# Special IO Module

## GT-52xx

## User Manual


Version 1.02

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# 1. Important Notes

Solid state equipment has operational characteristics differing from those of electromechanical equipment.

Safety Guidelines for the Application, Installation and Maintenance of Solid State Controls describes some important differences between solid state equipment and hard-wired electromechanical devices.

Because of this difference, and also because of the wide variety of uses for solid state equipment, all persons responsible for applying this equipment must satisfy themselves that each intended application of this equipment is acceptable.

In no event will CREVIS be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, CREVIS cannot assume responsibility or liability for actual use based on the examples and diagrams.

**Warning!**

**If you don't follow the directions, it could cause a personal injury, damage to the equipmentor explosion**

Do not assemble the products and wire with power applied to the system. Else it may cause an electric arc, which can result into unexpected and potentially dangerous action by field devices. Arching is explosion risk in hazardous locations. Be sure that the area is non-hazardous or remove system power appropriately before assembling or wiring the modules.

Do not touch any terminal blocks or IO modules when system is running. Else it may cause the unit to an electric shock or malfunction.

Keep away from the strange metallic materials not related to the unit and wiring works should be controlled by the electric expert engineer. Else it may cause the unit to a fire, electric shock or malfunction

**Caution!**

**If you disobey the instructions, there may be possibility of personal injury, damage to equipment or explosion. Please follow below Instructions.**

Check the rated voltage and terminal array before wiring. Avoid the circumstances over 50℃ of temperature.

Avoid placing it directly in the sunlight.

Avoid the place under circumstances over 85% of humidity.

Do not place Modules near by the inflammable material. Else it may cause a fire.

Do not permit any vibration approaching it directly.

Go through module specification carefully, ensure inputs, output connections are made with the specifications. Use standard cables for wiring. Use Product under pollution degree 2 environment.

## 1.1. Safety Instruction

### 1.1.1. Symbols

| | |
|---|---|
| DANGER  | Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death property damage, or economic loss |
| IMPORTANT | Identifies information that is critical for successful application and understanding of the product |
| ATTENTION  | Identifies information about practices or circumstances that can lead to personal injury, property damage, or economic loss.<br>Attentions help you to identity a hazard, avoid a hazard, and recognize the consequences |

### 1.1.2. Safety Notes

| | |
|---|---|
| DANGER  | The modules are equipped with electronic components that may be destroyed by electrostatic discharge. When handling the modules, ensure that the environment (persons, workplace and packing) is well grounded. Avoid touching conductive components, RBUS Pin. |

### 1.1.3. Certification

c-UL-us UL Listed Industrial Control Equipment, certified for U.S. and Canada

See UL File E235505

CE Certificate

EN 61000-6-2; Industrial Immunity

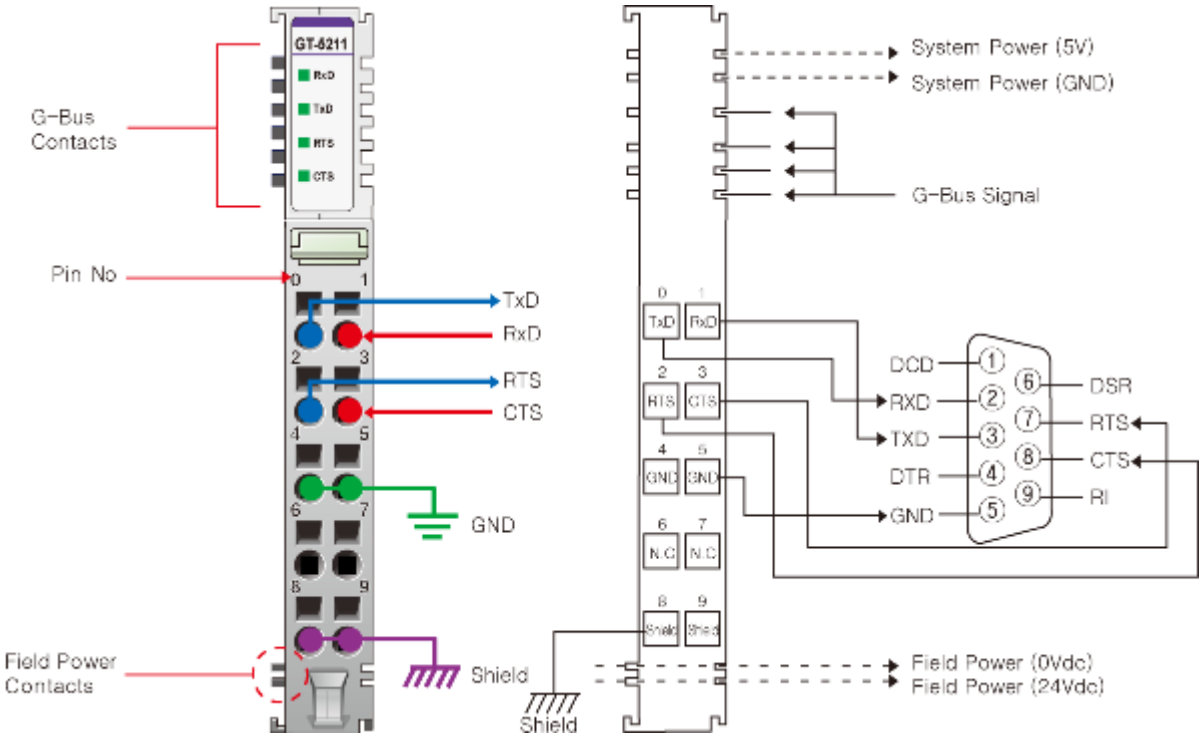
EN 61000-6-4; Industrial Emissions

Reach, RoHS (EU, CHINA)

# 2. Specification

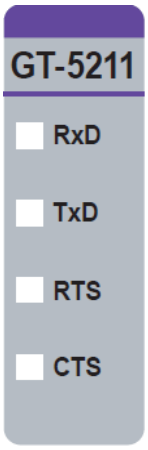
## 2.1. GT-5211

### 2.1.1. Wiring Diagram




| Pin No. | Signal Description | Signal Description | Pin No. |
|---|---|---|---|
| 0 | TxD | RxD | 1 |
| 2 | RTS | CTS | 3 |
| 4 | Common(GND) | Common(GND) | 5 |
| 6 | N.C | N.C | 7 |
| 8 | Shield | Shield | 9 |

### 2.1.2. LED Indicator



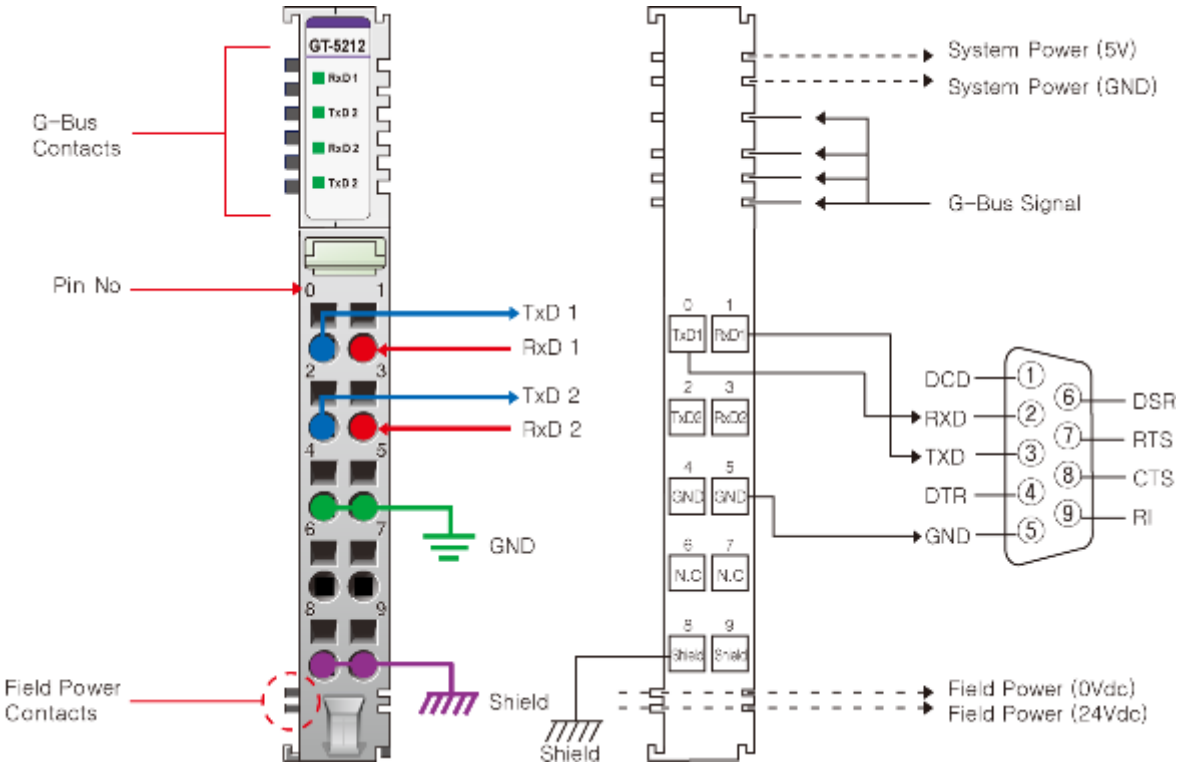

| LED No. | LED Function / Description | LED Color |
|---|---|---|
| RxD | Received Data | Green |
| TxD | Transmit Data | Green |
| RTS | Request-to-send | Green |
| CTS | Clear-to-send | Green |

### 2.1.3. Channel Status LED

| LED | Color | Status |
|---|---|---|
| RxD | GREEN | Received Data |
| TxD | GREEN | Transmit Data |
| RTS | GREEN | Request-to-send |
| CTS | GREEN | Clear-to-send |

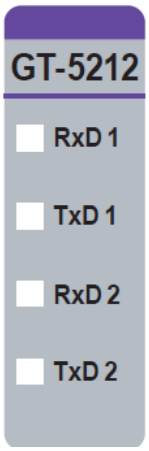
## 2.2. GT-5212

### 2.2.1. Wiring Diagram




| Pin No. | Signal Description | Signal Description | Pin No. |
|---|---|---|---|
| 0 | TxD1 | RxD1 | 1 |
| 2 | TxD2 | RxD2 | 3 |
| 4 | Common(GND) | Common(GND) | 5 |
| 6 | N.C | N.C | 7 |
| 8 | Shield | Shield | 9 |

### 2.2.2. LED Indicator



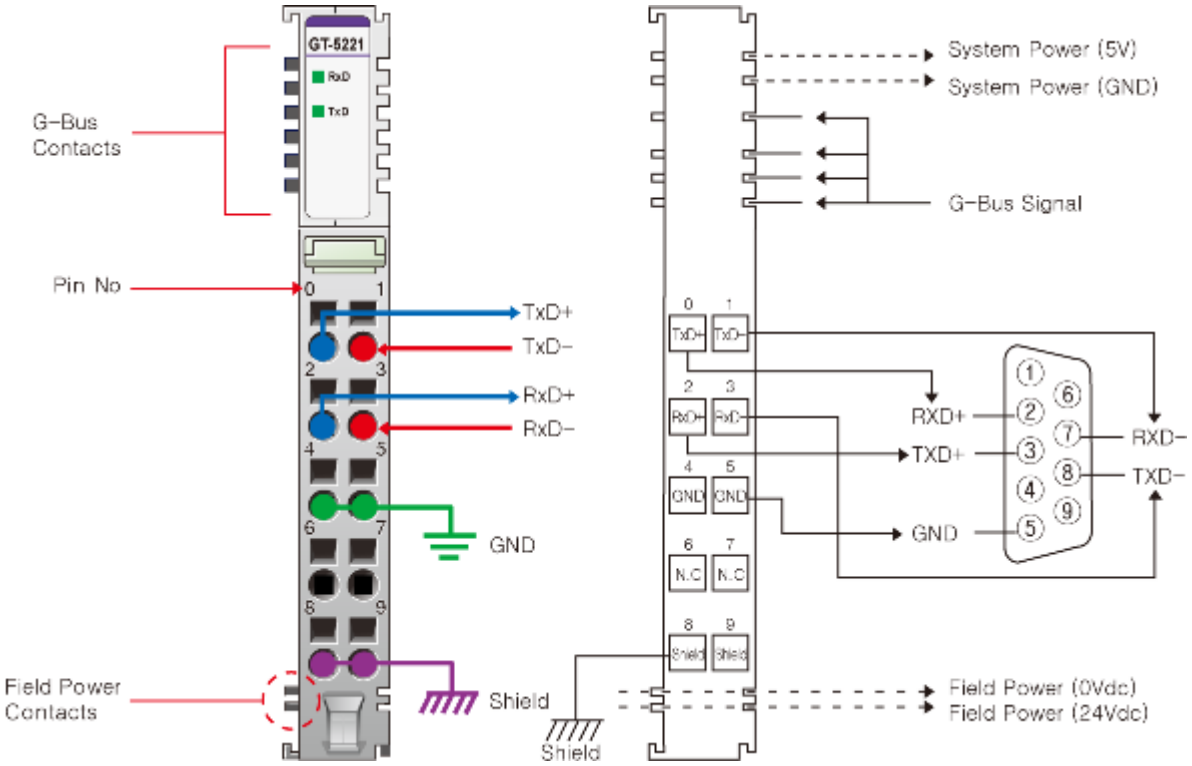

| LED No. | LED Function / Description | LED Color |
|---|---|---|
| RxD1 | Received Data 1 | Green |
| TxD1 | Transmit Data 1 | Green |
| RxD2 | Received Data 2 | Green |
| TxD2 | Transmit Data 2 | Green |

### 2.2.3. Channel Status LED

| LED | Color | Status |
|---|---|---|
| RxD1 | GREEN | Received Data1 |
| TxD1 | GREEN | Transmit Data1 |
| RxD2 | GREEN | Received Data2 |
| TxD2 | GREEN | Transmit Data2 |

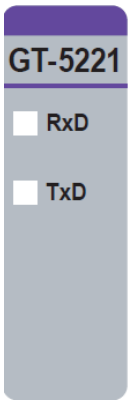
## 2.3. GT-5221

### 2.3.1. Wiring Diagram




| Pin No. | Signal Description | Signal Description | Pin No. |
|---|---|---|---|
| 0 | TxD+ | TxD- | 1 |
| 2 | RxD+ | RxD- | 3 |
| 4 | Common(GND) | Common(GND) | 5 |
| 6 | N.C | N.C | 7 |
| 8 | Shield | Shield | 9 |

### 2.3.2. LED Indicator



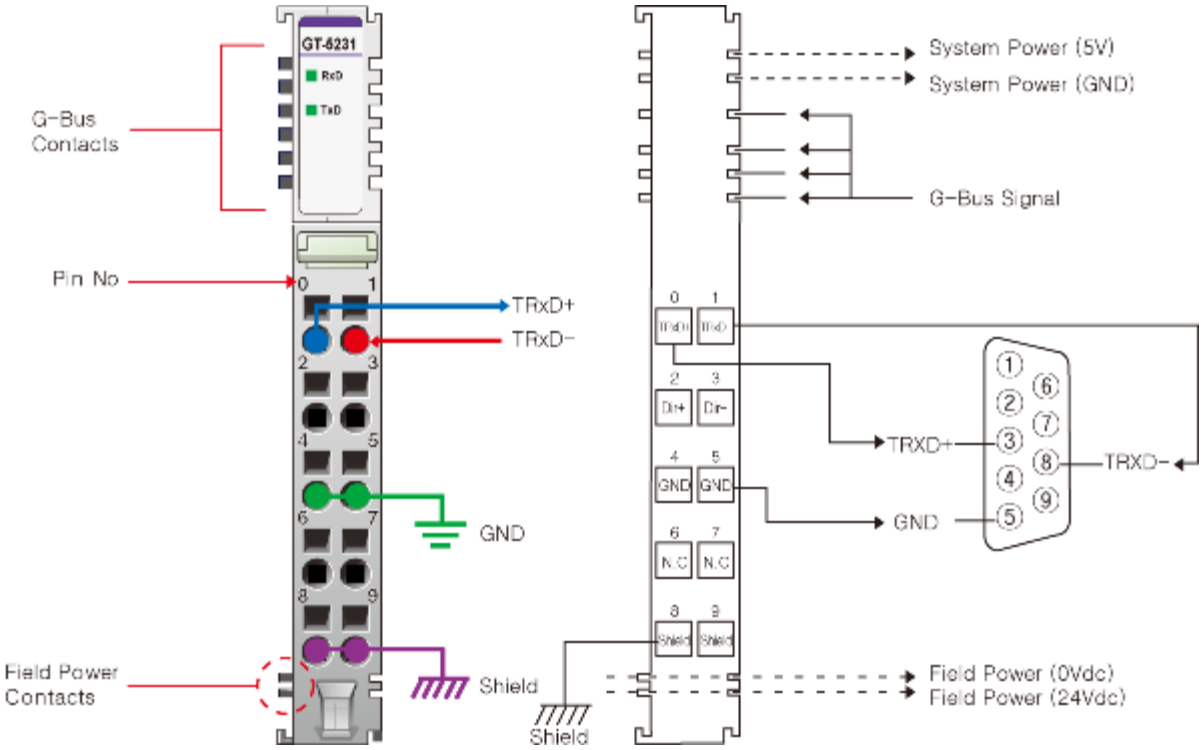

| LED No. | LED Function / Description | LED Color |
|---|---|---|
| RxD | Received Data | Green |
| TxD | Transmit Data | Green |

### 2.3.3. Channel Status LED

| LED | Color | Status |
|---|---|---|
| RxD | GREEN | Received Data |
| TxD | GREEN | Transmit Data |

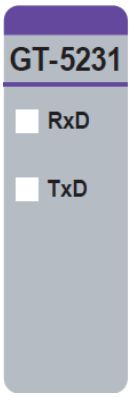
## 2.4. GT-5231

### 2.4.1. Wiring Diagram




| Pin No. | Signal Description | Signal Description | Pin No. |
|---|---|---|---|
| 0 | RS485+ | RS485- | 1 |
| 2 | DIR+ | DIR- | 3 |
| 4 | Common(GND) | Common(GND) | 5 |
| 6 | N.C | N.C | 7 |
| 8 | Shield | Shield | 9 |

### 2.4.2. LED Indicator



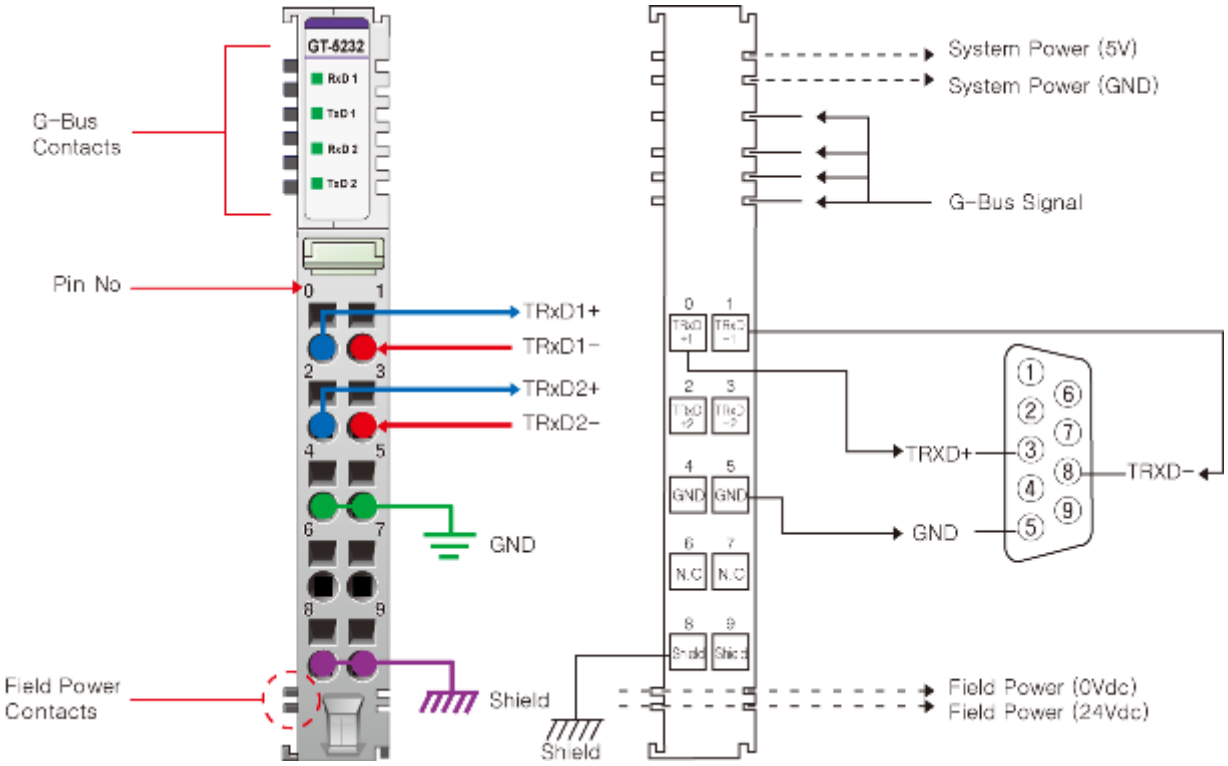

| LED No. | LED Function / Description | LED Color |
|---|---|---|
| RxD | Received Data | Green |
| TxD | Transmit Data | Green |

### 2.4.3. Channel Status LED

| LED | Color | Status |
|---|---|---|
| RxD | GREEN | Received Data |
| TxD | GREEN | Transmit Data |

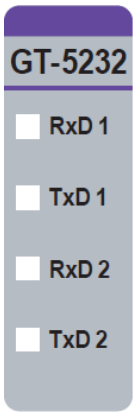
## 2.5. GT-5232

### 2.5.1. Wiring Diagram




| Pin No. | Signal Description | Signal Description | Pin No. |
|---|---|---|---|
| 0 | RS485+(ch0) | RS485-(ch0) | 1 |
| 2 | RS485+(ch1) | RS485-(ch1) | 3 |
| 4 | Common(GND) | Common(GND) | 5 |
| 6 | N.C | N.C | 7 |
| 8 | Shield | Shield | 9 |

### 2.5.2. LED Indicator




| LED No. | LED Function / Description | LED Color |
|---|---|---|
| RxD1 | Received Data 0 | Green |
| TxD1 | Transmit Data 0 | Green |
| RxD2 | Received Data 1 | Green |
| TxD2 | Transmit Data 1 | Green |

### 2.5.3. Channel Status LED

| LED | Color | Status |
|---|---|---|
| RxD1 | GREEN | Received Data0 |
| TxD1 | GREEN | Transmit Data0 |
| RxD2 | GREEN | Received Data1 |
| TxD2 | GREEN | Transmit Data1 |

## 2.6. Specification

| Items | GT-5211 | GT-5212 | GT-5221 | GT-5231 | GT-5232 |
|---|---|---|---|---|---|
| **Specification** | | | | | |
| Transfer Channels | TxD, RxD, Full Duplex | | | TxD, RxD, Half Duplex | |
| Transfer Rate | 1200bps~115200bps | | | | |
| Data Bit | 8bit | | | | |
| Parity Bit | None, Odd, Even(*Default : None) | | | | |
| Stop Bit | 1bit, 2bit (*Default : 1bit) | | | | |
| Flow Control | RTS,CTS | - | | | |
| Bit Distortion | <1.6% | | - | | |
| Connection | 10 RTB | | | | |
| Cable Type | Shield Cable Recommended. | | | | |
| Cable Length | Max.15m | | 1km twisted pair | | |
| Low Signal Voltage | -18V ~ -3V | | - | | |
| High Signal Voltage | 3V ~ 18V | | - | | |
| Data Buffer | IO User data 14 bytes (* Default) @Max. 61 Bytes | IO User data 12 bytes (* Default) @Max. 58 Bytes | IO User data 14 bytes (* Default) @Max. 61 Bytes | | IO User data 12 bytes (* Default) @Max. 58 Bytes |
| | IO size changed Max. 63 bytes | IO size changed Max. 62 bytes | IO size changed Max. 63 bytes | | IO size changed Max. 62 bytes |
| | Control/Status 1 byte, Rx/Tx Length 1 byte | Control/Status 2 bytes Rx/Tx Length 2 bytes | Control/Status 1 byte, Rx/Tx Length 1 byte | | Control/Status 2 bytes Rx/Tx Length 2 bytes |
| RXD Buffer | 1024bytes | | | | |
| TXD Buffer | 1024bytes | | | | |
| Line Impedance | - | | 120Ω | | |
| Input Image Size | 16 bytes (*Default) @ Max. 63 bytes | 16 bytes (*Default) @ Max. 62 bytes | 16 bytes (*Default) @ Max. 63 bytes | | 16 bytes (*Default) @ Max. 62 bytes |
| Output Image Size | 16 bytes (*Default) @ Max. 63 bytes | 16 bytes (*Default) @ Max. 62 bytes | 16 bytes (*Default) @ Max. 63 bytes | | 16 bytes (*Default) @ Max. 62 bytes |
| **General Specification** | | | | | |
| Power dissipation | Max. 85mA @ 5Vdc | | | | |
| Isolation | I/O to Logic : Isolation<br>Logic to Field power : Isolation (Not used)<br>Logic to System Power : Non-isolation | | | | |
| UL field power | Syupply Voltage : 24Vdc nominal, Class 2 | | | | |
| Field power | Not used Field power bypass to next expansion module | | | | |
| Wiring | I/O Cable Max. 2.0mm$^2$(AWG 14) | | | | |
| Torque | 0.8Nm (7lb-in) | | | | |
| Weight | 57g | | | | |
| Module size | 12mm x 99mm x 70mm | | | | |
| **Environment condition** | **Refer to 'Environment Specification'** | | | | |

# 3. Environment Specification

| **Environmental Specification** | |
|---|---|
| Operation Temperature | -40℃ ~70℃ |
| UL Temperature | -20℃ ~60℃ |
| Non-Operating Temperature | -40℃ ~85℃ |
| Relative Humidity | 5% ~ 90% Non-condensing |
| Mounting | DIN rail |
| **General Specification** | |
| Shock Operating | IEC 60068-2-27 : 2008/15g, 11ms |
| Vibration Resistance | Based on IEC 60068-2-6<br>DNVGL-CG-0039 : Vibration Class B, 4g |
| Industrial Emissions | EN61000-6-4/All : 2011 |
| Industrial Immunity | EN61000-6-2 : 2005 |
| Installation Position | Vertical and horizontal installation is available |
| Product Certifications | CE, UL, FCC |

# 4. Configuration and Operation Function

## 4.1. GT-52xx(Series) Mapping data into the image table

**Input image data**

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status** | TPA | 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

**Output image 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 Request (rising edge active)
- **TPR :** Transmit Processing Request (both edge active)

**GT-5211,5221,5231_image data (Input, Output Data Size : Default, 16Byte)**

| IO Input | | IO Output | |
|---|---|---|---|
| Byte#0 | Status | Byte#0 | Control |
| Byte#1 | RxLength | Byte#1 | TxLength |
| Byte#2 | RxData#0 | Byte#2 | TxData#0 |
| Byte#3 | RxData#1 | Byte#3 | TxData#1 |
| Byte#4 | RxData#2 | Byte#4 | TxData#2 |
| Byte#5 | RxData#3 | Byte#5 | TxData#3 |
| Byte#6 | RxData#4 | Byte#6 | TxData#4 |
| Byte#7 | RxData#5 | Byte#7 | TxData#5 |
| Byte#8 | RxData#6 | Byte#8 | TxData#6 |
| Byte#9 | RxData#7 | Byte#9 | TxData#7 |
| Byte#10 | RxData#8 | Byte#10 | TxData#8 |
| Byte#11 | RxData#9 | Byte#11 | TxData#9 |
| Byte#12 | RxData#10 | Byte#12 | TxData#10 |
| Byte#13 | RxData#11 | Byte#13 | TxData#11 |
| Byte#14 | RxData#12 | Byte#14 | TxData#12 |
| Byte#15 | RxData#13 | Byte#15 | TxData#13 |
| ------- | ------- | ------- | ------- |
| ------- | ------- | ------- | ------- |
| ------- | ------- | ------- | ------- |
| ------- | ------- | ------- | ------- |
| Byte#62 | RxData#60 | Byte#62 | TxData#60 |

**-** The input and output data size can be changed via parameter data.

(IO data size **MAX 63Byte**)

**- Default** Input, output data size : 16Byte

**GT-5212,5232_image data (Input, Output Data Size : Default, 16Byte)**

| IO Input | | IO Output | |
|---|---|---|---|
| Byte#0 | Ch#0 Status | Byte#0 | Ch#0 Control |
| Byte#1 | Ch#0 RxLength | Byte#1 | Ch#0 TxLength |
| Byte#2 | Ch#0 RxData#0 | Byte#2 | Ch#0 TxData#0 |
| Byte#3 | Ch#0 RxData#1 | Byte#3 | Ch#0 TxData#1 |
| Byte#4 | Ch#0 RxData#2 | Byte#4 | Ch#0 TxData#2 |
| Byte#5 | Ch#0 RxData#3 | Byte#5 | Ch#0 TxData#3 |
| Byte#6 | Ch#0 RxData#4 | Byte#6 | Ch#0 TxData#4 |
| Byte#7 | Ch#0 RxData#5 | Byte#7 | Ch#0 TxData#5 |
| Byte#8 | Ch#1 Status | Byte#8 | Ch#1 Control |
| Byte#9 | Ch#1 RxLength | Byte#9 | Ch#1 TxLength |
| Byte#10 | Ch#1 RxData#0 | Byte#10 | Ch#1 TxData#0 |
| Byte#11 | Ch#1 RxData#1 | Byte#11 | Ch#1 TxData#1 |
| Byte#12 | Ch#1 RxData#2 | Byte#12 | Ch#1 TxData#2 |
| Byte#13 | Ch#1 RxData#3 | Byte#13 | Ch#1 TxData#3 |
| Byte#14 | Ch#1 RxData#4 | Byte#14 | Ch#1 TxData#4 |
| Byte#15 | Ch#1 RxData#5 | Byte#15 | Ch#1TxData#5 |

**- 1channel** Input, output data size : 8Byte

**- Default** Input, output data All size : 16Byte

**-** The input and output data size can be changed via parameter data.

(IO data size **MAX 63Byte**)

- Can be set IO data size Even number

(If set to an odd number IO data size, Automatically changes to an even number)

## 4.2. Configuration Parameter Data

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

### 4.2.1. 1 Channel Module Parameter Data(GT-5211)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte#0 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | *Note 1 | Stop bit | Parity Bit | | Baudrate | | | |
| | TxD Process | 0 : 1bit | 00 : No | | 0000 : 115200bps | | | |
| | 0 : Disable | 1 : 2bit | 01 : Odd | | 0001 : 1200bps | | | |
| | 1 : Enable | | 10 : Even | | 0010 : 2400bps | | | |
| | | | | | 0011 : 4800bps | | | |
| | | | | | 0100 : 9600bps | | | |
| | | | | | 0101 : 19200bps | | | |
| | | | | | 0110 : 38400bps | | | |
| | | | | | 0111 : 57600bps | | | |
| | | | | | 1000 : 115200bps | | | |
| | | | | | Others : 115200bps | | | |
| Byte#1 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | IO data size | | | | | | Flow Control | |
| | 16~63 | | | | | | 00 : RTS/CTS Disable | |
| | | | | | | | 01 : RTS Enable | |
| | | | | | | | 10 : CTS Enable | |
| | | | | | | | 11 : RTS/CTS Enable | |
| Byte#2 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | Not Used | | | | | | | |
| Byte#3 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | Not Used | | | | | | | |

**- byte#0~1 for ch#0, byte#2~3 not used**

*** Note 1:**

- 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

### 4.2.2. 1 Channel Module Parameter Data(GT-5221, 5231)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte#0 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | * Note 1 | Stop bit | Parity Bit | | Baudrate | | | |
| | TxD Process | 0 : 1bit | 00 : No | | 0000 : 115200bps | | | |
| | 0 : Disable | 1 : 2bit | 01 : Odd | | 0001 : 1200bps | | | |
| | 1 : Enable | | 10 : Even | | 0010 : 2400bps | | | |
| | | | | | 0011 : 4800bps | | | |
| | | | | | 0100 : 9600bps | | | |
| | | | | | 0101 : 19200bps | | | |
| | | | | | 0110 : 38400bps | | | |
| | | | | | 0111 : 57600bps | | | |
| | | | | | 1000 : 115200bps | | | |
| | | | | | Others : 115200bps | | | |
| Byte#1 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | | | IO data size | | | | | |
| | | | 16~63 | | | | | |
| Byte#2 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | Not Used | | | | | | | |
| Byte#3 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | Not Used | | | | | | | |

**- byte#0~1 for ch#0, byte#2~3 not used**

*** Note 1:**

- 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

### 4.2.3. 2 Channel Module Parameter Data(GT-5212, 5232)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Byte#0 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | * Note 1 | Stop bit | Parity Bit | | Baudrate | | | |
| | TxD Process | 0 : 1bit | 00 : No | | 0000 : 115200bps | | | |
| | 0 : Disable | 1 : 2bit | 01 : Odd | | 0001 : 1200bps | | | |
| | 1 : Enable | | 10 : Even | | 0010 : 2400bps | | | |
| | | | | | 0011 : 4800bps | | | |
| | | | | | 0100 : 9600bps | | | |
| | | | | | 0101 : 19200bps | | | |
| | | | | | 0110 : 38400bps | | | |
| | | | | | 0111 : 57600bps | | | |
| | | | | | 1000 : 115200bps | | | |
| | | | | | Others : 115200bps | | | |
| Byte#1 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | | | IO data size | | | | | |
| | | | 16~62 | | | | | |
| Byte#2 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | * Note 1 | Stop bit | Parity Bit | | Baudrate | | | |
| | TxD Process | 0 : 1bit | 00 : No | | 0000 : 115200bps | | | |
| | 0 : Disable | 1 : 2bit | 01 : Odd | | 0001 : 1200bps | | | |
| | 1 : Enable | | 10 : Even | | 0010 : 2400bps | | | |
| | | | | | 0011 : 4800bps | | | |
| | | | | | 0100 : 9600bps | | | |
| | | | | | 0101 : 19200bps | | | |
| | | | | | 0110 : 38400bps | | | |
| | | | | | 0111 : 57600bps | | | |
| | | | | | 1000 : 115200bps | | | |
| | | | | | Others : 115200bps | | | |
| Byte#3 | Bit#7 | Bit#6 | Bit#5 | Bit#4 | Bit#3 | Bit#2 | Bit#1 | Bit#0 |
| | Not Used | | | | | | | |

**- byte#0~1 for ch#0, byte#2~3 for ch#1**

*** Note 1:**

- 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

## 4.3. Example

### 4.3.1. Example of Transmitting data

**Transmit data : A, B, C, D, E, F, G, H, I, J, K, L, M, N, O, P, Q, R, S, T, U, V, W, X, Y, Z(26byte)**

**Input, Output data Size : 16byte**

**Configuration Parameter**

| Parameter | Description | Value |
|---|---|---|
| Data Bit | 8 Data Bit | Not used |
| Parity Bit | No Parity | Default Value |
| Baud rate | 115200bps | Default Value |
| Stop Bit | 1 Bit | Default Value |
| RTS/CTS Flow Control | RTS/CTS Disable | Default Value |
| TxD Process | Disable | Default Value |

**- Step#0**

TR inverting (TR≠TA)

Output Length = 14byte (0x0E)

Output Data = “A, B, C, D, E, F, G, H, I, J, K, L, M, N”

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **bit#7** | **bit#6** | **bit#5** | **bit#4** | **bit#3** | **bit#2** | **bit#1** | **bit#0** |
| **Control Byte #0** | TPR | FT | FR | ---- | ---- | RA | TR | IR |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Tx Length #1** | ‘ 0E’(14byte) | | | | | | | |
| **Output Byte #2** | ‘A’ (0x41:ASCII code) | | | | | | | |
| **Output Byte #3** | ‘B’ (0x42) | | | | | | | |
| **Output Byte #4** | ‘C’ (0x43) | | | | | | | |
| **Output Byte #5** | ‘D’ (0x44) | | | | | | | |
| **Output Byte #6** | ‘E’ (0x45) | | | | | | | |
| **Output Byte #7** | ‘F’ (0x46) | | | | | | | |
| **Output Byte #8** | ‘G’ (0x47) | | | | | | | |
| **Output Byte #9** | ‘H’ (0x48) | | | | | | | |
| **Output Byte #10** | ‘I’ (0x49) | | | | | | | |
| **Output Byte #11** | ‘J’ (0x4A) | | | | | | | |
| **Output Byte #12** | ‘K’ (0x4B) | | | | | | | |
| **Output Byte #13** | ‘L’ (0x4C) | | | | | | | |
| **Output Byte #14** | ‘M’ (0x4D) | | | | | | | |
| **Output Byte #15** | ‘N’ (0x4E) | | | | | | | |

**- Step#1**

Check TA bit value in Status Byte.

TR=TA: transmit complete.

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

**- Step#2**

TR inverting (TR≠TA)

Output Length = 12byte (0x0C)

Output Data = “O, P, Q, R, S, T, U, V, W, X, Y, Z”

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Control Byte #0** | TPR | FT | FR | ---- | ---- | RA | TR | IR |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Tx Length #1** | ‘ 0C’(12byte) | | | | | | | |
| **Output Byte #2** | ‘O’ (0x4F:ASCII code) | | | | | | | |
| **Output Byte #3** | ‘P’ (0x50) | | | | | | | |
| **Output Byte #4** | ‘Q’ (0x51) | | | | | | | |
| **Output Byte #5** | ‘R’ (0x52) | | | | | | | |
| **Output Byte #6** | ‘S’ (0x53) | | | | | | | |
| **Output Byte #7** | ‘T’ (0x54) | | | | | | | |
| **Output Byte #8** | ‘U’ (0x55) | | | | | | | |
| **Output Byte #9** | ‘V’ (0x56) | | | | | | | |
| **Output Byte #10** | ‘W’ (0x57) | | | | | | | |
| **Output Byte #11** | ‘X’ (0x58) | | | | | | | |
| **Output Byte #12** | ‘Y’ (0x59) | | | | | | | |
| **Output Byte #13** | ‘Z’ (0x5A) | | | | | | | |
| **Output Byte #14** | 0x00 | | | | | | | |
| **Output Byte #15** | 0x00 | | | | | | | |

**- Step#3**

Check TA bit value in Status Byte.

TR=TA: transmit complete.

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### 4.3.2. Example of Receiving data

**Receive data : “ Company:CREVIS G-Series“(22byte)**

**Input, Output data Size : 16byte**

**Configuration Parameter**

| Parameter | Description | Value |
|---|---|---|
| Data Bit | 8 Data Bit | Not used |
| Parity Bit | No Parity | Default Value |
| Baud rate | 115200bps | Default Value |
| Stop Bit | 1 Bit | Default Value |
| RTS/CTS Flow Control | RTS/CTS Disable | Default Value |
| TxD Process | Disable | Default Value |

**- Step#0**

RR=RA

**RE :** RxD Exist (Remained)

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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

**- Step#1**

RA inverting (RA≠RR)

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

**- Step#2**

Check RR bit value in Status Byte

RA inverting (RA=RR)

Input Length = 14byte

**Input Data = “Company:CREVIS”**

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| **RX Length #1** | ‘ 0E’(14byte) | | | | | | | |
| **Input Byte #2** | ‘C’ (0x43:ASCII code) | | | | | | | |
| **Input Byte #3** | ‘o’ (0x6F) | | | | | | | |
| **Input Byte #4** | ‘m’ (0x6D) | | | | | | | |
| **Input Byte #5** | ‘p’ (0x70) | | | | | | | |
| **Input Byte #6** | ‘a’ (0x61) | | | | | | | |
| **Input Byte #7** | ‘n’ (0x6E) | | | | | | | |
| **Input Byte #8** | ‘y’ (0x79) | | | | | | | |
| **Input Byte #9** | ‘:’ (0x3A) | | | | | | | |
| **Input Byte #10** | ‘C’ (0x43) | | | | | | | |
| **Input Byte #11** | ‘R’ (0x52) | | | | | | | |
| **Input Byte #12** | ‘E’ (0x45) | | | | | | | |
| **Input Byte #13** | ‘V’ (0x56) | | | | | | | |
| **Input Byte #14** | ‘I’ (0x49) | | | | | | | |
| **Input Byte #15** | ‘S’ (0x53) | | | | | | | |

**- Step#3**

RA inverting (RA≠RR)

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

**- Step#4**

Check RR bit value in Status Byte

RA inverting (RA=RR)

Input Length = 8byte

Input Data = "**G-Series**"

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **RX Length #1** | ' 08'(8byte) | | | | | | | |
| **Input Byte #2** | 'G' (0x47:ASCII code) | | | | | | | |
| **Input Byte #3** | '-' (0x2D) | | | | | | | |
| **Input Byte #4** | 'S' (0x53) | | | | | | | |
| **Input Byte #5** | 'e' (0x65) | | | | | | | |
| **Input Byte #6** | 'r' (0x72) | | | | | | | |
| **Input Byte #7** | 'i' (0x69) | | | | | | | |
| **Input Byte #8** | 'e' (0x65) | | | | | | | |
| **Input Byte #9** | 's' (0x73) | | | | | | | |
| **Input Byte #10** | 0x00 | | | | | | | |
| **Input Byte #11** | 0x00 | | | | | | | |
| **Input Byte #12** | 0x00 | | | | | | | |
| **Input Byte #13** | 0x00 | | | | | | | |
| **Input Byte #14** | 0x00 | | | | | | | |
| **Input Byte #15** | 0x00 | | | | | | | |

### 4.3.3. Example of Transmitting data and Receiving data

**Transmit data: ”CREVIS”(6byte) _Receive data : “CREVIS“(6byte)**

**Input, Output data Size : 16byte**

**Configuration Parameter**

| Parameter | Description | Value |
|---|---|---|
| Data Bit | 8 Data Bit | Not used |
| Parity Bit | No Parity | Default Value |
| Baud rate | 115200bps | Default Value |
| Stop Bit | 1 Bit | Default Value |
| RTS/CTS Flow Control | RTS/CTS Disable | Default Value |
| TxD Process | Disable | Default Value |

**- Step#0 (Transmit)**

TR inverting (TR≠TA)

Output Length = 6byte

Output Data = “CREVIS”

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Control Byte #0** | TPR | FT | FR | ---- | ---- | RA | TR | IR |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Tx Length #1** | ‘ 06’(6byte) | | | | | | | |
| **Output Byte #2** | ‘C’ (0x43:ASCII code) | | | | | | | |
| **Output Byte #3** | ‘R’ (0x52) | | | | | | | |
| **Output Byte #4** | ‘E’ (0x45) | | | | | | | |
| **Output Byte #5** | ‘V’ (0x56) | | | | | | | |
| **Output Byte #6** | ‘I’ (0x49) | | | | | | | |
| **Output Byte #7** | ‘S’ (0x53) | | | | | | | |
| **Output Byte #8** | 0x00 | | | | | | | |
| **Output Byte #9** | 0x00 | | | | | | | |
| **Output Byte #10** | 0x00 | | | | | | | |
| **Output Byte #11** | 0x00 | | | | | | | |
| **Output Byte #12** | 0x00 | | | | | | | |
| **Output Byte #13** | 0x00 | | | | | | | |
| **Output Byte #14** | 0x00 | | | | | | | |
| **Output Byte #15** | 0x00 | | | | | | | |

**- Step#1**

Check TA bit value in Status Byte.

TR=TA: transmit complete.

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

**- Step#2 (Receive)**

RR=RA

**RE :** RxD Exist (Remained)

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

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

**- Step#3**

RA inverting (RA≠RR)

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

**- Step#4**

Check RR bit value in Status Byte

RA=RR : receive complete

Input Length = 6byte

**Input Data = “CREVIS”**

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| **RX Length #1** | ‘ 06’(6byte) | | | | | | | |
| **Input Byte #2** | ‘C’ (0x43:ASCII code) | | | | | | | |
| **Input Byte #3** | ‘R’ (0x52) | | | | | | | |
| **Input Byte #4** | ‘E’ (0x45) | | | | | | | |
| **Input Byte #5** | ‘V’ (0x56) | | | | | | | |
| **Input Byte #6** | ‘I’ (0x49) | | | | | | | |
| **Input Byte #7** | ‘S’ (0x53) | | | | | | | |
| **Input Byte #8** | 0x00 | | | | | | | |
| **Input Byte #9** | 0x00 | | | | | | | |
| **Input Byte #10** | 0x00 | | | | | | | |
| **Input Byte #11** | 0x00 | | | | | | | |
| **Input Byte #12** | 0x00 | | | | | | | |
| **Input Byte #13** | 0x00 | | | | | | | |
| **Input Byte #14** | 0x00 | | | | | | | |
| **Input Byte #15** | 0x00 | | | | | | | |

### 4.3.4. TPR and TPA Example

**Transmit data: ”CREVIS”(6byte)**

**Input, Output data Size : 16byte**

**Configuration Parameter**

| Parameter | Description | Value |
|---|---|---|
| Data Bit | 8 Data Bit | Not used |
| Parity Bit | No Parity | Default Value |
| Baud rate | 115200bps | Default Value |
| Stop Bit | 1 Bit | Default Value |
| RTS/CTS Flow Control | RTS/CTS Disable | Default Value |
| **TxD Process** | **Enable** | Default Value(Disable) |

**- Step#0**

TxD Process data in Configuration Parameter set to ″1″ (Enable)

**- Step#1**

TR inverting (TR≠TA)

Output Length = 3

Output Data = ″CRE″02

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | **bit#7** | **bit#6** | **bit#5** | **bit#4** | **bit#3** | **bit#2** | **bit#1** | **bit#0** |
| **Control Byte #0** | TPR | FT | FR | ---- | ---- | RA | TR | IR |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| **Tx Length #1** | ‘ 03’(3byte) | | | | | | | |
| **Output Byte #2** | ‘C’ (0x43:ASCII code) | | | | | | | |
| **Output Byte #3** | ‘R’ (0x52) | | | | | | | |
| **Output Byte #4** | ‘E’ (0x45) | | | | | | | |
| **Output Byte #5** | 0x00 | | | | | | | |
| **Output Byte #6** | 0x00 | | | | | | | |
| **Output Byte #7** | 0x00 | | | | | | | |
| **Output Byte #8** | 0x00 | | | | | | | |
| **Output Byte #9** | 0x00 | | | | | | | |
| **Output Byte #10** | 0x00 | | | | | | | |
| **Output Byte #11** | 0x00 | | | | | | | |
| **Output Byte #12** | 0x00 | | | | | | | |

| | |
|---|---|
| **Output Byte #13** | 0x00 |
| **Output Byte #14** | 0x00 |
| **Output Byte #15** | 0x00 |

**- Step#2**

Check TA bit value in Status Byte.

**TR=TA: transmit complete.**

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |

TxD Buffer

| **Offset** | TxD Buffer Data |
|---|---|
| **Output Byte #0** | 'C' (0x43:ASCII code) |
| **Output Byte #1** | 'R' (0x52) |
| **Output Byte #2** | 'E' (0x45) |
| **Output Byte #3** | 0x00 |
| **Output Byte #4** | 0x00 |
| **Output Byte #5** | 0x00 |
| **Output Byte #6** | 0x00 |
| **Output Byte #7** | 0x00 |
| **Output Byte #8** | 0x00 |
| .<br>.<br>. | .<br>.<br>. |
| **Output Byte #252** | 0x00 |
| **Output Byte #253** | 0x00 |
| **Output Byte #254** | 0x00 |
| **Output Byte #255** | 0x00 |

**- Step#3**

TR inverting (TR≠TA)

Output Length = 3

Output Data = “VIS”

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Control Byte #0** | TPR | FT | FR | ---- | ---- | RA | TR | IR |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Tx Length #1** | ‘ 03’(3byte) | | | | | | | |
| **Output Byte #2** | ‘V’ (0x56 ASCII code) | | | | | | | |
| **Output Byte #3** | ‘I’ (0x49) | | | | | | | |
| **Output Byte #4** | ‘S’ (0x53) | | | | | | | |
| **Output Byte #5** | 0x00 | | | | | | | |
| **Output Byte #6** | 0x00 | | | | | | | |
| **Output Byte #7** | 0x00 | | | | | | | |
| **Output Byte #8** | 0x00 | | | | | | | |
| **Output Byte #9** | 0x00 | | | | | | | |
| **Output Byte #10** | 0x00 | | | | | | | |
| **Output Byte #11** | 0x00 | | | | | | | |
| **Output Byte #12** | 0x00 | | | | | | | |
| **Output Byte #13** | 0x00 | | | | | | | |
| **Output Byte #14** | 0x00 | | | | | | | |
| **Output Byte #15** | 0x00 | | | | | | | |

**- Step#4**

Check TA bit value in Status Byte.

TR=TA: transmit complete

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

TxD Buffer

| Offset | TxD Buffer Data |
|---|---|
| **Output Byte #0** | ‘C’ (0x43:ASCII code) |
| **Output Byte #1** | ‘R’ (0x52) |
| **Output Byte #2** | ‘E’ (0x45) |
| **Output Byte #3** | ‘V’ (0x56 ASCII code) |
| **Output Byte #4** | ‘I’ (0x49) |
| **Output Byte #5** | ‘S’ (0x53) |
| **Output Byte #6** | 0x00 |
| **Output Byte #7** | 0x00 |

| | |
|---|---|
| **Output Byte #8** | 0x00 |
| .<br>.<br>. | .<br>.<br>. |
| **Output Byte #252** | 0x00 |
| **Output Byte #253** | 0x00 |
| **Output Byte #254** | 0x00 |
| **Output Byte #255** | 0x00 |

**- Step#5**

TPR inverting (TPR≠TPA)

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

Transmit all TxD Buffer data (TxD Buffer empty)

| **Offset** | TxD Buffer Data |
|---|---|
| **Output Byte #0** | 0x00 |
| **Output Byte #1** | 0x00 |
| **Output Byte #2** | 0x00 |
| **Output Byte #3** | 0x00 |
| **Output Byte #4** | 0x00 |
| **Output Byte #5** | 0x00 |
| **Output Byte #6** | 0x00 |
| **Output Byte #7** | 0x00 |
| **Output Byte #8** | 0x00 |
| .<br>.<br>. | .<br>.<br>. |
| **Output Byte #252** | 0x00 |
| **Output Byte #253** | 0x00 |
| **Output Byte #254** | 0x00 |
| **Output Byte #255** | 0x00 |

**- Step#6**

Check TPA bit value in Status Byte.

TPR=TPA: transmit complete

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### 4.3.5. GT-5211, 5221 (1ch) RxD Buffer data Overrun Check

For example, if other device transmits 1025 bytes of TxD data, RxD buffer of GT-52xx (Serial) will be overwritten 1 bytes.

| **Other device** | | **GT-52xx(Serial)** | |
|---|---|---|---|
| **Offset** | TxD Data | **Offset** | RxD Buffer data |
| **Output Byte #1** | 0x01 | **Input Byte #1** | 0x06(Overrun data) |
| **Output Byte #2** | 0x02 | **Input Byte #2** | 0x02 |
| **Output Byte #3** | 0x03 | **Input Byte #3** | 0x03 |
| **Output Byte #4** | 0x04 | **Input Byte #4** | 0x04 |
| **Output Byte #5** | 0x05 | **Input Byte #5** | 0x05 |
| **Output Byte #6** | 0x06 | **Input Byte #6** | 0x06 |
| .<br>.<br>. | .<br>.<br>. | .<br>.<br>. | |
| **Output Byte #1020** | 0x01 | **Input Byte #1019** | 0x10 |
| **Output Byte #1021** | 0x02 | **Input Byte #1020** | 0x01 |
| **Output Byte #1022** | 0x03 | **Input Byte #1021** | 0x02 |
| **Output Byte #1023** | 0x04 | **Input Byte #1022** | 0x03 |
| **Output Byte #1024 MAX** | 0x05 | **Input Byte #1023** | 0x04 |
| **Output Byte #1025** | 0x06(Overrun data) | **Input Byte #1024** | 0x05 |

RE (RxD Exist) bit check

| | **bit#7** | **bit#6** | **bit#5** | **bit#4** | **bit#3** | **bit#2** | **bit#1** | **bit#0** |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 |

RA (Receive Acknowledge) bit set

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

PLEASE CHECK RBO bit in Status Byte in order to prevent overwrite RX buffer.
When the RBO bit is set, it notifies that the RX buffer is full.

| | bit#7 | bit#6 | bit#5 | bit#4 | bit#3 | bit#2 | bit#1 | bit#0 |
|---|---|---|---|---|---|---|---|---|
| **Status Byte #0** | TPA | FTA | FRA | RE | RBO | RR | TA | IA |
| | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 |

If you try to write more than 1024 bytes on RX buffer, 1025rd byte overwrites the first byte on RX buffer.
Thus, it is recommended to write less than 1024 bytes.
IR (Initialization Request) bit set

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

RxD Buffer data Reset.

| **Offset** | RxD Buffer Data |
|---|---|
| **Input Byte #1** | 0x00 |
| **Input Byte #2** | 0x00 |
| **Input Byte #3** | 0x00 |
| **Input Byte #4** | 0x00 |
| **Input Byte #5** | 0x00 |
| **Input Byte #6** | 0x00 |
| .<br>.<br>. | .<br>.<br>. |
| **Input Byte #1021** | 0x00 |
| **Input Byte #1022** | 0x00 |
| **Input Byte #1023** | 0x00 |
| **Input Byte #1024** | 0x00 |

# 5. How to change I/O Data Size in XML file

## 5.1. I/O Guide Pro

**- 1ch Module XML change location**

```
<IOData InputLength="16" OutputLength="16">
    <Input OneChSize="8">
        <Ref TextId="T_Status_Data_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Length_Data_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_01" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_02" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_03" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_04" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_05" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_06" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_07" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_08" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_09" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_10" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_11" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_12" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_13" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        Write <Ref TextId="T_Byte_InData_XX" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
    </Input>
    <Output OneChSize="8">
        <Ref TextId="T_Ctrl_Data_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Length_Data_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_01" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_02" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_03" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_04" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_05" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_06" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_07" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_08" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_09" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_10" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_11" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_12" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_13" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        Write <Ref TextId="T_Byte_OutData_XX" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
    </Output>
</IOData>
```

**- 2ch Module XML change location**

```
<IOData InputLength="16" OutputLength="16">
    <Input OneChSize="8">
        <Ref TextId="T_Status_Data_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Length_Data_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_01" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_02" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_03" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_04" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_05" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        Write <Ref TextId="T_Byte_InData_XX" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>  1Ch Area
        <Ref TextId="T_Status_Data_01" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Length_Data_01" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_00" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_01" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_02" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_03" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_04" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_InData_05" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        Write <Ref TextId="T_Byte_InData_XX" ChannelType="BI" DataType="ByteArea" Length="1" Unit="" Visible="true"/>  2Ch Area
    </Input>
    <Output OneChSize="8">
        <Ref TextId="T_Ctrl_Data_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Length_Data_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_01" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_02" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_03" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_04" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_05" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        Write <Ref TextId="T_Byte_OutData_XX" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>  1Ch Area
        <Ref TextId="T_Ctrl_Data_01" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Length_Data_01" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_00" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_01" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_02" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_03" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_04" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        <Ref TextId="T_Byte_OutData_05" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>
        Write <Ref TextId="T_Byte_OutData_XX" ChannelType="BO" DataType="ByteArea" Length="1" Unit="" Visible="true"/>  2Ch Area
    </Output>
</IOData>
```

**- Step#1**

```
<IOData InputLength="16" OutputLength="16">
```

Change InputLength OutputLength

ex) I/O Date Size : 30Byte
<IOData InputLength=”30” OutputLength=”30”

**- Step#2**
Add T_Byte_InData_XX & T_Byte_OutData_XX

ex) I/O Data Size : 18Byte
Add the following to the Write area.

**- 1ch Module**
Input area
<Ref TextId="T_Byte_InData_14" ChannelType="BI" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>
<Ref TextId="T_Byte_InData_15" ChannelType="BI" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>

Output area
<Ref TextId="T_Byte_OutData_14" ChannelType="BO" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>
<Ref TextId="T_Byte_OutData_15" ChannelType="BO" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>

**- 2ch Module**
1ch Input area
<Ref TextId="T_Byte_InData_06" ChannelType="BI" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>

2ch Input area
<Ref TextId="T_Byte_InData_06" ChannelType="BI" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>

1ch Output area
<Ref TextId="T_Byte_OutData_06" ChannelType="BO" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>

2ch Output area
<Ref TextId="T_Byte_OutData_06" ChannelType="BO" DataType="ByteArea" Length="1" Unit=""
Visible="true"/>

## 5.2. CodeSys

**- XML change location**

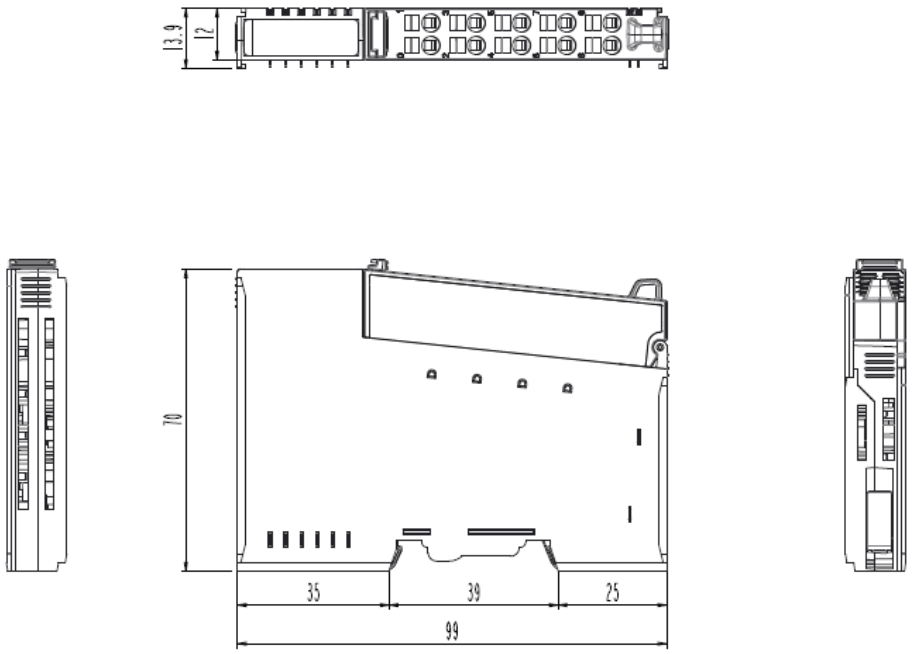
```
<Parameter ParameterId="1000" type="localTypes:ARRAY [0..15] OF TBit1Byte">
  <Attributes channel="input" download="true" functional="false" offlineaccess="read" onlineaccess="read" />
  <Default>0</Default>
  <Name name="local:in0">IN</Name>
</Parameter>

<Parameter ParameterId="2000" type="localTypes:ARRAY [0..15] OF TBit1Byte">
  <Attributes channel="output" download="true" functional="false" offlineaccess="readwrite" onlineaccess="readwrite" />
  <Default>0</Default>
  <Name name="local:out0">OUT</Name>
</Parameter>
```

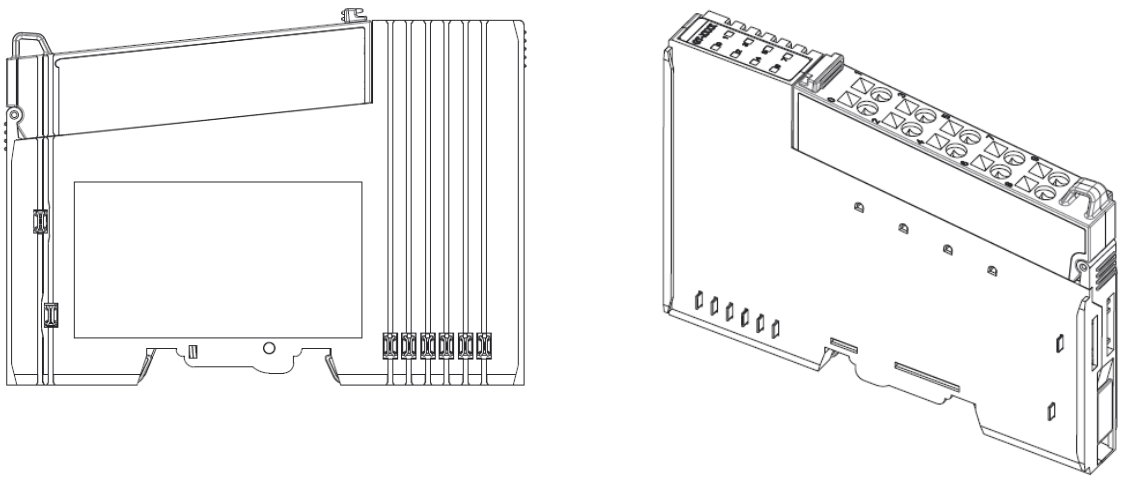
Change Array range
ex) I/O Data Size : 30Byte
[0..15] → [0..29]

# 6. Dimension

## 6.1. GT-52xx

(mm)



# 7. Mounting

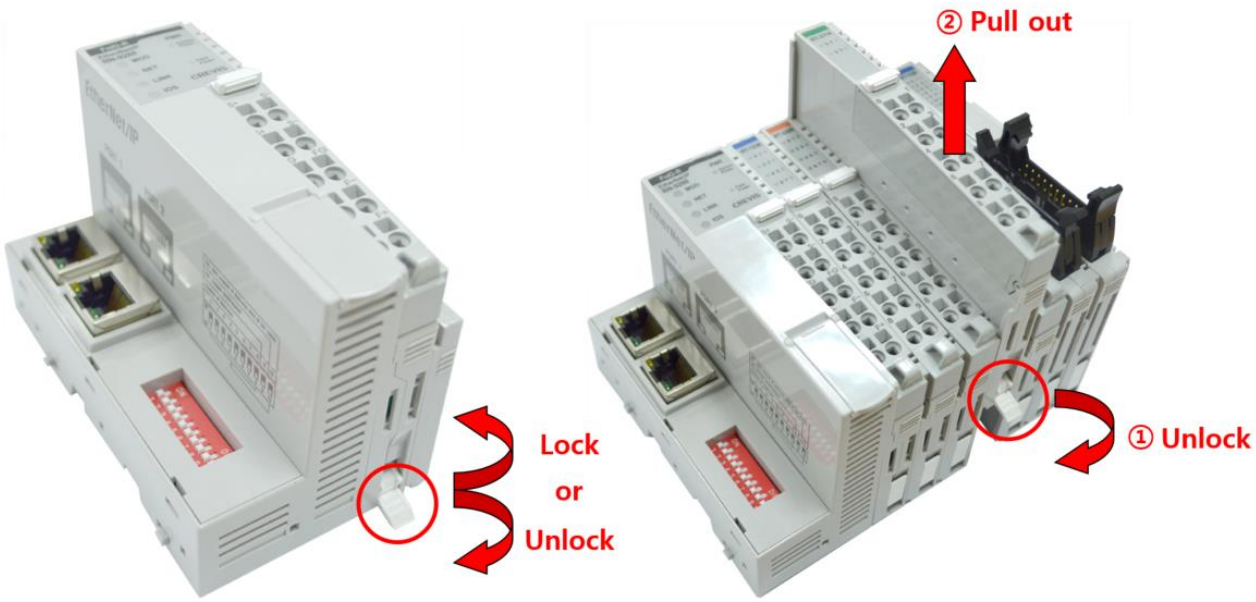
**Caution!**

**Hot surface!**
The surface of the housing can become hot during operation. If the device was operated at high ambient temperatures, allow it to cool off before touching it.

**Notice!**

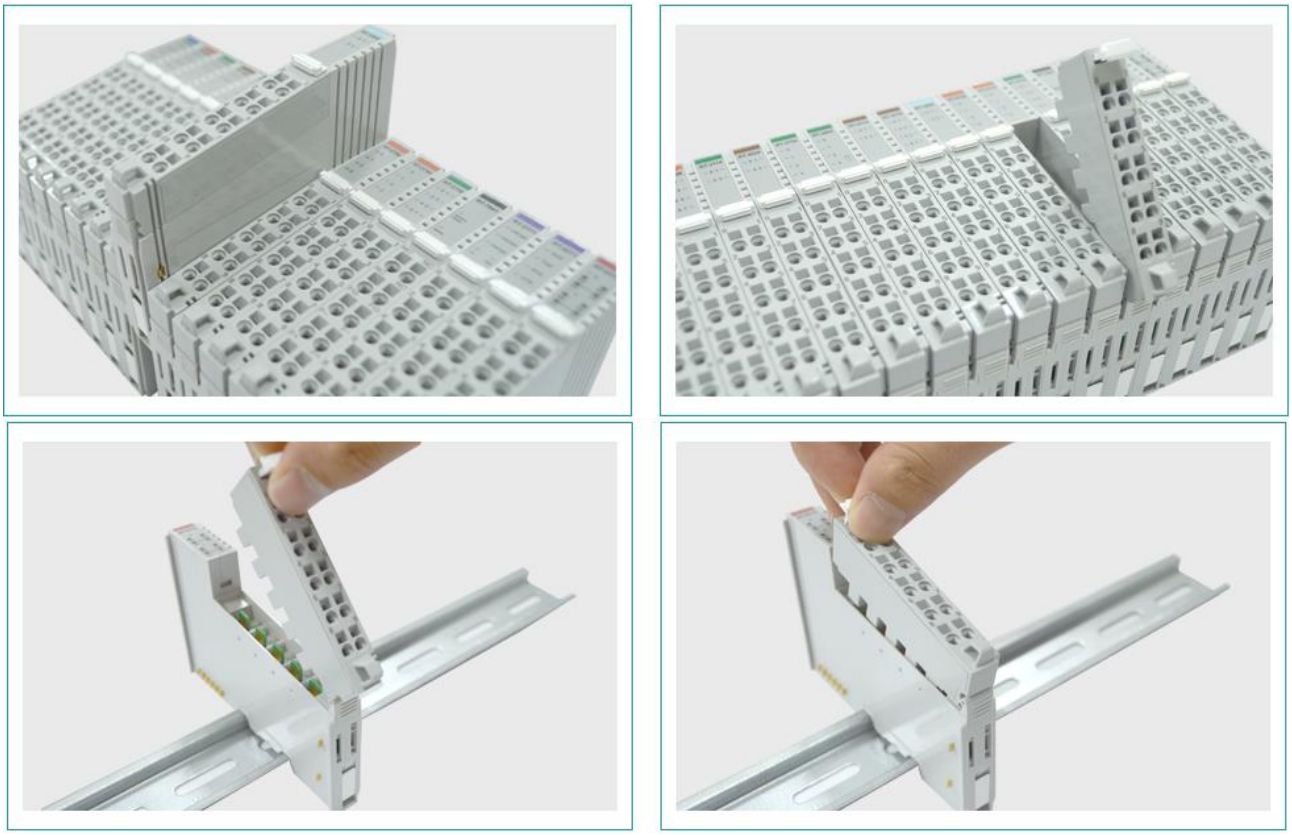
**Perform work on devices only if they are de-energized!**
Working on energized devices can damage them. Therefore, turn off the power supply before working on the devices.

## 7.1 I/O Inserting and Removing Devices




- As above figure in order to safeguard the FnIO module from jamming, it should be fixed onto the DIN rail with locking level. To do so, fold on the upper of the locking lever.
To pull out the FnIO module, unfold the locking lever as below figure.

## 7.2 RTB (Removable Terminal Block)



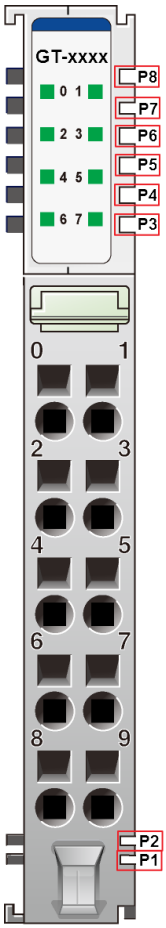
Whole terminal block can be combined and removed for the convenience if its maintenance.

There is a locking switch on the RTB for the easy combination and easy removal.

Easy combination and easy removal for IO modules on the din rail through One Touch Locking Switch.

# 8. G-Bus Pin Description

Communication between the RN series and the expansion module as well as system / field power supply of the bus modules is carried out via the internal bus. It is comprised of 6 data pin and 2 field power pin.




*Please refer to the table below regarding the pin description from P1 to P8.

| No. | Description |
|---|---|
| P1 | Field Power (VCC) |
| P2 | Field Power (GND) |
| P3 | GBUS CLK |
| P4 | GBUS MISO |
| P5 | GBUS MOSI |
| P6 | GBUS Token |
| P7 | System Power (GND) |
| P8 | System Power (VCC) |

| | |
|---|---|
| DANGER  | Do not touch data and field power pins in order to avoid soiling and damage by ESD noise. |

# APPENDIX A

## A.1. Product List

| No. | GT-Number | Description | ID(hex) |
|---|---|---|---|
| Digital Input Module | | | |
| 1 | GT-1238 | 8 Points, Universal, 24Vdc, 10RTB | 1238 |
| 2 | GT-123F | 16 Points, Universal, 24Vdc, 20P connector | 123F |
| 3 | GT-12DF | 16 Points, Universal, 24Vdc, 18RTB | 12DF |
| 4 | GT-12FA | 32 Points, Universal, 24Vdc, 40P connector | 12FA |
| 5 | GT-1428 | 8 Sink Input / 8 Source Output with Diagnostic, 24Vdc | 1428 |
| 6 | GT-1804 | 4 Points, 120Vac, 10RTB | 1804 |
| 7 | GT-1904 | 4 Points, 240Vac, 10RTB | 1904 |
| **Digital Output Module** | | | |
| 8 | GT-2318 | 8 Points, Sink, 24Vdc/0.5A, 10RTB | 2318 |
| 9 | GT-2328 | 8 Points, Source, 24Vdc/0.5A, 10RTB | 2328 |
| 10 | GT-221F | 16 Points, Sink, 24Vdc/0.3A, 20P connector | 221F |
| 11 | GT-222F | 16 Points, Source, 24Vdc/0.3A, 20P connector | 222F |
| 12 | GT-225F | 16 Points, Sink, 24Vdc/0.3A, 18RTB | 225F |
| 13 | GT-226F | 16 Points, Source, 24Vdc/0.3A, 18RTB | 226F |
| 14 | GT-22BA | 32 Points, Sink, 24Vdc/0.3A, 40P connector | 22BA |
| 15 | GT-22CA | 32 Points, Source, 24Vdc/0.3A, 40P connector | 22CA |
| 16 | GT-2418 | 8 Channels Sink Output with Diagnostics | 2418 |
| 17 | GT-2428 | 8 Channels Source Output with Diagnostics | 2428 |
| 18 | GT-2618 | 8 Points, Sink, 24Vdc/2A, 10RTB | 2618 |
| 19 | GT-2628 | 8 Points, Source, 24Vdc/2A, 10RTB | 2628 |
| 20 | GT-2734 | 4 Points, MOS Relay, 240Vdc/ac, 0.5A, 10RTB | 2734 |
| 21 | GT-2738 | 8 Points, MOS Relay Output Terminal, 240Vdc, 0.5A | 2738 |
| 22 | GT-2744 | 4 Points, Relay, 24Vdc/2A, 240Vac/2A, 10RTB | 2744 |
| 23 | GT-2764 | 4 Points, MOS Relay, 24Vdc/ac, 2A, 10RTB | 2764 |
| 24 | GT-2768 | 8 Points, Relay Output Terminal, 24Vdc/ac, 2A | 2768 |
| 25 | GT-2784 | 4 Points, MOS Relay, 110Vdc/ac, 1A, 10RTB | 2784 |
| 26 | GT-2788 | 8 Points, Relay Output Terminal, 110Vdc/ac, 1A | 2788 |
| **Analog Input Module** | | | |
| 27 | GT-3002 | 2ch load cell input unit, strain gauge | 3002 |
| 28 | GT-3114 | 4 Channels, 0~20, 4~20mA, 12bits, 10RTB | 3114 |
| 29 | GT-3154 | 4 Channels, 0~20, 4~20mA, 16bits, 10RTB | 3154 |
| 30 | GT-3118 | 8 Channels, 0~20, 4~20mA, 12bits, 10RTB | 3118 |
| 31 | GT-3158 | 8 Channels, 0~20, 4~20mA, 16bits, 10RTB | 3158 |
| 32 | GT-311F | 16 Channels, 0~20, 4~20mA, 12bits, 20P connector | 311F |
| 33 | GT-315F | 16 Channels, 0~20, 4~20mA, 16bits, 20P connector | 315F |
| 34 | GT-317F | 16 Channels, 0~20, 4~20mA, 12bits, 18RTB | 317F |
| 35 | GT-319F | 16 Channels, 0~20, 4~20mA, 16bits, 18RTB | 319F |
| 36 | GT-3424 | 4 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 10RTB | 3424 |
| 37 | GT-3464 | 4 Channels, 0~10, 0~5, 1~5Vdc, 16bits, 10RTB | 3464 |
| 38 | GT-3428 | 8 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 10RTB | 3428 |
| 39 | GT-3468 | 8 Channels, 0~10, 0~5, 1~5Vdc, 16bits, 10RTB | 3468 |
| 40 | GT-342F | 16 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 20P connector | 342F |

| | | | |
|---|---|---|---|
| 41 | GT-346F | 16 Channels, 0~10, 0~5, 1~5Vdc, 16bits, 20P connector | 346F |
| 42 | GT-347F | 16 Channels, 0~10, 0~5, 1~5Vdc, 12bits, 18RTB | 347F |
| 43 | GT-349F | 16 Channels, 0~10, 0~5, 1~5Vdc, 16bits, 18RTB | 349F |
| 44 | GT-3704 | 4 Channels, RTD, 10RTB | 3704 |
| 45 | GT-3708 | 8 Channels, RTD, 20P connector | 3708 |
| 46 | GT-3804 | 4 Channels, Thermocouple, 10RTB | 3804 |
| 47 | GT-3808 | 8 Channels, Thermocouple, 20P connector | 3808 |
| 48 | GT-3714 | 4 Channels, TEMP. Controller, RTD Input, SSR Output | 3714 |
| 49 | GT-3734 | 4 Channels, TEMP. Controller, RTD Input, Current Output | 3734 |
| 50 | GT-3814 | 4 Channels, TEMP. Controller, TC Input, SSR Output | 3814 |
| 51 | GT-3834 | 4 Channels, TEMP. Controller, TC Input, Current Output | 3834 |
| 52 | GT-3901 | AC Measurement | 3901 |
| 53 | GT-3914 | 4 Channels, Differential, 0~20, 4~20, +/-20mA, 12Bits, 10RTB | 3914 |
| 54 | GT-3934 | 4 Channels, Differential, 0~20, 4~20, +/-20mA, 16Bits, 10RTB | 3934 |
| 55 | GT-3918 | 8 Channels, Differential, 0~20, 4~20, +/-20mA, 12Bits, 18RTB | 3918 |
| 56 | GT-3938 | 8 Channels, Differential, 0~20, 4~20, +/-20mA, 16Bits, 18RTB | 3938 |
| 57 | GT-3924 | 4 Channels, Differential, 0~5, 0~10, +/-5, +/-10Vdc, 12Bits, 10RTB | 3924 |
| 58 | GT-3944 | 4 Channels, Differential, 0~5, 0~10, +/-5, +/-10Vdc, 16Bits, 10RTB | 3944 |
| 59 | GT-3928 | 8 Channels, Differential, 0~5, 0~10, +/-5, +/-10Vdc, 12Bits, 18RTB | 3928 |
| 60 | GT-3948 | 8 Channels, Differential, 0~5, 0~10, +/-5, +/-10Vdc, 16Bits, 18RTB | 3948 |
| **Analog Output Module** | | | |
| 61 | GT-4114 | 4CH, 0~20mA, 12Bits, 10RTB | 4114 |
| 62 | GT-4154 | 4CH, 0~20mA, 16Bits, 10RTB | 4154 |
| 63 | GT-4118 | 8CH, 0~20mA, 12Bits, 10RTB | 4118 |
| 64 | GT-4158 | 8CH, 0~20mA, 16Bits, 10RTB | 4158 |
| 65 | GT-4214 | 4 Channels, Current Output, 4~20mA, 12bits | 4214 |
| 66 | GT-4254 | 4 Channels, Current Output, 4~20mA, 16bits | 4254 |
| 67 | GT-4218 | 8 CHANNELS CURRENT OUTPUT, 4~20mA, 12BIT | 4218 |
| 68 | GT-4258 | 8 CHANNELS CURRENT OUTPUT, 4~20mA, 16BIT | 4258 |
| 69 | GT-4424 | 4CH, 0~10Vdc, 12Bits, 10RTB | 4424 |
| 70 | GT-4464 | 4CH, 0~10Vdc, 16Bits, 10RTB | 4464 |
| 71 | GT-4428 | 8CH, 0~10Vdc, 12Bits, 10RTB | 4428 |
| 72 | GT-4468 | 8CH, 0~10Vdc, 16Bits, 10RTB | 4468 |
| 73 | GT-442F | 16CH, 0~10Vdc, 12Bits, 20P Connector | 442F |
| 74 | GT-446F | 6CH, 0~10Vdc, 16Bits, 20P Connector | 446F |
| 75 | GT-447F | 16CH, 0~10Vdc, 12Bits, 18RTB | 447F |
| 76 | GT-449F | 16CH, 0~10Vdc, 16Bits, 18RTB | 449F |
| 77 | GT-4524 | AO 4 CHs, ±10Vdc, 12Bits, 10RTB | 4524 |
| 78 | GT-4564 | AO 4 CHs, ±10Vdc, 16Bits, 10RTB | 4564 |
| **Special Module** | | | |
| 79 | GT-5102 | 2CH, Encoder, Input, 5Vdc, 10RTB | 5102 |
| 80 | GT-5112 | High Speed Counter, 2CHs, 24Vdc, Encoder Input, 10RTB | 5112 |
| 81 | GT-5114 | High Speed Counter, 4CHs, 24Vdc, Encoder Input, 10RTB | 5114 |
| 82 | GT-5211 | 1CH, RS 232, RTS/CTS, Full Duplex Type, 10RTB | 5211 |
| 83 | GT-5212 | 2CH, RS 232, Full Duplex Type, 10RTB | 5212 |
| 84 | GT-5221 | 1CH, RS 485, Full Duplex Type, 10RTB | 5221 |
| 85 | GT-5231 | 1CH, RS 485, Half Full Duplex Type, 10RTB | 5231 |
| 86 | GT-5232 | 2CH, RS 485, Half Full Duplex Type, 10RTB | 5232 |

| | | | |
|---|---|---|---|
| 87 | GT-5352 | 2CH, Synchronous Serial Interface Input, 10RTB | 5352 |
| 88 | GT-5442 | PWM Output, 2CHs, 0.5A/24Vdc, Source, 18RTB | 5442 |
| 89 | GT-5444 | PWM Output, 4CHs, 0.5A/24Vdc, Source, 18RTB | 5444 |
| 90 | GT-5642 | Pulse Output, 2CHs, 0.5A/24Vdc, Source, 18RTB | 5642 |
| 91 | GT-5652 | Pulse Output, 2CHs, RS422 (Differential), 18RTB | 5652 |
| 92 | GT-5521 | 1CH, Stepper Module (TBD) | 5521 |
| **Power Module** | | | |
| 93 | GT-7408 | Shield Module | 7408 |
| 94 | GT-7508 | Common for 0Vdc | 7508 |
| 95 | GT-7511 | Power Expansion, In 24Vdc, Out 1A/5Vdc | 7511 |
| 96 | GT-7518 | Common for 24Vdc | 7518 |
| 97 | GT-7588 | Common for 0Vdc, 24Vdc | 7588 |
| 98 | GT-7641 | Field Power, 5/24/48 Vdc, 110/220 Vac | 7641 |
| 99 | GT-7151 | Noise Filter Module, 18RTB, None ID Type | 7151 |
| 100 | GT-7851 | Noise Filter Module, 18RTB, ID Type | 7851 |

## A.2. Glossary

- System Power: The power for starting up CPU.
- Field Power: The power for input and output line.
- Terminator Resistor: Resistor for prevention reflected wave.
- EDS: Electronic Data Sheet.
- sinking: The method of input and output what device does not have power source.
- sourcing: The method of input and output what device have power source.