

GW PN/ASCII... and TIA Portal V14

Configuring the GW PN/ASCII... to communicate with the Siemens TIA Portal V14

Application note

4007_en_A

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1 Description

This document provides step-by-step instructions for configuring the GW PN/ASCII... gateway with a Siemens® PROFINET controller TIA Portal®.

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Make sure you always use the latest documentation.
It can be downloaded at phoenixcontact.net/products.



2 Procedure

2.1 Configuration of the network

1. Download the latest general station description markup language (GSDML) files and save it to an accessible folder for future use. The GSDML file for the GW PN/ASCII... products are available at phoenixcontact.net/products.
2. Open the TIA Portal software and click the "Create new project" button.

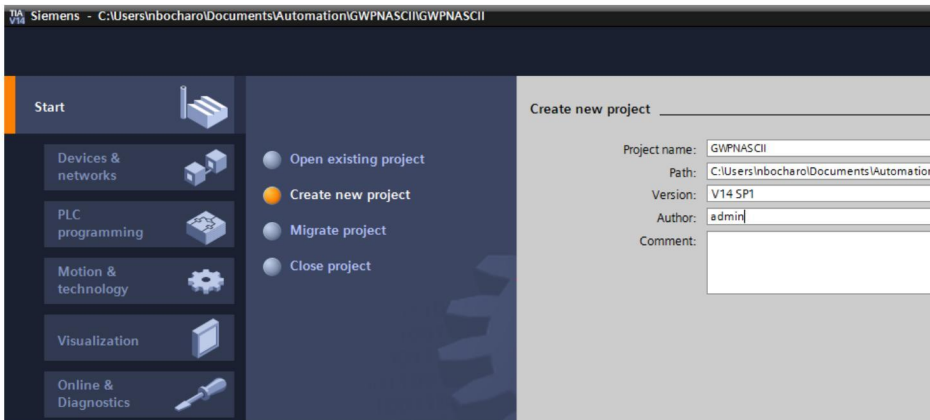


Figure 1 Create a new project

3. Click the "Configure a device" button".

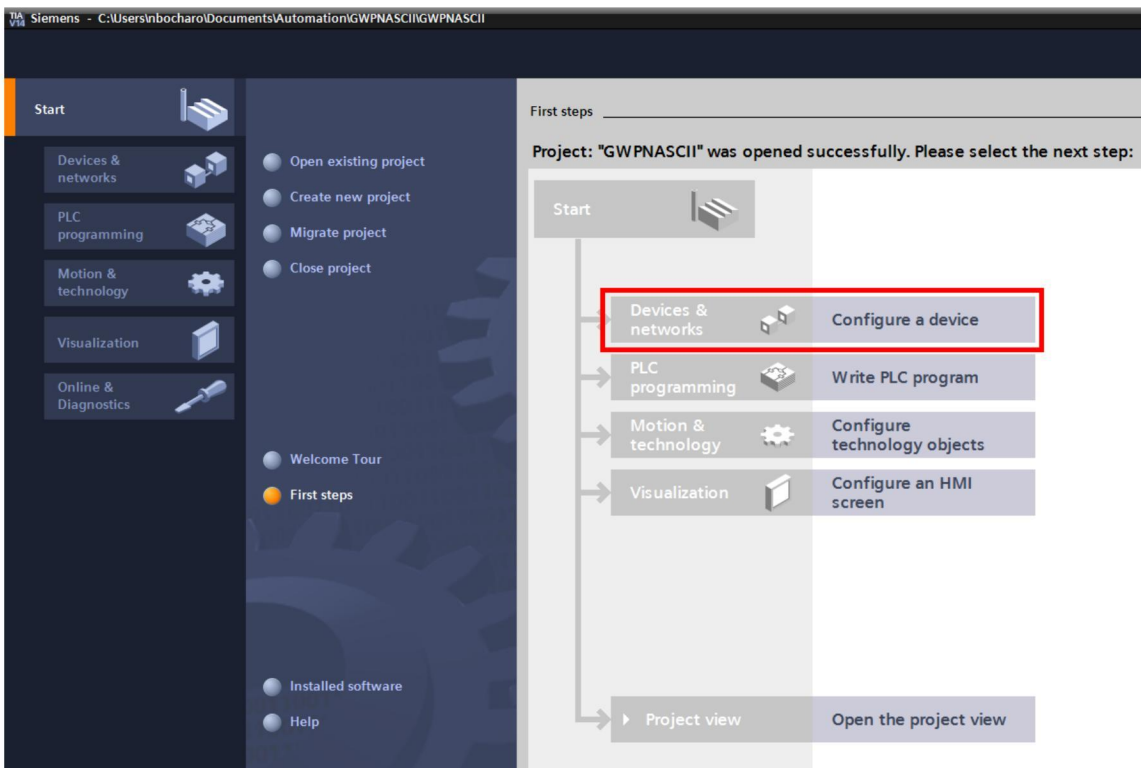


Figure 2 Configure a device

- Click the “Add New Device” button, and then find the desired controller in the list of devices. Click on the controller name to highlight it, and then click the “Add” button.

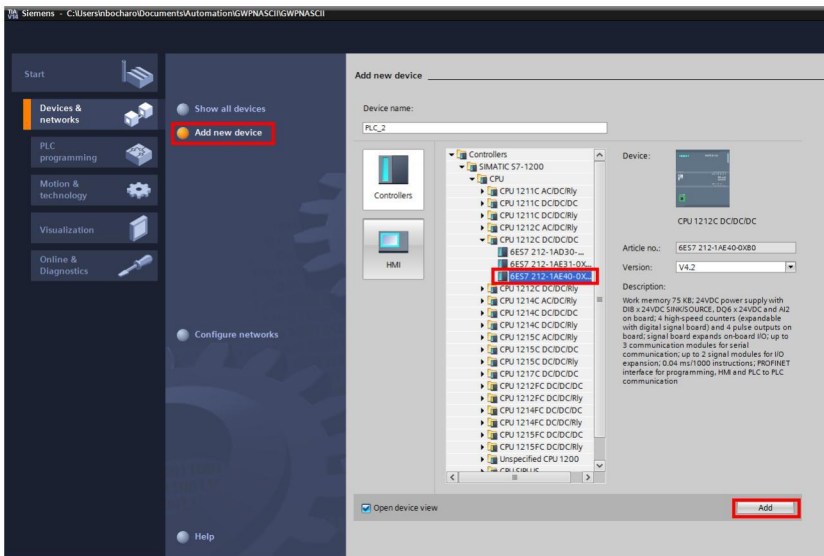


Figure 3 List of controllers in the “Add new device” list

- Click the controller name to open the "Properties" window for the controller. Click the "Ethernet addresses" menu to display the "Ethernet addresses" window for the selected controller.

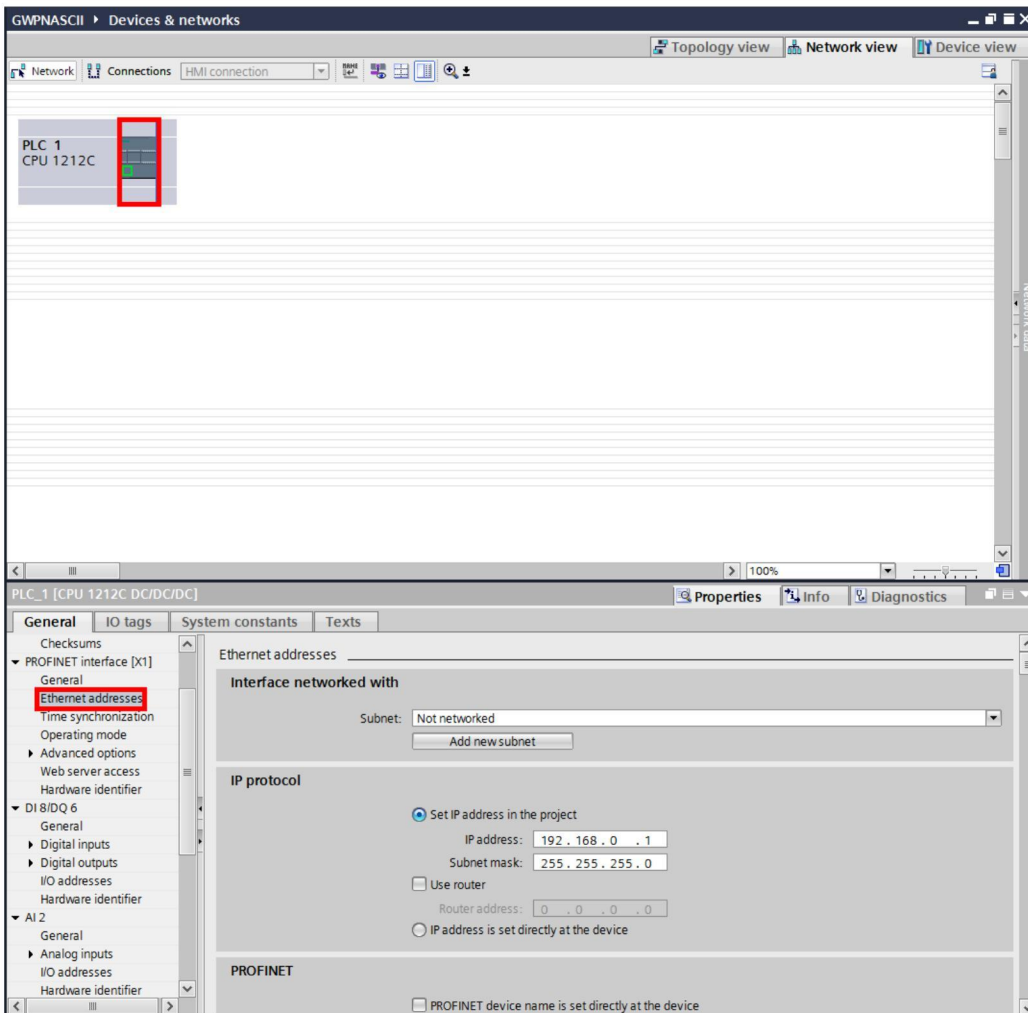


Figure 4 New devices

- Click the “Add new subnet” button to create a new PROFINET network. Enter the desired IP address for the subnet connection in the appropriate fields. The default PROFINET device name is acceptable.

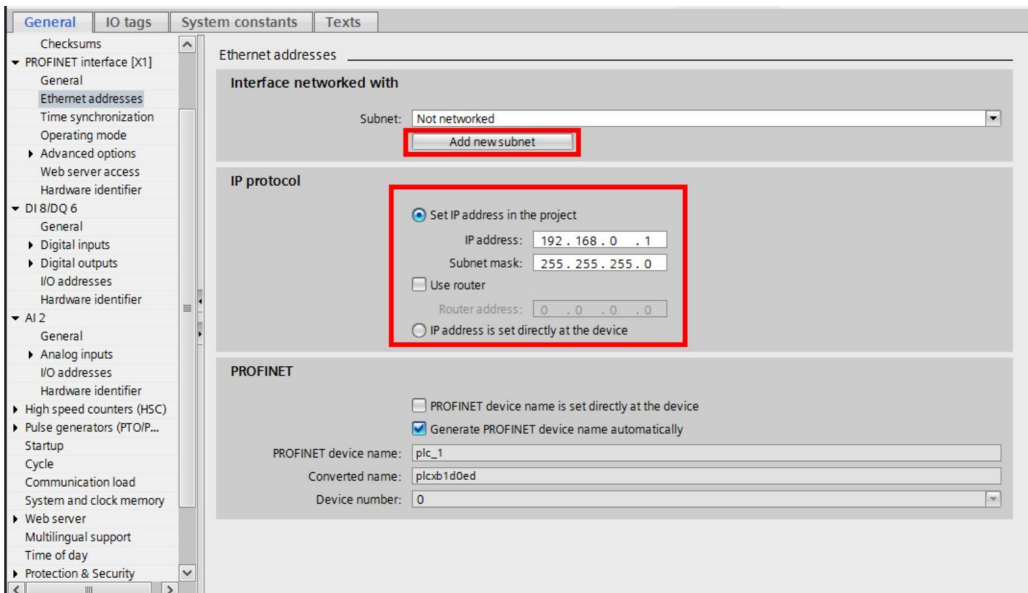


Figure 5 Configuring a new PROFINET network

- Click the “System and clock memory” menu to display the “System and clock memory” properties window. Click the “Enable the use of clock memory byte” box to allow use of the PLC clock to generate a pulse.

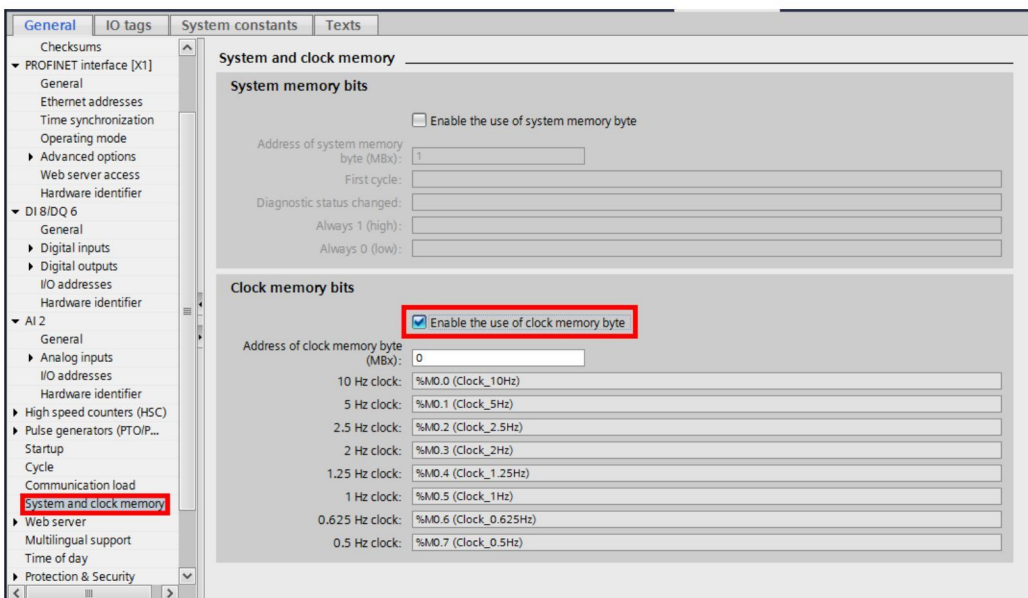


Figure 6 System clock and memory

The controller is now configured with a PROFINET network.

2.2 Installation of GSDs for the GW PN/ASCII....

1. Click the “Options/Manage general station description files (GSD)” menu.

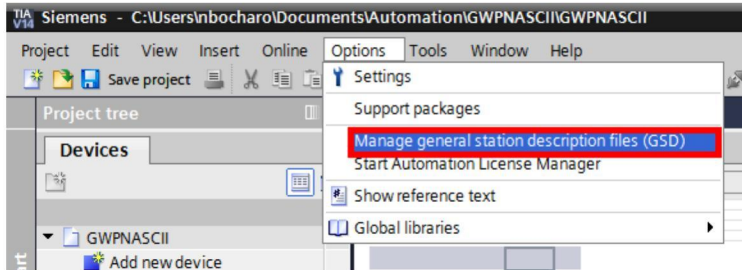


Figure 7 Manage general station description files (GSD)

2. Navigate to the folder containing the saved GSDML files, select the files by checking the boxes, and then click the “Install” button.

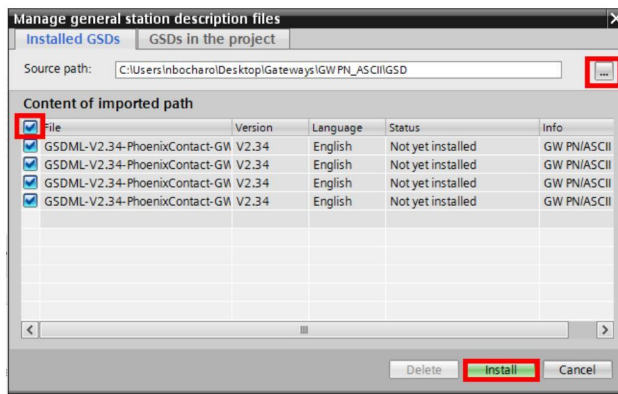


Figure 8 Installing the GSD files

- Once the GSDML files are installed and the catalog is updated, navigate to the “Network View” of TIA Portal. From the “Hardware catalog” pane, click “Other field devices/PROFINET IO/Gateway/Phoenix Contact/GW PN/ASCII” to display the available gateways. Click the device and drag it into the “Network view” window. For example, Figure 9 shows the selection of a gateway with one Ethernet port and two D-SUB 9 serial ports (GW PN/ASCII 2E/4DB9).

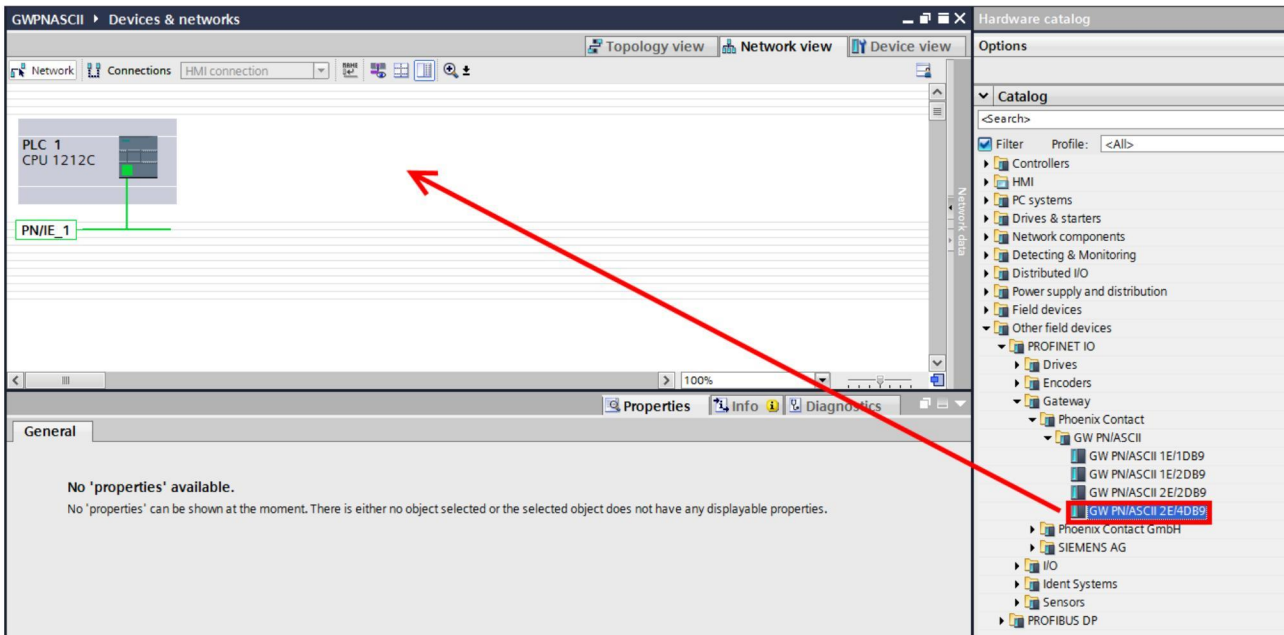


Figure 9 Gateway selection

- Click and hold the green box of the gateway icon and drag it to the PN/IE_1 network (see Figure 5) to establish a connection between the gateway and PLC.

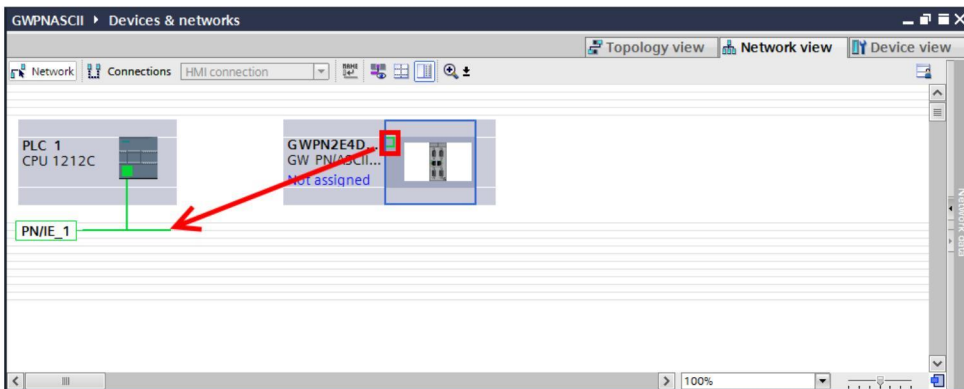


Figure 10 Connecting the gateway to the controller

5. Click the “Gateway” icon to display the settings.

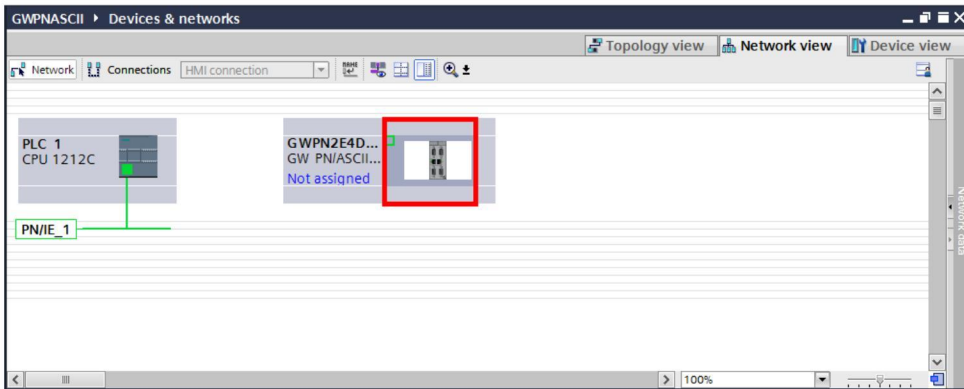


Figure 11 Gateway icon

6. Select **PN/IE_1** for the subnet. Set the IP address of the gateway. You can either pick your own device name or TIA Portal will generate one automatically.

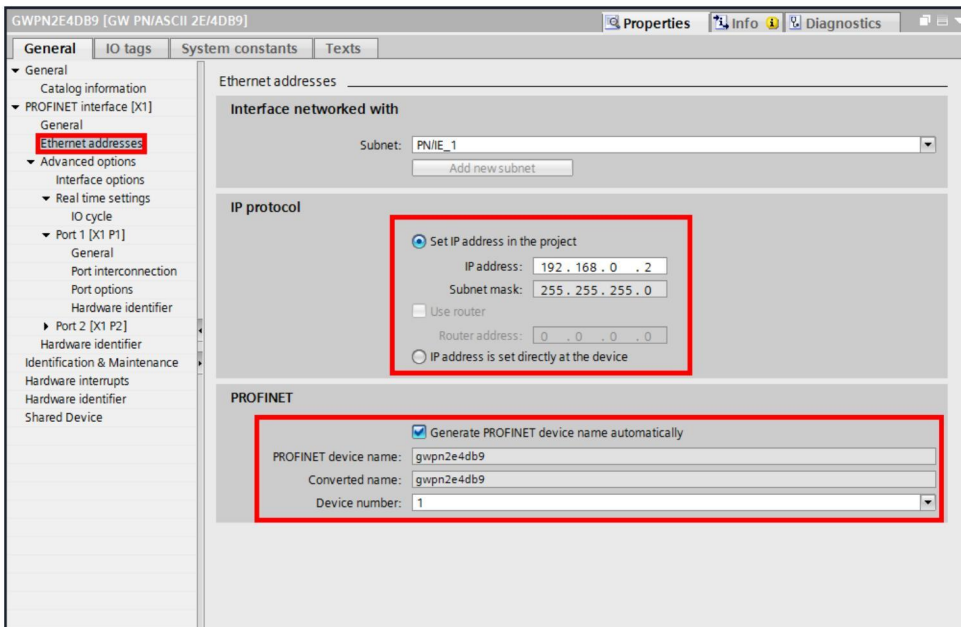


Figure 12 Ethernet addresses

7. Click the device icon, and then click the “NAME” button to assign the IP address and Device name to the device, Clicking the “Name” button opens the “Assign PROFINET device name” dialog box (see [Figure 14](#))

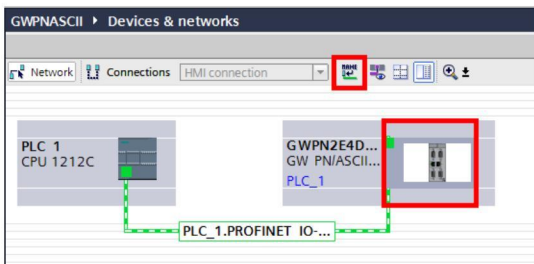


Figure 13 Connection name

8. From the “PROFINET device name” drop-down menu, select the device name for the gateway. From the “Type of the PG/PC interface” drop-down menu, select the interface used to communicate over the PROFINET network. Then click the “Update list” button.

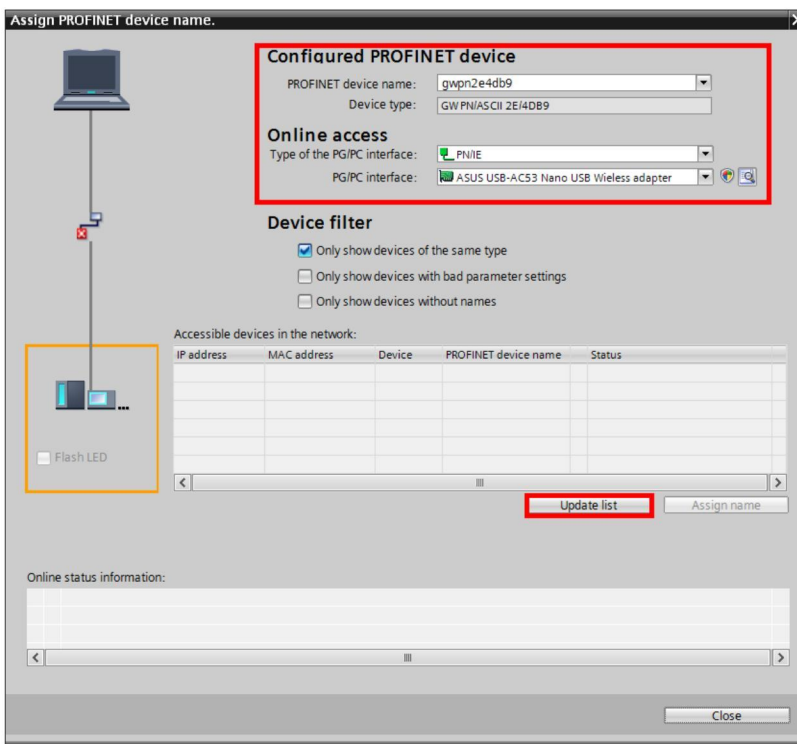


Figure 14 “Assign PROFINET device name” dialog box

9. After the list is updated, highlight the gateway on the list and click the “Assign name” button. This assigns the name and IP address specified in the project to the gateway.

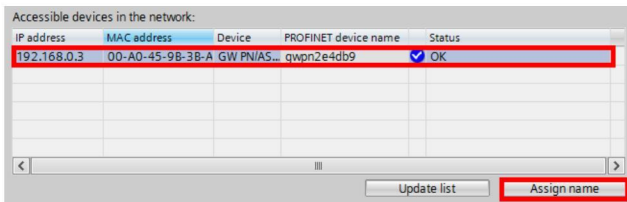


Figure 15 :“Accessible devices in the network” table

The gateway is now configured to communicate with the controller.

2.3 IO configuration example

In the “Device catalog/Device View” window is the “Module” folder. Located in the folder are the modules for the serial ports and the socket ports. You only need to add the modules if you are going to be using them.

In this example, only Port 1 on the gateway is used, so you only need to insert one serial module into Slot 1. If using Port 4, only insert a serial module into Slot 4.

1. Drag a “Serial” module from the Hardware catalog to the “Device overview” window.

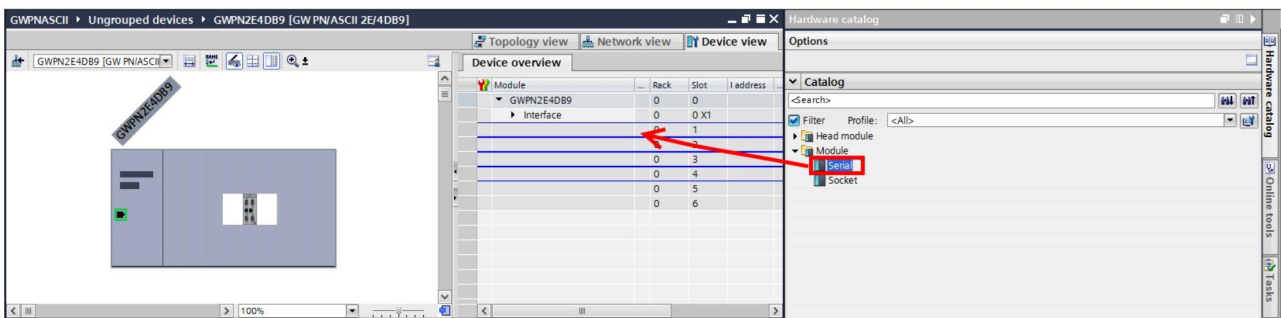


Figure 16 Assigning ports to the gateway

- Click the “Settings” line to open the “Properties” window. Highlight “General/Module parameters” on the left menu to configure the communication settings of the serial port.

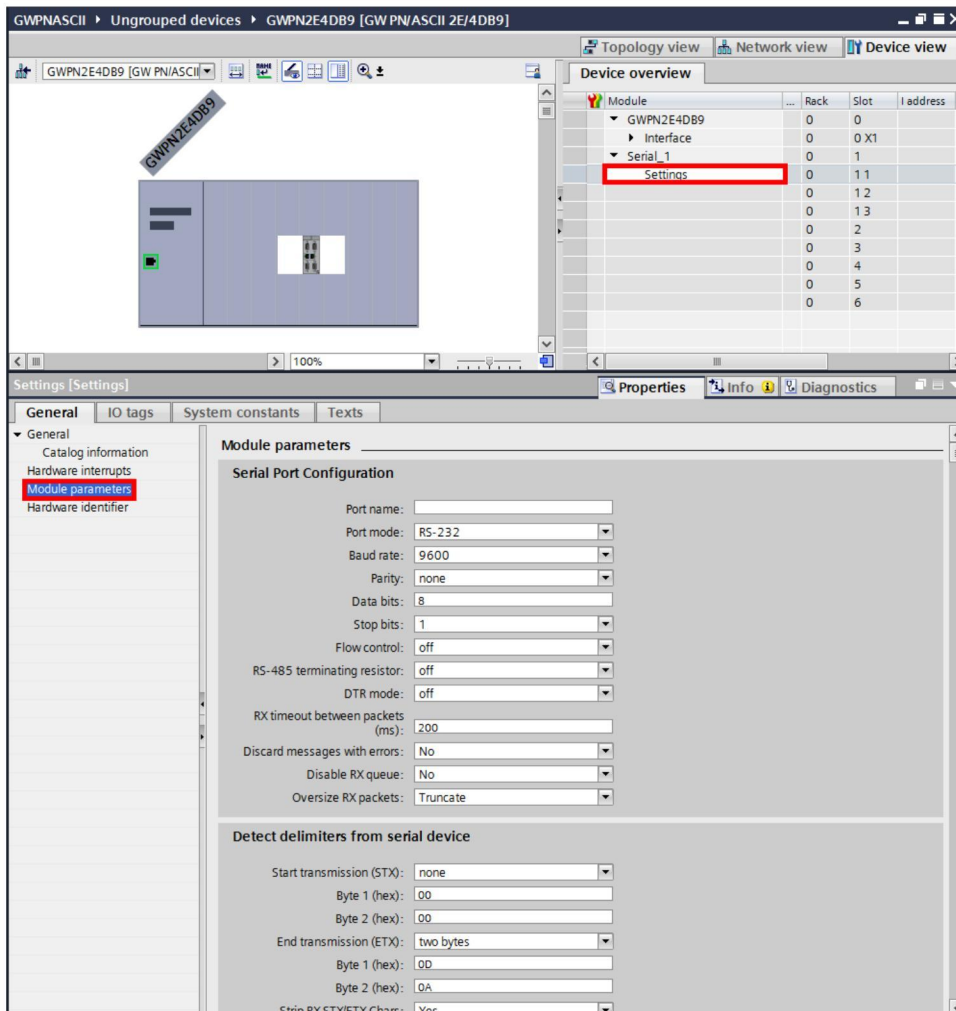


Figure 17 Serial port configuration

- Each submodule may be placed in one of the two available sub-slots of an IO module. Sub-slot 1 is reserved for an input submodule; Sub-slot 2 is for an output submodule.

Here are some tips when configuring IO modules and submodules:

- A serial or Ethernet module must be inserted to configure a submodule.
- If there isn't an exactly matching IO size, select the next size up. For instance, select the “Input 128 Bytes” submodule for a device that has 80 bytes input data.
- The input data size and output data size are independent. You can configure a serial module to have 64 bytes input data and 32 bytes output data.
- For input only devices, leave the Sub-slot 2 open. For output only devices, leave the Sub-Slot 1 open.
- If a serial port or an Ethernet device is not in use, simply leave the corresponding slot open.

- In this example, only one serial port is in use and it is an input and output device, so only one serial module (**Serial_1**) with one 32 byte input and one 32 byte output submodule is necessary.

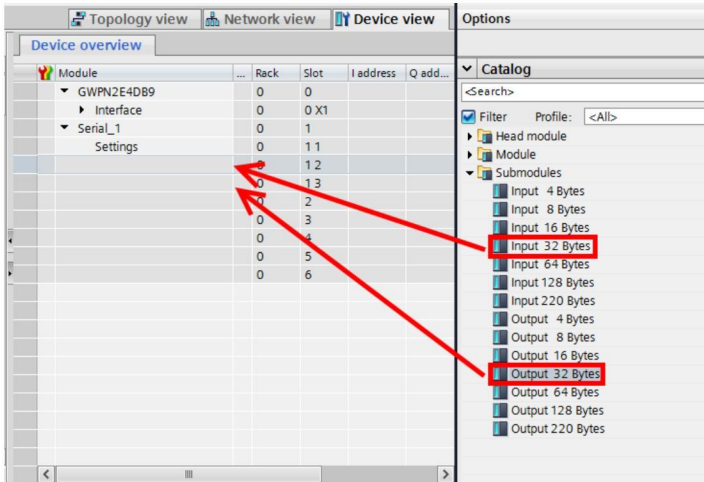


Figure 18 Adding submodules

- The “Device Overview” window shows the input register address for the serial input. The 32-byte input provides an array of 36 bytes: 2 bytes for sequence number, 2 bytes for length, and 32 bytes of data.

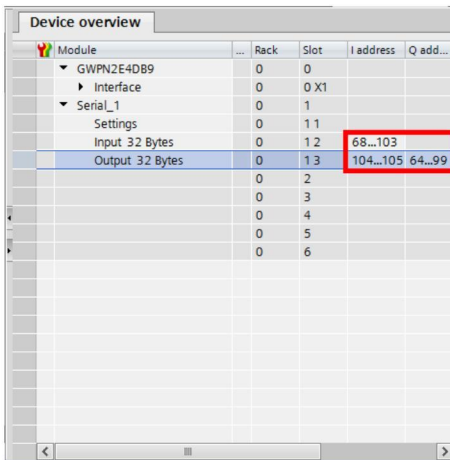


Figure 19 Device overview showing additional submodules

- In order to see the data, use a data block, or access the IO address directly through the watch table.

2.4 Using data block to read/write data

1. In the “Project tree” window, click the “Add new block” menu to add the “Data_block_1” block.

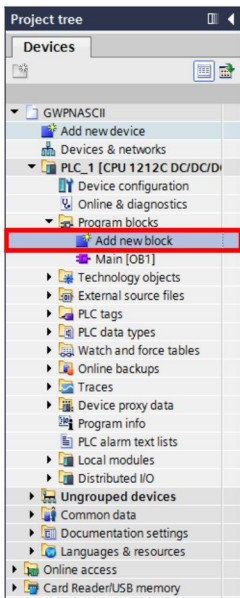


Figure 20 Adding a new block

2. Enter the desired name in the “Name” field.

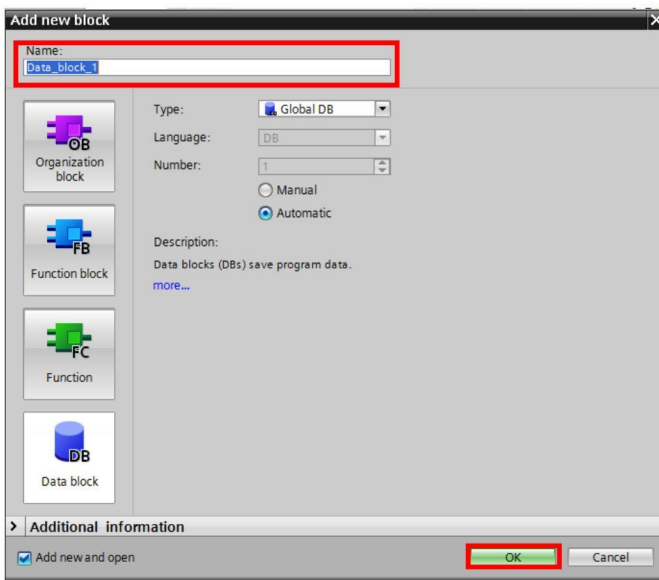


Figure 21 Configuring a new block

3. Right click the data block and select “Properties” from the menu.

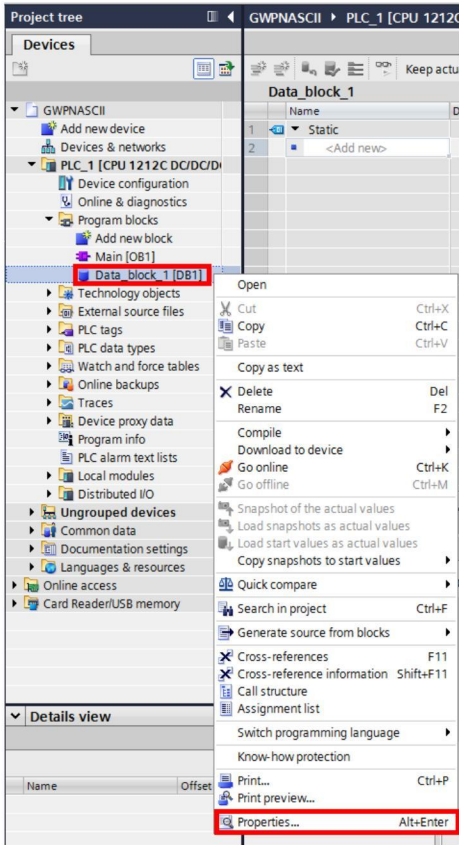


Figure 22 Open “Data_block_1 (DB1) properties” dialog box

4. Uncheck the “Optimized block access” attribute.

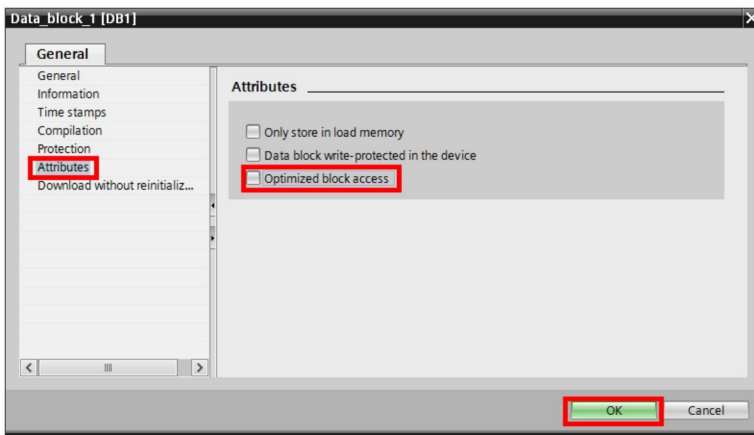


Figure 23 “Data_block_1 (DB1) attributes” dialog box

- In the “Data Block” configuration window, create an input buffer structure called **InputBuf** that has the same format as the input data, and an **OutputBuf** structure that has the same format as the output data.

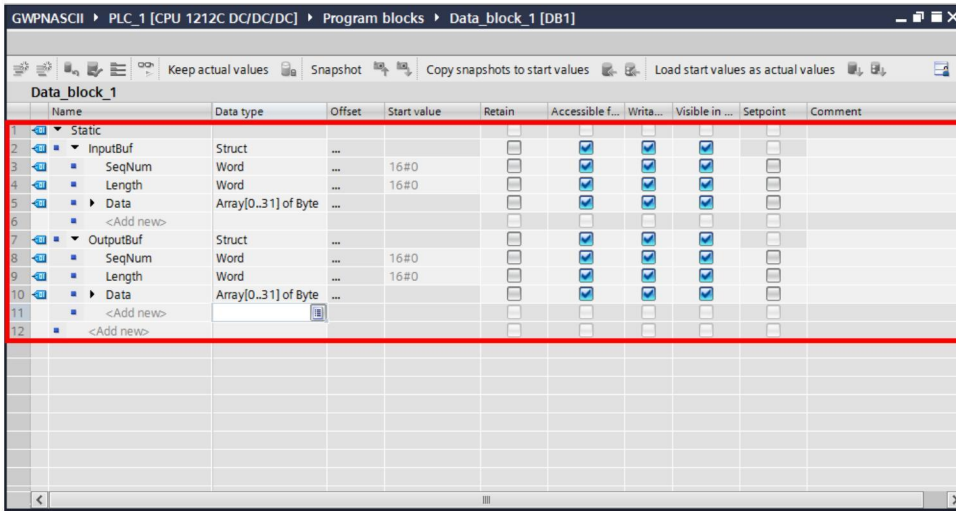


Figure 24 “Data_block_1 (DB1)” dialog box

- In the “SeqNum” section of the OutputBuf, the “Start value” field should be **0**. The “Length start value” field will be however long the message is. In this example, ten digits (0-9) are being sent, so the “Length” field is **10**, and the first ten values of the data array are filled as such. Since this is an GW PN/ASCII... gateway, the values in the data array must be entered as hex representations of their ASCII values.



Hex to ASCII conversions can be found on the internet.

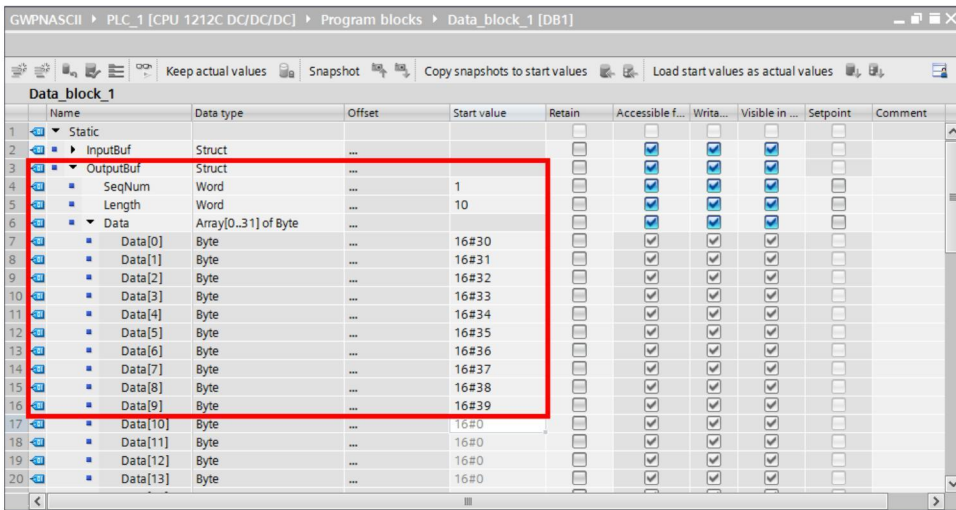


Figure 25 OutputBuf data block

7. Click the “Compile” button and compile the data block.

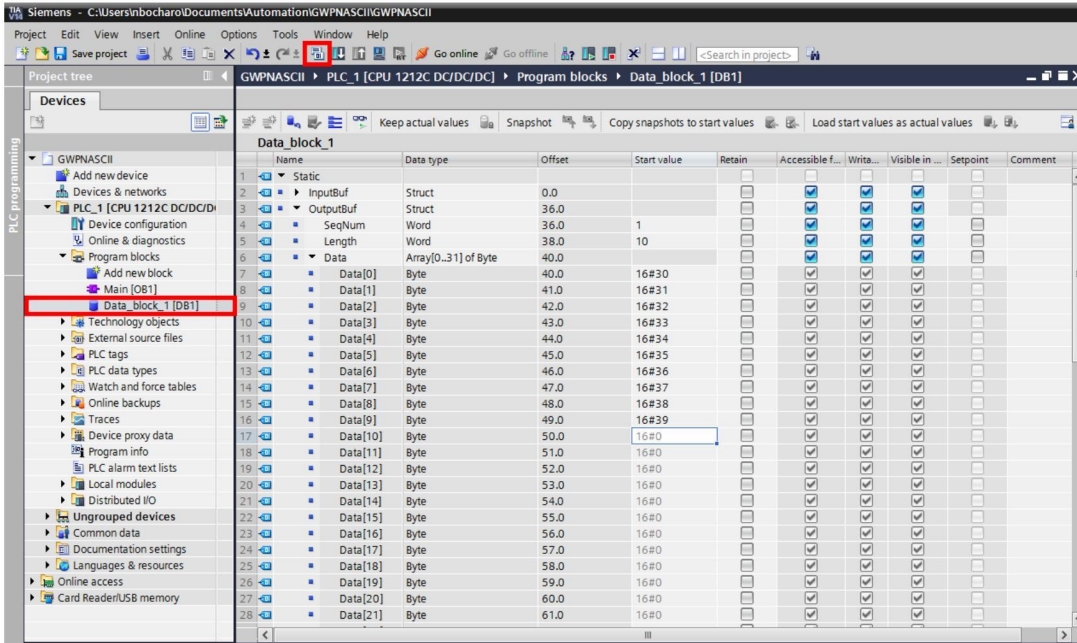


Figure 26 “Compile” button

8. Drag the DPRD_DAT block onto the ladder rung.

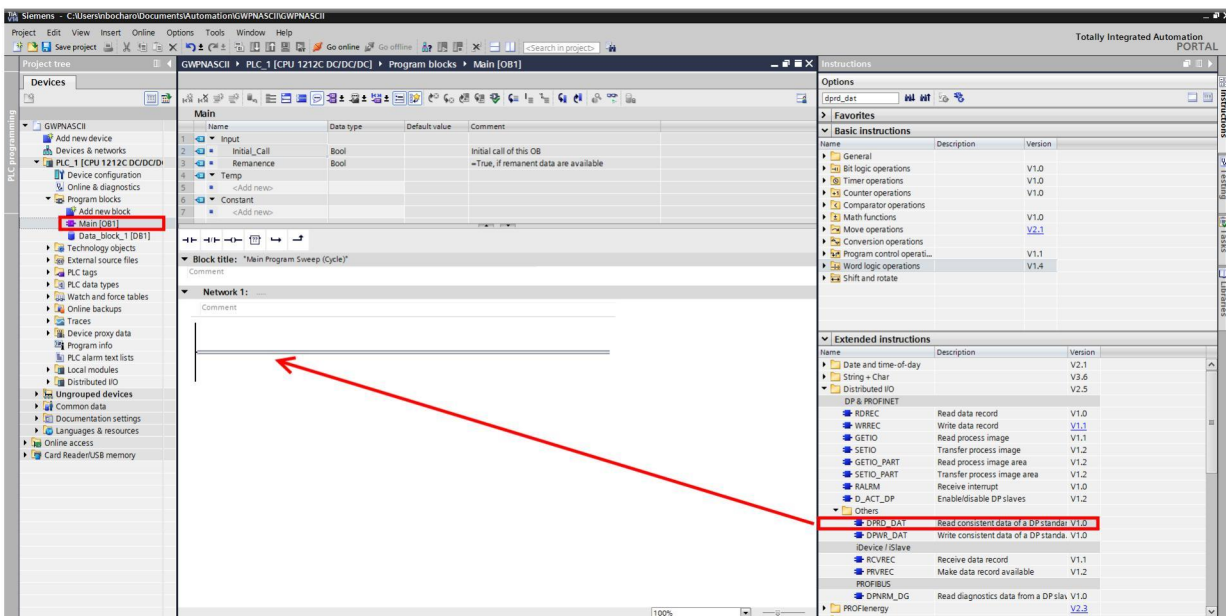


Figure 27 DPRD_DAT instruction block

9. Add a DPRD_DAT instruction to the main block. Assign the **InputBuf** structure made previously to the “RECORD” field (return can be a word).

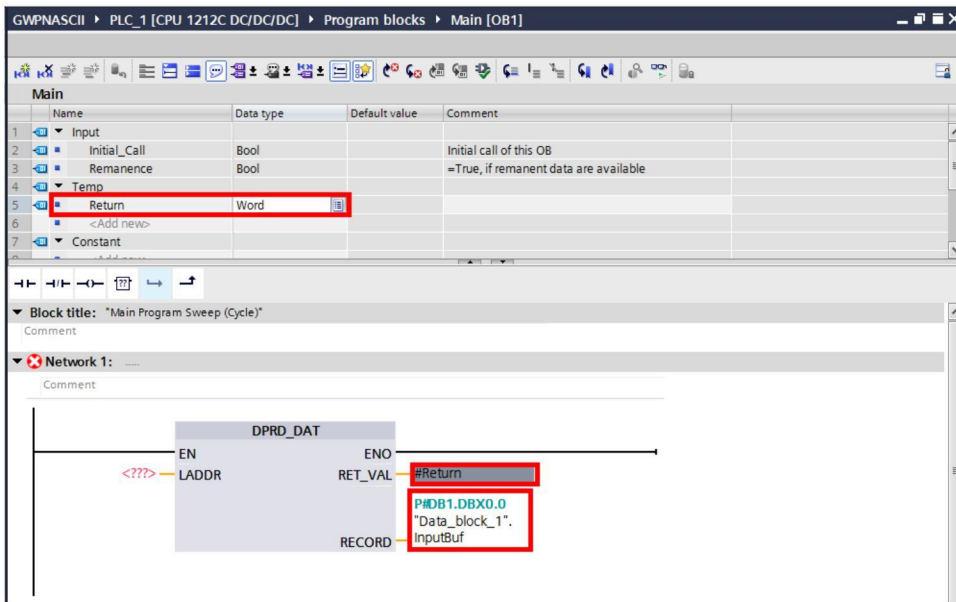


Figure 28 DPRD_DAT Block variable assignment

The “LADDR” field is the hardware address of the module. Click the “Input 32 Bytes” module in Device view to open it.

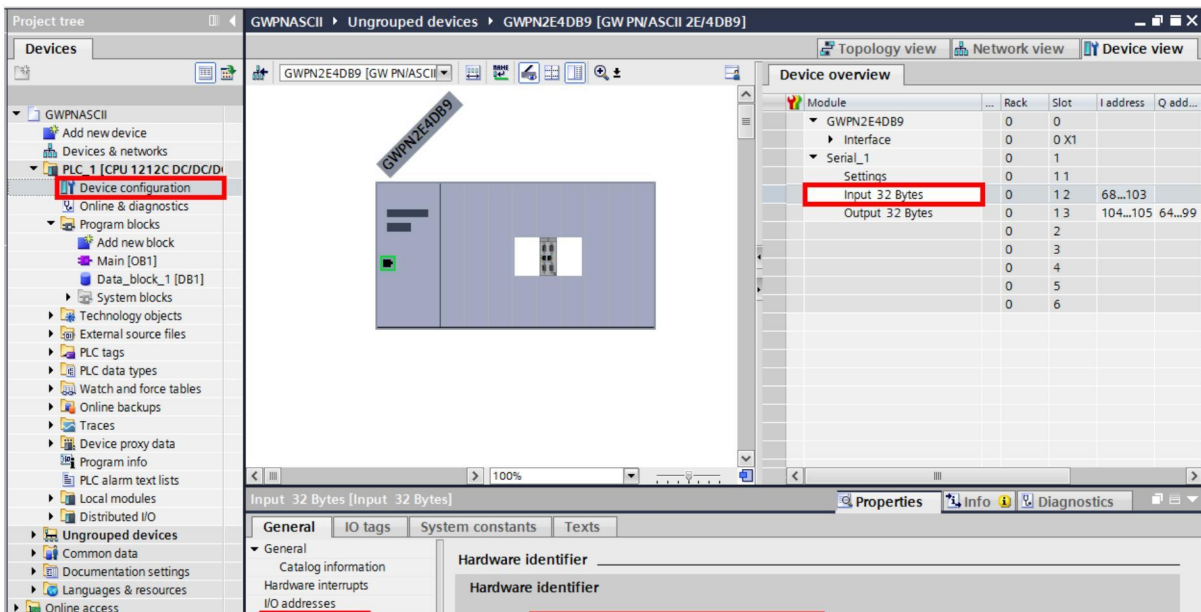


Figure 29 Hardware identifier

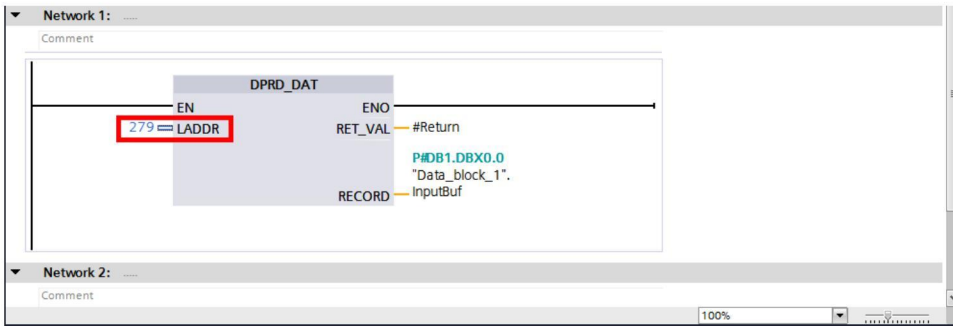


Figure 30 DPRD_DAT final configuration

10. Compile, download the project, and then click the “Run” button.
11. Click the “Go online” button to see the ASCII values that the GW PN/ASCII... receives through the serial port. In this example, a bar code scanner is used to read a bar code. The “SeqNum” field increased to 1 after a scan, the “Length” field is 0C_{hex} which is 12, and the data array is populated with the values from the barcode.

Name	Data type	Offset	Start value	Monitor value	Retain	Accessible f...	Writa...	Visible in ...	Setpoint
Static									
InputBuf	Struct	0.0							
SeqNum	Word	0.0	16#0	16#0001					
Length	Word	2.0	16#0	16#000C					
Data	Array(0..31) of Byte	4.0							
Data[0]	Byte	4.0	16#0	16#30					
Data[1]	Byte	5.0	16#0	16#30					
Data[2]	Byte	6.0	16#0	16#31					
Data[3]	Byte	7.0	16#0	16#32					
Data[4]	Byte	8.0	16#0	16#33					
Data[5]	Byte	9.0	16#0	16#34					
Data[6]	Byte	10.0	16#0	16#35					
Data[7]	Byte	11.0	16#0	16#36					
Data[8]	Byte	12.0	16#0	16#37					
Data[9]	Byte	13.0	16#0	16#38					
Data[10]	Byte	14.0	16#0	16#39					
Data[11]	Byte	15.0	16#0	16#35					
Data[12]	Byte	16.0	16#0	16#00					
Data[13]	Byte	17.0	16#0	16#00					
Data[14]	Byte	18.0	16#0	16#00					
Data[15]	Byte	19.0	16#0	16#00					
Data[16]	Byte	20.0	16#0	16#00					
Data[17]	Byte	21.0	16#0	16#00					
Data[18]	Byte	22.0	16#0	16#00					
Data[19]	Byte	23.0	16#0	16#00					
Data[20]	Byte	24.0	16#0	16#00					
Data[21]	Byte	25.0	16#0	16#00					
Data[22]	Byte	26.0	16#0	16#00					

Figure 31 Data block monitoring data

Writing serial data

The GW PN/ASCII... only writes data when the TxSeqNum is incremented. The following steps demonstrate writing a LAD program that increments the TxSeqNum once every two seconds.

Go back to the Main program block and insert a normally closed contact into Network 2, and assign it to the 0.5 Hz clock.



NOTE:

If the clock settings are not available, ensure the “Enable clock memory byte” box is unchecked (see Figure 6).

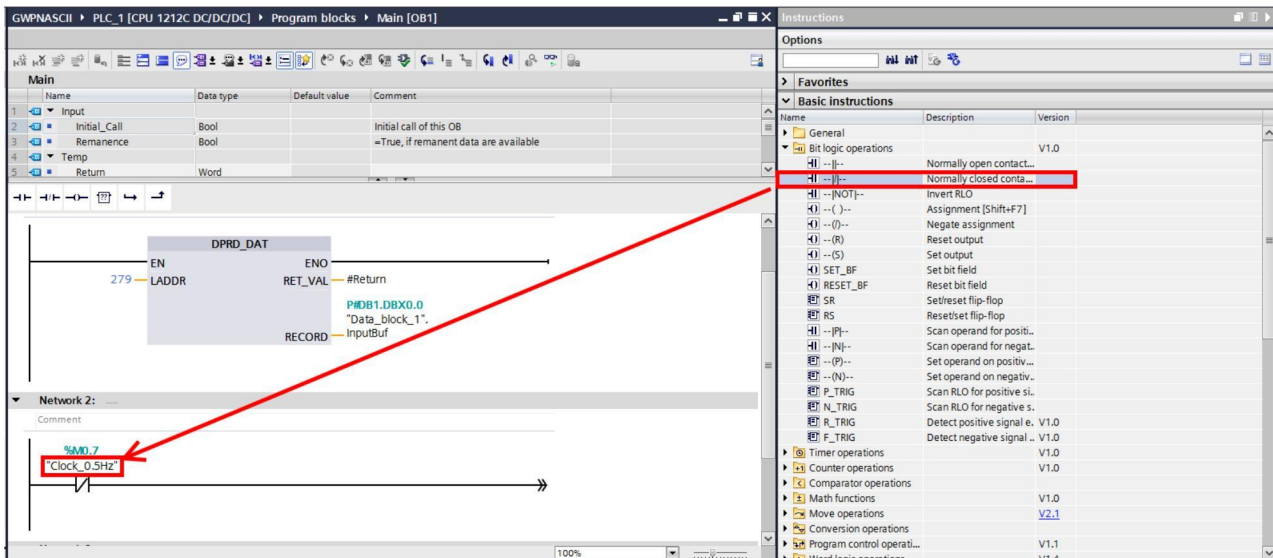


Figure 32 Clock assignment

12. Insert a TP function, and set the PT value to “T#1ms”. The combination of the normally closed contact assigned to the 0.5 Hz clock with the TP function will generate a 1 ms pulse every two seconds, and it is within that pulse that the output is written.

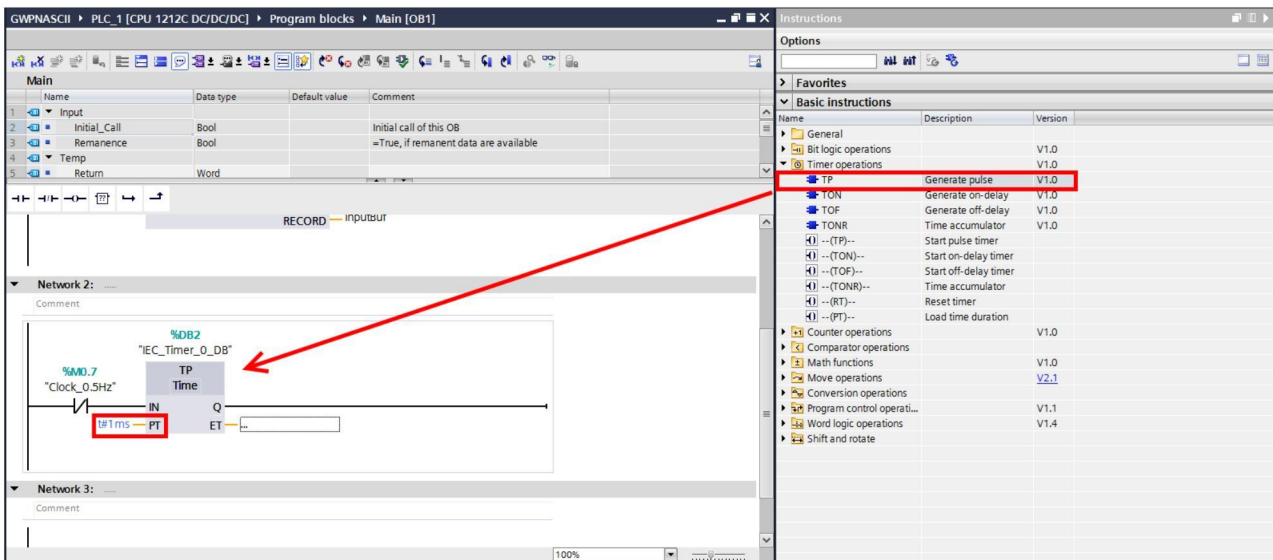


Figure 33 TP block configuration

13. Add a DPWR_DAT instruction. The "LADDR" field is the hardware identifier of the Serial Output block, similar to the DPRD_DAT instruction (see Figure 29). The "RECORD" field is the entire output buffer from the data block.

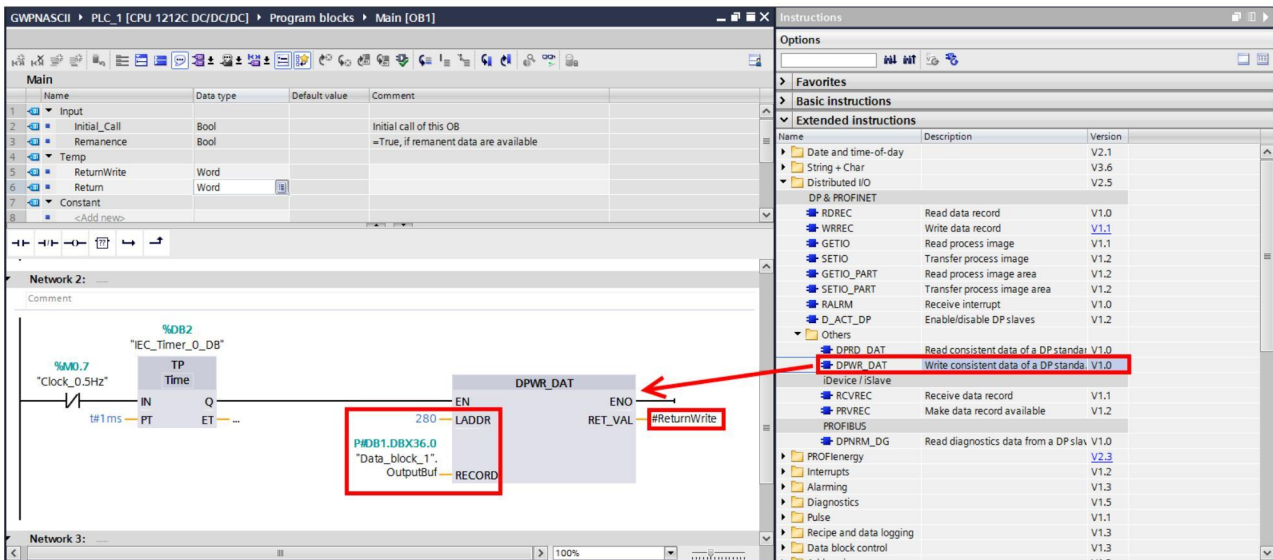


Figure 34 DPWR_DAT instruction

14. Add an "INC" function. Set the type to "Int" and select the "SeqNum" field of the OutputBuf struct as the "IN/OUT" field. This will increment the "SeqNum" field of the output buffer, which will cause the GW PN/ASCII... to send the output.

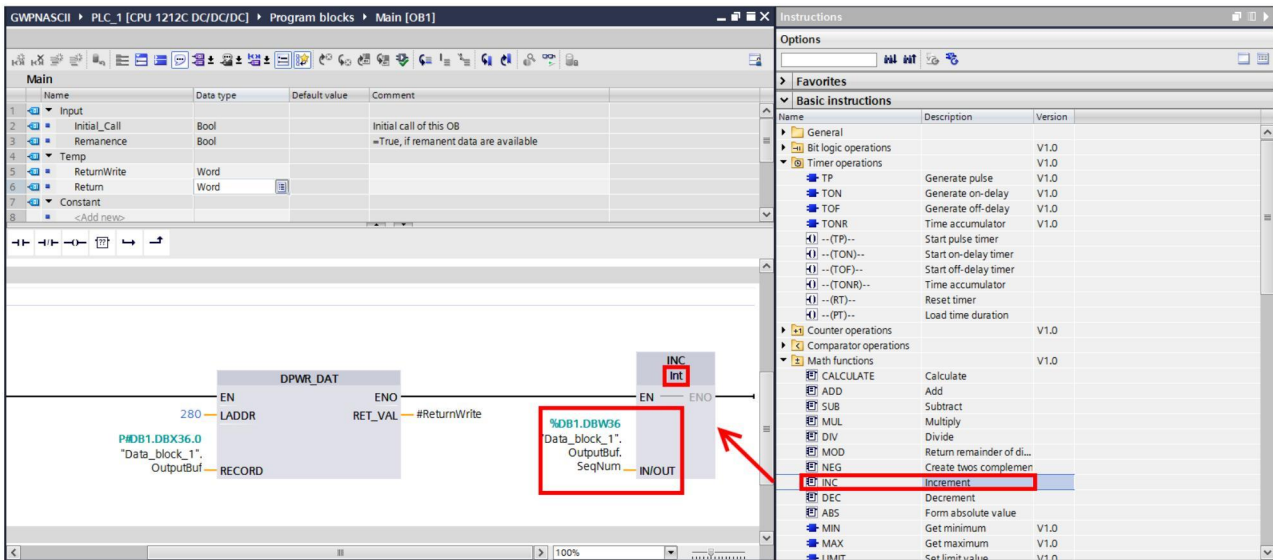


Figure 35 INC function

15. Compile the program and load it onto the PLC. The PLC program will now publish "0123456789" to the gateway, which transmits over the serial port. View the log in the "Diagnostics/Serial Logs" tab of the web manager.

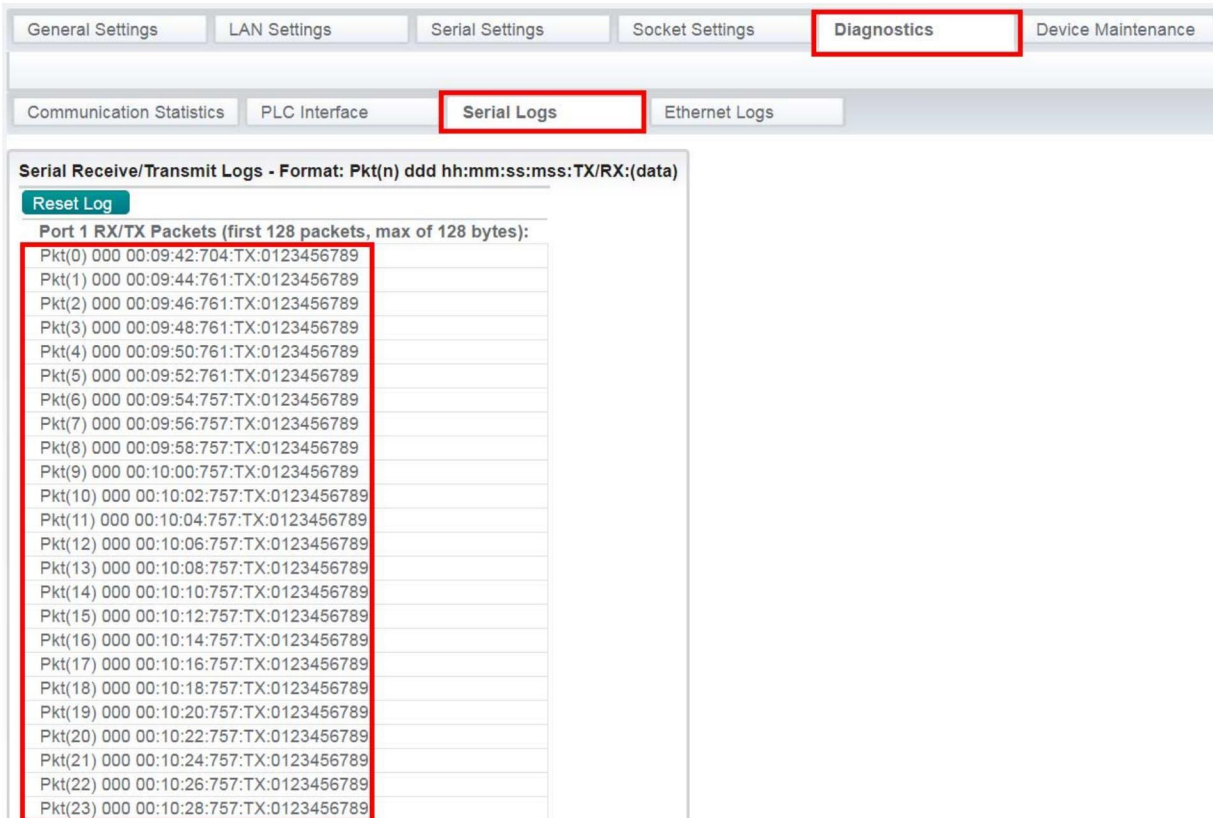


Figure 36 Serial logs

2.5 Reading values using watch table

1. Add new watch table, and then add the IO addresses of the Input 32 Bytes submodule. Each IO address reads four bytes, so skip every fourth address to avoid overlap.

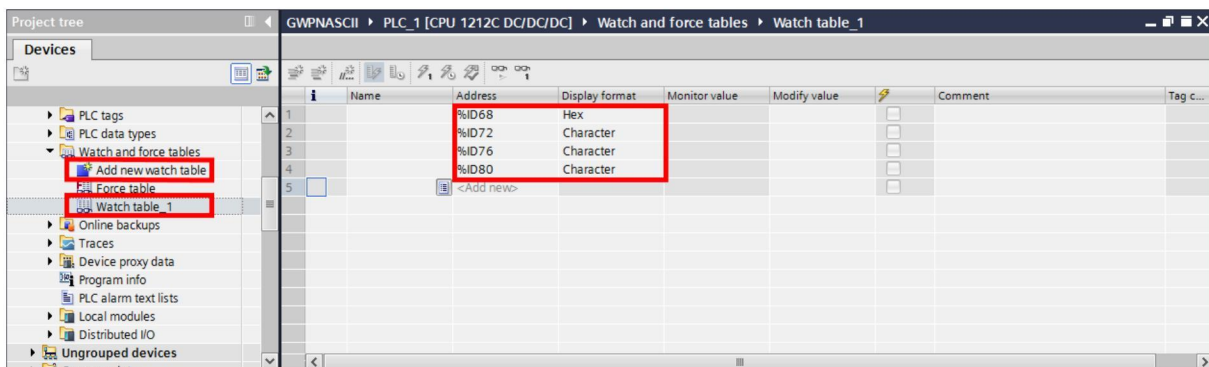


Figure 37 Watch table

2. Click the “Glasses” icon to go online and monitor the values.

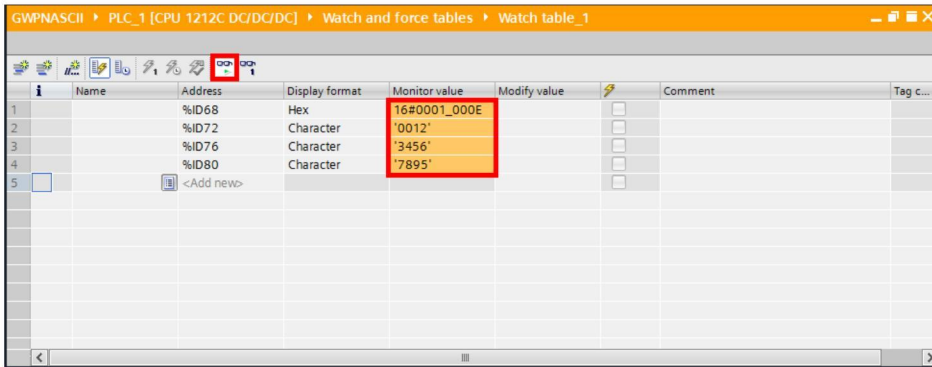


Figure 38 Watch table

3. When using a barcode scanner as an example, the values of the IO addresses change as different barcodes are scanned and different data is entered. The barcode in Figure 39 was used in this example.



Figure 39 Example barcode

2.6 Forcing output using watch table

1. Add the tags shown in Figure 40 to organize the “Watch” table.

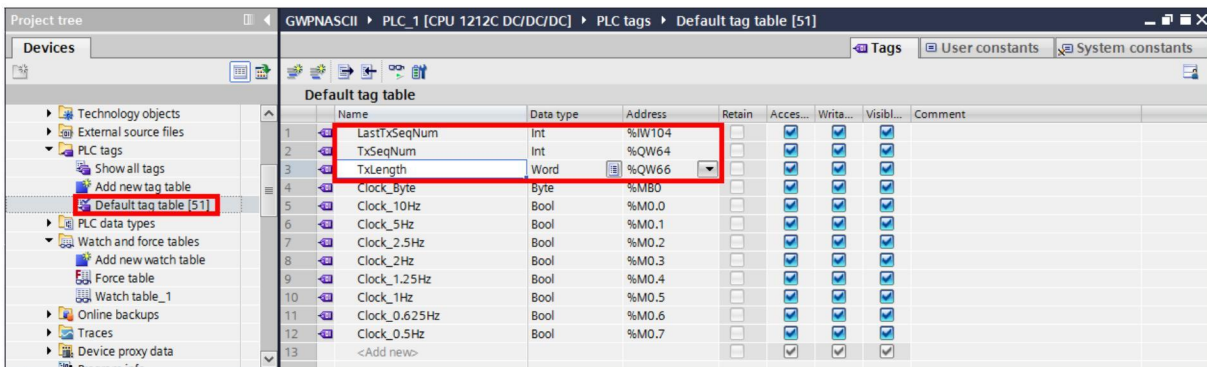


Figure 40 PLC Tag table



The addresses for these tags are determined by the addresses given within the GSDML. In this case, we use the IW104 as the address for LastTxSeqNum because that is the one byte input in the Output submodule that gives you the LastTxSeqNum. Then TxSeqNum is the first two bytes of the Q address range, and TxLength is the next two bytes, with the body of the message following afterwards.

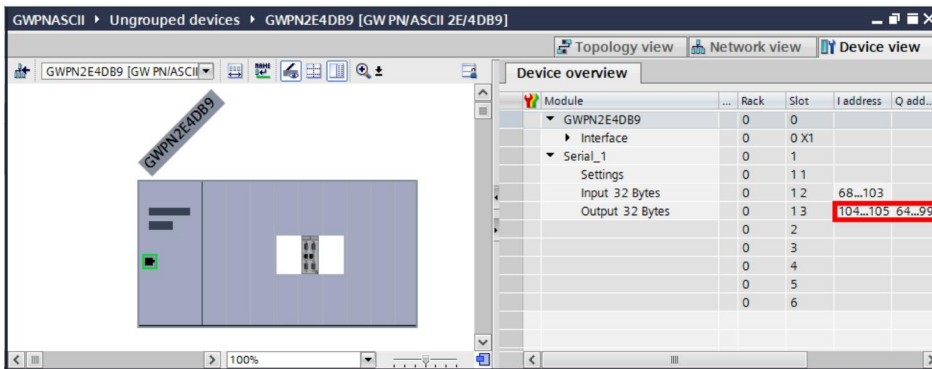


Figure 41 Tag addresses

- Go to the watch table and add the following addresses to watch. Modify the TxSeqNum field to be **1**, the "TxLength" field to be the number of characters being sent (in this case it's **3**), and the hex values of the ASCII characters to send. In this case, sending '123'.
- Compile and load, and then click the "Go online" button. Click the "Lightning bolt" icon to change the values of the "TxSeqNum" field. This will cause the "LastTxSeqNum" field to increase as well, meaning that a transaction was successfully sent through. Increase the TxSeqNum value to continue sending messages.

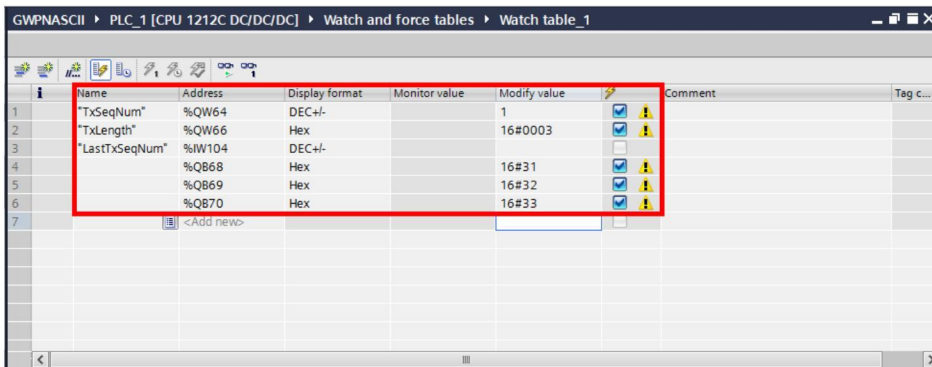


Figure 42 Watch table

4. You can see these messages under Diagnostics -> Serial Logs in the web manager of the gateway.

The screenshot shows the web manager interface with the following structure:

- Top navigation bar: General Settings, LAN Settings, Serial Settings, Socket Settings, **Diagnostics**, Device Maintenance.
- Sub-navigation bar: Communication Statistics, PLC Interface, **Serial Logs**, Ethernet Logs.
- Main content area: **Serial Receive/Transmit Logs - Format: Pkt(n) ddd hh:mm:ss:mss:TX/RX:(data)**
- Buttons: **Reset Log** (highlighted in green).
- Log entries for Port 1 RX/TX Packets (first 128 packets, max of 128 bytes):
 - Pkt(0) 000 00:43:31:509:TX:123
 - Pkt(1) 000 00:43:39:837:TX:123
 - Pkt(2) 000 00:44:11:669:TX:123
- Log entries for Port 2 RX/TX Packets (first 128 packets, max of 128 bytes):
 - No data
- Log entries for Port 3 RX/TX Packets (first 128 packets, max of 128 bytes):
 - No data
- Log entries for Port 4 RX/TX Packets (first 128 packets, max of 128 bytes):
 - No data

Figure 43 Serial log