
FnIO M-Series

M5212, 5222, 5232

M5212 (2 Channels, RS-232 Serial Interface)
M5222 (2 Channels, RS-422 Serial Interface)
M5232 (2 Channels, RS-485 Serial Interface)

History

REV.	PAGES	REMARKS	DATE	Editor
1.00	24	Preliminary	2020 05 27	YM KIM
1.01	18	Remove Description pages of Hot Swap Function, Use in Hazardous Environments and Caution(Before using the unit)	2021 04 01	SJ LIM

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1. Environment Specification

Environmental specification	
Operating Temperature	-25°C~60°C
UL Temperature	-20°C~60°C
Storage Temperature	-40°C~85°C
Relative Humidity	5% ~ 90% non-condensing
Mounting	DIN rail
General specification	
Shock Operating	IEC 60068-2-27
Vibration Resistance	Based on IEC 60068-2-6 DNVGL-CG-0039 : Vibration Class B, 4g
Industrial Emissions	EN 61000-6-4/A11 : 2011
Industrial Immunity	EN 61000-6-2 : 2005
Installation Position	Vertical and horizontal installation is available.
Product Certifications	CE, UL, FCC, ATEX

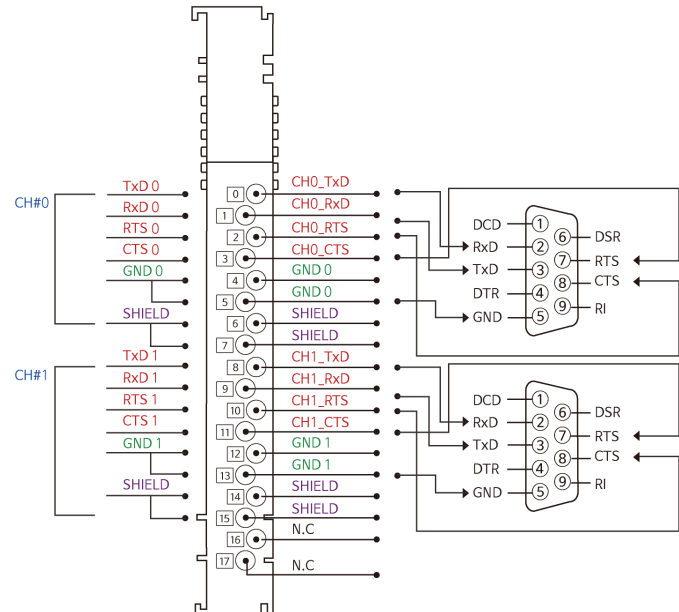
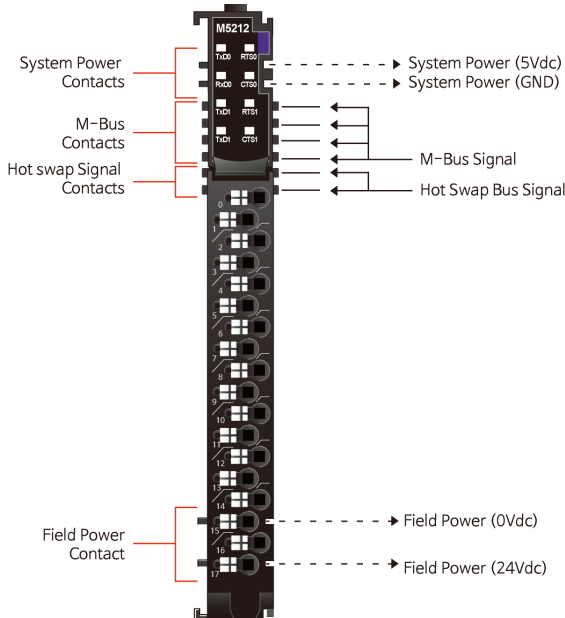
2. M52xx(Serial) Specification

Items	M5212	M5222	M5232
Specification			
Transfer Channels	TxD, RxD, Full Duplex		TxD, RxD, Half Duplex
Transfer Rate	1200bps~115200bps		
Data Bit	8bit, 9bit		
Parity Bit	None, Odd, Even(*Default : None)		
Stop Bit	1bit, 2bit (*Default : 1bit)		
Flow Control	RTS,CTS		-
Bit Distortion	<1.6%		-
Connection	18 RTB		
Cable Type	Shield Cable Recommended.		
Cable Length	Max.15m	1km twisted pair	
Low Signal Voltage	-18V ~ -3V	-	
High Signal Voltage	3V ~ 18V	-	
Line Impedance	-	120Ω	
Input Image Size	16 bytes (*Default) @ Max. 128 bytes		
Output Image Size	16 bytes (*Default) @ Max. 128 bytes		
Data Buffer (Per channel)	Control/Status 1 bytes Rx/Tx Length 1 bytes IO User data 6~62bytes		
RXD Buffer	1024bytes		
TXD Buffer	1024bytes		
General Specification			
Power Dissipation	Max. 85mA @ 5.0Vdc		
Isolation	I/O to Logic : Isolation Logic to Field power : Isolation (Not used) Logic to System Power : Non-isolation		
Relative Humidity	5% ~ 90% Non-condensing		
Field Power	Not used Field power bypass to next expansion module		
Wiring	0.205mm ^φ - 1.3mm ^φ (24-16 AWG)		
Torque	0.8Nm(7 lb-in)		
Weight	57g		
Module Size	12mm x 99mm x 70mm		
Environment Condition	Refer to 'Environment Specification'		

* Class 2, adjacent to voltage rating (30Vmax)

2.1.M5212(RS232/2 Channel)

2.1.1. Wiring Diagram



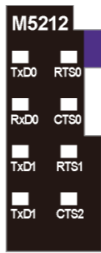
CH	Pin No.	Signal Description
0	0	TxD0
	1	RxD0
	2	RTS0
	3	CTS0*
	4	GND0
	5	
	6	Shield
1	8	TxD1
	9	RxD1
	10	RTS1
	11	CTS1*
	12	GND1
	13	Shield
-	14	
-	15	
-	16	-
-	17	-

Series No	Through Air	Over Surface	CTI
RTB18C	1.5mm	1.5mm	175≤CTI≤400

Spacings : The following minimum spacing in inches (millimeters) shall be maintained between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded Part including any mounting surface or exposed metal part.

* If High is input to the CTS pin before initializing the module, it may not operate normally because no edge occurs.

2.1.2. LED Indicator



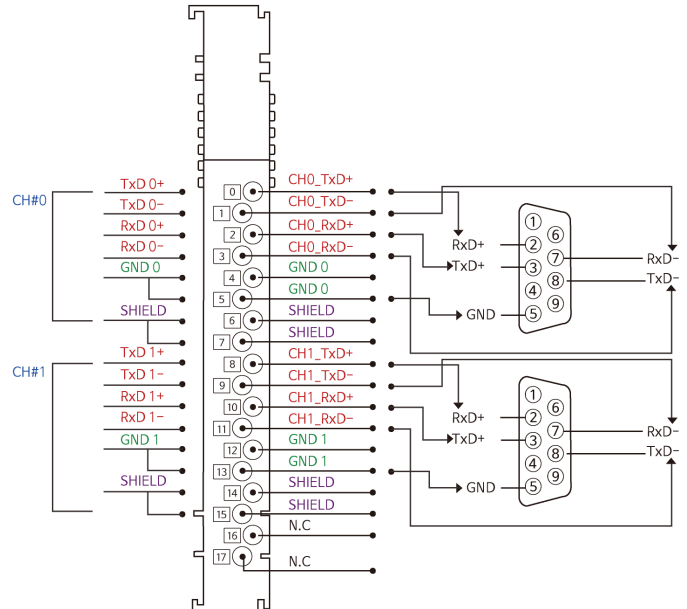
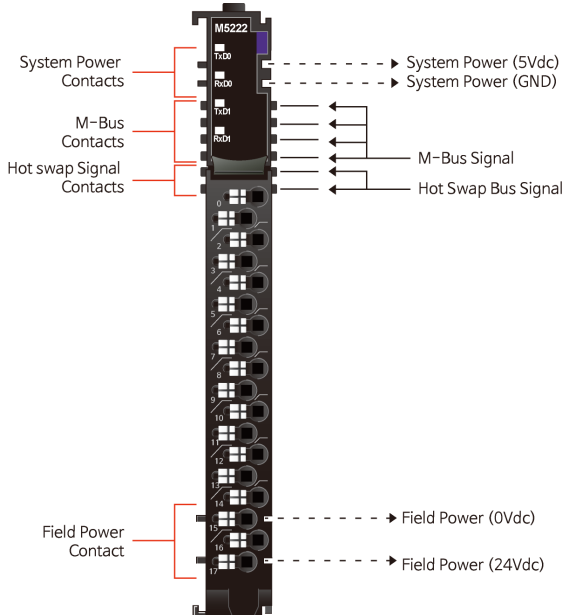
LED No.	LED Function / Description	LED Color
RxD0	Received Data 0	Green
TxD0	Transmit Data 0	Green
RxD1	Received Data 1	Green
TxD1	Transmit Data 1	Green
RTS0	Request to Send Control 0	Green
CTS0	Clear to Send Control 0	Green
RTS1	Request to Send Control 1	Green
CTS1	Clear to Send Control 1	Green

2.2. Channel Status LED

Status	LED	To indicate
Receive data	On	Normal operation
No data received	Off	Normal operation

2.3.M5222(RS422/2 Channel)

2.3.1. Wiring Diagram



CH	Pin No.	Signal Description
0	0	TxD0+
	1	TxD0-
	2	RxD0+
	3	RxD0-
	4	GND0
	5	
	6	Shield
7		
1	8	TxD1+
	9	TxD1-
	10	RxD1+
	11	RxD1-
	12	GND1
	13	
	14	Shield
15		
-	16	-
-	17	-

Series No	Through Air	Over Surface	CTI
RTB18C	1.5mm	1.5mm	175≤CTI≤400

Spacings : The following minimum spacing in inches(millimeters) shall be maintained between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded Part including any mounting surface or exposed metal part.

2.3.2. LED Indicator



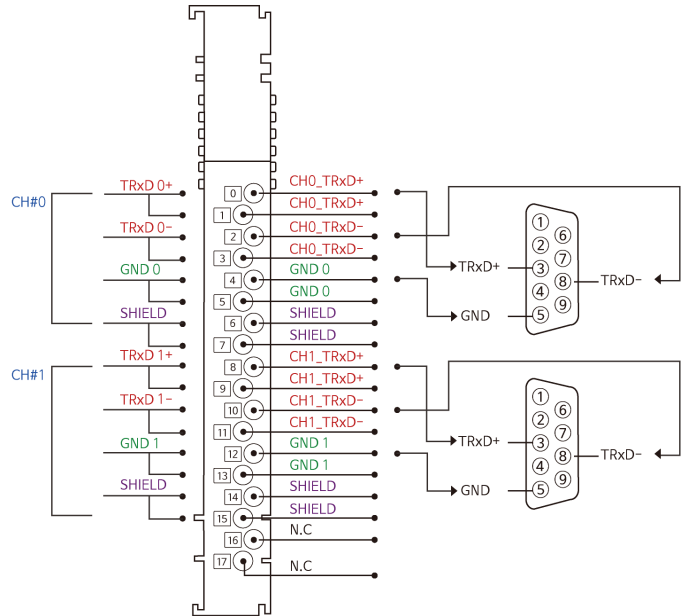
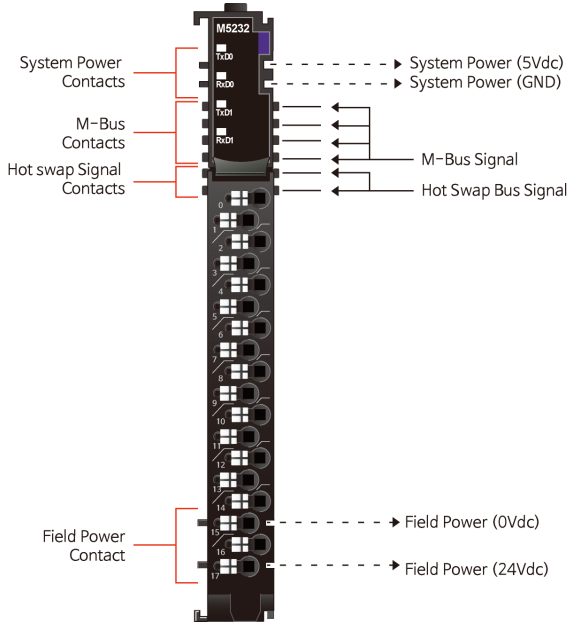
LED No.	LED Function / Description	LED Color
RxD0	Received Data 0	Green
TxD0	Transmit Data 0	Green
RxD1	Received Data 1	Green
TxD1	Transmit Data 1	Green

2.3.3. Channel Status LED

Status	LED	To indicate
Receive data	On	Normal operation
No data received	Off	Normal operation

2.4.M5232(RS485/2 Channels)

2.4.1. Wiring Diagram



CH	Pin No.	Signal Description
0	0	D0+
	1	
	2	D0-
	3	
	4	GND0
	5	
	6	
	7	Shield
1	8	D1+
	9	
	10	D1-
	11	
	12	GND1
	13	
14		
	15	Shield
-	16	-
-	17	-

Series No	Through Air	Over Surface	CTI
RTB18C	1.5mm	1.5mm	175<CTI<400

Spacings : The following minimum spacing in inches (millimeters) shall be maintained between uninsulated live parts of opposite polarity; and between an uninsulated live part and a grounded Part including any mounting surface or exposed metal part.

2.4.2. LED Indicator



LED No.	LED Function / Description	LED Color
RxD0	Received Data 0	Green
TxD0	Transmit Data 0	Green
RxD1	Received Data 1	Green
TxD1	Transmit Data 1	Green

2.4.3. Channel Status LED

Status	LED	To indicate
Receive data	On	Normal operation
No data received	Off	Normal operation

3. Mapping Data and Operation Function

3.1. Mapping Input data into the image table

IO Input		
CH0	Byte#0	Ch#0 Status**
	Byte#1	Ch#0 RxLength
	Byte#2	Ch#0 RxData#0
	Byte#3	Ch#0 RxData#1
	Byte#4	Ch#0 RxData#2
	Byte#5	Ch#0 RxData#3
	Byte#6	Ch#0 RxData#4
	Byte#7	Ch#0 RxData#5
CH1	Byte#8	Ch#1 Status**
	Byte#9	Ch#1 RxLength
	Byte#10	Ch#1 RxData#0
	Byte#11	Ch#1 RxData#1
	Byte#12	Ch#1 RxData#2
	Byte#13	Ch#1 RxData#3
	Byte#14	Ch#1 RxData#4
	Byte#15	Ch#1 RxData#5

* 1 channel Input size : default 8Byte, max 64Byte / All size : default 16Byte, max 128Byte

**Status Flag

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status	TRA	FTA	FRA	RE	RBO	RR	TA	IA

- **IA** : Initialization Acknowledge
- **TA** : Transmit Acknowledge
- **RR** : Receive Request
- **RBO** : RxD Buffer Overrun
- **RE** : RxD Exist (Remained)
- **FRA** : Flush RxD buffer Acknowledge
- **FTA** : Flush TxD buffer Acknowledge
- **TPA** : Transmit Processing Acknowledge

3.2. Mapping Output data into the image table

IO Output		
CH0	Byte#0	Ch#0 Control**
	Byte#1	Ch#0 TxLength
	Byte#2	Ch#0 TxData#0
	Byte#3	Ch#0 TxData#1
	Byte#4	Ch#0 TxData#2
	Byte#5	Ch#0 TxData#3
	Byte#6	Ch#0 TxData#4
	Byte#7	Ch#0 TxData#5
CH1	Byte#8	Ch#1 Control**
	Byte#9	Ch#1 TxLength
	Byte#10	Ch#1 TxData#0
	Byte#11	Ch#1 TxData#1
	Byte#12	Ch#1 TxData#2
	Byte#13	Ch#1 TxData#3
	Byte#14	Ch#1 TxData#4
	Byte#15	Ch#1 TxData#5

* 1channel Output size : default 8Byte, max 64Byte / All size : default 16Byte, max 128Byte

**Control Data

	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control	TPR	FT	FR	----	----	RA	TR	IR

- **IR** : Initialization Request (rising edge active)
- **TR** : Transmit Request (both edge active)
- **RA** : Receive Acknowledge (both edge active)
- **FR** : Flush RxD buffer Request (rising edge active)
- **FT** : Flush TxD buffer Acknowledge
- **TPR** : Transmit Processing Request (both edge active)

4. Configuration Parameter Data

Precautions for use : if you changed Parameter, you must reset Module

		Bit#7	Bit#6	Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
CH0	Byte#0	TxD Process* 0 : Disable 1 : Enable	Stop bit 0 : 1bit 1 : 2bit	Parity Bit 00 : No 01 : Odd 10 : Even		Baudrate 000 : 115200bps 001 : 1200bps 010 : 2400bps 011 : 4800bps 100 : 9600bps 101 : 19200bps 110 : 38400bps 111 : 57600bps			
	Byte#1	Flow Control (Only M5212) 00 : RTS/CTS Disable 01 : RTS Enable 10 : CTS Enable 11 : RTS/CTS Enable		Data Size** 8~64 byte					
CH1	Byte#2	TxD Process* 0 : Disable 1 : Enable	Stop bit 0 : 1bit 1 : 2bit	Parity Bit 00 : No 01 : Odd 10 : Even		Baudrate 000 : 115200bps 001 : 1200bps 010 : 2400bps 011 : 4800bps 100 : 9600bps 101 : 19200bps 110 : 38400bps 111 : 57600bps			
	Byte#3	Flow Control (Only M5212) 00 : RTS/CTS Disable 01 : RTS Enable 10 : CTS Enable 11 : RTS/CTS Enable		Data Size** 8~64 byte					

*** TxD Process:**

- Disable : Transmit immediately Output data
- Enable : Store the value of Output Data continually at TxD Buffer of Serial Interface Module, when TPA bit and TPR bit of Control Byte and Status Byte are different, transmit all Data that saved at TxD Buffer

**** Data Size:**

Bit#5	Bit#4	Bit#3	Bit#2	Bit#1	Bit#0
n=6	n=5	n=4	n=3	n=2	n=1

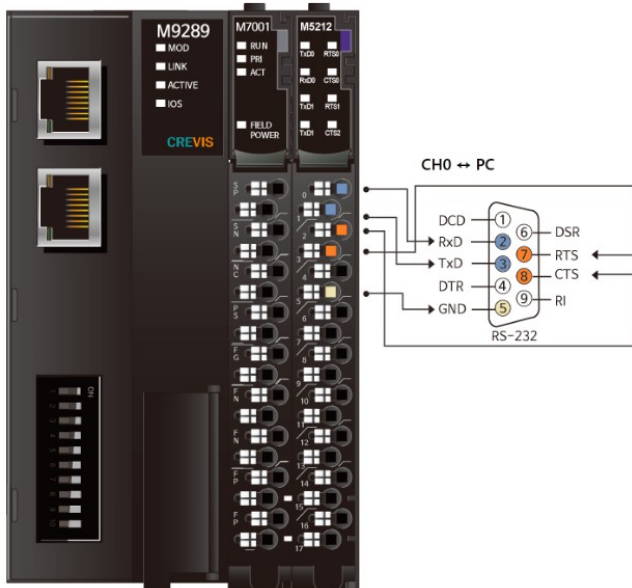
- 2ⁿ

- ex) 100000 = 64Byte
- 010100 = 40Byte
- 010000 = 32Byte
- 001010 = 20Byte
- 001000 = 16Byte

5. Example

5.1. Preparations

- Use program: IOGuidePro, IOGuidePro-Protocol Messenger-Modbus, RealTerm(PC Serial monitoring)
- Make the wiring suitable for the pinmap



- Check if the PC setting value is the same as the module parameter setting value. (Baudrate, Parity Bit, etc.....)
- Data Size ch0: 16byte, ch1 : 16byte (Parameter Settings)
- Total Input/Output Modbus image table : 16Word (ch0+ch1=32byte)
- Input data (Per channel)
- * 1 word: RxLength/Status Flag, 7word: Data

Input	Ch0								Ch1							
	Rxl/S	D1	D2	D3	D4	D5	D6	D7	Rxl/S	D1	D2	D3	D4	D5	D6	D7
Word																

- Output data (Per channel)
- * 1 word: TxLength/Control Data, 7word: Data

Output	Ch0								Ch1							
	Txl/C	D1	D2	D3	D4	D5	D6	D7	Txl/C	D1	D2	D3	D4	D5	D6	D7
Word																

5.2. Transmitting data

1) Ch0 transmitting data

- Check the TA value of the status flag
- *TA : Transmit Acknowledge

Input	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status	TRA	FTA	FRA	RE	RBO	RR	TA	IA

- To transmit data, change the TR bit (TR inverting; TA≠TR)
- * TR : Transmit Request (both edge active)

Output	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control	TPR	FT	FR	----	----	RA	TR	IR

[M5212 - IOGuidePro-Protocol Messenger-Modbus]

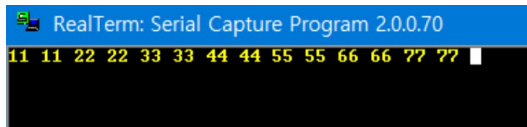
- Modbus Write

- TxLength: 0x0E, Control Data: 02(TR=1), Data: 14 byte

2) PC Receiving data

[PC-RealTerm]

* Check the transmission data



5.3. Transmitting data (TxD process Enable)

1) Set the TxD process parameter value to Enable.

[M5212-IOGuidePro]

Parameter Name	Project Value	Online Value
02: M5212		
Ch.0 Baudrate	115200bps	115200bps
Ch.0 Parity Bit	No Parity	No Parity
Ch.0 Stop Bit	1 bit	1 bit
Ch.0 TxD	Enable	Enable
Ch.0 Data_Size	16_byte	16_byte
Ch.0 Flow Control	RTS,CTS Disable	RTS,CTS Disable
Ch.1 Baudrate	115200bps	115200bps
Ch.1 Parity Bit	No Parity	No Parity
Ch.1 Stop Bit	1 bit	1 bit
Ch.1 TxD	Enable	Enable
Ch.1 Data_Size	16_byte	16_byte
Ch.1 Flow Control	RTS,CTS Disable	RTS,CTS Disable

2) Ch0 transmission data is stored in the Tx buffer.

- Check the TA value of the status flag

*TA : Transmit Acknowledge

Input	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status	TRA	FTA	FRA	RE	RBO	RR	TA	IA

- To transmit data, change the TR bit (TR inverting; TA≠TR)

* TR : Transmit Request (both edge active)

Output	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control	TPR	FT	FR	----	----	RA	TR	IR

[M5212 - IOGuidePro-Protocol Messenger-Modbus]

- Modbus Write (6 bytes are stored in TxD buffer)

- TxLength: 0x06, Control Data: 02(TR=1),

Data: 6 byte (TxD buffer : AA AA BB BB CC CC)

- Modbus Write (6 bytes are stored in TxD buffer)
- TxLength: 0x06, Control Data: 00(TR=0),
- Data: 6 byte (TxD buffer : AA AA BB BB CC CC **DD DD EE EE FF FF**)

Request

Slave ID (Dec) Function (Dec)
Address (Hex) Quantity (Dec) Word

Send Data (Hex, 0 on the right)

Send

Tx/C Data

3) Ch0 transmitting data

- Check the TPA value of the status flag
- *TPA : Transmit Processing Acknowledge

Input	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status	TRA	FTA	FRA	RE	RBO	RR	TA	IA

- To transmit data, change the TPR bit (TPR inverting: TPA≠TPR)
- * TPR : Transmit Processing Request (both edge active)

Output	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control	TPR	FT	FR	----	----	RA	TR	IR

- Modbus Write (Transmit the data stored in the TxD buffer, 6byte+6byte=12byte)
- TxLength: 0x0F, Control Data: 80(TPR=1),

Request

Slave ID (Dec) Function (Dec)
Address (Hex) Quantity (Dec) Word

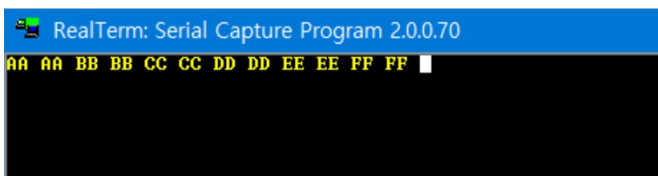
Send Data (Hex, 0 on the right)

Send

Tx/C

4) PC Receiving data

- [PC-RealTerm]
- * Check the transmission data

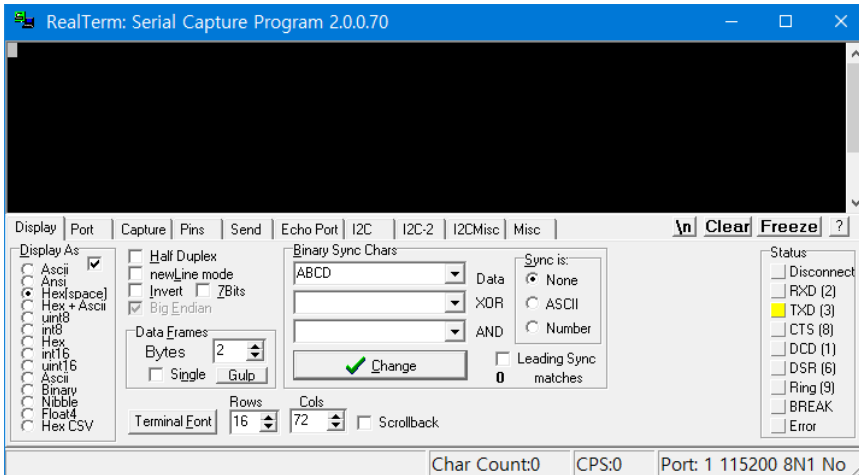


5.4. Receiving data

1) PC transmitting data

[PC-RealTerm]

- 14Byte : 3131 3232 3333 3434 3535 3636 3737



2) Ch0 Receiving data

- When there is received data, RE bit changes.

* **RE** : RxD Exist (Remained)

- Check the RR value of the status flag

* **RR** : Receive Request

Input	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Status	TRA	FTA	FRA	RE	RBO	RR	TA	IA

- To receive data, change the RA bit (RA inverting; RR≠RA)

* **RA** : Receive Acknowledge (both edge active)

Output	bit#7	bit#6	bit#5	bit#4	bit#3	bit#2	bit#1	bit#0
Control	TPR	FT	FR	----	----	RA	TR	IR

[M5212 - IOGuidePro-Protocol Messenger-Modbus]

- Modbus Write

- RxLength: 0E, Control Data: 04(RA=1),

Request

Slave ID (Dec) Function (Dec) Address (Hex) Quantity (Dec) Word

Send Data (Hex, 0 on the right)

Tx/C

Send

- Modbus Read (Check the received data)

- RxLength: 0E, Status Flag: 04(RR=1), Rx Data: 14 byte

Request

Slave ID (Dec) Function (Dec) Address (Hex) Quantity (Dec) Word

Send Data (Hex, 0 on the right)

Send

Response (0 on the right) Data

Rx/S

0000