

XLTR-1000 Chillgard RT Quick Start Guide for Modbus RTU

This document provides a brief overview of the connections and settings that must be used to connect a preconfigured XLTR-1000 gateway to a MSA Chillgard RT Refrigerant Monitor. This document also contains the Modbus register mapping for the application and some troubleshooting tips. For more information, please refer to the XLTR-1000 User's Manual available at <http://www.iccdesigns.com/products/millennium/xltr-1000.html>.

Wiring

Wiring the Gateway to the Chillgard RT

The Chillgard RT can be used to power the gateway from its 12V supply by connecting J14 terminals 1 (+12V) and 3 (GND) to the gateway's terminal block at terminals TB:5 (POWER) and TB:6 (GND) as shown in Figure 1. For RS-485 communications, connect J15 terminals A (+) and B (-) on the Chillgard RT to the gateway's terminal block at terminals TB:1 (A) and TB:2 (B) as shown in Figure 1. Additionally, a jumper wire must be placed on the gateway's terminal block between terminals TB:1 (A) and TB:3 (Y). Another jumper wire must be placed between terminals TB:2 (B) and TB:4 (Z). as shown in Figure 1.

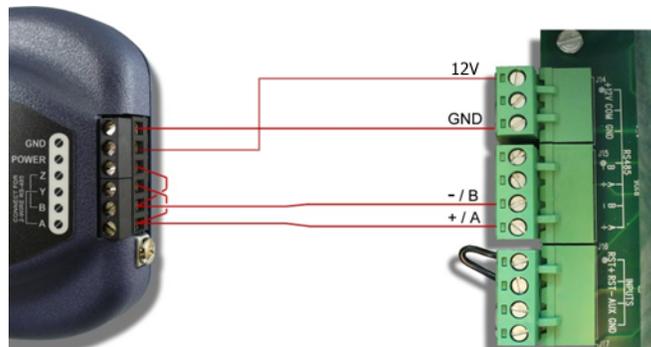


Figure 1: Gateway and Chillgard RT Connections

Wiring the Gateway to the Modbus RTU Network

The **RS-485 A** terminal on the gateway is configured for Modbus RTU. A jumper wire must be placed between terminals TB:1 (A) and TB:3 (Y). Another jumper wire must be placed between terminals TB:2 (B) and TB:4 (Z). Table 1 describes the XLTR-1000's RS-485 signals.

Table 1: RS-485 Modbus Connections

XLTR-1000 Port A Terminal	Signal Description
TB:1 (A) / TB:3 (Y)	A Signal (+)
TB:2 (B) / TB:4 (Z)	B Signal (-)
TB:5 (GND)	0V Reference

Customizing the XLTR-1000's Configuration

The XLTR-1000 can be configured via USB using the ICC Configuration Studio. Certain Modbus settings may need to be modified to match a specific network configuration. To modify the gateway's configuration, open the ICC Configuration Studio and connect the gateway via the included USB cable. The software will automatically recognize the connected device and upload the current configuration file stored on the gateway. The configuration must be downloaded back to the gateway after making any changes. The latest ICC Configuration Studio is available at <http://www.iccdesigns.com/icc-configuration-studio.html>.

Modbus Communications Settings

The Baud Rate, Parity, and Modbus Slave Address may need to be modified to be compatible with your network. These settings can be modified in the ICC Configuration Studio by selecting the corresponding items in the Project Pane and changing the settings in the Settings Pane. The Baud Rate and Parity can be changed by selecting "Modbus RTU Slave" and selecting the desired baud from the Baud Rate and Parity setting as shown in Figure 2. The Modbus Slave Address can be changed by selecting "Node" underneath "Modbus RTU Slave" and entering a value in the Address field as shown in Figure 3. The default settings for the gateway are shown in Table 2.

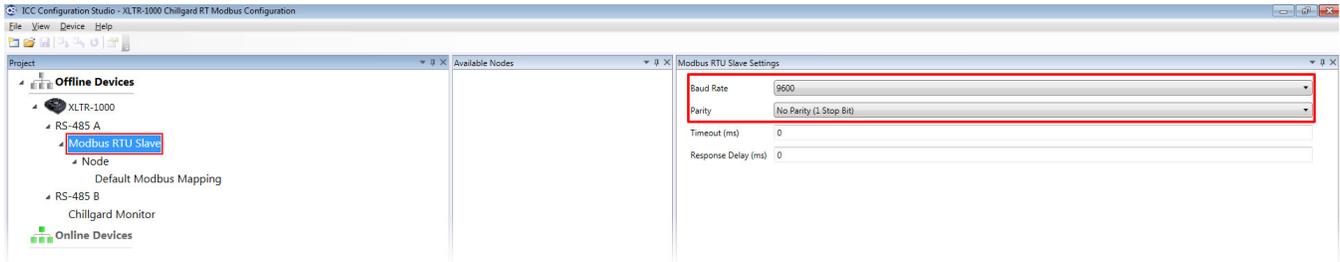


Figure 2: Modbus RTU Baud Rate and Parity

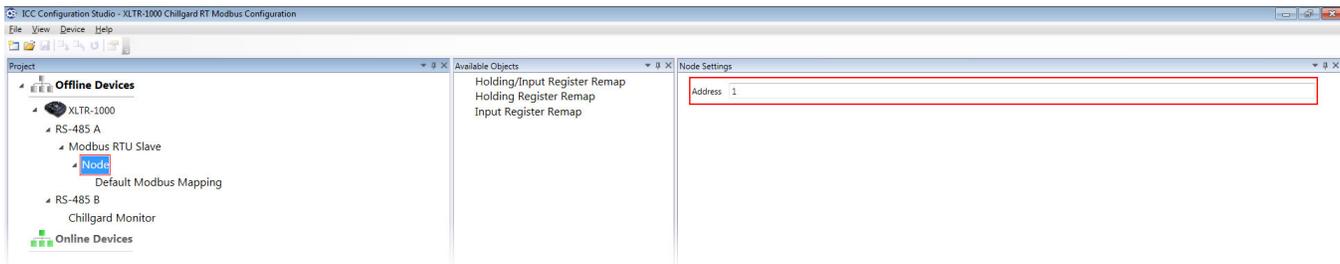


Figure 3: Modbus RTU Slave Address

Table 2: Default Modbus Settings

Setting	Default Value
Baud Rate	9600
Parity	No Parity (1 Stop Bit)
Address	1

Modbus Register Mapping

Table 3 provides a listing of the Modbus registers supported by the configuration preloaded on the XLTR-1000 gateway.

Table 3: Modbus Holding/Input Register Mapping

Register Number	Description	Definition Of Encoded Data
1	I/O State for Monitor Module	0 – Warmup 1 – Ready 2 – Trouble 3 – Cal/Setup
2	Alarm Information for Monitor Module	Bit 6 – Audio On Bit 7 – Alarm Latched
3	Audio and Latching Preferences	Bit 0 – Latching Caution Relay Bit 1 – Latching Warning Relay Bit 2 – Latching Alarm Relay Bit 3 – Audio Triggers on Caution Bit 4 – Audio Triggers on Warning Bit 5 – Audio Triggers on Alarm Bit 6 – Audio Triggers on Trouble Bit 7 – Audio Triggers on Auxiliary
4	Communication and Sample Information for Monitor Module	Bit 0 – Sample 1 Valid Bit 1 – Sample 2 Valid Bit 2 – Sample 3 Valid Bit 3 – Sample 4 Valid Bit 4 – Sample 5 Valid Bit 5 – Sample 6 Valid Bit 6 – Sample 7 Valid Bit 7 – Sample 8 Valid Bit 8 – Communication Error
5	Gas Number for Sensor 1	0 to 44 (Refer to manual for definition)
6	Gas Concentration for Sensor 1	-20 to 1050
7	Alarm State for Sensor 1	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
8	Reserved	
9	Gas Number for Sensor 2	0 to 44 (Refer to manual for definition)
10	Gas Concentration for Sensor 2	-20 to 1050

Register Number	Description	Definition Of Encoded Data
11	Alarm State for Sensor 2	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
12	Reserved	
13	Gas Number for Sensor 3	0 to 44 (Refer to manual for definition)
14	Gas Concentration for Sensor 3	-20 to 1050
15	Alarm State for Sensor 3	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
16	Reserved	
17	Gas Number for Sensor 4	0 to 44 (Refer to manual for definition)
18	Gas Concentration for Sensor 4	-20 to 1050
19	Alarm State for Sensor 4	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
20	Reserved	
21	Gas Number for Sensor 5	0 to 44 (Refer to manual for definition)
22	Gas Concentration for Sensor 5	-20 to 1050
23	Alarm State for Sensor 5	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
24	Reserved	
25	Gas Number for Sensor 6	0 to 44 (Refer to manual for definition)
26	Gas Concentration for Sensor 6	-20 to 1050
27	Alarm State for Sensor 6	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
28	Reserved	
29	Gas Number for Sensor 7	0 to 44 (Refer to manual for definition)
30	Gas Concentration for Sensor 7	-20 to 1050
31	Alarm State for Sensor 7	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
32	Reserved	

Register Number	Description	Definition Of Encoded Data
33	Gas Number for Sensor 8	0 to 44 (Refer to manual for definition)
34	Gas Concentration for Sensor 8	-20 to 1050
35	Alarm State for Sensor 8	0 - None Bit 0 – Caution Bit 1 – Warning Bit 2 – Alarm
36	Reserved	

Troubleshooting

This section details some troubleshooting tips to follow if any issues are encountered when installing the gateway and Chillgard RT onto a Modbus RTU network.

1. Power
 - a. Confirm that the gateway is receiving power from the 12V supply on the Chillgard RT. The MS (Module Status) LED should light green when the gateway is powered.
2. Wiring
 - a. Confirm the wiring matches the connections shown in Figure 1.
3. Configuration
 - a. Confirm that the gateway is configured with the appropriate network parameters (baud rate, parity, address, etc) using the ICC Configuration Studio as described in the Customizing the XLTR-1000's Configuration section.
4. Gateway LEDs
 - a. The MS (Module Status) LED should light green when the gateway is powered and should flash green when the gateway is connected via USB.
 - i. If this is not observed, check the gateway's power.
 - b. The RS-485 A TX and RX LEDs should both flash rapidly indicating Modbus RTU communications.
 - i. If this this is not observed, confirm that the Modbus RTU master device is sending requests on the Modbus network.
 - ii. If only the RX LED flashes, check the gateway's configuration using the ICC Configuration Studio and confirm that the RS-485 A port is configured for Modbus RTU Slave and that the network settings match that of the Modbus RTU master.
 - c. The RS-485 B RX LED should flash red. The TX LED will always be off.
 - i. If this is not observed, check the wiring between the gateway and the Chillgard RT.
 - ii. Check the gateway's configuration using the ICC Configuration Studio and confirm that the RS-485 B port is configured for Chillgard Monitor.
5. Chillgard RT Data Confirmation
 - a. View the gateway's internal database via the Database pane in ICC Configuration Studio and select the 16-bit Unsigned data type from the dropdown. There should be some highlighted cells which do not show a value of 0.
6. Modbus Data Confirmation
 - a. View the gateway's internal database via the Database pane in ICC Configuration Studio and select the 16-bit Unsigned data type from the dropdown. The data shown in the highlighted cells should match the data read on the Modbus system.