LAMPIRAN A

Listing Program Server dan Client

PROGRAM SERVER GERBANG TOL MASUK

```
Private Sub bntConnect_Click()
On Error GoTo t
sock1.Close
sock1.RemoteHost = txtIP
sock1.RemotePort = txtPort
sock1.Connect
Exit Sub
t:
MsgBox "Error : " & Err.Description, vbCritical
End Sub
Private Sub bntExit_Click()
End
End Sub
Private Sub bntSend_Click()
On Error GoTo t
sock1.SendData txtSend
txtLog = txtLog & "Client : " & txtSend & vbCrLf
txtSend = ""
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub

Private Sub DEC_Change()
DECHEX.Text = Hex(DEC.Text)
End Sub
```

```
Private Sub Dec_val_Click()
txtLog.Text = ""
decval.Text = ""
Timer5.Enabled = True
On Error GoTo t
Do While (Len(DECHEX.Text) < 8)
DECHEX.Text = "0" & DECHEX.Text
Loop
sock1.SendData "-" & Block2.Text & DECHEX.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Form_Load()
ClientFrm.Height = 1335
ClientFrm.Width = 3765
End Sub

Private Sub ID_capture_Click()
txtLog.Text = ""
Result_2.Text = ""
Timer2.Enabled = True
On Error GoTo t
sock1.SendData "s"
Exit Sub
t:
MsgBox "Error : " & Err.Description
```

```
sock1_Close
End Sub

Private Sub Login_Click()

Result_3.Text = ""
txtLog.Text = ""
Timer3.Enabled = True
On Error GoTo t
sock1.SendData "l" & block.Text & "AA" & KEY
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Read_Click()
txtLog.Text = ""
RD.Text = ""
Timer6.Enabled = True
On Error GoTo t
sock1.SendData "r" & Block3.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Read_val_Click()

Timer14.Enabled = True
```

```
txtLog.Text = ""
RV.Text = ""
Timer4.Enabled = True
On Error GoTo t
sock1.SendData "rv" & Block2.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close

End Sub
Private Sub RESET_Click()
txtLog.Text = ""
Result_1.Text = ""
Timer1.Enabled = True
On Error GoTo t
sock1.SendData "x"
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub

Private Sub sock1_Close()
sock1.Close
txtLog = txtLog & "*** Disconnected" & vbCrLf
Timer8.Enabled = True
ClientFrm.Height = 1335
ClientFrm.Width = 4800
```

```
RD.Text = ""
Result_1.Text = ""
Result_2.Text = ""
Result_3.Text = ""
Text_3.Text = ""


Timer1.Enabled = True
Timer2.Enabled = True
Timer3.Enabled = True
Timer4.Enabled = True
Timer5.Enabled = True
Timer6.Enabled = True
Timer7.Enabled = True
Timer8.Enabled = True
Timer9.Enabled = True
Timer10.Enabled = True
Timer11.Enabled = True
Timer12.Enabled = True
Timer13.Enabled = True
Timer14.Enabled = True

End Sub
Private Sub sock1_Connect()
txtLog = "Connected to " & sock1.RemoteHostIP & vbCrLf
Timer8.Enabled = False
ClientFrm.Height = 4200
ClientFrm.Width = 3765
End Sub
```

```
Private Sub sock1_DataArrival(ByVal bytesTotal As Long)

Dim dat As String

sock1.GetData dat, vbString

If Timer1.Enabled = True Then Result_1.Text = Result_1.Text + dat

If Timer2.Enabled = True Then Result_2.Text = Result_2.Text + dat

If Timer3.Enabled = True Then Result_3.Text = Result_3.Text + dat

If Timer4.Enabled = True Then RV.Text = RV.Text + dat

If Timer5.Enabled = True Then decval.Text = decval.Text + dat

If Timer6.Enabled = True Then RD.Text = RD.Text + dat

If Timer7.Enabled = True Then WRT.Text = WRT.Text + dat

txtLog = txtLog & dat & vbCrLf

End Sub

Private Sub sock1_Error(ByVal Number As Integer, Description As String, ByVal Scode As
Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long,
CancelDisplay As Boolean)

txtLog = txtLog & "*** Error : " & Description & vbCrLf

sock1_Close

End Sub



Private Sub Timer1_Timer()

Timer1.Enabled = False

End Sub


Private Sub Timer10_Timer()

If Timer8.Enabled = False Then

Call RESET_Click

Timer10.Enabled = False

End If
```

```
End Sub

Private Sub Timer11_Timer()
If Timer8.Enabled = False And Len(Result_2.Text) < 6 Then
Call ID_capture_Click
Timer11.Enabled = False
End If
End Sub

Private Sub Timer12_Timer()
If Timer8.Enabled = False And Len(Result_3.Text) < 6 Then
Call Login_Click
Timer12.Enabled = False
End If
End Sub

Private Sub Timer13_Timer()
If Timer8.Enabled = False And Len(Text3.Text) < 6 Then
Call Read_val_Click
Timer13.Enabled = False
End If
End Sub

Private Sub Timer14_Timer()
If Val(Text3.Text) > 5000 Then
Call Write_Click
End If
Timer14.Enabled = False
```

```
End Sub


Private Sub Timer2_Timer()
Timer2.Enabled = False
End Sub
Private Sub Timer3_Timer()
Timer3.Enabled = False
End Sub
Private Sub Timer4_Timer()
Timer4.Enabled = False
End Sub
Private Sub Timer5_Timer()
Timer5.Enabled = False
End Sub
Private Sub Timer6_Timer()
Timer6.Enabled = False
End Sub
Private Sub Timer7_Timer()
Timer7.Enabled = False
End Sub
Private Sub Timer8_Timer()
Call bntConnect_Click
End Sub
Private Sub Timer9_Timer()
Text3.Text = (Val(Mid(RV.Text, 1, 1)) * 268435456) + (Val(Mid(RV.Text, 2, 1)) *
16777216) + (Val(Mid(RV.Text, 3, 1)) * 1048576) + (Val(Mid(RV.Text, 4, 1)) * 65536) +
(Val(Mid(RV.Text, 5, 1)) * 4096) + (Val(Mid(RV.Text, 6, 1)) * 256) + (Val(Mid(RV.Text, 7,
1)) * 16) + (Val(Mid(RV.Text, 8, 1)))
For i = 1 To 8
Text2.Text = 0
```

```
Select Case Mid(RV.Text, i, 1)
Case "A"
Text2.Text = 10
Case "B"
Text2.Text = 11
Case "C"
Text2.Text = 12
Case "D"
Text2.Text = 13
Case "E"
Text2.Text = 14
Case "F"
Text2.Text = 15
End Select
Select Case i
Case 1
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 268435456
Case 2
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16777216
Case 3
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 1048576
Case 4
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 65536
Case 5
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 4096
Case 6
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 256
Case 7
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16
```

```
Case 8
Text3.Text = Val(Text3.Text) + Val(Text2.Text)
End Select
Next i
```

```
Text4.Text = (Val(Mid(decval.Text, 1, 1)) * 268435456) + (Val(Mid(decval.Text, 2, 1)) * 16777216) + (Val(Mid(decval.Text, 3, 1)) * 1048576) + (Val(Mid(decval.Text, 4, 1)) * 65536) + (Val(Mid(decval.Text, 5, 1)) * 4096) + (Val(Mid(decval.Text, 6, 1)) * 256) + (Val(Mid(decval.Text, 7, 1)) * 16) + (Val(Mid(decval.Text, 8, 1)))
For i = 1 To 8
Text1.Text = 0
Select Case Mid(decval.Text, i, 1)
Case "A"
Text1.Text = 10
Case "B"
Text1.Text = 11
Case "C"
Text1.Text = 12
Case "D"
Text1.Text = 13
Case "E"
Text1.Text = 14
Case "F"
Text1.Text = 15
End Select
Select Case i
Case 1
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 268435456
```

```
Case 2
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16777216
Case 3
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 1048576
Case 4
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 65536
Case 5
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 4096
Case 6
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 256
Case 7
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16
Case 8
Text4.Text = Val(Text4.Text) + Val(Text1.Text)
End Select
Next i

End Sub

Private Sub Write_Click()

wrtval.Text = ""

i = Len(Combo1.Text)
For y = 1 To i
wrtval.Text = Hex(Asc(Right(Combo1.Text, y))) + wrtval.Text
Next y
```

```
Do While (Len(wrtval.Text) < 32)
wrtval.Text = "0" & wrtval.Text
Loop

txtLog.Text = ""
WRT.Text = ""
Timer7.Enabled = True
On Error GoTo t
sock1.SendData "w" & Block3.Text & wrtval.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close



End Sub
```

PROGRAM SERVER GERBANG TOL KELUAR PADALARANG

```
Private Sub bntConnect_Click()
On Error GoTo t
sock1.Close
sock1.RemoteHost = txtIP
sock1.RemotePort = txtPort
sock1.Connect
Exit Sub
t:
MsgBox "Error : " & Err.Description, vbCritical
End Sub
```

```
Private Sub bntExit_Click()
End
End Sub
Private Sub bntSend_Click()
On Error GoTo t
sock1.SendData txtSend
txtLog = txtLog & "Client : " & txtSend & vbCrLf
txtSend = ""
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub DEC_Change()
DECHEX.Text = Hex(DEC.Text)
End Sub

Private Sub Dec_val_Click()
txtLog.Text = ""
decval.Text = ""
Timer5.Enabled = True
On Error GoTo t
Do While (Len(DECHEX.Text) < 8)
DECHEX.Text = "0" & DECHEX.Text
Loop
sock1.SendData "-" & Block2.Text & DECHEX.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
```

```
sock1_Close
End Sub

Private Sub Form_Load()
Picture2.Left = 14100

ClientFrm.Height = 1335
ClientFrm.Width = 4800
End Sub
Private Sub ID_capture_Click()
txtLog.Text = ""
Result_2.Text = ""
Timer2.Enabled = True
On Error GoTo t
sock1.SendData "s"
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Login_Click()
Result_3.Text = ""
txtLog.Text = ""
Timer3.Enabled = True
On Error GoTo t
sock1.SendData "l" & block.Text & "AA" & KEY
Exit Sub
t:
MsgBox "Error : " & Err.Description
```

```
sock1_Close
End Sub

Private Sub Read_Click()
Timer15.Enabled = True

txtLog.Text = ""
RD.Text = ""
Timer6.Enabled = True
On Error GoTo t
sock1.SendData "r" & Block3.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Read_val_Click()
txtLog.Text = ""
RV.Text = ""
Timer4.Enabled = True
On Error GoTo t
sock1.SendData "rv" & Block2.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub RESET_Click()
txtLog.Text = ""
```

```
Result_1.Text = ""
Timer1.Enabled = True
On Error GoTo t
sock1.SendData "x"
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub sock1_Close()
sock1.Close
txtLog = txtLog & "*** Disconnected" & vbCrLf
Timer8.Enabled = True
ClientFrm.Height = 1335
ClientFrm.Width = 4800
End Sub
Private Sub sock1_Connect()
txtLog = "Connected to " & sock1.RemoteHostIP & vbCrLf
Timer8.Enabled = False
ClientFrm.Height = 6045
ClientFrm.Width = 15000
End Sub
Private Sub sock1_DataArrival(ByVal bytesTotal As Long)
Dim dat As String
sock1.GetData dat, vbString
If Timer1.Enabled = True Then Result_1.Text = Result_1.Text + dat
If Timer2.Enabled = True Then Result_2.Text = Result_2.Text + dat
If Timer3.Enabled = True Then Result_3.Text = Result_3.Text + dat
If Timer4.Enabled = True Then RV.Text = RV.Text + dat
```

```
If Timer5.Enabled = True Then decval.Text = decval.Text + dat

If Timer6.Enabled = True Then RD.Text = RD.Text + dat

If Timer7.Enabled = True Then WRT.Text = WRT.Text + dat

txtLog = txtLog & dat & vbCrLf

End Sub

Private Sub sock1_Error(ByVal Number As Integer, Description As String, ByVal Scode As
Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long,
CancelDisplay As Boolean)

txtLog = txtLog & "*** Error : " & Description & vbCrLf

sock1_Close

End Sub



Private Sub Timer1_Timer()

Timer1.Enabled = False

End Sub


Private Sub Timer10_Timer()

If Timer8.Enabled = False Then

Call RESET_Click

Timer10.Enabled = False

End If

End Sub


Private Sub Timer11_Timer()

If Timer8.Enabled = False Then

Call ID_capture_Click

Timer11.Enabled = False

End If
```

```
End Sub

Private Sub Timer12_Timer()
If Timer8.Enabled = False Then
Call Login_Click
Timer12.Enabled = False
End If
End Sub

Private Sub Timer13_Timer()
If Timer8.Enabled = False Then
Call Read_val_Click
Timer13.Enabled = False
End If
End Sub

Private Sub Timer14_Timer()
If Timer8.Enabled = False Then
Call Read_Click
Timer14.Enabled = False
End If
End Sub

Private Sub Timer15_Timer()
If Left(RD.Text, 32) = "00000000000000000000043494D414849" Then
DEC.Text = "1000"
Call Dec_val_Click

asal.Caption = "CIMAHI"
```

```
Picture2.Left = -120
End If


If Left(RD.Text, 32) = "00000000000000000000504153545552" Then
DEC.Text = "2000"
Call Dec_val_Click

asal.Caption = "PASTEUR"
Picture2.Left = -120
End If


Timer15.Enabled = False
End Sub


Private Sub Timer16_Timer()
If Timer8.Enabled = False Then
Call Write_Click
Timer16.Enabled = False
End If
End Sub
```

```
Private Sub Timer2_Timer()

Timer2.Enabled = False

End Sub

Private Sub Timer3_Timer()

Timer3.Enabled = False

End Sub

Private Sub Timer4_Timer()

Timer4.Enabled = False

End Sub

Private Sub Timer5_Timer()

Timer5.Enabled = False

End Sub

Private Sub Timer6_Timer()

Timer6.Enabled = False

End Sub

Private Sub Timer7_Timer()

Timer7.Enabled = False

End Sub

Private Sub Timer8_Timer()

Call bntConnect_Click

End Sub

Private Sub Timer9_Timer()

Text3.Text = (Val(Mid(RV.Text, 1, 1)) * 268435456) + (Val(Mid(RV.Text, 2, 1)) *
16777216) + (Val(Mid(RV.Text, 3, 1)) * 1048576) + (Val(Mid(RV.Text, 4, 1)) * 65536) +
(Val(Mid(RV.Text, 5, 1)) * 4096) + (Val(Mid(RV.Text, 6, 1)) * 256) + (Val(Mid(RV.Text, 7,
1)) * 16) + (Val(Mid(RV.Text, 8, 1)))

For i = 1 To 8

Text2.Text = 0

Select Case Mid(RV.Text, i, 1)

Case "A"
```

```
Text2.Text = 10
Case "B"
Text2.Text = 11
Case "C"
Text2.Text = 12
Case "D"
Text2.Text = 13
Case "E"
Text2.Text = 14
Case "F"
Text2.Text = 15
End Select
Select Case i
Case 1
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 268435456
Case 2
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16777216
Case 3
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 1048576
Case 4
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 65536
Case 5
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 4096
Case 6
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 256
Case 7
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16
Case 8
Text3.Text = Val(Text3.Text) + Val(Text2.Text)
```

```
End Select

Next i



Text4.Text = (Val(Mid(decval.Text, 1, 1)) * 268435456) + (Val(Mid(decval.Text, 2, 1)) *
16777216) + (Val(Mid(decval.Text, 3, 1)) * 1048576) + (Val(Mid(decval.Text, 4, 1)) *
65536) + (Val(Mid(decval.Text, 5, 1)) * 4096) + (Val(Mid(decval.Text, 6, 1)) * 256) +
(Val(Mid(decval.Text, 7, 1)) * 16) + (Val(Mid(decval.Text, 8, 1)))

For i = 1 To 8

Text1.Text = 0

Select Case Mid(decval.Text, i, 1)

Case "A"

Text1.Text = 10

Case "B"

Text1.Text = 11

Case "C"

Text1.Text = 12

Case "D"

Text1.Text = 13

Case "E"

Text1.Text = 14

Case "F"

Text1.Text = 15

End Select

Select Case i

Case 1

Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 268435456

Case 2

Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16777216
```

```
Case 3
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 1048576
Case 4
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 65536
Case 5
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 4096
Case 6
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 256
Case 7
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16
Case 8
Text4.Text = Val(Text4.Text) + Val(Text1.Text)
End Select
Next i

End Sub
Private Sub Write_Click()

wrtval.Text = ""

i = Len(Text5.Text)
For y = 1 To i
wrtval.Text = Hex(Asc(Right(Text5.Text, y))) + wrtval.Text
Next y



Do While (Len(wrtval.Text) < 32)
wrtval.Text = "0" & wrtval.Text
Loop
```

```
txtLog.Text = ""
WRT.Text = ""
Timer7.Enabled = True
On Error GoTo t
sock1.SendData "w" & Block3.Text & wrtval.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
```

PROGRAM SERVER GERBANG TOL KELUAR CIMAHI

```
Private Sub bntConnect_Click()
On Error GoTo t
sock1.Close
sock1.RemoteHost = txtIP
sock1.RemotePort = txtPort
sock1.Connect
Exit Sub
t:
MsgBox "Error : " & Err.Description, vbCritical
End Sub
Private Sub bntExit_Click()
End
End Sub
Private Sub bntSend_Click()
On Error GoTo t
sock1.SendData txtSend
```

```
txtLog = txtLog & "Client : " & txtSend & vbCrLf
txtSend = ""
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub DEC_Change()
DECHEX.Text = Hex(DEC.Text)
End Sub

Private Sub Dec_val_Click()
txtLog.Text = ""
decval.Text = ""
Timer5.Enabled = True
On Error GoTo t
Do While (Len(DECHEX.Text) < 8)
DECHEX.Text = "0" & DECHEX.Text
Loop
sock1.SendData "-" & Block2.Text & DECHEX.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub

Private Sub Form_Load()
Picture2.Left = 3750
```

```
ClientFrm.Height = 1335
ClientFrm.Width = 3750
End Sub
Private Sub ID_capture_Click()
txtLog.Text = ""
Result_2.Text = ""
Timer2.Enabled = True
On Error GoTo t
sock1.SendData "s"
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Login_Click()
Result_3.Text = ""
txtLog.Text = ""
Timer3.Enabled = True
On Error GoTo t
sock1.SendData "l" & block.Text & "AA" & KEY
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub

Private Sub Read_Click()
Timer15.Enabled = True
```

```
txtLog.Text = ""
RD.Text = ""
Timer6.Enabled = True
On Error GoTo t
sock1.SendData "r" & Block3.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Read_val_Click()
txtLog.Text = ""
RV.Text = ""
Timer4.Enabled = True
On Error GoTo t
sock1.SendData "rv" & Block2.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub RESET_Click()
txtLog.Text = ""
Result_1.Text = ""
Timer1.Enabled = True
On Error GoTo t
sock1.SendData "x"
Exit Sub
t:
```

```
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub sock1_Close()
sock1.Close
txtLog = txtLog & "*** Disconnected" & vbCrLf
Timer8.Enabled = True
ClientFrm.Height = 4335
ClientFrm.Width = 3750
End Sub
Private Sub sock1_Connect()
txtLog = "Connected to " & sock1.RemoteHostIP & vbCrLf
Timer8.Enabled = False
ClientFrm.Height = 4260
ClientFrm.Width = 3750
End Sub
Private Sub sock1_DataArrival(ByVal bytesTotal As Long)
Dim dat As String
sock1.GetData dat, vbString
If Timer1.Enabled = True Then Result_1.Text = Result_1.Text + dat
If Timer2.Enabled = True Then Result_2.Text = Result_2.Text + dat
If Timer3.Enabled = True Then Result_3.Text = Result_3.Text + dat
If Timer4.Enabled = True Then RV.Text = RV.Text + dat
If Timer5.Enabled = True Then decval.Text = decval.Text + dat
If Timer6.Enabled = True Then RD.Text = RD.Text + dat
If Timer7.Enabled = True Then WRT.Text = WRT.Text + dat
txtLog = txtLog & dat & vbCrLf
End Sub
```

```
Private Sub sock1_Error(ByVal Number As Integer, Description As String, ByVal Scode As
Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long,
CancelDisplay As Boolean)

txtLog = txtLog & "*** Error : " & Description & vbCrLf

sock1_Close

End Sub



Private Sub Timer1_Timer()

Timer1.Enabled = False

End Sub


Private Sub Timer10_Timer()

If Timer8.Enabled = False Then

Call RESET_Click

Timer10.Enabled = False

End If

End Sub


Private Sub Timer11_Timer()

If Timer8.Enabled = False Then

Call ID_capture_Click

Timer11.Enabled = False

End If

End Sub


Private Sub Timer12_Timer()

If Timer8.Enabled = False Then

Call Login_Click
```

```
Timer12.Enabled = False
End If
End Sub

Private Sub Timer13_Timer()
If Timer8.Enabled = False Then
Call Read_val_Click
Timer13.Enabled = False
End If
End Sub

Private Sub Timer14_Timer()
If Timer8.Enabled = False Then
Call Read_Click
Timer14.Enabled = False
End If
End Sub

Private Sub Timer15_Timer()
If Left(RD.Text, 32) = "00000000000504144414C4152414E47" Then
DEC.Text = "1000"
Call Dec_val_Click

asal.Caption = "PADALARANG"
Picture2.Left = -120



End If
```

```
If Left(RD.Text, 32) = "00000000000000000000504153545552" Then
DEC.Text = "1000"
Call Dec_val_Click

asal.Caption = "PASTEUR"
Picture2.Left = -120
End If




Timer15.Enabled = False
End Sub



Private Sub Timer16_Timer()
If Timer8.Enabled = False Then
Call Write_Click
Timer16.Enabled = False
End If
End Sub

Private Sub Timer2_Timer()
Timer2.Enabled = False
End Sub
Private Sub Timer3_Timer()
```

```
Timer3.Enabled = False

End Sub

Private Sub Timer4_Timer()

Timer4.Enabled = False

End Sub

Private Sub Timer5_Timer()

Timer5.Enabled = False

End Sub

Private Sub Timer6_Timer()

Timer6.Enabled = False

End Sub

Private Sub Timer7_Timer()

Timer7.Enabled = False

End Sub

Private Sub Timer8_Timer()

Call bntConnect_Click

End Sub

Private Sub Timer9_Timer()

Text3.Text = (Val(Mid(RV.Text, 1, 1)) * 268435456) + (Val(Mid(RV.Text, 2, 1)) *
16777216) + (Val(Mid(RV.Text, 3, 1)) * 1048576) + (Val(Mid(RV.Text, 4, 1)) * 65536) +
(Val(Mid(RV.Text, 5, 1)) * 4096) + (Val(Mid(RV.Text, 6, 1)) * 256) + (Val(Mid(RV.Text, 7,
1)) * 16) + (Val(Mid(RV.Text, 8, 1)))

For i = 1 To 8

Text2.Text = 0

Select Case Mid(RV.Text, i, 1)

Case "A"

Text2.Text = 10

Case "B"

Text2.Text = 11

Case "C"
```

```
Text2.Text = 12
Case "D"
Text2.Text = 13
Case "E"
Text2.Text = 14
Case "F"
Text2.Text = 15
End Select
Select Case i
Case 1
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 268435456
Case 2
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16777216
Case 3
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 1048576
Case 4
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 65536
Case 5
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 4096
Case 6
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 256
Case 7
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16
Case 8
Text3.Text = Val(Text3.Text) + Val(Text2.Text)
End Select
Next i
```

```
Text4.Text = (Val(Mid(decval.Text, 1, 1)) * 268435456) + (Val(Mid(decval.Text, 2, 1)) *
16777216) + (Val(Mid(decval.Text, 3, 1)) * 1048576) + (Val(Mid(decval.Text, 4, 1)) *
65536) + (Val(Mid(decval.Text, 5, 1)) * 4096) + (Val(Mid(decval.Text, 6, 1)) * 256) +
(Val(Mid(decval.Text, 7, 1)) * 16) + (Val(Mid(decval.Text, 8, 1)))

For i = 1 To 8

Text1.Text = 0

Select Case Mid(decval.Text, i, 1)

Case "A"

Text1.Text = 10

Case "B"

Text1.Text = 11

Case "C"

Text1.Text = 12

Case "D"

Text1.Text = 13

Case "E"

Text1.Text = 14

Case "F"

Text1.Text = 15

End Select

Select Case i

Case 1

Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 268435456

Case 2

Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16777216

Case 3

Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 1048576

Case 4

Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 65536
```

```
Case 5
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 4096
Case 6
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 256
Case 7
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16
Case 8
Text4.Text = Val(Text4.Text) + Val(Text1.Text)
End Select
Next i

End Sub
Private Sub Write_Click()

wrtval.Text = ""

i = Len(Text5.Text)
For y = 1 To i
wrtval.Text = Hex(Asc(Right(Text5.Text, y))) + wrtval.Text
Next y



Do While (Len(wrtval.Text) < 32)
wrtval.Text = "0" & wrtval.Text
Loop

txtLog.Text = ""
WRT.Text = ""
Timer7.Enabled = True
```

```
On Error GoTo t
sock1.SendData "w" & Block3.Text & wrtval.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
```

PROGRAM SERVER GERBANG TOL KELUAR PASTEUR

```
Private Sub bntConnect_Click()
On Error GoTo t
sock1.Close
sock1.RemoteHost = txtIP
sock1.RemotePort = txtPort
sock1.Connect
Exit Sub
t:
MsgBox "Error : " & Err.Description, vbCritical
End Sub
Private Sub bntExit_Click()
End
End Sub
Private Sub bntSend_Click()
On Error GoTo t
sock1.SendData txtSend
txtLog = txtLog & "Client : " & txtSend & vbCrLf
txtSend = ""
Exit Sub
t:
```

```
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub DEC_Change()
DECHEX.Text = Hex(DEC.Text)
End Sub

Private Sub Dec_val_Click()
txtLog.Text = ""
decval.Text = ""
Timer5.Enabled = True
On Error GoTo t
Do While (Len(DECHEX.Text) < 8)
DECHEX.Text = "0" & DECHEX.Text
Loop
sock1.SendData "-" & Block2.Text & DECHEX.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub

Private Sub Form_Load()
Picture2.Left = 14100

ClientFrm.Height = 1335
ClientFrm.Width = 4800
End Sub
Private Sub ID_capture_Click()
```

```
txtLog.Text = ""
Result_2.Text = ""
Timer2.Enabled = True
On Error GoTo t
sock1.SendData "s"
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Login_Click()
Result_3.Text = ""
txtLog.Text = ""
Timer3.Enabled = True
On Error GoTo t
sock1.SendData "l" & block.Text & "AA" & KEY
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub

Private Sub Read_Click()
Timer15.Enabled = True

txtLog.Text = ""
RD.Text = ""
Timer6.Enabled = True
On Error GoTo t
```

```
sock1.SendData "r" & Block3.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub Read_val_Click()
txtLog.Text = ""
RV.Text = ""
Timer4.Enabled = True
On Error GoTo t
sock1.SendData "rv" & Block2.Text
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub RESET_Click()
txtLog.Text = ""
Result_1.Text = ""
Timer1.Enabled = True
On Error GoTo t
sock1.SendData "x"
Exit Sub
t:
MsgBox "Error : " & Err.Description
sock1_Close
End Sub
Private Sub sock1_Close()
```

```
sock1.Close

txtLog = txtLog & "*** Disconnected" & vbCrLf

Timer8.Enabled = True

ClientFrm.Height = 1335

ClientFrm.Width = 4800

End Sub

Private Sub sock1_Connect()

txtLog = "Connected to " & sock1.RemoteHostIP & vbCrLf

Timer8.Enabled = False

ClientFrm.Height = 6045

ClientFrm.Width = 15000

End Sub

Private Sub sock1_DataArrival(ByVal bytesTotal As Long)

Dim dat As String

sock1.GetData dat, vbString

If Timer1.Enabled = True Then Result_1.Text = Result_1.Text + dat

If Timer2.Enabled = True Then Result_2.Text = Result_2.Text + dat

If Timer3.Enabled = True Then Result_3.Text = Result_3.Text + dat

If Timer4.Enabled = True Then RV.Text = RV.Text + dat

If Timer5.Enabled = True Then decval.Text = decval.Text + dat

If Timer6.Enabled = True Then RD.Text = RD.Text + dat

If Timer7.Enabled = True Then WRT.Text = WRT.Text + dat

txtLog = txtLog & dat & vbCrLf

End Sub

Private Sub sock1_Error(ByVal Number As Integer, Description As String, ByVal Scode As
Long, ByVal Source As String, ByVal HelpFile As String, ByVal HelpContext As Long,
CancelDisplay As Boolean)

txtLog = txtLog & "*** Error : " & Description & vbCrLf

sock1_Close
```

```
End Sub


Private Sub Timer1_Timer()
Timer1.Enabled = False
End Sub

Private Sub Timer10_Timer()
If Timer8.Enabled = False Then
Call RESET_Click
Timer10.Enabled = False
End If
End Sub

Private Sub Timer11_Timer()
If Timer8.Enabled = False Then
Call ID_capture_Click
Timer11.Enabled = False
End If
End Sub

Private Sub Timer12_Timer()
If Timer8.Enabled = False Then
Call Login_Click
Timer12.Enabled = False
End If
End Sub

Private Sub Timer13_Timer()
```

```
If Timer8.Enabled = False Then
Call Read_val_Click
Timer13.Enabled = False
End If
End Sub

Private Sub Timer14_Timer()
If Timer8.Enabled = False Then
Call Read_Click
Timer14.Enabled = False
End If
End Sub

Private Sub Timer15_Timer()
If Left(RD.Text, 32) = "00000000000504144414C4152414E47" Then
DEC.Text = "2000"
Call Dec_val_Click

asal.Caption = "PADALARANG"
Picture2.Left = -120



End If



If Left(RD.Text, 32) = "00000000000000000000043494D414849" Then
DEC.Text = "1000"
Call Dec_val_Click
```

```
asal.Caption = "CIMAHI"
Picture2.Left = -120
End If



Timer15.Enabled = False
End Sub


Private Sub Timer16_Timer()
If Timer8.Enabled = False Then
Call Write_Click
Timer16.Enabled = False
End If
End Sub

Private Sub Timer2_Timer()
Timer2.Enabled = False
End Sub
Private Sub Timer3_Timer()
Timer3.Enabled = False
End Sub
Private Sub Timer4_Timer()
Timer4.Enabled = False
```

```
End Sub

Private Sub Timer5_Timer()

Timer5.Enabled = False

End Sub

Private Sub Timer6_Timer()

Timer6.Enabled = False

End Sub

Private Sub Timer7_Timer()

Timer7.Enabled = False

End Sub

Private Sub Timer8_Timer()

Call bntConnect_Click

End Sub

Private Sub Timer9_Timer()

Text3.Text = (Val(Mid(RV.Text, 1, 1)) * 268435456) + (Val(Mid(RV.Text, 2, 1)) *
16777216) + (Val(Mid(RV.Text, 3, 1)) * 1048576) + (Val(Mid(RV.Text, 4, 1)) * 65536) +
(Val(Mid(RV.Text, 5, 1)) * 4096) + (Val(Mid(RV.Text, 6, 1)) * 256) + (Val(Mid(RV.Text, 7,
1)) * 16) + (Val(Mid(RV.Text, 8, 1)))

For i = 1 To 8

Text2.Text = 0

Select Case Mid(RV.Text, i, 1)

Case "A"

Text2.Text = 10

Case "B"

Text2.Text = 11

Case "C"

Text2.Text = 12

Case "D"

Text2.Text = 13

Case "E"
```

```
Text2.Text = 14
Case "F"
Text2.Text = 15
End Select
Select Case i
Case 1
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 268435456
Case 2
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16777216
Case 3
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 1048576
Case 4
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 65536
Case 5
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 4096
Case 6
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 256
Case 7
Text3.Text = Val(Text3.Text) + Val(Text2.Text) * 16
Case 8
Text3.Text = Val(Text3.Text) + Val(Text2.Text)
End Select
Next i
```

```
Text4.Text = (Val(Mid(decval.Text, 1, 1)) * 268435456) + (Val(Mid(decval.Text, 2, 1)) *
16777216) + (Val(Mid(decval.Text, 3, 1)) * 1048576) + (Val(Mid(decval.Text, 4, 1)) *
65536) + (Val(Mid(decval.Text, 5, 1)) * 4096) + (Val(Mid(decval.Text, 6, 1)) * 256) +
(Val(Mid(decval.Text, 7, 1)) * 16) + (Val(Mid(decval.Text, 8, 1)))
```

```
For i = 1 To 8
Text1.Text = 0
Select Case Mid(decval.Text, i, 1)
Case "A"
Text1.Text = 10
Case "B"
Text1.Text = 11
Case "C"
Text1.Text = 12
Case "D"
Text1.Text = 13
Case "E"
Text1.Text = 14
Case "F"
Text1.Text = 15
End Select
Select Case i
Case 1
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 268435456
Case 2
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16777216
Case 3
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 1048576
Case 4
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 65536
Case 5
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 4096
Case 6
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 256
```

```
Case 7
Text4.Text = Val(Text4.Text) + Val(Text1.Text) * 16
Case 8
Text4.Text = Val(Text4.Text) + Val(Text1.Text)
End Select
Next i

End Sub
Private Sub Write_Click()

wrtval.Text = ""

i = Len(Text5.Text)
For y = 1 To i
wrtval.Text = Hex(Asc(Right(Text5.Text, y))) + wrtval.Text
Next y


Do While (Len(wrtval.Text) < 32)
wrtval.Text = "0" & wrtval.Text
Loop

txtLog.Text = ""
WRT.Text = ""
Timer7.Enabled = True
On Error GoTo t
sock1.SendData "w" & Block3.Text & wrtval.Text
Exit Sub
t:
```

```
MsgBox "Error : " & Err.Description

sock1_Close

End Sub
```

LAMPIRAN B

ACR120S SDK User Manual

Advanced Card Systems Ltd.

ACR120U Contactless Reader/Writer

APPLICATION PROGRAMMING INTERFACE

Version 1.06 11-2005

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CONTENTS

SCOPES

The ACR120U USB High Level APIs are some standard functions for controlling the Reader and accessing the supported contactless-cards. By using the High Level APIs, the users can develop applications that involve the use of contactless-cards with minimum effort. For examples,

- Access control, Identification: Reading the serial numbers of all cards in the field.
- Data Storage: Performing encrypted read and write operations.
- Ticketing: Performing read, write, increment and decrement operations in an encrypted environment.
- Multi applications: Performing read, write, increment and decrement operations on various sectors of the card.

The High Level APIs are available for Windows 98, ME, 2000 & XP Operating Systems.

USB INTERFACE

The ACR120U is connected to a computer through USB as specified in the USB Specification 1.1. The ACR120U is working in low speed mode, i.e. 1.5 Mbps.

USB Interface Wiring

Pin	Signal	Function
1	**V_{BUS}**	+5V power supply for the reader (~100mA)
2	**D-**	Differential signal transmits data between ACR120U and PC.
3	**D+**	Differential signal transmits data between ACR120U and PC.
4	**GND**	Reference voltage level for power supply

NOTE - In order for the ACR120U functioning properly through USB interface, ACS proprietary device drive has to be installed. Please refer to the *Device Driver Installation Guide* for more detail.

GROUP A. READER COMMANDS

1. ACR120_Open

High Level API:

DLLAPI INT16 AC_DECL ACR120_Open(INT16 ReaderPort);

Description	To open a port (connection) to Reader.	
Parameters	ReaderPort	The port number. Available choices are "ACR120_USB1" to "ACR120_USB8".
Return Value	INT16	Handle for further operations. Error Code < 0

2. ACR120_Close

High Level API:

DLLAPI INT16 AC_DECL ACR120_Close(INT16 hReader);

Description	To close the port (connection) to Reader.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
Return Value	INT16	0 = success; Error Code < 0

3. ACR120_Reset

High Level API:

DLLAPI INT16 AC_DECL ACR120_Reset(INT16 hReader);

Description	To reset the Mifare Chip of the Reader, then restore the factory settings	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
Return Value	INT16	0 = success; Error Code < 0

Sample Code:

```
#include “acr120.h”

main()
{
        // Open a communication channel, the first USB Reader
        INT16 hReader=ACR120_Open(ACR120_USB1);

        // Reset the Reader to the initial state.
        if(hReader>0)
        {
                INT16 Status= ACR120_Reset(hReader);
        }
        else
        {
                // error happened
        }

        // some operations
        // Close the communication channel, the first USB Reader
        if(hReader>0)
        {
                Status= ACR120_Close(hReader);
                hReader = -1;
        }

}
```

GROUP A. READER COMMANDS

4. ACR120_Status

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Status(INT16 hReader,
UINT8 pFirmwareVersion[20],
STRUCT_STATUS pReaderStatus);

Description	Return the firmware version and the Reader status.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	pFirmwareVersion	The firmware version will be returned (20 bytes)
	pReaderStatus	The Reader status.
Return Value	INT16	0 = success; Error Code < 0

Sample Code:

```
#include “acr120.h”

// Obtain the Firmware version & Reader Status if the USB connection is already
// established
if(hReader>0)
{
        UINT8 FirmwareVersion[20];
        STRUCT_STATUS ReaderStatus;

        INT16 Status= ACR120_Status(hReader. FirmwareVersion, &ReaderStatus);

        If(Status== SUCCESS_READER_OP)
        {
                // do some operations if the operation is success
        }
        else
        {
                // error happened!!

        }

}
```

GROUP A. READER COMMANDS

(Cont.)

```
Struct STRUCT_STATUS
{
        // 0x01 = Type A; 0x02 = Type B; 0x03 = Type A + Type B
        UINT8           MifareInterfaceType;

        // Bit 0 = Mifare Light; Bit 1 = Mifare1K; Bit 2 = Mifare 4K; Bit 3 = Mifare DESFire
        // Bit 4 = Mifare UltraLight; Bit 5 = JCOP30; Bit 6 = Shanghai Transport
        // Bit 7 = MPCOS Combi; Bit 8 = ISO type B, Calypso
        // Bit 9 – Bit 31 = To be defined
        UINT32          CardsSupported;

        UINT8           CardOpMode; // To be defined

        UINT8           FWI;    // the current FWI value (time out value)

        UINT8           RFU; // To be defined

        UINT16          RFU2; // to be defined

} ReaderStatus;
```

GROUP A. READER COMMANDS

5. ACR120_ReadRC531Reg

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ReadRC531Reg(INT16 hReader,
UINT8 RegNo,
UINT8 pValue);*

Description	To read the Mifare registers.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	RegNo	The register number.
	pValue	Mifare register's value.
Return Value	INT16	Result code. 0 means success.

6. ACR120_WriteRC531Reg

High Level API:

DLLAPI INT16 AC_DECL
ACR120_WriteRC531Reg(INT16 hReader,
UINT8 RegNo,
UINT8 Value);

Description	To write the Mifare registers	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	RegNo	The register number.
	Value	Mifare register's value to write
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

// Read & Write the Reader Register if the USB connection is already established
if(hReader>0)
{
        UINT8 RegNo=0x05; // the register address
        UINT8 Value;          // the register value

        INT16 Status= ACR120_ReadRC531Reg(hReader, RegNo, &Value);

        If(Status== SUCCESS_READER_OP)
        {
                // Update the register value
                Value!=0x01;
                Status= ACR120_WriteRC531Reg(hReader, RegNo, Value);

        }

        if(Status!= SUCCESS_READER_OP)
        {
                // error happened!!

        }

}
```

#Users are not recommended to modify the internal register setting.

GROUP A. READER COMMANDS

7. ACR120_DirectSend

High Level API:

DLLAPI INT16 AC_DECL
ACR120_DirectSend(INT16 hReader,
UINT8 DataLength,
UINT8 pData,*
UINT8 pResponseDataLength,*
UINT8 pResponseData,*
UINT16 TimedOut);

Description	To send data to the Reader directly.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	DataLength (N)	The Data Length (maximum 66 bytes)
	Data	The Data to be sent
	pResponseDataLength (K)	The Response Data Length
	pResponseData	The Response Data
	TimedOut	The Time Out for waiting the response data in m-sec
Return Value	INT16	0 = success; Error Code < 0

8. ACR120_DirectReceive

High Level API:

DLLAPI INT16 AC_DECL
ACR120_DirectReceive(INT16 hReader,
UINT8 RespectedDataLength,
UINT8 pReceivedDataLength,*
UINT8 pReceivedData,*
UINT16 TimedOut);

Description	To receive data from the Reader directly.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	RespectedDataLength	The Respected Data Length to be received (maximum 64 bytes)
	pReceivedDataLength (K)	The Data Length of the received data
	pReceivedData	The Received Data
	TimedOut	The Time Out for waiting the received data in m-sec
Return Value	INT16	0 = success; Error Code < 0

These two APIs are for special purposes.

GROUP A. READER COMMANDS

9. ACR120_RequestDLLVersion

High Level API:

DLLAPI INT16 AC_DECL
ACR120_RequestDLLVersion(UINT8 pVersionInfoLength,*
UINT8 pVersionInfo);*

Description	To get the reader's API DLL version information	
Parameters	pVersionInfoLength	
	pVersionInfo	It returns the DLL Version string.
Return Value	INT16	0 = success; Error Code < 0

Sample Code:

```
#include "acr120.h"

// Get the DLL Version

UINT8 Length;
UINT8 Version[40]; // the DLL Version string is less than 40 bytes long

INT16 Status=ACR120_RequestDLLVersion(&Length, Version);

if(Status== SUCCESS_READER_OP)
{
        // display the DLL version,

        Version[Length]='\0';  // add the terminator '\0'
        printf("The DLL version is %s", Version);
}
else
{
        // DLL Error !!

}
```

GROUP A. READER COMMANDS

10. ACR120_ReadEEPROM

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ReadEEPROM(INT16 hReader,
UINT8 RegNo,
UINT8 pEEPROMData);*

Description	Read the internal EEPROM.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	RegNo	The register number.
	pEEPROMData	Contain the EEPROM register's value.
Return Value	INT16	Result code. 0 means success.

11. ACR120_WriteEEPROM

High Level API:

DLLAPI INT16 AC_DECL
ACR120_WriteEEPROM(INT16 hReader,
UINT8 RegNo,
UINT8 EEPROMData);

Description	Write the internal EEPROM.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	RegNo	The register number.
	EEPROMData	The EEPROM register's value to write.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

// Read & Write the EEPROM if the USB connection is already established
if(hReader>0)
{
        UINT8 Address=0x04; // the address of the EEPROM to be accessed
        UINT8 Value;            // the value

        INT16 Status= ACR120_ReadEEPROM(hReader, Address, &Value);

        If(Status== SUCCESS_READER_OP)
        {
                // Update the register value
                Value &= 0x0F;
                Status= ACR120_WriteEEPROM(hReader, Address, Value);

        }

        if(Status!= SUCCESS_READER_OP)
        {
                // error happened!!
        }

}
```

GROUP A. READER COMMANDS

12. ACR120_ReadUserPort

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ReadUserPort(INT16 hReader,
UINT8 pUserPortState);*

Description	Read in the state of user port .	
Parameters	HReader	The handle to the Reader returned by ACR120_Open().
	pUserPortState	Contain the port state (only Bit 2 & Bit 6 are used).
Return Value	INT16	Result code. 0 means success.

13. ACR120_WriteUserPort

High Level API:

DLLAPI INT16 AC_DECL
ACR120_WriteUserPort(INT16 hReader,
UINT8 UserPortState);

Description	Update the state of user port.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	UserPortState	Contain the port state to write (only Bit 2 & Bit 6 are used).
Return Value	INT16	Result code. 0 means success.

UserPortState:
Bit 0: Not Used
Bit 1: Not Used
Bit 2: Buzzer (0 = OFF; 1 = ON)
Bit 3: Not Used
Bit 4: Not Used
Bit 5: Not Used
Bit 6: LED (0 = OFF; 1 = ON)
Bit 7: Not Used

Sample Code:

```
#include “acr120.h”

// Turn on the LED if the USB connection is already established
if(hReader>0)
{
        UINT8 PortValue;                // the value of the user port

        INT16 Status= ACR120_ReadUserPort(hReader, &PortValue);

        If(Status== SUCCESS_READER_OP)
        {
                // Turn on the LED only
                PortValue |= 0x40;
                Status= ACR120_WriteUserPort(hReader, PortValue);

        }

}
```

GROUP A. READER COMMANDS

14. ACR120_Power

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Power(INT16 hReader,
INT8 State);

Description	Turn on or off the antenna power.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	State	Turn OFF (0) or ON (1).
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

// Turn off the Antenna Power for power saving
if(hReader>0)
{
        INT16 Status= ACR120_Power(hReader, 0x00);
}

// The Antenna Power will be turned on automatically if any Card Operations is started.
// E.g. ACR120_Select(). Don’t need to turn on the Antenna Power manually.
// However, the Antenna Power cannot be turned off while any Card Operations is running.
```

GROUP B. GENERAL CARD COMMANDS

NOTE - All Card API's involving SECTOR and BLOCK parameters please refer to APPENDIX 5 for further explanation

1. ACR120_Select

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Select(INT16 hReader,
UINT8 pResultTagType,*
UINT8 pResultTagLength,*
UINT8 pResultSN[10]);

Description	Select a single card and return the card ID (Serial Number)	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	pResultTagType	Contain the selected Tag Type
	pResultTagLength	Contain the Length of the selected TAG.
	pResultSN	If the pResultTagLength = 4 or 7 or 10, the pSN contains the selected card ID (Serial Number). The ID may be 4 or 7 or 10 Bytes long.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include "acr120.h"

// Select a TAG on the reader

if(hReader>0)
{
        UINT8 TagType;          // the Tag Type
        UINT8 TagLength;        // the length of the Tag SN
        UINT8 TagSN[10];        // The SN of the Tag

        // This API is useful for selecting a TAG in which the SN is not known in advance.
        INT16 Status= ACR120_Select(hReader, &TagType, &TagLength, TagSN);

        If(Status== SUCCESS_READER_OP)
        {
                // Now the TagSN[10] contains the SN of the Tag
                // Please check the TagLength to determine the actual length of the SN
                // e.g for Mifare 1K card, the TagLength will be equal to 0x04.
                // the TagType will be equal to 0x02;

        }
        else
        {
                // No TAG is found!!

        }
}
```

GROUP B. GENERAL CARD COMMANDS

2. ACR120_ListTags

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ListTags(INT16 hReader,
UINT8 pNumTagFound,*
UINT8 pTagType[4],
UINT8 pTagLength[4],
UINT8 pSN[4][10]);

Description	List out the serial numbers of all tags, which are in readable antenna range.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	pNumTagFound	Contains of number of TAG listed.
	pTagType[4]	Contains the TAG Type
	pTagLength[4]	Contains the length of the serial number.
	pSN[4][10]	The flat array of serial numbers. All serial numbers are concatenated with fixed length – 10 bytes.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

UINT8 TagFound;          // number of TAG found
UINT8 TagType[4];        // the Tag Type
UINT8 TagLength[4];      // the length of the Tag SN
UINT8 TagSN[4][10];      // The SN of the Tag

// Find all the TAGs placed on the reader antenna. Maximum 4 TAGs can be recognized
// by the reader at the same time.
INT16 Status= ACR120_ListTags(hReader,
              &TagFound, TagType, TagLength, TagSN);

If(Status== SUCCESS_READER_OP)
{
        // Now the TagFound contains the number of TAG recognized by the reader

        // Assume the TagFound is equal to two, Two TAGs are found
        // the TagSN[0][10] contains the SN of the first Tag
        // the TagLength[0] contains the actual length of the SN of the first TAG
        // the TagType[0] contains the TAG Type of the first TAG

        // the TagSN[1][10] contains the SN of the second Tag
        // the TagLength[1] contains the actual length of the SN of the second TAG
        // the TagType[1] contains the TAG Type of the second TAG

        // the content of TagSN[2][10], TagLength[2], TagType[2] have no meaning
        // Similarly, the content of TagSN[3][10], TagLength[3], TagType[3] have no
        // meaning
}
else { // No TAG is found!! }
```

GROUP B. GENERAL CARD COMMANDS

3. ACR120_MultiTagSelect

High Level API:

DLLAPI INT16 AC_DECL
ACR120_MultiTagSelect(INT16 hReader,
UINT8 TagLength,
UINT8 SN[10],
UINT8 pResultTagType,*
UINT8 pResultTagLength,*
UINT8 pResultSN);*

Description	To select a TAG with specific serial number.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	TagLength (N)	Contains the length of the serial number of the TAG to be selected. The TagLength may be 4, 7 or 10 bytes long.
	SN	Contain the serial number of the TAG to be selected.
	pResultTagType	Contain the selected Tag Type
	pResultTagLength (K)	Contain the length of the serial number of the selected TAG. The pResultTagLength may be 4, 7 or 10 bytes long.
	pResultSN	The serial number of the selected TAG.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

UINT8 ResultTagType;            // the Tag Type detected by the reader
UINT8 ResultTagLength;          // the Tag length detected by the reader
UINT8 ResultTagSN[10];          // the Tag SN detected by the reader

// The SN of the Tag is “A6 2D EA 92”, the length is 4 bytes
// Fill the rest of the array with zeros
UINT8 TagSN[10]={   0xA6, 0x2D, 0xEA, 0x92, 0x00,
                    0x00, 0x00, 0x00, 0x00, 0x00};

// Select an arbitrary TAG if the SN of the TAG is known already. E.g. By using
// ACR120_ListTags()
// This API is useful for selecting an arbitrary TAG among all the TAGs.

INT16 Status= ACR120_MultiTagSelect(hReader,
            0x04, TagSN,
            ResultTagType, ResultTagLength, ResultTagSN);

If(Status== SUCCESS_READER_OP)
{
        // the ResultTagSN[10] contains the SN of the Tag detected by the reader
        // it must be the same as the TagSN[10]

        // the ResultTagLength contains the actual length of the SN of the TAG detected by
        //the reader. it must be the same as the TagLength

        // the ResultTagType contains the TAG Type of the TAG detected by the reader


}
else
{
        // No TAG is selected!!
}
```

GROUP B. GENERAL CARD COMMANDS

4. ACR120_TxDataTelegram

High Level API:

DLLAPI INT16 AC_DECL
ACR120_TxDataTelegram(INT16 hReader,
UINT8 SendDataLength,
UINT8 pSendData*
UINT8 pReceivedDataLength,*
UINT8 pReceivedData);*

Description	Send data to the Selected Card.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	SendDataLength (N)	The length of the data to be sent
	pSendData	The data to be sent
	pReceivedDataLength (K)	The length of the received data
	pReceivedData	The received data
Return Value	INT16	Result code. 0 means success.

Sample Code: None (please refer to the related document for more detailed information)

The Parameter "SendData" has the following format:

Telegram Length (1 Byte)	Option Byte (1 Byte)	Data (K Bytes)
K	#	Telegram Data

Telegram Length (K): This byte is transferred too for compatibility reasons even though it could be calculated with the SendDataLength**. SendDataLength (N) = Telegram Length (K) + 2**

Option byte:
This bytes holds transfer options.
Bit 0: if set Parity generation is enabled
Bit 1: if set Parity is odd, otherwise Parity bit is even
Bit 2: if set CRC generation for transmission is enabled
Bit 3: if set CRC checking for receiving is enabled
Bit 4: if set Crypto unit is deactivated before transmission start
Activation of the Crypto unit is only possible by using the login instruction
Bit 5,6,7: Bit Framing (Number of Bits from last Byte transmitted)

Data: The telegram data to be sent

Sample Code:

E.g. To send "RATS". {0x02, 0x0F, 0xE0, 0x50}

In which,
0x02: The DataTelegram Length
0x0F: The DataTelegram Option. Pls refer to the API Document for more detailed info.
{0xE0, 0x50}: RATS Command <DataTelegram to be sent>

// Sample Code for sending "RATS" to DESFire Card

```
UINT8 GetRATS[]={0x02,0x0F,0xE0,0x50};
UINT8 BlockData[64], BlockDataLength;

CMDStatus=ACR120_TxDataTelegram(ReaderHandle, 0x04, GetRATS,
                                &BlockDataLength, BlockData);

// If the command is successfully executed,
// the BlockDataLength will be equal to 0x06
// And the Block Data will have the data {0x06, 075, 0x77, 0x81, 0x02, 0x80}
```

#Common TeleDatagram Option Bytes Setting

- MIFare 1K/4K: 0xF3
- DESFire: 0x0F
- ISO Type B: 0x0C

Group C. Card Commands for MIFARE 1K/4K Cards

1. ACR120_Login

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Login(INT16 hReader,
UINT8 Sector,
UINT8 KeyType,
INT8 StoredNo,
UINT8 pKey[6]);

Description	Perform an authentication to access one sector of the card. Only one sector can be accessed at a time.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Sector	The sector no. to login.
	KeyType	The type of key. It can be AC_MIFARE_LOGIN_KEYTYPE_A, AC_MIFARE_LOGIN_KEYTYPE_B, AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_A, AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_B, AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_F, AC_MIFARE_LOGIN_KEYTYPE_STORED_A and AC_MIFARE_LOGIN_KEYTYPE_STORED_B
	StoredNo	The stored no of key if keyType = AC_MIFARE_LOGIN_KEYTYPE_STORED_A or AC_MIFARE_LOGIN_KEYTYPE_STORED_B.
	pKey	The login key if keyType = AC_MIFARE_LOGIN_KEYTYPE_A or AC_MIFARE_LOGIN_KEYTYPE_B. It's AC_MIFARE_KEY_LEN(6) bytes long.
Return Value	INT16	Result code. 0 means success.

Constant Definition:

AC_MIFARE_LOGIN_KEYTYPE_A	0xAA
AC_MIFARE_LOGIN_KEYTYPE_B	0xBB
AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_A	0xAD
AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_B	0xBD
AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_F	0xFD
AC_MIFARE_LOGIN_KEYTYPE_STORED_A	0xAF
AC_MIFARE_LOGIN_KEYTYPE_STORED_B	0xBF

Sample Code:

```
#include “acr120.h”

// Login the selected TAG on the reader
if(hReader>0)
{
        UINT8 TagType;          // the Tag Type
        UINT8 TagLength;        // the length of the Tag SN
        UINT8 TagSN[10];        // The SN of the Tag

        // Select a Tag
        INT16 Status= ACR120_Select(hReader, &TagType, &TagLength, TagSN);

        // Assume a Tag is successfully selected
        // Login the Sector 0x02 with a given key (Key A Login)

        UINT8 Key[6]={ 0x01, 0x02, 0x03, 0x04, 0x05, 0x06}; // the key used for login

        Status= ACR120_Login(hReader, 0x02,
                        AC_MIFARE_LOGIN_KEYTYPE_A, 0, Key);

        If(Status== SUCCESS_READER_OP)
        {
                // Now the Sector 0x02 is successfully authenticated (login success)
        }
        else
        {
                // The Sector 0x02 is not authenticated (login fail)!!
        }

        // some operations
        //
        //

        // Assume the Tag is still selected
        // Login the Sector 0x08 with a MasterKey 0x01 stored in Reader (Key B Login)

        Status= ACR120_Login(hReader, 0x08,
                AC_MIFARE_LOGIN_KEYTYPE_STORED_B, 0x01, NULL);

        If(Status== SUCCESS_READER_OP)
        {
                // Now the Sector 0x08 is successfully authenticated (login success)
        }
        else
        {
                // The Sector 0x08 is not authenticated (login fail)!!
        }

}
```

GROUP C. CARD COMMANDS FOR MIFARE 1K/4K CARDS

2. ACR120_Read

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Read(INT16 hReader,
UINT8 Block,
UINT8 pBlockData[16]);

Description	Read a block.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Block	The block number.
	pblockData	Contain the data read. It's AC_MIFARE_DATA_LEN(16) bytes long.
Return Value	INT16	Result code. 0 means success.

3. ACR120_ReadValue

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ReadValue(INT16 hReader,
UINT8 Block,
INT32 pValueData);*

Description	Read a value.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Block	The block number.
	pValueData	Contains the value read. It's 32 bit signed integer.
Return Value	INT16	Result code. 0 means success.

GROUP C. CARD COMMANDS FOR MIFARE 1K/4K CARDS

4. ACR120_Write

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Write(INT16 hReader,
UINT8 Block,
UINT8 pBlockData[16]);

Description	Write a block.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Block	The block number.
	pBlockData	Contain the data to write. It's AC_MIFARE_DATA_LEN(16) bytes long.
Return Value	INT16	Result code. 0 means success.

5. ACR120_WriteValue

High Level API:

DLLAPI INT16 AC_DECL
ACR120_WriteValue(INT16 hReader,
UINT8 Block,
INT32 ValueData);

Description	Write a value.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Block	The block number.
	ValueData	Contain the value to write. It's 32 bit signed integer.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

// Read & Write the Block if the USB connection is already established
if(hReader>0)
{
        UINT8 BlockData[16] // the data stored in the “Data Block”
        UINT8 BlockValue;     // the value stored in the “Value Block”

        // Assume the sector 0x02 is authenticated already
        // Read the block 0x08 of sector 0x02, each sector contains 4 blocks
        // Sector 0x02 consists of Blocks 0x08, 0x09, 0x0A & 0x0B

        // Assume the Block 0x08 is a “Data Block”, read the content
        INT16 Status= ACR120_Read(hReader, 0x08, BlockData);

        // update the block with a new content
        UINT8 NewBlockData[16];
        memset(NewBlockData, 0x00, 16);
        Status= ACR120_Write(hReader, 0x08, NewBlockData);

        //

        // Assume the Block 0x09 is a “Value Block”, read the value first
        Status= ACR120_ReadValue(hReader, 0x09, &BlockValue);

        // update the block with a new value. Decrease the value by 50
        Status= ACR120_WriteValue(hReader, 0x09, BlockValue-50);


}
```

GROUP C. CARD COMMANDS FOR MIFARE 1K/4K CARDS

6. ACR120_WriteMasterKey

High Level API:

DLLAPI INT16 AC_DECL
ACR120_WriteMasterKey(INT16 hReader,
UINT8 KeyNo,
UINT8 pKey[6]);

Description	Write master keys.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	KeyNo	The master key number.
	pKey	The key to write. It's AC_MIFARE_KEY_LEN(6) bytes long.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include "acr120.h"

// Store a master key into the reader
// There are totally 32 Masterkey storage space in the reader. From location 0x00 to 0x1F

if(hReader>0)
{

        UINT8 MasterKey[6]={0x00, 0x01, 0x02, 0x03, 0x04, 0x05};
        KeyStored=0x01;             // The MasterKey location in the reader.

        Status= ACR120_WriteMasterKey(hReader, KeyStored,  MasterKey);

        If(Status== SUCCESS_READER_OP)
        {
                // Now the Masterkey is successfully stored at location 0x01
        }
        else
        {
                // The Masterkey is not stored!!
        }

}
```

GROUP C. CARD COMMANDS FOR MIFARE 1K/4K CARDS

7. ACR120_Inc

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Inc (INT16 hReader,
UINT8 Block,
INT32 Value,
INT32 pNewValue);*

Description	Increment a value block by adding a value.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Block	The block number.
	Value	The value added to the block value.
	pNewValue	The updated value after increment.
Return Value	INT16	Result code. 0 means success.

8. ACR120_Dec

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Dec (INT16 hReader,
UINT8 Block,
INT32 Value,
INT32 pNewValue);*

Description	Decrement a value block by subtracting a value.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Block	The block number.
	Value	The value subtracts.
	pNewValue	The updated value after decrement.
Return Value	INT16	Result code. 0 means success.

GROUP C. CARD COMMANDS FOR MIFARE 1K/4K CARDS

9. ACR120_Copy

High Level API:

DLLAPI INT16 AC_DECL
ACR120_Copy(INT16 hReader,
UINT8 srcBlock,
UINT8 desBlock,
INT32 pNewValue);*

Description	Copy a value block to another value block of the same sector.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	srcBlock	The source block number.
	tgtBlock	The target block number.
	pNewValue	The updated value of the desBlock after copy.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include “acr120.h”

// Read & Write the Value Blocks if the USB connection is already established
if(hReader>0)
{
        UINT8 Block;  // the block number within the sector
        UINT8 BlockValue;     // the value stored in the “Value Block”

        // Assume the sector 0x02 is authenticated already
        // each sector contains 4 blocks
        // Sector 0x02 consists of Blocks 0x08, 0x09, 0x0A & 0x0B

        // Assume the Blocks 0x08 and 0x0A are “Value Block”, copy the value from block
        0x08 to block 0x0A first.
        INT16 Status= ACR120_Copy(hReader, 0x08, 0x09, &BlockValue);
        // now the BlockValue contains the updated value of Block 0x0A

        // update the block 0x0A with a new value. Decrease the value by 100 (decimal)
        Status= ACR120_Dec(hReader, 0x0A, 100,  &BlockValue);
        // now the BlockValue contains the updated value of Block 0x09

        // update the block 0x08 with a new value. Increase the value by 56 (decimal)
        Status= ACR120_Inc(hReader, 0x08, 56, &BlockValue);
        // now the BlockValue contains the updated value of Block 0x08
}
```

GROUP D. CARD COMMANDS FOR ASK CTS256B/512B CARDS (ONLY FOR SOME SPECIAL VERSIONS)

1. ACR120_ASKSectorWrite

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ASKSectorWrite(INT16 hReader,
UINT8 Sector,
UINT8 pBlockData[2]
UINT8 UpdateMode);

Description	Write a block.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Sector	The Sector number. For CTS256B, 0 <= Sector <= 15 For CTS512B, 0 <= Sector <= 31
	pBlockData	Contain the data to write. It's 2 bytes long.
	UpdateMode	'0' = Write. It will write '1's at the specified memory location, but not '0'. '1' = Update/Erase. It will update the specified location with the data provided. It is the only way to write '0's to the specified memory location
Return Value	INT16	Result code. 0 means success.

2. ACR120_ASKSectorRead

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ASKSectorRead(INT16 hReader,
UINT8 Sector,
UINT8 pBlockData[2]);

Description	Read a block.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Sector	The Sector number. For CTS256B, 0 <= Sector <= 15 For CTS512B, 0 <= Sector <= 31
	pBlockData	Contain the data received. It's 2 bytes long.
Return Value	INT16	Result code. 0 means success.

GROUP D. CARD COMMANDS FOR ASK CTS256B/512B CARDS (ONLY FOR SOME SPECIAL VERSIONS)

3. ACR120_ASKSectorMultiRead (for CTS512B only)

High Level API:

DLLAPI INT16 AC_DECL
ACR120_ASKSectorRead(INT16 hReader,
UINT8 Sector,
UINT8 pBlockData[8]);

Description	Read 4 consecutive sector blocks.	
Parameters	hReader	The handle to the Reader returned by ACR120_Open().
	Sector	The Sector number. For CTS512B only, 0 <= Sector <= 27
	pBlockData	Contain the data received. It's 8 bytes long.
Return Value	INT16	Result code. 0 means success.

Sample Code:

```
#include "acr120.h"

// Read & Write the Block if the USB connection is already established
if(hReader>0)
{
        UINT8 BlockData[2] ={0x12, 0x34}; // the data stored in the "Data Block"
        UINT8 MultiBlockData[8];

        // Assume a Tag is selected
        // Read the 4 consecutive sector blocks starting from Sector 0x00
        INT16 Status= ACR120_ASKSectorMultiRead(hReader,
                                0x00, MultiBlockData);

        // Read the content of Sector 0x05
        Status= ACR120_ASKSectorRead(hReader, 0x05, BlockData);

        BlockData[0] |= 0xAA;
        BlockData[1] |= 0x55;

        // Write the new BlockData to Sector 0x05, Write Mode
        Status= ACR120_ASKSectorWrite(hReader, 0x05, BlockData, 0);

        BlockData[0]=0x00; BlockData[1]=0x00;

        // Erase the content of Sector 0x05, Update Mode
        Status= ACR120_ASKSectorWrite(hReader, 0x05, BlockData, 1);


}
```

APPENDIX:

1. Error Codes returned by High Level APIs

SUCCESS_READER_OP(0)
Successful operation. No Error Found.
#Handled by the DLL. The DLL has to do the consistent checking even a "Success Response Status" is returned by the device.
#Corresponding to the << Response Status 'L', 'P', 'A' & 'G' >>.

ERR_INTERNAL_UNEXPECTED(-1000)
Library internal unexpected error.
#Handled by the DLL

ERR_PORT_INVALID(-2000)
The port is invalid.
#Handled by the DLL

ERR_PORT_OCCUPIED(-2010)
The port is occupied by another application.
#Handled by the DLL

ERR_HANDLE_INVALID(-2020)
The handle is invalid.
#Handled by the DLL

ERR_INCORRECT_PARAM(-2030)
Incorrect Parameter.
#Handled by the DLL.

ERR_READER_NO_TAG(-3000, or 0xF448)
No TAG in reachable range / selected.
#Corresponding to the << Response Status 'N' >>.

ERR_READER_OP_FAILURE(-3030, or 0xF42A)
Operation failed.
#Corresponding to the << Response Status 'F' >>.

ERR_READER_UNKNOWN(-3040, or 0xF420)
Reader unknown error.
#Corresponding to the << Response Status 'C', 'O', 'X' & '?' >>.

APPENDIX:

1. Error Codes returned by High Level APIs (Cont.)

ERR_READER_LOGIN_INVALID_STORED_KEY_FORMAT(-4010, or 0xF056)
Invalid stored key format in login process.
#Handled by the DLL.

ERR_READER_LOGIN_FAIL(-4011, or 0xF055)
Login failed.
#Corresponding to the << Response Status 'I' >>.

ERR_READER_OP_AUTH_FAIL(-4012, or 0xF054)
The operation or access is not authorized.
#Corresponding to the << Response Status 'I' >>.

ERR_READER_VALUE_DEC_EMPTY(-4030, or 0xF042)
Decrement failure (empty).
#Corresponding to the << Response Status 'E' >>.

ERR_READER_VALUE_INC_OVERFLOW(-4031, or 0xF041)
Increment Overflow.
#Corresponding to the << Response Status 'E' >>.

ERR_READER_VALUE_OP_FAILURE (-4032, 0xF040)
Value Operations failure. E.g. Value Increment
#Corresponding to the << Response Status 'I' >>.

ERR_READER_VALUE_INVALID_BLOCK(-4033, 0xF03F)
Block doesn't contain value.
#Corresponding to the << Response Status 'F' >>.

ERR_READER_VALUE_ACCESS_FAILURE (-4034, 0xF03E)
Value Access failure.
#Corresponding to the << Response Status 'U' >>.

APPENDIX:

2. Possible TAG Types

TAG Type Value	TAG Type Description	TAG SN Length
0x01	Mifare Light	4
0x02	Mifare 1K	4
0x03	Mifare 4K	4
0x04	Mifare DESFire	7
0x05	Mifare Ultralight	7
0x06	JCOP30	4
0x07	Shanghai Transport	4
0x08	MPCOS Combi	4
0x80	ISO Type B, Calypso	4
0x81	ASK CTS256B, Type B	8
0x82	ASK CTS512B, Type B	8

#The TAG SN Format of ASK CTS256B and CTS512B Cards

1st Byte	2nd Byte	3rd Byte	4th Byte	5th to 8th Bytes			
Manufacturing Code	Product Code	Embedded Code	Application Code	MSB (H)	MSB (L)	LSB (H)	LSB (L)
XX	0x50 (CTS256B) or 0x60 (CTS512B)	XX	XX	XX	XX	XX	XX

3. USB ID and Drivers for ACR120U

- VID_0x072F & PID_0x8003 as the USB ID of ACR120U
- ACR120.SYS will be used as the driver name for ACR120U based on ST7263
- ACR120U.DLL will be used as the DLL name for ACR120U based on ST7263.

APPENDIX:

4. Standard Program Flow

1) Before executing any Card Commands, get the Reader Handle first.
2) Select a TAG
3) Login the TAG
4) Access the TAG
5) Close the Reader Handle

// ACR120_Sample.c; a very simple program for accessing Philips MIFare 1K Tags

```
#include “acr120.h”

void main(void)
{
        INT16 hReader = -1;
        UINT8 Length, SN[10], Data[16], Type;

        // Get the Reader Handle first. Open a communication channel (USB Interface)
        hReader=ACR120_Open(ACR120_USB1);

        if(hReader<0){ // error happened!!! };

        // Assume the Reader Handle is ready, then “Select a TAG”
        ACR120_Select(hReader, &Type, &Length, SN);

        // Assume a TAG is selected, then “Login Sector 0x02” using “Default Key F”
        ACR120_Login(hReader, 0x02, AC_MIFARE_LOGIN_KEYTYPE_DEFAULT_F, 0, NULL);

        // Assume the Sector is authorized, then “Read data from Block 0x08 of Sector 0x02”
        ACR120_Read(hReader, 0x08, Data);

        /*
        Some operations.
        */

        ACR120_Close(hReader); // Close the port and quit the program

        return;
}
```

APPENDIX:

5. Physical and Logical Block/Sector Calculation

1. Mifare 1K

- Logical Sector is equal to Physical sector, which are 0 to 15.
- Logical block of each sector is from 0 to 3.
- Physical blocks = ((Sector * 4) + Logical block)

2. Mifare 4K

- **Case 1: If {0 <= Logical Sector <= 31}**
  - Physical sector is equal to Logical.
  - Logical block of each sector is from 0 to 3.
  - Physical blocks = ((Sector * 4) + Logical block)

- **Case 2: If {32 <= Logical Sector <= 39}**
  - Physical Sector = Logical Sector + ((Logical Sector - 32) * 3)
  - Logical block of each sector is from 0 to 15.
  - Physical blocks = ((Logical Sector - 32) * 16) + 128 + Logical block

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Datasheet Mifare 1K

DATA SHEET

mifare®

Standard Card IC

MF1 IC S50

Functional Specification

Product Specification

Revision 5.1

May 2001

Philips Semiconductors

PHILIPS

CONTENTS

MIFARE® is a registered trademark of Philips Electronics N.V.

1 FEATURES

1.1 MIFARE® RF Interface (ISO/IEC 14443 A)

- Contactless transmission of data and supply energy (no battery needed)
- Operating distance: Up to 100mm (depending on antenna geometry)
- Operating frequency: 13.56 MHz
- Fast data transfer: 106 kbit/s
- High data integrity: 16 Bit CRC, parity, bit coding, bit counting
- True anticollision
- Typical ticketing transaction: < 100 ms (including backup management)

1.2 EEPROM

- 1 Kbyte, organized in 16 sectors with 4 blocks of 16 bytes each (one block consists of 16 byte)
- User definable access conditions for each memory block
- Data retention of 10 years.
- Write endurance 100.000 cycles

1.3 Security

- Mutual three pass authentication (ISO/IEC DIS9798-2)
- Data encryption on RF-channel with replay attack protection
- Individual set of two keys per sector (per application) to support multi-application with key hierarchy
- Unique serial number for each device
- Transport key protects access to EEPROM on chip delivery

2 GENERAL DESCRIPTION

Philips has developed the MIFARE® MF1 IC S50 to be used in contactless smart cards according to ISO/IEC 14443A. The communication layer (MIFARE® RF Interface) complies to parts 2 and 3 of the ISO/IEC 14443A standard. The security layer sports the field-proven CRYPTO1 stream cipher for secure data exchange of the MIFARE® Classic family.

2.1 Contactless Energy and Data Transfer

In the MIFARE® system, the MF1 IC S50 is connected to a coil with a few turns and then embedded in plastic to form the passive contactless smart card. No battery is needed. When the card is positioned in the proximity of the Read Write Device (RWD) antenna, the high speed RF communication interface allows to transmit data with 106 kBit/s.

2.2 Anticollision

An intelligent anticollision function allows to operate more than one card in the field simultaneously. The anticollision algorithm selects each card individually and ensures that the execution of a transaction with a selected card is performed correctly without data corruption resulting from other cards in the field.

2.3 User Convenience

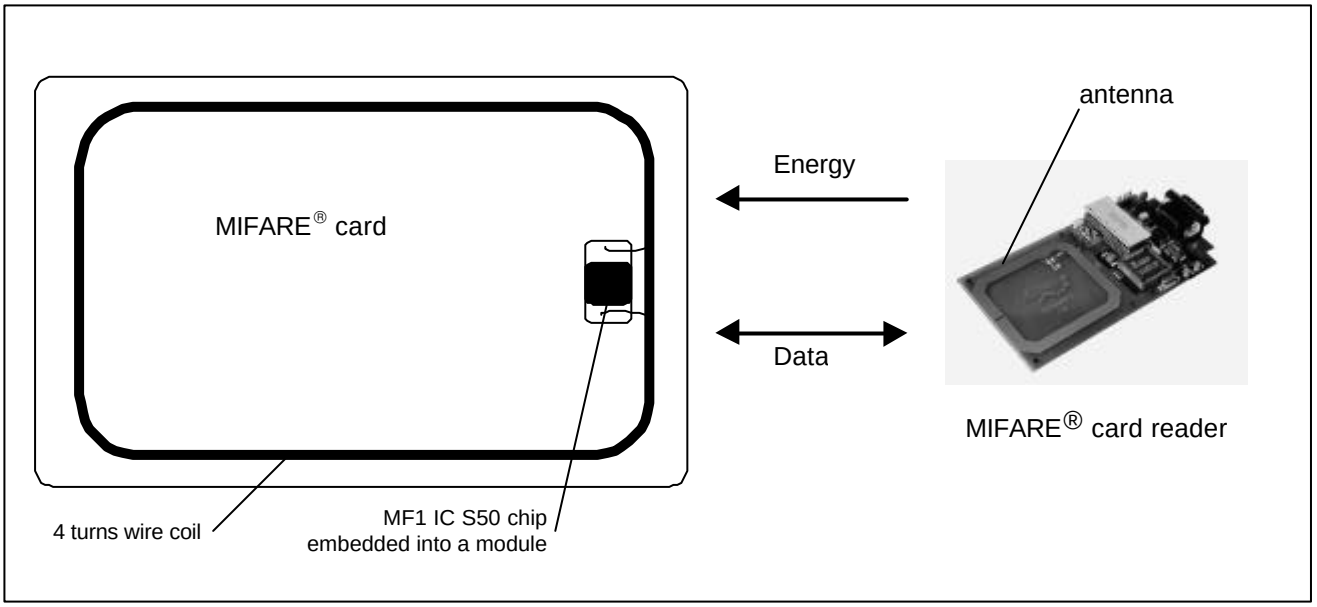
The MIFARE® system is designed for optimal user convenience. The high data transmission rate for example allows complete ticketing transactions to be handled in less than 100 ms. Thus, the MIFARE® card user is not forced to stop at the RWD antenna leading to a high throughput at gates and reduced boarding times onto busses. The MIFARE® card may also remain in the wallet during the transaction, even if there are coins in it.

2.4 Security

Special emphasis has been placed on security against fraud. Mutual challenge and response authentication, data ciphering and message authentication checks protect the system from any kind of tampering and thus make it attractive for ticketing applications. Serial numbers, which can not be altered, guarantee the uniqueness of each card.

2.5 Multi-application Functionality

The MIFARE® system offers real multi-application functionality comparable to the features of a processor card. Two different keys for each sector support systems using key hierarchies.



2.6 Delivery Options

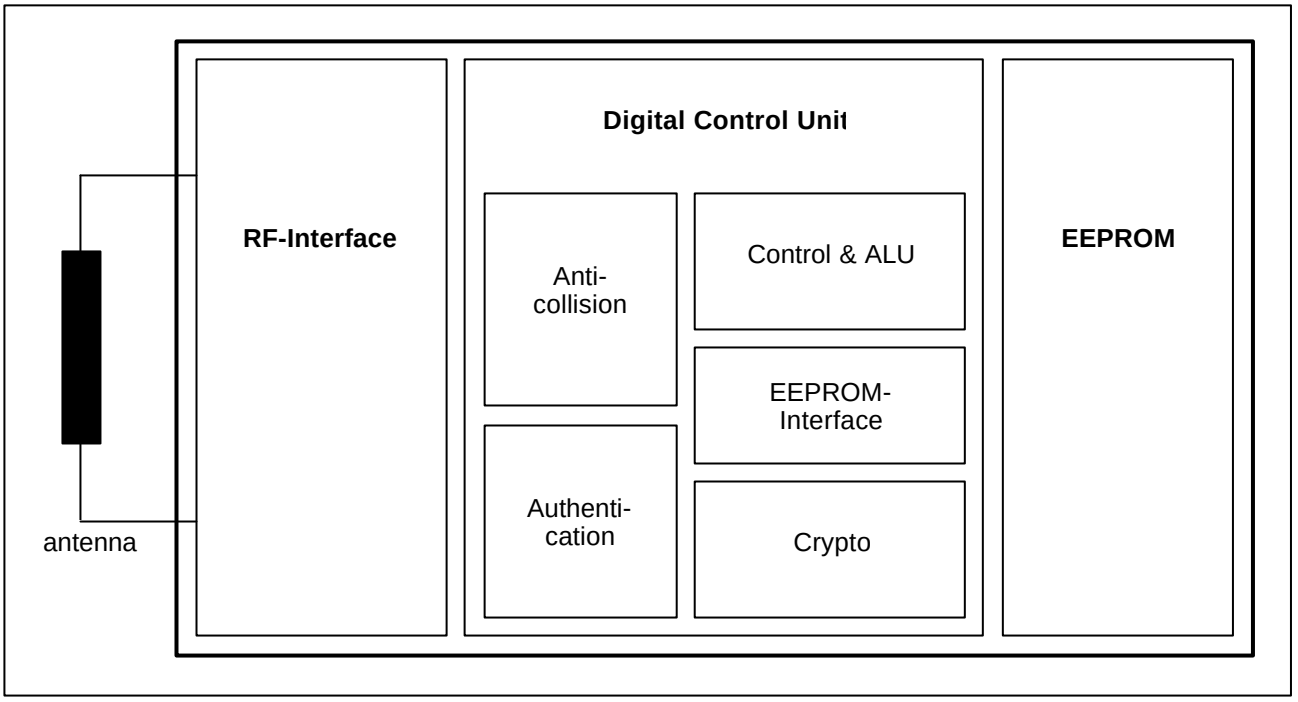
- Die on wafer
- Bumped die on wafer
- Chip Card Module

3 FUNCTIONAL DESCRIPTION

3.1 Block Description

The MF1 IC S50 chip consists of the 1 Kbyte EEPROM, the RF-Interface and the Digital Control Unit. Energy and data are transferred via an antenna, which consists of a coil with a few turns directly connected to the MF1 IC S50. No further external components are necessary. (For details on antenna design please refer to the document *MIFARE® Card IC Coil Design Guide*.)

- RF-Interface:
  – Modulator/Demodulator
  – Rectifier
  – Clock Regenerator
  – Power On Reset
  – Voltage Regulator
- Anticollision: Several cards in the field may be selected and operated in sequence
- Authentication: Preceding any memory operation the authentication procedure ensures that access to a block is only possible via the two keys specified for each block
- Control & Arithmetic Logic Unit: Values are stored in a special redundant format and can be incremented and decremented
- EEPROM-Interface
- Crypto unit: The field-proven CRYPTO1 stream cipher of the MIFARE® Classic family ensures a secure data exchange
- EEPROM: 1 Kbyte are organized in 16 sectors with 4 blocks each. A block contains 16 bytes. The last block of each sector is called “trailer”, which contains two secret keys and programmable access conditions for each block in this sector.



3.2 Communication Principle

The commands are initiated by the RWD and controlled by the Digital Control Unit of the MF1 IC S50 according to the access conditions valid for the corres-ponding sector.

3.2.1 REQUEST STANDARD / ALL

After Power On Reset (POR) of a card it can answer to a request command - sent by the RWD to all cards in the antenna field - by sending the answer to request code (ATQA according to ISO/IEC 14443A).

3.2.2 ANTICOLLISION LOOP

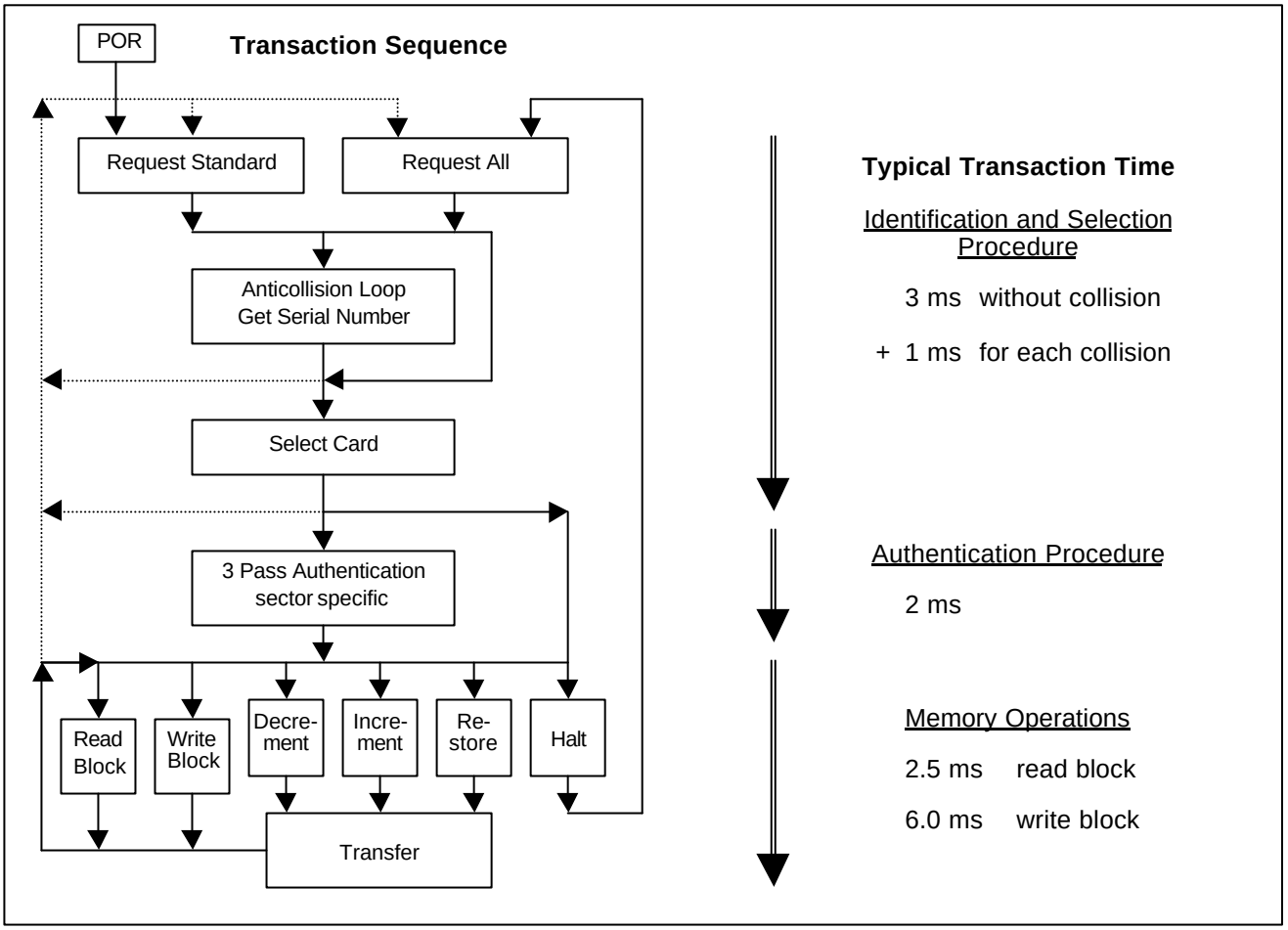
In the anticollision loop the serial number of a card is read. If there are several cards in the operating range of the RWD, they can be distinguished by their unique serial numbers and one can be selected (select card) for further transactions. The unselected cards return to the standby mode and wait for a new request command.

3.2.3 SELECT CARD

With the select card command the RWD selects one individual card for authentication and memory related operations. The card returns the Answer To Select(ATS) code (= 08h), which determines the type of the selected card. Please refer to the document *MIFARE® Standardised Card Type Identification Procedure* for further details.

3.2.4 3 PASS AUTHENTICATION

After selection of a card the RWD specifies the memory location of the following memory access and uses the corresponding key for the 3 pass authentication procedure. After a successful authentication all memory operations are encrypted.



3.2.5 MEMORY OPERATIONS

After authentication any of the following operations may be performed:

- Read block
- Write block
- Decrement: Decrements the contents of a block and stores the result in a temporary internal data-register
- Increment: Increments the contents of a block and stores the result in the data-register
- Restore: Moves the contents of a block into the data-register
- Transfer: Writes the contents of the temporary internal data-register to a value block

3.3 Data Integrity

Following mechanisms are implemented in the contactless communication link between RWD and card to ensure very reliable data transmission:

- 16 bits CRC per block
- Parity bits for each byte
- Bit count checking
- Bit coding to distinguish between "1", "0", and no information
- Channel monitoring (protocol sequence and bit stream analysis)

3.4 Security

To provide a very high security level a three pass authentication according to ISO 9798-2 is used.

3.4.1 THREE PASS AUTHENTICATION SEQUENCE

a) The RWD specifies the sector to be accessed and chooses key A or B.
b) The card reads the secret key and the access conditions from the sector trailer. Then the card sends a random number as the challenge to the RWD (pass one).
c) The RWD calculates the response using the secret key and additional input. The response, together with a random challenge from the RWD, is then transmitted to the card (pass two).
d) The card verifies the response of the RWD by comparing it with its own challenge and then it calculates the response to the challenge and transmits it (pass three).
e) The RWD verifies the response of the card by comparing it to its own challenge.

After transmission of the first random challenge the communication between card and RWD is encrypted.

3.5 RF Interface

The RF-interface is according to the standard for contactless smart cards ISO/IEC 14443A.

The carrier field from the RWD is always present (with short pauses when transmitting), because it is used for the power supply of the card.

For both directions of data communication there is only one start bit at the beginning of each frame. Each byte is transmitted with a parity bit (odd parity) at the end. The LSB of the byte with the lowest address of the selected block is transmitted first. The maximum frame length is 163 bits (16 data bytes + 2 CRC bytes = 16 * 9 + 2 * 9 + 1 start bit).

3.6 Memory Organisation

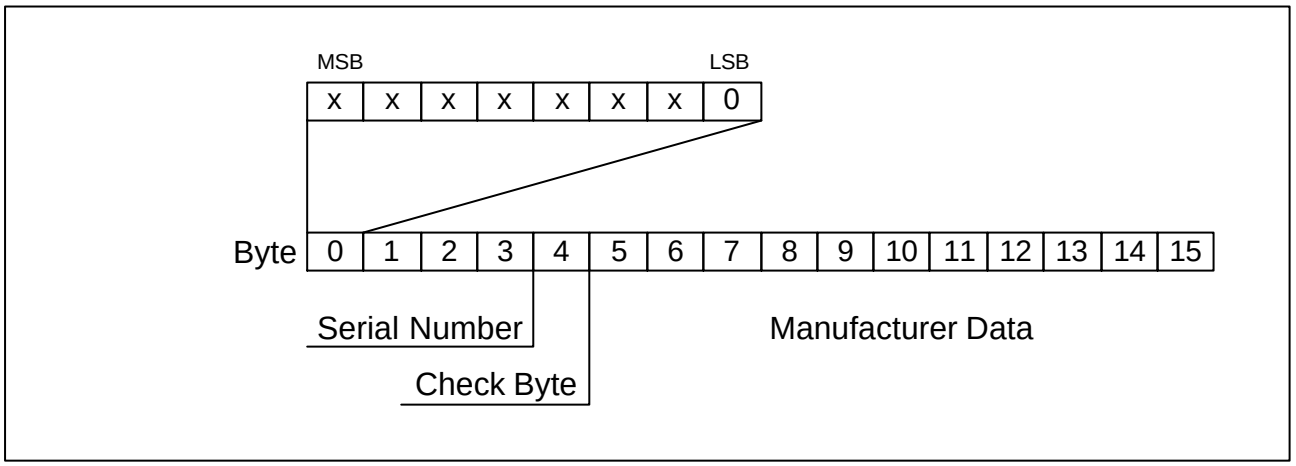
The 1024 x 8 bit EEPROM memory is organized in 16 sectors with 4 blocks of 16 bytes each.

In the erased state the EEPROM cells are read as a logical “0”, in the written state as a logical “1”.

		Byte Number within a Block															
Sector	**Block**	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	**Description**
15	3	Key A						Access Bits				Key B						Sector Trailer 15
	2																	Data
	1																	Data
	0																	Data
14	3	Key A						Access Bits				Key B						Sector Trailer 14
	2																	Data
	1																	Data
	0																	Data
:	:																	
:	:																	
:	:																	
1	3	Key A						Access Bits				Key B						Sector Trailer 1
	2																	Data
	1																	Data
	0																	Data
0	3	Key A						Access Bits				Key B						Sector Trailer 0
	2																	Data
	1																	Data
	0																	Manufacturer Block

3.6.1 MANUFACTURER BLOCK

This is the first data block (block 0) of the first sector (sector 0). It contains the IC manufacturer data. Due to security and system requirements this block is write protected after having been programmed by the IC manufacturer at production.



3.6.2 DATA BLOCKS

All sectors contain 3 blocks of 16 bytes for storing data (Sector 0 contains only two data blocks and the read-only manufacturer block).

The data blocks can be configured by the access bits as

- read/write blocks for e.g. contactless access control or
- value blocks for e.g. electronic purse applications, where additional commands like increment and decrement for direct control of the stored value are provided.

An authentication command has to be carried out before any memory operation in order to allow further commands.

3.6.2.1 Value Blocks

The value blocks allow to perform electronic purse functions (valid commands*: read, write, increment, decrement, restore, transfer*).
The value blocks have a fixed data format which permits error detection and correction and a backup management.
A value block can only be generated through a *write* operation in the value block format:

- Value: Signifies a signed 4-byte value. The lowest significant byte of a value is stored in the lowest address byte. Negative values are stored in standard 2´s complement format. For reasons of data integrity and security, a value is stored three times, twice non-inverted and once inverted.
- Adr: Signifies a 1-byte address, which can be used to save the storage address of a block, when implementing a powerful backup management. The address byte is stored four times, twice inverted and non-inverted. During *increment, decrement, restore* and *transfer* operations the address remains unchanged. It can only be altered via a *write* command.

Byte Number	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Description	Value				$\overline{\text{Value}}$				Value				Adr	$\overline{\text{Adr}}$	Adr	$\overline{\text{Adr}}$

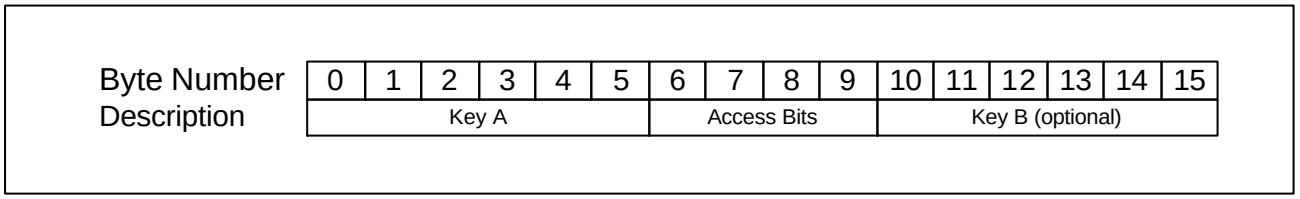
3.6.3 SECTOR TRAILER (BLOCK 3)

Each sector has a sector trailer containing the

- secret keys A and B(optional), which return logical “0”s when read and
- the access conditions for the four blocks of that sector, which are stored in bytes 6...9. The access bits also specify the type (read/write or value) of the data blocks.

If key B is not needed, the last 6 bytes of block 3 can be used as data bytes.

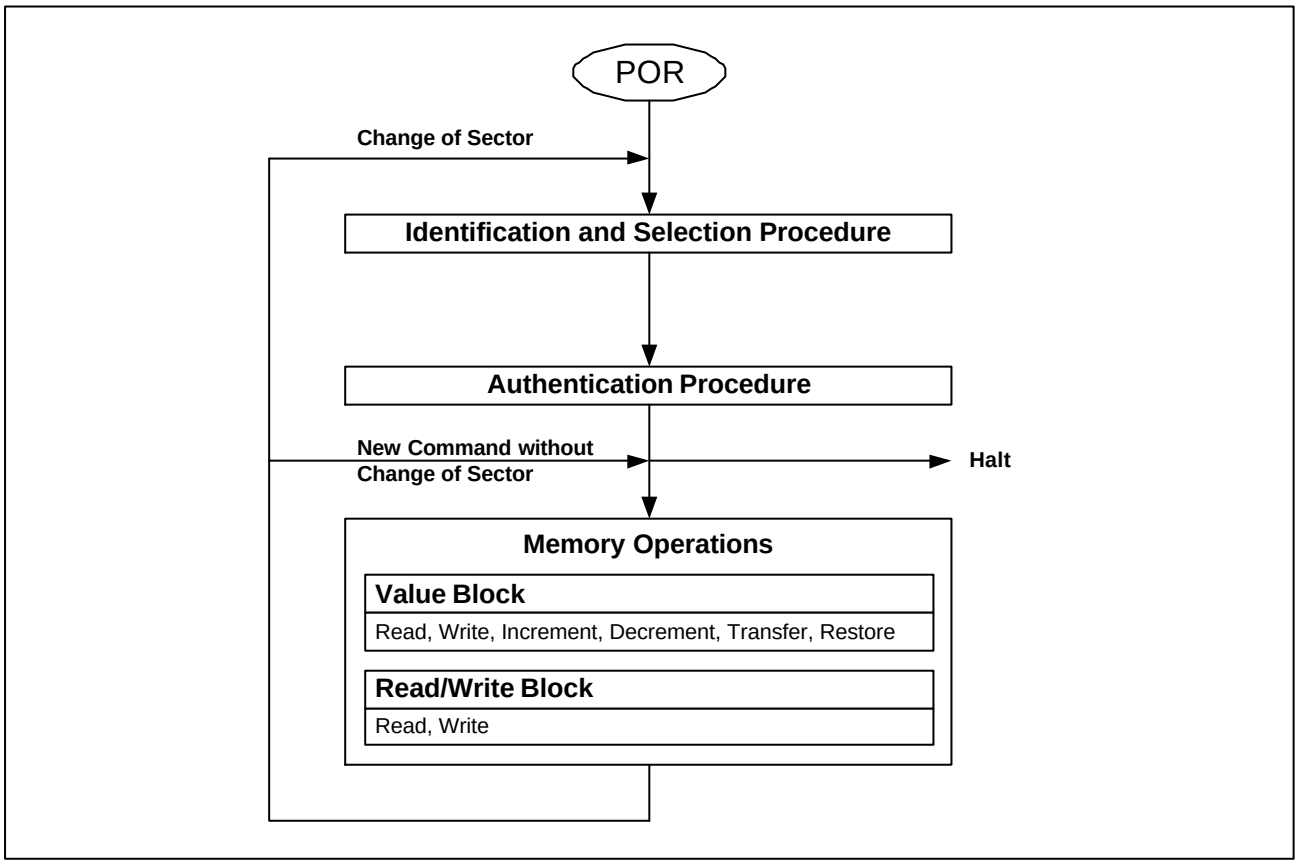
Byte 9 of the sector trailer is available for user data. For this byte apply the same access rights as for byte 6, 7 and 8.



3.7 Memory Access

Before any memory operation can be carried out, the card has to be selected and authenticated as described previously.

The possible memory operations for an addressed block depend on the key used and the access conditions stored in the associated sector trailer.



Memory Operations		
Operation	**Description**	**Valid for Block Type**
Read	reads one memory block	read/write, value and sector trailer
Write	writes one memory block	read/write, value and sector trailer
Increment	increments the contents of a block and stores the result in the internal data register	value
Decrement	decrements the contents of a block and stores the result in the internal data register	value
Transfer	writes the contents of the internal data register to a block	value
Restore	reads the contents of a block into the internal data register	value

3.7.1 ACCESS CONDITIONS

The access conditions for every data block and sector trailer are defined by 3 bits, which are stored non-inverted and inverted in the sector trailer of the specified sector.

The access bits control the rights of memory access using the secret keys A and B. The access conditions may be altered, provided one knows the relevant key and the current access condition allows this operation.

Note: In the following description the access bits are mentioned in the non-inverted mode only.

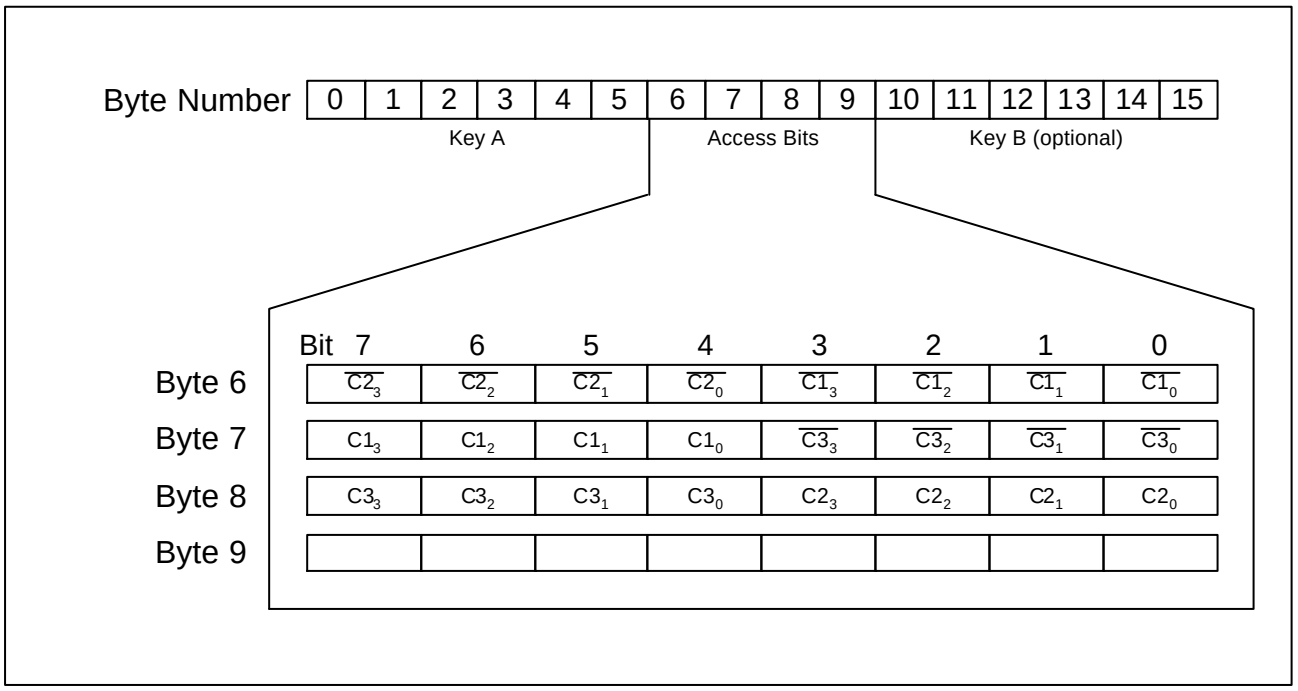
The internal logic of the MF1 IC S50 ensures that the commands are executed only after an authentication procedure or never.

Access Bits	Valid Commands		Block	Description
$C1_3\ C2_3\ C3_3$	read, write	→	3	sector trailer
$C1_2\ C2_2\ C3_2$	read, write, increment, decrement, transfer, restore	→	2	data block
$C1_1\ C2_1\ C3_1$	read, write, increment, decrement, transfer, restore	→	1	data block
$C1_0\ C2_0\ C3_0$	read, write, increment, decrement, transfer, restore	→	0	data block

Note: With each memory access the internal logic verifies the format of the access conditons. If it detects a format violation the whole sector is irreversible blocked.

3.7.2 ACCESS CONDITIONS FOR THE SECTOR TRAILER

Depending on the access bits for the sector trailer (block 3) the read/write access to the keys and the



access bits is specified as ‘never’, ‘key A’, ‘key B’ or key A|B’ (key A or key B).

On chip delivery the access conditions for the sector trailers and key A are predefined as transport configuration. Since key B may be read in transport configuration, new cards must be authenticated with key A.

Since the access bits themselves can also be blocked, special care should be taken during personalization of cards.

Note: the grey marked lines are access conditions where key B is readable and may be used for data.

Access bits			**Access condition for**						**Remark**
			KEYA		Access bits		KEYB		
C1	C2	C3	read	write	read	write	read	write	
0	0	0	never	key A	key A	never	key A	key A	Key B may be read
0	1	0	never	never	key A	never	key A	never	Key B may be read
1	0	0	never	key B	key A|B	never	never	key B	
1	1	0	never	never	key A|B	never	never	never	
0	0	1	never	key A	key A	key A	key A	key A	Key B may be read, transport configuration
0	1	1	never	key B	key A|B	key B	never	key B	
1	0	1	never	never	key A|B	key B	never	never	
1	1	1	never	never	key A|B	never	never	never	

3.7.3 ACCESS CONDITIONS FOR DATA BLOCKS

Depending on the access bits for data blocks (blocks 0...2) the read/write access is specified as 'never', 'key A', 'key B' or 'key A|B' (key A or key B). The setting of the relevant access bits defines the application and the corresponding applicable commands.

- Read/write block: The operations read and write are allowed.
- Value block: Allows the additional value operations *increment, decrement, transfer und restore*. In one case ('001') only *read* and *decrement* are possible for a non-rechargeable card. In the other case ('110') recharching is possible by using key B.
- Manufacturer block: The read-only condition is not affected by the access bits setting!

- Key management: In transport configuration key A must be used for authentication[1] .

Access bits			Access condition for				Application
C1	C2	C3	read	write	increment	decrement, transfer, restore	
0	0	0	key A|B[1]	key A|B[1]	key A|B[1]	key A|B[1]	transport configuration
0	1	0	key A|B[1]	never	never	never	read/write block
1	0	0	key A|B[1]	key B[1]	never	never	read/write block
1	1	0	key A|B[1]	key B[1]	key B[1]	key A|B[1]	value block
0	0	1	key A|B[1]	never	never	key A|B[1]	value block
0	1	1	key B[1]	key B[1]	never	never	read/write block
1	0	1	key B[1]	never	never	never	read/write block
1	1	1	never	never	never	never	read/write block

[1] if Key B may be read in the corresponding Sector Trailer it cannot serve for authentication (all grey marked lines in previous table). **Consequences:** If the RWD tries to authenticate any block of a sector with key B using grey marked access conditions, the card will refuse any subsequent memory access after authentication.

4 DEFINITIONS

Data sheet status	
Objective specification	This data sheet contains target or goal specifications for product development.
Preliminary specification	This data sheet contains preliminary data; supplementary data may be published later.
Product specification	This data sheet contains final product specifications.
Limiting values	
Limiting values given are in accordance with the Absolute Maximum Rating System (IEC 134). Stress above one or more of the limiting values may cause permanent damage to the device. These are stress ratings only and operation of the device at these or at any other conditions above those given in the Characteristics section of the specification is not implied. Exposure to limiting values for extended periods may affect device reliability.	
Application information	
Where application information is given, it is advisory and does not form part of the specification.	

5 LIFE SUPPORT APPLICATIONS

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6 REVISION HISTORY

Table 1 Functional Specification MF1 IC S50 Revision History

REVISION	DATE	CPCN	PAGE	DESCRIPTION
5.1	0501	2001 05013	9, 10	New Coding Manufacturer Block
5.0	1199			New Layout: Revised. Includes MF1 IC S50 05 silicon.
1.0		-		Initital version.

NOTES

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LAMPIRAN D

Spesifikasi Ethernet to Serial Gateway (EGSR-7150MJ)

EG-SR-7150MJ

User's Manual

(V 1.1)

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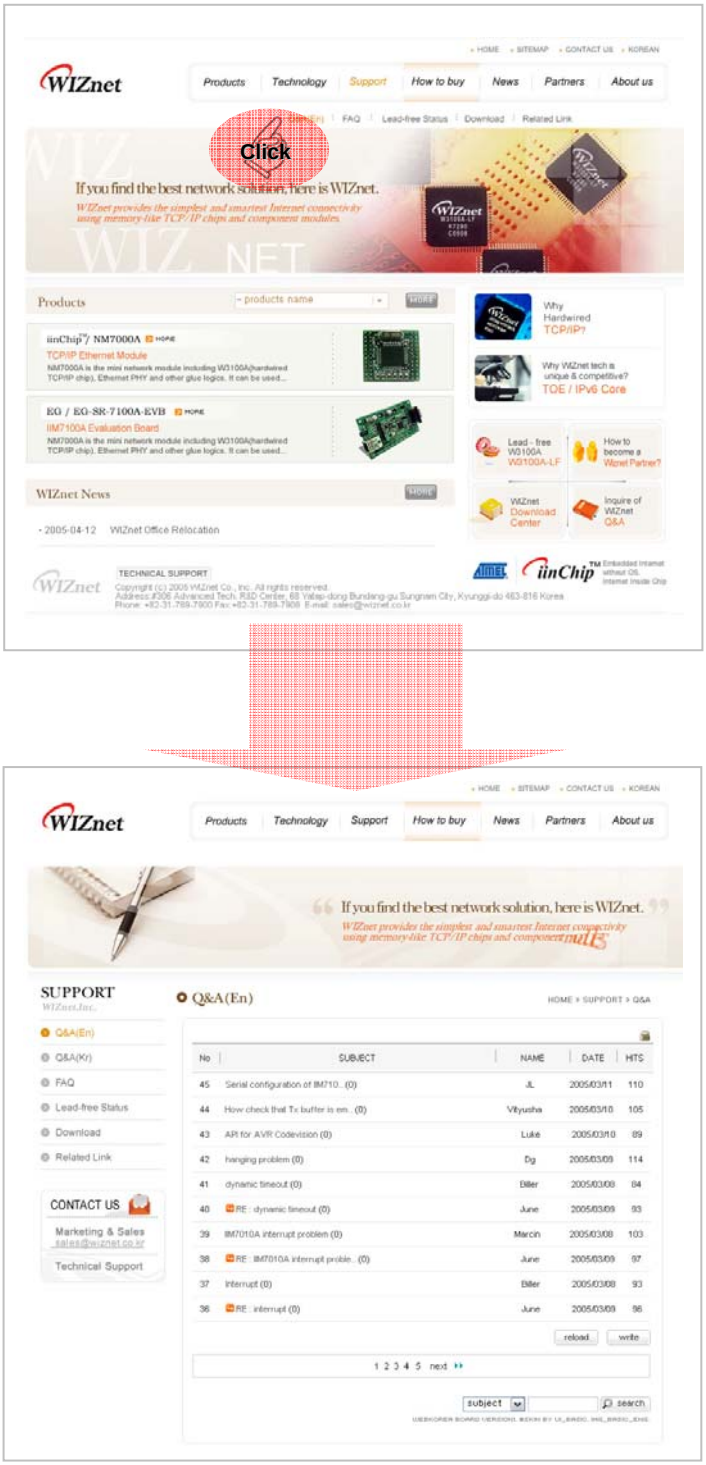
If you have any question about WIZnet Products, write them down onto our Q&A Board on our website at www.wiznet.co.kr. A WIZnet engineer will promptly provide you with an answer.



EG-SR-7150MJ User's Manual

1. Introduction

The EG-SR-7150MJ is a gateway module that converts serial data into TCP/IP data type. It transmits the data sent by a serial equipment to the Internet and TCP/IP data to the equipment.

With the EG-SR-7150MJ mounted with an RJ-45 connector, users can have an easier and quicker interface with the Ethernet.

The EG-SR-7150MJ provides serial commands, with which the developers of any serial device can add local configuration capability to their products. For example, a card reader developer can program the keypad on a card reader to configure serial or network on-site without the use of a laptop or PC.

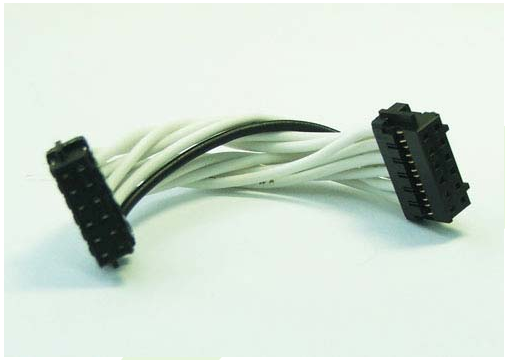
1.1. Key Features

- Ready-to-go serial to Ethernet gateway module mounted with an RJ-45 connector
- Serial Command Support
  - Simple command frame format
  - Comprehensive & readable command set for network and serial settings
  - On-site configuration without PC
- High stability & reliability by using a W3150A WIZnet Chip, a fully-hardwired TCP/IP stack
- Easy and powerful configuration program
- 10/100Mbps Ethernet interface, Max. 230Kbps Serial interface
- RoHS compliant

1.2. Products Contents (EG-SR-7150MJ-EVB)

The EG-SR-7150MJ-EVB, the evaluation kit for the EG-SR-7150MJ contains the following items;

	EG-SR-7150MJ Module

	Test Board for EG-SR-7150MJ
	12pin Cable (Connecting EG-SR-7150MJ to Test Board)
	Serial Cable (Connecting Serial Device to Test Board)
	LAN Cable (Connecting EG-SR-7150MJ to Host)
	Power (DC 5V Adaptor)

	CD (Containing Manual, H/W & S/W Materials)

☞ Please immediately notify your sales representative if any of the items above is missing or damaged.

1.3. Specifications of the EG-SR-7150MJ

Category	Specifications
Form Factor	2mm Pitch 2x6 pins, 62x40 mm
LAN Interface	10/100 Mbps auto-sensing, RJ-45 connector
Protocol	TCP, UDP, IP, ARP, ICMP, MAC, (IGMP, PPPoE)
CPU	AT89C51RC2 (8bit MCU and 32K Flash)
Serial Interface	RS 232 (LVTTL)
Serial Signals	TXD, RXD, RTS, CTS, GND
Serial Parameters	Parity : None, Even, Odd Data bits : 7, 8 Flow control : RTS/CTS, XON/XOFF Speed : up to 230Kbps
Management	Configuration utility based on Windows
Temperature	0℃~70℃ (Operating), -40℃~85℃ (Storage)
Humidity	10~90%
Power	150mA @ 3.3V (max)
Size	40mm x 62mm x 17mm

2. Getting Started

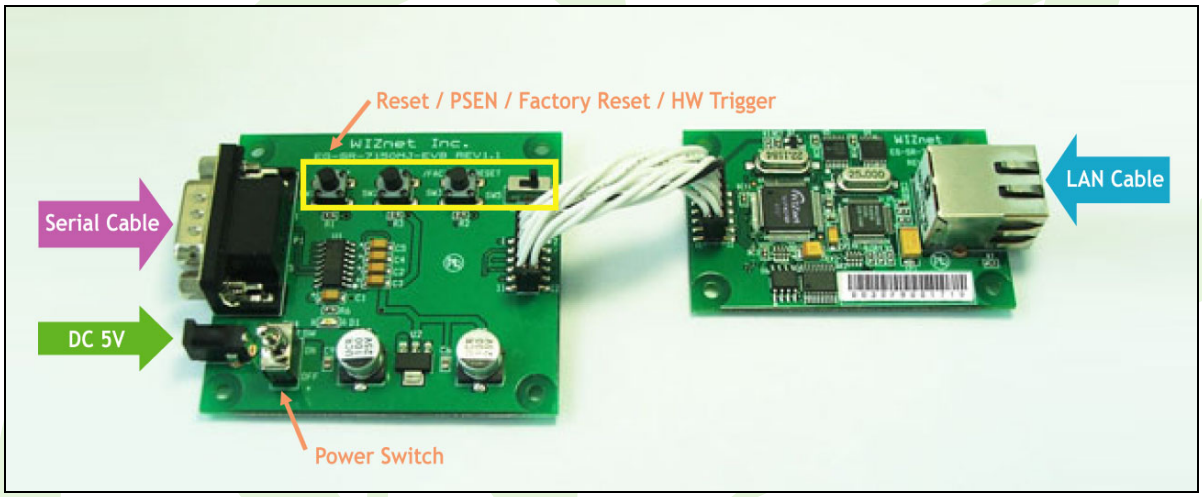
This Chapter describes how to set up and configure the EG-SR-7150MJ.

The following items are required to get started.

- Power Cable (included in the EG-SR-7150MJ-EVB package)
- Serial and Ethernet Cables (included in the of EG-SR-7150MJ-EVB package)
- PC or Laptop with Network Interface Card (hereafter, NIC) and/or one RS232 serial port

2.1. Hardware Installation procedure

Follow steps below to prepare the module and evaluation board for testing.



STEP 1: Connect the EG-SR-7150MJ module to the test board by using the 12pin cable.

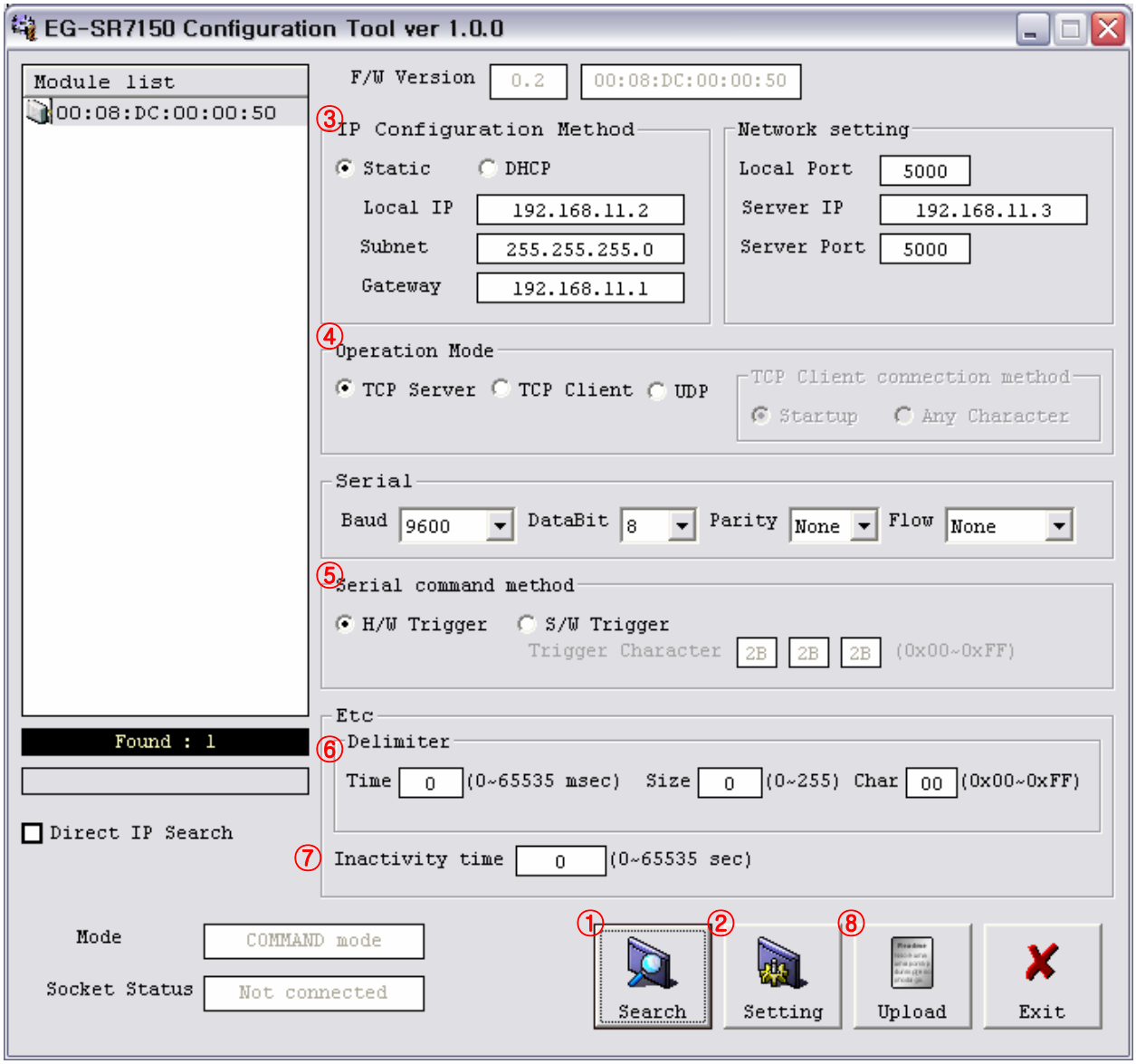
STEP 2: Connect the 5V DC power line to the power jack of the test board.

STEP 3: Use the RJ45 Ethernet cable in order to connect the module to an Ethernet network.

STEP 4: Use the serial data cable to connect the test board to a serial device.

2.2. Configuration Tool

2.2.1. Configuration tool features



① Search

The Search function is used to search all modules existing on the same Subnet. The UDP broadcast is used for searching modules on a LAN.

The MAC address for a searched module will be listed in the "**Module list**".

If **Direct IP Search** is checked, TCP will be used for searching instead of UDP. This mode is used more for searching the EG-SR-7150MJ modules on remote networks than local networks with the same subnet. An IP address assigned to the module will be required.

② Setting

If you select one of the MAC addresses listed in the "**Module list**", the configuration value of the selected module will be displayed. After changing each value in the configuration program, click the "**Setting**" button to complete the configuration.

The module will be initialized with the new configurations.

③ IP Configuration method: Static, DHCP

Static: The IP address can be manually assigned by users.

DHCP: The module assigns IP, subnet and gateway addresses by acquiring them from the DHCP server

☞ Other configurations should be set manually except for the IP configuration of DHCP.

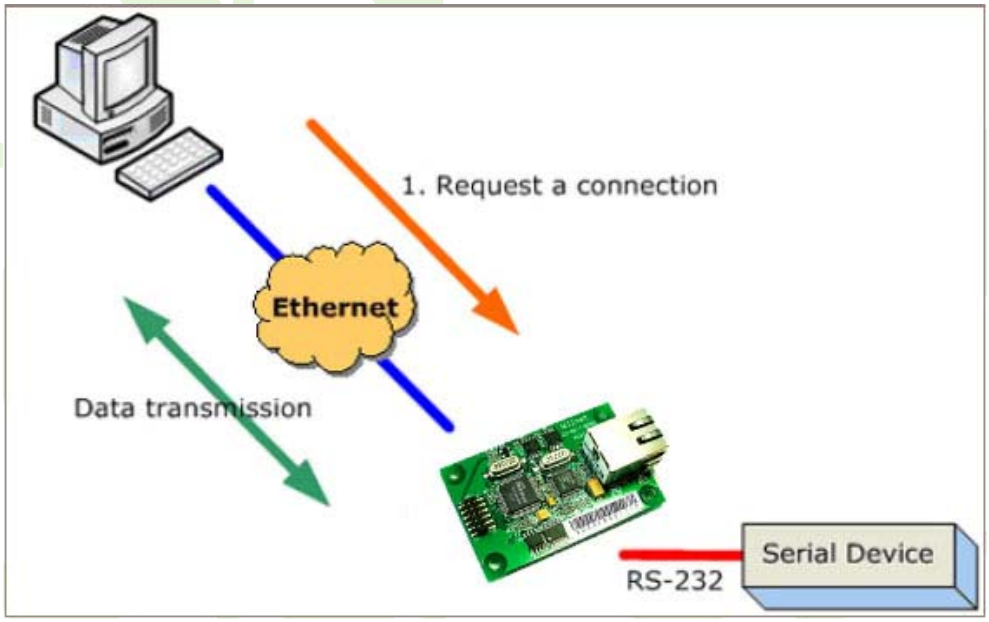
④ Operation mode: TCP server, TCP client, UDP

Three different operation modes are supported — TCP Server, TCP Client, and UDP.

The main difference between the TCP and UDP protocols is that TCP guarantees the delivery of data by requesting the recipient to send an acknowledgement to the sender. On the other hand, UDP does not require this type of verification, so data can be delivered quicker, but its delivery can not be guaranteed.

The TCP Server and TCP Client mode are related to the first step of connection establishment. Once the connection is established, data will be transparently transmitted in both directions (from Server to Client or from Client to Server).

TCP server mode

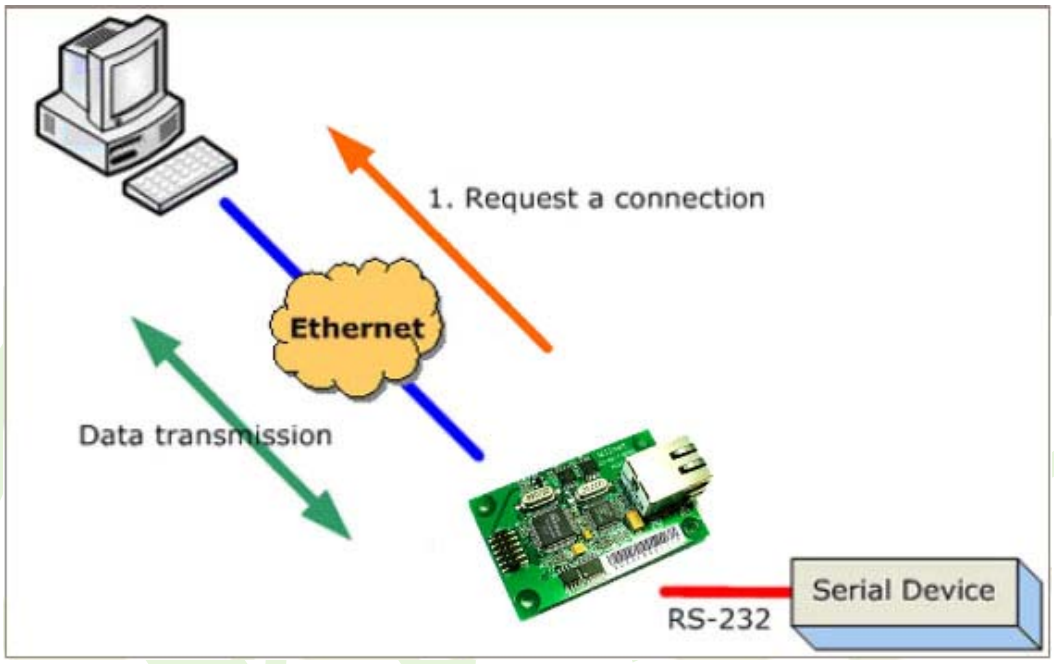


To operate this mode, the **Local IP, Subnet, gateway address and local port number** should be configured. The EG-SR-7150MJ waits to be connected by the host computer, allowing the host computer to establish a connection and get data from the serial device.

As illustrated in the figure above, the data transmission is as follows:

1. The host connects to the EG-SR-7150MJ which is configured as TCP Server Mode.
2. Once the connection is established, data can be transmitted in both directions - from the host to the EG-SR-7150MJ, and from the EG-SR-7150MJ to the host.

TCP client mode

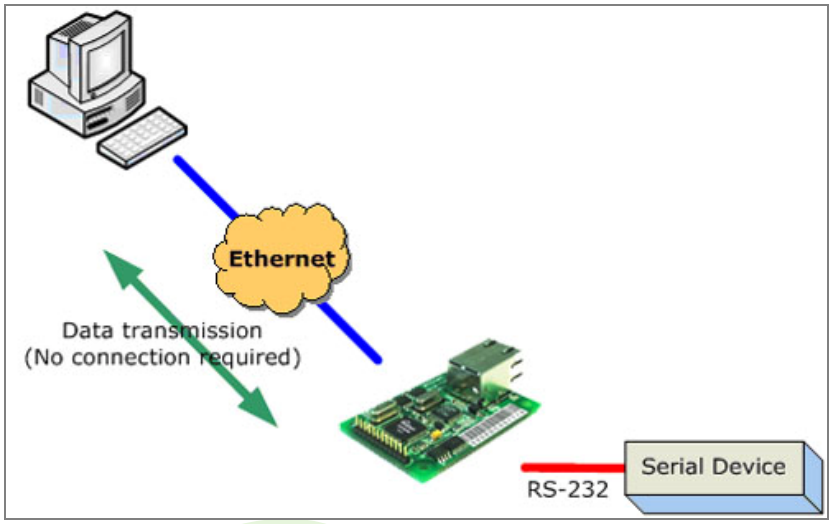


To operate this mode, the **Local IP, Subnet, gateway address, server IP, server port number** should be set. In the **TCP Client mode**, the EG-SR-7150MJ proceeds active open for establishing a TCP connection to a host computer.

As illustrated in the figure above, data transmission is as follows:

1. The EG-SR-7150MJ operating as TCP Client Mode establishes a connection based on the condition set in the **TCP client connection method** (**Startup, Any character**). i.e. the EG-SR-7150MJ can try to connect as soon as one starts up(**Startup**), or later when data from serial device arrives. (**Any character**).
2. After the connection is established, data can be transmitted in both directions - from the host to the EG-SR-7150-MJ, and from the EG-SR-7150-MJ to the host.

UDP mode



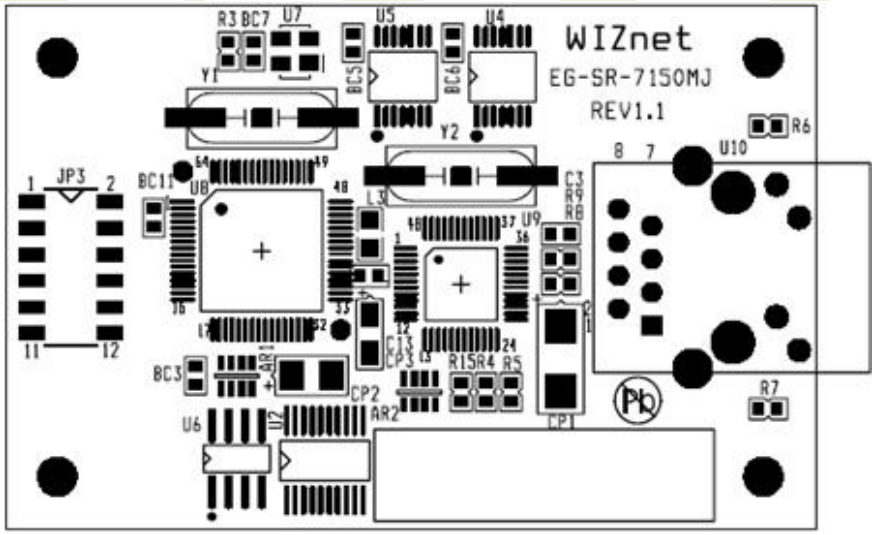
In UDP mode, any TCP/IP connection procedure is not required.

⑤ Serial command method: H/W trigger, S/W trigger

With this menu, you can designate how the Serial command mode can be entered. Two types are supported - H/W Trigger and S/W Trigger.

H/W trigger: Serial command mode can be triggered by pulling H/W trigger pin to low. It can be exited by pulling it to high.

```
-----------------------------------
            JP3
-----------------------------------
/RESET - 1   2 -  3.3V
   RXD - 3   4 - 3.3V
   CTS - 5   6 - /FACTORY_RESET
   TXD - 7   8 - /HW_TRIGGER
   RTS - 9   10 - /PSEN
 GND - 11  12 - GND
```



S/W trigger: Serial command mode can be triggered when 3 user-defined characters are detected. It can be exited by using the WR command.

⑥ Delimiter: Time, Size, Character

You can designate how the serial data can be packed and sent to the Ethernet. There are 3 delimiters - Time, Size and Character. If all of them are set as '0', whenever the serial data arrives, they will be sent to the Ethernet without any condition. When any of the three delimiters is satisfied, data can be sent to the Ethernet.

Ex) Delimiter: Size=10, Char=0x0D

Serial data: 0123456789abc

Ethernet data: 0123456789

☞ "abc" data remains in the serial buffer of module

⑦ Inactivity time

After the connection is established, if there is not any data transmission within the time defined in "**Inactivity time"**, the connection will be automatically closed.

⑧ Upload

Upload the firmware through the network.

☞ After uploading the firmware, 10~20 seconds are required for initialization.

2.3. Serial Communication Specification

In this chapter, we describe the structure of the data frames used in issuing commands and receiving responses to and from the device.

2.3.1. Frame Format

Command Frame format

Descriptor	STX	Command code	Parameter	ETX
Length(bytes)	1	2	Variable	1

Reply Frame format

Descriptor	STX	Reply code	Parameter	ETX
Length(bytes)	1	1	Variable	1

2.3.2. STX & ETX

Setting	Comments
STX	'<' : Hex = 3Ch
ETX	'>' : Hex = 3Eh

2.3.3. Reply Code

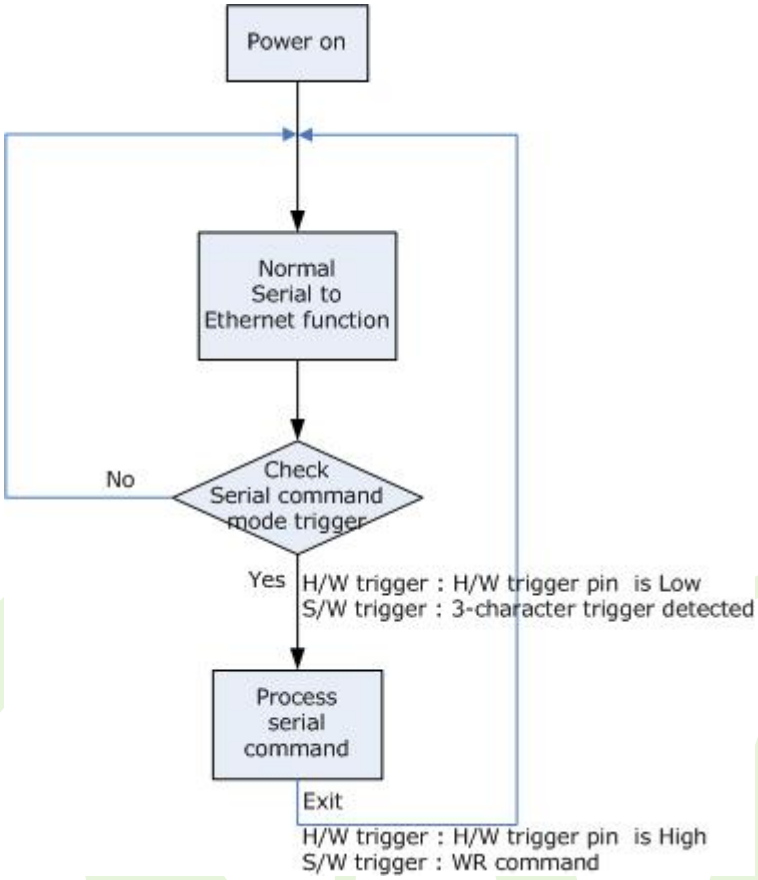
Reply	Comments
S	Command was successful
F	Command failed
1	Invalid command
2	Invalid parameter
E	Enter serial command mode

2.3.4. Command Code

Command	Parameter	Comments
WI	xxx.xxx.xxx.xxx (eg. 192.168.11.133)	Set Local IP
WS	xxx.xxx.xxx.xxx (eg. 255.255.255.0)	Set Subnet mask
WG	xxx.xxx.xxx.xxx (eg. 192.168.11.1)	Set Gateway
WP	0~65535	Set Local IP's port number
WD	0 : Static 1 : DHCP	Set the IP configuration method
WM	0 : TCP server 1 : TCP client 2 : UDP	Set the operation mode
WC	0 : startup 1 : any character	TCP client method
WB	XXXX eg. [Baudrate]1: 115200, 2: 57600, 3: 38400, 4: 19200, 5: 9600, 6: 4800, 7: 2400,8: 1200 [data byte] 7 : 7bit, 8bit [parity] 0 : no parity, 1 : Odd, 2 :Even [Flow] 0 : no, 1 : Xon/Xoff, 2 :RTS/CTS	Set the serial baud rate, data, parity and flow control. 4bytes:[Baud][data byte][parity][flow]
WT	0 : Disable 1 : H/W trigger 2 : S/W trigger	Set the serial command method
WE	xxxxxx (eg. In hex format : 2B 2B 2B)	Set the command mode character

WX	xxx.xxx.xxx.xxx (eg. 192.168.11.144)	Set server IP address
WN	0~65535	Set server port number
WR		Restart
OC	XX	Set delimiter character in hex
OS	0~255	Set delimiter size
OT	0~65535	Set delimiter time
OI	0~65535	Set Inactivity timer value
Command	Parameter	Comments
RI		Get Local IP
RS		Get Subnet mask
RG		Get Gateway
RP		Get Local IP's port number
RD		Get the IP configuration method
RM		Get the operation mode
RC		Get the TCP client method
RB		Get the serial baud rate
RT		Get the serial command method
RE		Get the command mode character
RF		Get the firmware version
RX		Get the server IP address
RN		Get the server port number
QC		Get delimiter character in hex
QS		Get delimiter size
QT		Get delimiter time
QI		Get Inactivity timer value

2.4. Operation Flow



2.5. Factory Default

While the Factory Reset is low and the /Reset is applied, the module is initialized with the factory default value.

IP configuration	Static
Local IP address	192.168.11.2
Subnet mask	255.255.255.0
Gateway address	192.168.11.1
Local port number	5000
Server IP address	192.168.11.3
Server port number	5000
Operation mode	TCP server mode
Serial port	9600 bps 8-N-1
Serial command method	H/W trigger

3. Demonstration and Test

In this chapter, three examples are given to show how functions of the EG-SR-7150MJ can be tested. The testing environment is as follows:

Hardware

- PC having RS-232 serial port.
- EG-SR-7150MJ & Test board

Software

- Windows operating system installed on testing PC.
- EG-SR-7150MJ Configuration tool
- Hyper Terminal Program

Testing Structure

- Ethernet cross cable to connect the LAN ports of PC and EG-SR-7150MJ.
- RS-232 cable to connect the COM port of PC (usually COM1 or COM2) and serial port of EG-SR-7150MJ-EVB.

3.1. Case 1: Getting IP address using H/W trigger

STEP1: Configure the trigger mode as "H/W trigger" in the Configuration Tool.

STEP2: Check the serial port setting such as baud rate of the module.

STEP3: Start HyperTerminal program and set the serial port of PC to the setting of module checked in STEP2.

STEP4: Pull H/W trigger pin to low to enter the serial command mode.

STEP5: Use HyperTerminal program to send "**<RI>**" (command to request IP address)

STEP6: HyperTerminal program displays "**<S192.168.11.2>**"

(It indicates that the command was successfully executed and IP address is 192.168.11.2)

STEP7: Pull H/W trigger pin to high to exit the serial command mode

3.2. Case 2: Changing IP address using H/W trigger

STEP1: Configure the trigger mode as "H/W trigger" in the Configuration Tool.

STEP2: Check the serial port setting such as baud rate of the module.

STEP3: Start HyperTerminal program and set the serial port of PC to the setting of module checked in STEP2.

STEP4: Pull H/W trigger pin to low to enter serial command mode.

STEP5: Use HyperTerminal program to send "**<WI192.168.11.10>**"

(command to change the IP address as 192.168.11.10)

STEP6: HyperTerminal program displays "**<S>**"
(Indicates the command was successfully executed)

STEP7: Use HyperTerminal program to send "**<RI>**" (command to request IP address)

STEP8: HyperTerminal program displays "**<S192.168.11.10>**"
(Indicates the command was executed successfully and IP address is 192.168.11.10)

STEP9: Pull H/W trigger pin to high to exit serial command mode

☞ All changes are applied after exit the serial command mode

3.3. Case 3: Changing IP address using S/W trigger

STEP1: Configure the trigger mode as S/W trigger at the Configuration program, and check the three trigger characters. For example, assume the trigger is "25 25 25"

STEP2: Check the serial port setting such as baud rate of the module.

STEP3: Start HyperTerminal program and set the serial port of the PC to the serial setting of the module checked in STEP2.

STEP4: Use HyperTerminal program to send three trigger characters to enter the serial command mode; **% % %** (in hex :0x25 0x25 0x25) in this case.

STEP5: Use HyperTerminal program to send "**<WI192.168.11.10>**"
(command to change the IP address as 192.168.11.10)

STEP6: HyperTerminal program displays "**<S>**"
(Indicate the command was executed successfully)

STEP7: Use HyperTerminal program to send "**<RI>**" (command to request IP address)

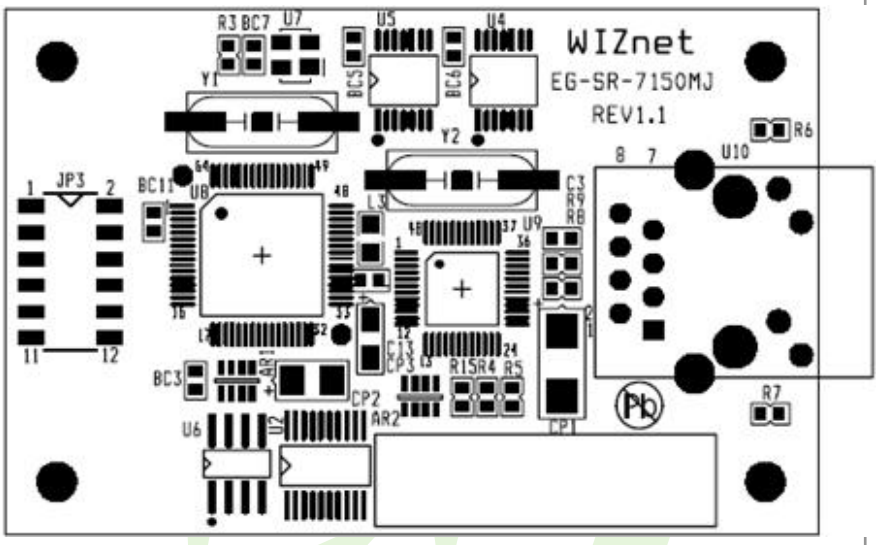
STEP8: HyperTerminal program displays "**<S192.168.11.10>**"
(Indicate the command was executed successfully and IP address is 192.168.11.10)

STEP9: Use HyperTerminal program to send "**<WR>**"
(command to exit serial command mode)

☞ All changes are applied after exiting the serial command mode.

4. PIN Assignment and Dimensions

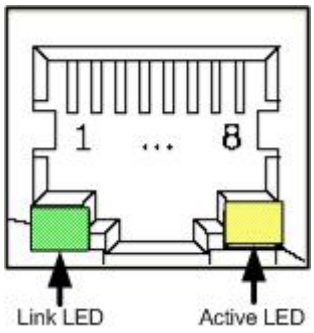
```
-----------------------------------
              JP3
-----------------------------------
/RESET - 1   2 -  3.3V
   RXD - 3   4 - 3.3V
   CTS - 5   6 - /FACTORY_RESET
   TXD - 7   8 - /HW_TRIGGER
   RTS - 9   10 - /PSEN
 GND - 11  12 - GND
```



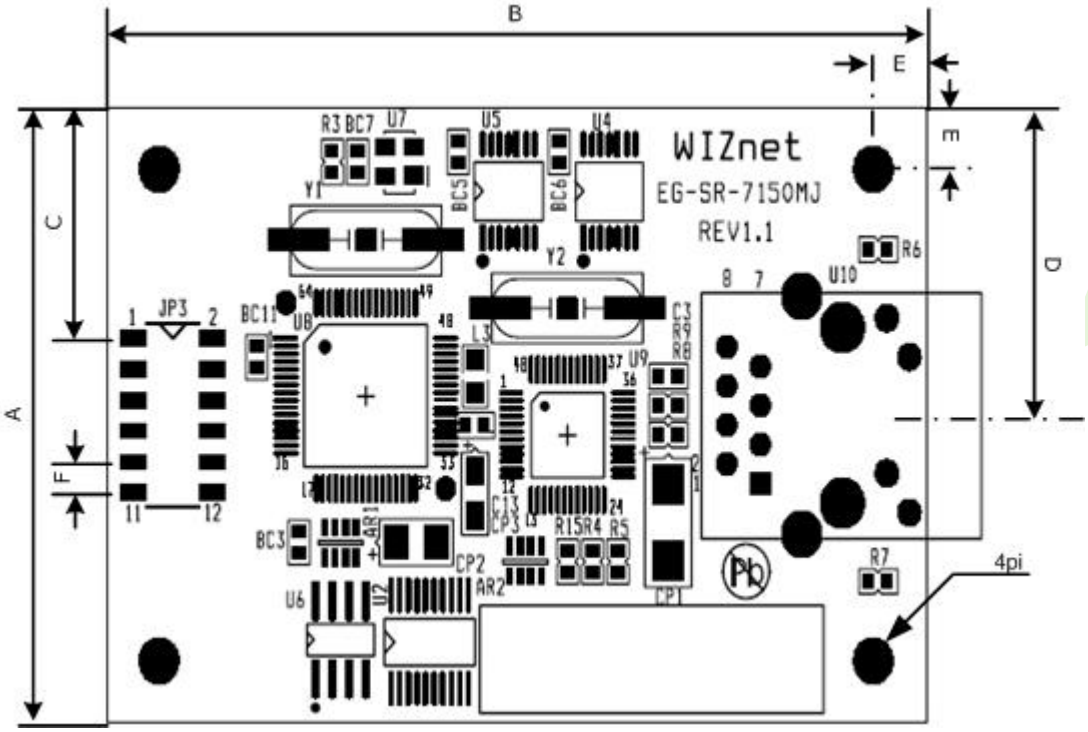
Name	Functions	I/O	
3.3V	Power		
/RESET	Low active reset Minimum 1.2 usec is required.	Input	
RXD	RS-232 Data Input	Input	
CTS	RS-232 Clear To Send	Input	Optional
TXD	RS-232 Data Output	Output	
RTS	RS-232 Request To Send	Output	Optional
Factory Reset	Pull Factory Reset to low and if /RESET is activated, the configuration is changed to factory default.	Input	
H/W Trigger	Pull H/W Trigger to low, enter the serial command mode	Input	
/PSEN	Pull /PSEN to low and if /RESET is activated, the module enter the bootloader for FLIP connection	Input	

☞ All signal levels are 3.3V LVTTL.

Ethernet port Pinouts

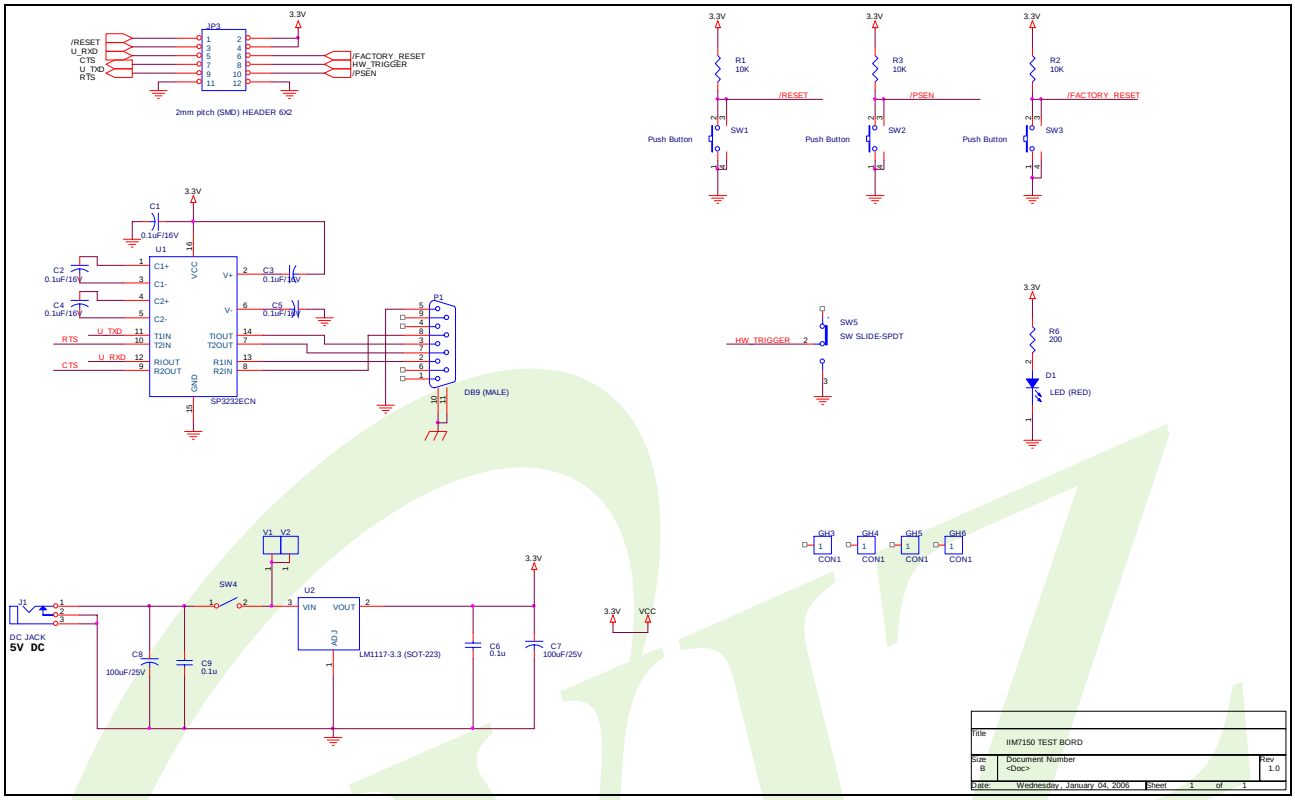


Pin	Signal
1	TX+
2	TX-
3	RX+
6	RX-



Symbol	Dimension(mm)
A	40
B	62
C	15
D	20
E	4
F	2

5. Reference Schematic



6. ETC

6.1. Firmware Uploading through the FLIP software

The following items are required to get started. :

- EG-SR-7150-MJ test board
- UART cross cable
- Program file in HEX file format
- FLIP utility installed on your PC

On a PC, one must have a file in HEX format to program the EG-SR-7150MJ. For example this file could be named “app.hex”.

Step 1

Connect the EG-SR-7150MJ test board to a PC with the UART cable supplied.

Important : If you have any program running on your PC with which COM port is used such as "Hyperterminal", be sure to connect the cable to the COM port not used.

Step 2

Power on the test board.

While pressing the /PSEN button, click the /RESET button. Then release the /PSEN button

Step 3

Run the ISP software named FLIP by ATMEL.

Step 4

Select the device by pushing the F2 button. Here you must choose AT89C51RC2.

Step 5

Set up the communication port by pushing the F3 button. Make sure to select the same port as the one you have plug in the UART cable of the EG-SR-7150MJ test board.

Step 6

Now, you should be connected to the board and able to program.

Now you will have to browse your PC to load your file in hex format.

Step 7

After programming, check if the BSB, SBV and SSB are set as FF, 00 and FF respectively.

6.2. Warranty

WIZnet Co., Ltd offers the following limited warranties applicable only to the original purchaser. This offer is non-transferable.

WIZnet warrants our products and its parts against defects in materials and workmanship under normal use for period of standard ONE(1)YEAR for the EG-SR-7150MJ Module, Evaluation Board and labor warranty after the date of original retail purchase. During this period, WIZnet will repair or replace a defective products or part free of charge.

Warranty Conditions:

1. The warranty applies only to products distributed by WIZnet or our official distributors.
2. The warranty applies only to defects in material or workmanship as mentioned above in 6.2 Warranty. The warranty applies only to defects which occur during normal use

and does not extend to damage to products or parts which results from alternation, repair, modification, faulty installation or service by anyone other than someone authorized by WIZnet Inc. ; damage to products or parts caused by accident, abuse, or misuse, poor maintenance, mishandling, misapplication, or used in violation of instructions furnished by us ; damage occuring in shipment or any damage caused by an act of God, such as lightening or line surge.

Procedure for Obtaining Warranty Service

1. Contact an authorized distributors or dealer of WIZnet Inc. for obtaining an RMA (Return Merchandise Authorization) request form within the applicable warranty period.
2. Send the products to the distributors or dealers together with the completed RMA request form. All products returned for warranty must be carefully repackaged in the original packing materials.
3. Any service issue, please contact to sales@wiznet.co.kr