LAMPIRAN

Lampiran 1. Aplikasi Sistem Keamanan Komputer Berbasis RFID Dengan Menggunakan Mikrokontroler ATMega 32

Komponen sistem :

1. RFID *Reader*
2. Komputer *Server*
3. Desktop *Switch*
4. Komputer-Komputer *Client*

Bentuk Fisik Sistem Keamanan Komputer Berbasis RFID Dengan Menggunakan Mikrokontroler ATMega 32

Lampiran 2. Program Mikrokontroler ATMega 32 Sistem Keamanan Komputer Berbasis RFID Dengan Menggunakan Mikrokontroler ATMega 32

```
$regfile = "m32def.dat"
$crystal = 11059200
$baud = 9600
Dim Flagserial As Byte
Dim Data1 As String * 30
Dim Id As String * 30
Print "RFID reader test"
Do
Flagserial = Inkey()
If Flagserial = &H02 Then
Input Data1 Noecho
Id = Mid(data1 , 1 , 12)
Print Id
Flagserial = 0
Data1 = ""
End If
```

Lampiran 3. Koding *Software* Aplikasi Sistem Keamanan Komputer

A. Koding *Software* Aplikasi Laboraturium Komputer

a. Modul Koneksi

```
Imports Microsoft.VisualBasic
Imports MySql.Data.MySqlClient


Public Class ModMysql
    Protected tblPengguna = New DataTable
    Protected SQL As String
    Protected      Cn,      m_conn      As
MySql.Data.MySqlClient.MySqlConnection
    Protected            Cmd           As
MySql.Data.MySqlClient.MySqlCommand
    Protected             Da           As
MySql.Data.MySqlClient.MySqlDataAdapter
    'Protected            Dr           As
MySql.Data.MySqlClient.MySqlDataReader
    Protected Ds As DataSet
    Protected Dt As DataTable


    Public  Function  OpenConnAccess()  As
Boolean

        Dim        SQLConnection        As
MySql.Data.MySqlClient.MySqlConnection
        Dim   sConnString   As   String   =
"server=192.168.1.1;     user     id=root;
password=123;     database=sistem_keamanan;
pooling=false"
        SQLConnection         =         New
MySql.Data.MySqlClient.MySqlConnection(sCo
nnString)
        SQLConnection.Open()

        Try
            Cn            =            New
MySql.Data.MySqlClient.MySqlConnection(sCo
nnString)
            Cn.Open()
            If          Cn.State          <>
ConnectionState.Open Then
                Return False
            Else
                Return True
            End If
        Catch ex As Exception
            MsgBox(ex.ToString())
            Return False
        End Try
    End Function

    Public Sub CloseConn()
        If Not IsNothing(Cn) Then
            Cn.Close()
            Cn = Nothing
        End If
    End Sub
    Public   Function   ExecuteQuery(ByVal
Query As String) As DataTable
        If Not OpenConnAccess() Then
            MsgBox("Koneksi     Gagal..!!",
MsgBoxStyle.Critical, "Access Failed")
            Return Nothing
            Exit Function
        End If

        Cmd             =             New
MySql.Data.MySqlClient.MySqlCommand(Query,
Cn)
        Da              =             New
MySql.Data.MySqlClient.MySqlDataAdapter
        Da.SelectCommand = Cmd

        Ds = New Data.DataSet
        Da.Fill(Ds)

        Dt = Ds.Tables(0)

        Return Dt

        Dt = Nothing
        Ds = Nothing
        Da = Nothing
        Cmd = Nothing

        CloseConn()

    End Function
    Public Sub ExecuteNonQuery(ByVal Query
As String)
        If Not OpenConnAccess() Then
            MsgBox("Koneksi     Gagal..!!",
MsgBoxStyle.Critical, "Access Failed..!!")
            Exit Sub
        End If

        Cmd             =             New
MySql.Data.MySqlClient.MySqlCommand
        Cmd.Connection = Cn
        Cmd.CommandType = CommandType.Text
        Cmd.CommandText = Query
        Cmd.ExecuteNonQuery()
        Cmd = Nothing
        CloseConn()
    End Sub
End Class
```

b. Login Sistem

```
Imports System
Imports System.IO.Ports
Imports System.Threading
Imports System.IO

Public Class Login
    Dim pos As Integer
    Dim path As String =
Directory.GetCurrentDirectory()

    Private readBuffer As String =
String.Empty
    Private Bytenumber As Integer
    Private ByteToRead As Integer
    Private byteEnd(2) As Char
    Private comOpen As Boolean


    Dim SQL As String
    Dim Proses As New ModMysql
    Dim myTbl As DataTable
    Dim myTbl2 As DataTable
    Dim myTbl3 As DataTable
    Dim myTblADMIN As DataTable
    Dim myTblUSER As DataTable
    Dim Statusku As String
    Dim rfidku As String

    Private Sub OK_Click(ByVal sender As
System.Object, ByVal e As
System.EventArgs) Handles OK.Click
        koneksiport()
        Dim u, p As String
        u = Trim(TNama.Text)
        p = Trim(TRFID.Text)
        Statusku = "ON"
        If Len(u) < 1 Or Len(p) < 5 Then
            MessageBox.Show("Lengkapi Data
Anda")
        Else
            myTbl =
Proses.ExecuteQuery("Select * From tbluser
where NAMA like '" & u & "' and RFID like
'%" & p & "%' and status='" & "ADMIN" &
"'")
            myTbl2 =
Proses.ExecuteQuery("Select * From tbluser
where NAMA like '" & u & "' and RFID like
'%" & p & "%' and status='" & "MAHASISWA"
& "' AND PRODI LIKE '%" & LProdi.Text &
"%' AND MATAKULIAH LIKE '%" & LMK.Text &
"%'")
            myTbl3 =
Proses.ExecuteQuery("Select STATS_KOMPUTER
From tbllogin where  RFID like '%" & p &
"%' and STATS_KOMPUTER='ON'")

            If myTbl3.Rows.Count > 0 Then
                MsgBox("Anda sudah memakai
komputer bro, rakus amat",
MsgBoxStyle.Critical + MsgBoxStyle.OkOnly,
"Fail")
                TNama.Text = ""
                TRFID.Text = ""
                TNama.Focus()
                Me.reset()
                Me.Show()
                Exit Sub
            Else

'=======================================
=======================================
=

            End If

'=======================================
=======================================
=
            If myTbl.Rows.Count > 0 Then
'admin
                pos = 1
                Me.Hide()
                MenuUtama.Panel5.Text =
Today
                MenuUtama.Panel1.Text =
myTbl.Rows(0).Item("RFID")
                MenuUtama.Panel2.Text =
myTbl.Rows(0).Item("NAMA")
                MenuUtama.Panel3.Text =
myTbl.Rows(0).Item("STATUS")
                MenuUtama.Panel4.Text =
myTbl.Rows(0).Item("JURUSAN")
                MenuUtama.Panel7.Text =
myTbl.Rows(0).Item("NOREG")
                MenuUtama.Panel8.Text =
myTbl.Rows(0).Item("prodi")
                MenuUtama.Panel9.Text =
myTbl.Rows(0).Item("matakuliah")

MenuUtama.UserToolStripMenuItem.Visible =
True

MenuUtama.LogoutToolStripMenuItem1.Visible
= True

MenuUtama.ExitToolStripMenuItem.Visible =
True

                MenuUtama.Show()

                TNama.Text = ""
                TRFID.Text = ""
                TNama.Focus()

            ElseIf myTbl2.Rows.Count > 0
Then 'mhs
                If LMK.Text = "" Or
LProdi.Text = "" Then
                    MsgBox("data tidak
cocok")
                    Exit Sub

                End If
                pos = 0
                Me.Visible = False
```

```
                MenuUtama.Panel5.Text =
Today
                'myTbl3.Rows(0).Item
                MenuUtama.Panel1.Text =
myTbl2.Rows(0).Item("RFID")
                MenuUtama.Panel2.Text =
myTbl2.Rows(0).Item("NAMA")
                MenuUtama.Panel3.Text =
myTbl2.Rows(0).Item("STATUS")
                MenuUtama.Panel4.Text =
myTbl2.Rows(0).Item("JURUSAN")
                MenuUtama.Panel7.Text =
myTbl2.Rows(0).Item("NOREG")
                MenuUtama.Panel8.Text =
myTbl2.Rows(0).Item("prodi")
                MenuUtama.Panel9.Text =
myTbl2.Rows(0).Item("matakuliah")

MenuUtama.UserToolStripMenuItem.Visible =
False

MenuUtama.LogoutToolStripMenuItem1.Visible
= False

MenuUtama.ExitToolStripMenuItem.Visible =
False

                MenuUtama.Show()

                TNama.Text = ""
                TRFID.Text = ""
                TNama.Focus()
            Else
                pos = 0
                MsgBox("Login
Gagal...Silakan Hub Administrator",
MsgBoxStyle.Critical + MsgBoxStyle.OkOnly,
"Fail")
                TNama.Text = ""
                TRFID.Text = ""
                TNama.Focus()

            End If

        End If

    End Sub
    Private Sub Cancel_Click(ByVal sender
As System.Object, ByVal e As
System.EventArgs) Handles Cancel.Click
        If comOpen Then

            Try
                mySerial.DiscardInBuffer()
                mySerial.Close()
            Catch
                MessageBox.Show("koneksi
putus")
            End Try
            comOpen = False
        End If

        Me.Close()
    End Sub

    Private Sub TNama_KeyPress(ByVal
sender As Object, ByVal e As
System.Windows.Forms.KeyPressEventArgs)
Handles TNama.KeyPress
        If e.KeyChar = Chr(13) Then
            TRFID.Focus()
        End If
    End Sub

    Private Sub TPassword_KeyPress(ByVal
sender As Object, ByVal e As
System.Windows.Forms.KeyPressEventArgs)
Handles TRFID.KeyPress
        If e.KeyChar = Chr(13) Then

            OK.Focus()
            OK.PerformClick()
        End If
    End Sub

    Private Sub Login_FormClosed(ByVal
sender As Object, ByVal e As
System.Windows.Forms.FormClosedEventArgs)
Handles Me.FormClosed
        If comOpen Then mySerial.Close()

    End Sub

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

        Me.Text = "Welcome:" &
DateTime.Now.ToString("yyyy-MM-dd")
        Dim path As String =
Directory.GetCurrentDirectory()
        'PictureBox1.Image =
Image.FromFile(path & "\img\admin.png")
        'PB.Image = Image.FromFile(path &
"\img\Administrator.png")
        pos = 0
        Dim Portnames As String() =
System.IO.Ports.SerialPort.GetPortNames
        If Portnames Is Nothing Then
            MsgBox("There are no Com Ports
detected!")
            Me.Close()
        End If
        cmbPort.Items.AddRange(Portnames)
        cmbPort.Text = Portnames(0)
        cmbBaud.Text = "9600"

        With mySerial

            .ParityReplace = &H3B
' replace ";" when parity error occurs
            .PortName = cmbPort.Text
            .BaudRate = CInt(cmbBaud.Text)
            .Parity = IO.Ports.Parity.None
            .DataBits = 8
            .StopBits =
IO.Ports.StopBits.One
            .Handshake =
IO.Ports.Handshake.None
            .RtsEnable = False
```

```
            .ReceivedBytesThreshold = 1
'threshold: one byte in buffer > event is
fired
            .NewLine = vbCr         ' CR
must be the last char in frame. This
terminates the SerialPort.readLine
            '.ReadTimeout = 10000
        End With

        ' check whether device is
avaiable:
        Try
            mySerial.Open()
            comOpen = mySerial.IsOpen
        Catch ex As Exception
            comOpen = False
            MsgBox("Error Open: " &
ex.Message)
        End Try
    End Sub

    Sub koneksiport()
        pos = 0
        Dim Portnames As String() =
System.IO.Ports.SerialPort.GetPortNames
        Dim stats As String
        stats = "OFF"
        If Portnames Is Nothing Then
            MsgBox("There are no Com Ports
detected!")
            Me.Close()


        End If
        'SQL = "UPDATE `tbllogin` set
`STATS_KOMPUTER`='" & stats & "'"
        ' Proses.ExecuteNonQuery(SQL)
        cmbPort.Items.AddRange(Portnames)
        cmbPort.Text = Portnames(0)
        cmbBaud.Text = "9600"
    End Sub


    Private Sub
SerialPort1_DataReceived(ByVal sender As
System.Object, _

ByVal e As
System.IO.Ports.SerialDataReceivedEventArg
s) _

Handles mySerial.DataReceived
        If comOpen Then
            Try
                byteEnd =
mySerial.NewLine.ToCharArray

                ' get number off bytes in
buffer
                Bytenumber =
mySerial.BytesToRead

                ' read one byte from
buffer
                'ByteToRead =
SerialPort1.ReadByte()

                ' read one char from
buffer
                'CharToRead =
SerialPort1.ReadChar()

                ' read until string "90"
                'readBuffer1 =
SerialPort1.ReadTo("90")

                ' read entire string until
.Newline
                readBuffer =
mySerial.ReadLine()

                'data to UI thread
                Me.Invoke(New
EventHandler(AddressOf DoUpdate))

            Catch ex As Exception
                MsgBox("read " &
ex.Message)
            End Try
        End If
    End Sub

    Private Sub btnConnect_Click(sender As
Object, e As EventArgs) Handles
btnConnect.Click
        If btnConnect.Text = "&Connect"
Then
            If mySerial.IsOpen Then
                mySerial.Close()
            End If
            mySerial.PortName =
cmbPort.SelectedItem

            ' mySerial.ReadTimeout = 100
            mySerial.BaudRate = 9600
'Convert.ToInt32(cmbBaud.SelectedItem.ToSt
ring)
            '  mySerial.Parity =
IO.Ports.Parity.None ' no parity
            ' mySerial.DataBits = 8 ' 8
bits
            ' mySerial.StopBits =
IO.Ports.StopBits.One ' one stop bit
            'mySerial.ReadTimeout = 1000 '
milliseconds so times out in 1 second if
no response

            If Not mySerial.IsOpen Then
                mySerial.Open()
            End If

            If mySerial.IsOpen() = True
Then
                btnConnect.Text =
"&Disconnect"
                MsgBox("Koneksi Berhasil",
MsgBoxStyle.Information, "Sukses")
                TNama.Focus()
                OK.Enabled = True
            Else
                MsgBox("Koneksi Gagal",
MsgBoxStyle.Information, "Gagal")
```

```
                OK.Enabled = False
            End If

        Else
            If mySerial.IsOpen Then
                mySerial.Close()
                MsgBox("Koneksi Putus",
MsgBoxStyle.Information, "Putus")
                OK.Enabled = False
            End If
            btnConnect.Text = "&Connect"
        End If
    End Sub

    Sub reset()
        pos = 0
    End Sub
    Private Sub
mySerial_DataReceived(ByVal sender As
System.Object, _

ByVal e As
System.IO.Ports.SerialDataReceivedEventArg
s) _

Handles mySerial.DataReceived
        If mySerial.IsOpen Then
            Try
                readBuffer =
mySerial.ReadLine()
                Me.Invoke(New
EventHandler(AddressOf DoUpdate))
            Catch ex As Exception
            End Try
        End If
    End Sub
    Public Sub DoUpdate(ByVal sender As
Object, ByVal e As System.EventArgs)
        If Len(readBuffer) > 10 Then
            readBuffer = Trim(readBuffer)
            If pos = 0 Then
                TRFID.Text = readBuffer
            ElseIf pos = 1 Then
                FormRegiser.txtRFID.Text =
readBuffer
            End If
            readBuffer = ""
        End If
    End Sub

    Private Sub Login_FormClosing(ByVal
sender As System.Object, ByVal e As
System.Windows.Forms.FormClosingEventArgs)
Handles MyBase.FormClosing
        Try
            mySerial.Close()
        Catch ex As Exception
            MsgBox(ex.ToString)
        End Try
    End Sub

    Private Sub Timer1_Tick(sender As
Object, e As EventArgs) Handles
Timer1.Tick
        LJam.Text = TimeOfDay
    End Sub

    Private Sub TRFID_TextChanged(sender
As Object, e As EventArgs) Handles
TRFID.TextChanged

    End Sub
End Class
```

c. Menu Utama

```
Public Class MenuUtama

    Private Sub Timer1_Tick(ByVal sender
As System.Object, ByVal e As
System.EventArgs) Handles Timer1.Tick
        Panel6.Text = TimeOfDay
    End Sub

    Private Sub
LogOutToolStripMenuItem_Click(ByVal sender
As System.Object, ByVal e As
System.EventArgs) Handles
LogOutToolStripMenuItem.Click
        Panel1.Text = ""
        Panel2.Text = ""
        Panel3.Text = ""
        Panel4.Text = ""
        Panel5.Text = ""
        Panel6.Text = ""
        Me.Close()
        Login.reset()
        Login.Show()
        Login.TNama.Clear()
        'Login.TRFID.Clear()
        Login.TNama.Focus()
    End Sub

    Private Sub
ExitToolStripMenuItem_Click(ByVal sender
As System.Object, ByVal e As
System.EventArgs) Handles
ExitToolStripMenuItem.Click
        If MessageBox.Show("Tutup
aplikasi...?", "",
MessageBoxButtons.YesNo) =
Windows.Forms.DialogResult.Yes Then
            End
        End If
    End Sub

    Private Sub Panel5_Click(ByVal sender
As System.Object, ByVal e As
System.EventArgs) Handles Panel5.Click

    End Sub
```

```
    Private Sub
PendaftaranToolStripMenuItem_Click(ByVal
sender As System.Object, ByVal e As
System.EventArgs) Handles
UserToolStripMenuItem.Click

        FormRegiser.Show()

    End Sub

    Private Sub MenuUtama_KeyPress(ByVal
sender As Object, ByVal e As
System.Windows.Forms.KeyPressEventArgs)
Handles Me.KeyPress
        If e.KeyChar = Chr(27) Then
            If MessageBox.Show("Tutup
aplikasi...?", "",
MessageBoxButtons.YesNo) =
Windows.Forms.DialogResult.Yes Then
                End
            End If
        End If
    End Sub

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

    End Sub

    Private Sub
LoginToolStripMenuItem_Click(sender As
```

d. Pendaftaran

```
Public Class FormRegiser
    Dim SQL As String
    Dim Proses As New ModMysql
    Dim myTbl As DataTable
    Dim abc As String

    Sub kosongkan()
        txtRFID.Clear()
        txtNama.Clear()
        txtNoReg.Clear()
        txtCari.Clear()
        txtStatus.Text = "MAHASISWA"
        txtJurusan.Text = ""
        txtprodi.Text = ""
        txtmk.Text = ""
        txtRFID.Focus()
        Call lihat()
        abc = "save"
    End Sub

    Sub lihat()
        myTbl =
Proses.ExecuteQuery("Select * From tbluser
order by RFID desc")
        DGV.DataSource = myTbl
        DGV.Columns(1).Width = 130
```

```
Object, e As EventArgs) Handles
LoginToolStripMenuItem.Click
        Komputer.TextBox1.Text =
Panel1.Text
        Komputer.Tnama.Text = Panel2.Text
        Komputer.TNoreg.Text = Panel7.Text
        Komputer.TJursan.Text =
Panel4.Text
        Komputer.TStatus.Text =
Panel3.Text
        Komputer.TProdi.Text = Panel8.Text
        Komputer.TMK.Text = Panel9.Text

        Komputer.ShowDialog()

    End Sub


    Private Sub Panel6_Click(sender As
Object, e As EventArgs) Handles
Panel6.Click

    End Sub


    Private Sub
LogoutToolStripMenuItem1_Click(sender As
Object, e As EventArgs) Handles
LogoutToolStripMenuItem1.Click
        KomputerLockShut.Show()

    End Sub
            End Class
```

```
    End Sub

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

        txtStatus.Items.Add("MAHASISWA")
        txtStatus.Items.Add("ADMIN")
        txtJurusan.Items.Add("TEKNIK
ELEKTRO")
        txtprodi.Items.Add("Pend. Teknik
Elektro Reg")
        txtprodi.Items.Add("Pend. Teknik
Elektro NonReg")
        txtprodi.Items.Add("Pend. Teknik
Elektronika Reg")
        txtprodi.Items.Add("Pend. Teknik
Elektronika NonReg")
        txtprodi.Items.Add("D3
Elektronika")
        txtprodi.Items.Add("Pend. TIK
Reg")
        txtprodi.Items.Add("Pend. TIK
NonReg")
        txtmk.Items.Add("Pemrograman
Komputer")
```

```
        txtmk.Items.Add("Algoritma dan
Pemrograman II")
        txtmk.Items.Add("Pemrograman
Jaringan")
        txtmk.Items.Add("Animasi Komputer
Lanjut")
        txtmk.Items.Add("Kriptografi")
        CBOHARI.Items.Add("Senin")
        CBOHARI.Items.Add("Selasa")
        CBOHARI.Items.Add("Rabu")
        CBOHARI.Items.Add("Kamis")
        CBOHARI.Items.Add("Jum'at")
        CBOMK.Items.Add("Pemrograman
Komputer")
        CBOMK.Items.Add("Algoritma dan
Pemrograman II")
        CBOMK.Items.Add("Pemrograman
Jaringan")
        CBOMK.Items.Add("Animasi Komputer
Lanjut")
        CBOMK.Items.Add("Kriptografi")
        CBOPRODI.Items.Add("Pend. Teknik
Elektro Reg")
        CBOPRODI.Items.Add("Pend. Teknik
Elektro NonReg")
        CBOPRODI.Items.Add("Pend. Teknik
Elektronika Reg")
        CBOPRODI.Items.Add("Pend. Teknik
Elektronika NonReg")
        CBOPRODI.Items.Add("D3
Elektronika")
        CBOPRODI.Items.Add("Pend. TIK
Reg")
        CBOPRODI.Items.Add("Pend. TIK
NonReg")
        Call kosongkan()

    End Sub

    Private Sub
ComboBox1_SelectedIndexChanged(ByVal
sender As System.Object, ByVal e As
System.EventArgs) Handles
txtStatus.SelectedIndexChanged
        If txtStatus.Text = "ADMIN" Then
            txtJurusan.Text = "-"
            txtprodi.Text = "-"
            txtmk.Text = "-"
        End If
    End Sub


    Private Sub btnSave_Click(sender As
Object, e As EventArgs) Handles
btnSave.Click
        If txtRFID.Text = "" Then
txtRFID.Focus() : Exit Sub

        If abc = "save" Then
            SQL = "Insert into tbluser
Values ('" & txtRFID.Text & "','" &
txtNama.Text & "','" & txtNoReg.Text &
"','" & txtStatus.Text & "','" &
txtJurusan.Text & "','" & txtprodi.Text &
"','" & txtmk.Text & "')"
            Proses.ExecuteNonQuery(SQL)
            Call kosongkan()
            'Else
            ' If MessageBox.Show("Yakin
akan diubah..?", "",
MessageBoxButtons.YesNo) =
Windows.Forms.DialogResult.Yes Then
            'SQL = "UPDATE tbluser set
`NAMA`= '" & txtNama.Text & "',`NOREG`='"
& txtNoReg.Text & "',`STATUS`='" &
txtStatus.Text & "',`JURUSAN`='" &
txtJurusan.Text & "',`PRODI`= '" &
txtprodi.Text & "',`MATAKULIAH`= '" &
txtmk.Text & "'" ' where `RFID` = '" &
txtRFID.Text & "'"
            'Proses.ExecuteNonQuery(SQL)
        End If
        Call kosongkan()

        ' End If
    End Sub

    Private Sub btnDelete_Click(sender As
Object, e As EventArgs) Handles
btnDelete.Click
        Dim mau As String
        mau = MsgBox("Anda mau hapus data
ini?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "Hapus")
        If mau = vbYes Then
            SQL = "delete from tbluser
where RFID = '" & txtRFID.Text & "'"
            Proses.ExecuteNonQuery(SQL)
        End If
        Call kosongkan()

    End Sub

    Private Sub btnCancel_Click(sender As
Object, e As EventArgs) Handles
btnCancel.Click
        Call kosongkan()
    End Sub

    Private Sub btnClose_Click(sender As
Object, e As EventArgs) Handles
btnClose.Click
        Hide()
    End Sub


    Private Sub DGV_CellMouseClick(sender
As Object, e As
DataGridViewCellMouseEventArgs) Handles
DGV.CellMouseClick
        abc = "ubah"
        On Error Resume Next
        txtRFID.Text =
DGV.SelectedCells(0).Value
        txtNama.Text =
DGV.SelectedCells(1).Value
        txtNoReg.Text =
DGV.SelectedCells(2).Value
        txtStatus.Text =
DGV.SelectedCells(3).Value
        txtJurusan.Text =
DGV.SelectedCells(4).Value
```

```
        txtprodi.Text =
DGV.SelectedCells(5).Value
        txtmk.Text =
DGV.SelectedCells(6).Value
      End Sub
    Private Sub txtCari_TextChanged(sender
As Object, e As EventArgs) Handles
txtCari.TextChanged
        Dim sql As String
        If txtCari.Text = "" Then
            sql = "Select * From tbluser
order by RFID desc"
        Else
            sql = "Select * From tbluser
where NAMA like '%" & txtCari.Text & "%'
order by RFID desc"

        End If

        myTbl = Proses.ExecuteQuery(sql)
        DGV.DataSource = myTbl
        DGV.Columns(1).Width = 130


    End Sub

    Private Sub BTBuka_Click(sender As
Object, e As EventArgs) Handles
BTBuka.Click
        Login.LHari.Text = CBOHARI.Text
        Login.LMK.Text = CBOMK.Text
        Login.LProdi.Text = CBOPRODI.Text
        CBOHARI.Text = ""
        CBOMK.Text = ""
        CBOPRODI.Text = ""
        Me.Hide()

    End Sub
        End Class
```

e. Login Komputer

```
Public Class Komputer
    Dim SQL As String
    Dim Proses As New ModMysql
    Dim myTbl As DataTable
    Dim abc As String


    Private Sub btnSatu_Click(sender As
Object, e As EventArgs) Handles
btnSatu.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 1
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 1")
        If mau = vbYes Then
            btnSatu.Visible = False
            btnSatu.Enabled = False
            KomputerLockShut.BT1.Enabled =
True
            KomputerLockShut.TextBox1.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex1.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "1"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"


            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 1",
MsgBoxStyle.Information, "Sukses PC1")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()

        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 1", MsgBoxStyle.Information, "Gagal
PC1")
        End If
    End Sub

    Private Sub btnDua_Click(sender As
Object, e As EventArgs) Handles
btnDua.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 2
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 2")
        If mau = vbYes Then
            btnDua.Visible = False
            btnDua.Enabled = False
            KomputerLockShut.BT2.Enabled =
True
```

```
            KomputerLockShut.TextBox2.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex2.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "2"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 2",
MsgBoxStyle.Information, "Sukses PC2")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()

        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 2", MsgBoxStyle.Information, "Gagal
PC2")
        End If
    End Sub

    Private Sub btnTiga_Click(sender As
Object, e As EventArgs) Handles
btnTiga.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 3
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 3")
        If mau = vbYes Then
            btnTiga.Visible = False
            btnTiga.Enabled = False
            KomputerLockShut.BT3.Enabled =
True
            KomputerLockShut.TextBox3.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex3.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "3"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 3",
MsgBoxStyle.Information, "Sukses PC3")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 3", MsgBoxStyle.Information, "Gagal
PC3")
        End If
    End Sub

    Private Sub btnEmpat_Click(sender As
Object, e As EventArgs) Handles
btnEmpat.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 4
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 4")
        If mau = vbYes Then
            btnEmpat.Visible = False
            btnEmpat.Enabled = False
            KomputerLockShut.BT4.Enabled =
True
            KomputerLockShut.TextBox4.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex4.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "4"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
```

```
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 4",
MsgBoxStyle.Information, "Sukses PC4")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 4", MsgBoxStyle.Information, "Gagal
PC4")
        End If
    End Sub

    Private Sub btnLima_Click(sender As
Object, e As EventArgs) Handles
btnLima.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 5
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 5")
        If mau = vbYes Then
            btnLima.Visible = False
            btnLima.Enabled = False
            KomputerLockShut.BT5.Enabled =
True
            KomputerLockShut.TextBox5.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex5.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "5"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 5",
MsgBoxStyle.Information, "Sukses PC5")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 5", MsgBoxStyle.Information, "Gagal
PC5")
        End If
    End Sub

    Private Sub btnEnam_Click(sender As
Object, e As EventArgs) Handles
btnEnam.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 6
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 6")
        If mau = vbYes Then
            btnEnam.Visible = False
            btnEnam.Enabled = False
            KomputerLockShut.BT6.Enabled =
True
            KomputerLockShut.TextBox6.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex6.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "6"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 6",
MsgBoxStyle.Information, "Sukses PC6")
            Me.Hide()
```

```
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 6", MsgBoxStyle.Information, "Gagal
PC6")
        End If
    End Sub

    Private Sub ButtonTujuh_Click(sender
As Object, e As EventArgs) Handles
btnTujuh.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 7
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 7")
        If mau = vbYes Then
            btnTujuh.Visible = False
            btnTujuh.Enabled = False
            KomputerLockShut.BT7.Enabled =
True
            KomputerLockShut.TextBox7.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex7.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "7"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 7",
MsgBoxStyle.Information, "Sukses PC7")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 7", MsgBoxStyle.Information, "Gagal
PC7")
        End If
    End Sub

    Private Sub btnDelapan_Click(sender As
Object, e As EventArgs) Handles
btnDelapan.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 8
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 8")
        If mau = vbYes Then
            btnDelapan.Visible = False
            btnDelapan.Enabled = False
            KomputerLockShut.BT8.Enabled =
True
            KomputerLockShut.TextBox8.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex8.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "8"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 8",
MsgBoxStyle.Information, "Sukses PC8")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 8", MsgBoxStyle.Information, "Gagal
PC8")
        End If
    End Sub

    Private Sub btnSembilan_Click(sender
As Object, e As EventArgs) Handles
btnSembilan.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no 9
?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 9")
        If mau = vbYes Then
```

```
            btnSembilan.Visible = False
            btnSembilan.Enabled = False
            KomputerLockShut.BT9.Enabled =
True
            KomputerLockShut.TextBox9.Text
= MenuUtama.Panel2.Text
            KomputerLockShut.tex9.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "9"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 9",
MsgBoxStyle.Information, "Sukses PC9")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 9", MsgBoxStyle.Information, "Gagal
PC9")
        End If
    End Sub

    Private Sub btnSepuluh_Click(sender As
Object, e As EventArgs) Handles
btnSepuluh.Click
        Dim mau As String
        mau = MsgBox("Anda memilih PC no
10 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 10")
        If mau = vbYes Then
            btnSepuluh.Visible = False
            btnSepuluh.Enabled = False
            KomputerLockShut.BT10.Enabled
= True

KomputerLockShut.TextBox10.Text =
MenuUtama.Panel2.Text
            KomputerLockShut.tex10.Text =
MenuUtama.Panel7.Text
            Dim tgl, jammulai, jamselesai,
komputer, rfid, stat As String
            stat = "ON"
            rfid = TextBox1.Text
            komputer = "10"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jammulai =
DateTime.Now.ToString("HH:mm:ss")
            jamselesai = "1:1:1"

            SQL = "INSERT INTO `tbllogin`
(`ID`,
`NAMA`,`NOREG`,`STATUS`,`JURUSAN`,`PRODI`,
`MATAKULIAH`,`TANGGAL`, `JAMMULAI`,
`JAMSELESAI`, `KOMPUTER`, `RFID`,
`STATS_KOMPUTER`) VALUES ('','" &
MenuUtama.Panel2.Text & "','" &
MenuUtama.Panel7.Text & "','" &
MenuUtama.Panel3.Text & "','" &
MenuUtama.Panel4.Text & "','" &
MenuUtama.Panel8.Text & "','" &
MenuUtama.Panel9.Text & "', '" & tgl &
"','" & jammulai & "', '" & jamselesai &
"', '" & komputer & "', '" & rfid & "', '"
& stat & "')"
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil
terkoneksi ke PC 10",
MsgBoxStyle.Information, "Sukses PC1")
            Me.Hide()
            MenuUtama.Hide()
            Login.reset()
            Login.Show()
        Else
            MsgBox("Anda Gagal terkoneksi
ke PC 10", MsgBoxStyle.Information, "Gagal
PC10")
        End If
    End Sub

    Private Sub Komputer_Load(sender As
Object, e As EventArgs) Handles
MyBase.Load

        btnSatu.BackColor = Color.Red
        btnDua.BackColor = Color.Red
        btnTiga.BackColor = Color.Red
        btnEmpat.BackColor = Color.Red
        btnLima.BackColor = Color.Red
        btnEnam.BackColor = Color.Red
        btnTujuh.BackColor = Color.Red
        btnDelapan.BackColor = Color.Red
        btnSembilan.BackColor = Color.Red
        btnSepuluh.BackColor = Color.Red

        Dim strIPAddress As String
        SQL = "Select `IP_ADDRESS` From
`tblip`  "
        myTbl = Proses.ExecuteQuery(SQL)
        Dim ju, i As Integer
        ju = myTbl.Rows.Count
        If ju = 0 Then

        Else
```

```
            For i = 0 To ju - 1
                With myTbl.Rows(i)

                    strIPAddress =
.Item("IP_ADDRESS")

                    'MsgBox("#" &
strIPAddress & "#")
                    If strIPAddress =
"192.168.1.3" Then
                        btnSatu.BackColor
= Color.Green
                    End If


                    If strIPAddress =
"192.168.1.5" Then
                        btnDua.BackColor =
Color.Green
                    End If


                    If strIPAddress =
"192.168.1.7" Then
                        btnTiga.BackColor
= Color.Green

                    End If


                    If strIPAddress =
"192.168.1.11" Then
                        btnEmpat.BackColor
= Color.Green

                    End If


                    If strIPAddress =
"192.168.1.13" Then
                        btnLima.BackColor
= Color.Green

                    End If
                    If strIPAddress =
"192.168.1.15" Then
                        btnEnam.BackColor
= Color.Green

                    End If


                    If strIPAddress =
"192.168.1.17" Then
                        btnTujuh.BackColor
= Color.Green

                    End If


                    If strIPAddress =
"192.168.1.19" Then

btnDelapan.BackColor = Color.Green

                    End If


                    If strIPAddress =
"192.168.1.21" Then

btnSembilan.BackColor = Color.Green

                    End If


                    If strIPAddress =
"192.168.1.23" Then

btnSepuluh.BackColor = Color.Green

                    End If

                End With
            Next i
        End If

    End Sub

            End Class
```

f. Logout Komputer

```
Public Class KomputerLockShut
    Dim SQL As String
    Dim Proses As New ModMysql
    Dim myTbl As DataTable
    Dim abc As String


    Private Sub BT1_Click(sender As
Object, e As EventArgs) Handles BT1.Click
        Komputer.btnSatu.Visible = True
        BT1.Enabled = False
        Komputer.btnSatu.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 1 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 1")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "1"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"
```

```
            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 1", MsgBoxStyle.Information,
"Sukses PC1")
            TextBox1.Clear()
            tex1.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 1", MsgBoxStyle.Information,
"Gagal PC1")
        End If
    End Sub

    Private Sub BT2_Click(sender As
Object, e As EventArgs) Handles BT2.Click
        Komputer.btnDua.Visible = True
        BT2.Enabled = False
        Komputer.btnDua.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 2 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 2")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "2"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 2", MsgBoxStyle.Information,
"Sukses PC2")
            TextBox2.Clear()
            tex2.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 2", MsgBoxStyle.Information,
"Gagal PC2")
        End If
    End Sub

    Private Sub BT3_Click(sender As
Object, e As EventArgs) Handles BT3.Click
        Komputer.btnTiga.Visible = True
        BT3.Enabled = False
        Komputer.btnTiga.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 3 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 3")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "3"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 3", MsgBoxStyle.Information,
"Sukses PC3")
            TextBox3.Clear()
            tex3.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 3", MsgBoxStyle.Information,
"Gagal PC3")
        End If
    End Sub

    Private Sub BT4_Click(sender As
Object, e As EventArgs) Handles BT4.Click
        Komputer.btnEmpat.Visible = True
        BT4.Enabled = False
        Komputer.btnEmpat.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 4 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 4")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "4"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 4", MsgBoxStyle.Information,
"Sukses PC4")
            TextBox4.Clear()
            tex4.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 4", MsgBoxStyle.Information,
"Gagal PC4")
        End If
```

```
    End Sub

    Private Sub BT5_Click(sender As
Object, e As EventArgs) Handles BT5.Click
        Komputer.btnLima.Visible = True
        BT5.Enabled = False
        Komputer.btnLima.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 5 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 5")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "5"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 5", MsgBoxStyle.Information,
"Sukses PC5")
            TextBox5.Clear()
            tex5.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 5", MsgBoxStyle.Information,
"Gagal PC5")
        End If
    End Sub

    Private Sub BT6_Click(sender As
Object, e As EventArgs) Handles BT6.Click
        Komputer.btnEnam.Visible = True
        BT6.Enabled = False
        Komputer.btnEnam.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 6 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 6")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "6"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 6", MsgBoxStyle.Information,
"Sukses PC6")
            TextBox6.Clear()
            tex6.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 6", MsgBoxStyle.Information,
"Gagal PC6")
        End If
    End Sub

    Private Sub BT7_Click(sender As
Object, e As EventArgs) Handles BT7.Click
        Komputer.btnTujuh.Visible = True
        BT7.Enabled = False
        Komputer.btnTujuh.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 7 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 7")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "7"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 7", MsgBoxStyle.Information,
"Sukses PC7")
            TextBox7.Clear()
            tex7.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 7", MsgBoxStyle.Information,
"Gagal PC7")
        End If
    End Sub

    Private Sub BT8_Click(sender As
Object, e As EventArgs) Handles BT8.Click
        Komputer.btnDelapan.Visible = True
        BT8.Enabled = False
        Komputer.btnDelapan.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 8 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 8")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
```

```
            komputer = "8"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 8", MsgBoxStyle.Information,
"Sukses PC8")
            TextBox8.Clear()
            tex8.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 8", MsgBoxStyle.Information,
"Gagal PC8")
        End If
    End Sub

    Private Sub BT9_Click(sender As
Object, e As EventArgs) Handles BT9.Click
        Komputer.btnSembilan.Visible =
True
        BT9.Enabled = False
        Komputer.btnSembilan.Enabled =
True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 9 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 9")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "9"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 9", MsgBoxStyle.Information,
"Sukses PC9")
            TextBox9.Clear()
            tex9.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 9", MsgBoxStyle.Information,
"Gagal PC9")
        End If
    End Sub

    Private Sub BT10_Click(sender As
Object, e As EventArgs) Handles BT10.Click
        Komputer.btnSepuluh.Visible = True
        BT10.Enabled = False
        Komputer.btnSepuluh.Enabled = True
        Dim mau As String
        mau = MsgBox("Anda ingin LOCK PC
no 10 ?", MsgBoxStyle.Question +
MsgBoxStyle.YesNo, "No 10")
        If mau = vbYes Then
            Dim tgl, jamselesai, komputer,
stat As String
            stat = "OFF"
            komputer = "10"
            tgl =
DateTime.Now.ToString("yyyy-MM-dd")
            jamselesai =
DateTime.Now.ToString("HH:mm:ss")
            SQL = "UPDATE `tbllogin` set
`JAMSELESAI`='" & jamselesai & "',
STATS_KOMPUTER='OFF' where  `KOMPUTER`= '"
& komputer & "' and STATS_KOMPUTER='ON'
and `TANGGAL`='" & tgl & "'"

            Proses.ExecuteNonQuery(SQL)
            MsgBox("Anda berhasil stop
koneksi ke PC 10",
MsgBoxStyle.Information, "Sukses PC10")
            TextBox10.Clear()
            tex10.Clear()
            Me.Hide()

        Else
            MsgBox("Anda Gagal stop
koneksi ke PC 10",
MsgBoxStyle.Information, "Gagal PC10")
        End If
    End Sub


        End Class
```

B. Koding *Software* Aplikasi *Lockscreen*

a. *Lock Client*

```
Public Class FormApp
    Dim SQL, nom, status As String
    Dim sudah1, sudah2 As Boolean
    Dim wes1, wes2 As Boolean
    Dim bolExit As Boolean = False
    Dim Proses As New ModMysql2
    Dim myTbl As DataTable
    Public keterangan As Integer
    Dim strHostName As String
    Dim strIPAddress As String
    Sub cek()
        nom = "1"
        Dim sql As String
        status = ""
        sql = "Select `STATS_KOMPUTER`
From `tbllogin` where `KOMPUTER` like '" &
nom & "' order by `ID` desc"
        myTbl = Proses.ExecuteQuery(sql)
        If myTbl.Rows.Count = 0 Then
            lInfo.Text = sql
        Else
            With myTbl.Rows(0)
                status =
.Item("STATS_KOMPUTER")
            End With
            lInfo.Text =
DateTime.Now.ToString("HH:mm:ss") & "#" &
status & "#"
            status = Trim(status)
            If status = "ON" Then

                If keterangan = 0 Then

                    Dim process As
System.Diagnostics.Process = Nothing
                    Dim psi As New
ProcessStartInfo
                    psi.UseShellExecute =
True
                    psi.FileName =
"taskkill.exe"
                    psi.Arguments = "/F
/IM taskmgr.exe"
                    process =
System.Diagnostics.Process.Start(psi)

                    Shell("explorer.exe")

                    strHostName =
System.Net.Dns.GetHostName()

                    strIPAddress =
System.Net.Dns.GetHostByName(strHostName).
AddressList(0).ToString()

                    keterangan = 1
                    Form1.keterangan = 0
                    Form1.Show()

                    Me.Hide()
                End If


            End If
        End If
    End Sub
    Private Sub Timer1_Tick(sender As
Object, e As EventArgs) Handles
Timer1.Tick
        lInfo.Text =
DateTime.Now.ToString("HH:mm:ss")
        cek()
    End Sub

    Private Sub FormApp_Disposed(sender As
Object, e As EventArgs) Handles
Me.Disposed
        SQL = "delete from tblip where
HOST_NAME = '" & strHostName & "'"
        Proses.ExecuteNonQuery(SQL)
    End Sub

    Private Sub FormApp_Load(sender As
Object, e As EventArgs) Handles
MyBase.Load
        keterangan = 0
        Dim process As
System.Diagnostics.Process = Nothing
        Dim psi As New ProcessStartInfo
        psi.UseShellExecute = True
        psi.FileName = "taskkill.exe"
        psi.Arguments = "/F /IM
explorer.exe"
        process =
System.Diagnostics.Process.Start(psi)

        strHostName =
System.Net.Dns.GetHostName()

        strIPAddress =
System.Net.Dns.GetHostByName(strHostName).
AddressList(0).ToString()

        SQL = "Insert into tblip Values
('','" & strHostName & "','" &
strIPAddress & "')"
        Proses.ExecuteNonQuery(SQL)

    End Sub

End Class
```

b. *Unlock Client*

```
Public Class Form1
    Dim SQL, nom, status As String
    Dim sudah1, sudah2 As Boolean
    Dim wes1, wes2 As Boolean
    Dim bolExit As Boolean = False
    Dim Proses As New ModMysql2
    Dim myTbl As DataTable
    Public keterangan As Integer
    Dim strHostName As String
    Dim strIPAddress As String

    Sub cek()

        Dim sql As String
        status = ""
        sql = "Select `STATS_KOMPUTER`
From `tbllogin` where `KOMPUTER` like '" &
nom & "' order by `ID` desc"
        myTbl = Proses.ExecuteQuery(sql)
        If myTbl.Rows.Count = 0 Then
        Else
            With myTbl.Rows(0)
                status =
.Item("STATS_KOMPUTER")
            End With

            status = Trim(status)
            If status = "OFF" Then

                If keterangan = 0 Then


                    Dim process As
System.Diagnostics.Process = Nothing
                    Dim psi As New
ProcessStartInfo
                    psi.UseShellExecute =
True
                    psi.FileName =
"taskkill.exe"
                    psi.Arguments = "/F
/IM explorer.exe"
                    process =
System.Diagnostics.Process.Start(psi)

                    strHostName =
System.Net.Dns.GetHostName()

                    strIPAddress =
System.Net.Dns.GetHostByName(strHostName).
AddressList(0).ToString()

                    keterangan = 1
                    FormApp.keterangan = 0
                    FormApp.Show()



                    Me.Hide()
                End If


            End If

        End If
    End Sub

    Private Sub Form1_Disposed(sender As
Object, e As EventArgs) Handles
Me.Disposed
        SQL = "delete from tblip where
HOST_NAME = '" & strHostName & "'"
        Proses.ExecuteNonQuery(SQL)
    End Sub

    Private Sub LogInfo_Load(sender As
Object, e As EventArgs) Handles
MyBase.Load
        nom = "1"
        status = "OFF"
        sudah1 = False
        sudah2 = False

        wes1 = True
        wes2 = False

        keterangan = 0

        strHostName =
System.Net.Dns.GetHostName()

        strIPAddress =
System.Net.Dns.GetHostByName(strHostName).
AddressList(0).ToString()
    End Sub

    Private Sub tmrCek_Tick(sender As
Object, e As EventArgs) Handles
tmrCek.Tick

        cek()
    End Sub

End Class
```

Lampiran 4. Datasheet RFID Starter Kit-ID12

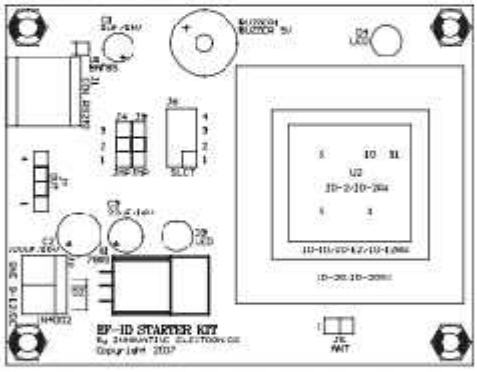
RFID Starter Kit

RFID Starter Kit merupakan suatu sarana pengembangan RFID berbasis reader tipe ID-12 yang telah dilengkapi dengan jalur komunikasi RS-232 serta indikator buzzer dan LED. Modul ini dapat digunakan dalam aplikasi mesin absensi RFID, RFID access controller, dsb.

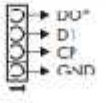
Spesifikasi

1. Berbasis RFID reader ID-12 dengan frekuensi kerja 125 kHz untuk kartu berformat EM4001/sejenis dan memiliki jarak baca maksimal 12 cm.
2. Kompatibel dengan variar RFID reader lainnya, antara lain: ID-2, ID-10, dan ID-20.
3. Mendukung variar RFID reader/writer, antara lain: ID-2RW, ID-12RW, dan ID-20RW.
4. Mendukung format data ASCII (UART TTL/RS-232), Wiegand26, maupun Magnetic ABA Track2 (Magnet Emulation).
5. Dilengkapi dengan buzzer sebagai indikator baca, serta LED sebagai indikator tulis.
6. Tersedia jalur komunikasi serial UART RS-232 dengan konektor RJ11.
7. Tegangan input catu daya 9 - 12 VDC (J2).

Tata Letak dan Setting Jumper



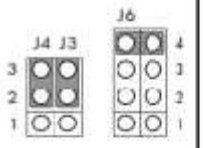
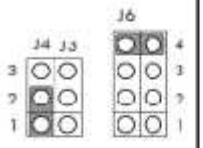
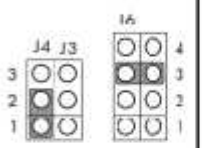
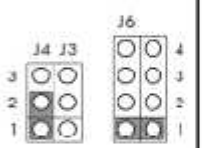
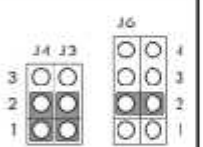
Antena dapat dihubungkan ke J5 untuk RFID reader only atau reader/writer yang memerlukan antena eksternal, seperti ID-2 dan ID-2RW.

Alokasi Pin J7


* = perhatikan setting jumper J3 & J4

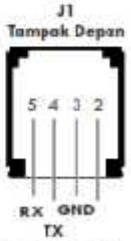
J7 hanya digunakan untuk RFID reader only dalam mode UART TTL (ASCII), Wiegand26, dan Magnet Emulation. J7 tidak boleh digunakan pada mode lain.

Pengaturan jumper J3, J4, dan J6 harus disesuaikan dengan jenis RFID (reader only atau reader/writer) serta format data RFID reader yang akan digunakan.

Setting Jumper J3, J4, & J6	
	RFID reader only dengan format data UART RS-232 (ASCII).
	RFID reader only dengan format data UART TTL (ASCII).
	RFID reader only dengan format data Wiegand26
	RFID reader only dengan format data Magnet Emulation
	RFID reader/writer dengan antarmuka UART RS-232.

Adapun hubungan antara komputer dengan RFID Starter Kit adalah "Straight" dengan konfigurasi sebagai berikut:

COM port Komputer DB9	RFID Starter Kit J1
RX (pin 2)	RX (pin 5)
TX (pin 3)	TX (pin 4)
GND (pin 5)	GND (pin 3)



J1 hanya digunakan untuk RFID reader only dalam mode UART RS-232 (ASCII) dan RFID reader/writer. Pada mode lain, J1 tidak boleh digunakan dan kabel tidak boleh terhubung.

Isi CD

1. Contoh Aplikasi dan Program Testing.
2. Datasheet RFID Reader ID-12.
3. Manual RFID Starter Kit.
4. Website Innovative Electronics

Prosedur Testing

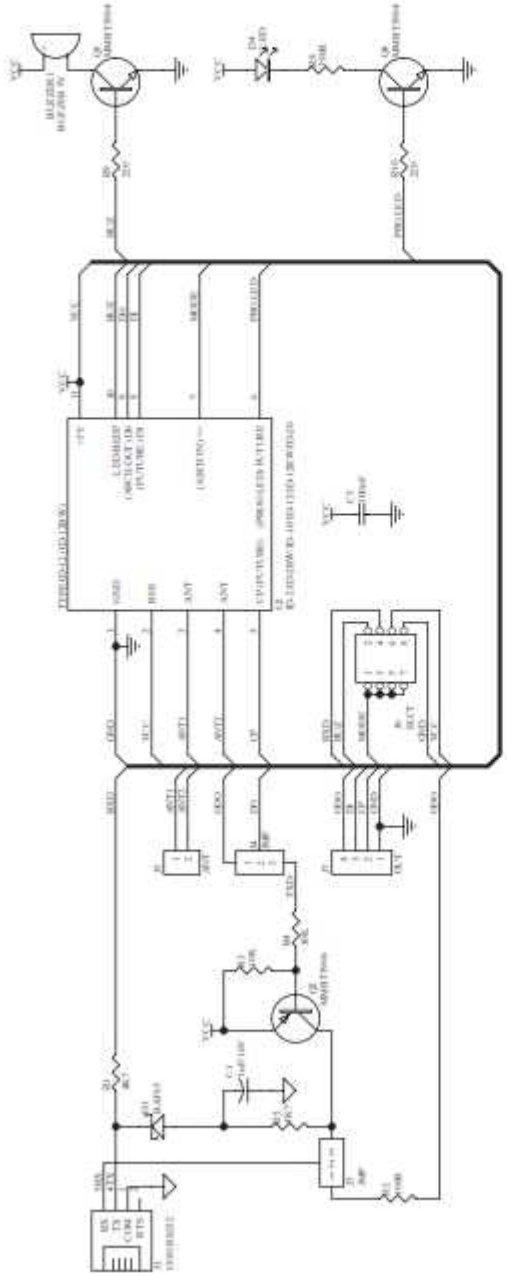
Prosedur testing berikut akan menguji jalur komunikasi RS-232 dan RFID reader ID-12 dalam mode ASCII.

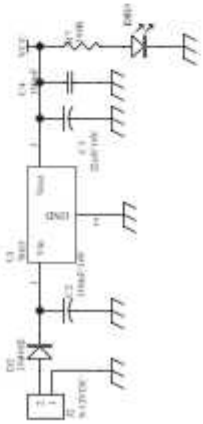
Langkah-langkah testing:

- Atur RFID Starter Kit agar RFID reader ID-12 bekerja pada mode UART RS-232 (ASCII), yaitu jumper J3 & J4 pada posisi 2-3 dan jumper J6 pada posisi 4.
- Hubungkan RJ11 (J1) RFID Starter Kit ke COM port komputer menggunakan kabel serial.
- Hubungkan catu daya 9 VDC ke terminal J2 RFID Starter Kit.
- Jalankan program RFID1.exe, lalu pilih COM port yang sesuai.
- Nyalakan catu daya, lalu dekatkan RFID transponder ke RFID reader. Pada program RFID1.exe akan muncul nomor ID dari RFID transponder tersebut.

❋ ***Terima Kasih atas kepercayaan Anda menggunakan produk kami, bila ada kesulitan, pertanyaan atau saran mengenai produk ini silahkan menghubungi technical support kami :***

Support@innovativeelectronics.com





Lampiran 5. Datasheet ATMega 32

Features

- High-performance, Low-power AVR® 8-bit Microcontroller
- Advanced RISC Architecture
  - 131 Powerful Instructions – Most Single-clock Cycle Execution
  - 32 x 8 General Purpose Working Registers
  - Fully Static Operation
  - Up to 16 MIPS Throughput at 16 MHz
  - On-chip 2-cycle Multiplier
- Nonvolatile Program and Data Memories
  - 32K Bytes of In-System Self-Programmable Flash
    Endurance: 10,000 Write/Erase Cycles
  - Optional Boot Code Section with Independent Lock Bits
    In-System Programming by On-chip Boot Program
    True Read-While-Write Operation
  - 1024 Bytes EEPROM
    Endurance: 100,000 Write/Erase Cycles
  - 2K Byte Internal SRAM
  - Programming Lock for Software Security
- JTAG (IEEE std. 1149.1 Compliant) Interface
  - Boundary-scan Capabilities According to the JTAG Standard
  - Extensive On-chip Debug Support
  - Programming of Flash, EEPROM, Fuses, and Lock Bits through the JTAG Interface
- Peripheral Features
  - Two 8-bit Timer/Counters with Separate Prescalers and Compare Modes
  - One 16-bit Timer/Counter with Separate Prescaler, Compare Mode, and Capture Mode
  - Real Time Counter with Separate Oscillator
  - Four PWM Channels
  - 8-channel, 10-bit ADC
    8 Single-ended Channels
    7 Differential Channels in TQFP Package Only
    2 Differential Channels with Programmable Gain at 1x, 10x, or 200x
  - Byte-oriented Two-wire Serial Interface
  - Programmable Serial USART
  - Master/Slave SPI Serial Interface
  - Programmable Watchdog Timer with Separate On-chip Oscillator
  - On-chip Analog Comparator
- Special Microcontroller Features
  - Power-on Reset and Programmable Brown-out Detection
  - Internal Calibrated RC Oscillator
  - External and Internal Interrupt Sources
  - Six Sleep Modes: Idle, ADC Noise Reduction, Power-save, Power-down, Standby and Extended Standby
- I/O and Packages
  - 32 Programmable I/O Lines
  - 40-pin PDIP, 44-lead TQFP, and 44-pad MLF
- Operating Voltages
  - 2.7 - 5.5V for ATmega32L
  - 4.5 - 5.5V for ATmega32
- Speed Grades
  - 0 - 8 MHz for ATmega32L
  - 0 - 16 MHz for ATmega32
- Power Consumption at 1 MHz, 3V, 25°C for ATmega32L
  - Active: 1.1 mA
  - Idle Mode: 0.35 mA
  - Power-down Mode: < 1 µA

8-bit AVR® Microcontroller with 32K Bytes In-System Programmable Flash

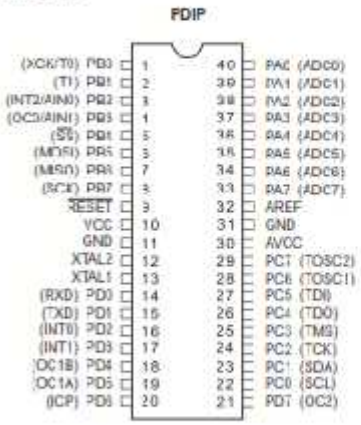
ATmega32
ATmega32L

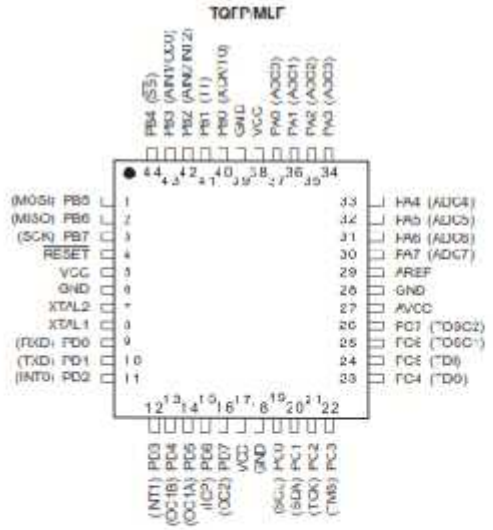
Preliminary

2503F–AVR–12/03

Pin Configurations

Figure 1. Pinouts ATmega32





Disclaimer

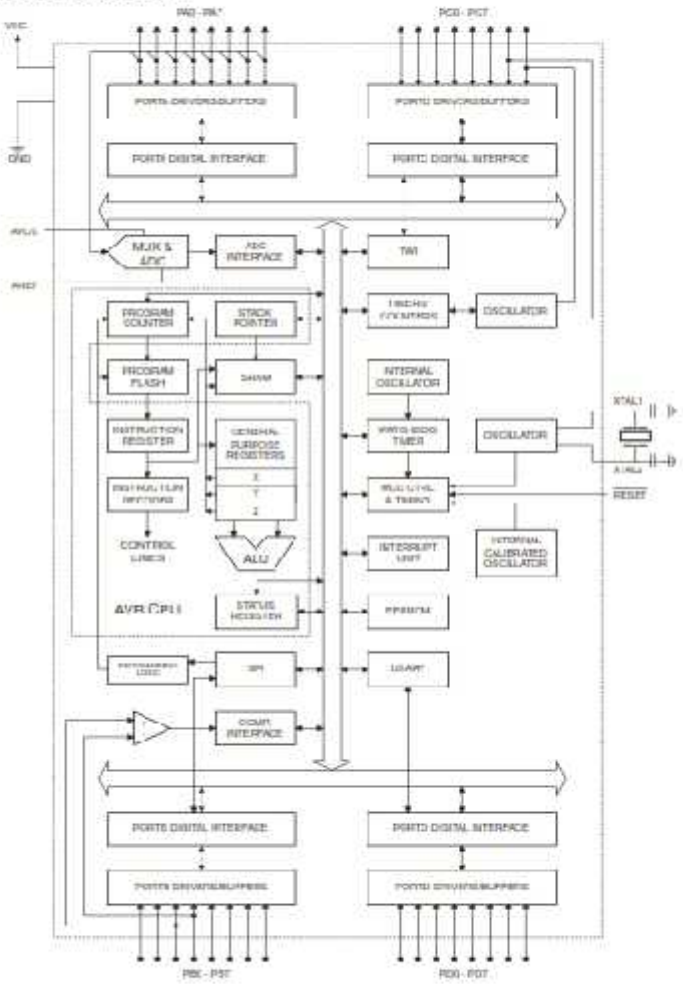
Typical values contained in this datasheet are based on simulations and characterization of other AVR microcontrollers manufactured on the same process technology. Min and Max values will be available after the device is characterized.

Overview

The ATmega32 is a low-power CMOS 8-bit microcontroller based on the AVR enhanced RISC architecture. By executing powerful instructions in a single clock cycle, the ATmega32 achieves throughputs approaching 1 MIPS per MHz allowing the system designer to optimize power consumption versus processing speed.

Block Diagram

Figure 2. Block Diagram



The AVR core combines a rich instruction set with 32 general purpose working registers. All the 32 registers are directly connected to the Arithmetic Logic Unit (ALU), allowing two independent registers to be accessed in one single instruction executed in one clock cycle. The resulting architecture is more code efficient while achieving throughputs up to ten times faster than conventional CISC microcontrollers.

The ATmega32 provides the following features: 32K bytes of In-System Programmable Flash Program memory with Read-While-Write capabilities, 1024 bytes EEPROM, 2K byte SRAM, 32 general purpose I/O lines, 32 general purpose working registers, a JTAG interface for Boundary-scan, On-chip Debugging support and programming, three flexible Timer/Counters with compare modes, Internal and External Interrupts, a serial programmable USART, a byte oriented Two-wire Serial Interface, an 8-channel, 10-bit ADC with optional differential input stage with programmable gain (TQFP package only), a programmable Watchdog Timer with Internal Oscillator, an SPI serial port, and six software selectable power saving modes. The Idle mode stops the CPU while allowing the USART, Two-wire interface, A/D Converter, SRAM, Timer/Counters, SPI port, and interrupt system to continue functioning. The Power-down mode saves the register contents but freezes the Oscillator, disabling all other chip functions until the next External Interrupt or Hardware Reset. In Power-save mode, the Asynchronous Timer continues to run, allowing the user to maintain a timer base while the rest of the device is sleeping. The ADC Noise Reduction mode stops the CPU and all I/O modules except Asynchronous Timer and ADC, to minimize switching noise during ADC conversions. In Standby mode, the crystal/resonator Oscillator is running while the rest of the device is sleeping. This allows very fast start-up combined with low power consumption. In Extended Standby mode, both the main Oscillator and the Asynchronous Timer continue to run.

The device is manufactured using Atmel's high density nonvolatile memory technology. The On-chip ISP Flash allows the program memory to be reprogrammed in-system through an SPI serial interface, by a conventional nonvolatile memory programmer, or by an On-chip Boot program running on the AVR core. The boot program can use any interface to download the application program in the Application Flash memory. Software in the Boot Flash section will continue to run while the Application Flash section is updated, providing true Read-While-Write operation. By combining an 8-bit RISC CPU with In-System Self-Programmable Flash on a monolithic chip, the Atmel ATmega32 is a powerful microcontroller that provides a highly-flexible and cost-effective solution to many embedded control applications.

The ATmega32 AVR is supported with a full suite of program and system development tools including: C compilers, macro assemblers, program debugger/simulators, in-circuit emulators, and evaluation kits.

Pin Descriptions

VCC

Digital supply voltage.

GND

Ground.

Port A (PA7..PA0)

Port A serves as the analog inputs to the A/D Converter.

Port A also serves as an 8-bit bi-directional I/O port, if the A/D Converter is not used. Port pins can provide internal pull-up resistors (selected for each bit). The Port A output buffers have symmetrical drive characteristics with both high sink and source capability. When pins PA0 to PA7 are used as inputs and are externally pulled low, they will source current if the internal pull-up resistors are activated. The Port A pins are tri-stated when a reset condition becomes active, even if the clock is not running.

Port B (PB7..PB0)

Port B is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port B output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port B pins that are externally pulled low will source current if the pull up resistors are activated. The Port B pins are tri-stated when a reset condition becomes active, even if the clock is not running.

Port B also serves the functions of various special features of the ATmega32 as listed on page 55.

Port C (PC7..PC0)

Port C is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port C output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port C pins that are externally pulled low will source current if the pull up resistors are activated. The Port C pins are tri-stated when a reset condition becomes active, even if the clock is not running. If the JTAG interface is enabled, the pull-up resistors on pins PC5(TDI), PC3(TMS) and PC2(TCK) will be activated even if a reset occurs.

The TD0 pin is tri-stated unless TAP states that shift out data are entered.

Port C also serves the functions of the JTAG interface and other special features of the ATmega32 as listed on page 58.

Port D (PD7..PD0)

Port D is an 8-bit bi-directional I/O port with internal pull-up resistors (selected for each bit). The Port D output buffers have symmetrical drive characteristics with both high sink and source capability. As inputs, Port D pins that are externally pulled low will source current if the pull-up resistors are activated. The Port D pins are tri-stated when a reset condition becomes active, even if the clock is not running.

Port D also serves the functions of various special features of the ATmega32 as listed on page 60.

$\overline{\text{RESET}}$

Reset Input. A low level on this pin for longer than the minimum pulse length will generate a reset, even if the clock is not running. The minimum pulse length is given in Table 15 on page 35. Shorter pulses are not guaranteed to generate a reset.

XTAL1

Input to the inverting Oscillator amplifier and input to the internal clock operating circuit.

XTAL2

Output from the inverting Oscillator amplifier.

AVCC

AVCC is the supply voltage pin for Port A and the A/D Converter. It should be externally connected to V_{CC}, even if the ADC is not used. If the ADC is used, it should be connected to V_{CC} through a low-pass filter.

AREF

AREF is the analog reference pin for the A/D Converter.

Register Summary

Address	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Page
(5F) ($5F)	SREG	I	T	H	S	V	N	Z	C	8
(5E) ($5E)	SPH	–	–	–	–	–	SP10	SP9	SP8	9
(5D) ($5D)	SPL	SP7	SP6	SP5	SP4	SP3	SP2	SP1	SP0	9
(5C) ($5C)	OCR0	Timer/Counter0 Output Compare Register								80
(5B) ($5B)	GICR	INT1	INT0	INT2	–	–	–	IVSEL	IVCE	45, 65
(5A) ($5A)	GIFR	INTF1	INTF0	INTF2	–	–	–	–	–	66
(59) ($59)	TIMSK	OCIE2	TOIE2	TICIE1	OCIE1A	OCIE1B	TOIE1	OCIE0	TOIE0	84, 110, 128
(58) ($58)	TIFR	OCF2	TOV2	ICF1	OCF1A	OCF1B	TOV1	OCF0	TOV0	85, 111, 128
(57) ($57)	SPMCR	SPMIE	RWWSB	–	RWWSRE	BLBSET	PGWRT	PGERS	SPMEN	246
(56) ($56)	TWCR	TWINT	TWEA	TWSTA	TWSTO	TWWC	TWEN	–	TWIE	175
(55) ($55)	MCUCR	SE	SM2	SM1	SM0	ISC11	ISC10	ISC01	ISC00	35, 64
(54) ($54)	MCUCSR	JTD	ISC2	–	JTRF	WDRF	BORF	EXTRF	PORF	36, 65, 226
(53) ($53)	TCCR0	FOC0	WGM00	COM01	COM00	WGM01	CS02	CS01	CS00	78
(52) ($52)	TCNT0	Timer/Counter0 (8 Bits)								80
$51[7] ($51)[7]	OSCCAL	Oscillator Calibration Register								28
	OCDR	On-Chip Debug Register								203
(50) ($50)	SFIOR	ADTS2	ADTS1	ADTS0	–	ACME	PUD	PSR2	PSR10	31, 63, 120, 196, 216
(4F) ($4F)	TCCR1A	COM1A1	COM1A0	COM1B1	COM1B0	FOC1A	FOC1B	WGM11	WGM10	105
(4E) ($4E)	TCCR1B	ICNC1	ICES1	–	WGM13	WGM12	CS12	CS11	CS10	108
(4D) ($4D)	TCNT1H	Timer/Counter1 – Counter Register High Byte								109
(4C) ($4C)	TCNT1L	Timer/Counter1 – Counter Register Low Byte								109
(4B) ($4B)	OCR1AH	Timer/Counter1 – Output Compare Register A High Byte								109
(4A) ($4A)	OCR1AL	Timer/Counter1 – Output Compare Register A Low Byte								109
(49) ($49)	OCR1BH	Timer/Counter1 – Output Compare Register B High Byte								109
(48) ($48)	OCR1BL	Timer/Counter1 – Output Compare Register B Low Byte								109
(47) ($47)	ICR1H	Timer/Counter1 – Input Capture Register High Byte								110
(46) ($46)	ICR1L	Timer/Counter1 – Input Capture Register Low Byte								110
(45) ($45)	TCCR2	FOC2	WGM20	COM21	COM20	WGM21	CS22	CS21	CS20	123
(44) ($44)	TCNT2	Timer/Counter2 (8 Bits)								125
(43) ($43)	OCR2	Timer/Counter2 Output Compare Register								125
(42) ($42)	ASSR	–	–	–	–	AS2	TCN2UB	OCR2UB	TCR2UB	126
(41) ($41)	WDTCR	–	–	–	WDTOE	WDE	WDP2	WDP1	WDP0	41
$40[7] ($40)[7]	UBRRH	URSEL	–	–	–	UBRR[11:8]				162
	UCSRC	URSEL	UMSEL	UPM1	UPM0	USBS	UCSZ1	UCSZ0	UCPOL	160
(3F) ($5F)	EIMSK	–	–	–	–	–	–	INT2	INT0	67
(3E) ($3E)	EIFR	–	–	–	–	–	–	INTF2	INTF0	67
(3D) ($3D)	EEARL	EEPROM Address Register Low Byte								21
(3C) ($3C)	EEDR	EEPROM Data Register								21
(3B) ($3B)	EECR	–	–	–	–	EERIE	EEMWE	EEWE	EERE	21
(3A) ($3A)	PORTA	PORTA7	PORTA6	PORTA5	PORTA4	PORTA3	PORTA2	PORTA1	PORTA0	63
(39) ($39)	DDRA	DDA7	DDA6	DDA5	DDA4	DDA3	DDA2	DDA1	DDA0	63
(38) ($38)	PINA	PINA7	PINA6	PINA5	PINA4	PINA3	PINA2	PINA1	PINA0	63
(37) ($37)	PORTB	PORTB7	PORTB6	PORTB5	PORTB4	PORTB3	PORTB2	PORTB1	PORTB0	63
(36) ($36)	DDRB	DDB7	DDB6	DDB5	DDB4	DDB3	DDB2	DDB1	DDB0	63
(35) ($35)	PINB	PINB7	PINB6	PINB5	PINB4	PINB3	PINB2	PINB1	PINB0	63
(34) ($34)	PORTC	PORTC7	PORTC6	PORTC5	PORTC4	PORTC3	PORTC2	PORTC1	PORTC0	63
(33) ($33)	DDRC	DDC7	DDC6	DDC5	DDC4	DDC3	DDC2	DDC1	DDC0	63
(32) ($32)	PINC	PINC7	PINC6	PINC5	PINC4	PINC3	PINC2	PINC1	PINC0	63
(31) ($31)	PORTD	PORTD7	PORTD6	PORTD5	PORTD4	PORTD3	PORTD2	PORTD1	PORTD0	63
(30) ($30)	DDRD	DDD7	DDD6	DDD5	DDD4	DDD3	DDD2	DDD1	DDD0	63
(2F) ($2F)	PIND	PIND7	PIND6	PIND5	PIND4	PIND3	PIND2	PIND1	PIND0	63
(2E) ($2E)	SPDR	SPI Data Register								136
(2D) ($2D)	SPSR	SPIF	WCOL	–	–	–	–	–	SPI2X	136
(2C) ($2C)	SPCR	SPIE	SPE	DORD	MSTR	CPOL	CPHA	SPR1	SPR0	134
(2B) ($2B)	UDR	USART I/O Data Register								157
(2A) ($2A)	UCSRA	RXC	TXC	UDRE	FE	DOR	PE	U2X	MPCM	158
(29) ($29)	UCSRB	RXCIE	TXCIE	UDRIE	RXEN	TXEN	UCSZ2	RXB8	TXB8	159
(28) ($28)	UBRRL	USART Baud Rate Register Low Byte								162
(27) ($27)	ACSR	ACD	ACBG	ACO	ACI	ACIE	ACIC	ACIS1	ACIS0	197
(26) ($26)	ADMUX	REFS1	REFS0	ADLAR	MUX4	MUX3	MUX2	MUX1	MUX0	212
(25) ($25)	ADCSRA	ADEN	ADSC	ADFR	ADIF	ADIE	ADPS2	ADPS1	ADPS0	214
(24) ($24)	ADCL	ADC Data Register Low Byte								215
(23) ($23)	ADCH	ADC Data Register High Byte								215
(22) ($22)	TWDR	Two-wire Serial Interface Data Register								177
(21) ($21)	TWAR	TWA6	TWA5	TWA4	TWA3	TWA2	TWA1	TWA0	TWGCE	177

Address	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Page
$21 ($41)	TWDR	TWD7	TWD6	TWD5	TWD4	TWD3	TWD2	TWD1	TWD0	179
$20 ($40)	TWAR	Two-wire Serial Interface Slave Address Register								179

Notes:
1. When the OCDEN Fuse is unprogrammed, the OSCCAL Register is always accessed on this address. Refer to the debugger specific documentation for details on how to use the OCDR Register.
2. Refer to the USART description for details on how to access UBRRH and UCSRC.
3. For compatibility with future devices, reserved bits should be written to zero if accessed. Reserved I/O memory addresses should never be written.
4. Some of the Status Flags are cleared by writing a logical one to them. Note that the CBI and SBI instructions will operate on all bits in the I/O Register, writing a one back into any flag read as set, thus clearing the flag. The CBI and SBI instructions work with registers $00 to $1F only.

Instruction Set Summary

Mnemonics	Operands	Description	Operation	Flags	#Clocks
ARITHMETIC AND LOGIC INSTRUCTIONS					
ADD	Rd, Rr	Add two Registers	Rd ← Rd + Rr	Z,C,N,V,H	1
ADC	Rd, Rr	Add with Carry two Registers	Rd ← Rd + Rr + C	Z,C,N,V,H	1
ADIW	Rdl,K	Add Immediate to Word	Rdh:Rdl ← Rdh:Rdl + K	Z,C,N,V,S	2
SUB	Rd, Rr	Subtract two Registers	Rd ← Rd - Rr	Z,C,N,V,H	1
SUBI	Rd, K	Subtract Constant from Register	Rd ← Rd - K	Z,C,N,V,H	1
SBC	Rd, Rr	Subtract with Carry two Registers	Rd ← Rd - Rr - C	Z,C,N,V,H	1
SBCI	Rd, K	Subtract with Carry Constant from Reg.	Rd ← Rd - K - C	Z,C,N,V,H	1
SBIW	Rdl,K	Subtract Immediate from Word	Rdh:Rdl ← Rdh:Rdl - K	Z,C,N,V,S	2
AND	Rd, Rr	Logical AND Registers	Rd ← Rd • Rr	Z,N,V	1
ANDI	Rd, K	Logical AND Register and Constant	Rd ← Rd • K	Z,N,V	1
OR	Rd, Rr	Logical OR Registers	Rd ← Rd v Rr	Z,N,V	1
ORI	Rd, K	Logical OR Register and Constant	Rd ← Rd v K	Z,N,V	1
EOR	Rd, Rr	Exclusive OR Registers	Rd ← Rd ⊕ Rr	Z,N,V	1
COM	Rd	One's Complement	Rd ← $FF - Rd	Z,C,N,V	1
NEG	Rd	Two's Complement	Rd ← $00 - Rd	Z,C,N,V,H	1
SBR	Rd,K	Set Bit(s) in Register	Rd ← Rd v K	Z,N,V	1
CBR	Rd,K	Clear Bit(s) in Register	Rd ← Rd • ($FF - K)	Z,N,V	1
INC	Rd	Increment	Rd ← Rd + 1	Z,N,V	1
DEC	Rd	Decrement	Rd ← Rd - 1	Z,N,V	1
TST	Rd	Test for Zero or Minus	Rd ← Rd • Rd	Z,N,V	1
CLR	Rd	Clear Register	Rd ← Rd ⊕ Rd	Z,N,V	1
SER	Rd	Set Register	Rd ← $FF	None	1
MUL	Rd, Rr	Multiply Unsigned	R1:R0 ← Rd x Rr	Z,C	2
MULS	Rd, Rr	Multiply Signed	R1:R0 ← Rd x Rr	Z,C	2
MULSU	Rd, Rr	Multiply Signed with Unsigned	R1:R0 ← Rd x Rr	Z,C	2
FMUL	Rd, Rr	Fractional Multiply Unsigned	R1:R0 ← (Rd x Rr) << 1	Z,C	2
FMULS	Rd, Rr	Fractional Multiply Signed	R1:R0 ← (Rd x Rr) << 1	Z,C	2
FMULSU	Rd, Rr	Fractional Multiply Signed with Unsigned	R1:R0 ← (Rd x Rr) << 1	Z,C	2
BRANCH INSTRUCTIONS					
RJMP	k	Relative Jump	PC ← PC + k + 1	None	2
IJMP		Indirect Jump to (Z)	PC ← Z	None	2
JMP	k	Direct Jump	PC ← k	None	3
RCALL	k	Relative Subroutine Call	PC ← PC + k + 1	None	3
ICALL		Indirect Call to (Z)	PC ← Z	None	3
CALL	k	Direct Subroutine Call	PC ← k	None	4
RET		Subroutine Return	PC ← Stack	None	4
RETI		Interrupt Return	PC ← Stack	I	4
CPSE	Rd,Rr	Compare, Skip if Equal	if (Rd = Rr) PC ← PC + 2 or 3	None	1 / 2 / 3
CP	Rd,Rr	Compare	Rd - Rr	Z,N,V,C,H	1
CPC	Rd,Rr	Compare with Carry	Rd - Rr - C	Z,N,V,C,H	1
CPI	Rd,K	Compare Register with Immediate	Rd - K	Z,N,V,C,H	1
SBRC	Rr, b	Skip if Bit in Register Cleared	if (Rr(b)=0) PC ← PC + 2 or 3	None	1 / 2 / 3
SBRS	Rr, b	Skip if Bit in Register is Set	if (Rr(b)=1) PC ← PC + 2 or 3	None	1 / 2 / 3
SBIC	P, b	Skip if Bit in I/O Register Cleared	if (P(b)=0) PC ← PC + 2 or 3	None	1 / 2 / 3
SBIS	P, b	Skip if Bit in I/O Register is Set	if (P(b)=1) PC ← PC + 2 or 3	None	1 / 2 / 3
BRBS	s, k	Branch if Status Flag Set	if (SREG(s) = 1) then PC ← PC+k + 1	None	1 / 2
BRBC	s, k	Branch if Status Flag Cleared	if (SREG(s) = 0) then PC ← PC+k + 1	None	1 / 2
BREQ	k	Branch if Equal	if (Z = 1) then PC ← PC + k + 1	None	1 / 2
BRNE	k	Branch if Not Equal	if (Z = 0) then PC ← PC + k + 1	None	1 / 2
BRCS	k	Branch if Carry Set	if (C = 1) then PC ← PC + k + 1	None	1 / 2
BRCC	k	Branch if Carry Cleared	if (C = 0) then PC ← PC + k + 1	None	1 / 2
BRSH	k	Branch if Same or Higher	if (C = 0) then PC ← PC + k + 1	None	1 / 2
BRLO	k	Branch if Lower	if (C = 1) then PC ← PC + k + 1	None	1 / 2
BRMI	k	Branch if Minus	if (N = 1) then PC ← PC + k + 1	None	1 / 2
BRPL	k	Branch if Plus	if (N = 0) then PC ← PC + k + 1	None	1 / 2
BRGE	k	Branch if Greater or Equal, Signed	if (N ⊕ V= 0) then PC ← PC + k + 1	None	1 / 2
BRLT	k	Branch if Less Than Zero, Signed	if (N ⊕ V= 1) then PC ← PC + k + 1	None	1 / 2
BRHS	k	Branch if Half Carry Flag Set	if (H = 1) then PC ← PC + k + 1	None	1 / 2
BRHC	k	Branch if Half Carry Flag Cleared	if (H = 0) then PC ← PC + k + 1	None	1 / 2
BRTS	k	Branch if T Flag Set	if (T = 1) then PC ← PC + k + 1	None	1 / 2
BRTC	k	Branch if T Flag Cleared	if (T = 0) then PC ← PC + k + 1	None	1 / 2
BRVS	k	Branch if Overflow Flag is Set	if (V = 1) then PC ← PC + k + 1	None	1 / 2
BRVC	k	Branch if Overflow Flag is Cleared	if (V = 0) then PC ← PC + k + 1	None	1 / 2

Mnemonics	Operands	Description	Operation	Flags	#Clocks
BRIE	k	Branch if Interrupt Enabled	if (I = 1) then PC ← PC + k + 1	None	1 / 2
BRID	k	Branch if Interrupt Disabled	if (I = 0) then PC ← PC + k + 1	None	1 / 2
DATA TRANSFER INSTRUCTIONS					
MOV	Rd, Rr	Move Between Registers	Rd ← Rr	None	1
MOVW	Rd, Rr	Copy Register Word	Rd+1:Rd ← Rr+1:Rr	None	1
LDI	Rd, K	Load Immediate	Rd ← K	None	1
LD	Rd, X	Load Indirect	Rd ← (X)	None	2
LD	Rd, X+	Load Indirect and Post-Inc.	Rd ← (X), X ← X + 1	None	2
LD	Rd, - X	Load Indirect and Pre-Dec.	X ← X - 1, Rd ← (X)	None	2
LD	Rd, Y	Load Indirect	Rd ← (Y)	None	2
LD	Rd, Y+	Load Indirect and Post-Inc.	Rd ← (Y), Y ← Y + 1	None	2
LD	Rd, - Y	Load Indirect and Pre-Dec.	Y ← Y - 1, Rd ← (Y)	None	2
LDD	Rd,Y+q	Load Indirect with Displacement	Rd ← (Y + q)	None	2
LD	Rd, Z	Load Indirect	Rd ← (Z)	None	2
LD	Rd, Z+	Load Indirect and Post-Inc.	Rd ← (Z), Z ← Z+1	None	2
LD	Rd, -Z	Load Indirect and Pre-Dec.	Z ← Z - 1, Rd ← (Z)	None	2
LDD	Rd, Z+q	Load Indirect with Displacement	Rd ← (Z + q)	None	2
LDS	Rd, k	Load Direct from SRAM	Rd ← (k)	None	2
ST	X, Rr	Store Indirect	(X) ← Rr	None	2
ST	X+, Rr	Store Indirect and Post-Inc.	(X) ← Rr, X ← X + 1	None	2
ST	- X, Rr	Store Indirect and Pre-Dec.	X ← X - 1, (X) ← Rr	None	2
ST	Y, Rr	Store Indirect	(Y) ← Rr	None	2
ST	Y+, Rr	Store Indirect and Post-Inc.	(Y) ← Rr, Y ← Y + 1	None	2
ST	- Y, Rr	Store Indirect and Pre-Dec.	Y ← Y - 1, (Y) ← Rr	None	2
STD	Y+q,Rr	Store Indirect with Displacement	(Y + q) ← Rr	None	2
ST	Z, Rr	Store Indirect	(Z) ← Rr	None	2
ST	Z+, Rr	Store Indirect and Post-Inc.	(Z) ← Rr, Z ← Z + 1	None	2
ST	-Z, Rr	Store Indirect and Pre-Dec.	Z ← Z - 1, (Z) ← Rr	None	2
STD	Z+q,Rr	Store Indirect with Displacement	(Z + q) ← Rr	None	2
STS	k, Rr	Store Direct to SRAM	(k) ← Rr	None	2
LPM		Load Program Memory	R0 ← (Z)	None	3
LPM	Rd, Z	Load Program Memory	Rd ← (Z)	None	3
LPM	Rd, Z+	Load Program Memory and Post-Inc	Rd ← (Z), Z ← Z+1	None	3
SPM		Store Program Memory	(Z) ← R1:R0	None	-
IN	Rd, P	In Port	Rd ← P	None	1
OUT	P, Rr	Out Port	P ← Rr	None	1
PUSH	Rr	Push Register on Stack	Stack ← Rr	None	2
POP	Rd	Pop Register from Stack	Rd ← Stack	None	2
BIT AND BIT-TEST INSTRUCTIONS					
SBI	P,b	Set Bit in I/O Register	I/O(P,b) ← 1	None	2
CBI	P,b	Clear Bit in I/O Register	I/O(P,b) ← 0	None	2
LSL	Rd	Logical Shift Left	Rd(n+1) ← Rd(n), Rd(0) ← 0	Z,C,N,V	1
LSR	Rd	Logical Shift Right	Rd(n) ← Rd(n+1), Rd(7) ← 0	Z,C,N,V	1
ROL	Rd	Rotate Left Through Carry	Rd(0)← C,Rd(n+1) ← Rd(n),C← Rd(7)	Z,C,N,V	1
ROR	Rd	Rotate Right Through Carry	Rd(7)← C,Rd(n)← Rd(n+1),C← Rd(0)	Z,C,N,V	1
ASR	Rd	Arithmetic Shift Right	Rd(n) ← Rd(n+1), n=0..6	Z,C,N,V	1
SWAP	Rd	Swap Nibbles	Rd(3..0)← Rd(7..4),Rd(7..4)← Rd(3..0)	None	1
BSET	s	Flag Set	SREG(s) ← 1	SREG(s)	1
BCLR	s	Flag Clear	SREG(s) ← 0	SREG(s)	1
BST	Rr, b	Bit Store from Register to T	T ← Rr(b)	T	1
BLD	Rd, b	Bit load from T to Register	Rd(b) ← T	None	1
SEC		Set Carry	C ← 1	C	1
CLC		Clear Carry	C ← 0	C	1
SEN		Set Negative Flag	N ← 1	N	1
CLN		Clear Negative Flag	N ← 0	N	1
SEZ		Set Zero Flag	Z ← 1	Z	1
CLZ		Clear Zero Flag	Z ← 0	Z	1
SEI		Global Interrupt Enable	I ← 1	I	1
CLI		Global Interrupt Disable	I ← 0	I	1
SES		Set Signed Test Flag	S ← 1	S	1
CLS		Clear Signed Test Flag	S ← 0	S	1
SEV		Set Two's Complement Overflow	V ← 1	V	1
CLV		Clear Two's Complement Overflow	V ← 0	V	1
SET		Set T in SREG	T ← 1	T	1
CLT		Clear T in SREG	T ← 0	T	1
SEH		Set Half Carry Flag in SREG	H ← 1	H	1

Mnemonics	Operands	Description	Operation	Flags	#Clocks
CLH		Clear Half Carry Flag in SREG	H ← 0	H	1
MCU CONTROL INSTRUCTIONS					
NOP		No Operation		None	1
SLEEP		Sleep	(see specific descr. for Sleep function)	None	1
WDR		Watchdog Reset	(see specific descr. for WDR/timer)	None	1
BREAK		Break	For On-Chip Debug Only	None	N/A

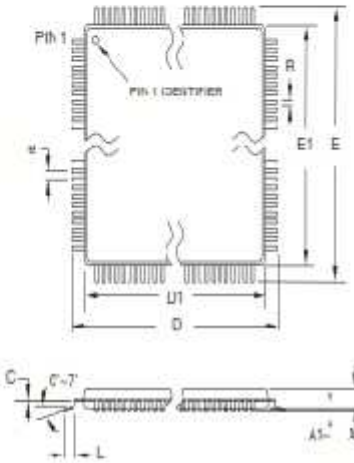
Ordering Information

Speed (MHz)	Power Supply	Ordering Code	Package	Operation Range
8	2.7 - 5.5V	ATmega32L-8AC ATmega32L-8PC ATmega32L-8MC	44A 40P6 44M1	Commercial (0°C to 70°C)
		ATmega32L-8AI ATmega32L-8PI ATmega32L-8MI	44A 40P6 44M1	Industrial (-40°C to 85°C)
16	4.5 - 5.5V	ATmega32-16AC ATmega32-16PC ATmega32-16MI	44A 40P6 44M1	Commercial (0°C to 70°C)
		ATmega32-16AI ATmega32-16PI ATmega32-16MC	44A 40P6 44M1	Industrial (-40°C to 85°C)

Package Type	
44A	44-lead, Thin (1.0 mm) Plastic Gull Wing Quad Flat Package (TQFP)
40P6	40-pin, 0.600" Wide, Plastic Dual Inline Package (PDIP)
44M1	44-pad, 7 x 7 x 1.0 mm body, lead pitch 0.50 mm, Micro Lead Frame Package (MLF)

Packaging Information

44A



COMMON DIMENSIONS
(Unit of Measure = mm)

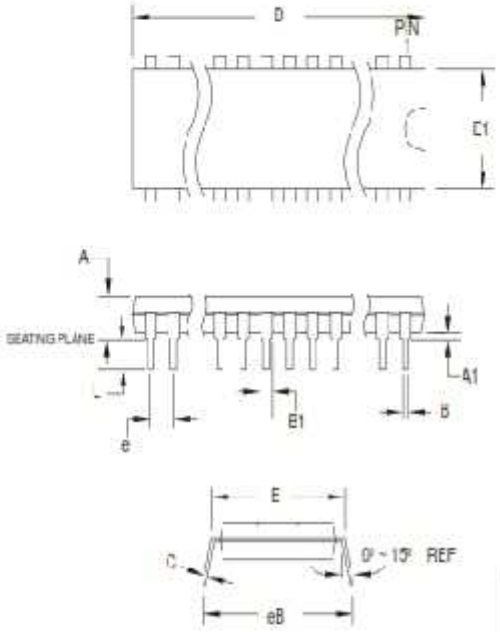
SYMBOL	MIN	NOM	MAX	NOTE
A	–	–	1.20	
A1	0.05		0.15	
A2	0.95	1.00	1.05	
D	11.75	12.00	12.25	
D1	9.90	10.00	10.10	Note 2
E	11.75	12.00	12.25	
E1	9.90	10.00	10.10	Note 2
B	0.30	–	0.45	
C	0.09		0.20	
L	0.45	–	0.75	
e		0.80 TYP		

Notes:
1. This package conforms to JEDEC reference MS-026, Variation ACB.
2. Dimensions D1 and E1 do not include mold protrusion. Allowable protrusion is 0.25 mm per side. Dimensions D1 and E1 are maximum plastic body size dimensions including mold mismatch.
3. Lead coplanarity is 0.10 mm maximum.

10/5/2001

	TITLE	DRAWING NO.	REV.
2325 Orchard Parkway San Jose, CA 95131	44A, 44-lead, 10 x 10 mm Body Size, 1.0 mm Body Thickness, 0.8mm Lead Pitch, Thin Profile Plastic Quad Flat Package (TQFP)	44A	B

40P6



COMMON DIMENSIONS
(Unit of Measure – mm)

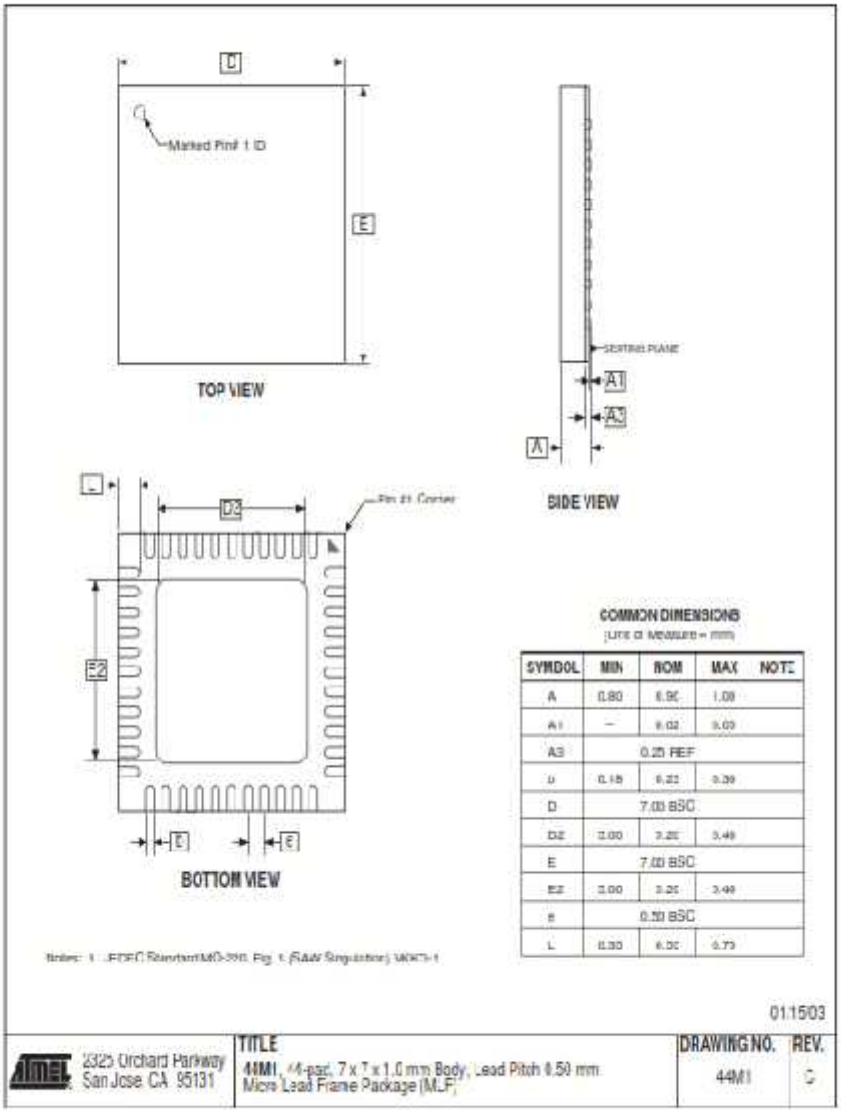
SYMBOL	MIN	NOM	MAX	NOTE
A	–	–	4.826	
A1	0.381	–	–	
D	52.070	–	52.578	Note 2
E	15.240		15.875	
E1	13.462	–	13.970	Note 2
B	0.356		0.559	
B1	1.041	–	1.651	
L	3.048	–	3.556	
C	0.203	–	0.381	
eD	15.494	–	17.526	
e	2.540 TYP			

Notes: 1. This package conforms to JEDEC reference MS-011, Variation AC.
2. Dimensions D and E1 do not include mold Flash or Protrusion. Mold Flash or Protrusion shall not exceed 0.25 mm (0.010").

09/28/01

	TITLE	DRAWING NO.	REV.
2325 Orchard Parkway San Jose, CA 95131	40P6, 40-lead (0.600"/15.24 mm Wide) Plastic Dual Inline Package (PDIP)	40P6	B

44M1



COMMON DIMENSIONS
(Unit of Measure = mm)

SYMBOL	MIN	NOM	MAX	NOTE
A	0.80	0.90	1.00	
A1	–	0.02	0.05	
A3		0.25 REF		
b	0.18	0.23	0.30	
D		7.00 BSC		
D2	5.00	5.20	5.40	
E		7.00 BSC		
E2	5.00	5.20	5.40	
e		0.50 BSC		
L	0.30	0.40	0.50	

Notes: 1. JEDEC Standard MO-220, Fig. 1, (Saw Singulation) VKKD-1

01/15/03

	TITLE	DRAWING NO.	REV.
2325 Orchard Parkway San Jose, CA 95131	44M1, 44-pad, 7 x 7 x 1.0 mm Body, Lead Pitch 0.50 mm Micro Lead Frame Package (MLF)	44M1	C

Lampiran 6. Daftar Riwayat Hidup

DAFTAR RIWAYAT HIDUP

Data Pribadi

Nama Lengkap	:	Cahyo Agus Nugroho
Tempat, Tanggal Lahir	:	Jakarta, 3 Agustus 1992
Jenis Kelamin	:	Laki-laki
Agama	:	Islam
Status Perkawinan	:	Belum Menikah
Alamat	:	JL. Swadaya II Rt01/08 No.77, Jatiranggon, Jatisampurna, Bekasi. 17432
E-mail	:	nugrohoaguscahyo03@gmail.com

Pendidikan Formal

1998 – 2004	:	SDN Jatimurni III Bekasi
2004 – 2007	:	SMPN 283 Jakarta
2007 – 2010	:	SMAN 67 Jakarta
2010 – Sekarang	:	Universitas Negeri Jakarta, Fakultas Teknik, Jurusan Teknik Elektro, Program Studi S1 Pendidikan Teknik Elektronika.

Demikian daftar riwayat hidup ini saya buat dengan sebenar-benarnya dan dapat dipertanggung jawabkan serta dipergunakan sebagaimana mestinya.