JetBox 5630
Modbus Gateway

User Manual

www.korenixembedded.com

0.0.1

Modbus Gateway Software Design Specification

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Acknowledgments

1 Overview

The Modbus Gateway is optional value-added software provided by Korenix. The major function of the Modbus Gateway enables serial Modbus RTU (or Modbus ASCII) devices to communicate with Modbus TCP devices.

Modbus is an open serial communications protocol based on master/slave architecture and used to connect a supervisory computer with a remote terminal unit (RTU) in supervisory control and data acquisition (SCADA) system. However, Modbus has been extended to operate over Ethernet using the IP protocol suite. Therefore, the Modbus Gateway converts between the Modbus TCP/IP protocol and Modbus ASCII/RTU protocols transparently and let users integrate their control systems easier.

Modbus Gateway upgrades to v2.x
Different from version 1.x, which supports only one TCP to one COM control, we have a great improvement that version 2.x now supports Modbus multi TCP to multi COM contr ol for providing a better solution of devices control and data acquisition. Modbus GW V2.x is compatible with previous version; besides, JetBox with v2.x can communicate with JetBox with v1.x in the same gateway. For JetBox 5630 series, we directly support Modbus GW V2.0 to provide convenience to users.

2 How to use the Modbus Gateway?

2.1 How does it work?

- **Accept Connection**

When you start to execute the Modbus Gateway program, it would automatically run the Modbus TCP server to receive connection from outer Modbus TCP client.

- **Access Data from TCP**

Once the connection is built, the program would start to access the data of TCP socket by orders. If the content is "0"; which means the TCP connection is corrupted, the program will check the packet format. In case the format is not following Modbus TCP protocol, the program would interrupt this connection and access next packet.

- **Data Convert**

When the data is accessed correctly, the PDU data will be captured from Modbus TCP. Then the data would be transformed from Modbus TCP to Modbus RTU/ASCII protocol format according to function code and unit identifier of Modbus RTU/ASCII.

● **Send Request and Wait for Response**

After the data format is transformed, the data will be send to Modbus RTU/ASCII Slave server and wait for response. Besides, once data access from serial port, the time-out mechanism will be activated and waiting-for-response time is set to 5 second. If the response time exceeds the limit, the system will consider the request as failed and process the next data.

● **Write Response back to TCP**

If the Modbus RTU/ASCII Slave server checks there's no error happened about the data, the data will be transformed back to Modbus TCP format. Then the server will determine which TCP master the request is from and write response back.

2.2 Usage

The followings are parameters settings and explanations of this program.

Name：
   modbusgw: a mechanism of data transforming between Modbus TCP and Modbus RTU/ASCII.

Synopsis：
   modbusgw –port <port> [–f <file_name>] [-protocol {rtu | ascii}] [–baud <baud>] [–parity {none | even | odd}] [–bits {7 | 8}] [–stop {1 | 2}] [-timeout <t>] [–srate <t>] [–tcp <port>] [–tcpaging <t>]

Description：
   modbusgw is mechanism of data transforming between Modbus TCP and Modbus RTU/ASCII. We use the mechanism to transform the data between two protocols, and it can help providing unlimited communication and data exchange through different-hardware Modbus devices.

Options：

-f <file_name>

Name of specified profile. **Default : ./modbusgw.cfg**
Once '**-f**' is typed, the default profile will be brought in automatically.

[modbusgw]
port=ttyO2
protocol=rtu
baud=115200
parity=none
bits=8
stop=1
timeout=10
srate=200
tcp=502
tcpaging=420

NOTE: Except shared values such as tcp、srate、timeout、tcpaging. These shared values are setted in [modbusgw]. If user does not set this column, all parameters will follow default settings in [modbusgw]

-port <port>

Device name for serial port.
Ex : the default values is ttyO2

-protocol {rtu | ascii}

Set Modbus protocol. **Default : RTU**

-baud <baud>

Set data transfer rate.
User can set transfer rate listed in the following table:
{50, 75, 110, 134, 150, 300, 600, 1200, 1800, 2400, 4800, 9600, 19200, 38400, 57600, 115200, 230400, 460800} **Default: 9600**

-parity {none | even | odd}

Set parity check parameters to avoid errors during data transferring. **Default: none**

-bits {7 | 8}

Set the length of each data. **Default: 8 bits**

-stop {1 | 2}

Set the length of stop bit. **Default: 1**

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-timeout <t> (second)

Set the wait-for-respond-time of data transferring from Modbus TCP to Modbus RTU/ASCII through Modbus Gateway. Range from 0~600 seconds. **Default: 5 seconds**

NOTE: There's also response-time-out setting in HMI or simulator. Please check the settings in both side are consistent or the value set in simulator must be larger than program to avoid errors happened during transferring.

-srate <t> (millisecond)

Set the scan rate from 0~10000ms. **Default: 200ms**

NOTE: Please adjust the parameter properly to leave delay time for data transferring. It takes time to respond for Modbus RTU/ASCII server when there're multi connections at one time, so time-out would happen if TCP server keeps sending data to RTU/ASCII.

-tcp <port>

Set the port numbers of Modbus TCP server from 1~65535. **Default: 502**

-tcpaging <t>

The system will automatically interrupt the connection to avoid occupying channel if the TCP connection is failed or idling abnormally. Range from 1~7200 seconds. **Default: 420s**

Example：

modbusgw –port ttyO2 –protocol rtu –baud 115200 –parity even –bits 8 –stop 1 -timeout 5 –srate 200 –tcp 502 –tcpaging 100
or
 modbusgw –f ./modbusgw.cfg

Notice:

1. All parameter settings shall be written in lower case alphabet. (Ex: 'a')
2. Slave ID should be unique and can't be used repeatedly.

2.3   Specification

LAN	
Ethernet	10/100/1000 Mbps, RJ45
Serial Interface	
Interface	RS-232/422/485, software selectable
No. of Port	1
Serial Communication Parameters	
Parity	None、Odd、Even
Data bits	7、8
Stop bits	1、2
Baud Rate Speed	50、75、110、134、150、300、600、1200、1800、2400、4800、9600、19200、38400、57600、115200、230400、460800
Software Features	
Operation Modes	TCP Slave、RTU Master、ASCII Master
Multi TCP Master to Multi RTU/ASCII Slave	Up to 32 Connections

3 SW Revision History

Version Release	Release Date	Modbus GW Version	Features
1st	2014/August	Modbus GW v2.0.0	First release