

LAMPIRAN

Listing Program



LISTING PROGRAM MIKROKONTROLER SLAVE

```

$regfile = "m16def.dat"
'deklarasi mikrokontroler yang digunakan adalah ATmega 16
$crystal = 16000000
'deklarasi cristal yang digunakan adalah 16Mhz
$hwstack = 40
$swstack = 16
$framesize = 32
'-----
'==== KONFIGURASI PORT ===-
'-----
Config Porta = Output
Config Portd.7 = Output
Config Portd.2 = Output
Config Portd.3 = Output
Config Portd.4 = Output
'-----
'==== DEKLARASI VARIABEL SUBRUTIN ===-
'-----
Declare Sub Tunggu_koma
Declare Sub Terima_serial
Declare Sub Command_suhu
Declare Sub Command_kelembaban
Declare Sub Command_co2
Declare Sub Command_ph
Declare Sub Hitung_ph

Config Com1 = 9600 , Synchron = 0 , Parity = None , Stopbits
= 1 , Databits = 8 , Clockpol = 0
'-----
'==== DEKLARASI VARIABEL ===-
'-----
Dim Buff_ser As Byte
Dim Suhu As Byte
Dim Kelembaban As Byte
Dim Co2 As Byte
Dim Ph As Single
Dim Persepuluh As Single , Perseratus As Single

'-----*
'==== MAIN PROGRAM ===-
'-----*
Do
  Call Command_suhu
  'memanggil sub rutin suhu

  Call Command_kelembaban
  'memanggil sub rutin kelembaban

  Call Command_co2
  'memanggil sub rutin co2

  Call Command_ph
  'memanggil sub rutin ph
  If Ph > 0 Then
    Portd.2 = 1
    Portd.3 = 0
    Portd.4 = 1

```

```

Else
    Portd.2 = 0
    Portd.3 = 0
    Portd.4 = 1
End If

Loop

'-----*
'==== SUBROUTIN =====
'-----*

'-----*
'==== SUBROUTIN KELEMBABAN =====
'-----*

Sub Command_kelembaban
Tunggu_k:
Call Terima_serial
'memanggil sub fungsi terima_serial
If Buff_ser = "K" Then
    Porta.5 = 1
    Porta.4 = 1
    'saat data pada variabel buff_ser adalah K maka port
    A.5(ultrasonic atomizer) dan A.6(kipas) akan aktif
Elseif Buff_ser = "R" Then
    Porta.5 = 0
    Porta.4 = 0
    'saat data pada variabel buff_ser adalah R maka port
    A.5(ultrasonic atomizer) dan A.6(kipas) akan tidak aktif
End If
End Sub

'-----*
'==== SUBROUTIN SUHU =====
'-----*

Sub Command_suhu
Tunggu_s:
Call Terima_serial
'memanggil sub fungsi terima_serial
If Buff_ser = "S" Then
    Porta.7 = 1
    Porta.3 = 1
    'saat data pada variabel buff_ser adalah S maka port
    A.7 (peltier) dan port A.3(pompa) akan aktif
Elseif Buff_ser = "T" Then
    Porta.7 = 0
    Porta.3 = 0
    'saat data pada variabel buff_ser adalah T maka port
    A.7 (peltier) dan port A.3(pompa) akan tidak aktif
End If
End Sub

'-----*
'==== SUBROUTIN CO2 =====
'-----*

Sub Command_co2
Tunggu_c:
Call Terima_serial
'memanggil sub fungsi terima_serial
If Buff_ser = "C" Then

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Porta.6 = 1
'saat data pada variabel buff_ser adalah C maka port
A.6 (Valve C02) akan aktif
Elseif Buff_ser = "0" Then
Portd.6 = 0
'saat data pada variabel buff_ser adalah 0 maka port
A.6 (Valve C02) akan tidak aktif
End If
End Sub
'-----
'==== SUBROUTIN PH ===-
'-----
Sub Command_ph
Call Terima_serial
If Buff_ser = "+" Then
Call Hitung_ph
'saat variabel buff_ser sama dengan + maka program
memanggil sub fungsi hitung_ph
Elseif Buff_ser = "-" Then
Call Hitung_ph
Ph = Ph * -1
'saat variabel buff_ser sama dengan - maka program akan
memanggil sub fungsi hitung_ph dengan nilai ph yang
dihasilkan dikalikan -1
End If
End Sub
'-----
'==== SUBROUTIN TERIMA SERIAL ===-
'-----
Sub Terima_serial:
sbis ucsra, rxc
'lompati jika bit I/O terpenuhi
rjmp terima_serial
'relative jump ke terima serial
Buff_ser = Udr
'memasukkan data pada regiater UDR pada variabel buff_ser
End Sub
'-----
'==== SUBROUTIN HITUNG PH ===-
'-----
Sub Hitung_ph
Call Terima_serial
'memanggil sub rutin terima_serial
Ph = Buff_ser - 48
'nilai ph adalah data pada buff_ser(desimal) dikurangkan 48
Call Terima_serial
'memanggil sub rutin terima_serial
If Buff_ser <> ", " Then
Buff_ser = Buff_ser - 48
Ph = Ph * 10
Ph = Ph + Buff_ser
Call Terima_serial
'memanggil sub rutin terima_serial
Persepuluh = Buff_ser - 48
Persepuluh = Persepuluh / 10
Call Terima_serial
'memanggil sub rutin terima_serial
Perseratus = Buff_ser - 48

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    Perseratus = Perseratus / 100
Else
    Call Terima_serial
    'memanggil sub rutin terima_serial
    Persepuluh = Buff_ser - 48
    Persepuluh = Persepuluh / 10
    Call Terima_serial
    'memanggil sub rutin terima_serial
    Perseratus = Buff_ser - 48
    Perseratus = Perseratus / 100
End If
Ph = Ph + Persepuluh
Ph = Ph + Perseratus
End Sub

```

LISTING PROGRAM MIKROKONTROLER MASTER

```

$regfile = "m128def.dat"
$crystal = 16000000
$hwstack = 32
$swstack = 10
$framesize = 40
$baud = 9600
$baud1 = 9600
'konfigurasi komunikasi serial
Config Com1 = Dummy, Synchron = 0, Parity = None,
Stopbits = 1, Databits = 8, Clockpol = 0
Config Com2 = Dummy, Synchron = 0, Parity = None,
Stopbits = 1, Databits = 8, Clockpol = 0
'pin-pin lcd yang digunakan
Config Lcdpin = Pin, Db4 = Portb.3, Db5 = Portb.2, Db6 =
Portb.1, Db7 = Portb.0, E = Portb.5, Rs = Portb.7
'konfigurasi LCD
Config Lcd = 20 * 4
'konfigurasi keypad
Config Kbd = Portc
'konfigurasi 1 wire
Config 1wire = Portb.4
'membuat karakter derajat
Deflcdchar 1, 28, 20, 28, 32, 32, 32, 32, 32
'konfigurasi ADC

```

```
Config Adc = Single , Prescaler = Auto , Reference = Avcc
```

```
'----- DEKLARASI VARIABEL -----'
```

```
Dim Ph As Word
Dim Phs As Single
Dim Channel_ph As Byte
Dim Channel_co2 As Byte
Dim Co As Word
Dim C As Word
Dim Carbon As Single
Dim Co1 As Single
Dim Co2 As Single
Dim Ar As Integer ,
Dim I As Byte
Dim Suhu_ds As Single
Dim Dataword As Word
Dim Command As Byte
Dim Calc As Single
Dim Calc2 As Single
Dim Rhlinear As Single
Dim Rhlintemp As Single
Dim Tempc As Single
Dim Ctr As Byte
Dim X As Word
Dim Y As Single
Dim Z As Single
Dim Suhu As Single
Dim Kelembaban As Single
Dim Btn As Byte
Dim Tombol As Byte
Dim Setpoint_ratusan As Integer
Dim Setpoint_puluhan As Byte
Dim Setpoint_satuan As Byte
Dim Suhu_sp As Single
Dim Ph_sp As Single
Dim Rh_sp As Single
Dim Co2_sp As Single
Dim P As Single
Dim S_var As Byte
Dim C_var As Byte
Dim K_var As Byte
```

```
'----- DEKLARASI KONSTANTA -----'
```

```
Const C1 = -4
Const C2 = 0.0405
Const C3 = -0.0000028
Const S = .01
Const H = .00008
```

```
Sck Alias Portd.0
'sck output pada portd.0
Dataout Alias Portd.1
'ketika memanggil dataout portd.1 menjadi output
Datain Alias Pind.1
```

'ketika memanggil datain portd.1 menjadi input

```

Declare Sub Kirim()
Declare Sub Tampil
Declare Sub Data_suhu
Declare Sub Keypad
Declare Sub Entry

Ddrd = &B11111111
'port d sebagai output
Config Pind.0 = Output
Config Pind.1 = Output
Wait 1
Set Dataout
For Ctr = 1 To 12
Set Sck
Waitus 2
Reset Sck
Waitus 2
Next Ctr

Config Single = Scientific , Digits = 2

Start Adc
Channel_ph = 0
Channel_co2 = 1

C = Getadc(channel_co2)
Carbon = C

Tampilan_awal:
Cls
Cursor Off
Locate 1 , 5
Lcd "CELL CHAMBER"
Locate 2 , 4
Lcd "CONFIGURATIONS"
Locate 4 , 5
Lcd ">PRESS ENTER"

Do
Call Keypad
Loop Until Tombol = 77

Cls
Lcd "SETPOINT SUHU"
Call Entry
Suhu_sp = Setpoint_ratusan
Cls
Lcd "SETPOINT PH"
Call Entry
Ph_sp = Setpoint_ratusan
Cls
Lcd "SETPOINT RH"
Call Entry
Rh_sp = Setpoint_ratusan
Cls
Lcd "SETPOINT CO2"

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Call Entry
Co2_sp = Setpoint_ratusan

Cls
Upperline
Lcd "SUHU : " ; Suhu_sp ; " [CANCEL]"
Lowerline
Lcd "pH : " ; Ph_sp
Thirdline
Lcd "RH : " ; Rh_sp
Fourthline
Lcd "CO2 : " ; Co2_sp ; " [ENTER]"
Waitms 200

```

```

Cancel:
Call Keypad
If Tombol = 99 Then
    Goto Tampilan_awal
Elseif Tombol = 77 Then
    Goto Program_utama
Else
    Goto Cancel
End If

```

```

Program_utama:
Do
Call Data_suhu
If Kelembaban < Rh_sp Then Print "K"
If Kelembaban > Rh_sp Then Print "R"
Waitms 100
Iwreset Pinb , 4
Iwwrite &HCC , 1 , Pinb , 4
'note that now the number of bytes must be specified!
Iwwrite &H44 , 1 , Pinb , 4
start measure
Wait 1
wait for end of conversion

Iwreset Pinb , 4
'use this port and pin for the second device
Iwwrite &HCC , 1 , Pinb , 4
'note that now the number of bytes must be specified!
Iwwrite &HBE , 1 , Pinb , 4
Ar = Iwread(2 , Pinb , 4)
Suhu_ds = Ar / 16
If Suhu_ds < Suhu_sp Then Print "S"
If Suhu_ds > Suhu_sp Then Print "T"
'co2
Co = Getadc(channel_co2)
Co1 = Co
Co1 = Co1 - Carbon
Co1 = Co1 * 5
Co1 = Co1 / 4.45
Co1 = Co1 * 49600
Co1 = Co1 / 1024
Co2 = 400 + Co1
Co2 = Co1 / 10000
If Co2 < Co2_sp Then Print "C"

```

```

If Co2 > Co2_sp Then Print "0"
Waitms 100
'Ph
Ph = Getadc(channel_ph)
Phs = Ph
Phs = Phs / 1024
Phs = Phs * 14
Phs = 14 - Phs
Waitms 100
Open "com2: " For Binary As #2
Print #2 , Suhu_ds ; "#" ; Kelembaban ; "#" ; Co2 ; "#" ; Phs
; "#"
Close #2
P = Ph_sp - Phs
P = Abs(p)
If Phs < Ph_sp Then Print "+" ; P
If Phs > Ph_sp Then Print "-" ; P
Waitms 100
Cls
Cursor Off
Upperrline
Lcd "Rh =" ; Kelembaban ; " " ; "%"
Lowerline
Lcd "CO2 =" ; Co2 ; " " ; "%"
Thirdline
Lcd "pH =" ; Phs
Fourthline
Lcd "Suhu=" ; Suhu_ds ; " " ; Chr(1) ; "C"
Waitms 500
Loop
End

Sub Data_suhu
'perintah untuk mengambil data suhu
Command = &B00000011
Call Kirim
'memanggil fungsi kirim
Tempc = S * Dataword
Tempc = Tempc - 40
Suhu = Tempc
'perintah untuk mengambil data kelembaban
Command = &B00000101
Call Kirim
Calc = C2 * Dataword
Calc2 = Dataword * Dataword
Calc2 = C3 * Calc2
Calc = Calc + C1
Rhlinear = Calc + Calc2
Calc = H * Dataword
Calc = Calc + S
Calc2 = Tempc - 25
Calc = Calc2 * Calc
Rhlintemp = Calc + Rhlinear
Kelembaban = Rhlintemp
End Sub

Sub Kirim()
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
Ddrd = &B11111101
Config Pind.1 = Input
Set Sck
Reset Sck
Waitus 10
Bitwait Pind.1 , Reset
Shiftin Datain , Sck , Databyte , 1
Datavalue = Databyte
Ddrd = &B11111111
Config Pind.1 = Output
Reset Dataout
Set Sck
Reset Sck
Ddrd = &B11111101
Config Pind.1 = Input
Shiftin Datain , Sck , Databyte , 1
Shift Datavalue , Left , 8
Datavalue = Datavalue Or Databyte
Dataword = Datavalue
Ddrd = &B11111111
Config Pind.1 = Output
Reset Dataout
Set Sck
Reset Sck
Ddrd = &B11111101
Config Pind.1 = Input
Shiftin Datain , Sck , Databyte , 1
Ddrd = &B11111111
Config Pind.1 = Output
Set Dataout
Set Sck
Reset Sck
End Sub

```

```

'===== SUBROUTIN =====
Sub Entry
'satuan
Scan_satuan:
Call Keypad
If Tombol < 20 Then
    Setpoint_satuan = Tombol
    Cls
    Lcd Setpoint_satuan
Elseif Tombol = 77 Then
    Setpoint_ratusan = 0
    Goto Selesai
Else
    Goto Scan_satuan
End If
'puluhan

```

```

Scan_puluhan:
Call Keypad
If Tombol < 20 Then
    Setpoint_puluhan = Setpoint_satuan * 10
    Setpoint_puluhan = Setpoint_puluhan + Tombol
Cls
Lcd Setpoint_puluhan
Elseif Tombol = 30 Then
    Cls
    Lcd "0"
    Goto Scan_satuan
Elseif Tombol = 77 Then
    Setpoint_ratusan = Setpoint_satuan
    Goto Selesai
End If
'ratusan
Scan_ratusan:
Call Keypad
If Tombol < 20 Then
    Setpoint_ratusan = Setpoint_puluhan * 10
    Setpoint_ratusan = Setpoint_ratusan + Tombol
Cls
Lcd Setpoint_ratusan
Elseif Tombol = 30 Then
    Cls
    Lcd Setpoint_satuan
    Goto Scan_puluhan
Elseif Tombol = 77 Then
    Setpoint_ratusan = Setpoint_puluhan
    Goto Selesai
End If
'tunggu enter
Tunggu_enter:
Call Keypad
If Tombol = 30 Then
    Cls
    Lcd Setpoint_puluhan
    Goto Scan_ratusan
Elseif Tombol = 77 Then
    Goto Selesai
Else
    Goto Tunggu_enter
End If
Selesai:
End Sub

Sub Keypad
Tunggu_tekan:
Btn = Getkbd()
If Btn > 15 Then Goto Tunggu_tekan
Tombol = Lookup(btn , Dta)
Waitms 200
End Sub

Dta:
Data 20 , 77 , 0 , 99 , 50 , 9 , 8 , 7 , 40 , 6 , 5 , 4 , 30
    , 3 , 2 , 1

```

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