Simulate Modbus serial communication RutOS

Contents

Summary

Modbus is a serial communications protocol originally published by Modicon (now Schneider Electric) in 1979 for use with its programmable logic controllers (PLCs). Modbus has become a de facto standard communication protocol and is now a commonly available means of connecting industrial electronic devices. The main reasons for the use of Modbus in the industrial environment are:

- developed with industrial applications in mind;
- openly published and royalty-free;
- easy to deploy and maintain;
- moves raw bits or words without placing many restrictions on vendors.

Modbus enables communication among many devices connected to the same 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. Many of the data types are named from its use in driving relays: a single-bit physical output is called a coil, and a single-bit physical input is called a discrete input or a contact.

This article provides a brief example on how to use Modbus serial to monitor a slave device, send data to server and how to configure slave alarms. To find more information about this feature visit RUT955 Modbus and RUT955 RS232/RS485 pages.

Prerequisites

- One device with RS232
- Windows 10 computer
- Hercules and modRSsim applications
- RS232 to USB cable

Topology

Installation

Open device's WebUI, navigate to **Services->Package manager->Packages** and search for **Modbus Serial Master**
1. Press **+** to install
2. After installation you should see a status *Installed* on this package

Configuring Modbus serial slave device

In this example we are going to be using our Windows 10 computer as a slave. To do so you will need to install **modRSsim** application, which you can download here.

When you are done with that, open the app and apply the following configuration.

1. Select **Protocol** (MODBUS RS-232).
2. Click **Setup the communication Serial or TCP/IP port**.

1. Select the **Port** which you connected RS232 cable to (to find which port you are using go to Windows search bar and write **Device Manager** then select **Ports** and see which one you are using).
2. Select **Parity** (Even).
3. Click **OK**.

Configuring Modbus serial master

Open router's WebUI, navigate to **Services > Modbus > Modbus Serial Master** and apply the following configuration.

1. Press **Enable**.
2. Select **Baud rate** (9600, it must match slave's baud rate).
3. Select **Parity** (Even).
4. Press **Save**.

Now create **RS232 slave** by writing a name, pressing **Add** button. It should appear like in the

example and then press **Edit**.

Then apply the following configuration.

1. Check **Enable**.
2. Type in desired **Name**.
3. Type in **Slave ID** (any number from 1 to 255).
4. Write a **name** for a new request.
5. Add new request by clicking **ADD**.
6. Select **data type**.
7. Select **Function** (Read holding registers (3)).
8. Write **First register** (1) and Write **Register count** (10).
9. Enable the request and you can test it through **request configuration testing**.
10. Press **Save**.

Modbus data to server

Creating server

In order to test the functionality, you will need to set up a server (you can run a server on the same computer you use as a slave simulator).

There are many ways how you can create a server to which Modbus will send data to. In this example we are going to be using Windows 10 computer and Hercules app, which you can download here, to create a test server. Download, install the app and apply the configuration below:

1. Select **TCP Server** tab.
2. Enter **Port** (In this example default 80 is used).
3. Click **Listen**

And that is it, now you will be able to see the data coming from Modbus in the Received data section.

RUT Modbus data to server configuration

In order to setup your router to send Modbus data to server you will need to navigate to **Services > Data to Server** , create a **"NEW COLLECTION NAME"** and press **ADD** to add a new instance.

1. Select **Type: Modbus**
2. Select **Format Type: Custom**
3. Enter desired **format string**
4. Click **"NEXT: COLLECTION EDIT"**
5. In this configuration window, you can leave the settings as default and click **"NEXT: SERVER CONFIGURATION"**
6. Select **Type: HTTP**
7. Enter **Server address**
8. Click **"SAVE & APPLY"**

Receiving data

Open Hercules again, press **Listen** and you should start receiving Modbus Data messages.

Try to change some data in the Modbus Slave simulator.

Received data should change.

Slave alarms

In order to setup the following configuration SIM card is required.

Go back to **Services > Modbus > Modbus Serial Master'** ***and press edit the same Slave configuration or create a new one. There will be section called*** *Alarms Configuration*. Create a name, then press **Add** button. When it appears like in the example, press **Edit**.

Then apply the following configuration:

1. **Enable** instance.
2. Select **Function** (Read Holding Registers).
3. Write **Register** (1).
4. Select **Condition** (More than).
5. Write **Value** (10).
6. Select **Action frequency** (First trigger)
7. Select **Action** (SMS).
8. Create **Message** (type anything you want to receive).
9. Write **Phone number** (the number you want to receive the messages to).
10. Press **Save**.

Now go back to **Modbus slave simulator** and edit this window:

Change the value to anything below 10, you should not receive messages. Then change the value to anything above 10, you should start receiving messages.