Modbus has become a de facto standard industrial communication protocol, and is now the most commonly available means of connecting industrial electronic devices. Modbus allows for communication between many devices connected to the same RS-485 network, for example, a system that measures temperature and humidity and communicates the results to a computer. Modbus is often used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) systems.
The tGW-700/tGW-2200 module is a Modbus gateway that enables a Modbus TCP/UDP host to communicate with serial Modbus RTU/ASCII devices through an Ethernet network, and eliminates the cable length limitation of legacy serial communication devices. The module can be used to create a pair-connection application (as well as serial-bridge or serial-tunnel application), and can then route data over TCP/IP between two serial Modbus RTU/ASCII devices, which is useful when connecting mainframe computers, servers or other serial devices that use Modbus RTU/ASCII protocols and do not themselves have Ethernet capability.

The maximum number of TCP connections for each serial port is up to 32 (Rev B), this allows multiple masters accessing slave devices on the same serial port. The read-cache function is used to store previous requests and responses in the memory buffer of the tGW-700/tGW-2200 module. When other HMI/SCADA master controllers send the same requests to the same RTU slave device, the cached response is returned immediately. This feature dramatically reduces the loading on the serial port communication, ensures faster TCP responses, and improves the stability of the entire system.

The tGW-2200 series has a built-in two-port Ethernet switch to implement daisy-chain topology. The cabling is much easier and total costs of cable and switch are significantly reduced. LAN Bypass feature guarantees the Ethernet communication if tGW-2200 loses its power.

The tGW-700/tGW-2200 module features a powerful 32-bit MCU to enable efficient handling of network traffic, and also has a built-in web server that provides an intuitive web management interface that allows users to modify the configuration of the module, including the DHCP/Static IP, the gateway/mask settings and the serial port settings.

The CPU watchdog automatically resets the CPU if the built-in firmware is operating abnormally, while the host watchdog automatically resets the CPU if there is no communication between the module and the host (PC or PLC) for a predefined period of time (system timeout). The dual watchdog is an important feature that ensures the module operates continuously, even in harsh environments.

The tGW-700/tGW-2200 module offers true IEEE 802.3af-compliant (classification, Class 1) Power over Ethernet (PoE) functionality using a standard category 5 Ethernet cable to receive power from a PoE switch such as the NS-205PSE. If there is no PoE switch on site, the module will also accept power input from a DC adapter. The tGW-700/tGW-2200 module is designed for ultra-low power consumption, reducing hidden costs from increasing fuel and electricity prices, especially when you have a large number of modules installed. Reducing the amount of electricity consumed by choosing energy-efficient equipment can have a positive impact on maintaining a green environment.

Based on an amazing tiny form-factor, the tGW-700/tGW-2200 achieves maximum space savings that allows it to be easily installed anywhere, even directly embedded into a machine. It also supports automatic RS-485 direction control when sending and receiving data, thereby improving the stability of the RS-485 communication.

### Comparison Table

<table>
<thead>
<tr>
<th>Series</th>
<th>Ethernet</th>
<th>Programmable</th>
<th>Virtual COM</th>
<th>Virtual I/O</th>
<th>DHCP</th>
<th>Web Configuration</th>
<th>UDP Search</th>
<th>Modbus Gateway</th>
<th>Multi-client</th>
</tr>
</thead>
<tbody>
<tr>
<td>tGW-700 Series</td>
<td>10/100 M, PoE</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>PPDS-700-MTCP Series</td>
<td>10/100 M, PoE</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
</tbody>
</table>

### Applications

- Factory Automation
- Home Automation
- Building Automation
- Remote Diagnosis and Management
1. Modbus TCP Masters to RTU/ASCII Gateway application

- Multiple Modbus TCP Master
- Modbus RTU/ASCII Slave Devices

PC #1

Modbus TCP

10/100 M Ethernet

RS-485

Max. TCP connections (Masters) per serial port: 32 (RevB)

Max. Device (Slave) per serial port: 247

2. Modbus TCP to RTU/ASCII Gateway application (dual-port)

- Modbus TCP Master
- Modbus RTU

PC

10/100 M Ethernet

Port 502 (COM1)

Port 503 (COM2)

RS-485

Modbus ASCII

3. Modbus RTU/ASCII to TCP Gateway application (like pair-connection)

- Single Modbus RTU/ASCII Master
- Single Modbus TCP Slave

PLC

RS-232/422/485

Pair-connection Client (Modbus TCP Master)

Pair-connection Server

4. Virtual RS-485 bus application through pair-connection

- Single Modbus RTU/ASCII Master
- Modbus RTU ASCII Slaves

PLC

RS-485

Pair-connection Client

Pair-connection Server

RS-485 slave devices
## System Specifications

### Models

- **TGW-712**
  - TGW-722 (tGW-2212)
  - TGW-712i (tGW-2212i)
- **TGW-732**
  - TGW-732i (tGW-2215)
- **TGW-715**
  - TGW-715i (tGW-2215i)
- **TGW-725**
  - TGW-725i (tGW-2225)
- **TGW-735**
  - TGW-735i (tGW-2235)
- **TGW-718**
  - TGW-718i (tGW-2218)
- **TGW-718i-D**
- **TGW-724**
  - TGW-724i (tGW-2241)
- **TGW-734**
  - TGW-734i (tGW-2244)

### System

- **CPU**: 32-bit MCU

### Communication Interface

- **Ethernet**: 700 Series 10/100 Base-TX, 8-pin RJ-45 x 1, (Auto-negotiating, Auto-MDI/MDIX, LED indicator)
- **2200 Series**: 2-Port 10/100 Base-TX Ethernet Switch with LAN Bypass, RJ-45 x 2 (Auto-negotiating, Auto-MDI/MDIX, LED indicator)

### Power Supply

- **Input**: IEEE 802.3af, Class 1

### COM Port

- **Self-Tuner**: – Yes, automatic RS-485 direction control

### Power Isolation

- **1000 Vdc for tGW-722i/ 723i/ 718i-D only**

### Signal Isolation

- **3000 Vdc for tGW-712i/ 715i/ 725i/ 718i/ 724i/ 734i only**

### ESD Protection

- +/-4 kV

### COM Port Capability (16C550 or compatible UART)

- Baud Rate: 115200 bps Max.
- Data Bit: 5, 6, 7, 8
- Parity: None, Odd, Even, Mark, Space
- Stop Bit: 1, 2
- Power

### Power Input

- **IEEE 802.3af, Class 1 for PoE +12 ~ +48 Vdc for DC Jack**

### Power Consumption

- 0.07 A @ 24 Vdc

### Mechanical

- **700 Series**
  - Male DB-9 x 1
  - 10-pin Removable Terminal Block x 1
- **2200 Series**
  - Male DB-9 x 1
  - 10-pin Removable Terminal Block x 1

### Connector

- **Dimensions (W x H x D)**
  - 700 Series: 52 mm x 95 mm x 27 mm (tGW-712: 52 mm x 90 mm x 27 mm)
  - 2200 Series: 90mm x 110mm x 33mm (without connectors)

### Installation

- DIN-Rail mounting

### Case

- **Environment**
  - **Operating Temperature**: -25 °C ~ +75 °C
  - **Storage Temperature**: -30 °C ~ +80 °C
  - **Humidity**: 10 ~ 90% RH, non-condensing

## Pin Assignments

### Models

- **TGW-712**:
  - **COM1**: (Male DB-9)
    - 09: N/A
    - 08: CTS1
    - 07: RTS1
    - 06: N/A
    - 05: N/G
    - 04: N/A
    - 03: TxD1
    - 02: RxD1
    - 01: N/A

- **TGW-718-D**
  - **COM1**: (Male DB-9)
    - 09: N/A
    - 08: CTS
    - 07: RTS
    - 06: N/A
    - 05: N/G
    - 04: N/A
    - 03: TxD
    - 02: RxD
    - 01: N/A

- **TGW-724/7GW-725**
  - **COM2**: 10 (TxD2)
    - 09 (RxD2)
    - 08 (GND)
    - 07 (TxD1)
    - 06 (RxD1)
    - 05 (GND)
    - 04 (Data+)
    - 03 (Data-)
    - 02 (TxD1)
    - 01 (RxD1)

- **TGW-715/7GW-715i**
  - **COM3**: 10 (TxD2)
    - 09 (RxD2)
    - 08 (CPS)
    - 07 (CTS2)
    - 06 (N/A)
    - 05 (GND)
    - 04 (Data+)
    - 03 (Data-)
    - 02 (TxD)
    - 01 (RxD)

- **TGW-718/7GW-718i**
  - **COM4**: 10 (TxD2)
    - 09 (RxD2)
    - 08 (CTSI)
    - 07 (RTS2)
    - 06 (TxD2)
    - 05 (RxD2)
    - 04 (GND)
    - 03 (GND)
    - 02 (TxD1)
    - 01 (RxD1)

- **TGW-724/7GW-725**
  - **COM5**: 10 (TxD2)
    - 09 (RxD2)
    - 08 (GND)
    - 07 (TxD1)
    - 06 (RxD1)
    - 05 (GND)
    - 04 (Data+)
    - 03 (Data-)
    - 02 (TxD)
    - 01 (RxD)

- **TGW-718/7GW-718i**
  - **COM6**: 10 (TxD2)
    - 09 (RxD2)
    - 08 (CTSI)
    - 07 (RTS2)
    - 06 (TxD2)
    - 05 (RxD2)
    - 04 (GND)
    - 03 (GND)
    - 02 (TxD1)
    - 01 (RxD1)

- **TGW-724/7GW-725**
  - **COM7**: 10 (TxD2)
    - 09 (RxD2)
    - 08 (GND)
    - 07 (TxD1)
    - 06 (RxD1)
    - 05 (GND)
    - 04 (Data+)
    - 03 (Data-)
    - 02 (TxD)
    - 01 (RxD)

### Website

- [http://www.icpdas.com](http://www.icpdas.com)
Tiny Serial-to-Ethernet Device Server & Modbus Gateway

Dimensions (Unit: mm)

<table>
<thead>
<tr>
<th>Model</th>
<th>Dimensions (mm)</th>
<th>Side View</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGW-712/712i/718i-D</td>
<td>10.2 x 19.0 x 35.4</td>
<td>Left Side View</td>
</tr>
<tr>
<td>TGW-712/712i/718i-D</td>
<td>6.6 x 27.0</td>
<td>Front View</td>
</tr>
<tr>
<td>TGW-712/712i/718i-D</td>
<td>23.0 x 52.0 x 77.4</td>
<td>Left Side View</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Right Side View</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Rear View</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom View</td>
</tr>
</tbody>
</table>

Ordering Information

Note: ▶ Available soon

<table>
<thead>
<tr>
<th>Model</th>
<th>Isolated/Non-Isolated</th>
<th>2-port Ethernet Switch</th>
<th>Modbus/TCP to RTU/ASCII Gateway: Includes one CA-002 cable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>TGW-712 CR</td>
<td>Isolated</td>
<td>▶TGW-2212</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-232 Port (RoHS)</td>
</tr>
<tr>
<td>TGW-722 CR</td>
<td>Isolated</td>
<td>▶TGW-2212</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2 RS-232 Ports (RoHS)</td>
</tr>
<tr>
<td>TGW-732 CR</td>
<td>Isolated</td>
<td>▶TGW-2212</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3 RS-232 Ports (RoHS)</td>
</tr>
<tr>
<td>TGW-715 CR</td>
<td>Isolated</td>
<td>▶TGW-2215</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-422/485 (RoHS)</td>
</tr>
<tr>
<td>TGW-725 CR</td>
<td>Isolated</td>
<td>▶TGW-2225</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 2 RS-485 Ports (RoHS)</td>
</tr>
<tr>
<td>TGW-735 CR</td>
<td>Isolated</td>
<td>▶TGW-2235</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 3 RS-485 Ports (RoHS)</td>
</tr>
<tr>
<td>TGW-718 CR</td>
<td>Isolated</td>
<td>▶TGW-2218</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE and 1 RS-232/422/485 Port (RoHS) (10-pin Terminal Block Connector for TGW-718/718i, Male DB-9 Connector for TGW-718i-D)</td>
</tr>
<tr>
<td>TGW-724 CR</td>
<td>Isolated</td>
<td>▶TGW-2241</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 1 RS-485 and 1 RS-232 Ports (RoHS)</td>
</tr>
<tr>
<td>TGW-734 CR</td>
<td>Isolated</td>
<td>▶TGW-2235</td>
<td>Tiny Modbus/TCP to RTU/ASCII Gateway with PoE, 1 RS-485 and 2 RS-232 Ports (RoHS)</td>
</tr>
</tbody>
</table>

Accessories

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CA-002</td>
<td>DC connector to 2-wire power cable, 0.3 M</td>
</tr>
<tr>
<td>CA-0915</td>
<td>Male DB-9 to Female DB-9 Cable, 1.5 m</td>
</tr>
<tr>
<td>CA-0910F</td>
<td>Female DB-9 to Female DB-9 Cable, 1.0 m</td>
</tr>
<tr>
<td>CA-0910N</td>
<td>DB-9 Female-Female 3-wire Null Modem Cable, 1M</td>
</tr>
<tr>
<td>CA-PC09F</td>
<td>DB-9 Female Connector with Plastic Cover</td>
</tr>
<tr>
<td>FRA05-S12-SU CR</td>
<td>12V/0.58A (max.) Power Supply (RoHS, for tDS/tGW-700)</td>
</tr>
<tr>
<td>DIN-KA52F CR</td>
<td>24V/1.04A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205 and NS-205PSE-24V)</td>
</tr>
<tr>
<td>DIN-KA52F-48 CR</td>
<td>48V/0.52A, 25 W Power Supply with DIN-Rail Mounting (RoHS, for NS-205PSE)</td>
</tr>
<tr>
<td>NS-205PSE CR</td>
<td>Unmanaged Ethernet Switch with 4 PoE Ports and 1 RJ-45 Uplink (RoHS)</td>
</tr>
<tr>
<td>NS-205PSE-24V CR</td>
<td>Unmanaged 5-port 10/100 Mbps PoE (PSE) Ethernet Switch; 24 VDC Input (RoHS)</td>
</tr>
</tbody>
</table>