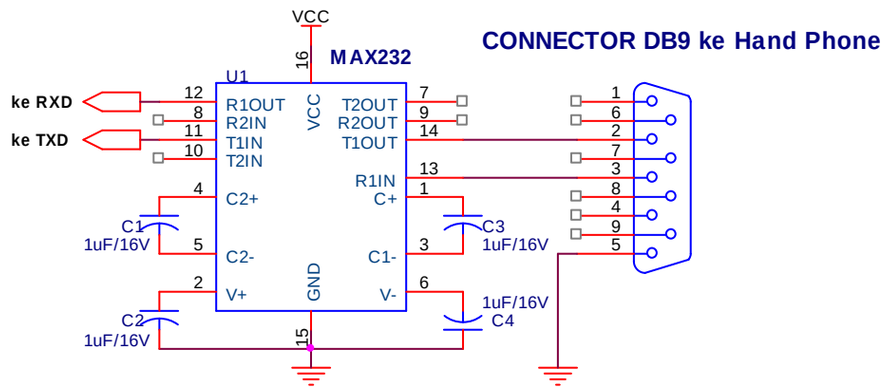
```
   Cnt_ir = Cnt_ir + 2
   If Cnt_ir > 11 Then
      Shift Data_ir , Right , 1
      Reset Flag_ir_start
      Set Flag_ir_ok
      Cnt_ir = 0
   End If
 End If
Return
```

80. SMS controller baca sms masuk (B)



Pin Data Siemens M35, C35, S45, S35

Pin	Name	Dir	Description
1	GND	-	Ground
2	SELF-SERVICE	in/out	Recognition/control battery charger
3	LOAD	in	Charging voltage
4	BATTERY	out	Battery (S25 only)
5	DATA OUT (TX)	out	Data sent
6	DATA IN (RX)	in	Data received
7	Z_CLK	-	Clock line for accessory bus. Use as DCD In data operation
8	Z_DATA	-	Data line for accessory bus. Use as CTS in data operation
9	MICG	-	Ground for microphone
10	MIC	in	Microphone input
11	AUD	out	Loudspeaker
12	AUDG	-	Ground for external speak



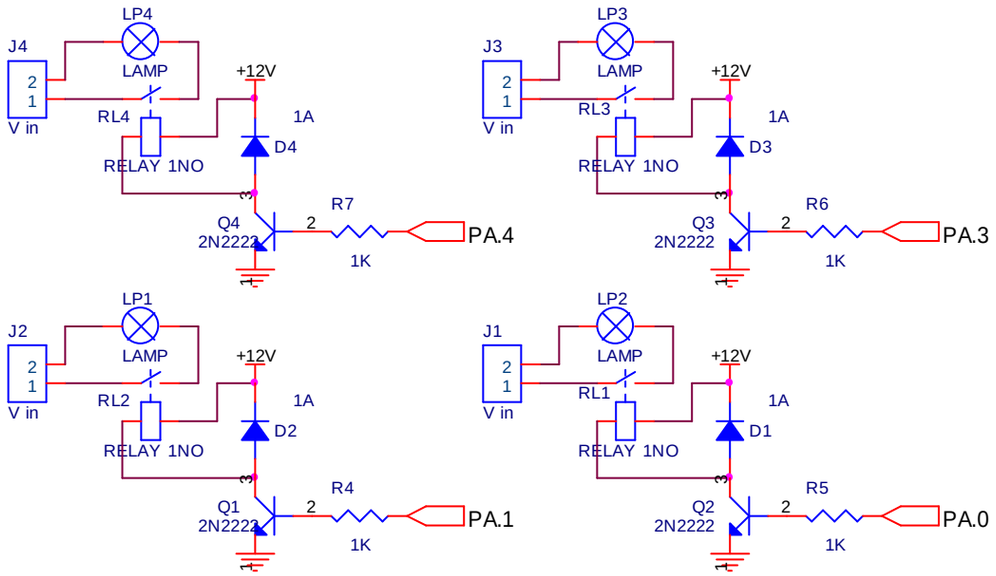

```
$regfile = "m32def.dat"
$crystal = 16000000
$baud = 19200

Declare Sub Getline(s As String)
Declare Sub Flushbuf()
Declare Sub Showsms(s As String )

Dim B As Byte , I As Byte
Dim Sret As String * 66 , Stemp As String * 6 , Isi_sms As String *
2

Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Test Connection"
Print "ATE0"
Getline Sret
Print "AT"
Getline Sret
Locate 2 , 1
Lcd Sret
Print "AT+CMGD=1"
Flushbuf
Print "AT+CSMS=1"
Getline Sret
Print "AT+CNMI=1,1,0,1,1"
Getline Sret
Wait 2
Cls
Lcd "Baca isi sms"

Do
   Getline Sret
   I = Instr(sret , ":")
   If I > 0 Then
      Stemp = Left(sret , I)
      Select Case Stemp
         Case "+CMTI:" : Showsms Sret
      End Select
      Locate 2 , 1
      Lcd "Isi sms:" ; Isi_sms
   End If
Loop
```

```
Sub Showsms(s As String )
    I = Instr(s , ",")
    I = I + 1
    Stemp = Mid(s , I)
    Print "AT+CMGR=" ; Stemp
    Getline S
    Getline S
    Isi_sms = Right(s , 2)
   Print "AT+CMGD=1"
   Flushbuf
   Waitms 200
End Sub

Sub Getline(s As String)
  S = ""
  Do
  B = Inkey()
  Select Case B
     Case 0
     Case 13
     Case 10 : If S <> "" Then Exit Do
     Case Else
     S = S + Chr(b)
  End Select
  Loop
End Sub

Sub Flushbuf()
  Waitms 100
  Do
    B = Inkey()
  Loop Until B = 0
End Sub
```

81. SMS controller kirim sms (B)

```
$regfile = "m32def.dat"
$crystal = 16000000
$baud = 19200

Declare Sub Getline(s As String)
Declare Sub Showsms(s As String)
Declare Sub Flushbuf()
Dim B As Byte
Dim Sret As String * 66

Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Test Connection"
Print "ATE0"
Getline Sret
Print "AT"
Getline Sret
Locate 2 , 1
Lcd Sret
Wait 2

Cls
Lcd "Kirim sms...."
Wait 1
Print "AT+CMGS=3"
Wait 1
Print "0681805500000001000C8180812047169800000034F670C" ; Chr(26)

Do
Loop

Sub Getline(s As String)
  S = ""
  Do
  B = Inkey()
  Select Case B
     Case 0
     Case 13
     Case 10 : If S <> "" Then Exit Do
     Case Else
     S = S + Chr(b)
  End Select
  Loop
End Sub
```

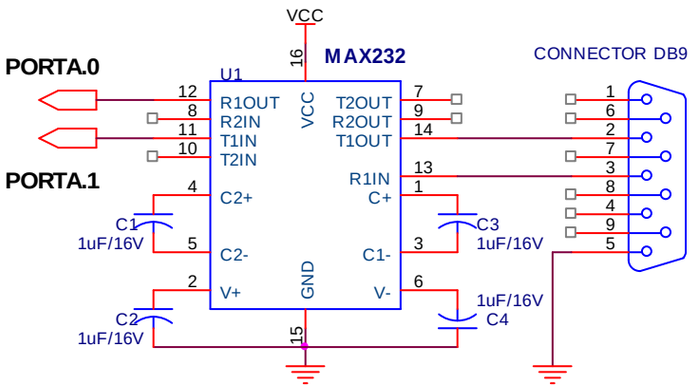
82. Mengontrol lampu dengan SMS control (B)




```
$regfile = "m32def.dat"
$crystal = 16000000
$baud = 19200

Ddra = &HFF
Porta = 0

Declare Sub Getline(s As String)
Declare Sub Flushbuf()
Declare Sub Showsms(s As String )

Dim B As Byte , I As Byte
Dim Sret As String * 66 , Stemp As String * 6 , Isi_sms As String *
8

Print "ATE0"
Getline Sret
Print "AT"
Getline Sret
Print "AT+CMGD=1"
Flushbuf
Print "AT+CSMS=1"
Getline Sret
Print "AT+CNMI=1,1,0,1,1"
Getline Sret
Wait 2

Do
   Getline Sret
   I = Instr(sret , ":")
   If I > 0 Then
      Stemp = Left(sret , I)
      Select Case Stemp
         Case "+CMTI:" : Showsms Sret
      End Select
   End If
Loop

Sub Showsms(s As String )
    I = Instr(s , ",")
    I = I + 1
    Stemp = Mid(s , I)
    Print "AT+CMGR=" ; Stemp
    Getline S
    Getline S
    Isi_sms = Right(s , 8)
    Select Case Isi_sms
       Case "30180C06" : Porta = &B0000
       Case "30186C06" : Porta = &B0001
       Case "30580C06" : Porta = &B0010
       Case "30592C06" : Porta = &B0011
       Case "B0180C06" : Porta = &B0100
       Case "B0182C06" : Porta = &B0101
       Case "B0580C06" : Porta = &B0110
       Case "B0582C06" : Porta = &B0111
       Case "31180C06" : Porta = &B1000
       Case "31182C06" : Porta = &B1001
       Case "31580C06" : Porta = &B1010
       Case "31582C06" : Porta = &B1011
       Case "B1180C06" : Porta = &B1100
       Case "B1180C06" : Porta = &B1101
       Case "B1580C06" : Porta = &B1110
       Case "B1582C06" : Porta = &B1111
   End Select
   Print "AT+CMGD=1"
   Flushbuf
   Waitms 200
```

```
End Sub
Sub Getline(s As String)
  S = ""
  Do
  B = Inkey()
  Select Case B
     Case 0
     Case 13
     Case 10 : If S <> "" Then Exit Do
     Case Else
     S = S + Chr(b)
  End Select
  Loop
End Sub

Sub Flushbuf()
  Waitms 100
  Do
    B = Inkey()
  Loop Until B = 0
End Sub
```

83. Membuat USART buatan (ATmega BASCOM) (B)




```
$regfile = "m32def.dat"
$crystal = 16000000
$baud = 19200

Waitms 100
Open "coma.1:19200,8,n,1" For Output As #1
Print #1 , "test serial1"
End
```

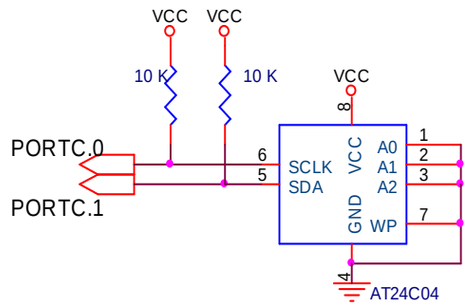
84. Menulis data ke EEPROM Internal ATmega16 (B)

```
$regfile = "m16def.dat"
$crystal = 11059200
Dim Data_eeprom As Byte
Data_eeprom = 75
Writeeeprom Data_eeprom , 1
Data_eeprom = 16
Writeeeprom Data_eeprom , 2
End
```

85. Membaca data di EEPROM Internal ATmega16 (B)

```
$regfile = "m16def.dat"
$crystal = 11059200
Config Lcdpin=Pin,Rs=PORTC.0,E=PORTC.2 , Db4 = PORTC.4
Config Lcdpin = Pin , Db5 = PORTC.5 , Db6 = PORTC.6, Db7 = PORTC.7
Config Lcd = 16 * 2
Cursor Off
Cls
Dim Data_eeprom as Byte
Data_eeprom = 75
Writeeeprom Data_eeprom , 1
Data_eeprom = 16
Writeeeprom Data_eeprom , 2
Readeeprom Data_eeprom , 1
Lcd "Addr 1=" ; Data_eeprom
Readeeprom Data_eeprom , 2
Lowerline
Lcd "Addr 2=" ; Data_eeprom
End
```

86. Menulis data ke EEPROM Eksternal AT24C04 (C)



```
#include <mega32.h>
#include <delay.h>
#asm
   .equ __i2c_port=0x15 ;PORTC
   .equ __sda_bit=1
   .equ __scl_bit=0
#endasm
#include <i2c.h>
#include <stdio.h>
#define EEPROM_BUS_ADDRESS 0xa0
#asm
   .equ __lcd_port=0x1B ;PORTA
#endasm
#include <lcd.h>

char data;
unsigned char buff[16];
void eeprom_write(unsigned int address, unsigned char data) {
i2c_start();
i2c_write(EEPROM_BUS_ADDRESS);
i2c_write(address);
i2c_write(data);
i2c_stop();
delay_ms(10);
}

void main(void){
i2c_init();
lcd_init(16);
lcd_clear();
lcd_putsf("Tulis EEPROM ext");
eeprom_write(2,25);
while (1);

}
```

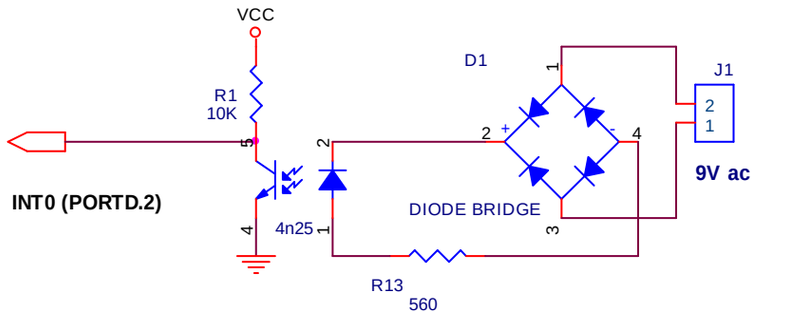
87. Membaca Data di EEPROM Eksternal AT24C04 (C)

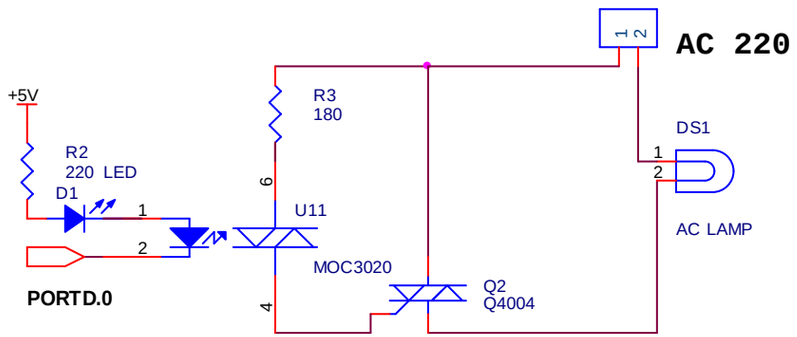
```
#include <mega32.h>
#include <delay.h>
#asm
   .equ __i2c_port=0x15 ;PORTC
   .equ __sda_bit=1
   .equ __scl_bit=0
#endasm
#include <i2c.h>
#include <stdio.h>
#define EEPROM_BUS_ADDRESS 0xa0
#asm
   .equ __lcd_port=0x1B ;PORTA
#endasm
#include <lcd.h>
char data;
unsigned char buff[16];
unsigned char eeprom_read(unsigned int address) {
unsigned char data;
i2c_start();
i2c_write(EEPROM_BUS_ADDRESS);
i2c_write(address);
i2c_start();
i2c_write(EEPROM_BUS_ADDRESS | 1);
data=i2c_read(0);
i2c_stop();
return data;
}

void main(void){
i2c_init();
lcd_init(16);
lcd_clear();
lcd_putsf("Baca EEPROM ext");
data=eeprom_read(0x2);
sprintf(buff,"data=%d",data);
lcd_gotoxy(0,1);
lcd_puts(buff);
while (1);
}
```

88. Dimer LED (B)

```
$regfile = "m32def.dat"
$crystal = 16000000
Config Adc = Single , Prescaler = Auto , Reference = Avcc    Config
Timer1 = Pwm , Pwm = 10 , Compare A Pwm = Clear Up , Prescale = 1
Dim W As Word
Start Adc
Do
   W = Getadc(0)
   Pwm1a = W
   Waitms 100
Loop
```

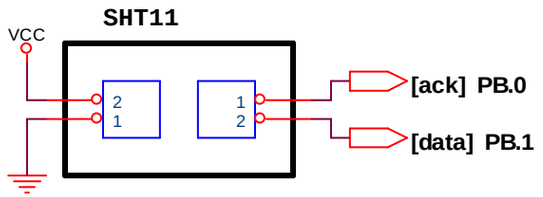
89. Dimmer lampu AC (B)






```
$regfile = "m32def.dat"
$crystal = 16000000
Dim J As Word , K As Integer , Sign As Bit , I As Byte
Config Int0 = Falling
On Int0 Int_ext0
Ddrd = &B1111011
Portd = &B1111111
Triac Alias Portd.0
Sign = 0
Triac = 1
Enable Interrupts
Enable Int0
Wait 1
Do
 J = J + 5
 If J >= 190 Then J = 0
Waitms 200
Loop
End

Int_ext0:
   K = 0
   If Sign = 0 Then
     Triac = 1
     Config Int0 = Rising
     Sign = 1
     Triac = 0
   Else
     Triac = 1
     Config Int0 = Falling
     Sign = 0
     For K = 0 To J
       Waitus 100
     Next K
     Triac = 0
   End If
Return
```

90. Membuat pengukur kelembaban dengan SHT11(B)

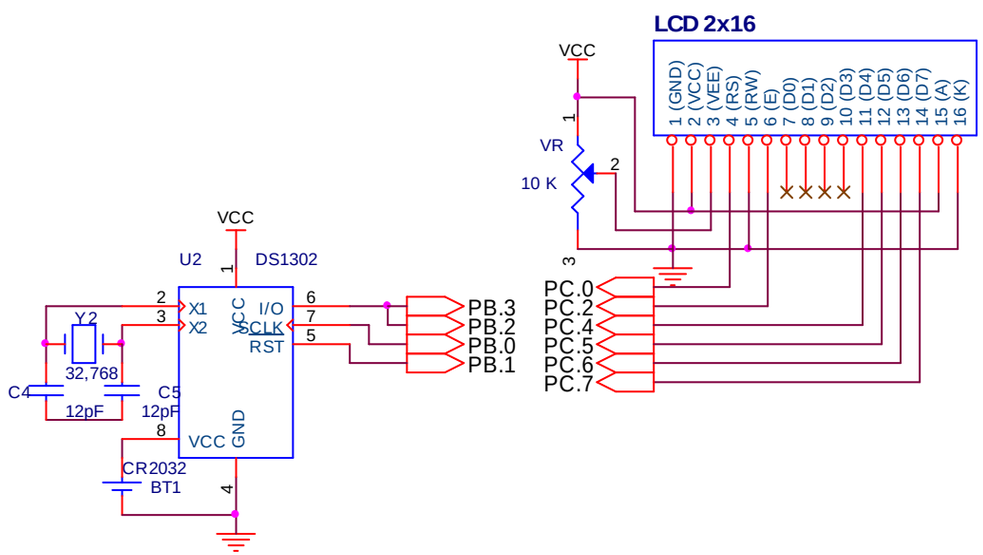



```
$regfile = "m8535.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
```

```
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "     SHT 11"
Lowerline
Lcd "Humidity Sensor"
Wait 3
Cls
Lcd "Temp="
Lowerline
Lcd "Humi="
Dim Ctr As Byte
Dim Dataword As Word
Dim Command As Byte
Dim Dis As String * 20
Dim Calc As Single
Dim Calc2 As Single
Dim Rhlinear As Single
Dim Rhlintemp As Single
Dim Tempc As Single
Dim Tempf As Single
Const C1 = -4
Const C2 = 0.0405
Const C3 = -0.0000028
Const T1c = .01
Const T2 = .00008
Const T1f = .018
Sck Alias Portb.0
Dataout Alias Portb.1
Datain Alias Pinb.1
Redled Alias Portb.2
Declare Sub Getit()
Ddrb = &B11111111
Config Pinb.0 = Output
Config Pinb.1 = Output
Set Dataout
For Ctr = 1 To 12
   Set Sck
   Waitus 2
   Reset Sck
   Waitus 2
Next Ctr
Do
   Command = &B00000011
   Call Getit
   Tempf = T1f * Dataword
   Tempf = Tempf - 40
   Tempc = T1c * Dataword
   Tempc = Tempc - 40
   Dis = Fusing(tempc , "###.##")
   Locate 1 , 6
   Lcd Dis ; " C "
   Command = &B00000101
   Call Getit
   Calc = C2 * Dataword
   Calc2 = Dataword * Dataword
   Calc2 = C3 * Calc2
   Calc = Calc + C1
   Rhlinear = Calc + Calc2
   Calc = T2 * Dataword
   Calc = Calc + T1c
   Calc2 = Tempc - 25
   Calc = Calc2 * Calc
   Rhlintemp = Calc + Rhlinear
   Dis = Fusing(rhlintemp , "##.##")
   Locate 2 , 6
   Lcd Dis
   Wait 1
Loop

Sub Getit()
   Local Datavalue As Word
   Local Databyte As Byte
   Set Sck
   Reset Dataout
   Reset Sck
   Set Sck
   Set Dataout
   Reset Sck
   Shiftout Dataout , Sck , Command , 1
   Ddrb = &B11111101
   Config Pinb.1 = Input
   Set Sck
   Reset Sck
   Waitus 10
   Bitwait Pinb.1 , Reset
   Shiftin Datain , Sck , Databyte , 1
   Datavalue = Databyte
   Ddrb = &B11111111
   Config Pinb.1 = Output
   Reset Dataout
   Set Sck
```

```
   Reset Sck
   Ddrb = &B11111101
   Config Pinb.1 = Input
   Shiftin Datain , Sck , Databyte , 1
   Shift Datavalue , Left , 8
   Datavalue = Datavalue Or Databyte
   Dataword = Datavalue
   Ddrb = &B11111111
   Config Pinb.1 = Output
   Reset Dataout
   Set Sck
   Reset Sck
   Ddrb = &B11111101
   Config Pinb.1 = Input
   Shiftin Datain , Sck , Databyte , 1
   Ddrb = &B11111111
   Config Pinb.1 = Output
   Set Dataout
   Set Sck
   Reset Sck
End Sub
End
```

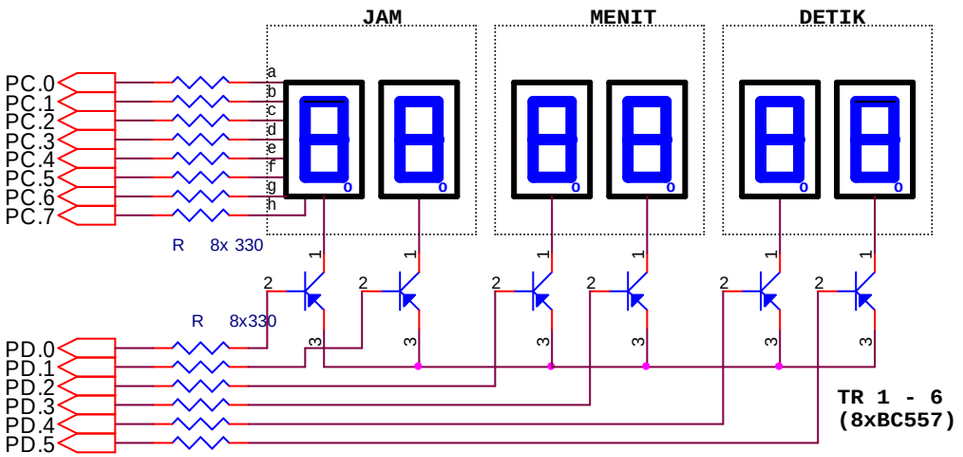
91. Jam Digital dengan RTC DS1302 Tampilan LCD (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Dim _hour As Byte
Dim _min As Byte , _sec As Byte
Dim Writecommand As Byte
Dim Writebyte As Byte
Dim Readcommand As Byte
Dim Readbyte As Byte , Angka As Byte , F_scn As Bit
Dim Kode As Byte , Nilai As Word , K As Byte
Dim Q As Word , R As Word , Hari As Byte
Dim Jam_real As Byte , Men_real As Byte , Det_real As Byte
Dim Tang As Byte , Bul As Byte , Tah As Byte

Serialin Alias Pinb.2
Serialclock Alias Portb.0
Serialout Alias Portb.3
Ds1302 Alias Portb.1
Portb = 0
Ddrb = &B00001011
Ddrc = &B11111111
Portc = &HFF
Ddrd = &B11111111
Portd = &HFF

Config Lcdpin = Pin , Db4 = Portc.4 , Db5 = Portc.5 , Db6 = Portc.6
, Db7 = Portc.7 , E = Portc.2 , Rs = Portc.0
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Date="
Lowerline
Lcd "Time="

Do
   Gosub Get_time
     Locate 1 , 6
     Lcd Tang ; "/" ; Bul ; "/20" ; Tah
     Locate 2 , 6
     Lcd _hour ; ":" ; _min ; ":" ; _sec ; " "
   Waitms 1200
Loop

Get_time:
   Readcommand = &H85
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
```

```
   _hour = Makedec(readbyte)
   Readcommand = &H83
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   _min = Makedec(readbyte)
   Readcommand = &H81
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   _sec = Makedec(readbyte)
   Readcommand = &H87
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Tang = Makedec(readbyte)
   Readcommand = &H89
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Bul = Makedec(readbyte)
   Readcommand = &H8D
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Tah = Makedec(readbyte)
   Readcommand = &H8B
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Hari = Makedec(readbyte)

Return
Set_time:

   Writecommand = &H8E
   Writebyte = Makebcd(00)
   Gosub Write_ds1302
   Writecommand = &H8A
   Writebyte = Makebcd(hari)
   Gosub Write_ds1302
   Writecommand = &H84
   Writebyte = Makebcd(jam_real)
   Gosub Write_ds1302
   Writecommand = &H82
   Writebyte = Makebcd(men_real)
   Gosub Write_ds1302
   Writecommand = &H80
   Writebyte = Makebcd(det_real)
   Gosub Write_ds1302
   Writecommand = &H86
   Writebyte = Makebcd(tang)
   Gosub Write_ds1302
   Writecommand = &H88
   Writebyte = Makebcd(bul)
   Gosub Write_ds1302
   Writecommand = &H8C
   Writebyte = Makebcd(tah)
   Gosub Write_ds1302
Return

Write_ds1302:
   Ddrb = &B00001011
   nop
   Reset Serialclock
   nop
   Reset Ds1302
   Waitus 5
   Set Ds1302
   Waitus 5
   Shiftout Serialout , Serialclock , Writecommand , 3
   Shiftout Serialout , Serialclock , Writebyte , 3
   Reset Serialclock
   Waitus 5
   Reset Ds1302
   Waitus 5
Return

Read_ds1302:
   Ddrb = &B00001011
   nop
   Reset Serialclock
   nop
   Reset Ds1302
   Waitus 5
   Set Ds1302
   Waitus 5
   Shiftout Serialout , Serialclock , Readcommand , 3
   Ddrb = &B00000011
   nop
   Shiftin Serialin , Serialclock , Readbyte , 2
   Reset Ds1302
   Waitus 5
Return
```

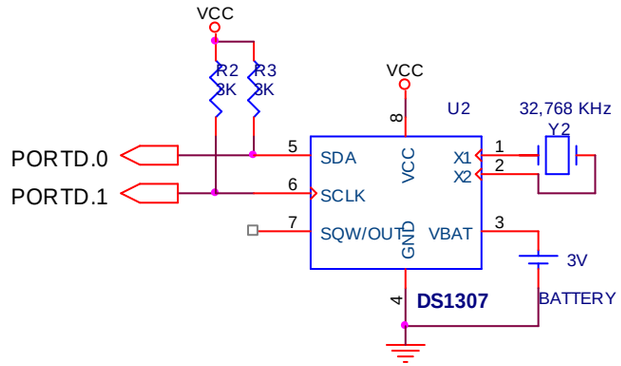
92. Jam Digital dengan RTC DS1302 Tampilan Seven Segment (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
Dim _min As Byte , _sec As Byte, _hour As Byte
Dim Writecommand As Byte, Writebyte As Byte, Readcommand As Byte
Dim Readbyte As Byte , Angka As Byte , F_scn As Bit
Dim Kode As Byte , Nilai As Word , K As Byte
Dim Q As Word , R As Word , Hari As Byte
Dim Jam_real As Byte , Men_real As Byte , Det_real As Byte
Dim Tang As Byte , Bul As Byte , Tah As Byte, I As Byte
Dim Men_pul As Byte , Men_sat As Byte , Det_pul As Byte , Det_sat As
Byte
Dim Jam_pul As Byte , Jam_sat As Byte

Serialin Alias Pinb.2
Serialclock Alias Portb.0
Serialout Alias Portb.3
Ds1302 Alias Portb.1
Portb = 0
Ddrb = &B00001011
Ddrc = &B11111111
Portc = &HFF
Ddrd = &B11111111
Portd = &HFF
Do
 Gosub Get_time
 Jam_pul = _hour / 10
 Jam_sat = _hour Mod 10
 Men_pul = _min / 10
 Men_sat = _min Mod 10
 Det_pul = _sec / 10
 Det_sat = _sec Mod 10

 For I = 0 To 33
      Portd = &HFE
      Portc = Lookup(jam_pul , Angka)
      Waitms 2
      Portd = &HFD
      Portc = Lookup(jam_sat , Angka)
      Waitms 2
      Portd = &HFB
      Portc = Lookup(men_pul , Angka)
      Waitms 2
      Portd = &HF7
      Portc = Lookup(men_sat , Angka)
      Waitms 2
      Portd = &HEF
      Portc = Lookup(det_pul , Angka)
      Waitms 2
      Portd = &HDF
      Portc = Lookup(det_sat , Angka)
      Waitms 2
 Next
Loop
End

Get_time:
   Readcommand = &H85
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   _hour = Makedec(readbyte)
   Readcommand = &H83
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   _min = Makedec(readbyte)
   Readcommand = &H81
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   _sec = Makedec(readbyte)
   Readcommand = &H87
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Tang = Makedec(readbyte)
```

```
   Readcommand = &H89
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Bul = Makedec(readbyte)
   Readcommand = &H8D
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Tah = Makedec(readbyte)
   Readcommand = &H8B
   Gosub Read_ds1302
   Rotate Readbyte , Left , 1
   Hari = Makedec(readbyte)
Return
Set_time:
   Writecommand = &H8E
   Writebyte = Makebcd(00)
   Gosub Write_ds1302
   Writecommand = &H8A
   Writebyte = Makebcd(hari)
   Gosub Write_ds1302
   Writecommand = &H84
   Writebyte = Makebcd(jam_real)
   Gosub Write_ds1302
   Writecommand = &H82
   Writebyte = Makebcd(men_real)
   Gosub Write_ds1302
   Writecommand = &H80
   Writebyte = Makebcd(det_real)
   Gosub Write_ds1302
   Writecommand = &H86
   Writebyte = Makebcd(tang)
   Gosub Write_ds1302
   Writecommand = &H88
   Writebyte = Makebcd(bul)
   Gosub Write_ds1302
   Writecommand = &H8C
   Writebyte = Makebcd(tah)
   Gosub Write_ds1302
Return
Write_ds1302:
   Ddrb = &B00001011
   nop
   Reset Serialclock
   nop
   Reset Ds1302
   Waitus 5
   Set Ds1302
   Waitus 5
   Shiftout Serialout , Serialclock , Writecommand , 3
   Shiftout Serialout , Serialclock , Writebyte , 3
   Reset Serialclock
   Waitus 5
   Reset Ds1302
   Waitus 5
Return
Read_ds1302:
   Ddrb = &B00001011
   nop
   Reset Serialclock
   nop
   Reset Ds1302
   Waitus 5
   Set Ds1302
   Waitus 5
   Shiftout Serialout , Serialclock , Readcommand , 3
   Ddrb = &B00000011
   nop
   Shiftin Serialin , Serialclock , Readbyte , 2
   Reset Ds1302
   Waitus 5
Return
Angka:
   Data &HC0,&HF9,&HA4,&HB0,&H99,&H92,&H82,&HF8,&H80,&H90
```

93. Jam Digital dengan RTC DS1307 Tampilan LCD (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
```

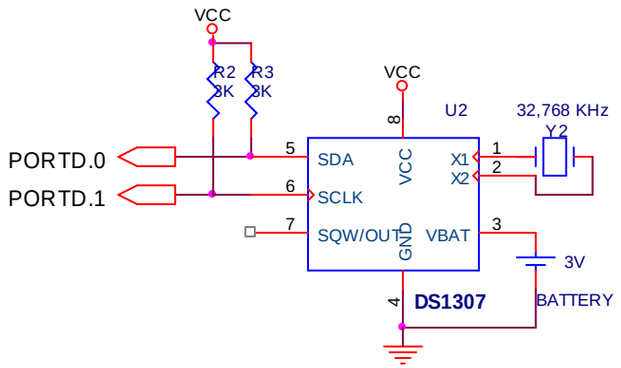
```
$lib "mcsbyte.lbx"
$lib "ds1307clock.lib"
Config Sda = Portd.0
Config Scl = Portd.1
Const Ds1307w = &HD0                                        '
Const Ds1307r = &HD1
Config Clock = User
Dim Weekday As Byte
Config  Lcdpin  =  Pin,Db4=Portc.4,Db5=Portc.5,Db6=Portc.6,Db7=Portc.7
, E = Portc.2 , Rs = Portc.0
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "  Jam Digital"
Lowerline
Lcd "  RTC DS1307"
Wait 3
Cls
Lcd "Date="
Lowerline
Lcd "Time="
Do
     Locate 1 , 6
     Lcd Date$
     Locate 2 , 6
     Lcd Time$
   Waitms 1000
Loop
Getdatetime:
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 0
  I2cstart
  I2cwbyte Ds1307r
  I2crbyte _sec , Ack
  I2crbyte _min , Ack
  I2crbyte _hour , Ack
  I2crbyte Weekday , Ack
  I2crbyte _day , Ack
  I2crbyte _month , Ack
  I2crbyte _year , Nack
  I2cstop
  _sec=Makedec(_sec):_min = Makedec(_min):_hour = Makedec(_hour)
  _day=Makedec(_day):_month=Makedec(_month):_year=Makedec(_year)
Return
Setdate:
  _day=Makebcd(_day):_month=Makebcd(_month):_year= akebcd(_year)
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 4 7
  I2cwbyte _day
  I2cwbyte _month
  I2cwbyte _year
  I2cstop
Return
Settime:
  _sec=Makebcd(_sec):_min=Makebcd(_min):_hour=Makebcd(_hour)
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 0
  I2cwbyte _sec
  I2cwbyte _min
  I2cwbyte _hour
  I2cstop
Return
```

94. Jam Digital RTC DS1302 Tampilan LCD dengan CodeVision (C)

```
#include <mega8535.h>
#include <delay.h>
#asm
   .equ __lcd_port=0x15 ;PORTC
#endasm
#include <lcd.h>
#include <stdio.h>
#asm
   .equ __ds1302_port=0x18 ;PORTB
   .equ __ds1302_io=2
   .equ __ds1302_sclk=0
   .equ __ds1302_rst=1
#endasm
#include <ds1302.h>
unsigned char h,m,s,d,t,y;
char buffer[16];

void main(void){
lcd_init(16);
rtc_init(1,2,2);
```

```
delay_ms(1500);
delay_ms(100);
lcd_clear();
lcd_putsf("Date=");
lcd_gotoxy(0,1);
lcd_putsf("Time=");
while(1) {
  rtc_get_date(&d,&t,&y);
  rtc_get_time(&h,&m,&s);
  sprintf( buffer,"%02d/%02d/%02d",d,t,y);
  lcd_gotoxy(5,0);
  lcd_puts(buffer);
  sprintf( buffer,"%02d:%02d:%02d",h,m,s);
  lcd_gotoxy(5,1);
  lcd_puts(buffer);
  delay_ms(900);
 }
}
```

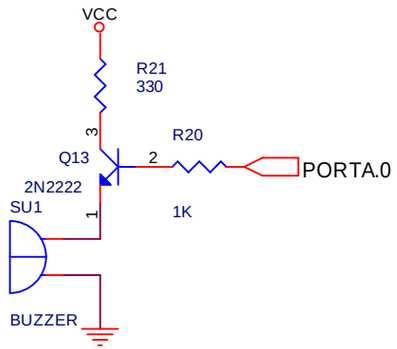
95. Jam Digital RTC DS1307 Tampilan LCD dengan CodeVision (C)

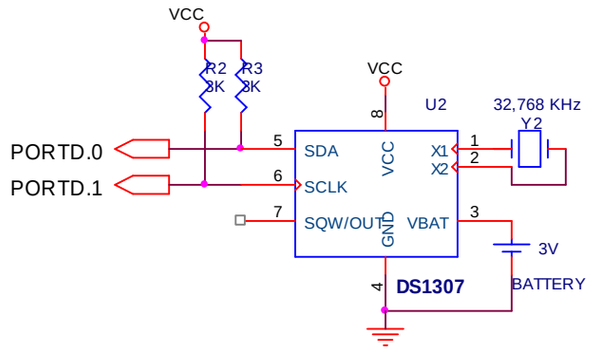



```
#include <mega8535.h>
#include <delay.h>
#include <stdio.h>
#asm
   .equ __i2c_port=0x12 ;PORTD
   .equ __sda_bit=0
   .equ __scl_bit=1
#endasm
#include <i2c.h>
```

```
#include <ds1307.h>
#asm
   .equ __lcd_port=0x15 ;PORTC
#endasm
#include <lcd.h>
unsigned char h,m,s,d,t,y;
char buffer[16];
void main(void){
i2c_init();
rtc_init(0,0,0);
delay_ms(100);
lcd_init(16);
lcd_clear();
lcd_putsf("Date=");
lcd_gotoxy(0,1);
lcd_putsf("Time=");
while (1)      {
      rtc_get_date(&d,&t,&y);
      rtc_get_time(&h,&m,&s);
      sprintf( buffer,"%02d/%02d/%02d",d,t,y);
      lcd_gotoxy(5,0);
      lcd_puts(buffer);
      sprintf( buffer,"%02d:%02d:%02d",h,m,s);
      lcd_gotoxy(5,1);
      lcd_puts(buffer);
      delay_ms(900);
      };
}
```

96. Membuat alarm otomatis berbasis waktu (B)

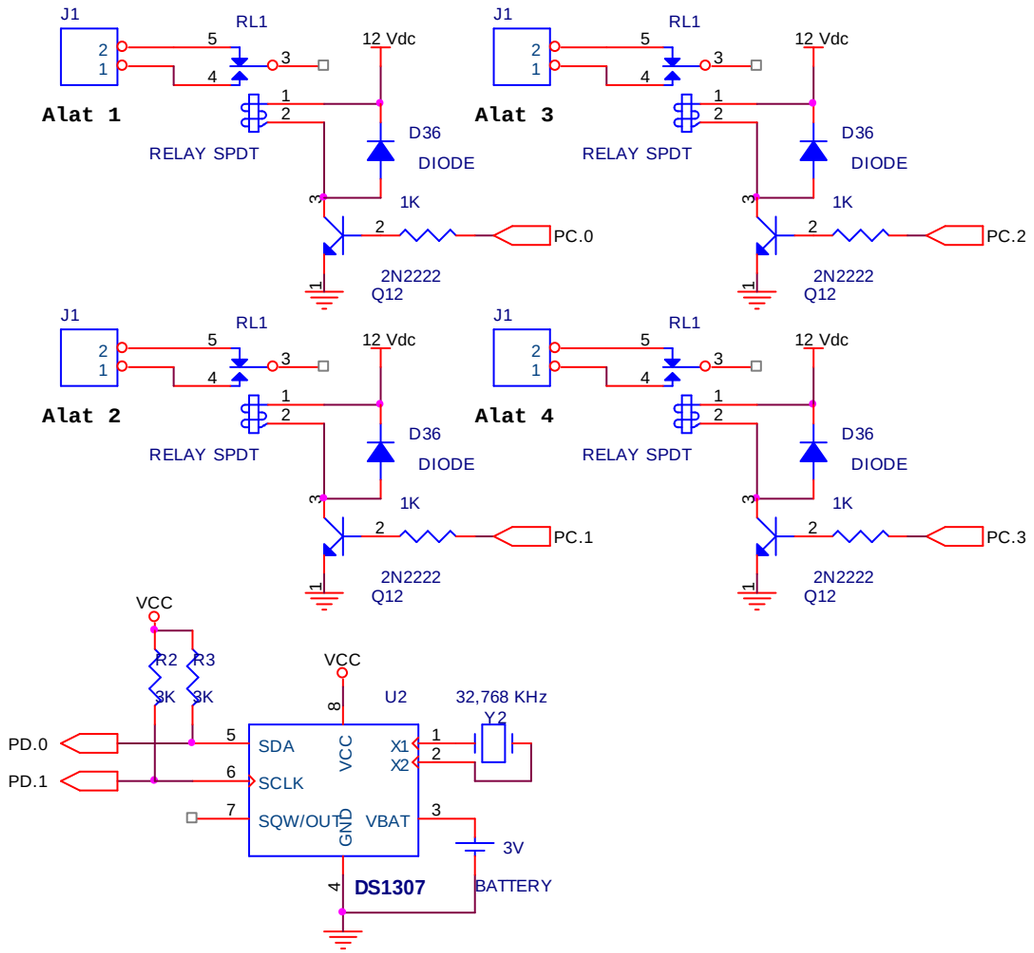





```
$regfile = "m16def.dat"
```

```
$crystal = 16000000
$lib "mcsbyte.lbx"
$lib "ds1307clock.lib"
Config Sda = Portd.0
Config Scl = Portd.1
Const Ds1307w = &HD0                                        '
Const Ds1307r = &HD1
Config Clock = User
Ddra.0 = 1
Porta.0 = 0
Dim Weekday As Byte
Dim Jam_alarm As Byte
Dim Menit_alarm As Byte
Config Lcdpin=Pin,Db4=Portc.4,Db5 = Portc.5 , Db6 = Portc.6 , Db7 =
Portc.7 , E = Portc.2 , Rs = Portc.0
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd " Alarm Otomatis"
Lowerline
Lcd " Berbasis Waktu"
Wait 3
Jam_alarm = 4
Menit_alarm = 15
Cls
Lcd "Jam="
Lowerline
Lcd "Alarm=" ; Jam_alarm ; ":" ; Menit_alarm

Do
     Locate 1 , 5
     Lcd Time$
     Gosub Getdatetime
     If Jam_alarm = _hour And Menit_alarm = _min Then
        Porta.0 = 1
     End If
   Waitms 1000
Loop

Getdatetime:
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 0
  I2cstart
  I2cwbyte Ds1307r
  I2crbyte _sec , Ack
  I2crbyte _min , Ack
  I2crbyte _hour , Ack
  I2crbyte Weekday , Ack
  I2crbyte _day , Ack
  I2crbyte _month , Ack
  I2crbyte _year , Nack
  I2cstop
  _sec=Makedec(_sec):_min = Makedec(_min):_hour = Makedec(_hour)
  _day=Makedec(_day):_month=Makedec(_month): year= Makedec(_year)
Return

Setdate:
  _day=Makebcd(_day):_month=Makebcd(_month):_year=Makebcd(_year)
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 4 7
  I2cwbyte _day
  I2cwbyte _month
  I2cwbyte _year
  I2cstop
Return

Settime:
  _sec=Makebcd(_sec):_min=Makebcd(_min):_hour=Makebcd(_hour)
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 0
  I2cwbyte _sec
  I2cwbyte _min
  I2cwbyte _hour
  I2cstop
Return
```

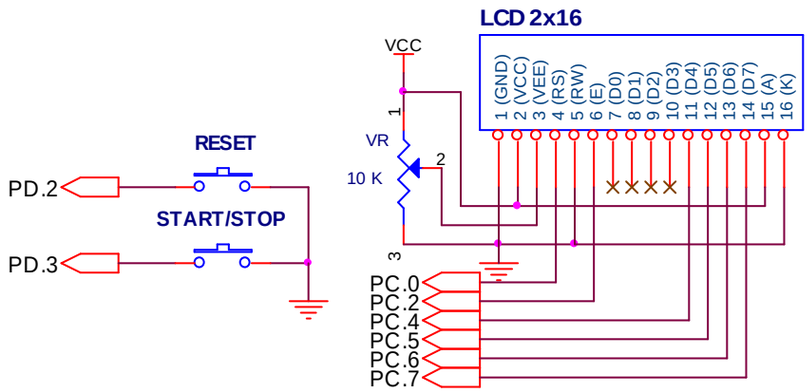
97. Kontrol Peralatan Listrik Berbasis waktu (B)




```
$regfile = "m8535.dat"
$crystal = 16000000
$lib "mcsbyte.lbx"
$lib "ds1307clock.lib"
Config Sda = Portd.0
Config Scl = Portd.1
Const Ds1307w = &HD0
Const Ds1307r = &HD1
Config Clock = User
'
Alat1 Alias Portc.0
Alat2 Alias Portc.1
Alat3 Alias Portc.2
Alat4 Alias Portc.3
Ddrc = &HFF
Portc = 0
Dim Weekday As Byte
Dim H1 As Byte , H2 As Byte , H3 As Byte , H4 As Byte
Dim M1 As Byte , M2 As Byte , M3 As Byte , M4 As Byte
H1 = 7
M1 = 0
H2 = 8
M2 = 15
H3 = 12
M3 = 35
H4 = 15
M4 = 25
Do
     Gosub Getdatetime
       If H1 = _hour And M1 = _min Then
        Alat1 = 1
     End If
          If H2 = _hour And M2 = _min Then
        Alat2 = 1
     End If
     If H3 = _hour And M3 = _min Then
        Alat3 = 1
     End If
     If H4 = _hour And M4 = _min Then
        Alat4 = 1
     End If
   Waitms 1000
Loop

Getdatetime:
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 0
  I2cstart
  I2cwbyte Ds1307r
  I2crbyte _sec , Ack
  I2crbyte _min , Ack
  I2crbyte _hour , Ack
  I2crbyte Weekday , Ack
  I2crbyte _day , Ack
  I2crbyte _month , Ack
```

```
  I2crbyte _year , Nack
  I2cstop
  _sec=Makedec(_sec):_min=Makedec(_min):_hour= Makedec(_hour)
  _day=Makedec(_day):_month=Makedec(_month):_year=Makedec(_year)
Return
Setdate:
  _day=Makebcd(_day):_month=Makebcd(_month):_year= Makebcd(_year)
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 4 7
  I2cwbyte _day
  I2cwbyte _month
  I2cwbyte _year
  I2cstop
Return
Settime:
  _sec=Makebcd(_sec):_min = Makebcd(_min):_hour=Makebcd(_hour)
  I2cstart
  I2cwbyte Ds1307w
  I2cwbyte 0
  I2cwbyte _sec
  I2cwbyte _min
  I2cwbyte _hour
  I2cstop
Return
```

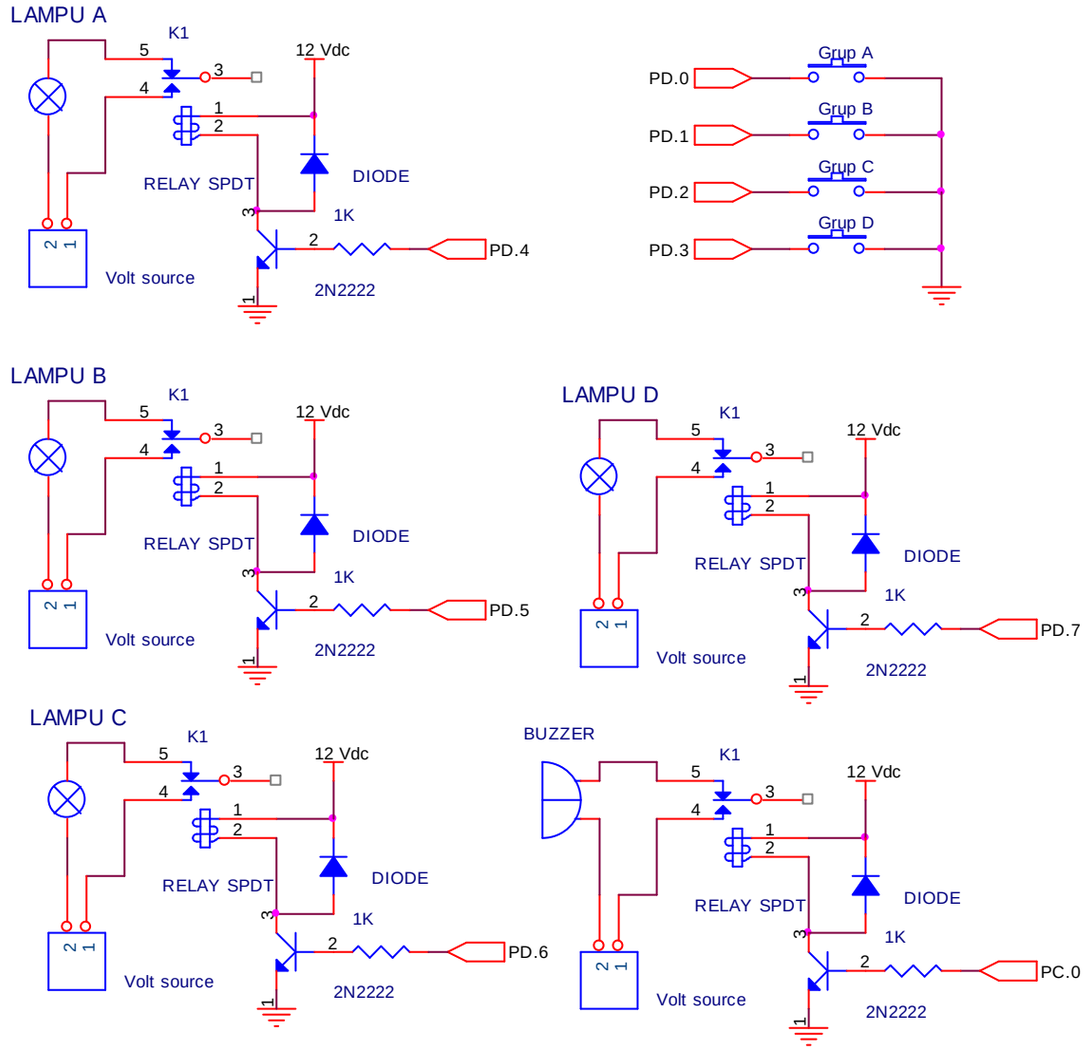
98. Stop Watch (B)




```
$regfile = "m16def.dat"
$crystal = 16000000
Config Lcdpin = Pin , Rs = Portc.0 , E = Portc.2 , Db4 = Portc.4
Config Lcdpin = Pin , Db5 = Portc.5 , Db6 = Portc.6 , Db7 = Portc.7
Config Lcd = 16 * 2
Cursor Off
Cls
Lcd "Stop Watch"
Dim Waktu As Word , Menit As Byte , Detik As Byte , Jam As Byte
Dim Ms As Byte , Kode As Bit
Ddrd.2 = 0
Portd.2 = 1
Ddrd.3 = 0
Portd.3 = 1

Config Int0 = Low Level
Config Int1 = Low Level
Config Timer1 = Timer , Prescale = 64

On Int0 Rst
On Int1 Ss
On Ovf1 Count
Enable Interrupts
Enable Int0
Enable Int1
Timer1 = 40535                                          '100 ms
Do

Loop
End
Rst:
  If Kode = 0 Then
  Ms = 0
  Detik = 0
  Menit = 0
  Jam = 0
  Locate 2 , 1
  Lcd Jam ; ":" ; Menit ; ":" ; Detik ; ":" ; Ms ; "  "
  Waitms 200
  End If

Return
Ss:
   Kode = Not Kode
   If Kode = 1 Then
      Enable Ovf1
      Start Timer1
   Else
      Disable Ovf1
```

```
      Stop Timer1
   End If
   Waitms 200
Return

Count:
   Stop Timer1
   Incr Ms
   If Ms >= 10 Then
      Incr Detik
      If Detik >= 60 Then
         Incr Menit
         Detik = 0
         If Menit >= 60 Then
            Incr Jam
            Menit = 0
         End If
      End If
      Ms = 0
   End If
   Locate 2 , 1
   Lcd Jam ; ":" ; Menit ; ":" ; Detik ; ":" ; Ms ; "  "
   Timer1 = 40535
   If Kode = 1 Then Start Timer1
Return
```

99. Tombol Tebak Tepat/Kuis (B)




```
$regfile = "m161def.dat"
$crystal = 16000000
Ddrd = &B11110000
Portd = &HFF
Ddrc.0 = 1
Portc.0 = 1
```

```
Buzer Alias Portc.0

Do
   While Pind.0 = 0
      Buzer = 1
      Portd.4 = 1
   Wend
   While Pind.1 = 0
      Buzer = 1
      Portd.5 = 1
   Wend
   While Pind.2 = 0
      Buzer = 1
      Portd.6 = 1
   Wend
   While Pind.3 = 0
      Buzer = 1
      Portd.7 = 1
   Wend
   Portd = &B00001111
   Buzer = 0

Loop
End
```