Autonics 485 Communication Series Application

Manual for MP5

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Autonics
Sensors & Controllers
Bldg. 402 3rd Fl., Bucheon Techno Park. 193, Yakdae-dong, Wonmi-gu, Bucheon-si, Gyeonggi-do, 420-734, Korea
TEL:032-329-0722, FAX:032-329-0728
http://www.autonics.com

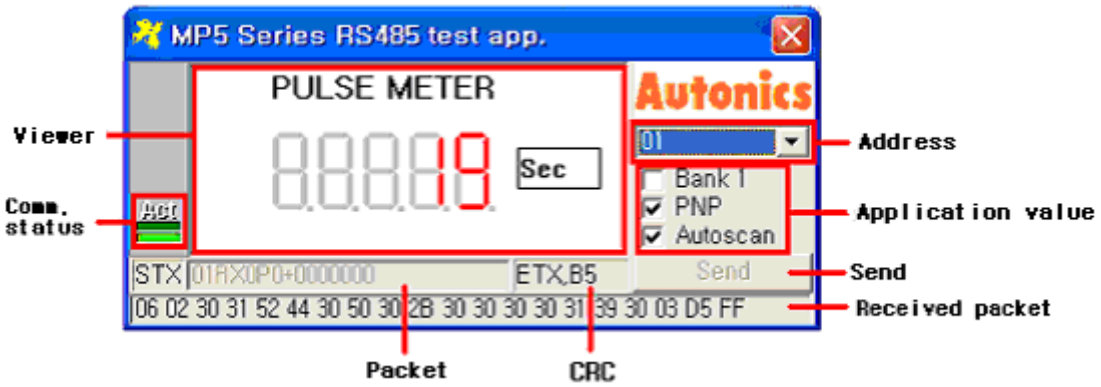


Fig.1 Main screen

Comm. status: TX (Higher LED)/RX (Lower LED)

Green: Succeed Yellow: Fail

Viewer : Display selected address and the P0 value by 7-segment type

Clicking a viewer, Fig. 2 is appeared.

Application value : Bank1 – Select Bank 1

PNP – Increase address automatically

Autoscan – Polling every constant time

Address : Display the searched address, add or delete

Send : Send a packet data to comm. line. Display the processing status.

When Autoscan setting is unlocked, it enables to input.

CRC : Show the calculated value of sending packet plus ETX CRC

Received packet: Display the data, received from comm. line, by HEX value.

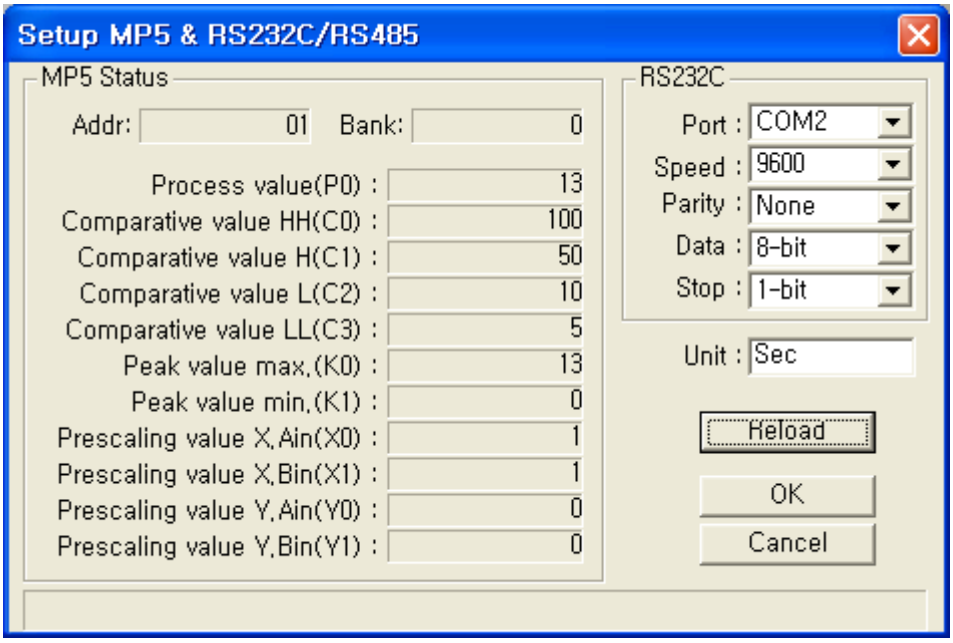


Fig.2 Set value, setting a unit and comm. conditions

Show the address and set value. Setting a communication condition is available.

Addr. : Display Address

Bank : Display Bank (0/1)

P0 : Displayed value on the 7 segments of MP5 (Process value)

C0 : Comparative value HH

C1 : Comparative value H

C2 : Comparative value L

C3 : Comparative value LL

K0 : Peak value maximum

K1 : Peak value minimum

X0 : Prescaling value X.Ain

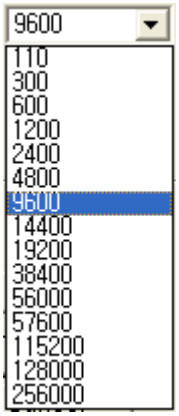
X1 : Prescaling value X.Bin

Y0 : Prescaling value Y.Ain

Y1 : Prescaling value Y.Bin

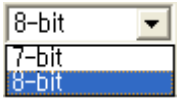
* Port

* Speed



* Comm. Parity

* Data bit



* Stop-bit

Unit : Set a unit.

Reload : Reload a set value. Processing is displayed.

OK : When changing comm. conditions, close the comm. port and then open it again.

Cancel: Cancel the set value

CRC (Cyclic Redundancy Check)

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	5E	BC	E2	61	3F	DD	83	C2	9C	7E	20	A3	FD	1F	41
10	9D	C3	21	7F	FC	A2	40	1E	5F	01	E3	BD	3E	60	82	DC
20	23	7D	9F	C1	42	1C	FE	A0	E1	BF	5D	03	80	DE	3C	62
30	BE	E0	02	5C	DF	81	63	3D	7C	22	C0	9E	1D	43	A1	FF
40	46	18	FA	A4	27	79	9B	C5	84	DA	38	66	E5	BB	59	07
50	DB	85	67	39	BA	E4	06	58	19	47	A5	FB	78	26	C4	9A
60	65	3B	D9	87	04	5A	B8	E6	A7	F9	1B	45	C6	98	7A	24
70	F8	A6	44	1A	99	C7	25	7B	3A	64	86	D8	5B	05	E7	B9
80	8C	D2	30	6E	ED	B3	51	0F	4E	10	F2	AC	2F	71	93	CD
90	11	4F	AD	F3	70	2E	CC	92	D3	8D	6F	31	B2	EC	0E	50
A0	AF	F1	13	4D	CE	90	72	2C	6D	33	D1	8F	0C	52	B0	EE
B0	32	6C	8E	D0	53	0D	EF	B1	F0	AE	4C	12	91	CF	2D	73
C0	CA	94	76	28	AB	F5	17	49	08	56	B4	EA	69	37	D5	8B
D0	57	09	EB	B5	36	68	8A	D4	95	CB	29	77	F4	AA	48	16
E0	E9	B7	55	0B	88	D6	34	6A	2B	75	97	C9	4A	14	F6	A8
F0	74	2A	C8	96	15	4B	A9	F7	B6	E8	0A	54	D7	89	6B	35

Chart1. CRC8 Table

Ex) Calculate below MT4 series packet by Cyclic Redundancy Check

	STX	Addr.		Command		Code		ETX	CRC
ASCII	STX	0	6	R	X	P	0	ETX	CRC
Hexadecimal	02h	30h	36h	52h	58h	50h	30h	03h	2Dh
Binary	00000010	00110000	00110110	01010010	01011000	01010000	00110000	00000011	00101101

1. CRC checking from the next of STX to the before of CRC char by using the table.
   a. XOR with a calculated value. (In case of the head char., XOR with 00)
   b. Use the calculated value as an index. STX의 다음 문자부터 BCC의 앞문자까지
   c. Get a matched value with index. Repeat it from 'a' until it's finished.

$$Table[00 \oplus 30] = BE$$
$$Table[BE \oplus 36] = 4E$$
$$Table[4E \oplus 52] = 3E$$
$$Table[3E \oplus 58] = B8$$
$$Table[B8 \oplus 50] = 2B$$
$$Table[2B \oplus 30] = BD$$
$$Table[BD \oplus 03] = 2D$$

2. 2D, the last value of #1, is used as CRC value.

<Implement CRC code by ANSI-C>

```
const unsigned char CRC8_table[256] = {
        0x00, 0x5e, 0xbc, 0xe2, 0x61, 0x3f, 0xdd, 0x83,
        0xc2, 0x9c, 0x7e, 0x20, 0xa3, 0xfd, 0x1f, 0x41,
        0x9d, 0xc3, 0x21, 0x7f, 0xfc, 0xa2, 0x40, 0x1e,
        0x5f, 0x01, 0xe3, 0xbd, 0x3e, 0x60, 0x82, 0xdc,
        0x23, 0x7d, 0x9f, 0xc1, 0x42, 0x1c, 0xfe, 0xa0,
        0xe1, 0xbf, 0x5d, 0x03, 0x80, 0xde, 0x3c, 0x62,
        0xbe, 0xe0, 0x02, 0x5c, 0xdf, 0x81, 0x63, 0x3d,
        0x7c, 0x22, 0xc0, 0x9e, 0x1d, 0x43, 0xa1, 0xff,
        0x46, 0x18, 0xfa, 0xa4, 0x27, 0x79, 0x9b, 0xc5,
        0x84, 0xda, 0x38, 0x66, 0xe5, 0xbb, 0x59, 0x07,
        0xdb, 0x85, 0x67, 0x39, 0xba, 0xe4, 0x06, 0x58,
        0x19, 0x47, 0xa5, 0xfb, 0x78, 0x26, 0xc4, 0x9a,
        0x65, 0x3b, 0xd9, 0x87, 0x04, 0x5a, 0xb8, 0xe6,
        0xa7, 0xf9, 0x1b, 0x45, 0xc6, 0x98, 0x7a, 0x24,
        0xf8, 0xa6, 0x44, 0x1a, 0x99, 0xc7, 0x25, 0x7b,
        0x3a, 0x64, 0x86, 0xd8, 0x5b, 0x05, 0xe7, 0xb9,
        0x8c, 0xd2, 0x30, 0x6e, 0xed, 0xb3, 0x51, 0x0f,
        0x4e, 0x10, 0xf2, 0xac, 0x2f, 0x71, 0x93, 0xcd,
        0x11, 0x4f, 0xad, 0xf3, 0x70, 0x2e, 0xcc, 0x92,
        0xd3, 0x8d, 0x6f, 0x31, 0xb2, 0xec, 0x0e, 0x50,
        0xaf, 0xf1, 0x13, 0x4d, 0xce, 0x90, 0x72, 0x2c,
        0x6d, 0x33, 0xd1, 0x8f, 0x0c, 0x52, 0xb0, 0xee,
        0x32, 0x6c, 0x8e, 0xd0, 0x53, 0x0d, 0xef, 0xb1,
        0xf0, 0xae, 0x4c, 0x12, 0x91, 0xcf, 0x2d, 0x73,
        0xca, 0x94, 0x76, 0x28, 0xab, 0xf5, 0x17, 0x49,
        0x08, 0x56, 0xb4, 0xea, 0x69, 0x37, 0xd5, 0x8b,
        0x57, 0x09, 0xeb, 0xb5, 0x36, 0x68, 0x8a, 0xd4,
        0x95, 0xcb, 0x29, 0x77, 0xf4, 0xaa, 0x48, 0x16,
        0xe9, 0xb7, 0x55, 0x0b, 0x88, 0xd6, 0x34, 0x6a,
        0x2b, 0x75, 0x97, 0xc9, 0x4a, 0x14, 0xf6, 0xa8,
        0x74, 0x2a, 0xc8, 0x96, 0x15, 0x4b, 0xa9, 0xf7,
        0xb6, 0xe8, 0x0a, 0x54, 0xd7, 0x89, 0x6b, 0x35
};

/* The function for checking one CRC */
unsigned char CRC8_Check(unsigned char CRC, unsigned char data)
{
```

```
        return CRC8_table[CRC ^ data];
}

/* The function for checking the packet of CRC */
unsigned char CRC8_Packet(unsigned char* packet, int size)
{
        unsigned char CRC = 0x00;
        while(size--) { CRC = CRC8_table[CRC ^ *packet++]; }
        return CRC;
}
```

BCC (Block Check Character)

Ex) Calculate TZ(N) series packet by Block Check Character

	STX	Addr.		Command		Code		ETX	BCC
ASCII	STX	0	6	R	X	P	0	ETX	BCC
Hexadecimal	02h	30h	36h	52h	58h	50h	30h	03h	6Fh
Binary	00000010	00110000	00110110	01010010	01011000	01010000	00110000	00000011	01101111

Operate XOR from the next letter of STX to the letter before BCC.

$$30 \oplus 36 \oplus 52 \oplus 58 \oplus 50 \oplus 30 \oplus 03 = 6F$$

Implement BCC code by ANSI-C

```
/* The function for checking the packet of BCC */
unsigned char BCC_packet(unsigned char *packet, int size)
{
        unsigned char BCC = 0x00;
        while(size--) { BCC ^= *packet++; }
        return BCC;
}
```

This below example is for MP5 series. Others are available by switching a protocol.

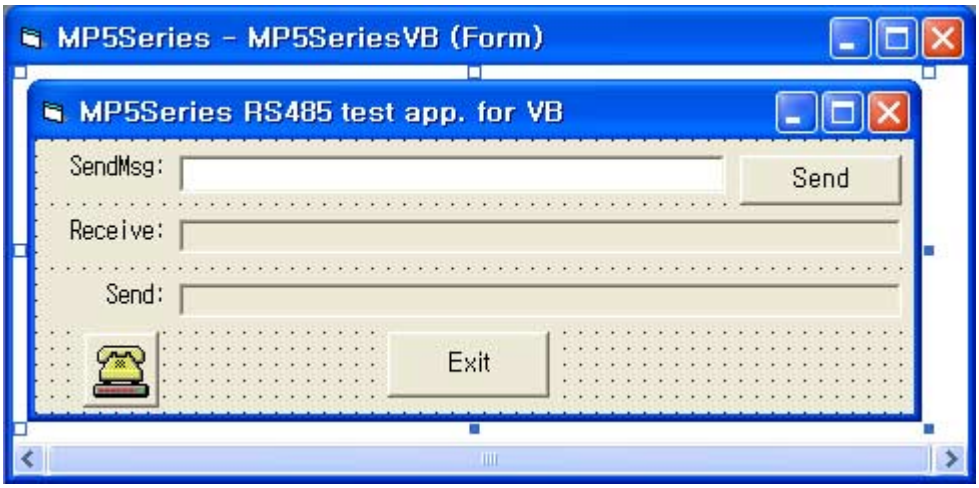


Fig.1 Visual Basic Main Screen

Source.1 MP5SeriesVB

```
Private Sub Form_Load()                          'Program load
    CRC8_init                                    'CRC8 table initializing

    MSComm.CommPort = 2                          'COM2 set
    MSComm.Settings = "9600,n,8,1"               '9600,no parity,8bit data, 1stop bit
    MSComm.InputLen = 0                          'automatic setting input buffer length
    MSComm.RThreshold = 1                        'Sets and returns the number of characters to receive
    MSComm.SThreshold = 1                        'Sets and returns the minimum number of characters
                                                 allowable in the transmit buffer
    MSComm.InputMode = comInputModeBinary        'Input binary data
    MSComm.RTSEnable = False
    MSComm.DTREnable = True
    MSComm.PortOpen = True                       'Open communication port

    SendMsg.Text = "01RX0P0+0000000"             'SendMsg component initializing
End Sub

Private Sub Form_Terminate()                     'Program terminates
    If MSComm.PortOpen = True Then
        MSComm.PortOpen = False                  'Close a communication port.
    End If
End Sub

Private Sub MSComm_OnComm()                      'Communication event ON
    Dim rBuf As Variant
    Dim Msg As String
    Dim RChar As Byte
    Dim i As Integer

    Select Case MSComm.CommEvent                 'Confirm a communication event
    Case comEvSend                               'Send event
```

```
        MSComm.RTSEnable = False                    'RTS signal enable

    Case comEvReceive                               'Receive event
        WaitTimer (2)                               'Wait

        Msg = ""
        While MSComm.InBufferCount > 0              'If having data in buffer
            rBuf = MSComm.Input                     'save on rBuf temporarily
            For i = 1 To UBound(rBuf)               'Analyze and output as many as received
                RChar = AscB(MidB(rBuf, i, 1))
                ReceiveMsg = ReceiveMsg & Right$("00" & Hex$(RChar), 2) & " "
            Next i
        Wend

    End Select
End Sub

Private Sub Send_Click()                            'Click a (Send) button
    Dim Msg As String
    Dim Send(0 To 32) As Byte                       'Determine as byte because of the range of CRC value
    Dim CRC As Byte
    Dim i As Integer

    ReceiveMsg = ""                                 'ReceiveMsg component initializing
    StatusMsg = ""                                  'StatusMsg component initializing

    If MSComm.PortOpen = True Then                  'If port is opened
        Msg = Mid(SendMsg, 1, 15) + Chr(&H3)        'Add ETX(&H3) signal on Chr.string
        CRC = CRC8table_packet(Msg, 16)             'Calculate CRC
        Send(0) = &H2                               'Add STX(&H2) on outputted Chr. string
        For i = 1 To 16                             'Create outputted Chr. string
            Send(i) = Asc(Mid(Msg, i, 1))
        Next i
        Send(17) = CRC                              'Add CRC on outputted Chr. string

        MSComm.RTSEnable = True                     'RTS ON
        MSComm.Output = Send                        'Send data to communication line
        For i = 0 To 17                             'Output sent Chr. string
            StatusMsg = StatusMsg & Right$("00" & Hex$(Send(i)), 2) & " "
        Next i
    Else
        StatusMsg = "Invalid COM port"              'Error message output
    End If
End Sub
```

Source.2 Module_CRC

```
Option Explicit
Dim CRC8_table(0 To 255) As Byte

Public Sub CRC8_init()
    Dim TempTable As Variant
    Dim i As Integer

    TempTable = Array( _
        &H0, &H5E, &HBC, &HE2, &H61, &H3F, &HDD, &H83, &HC2, &H9C, &H7E, &H20, &HA3, &HFD, &H1F, &H41, _
        &H9D, &HC3, &H21, &H7F, &HFC, &HA2, &H40, &H1E, &H5F, &H1, &HE3, &HBD, &H3E, &H60, &H82, &HDC, _
        &H23, &H7D, &H9F, &HC1, &H42, &H1C, &HFE, &HA0, &HE1, &HBF, &H5D, &H3, &H80, &HDE, &H3C, &H62, _
        &HBE, &HE0, &H2, &H5C, &HDF, &H81, &H63, &H3D, &H7C, &H22, &HC0, &H9E, &H1D, &H43, &HA1, &HFF, _
        &H46, &H18, &HFA, &HA4, &H27, &H79, &H9B, &HC5, &H84, &HDA, &H38, &H66, &HE5, &HBB, &H59, &H7, _
        &HDB, &H85, &H67, &H39, &HBA, &HE4, &H6, &H58, &H19, &H47, &HA5, &HFB, &H78, &H26, &HC4, &H9A, _
        &H65, &H3B, &HD9, &H87, &H4, &H5A, &HB8, &HE6, &HA7, &HF9, &H1B, &H45, &HC6, &H98, &H7A, &H24, _
        &HF8, &HA6, &H44, &H1A, &H99, &HC7, &H25, &H7B, &H3A, &H64, &H86, &HD8, &H5B, &H5, &HE7, &HB9, _
        &H8C, &HD2, &H30, &H6E, &HED, &HB3, &H51, &HF, &H4E, &H10, &HF2, &HAC, &H2F, &H71, &H93, &HCD, _
        &H11, &H4F, &HAD, &HF3, &H70, &H2E, &HCC, &H92, &HD3, &H8D, &H6F, &H31, &HB2, &HEC, &HE, &H50, _
        &HAF, &HF1, &H13, &H4D, &HCE, &H90, &H72, &H2C, &H6D, &H33, &HD1, &H8F, &HC, &H52, &HB0, &HEE, _
        &H32, &H6C, &H8E, &HD0, &H53, &HD, &HEF, &HB1, &HF0, &HAE, &H4C, &H12, &H91, &HCF, &H2D, &H73, _
        &HCA, &H94, &H76, &H28, &HAB, &HF5, &H17, &H49, &H8, &H56, &HB4, &HEA, &H69, &H37, &HD5, &H8B, _
        &H57, &H9, &HEB, &HB5, &H36, &H68, &H8A, &HD4, &H95, &HCB, &H29, &H77, &HF4, &HAA, &H48, &H16, _
        &HE9, &HB7, &H55, &HB, &H88, &HD6, &H34, &H6A, &H2B, &H75, &H97, &HC9, &H4A, &H14, &HF6, &HA8, _
        &H74, &H2A, &HC8, &H96, &H15, &H4B, &HA9, &HF7, &HB6, &HE8, &HA, &H54, &HD7, &H89, &H6B, &H35)

    For i = 0 To UBound(TempTable)
       CRC8_table(i) = TempTable(i)
    Next i
End Sub

Function CRC8table_packet(ByRef Packet As String, ByRef Size As Integer) As Byte
    Dim CRC As Byte
    Dim i As Integer
    CRC = 0
    For i = 1 To Size
        CRC = CRC8_table(CRC Xor Asc(Mid(Packet, i, 1)))
    Next i
    CRC8table_packet = CRC
End Function

Function BCC_packet(ByRef Packet As String, ByRef Size As Integer) As Byte
    Dim BCC As Byte
    Dim i As Integer
    BCC = 0
    For i = 1 To Size
        BCC = BCC Xor Asc(Mid(Packet, i, 1))
    Next i
    BCC_packet = BCC
End Function


Public Sub WaitTimer(ByRef Time As Single)
    Dim hTimer As Single
    hTimer = Timer + (Time / 100)
    Do
        DoEvents
    Loop Until hTimer < Timer
End Sub
```