

Modbus RTU Gateway

Introduction

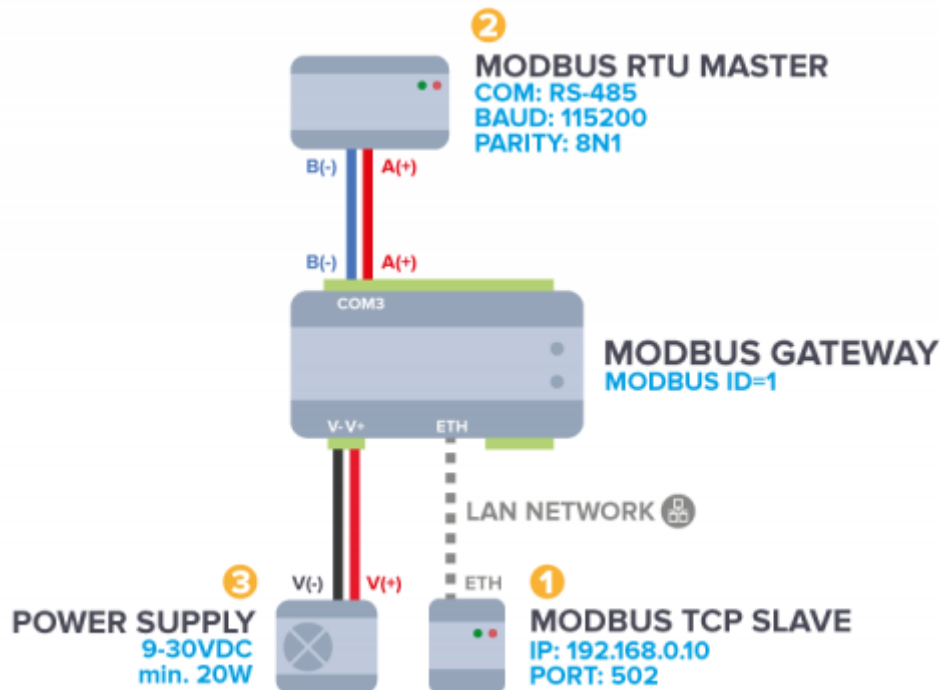
Modbus Gateway is designed for easy integration of Modbus RTU and TCP network. With this device, Modbus TCP slaves can be made accessible to serial masters. It also has a remote web access panel that allows you to manage groups of devices. That makes integration customizable and easy.

1. Connection

To proceed this manual you need:

- Power Supply (9-30VDC, min. 20W)
- ETH cable RJ-45
- PC with free ETH port
- LAN Network, switch with 3 free ports

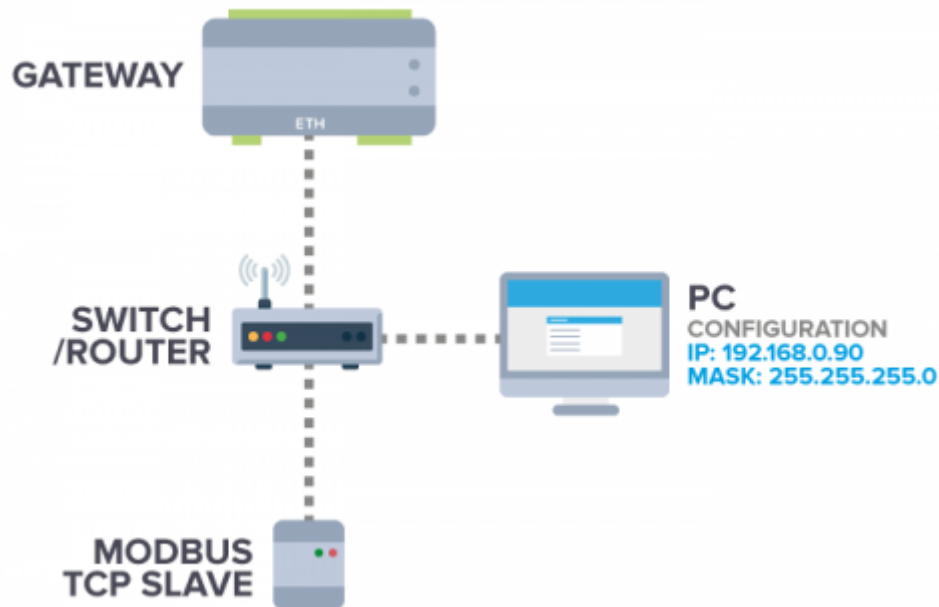
The following diagram shows how Modbus Master should be connected to serial port (RS-485) and Modbus Slave device connection in LAN Network:



1. Configure your Modbus TCP Slave according to the default settings (**IP**: 192.168.0.10, **PORT**: 502, **ID**: 1) and then connect the device to the LAN network where you have your Modbus Slave.
2. Configure your Modbus RTU Master according to the default settings (**Mode**: RS-485, **Baudrate**: 115200, **Parity**: 8N1) and then connect your Modbus RTU Master to COM3.
3. Connect the power supply to the device.

2. Verify default configuration

You can connect to the device using your PC. Please connect PC to the same network as gateway device and setup Network settings as in the schema below.



2.1. Login to the device

You can connect to the Gateway device by your PC using SSH client (port 22) e.g. using PuTTY application in Windows or `ssh` command in Linux.

[Download PuTTY.](#)

To connect use following data:

IP address:192.168.0.101

port:22

Login:pi

Password:raspberry

After login please use command:

sudo su

2.2. Verify default configuration

You can verify connection using **gateway** script. This script is testing connection with Modbus TCP Slave, checking serial port configuration and status of iMod (Gateway service) application.

Using:

```
pi@raspberrypi ~ $ gateway --help

gateway script is for check default configuration of Modbus Gateway device

Using:
gateway check - check default configuration
gateway showlog - show log from the last communication try
gateway restore - restore device to default configuration
gateway -h - show help
```

```
gateway check
```

Correct response:

```
pi@raspberrypi ~ $ gateway check
Checking serial port settings ...
PASS - Serial port is in RS-485 mode
Checking current configuration file with default configuration file ...
PASS - Configuration is same as default configuration
Checking connection with Modbus TCP Slave ...
Connection to 192.168.0.12 3502 port [tcp/*] succeeded!
PASS - Connection is correct
Checking iMod (Gateway service) status
PASS - iMod (Gateway service) is running.
```

Use your Modbus RTU Master to poll Modbus TCP Slave. If this is successful - your connection is ready.



In default configuration device can work with Modbus RTU Master via RS-485 and one Modbus TCP slave, which IP is 192.168.0.10, but you can change default setting in **3. Advanced configuration**.

3. Advanced configuration

3.1. Editing default configuration

Default configuration of device is located in **/mnt/mtd/iMod/config/MainConfig.xml** you can edit this using editor i.e. nano.

```
nano /mnt/mtd/iMod/config/MainConfig.xml
```

3.1.1 Change serial port settings

To change default serial port settings please find following line in configuration file.

```
<port>"COM3-115200-8N1"</port>
```

If you want to change serial port type i.e. RS-232 instead RS-485 use **comctrl** as follow:

```
comctrl 2 RS-232
```



RS-232: COM1, COM2
RS-485: COM3, COM4

Then please use **COM2** instead **COM3** in configuration file:

```
<port>"COM2-115200-8N1"</port>
```

After applying the change, please do following command:

```
imod start
```

3.1.2 Add more Modbus TCP slaves

To add more Modbus TCP slaves to configuration please add code like a following example to the configuration file before `</groupe>` tag. Just change IP address in `<port>` tag.

```
<source-channel name="MODBUS_TCP_Source_1">  
  <protocol name="MODBUS">  
    <property name="type" value="TCP"/>  
  </protocol>  
  <property name="device-id" value="1" />  
  <port>"ET-192.168.0.12-3502-TCP"</port>  
</source-channel>
```

3.1.3 Change network settings

In default DHCP is turned off. To set a dynamic IP address, edit the file in the location: `/etc/network/interfaces` and add following lines:

```
auto eth0  
allow-hotplug eth0  
iface eth0 inet manual
```

Then please do following commands:

```
cd /etc/init.d/  
update-rc.d dhcpcd defaults
```



For more info check: [Communication via the Ethernet port](#)

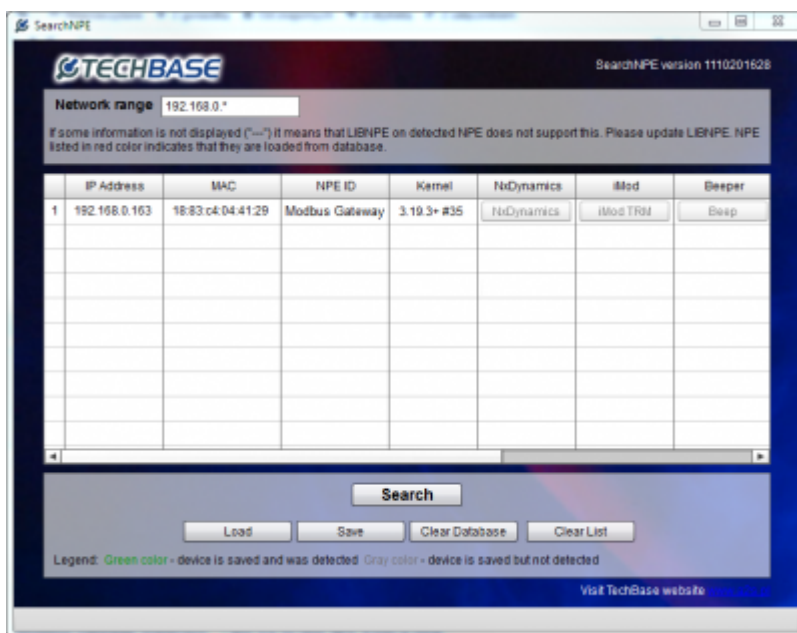
Troubleshooting

1. Problem of finding the gateway device in the LAN network

You can find your device in LAN network using SearchNPE application:

[Download SearchNPE](#)

Enter an address range as in bellow example according to your network in **Network range** and then click **Search**.



Now when you know IP address of the device, you can connect to the device - [2.1. Login to the device](#).

If you want to change IP address of the gateway device, edit the file in the location: **/etc/network/interfaces** as follows and change :

```
interface eth0 inet static
address 192.168.1.1
netmask 255.255.255.0
gateway 192.168.1.254
```

The next step is to disable the DHCP service by executing the following commands

```
cd /etc/init.d/
```

```
update-rc.d dhcpcd remove
```

2. Default configuration doesn't work

When you are logged on the device you can use **gateway** script to check what is wrong.

```
gateway check
```

Then you can show log from gateway test:

```
gateway showlog
```

2.1 Gateway can't get Modbus TCP Slave

Information in gateway log:

```
FAIL - Slave isn't available
```

Please check again configuration of your Modbus TCP Slave device. Set bellow settings:

Default Modbus TCP Slave settings

IP address	192.168.0.10
port	502
Slave ID	1

2.2 Bad configuration

Information in gateway log:

```
FAIL - Current configuration isn't same as default configuration
```

Following is the default configuration of the device. Just copy this to the **/mnt/mtd/iMod/config/MainConfig.xml** location.

Download: [mainconfig.zip](#)

```
<?xml version="1.0" encoding="UTF-8"?>
<iMod version="1.2.53">
  <group name="channels">
    <access-channel name="Modbus_RTU_Access_1">
      <protocol name="MODBUS">
        <property name="type" value="RTU"/>
      </protocol>
      <port>"COM3-115200-8N1"</port>
      <property name="referenced-source-channel"
value="MODBUS_TCP_Source_1"/>
    </access-channel>
    <source-channel name="MODBUS_TCP_Source_1">
      <protocol name="MODBUS">
        <property name="type" value="TCP"/>
      </protocol>
    </source-channel>
  </group>
</iMod>
```

```
<port>"ET-192.168.0.10-502-TCP"</port>
</source-channel>
</group>
</imod>
```

2.3 Modbus Master can't poll Device

First step is check connection to **COM3**. Please back to the **1. Connection** and check the wiring diagram.



A(+) - A(+)
B(-) - B(-)

3. Communication problem on RS-485

Regarding to RS-485 standard, should be used a resistor 120Ω , and no more than 2 termination resistors should be used, one at each end of the RS-485 transmission line. Modbus Device have a built-in resistor 120Ω so please used only one resistor on second end of RS-485 line.

