

# How to Configure the MGate 5114 with IEC 60870-5-104 SCADA

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### About Moxa

Moxa is a leading provider of edge connectivity, industrial networking, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things. With over 30 years of industry experience, Moxa has connected more than 50 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures. Information about Moxa’s solutions is available at [www.moxa.com](http://www.moxa.com).

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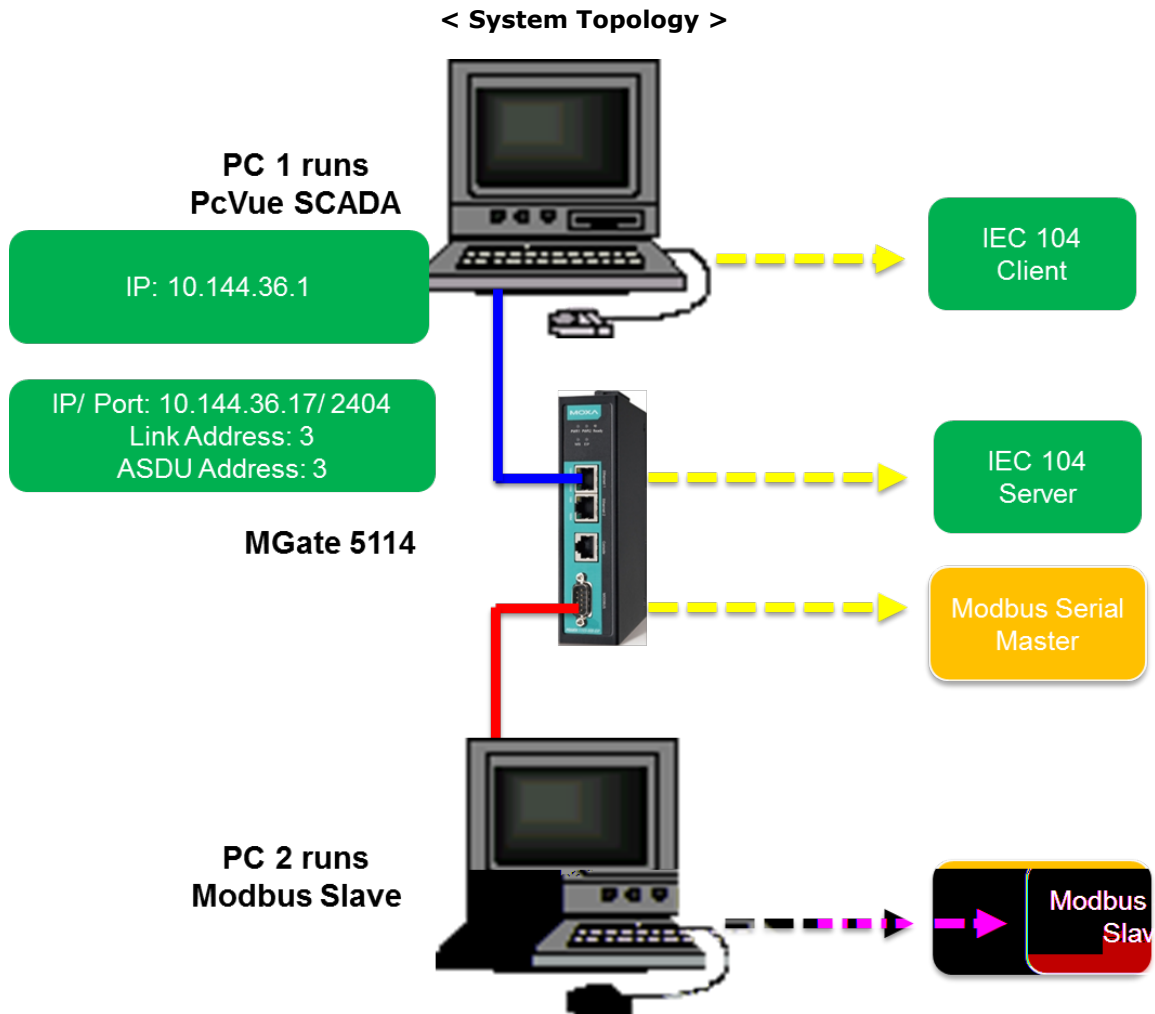


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# 1 System Topology

This technical note demonstrates how to use the **MGate 5114** to communicate with **IEC 60870-5-104 SCADA**. We use **PcVue SCADA** as an IEC 60870-5-104 Client to monitor remote Modbus RTU via the MGate 5114. In this topology, it shows how the MGate 5114 converts between **IEC 60870-5-104 Client** and **Modbus RTU Slave**.



## 2 Protocol Simulators

### 2.1 PcVue SCADA

**PcVue SCADA** system is published by **ARC Informatique**. We use Version **11.1** in this demo. It has an IEC 60870-5-104 built-in driver for IEC 60870-5-104 communication.

### 2.2 Modbus Slave

**Modbus Slave** is the very popular Modbus slave simulator for testing and debugging your Modbus devices. It supports Modbus RTU/ASCII and Modbus TCP/IP.

**Download website:** <http://www.modbustools.com/download.html>

## 3 Simulation of Modbus Slave Settings

In the topology, PC2 runs **Modbus Slave** and connects to the MGate 5114's serial port.

The serial parameters are defined as: **115200, 8/N/1, RS-485 (2-wire)**

We simulate various Modbus devices with different slave IDs.

< SP Definition, Slave ID 1 >

	Alias	0x0000
1	SP 1	0
2		

< DP Definition, Slave ID 2 >

	Alias	0x0000
1	DP 1_OFF	0
2	DP 1_On	0

< Step Definition, Slave ID 3 >

	Alias	4x0000
1	Step 1	0
2		

(Display: Signed)

< BS32 Definition, Slave ID 4 >

	Alias	4x0000
1	BS32 1	0x0000
2		0x0000

(Display: Hex)

< MN Definition, Slave ID 5 >

	Alias	4x0000
1	MN 1	0x0000
2		

(Display: Hex)

< MS Definition, Slave ID 6 >

	Alias	4x0000
1	MS 1	0
2		

(Display: Signed)

< MF Definition, Slave ID 7 >

	Alias	4x0000
1	MF 1	0
2		--

(Display: Float CD AB)

< Counter Definition, Slave ID 8 >

	Alias	4x0000
1	Counter 1	0
2		--

(Display: Long CD AB)

## 4 MGate 5114 Settings

For the MGate’s 5114 settings, we should access the web console to configure. Here are the configuration steps:

- Step 1. Configuration of serial parameters (Serial Settings)
- Step 2. Protocol selection (Protocol Conversion)
- Step 3. Configuration of protocol 1 (Modbus RTU Master Settings)
- Step 4. Configuration of protocol 2 (IEC 60870-5-104 Server Settings)
- Step 5. I/O data mapping

### Step 1. Configuration of Serial Parameters (Serial Settings)

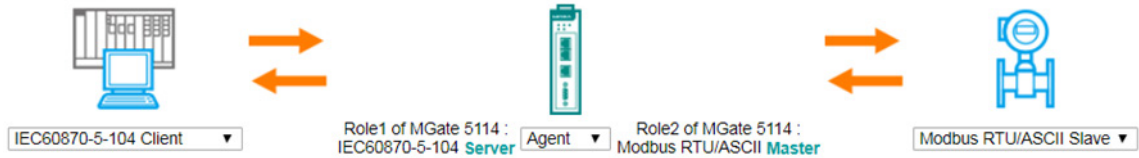
Go to **Serial Settings** to configure the serial parameters, which should be the same as your Modbus device. Here, we configure it as: **115200, 8/N/1, RS-485 (2-wire)**

#### Serial Settings

Port	Baud rate	Parity	Data bit	Stop bit	Flow control	FIFO	Interface
1	115200	None	8	1	None	Enable	RS-485 2-wire

### Step 2. Protocol Selection (Protocol Conversion)

For a protocol gateway, we have to configure each protocol's role that should be selected here. This is an example of converting from Modbus RTU to IEC 60870-5-104. After protocol selection, the next steps are to configure each side of the MGate.



### Step 3. Configuration of Protocol 1 (Modbus RTU Master Settings)

In Modbus RTU Master Settings, the related parameters can be configured. Here, we use the default settings. For details, you can refer to the user's manual.

**Role** Master

**Mode** RTU ▼

**Master Settings**

<b>Initial delay</b>	<input type="text" value="0"/>	(0 - 30000 ms)
<b>Max. retry</b>	<input type="text" value="3"/>	(0 - 5)
<b>Response timeout</b>	<input type="text" value="1000"/>	(10 - 120000 ms)
<b>Inter-frame delay</b>	<input type="text" value="0"/>	(10 - 500 ms, 0: default)
<b>Inter-character timeout</b>	<input type="text" value="0"/>	(10 - 500 ms, 0: default)

Then, we have to monitor and control the Modbus slave device. Therefore, Modbus commands should be configured. The Modbus commands are shown as below:

**Modbus Commands**

+ Add
✎ Edit
📄 Clone
🗑 Delete
↕ Move

Index	Name	Slave ID	Function	Address / Quantity	Trigger	Poll Interval	Endian Swap
1	ReadSP	1	1	Read address 0, Quantity 1	Cyclic	1000	None
2	WriteSP	1	5	Write address 0, Quantity 1	Data Change	N/A	None
3	ReadDP	2	1	Read address 0, Quantity 2	Cyclic	1000	None
4	WriteDP	2	15	Write address 0, Quantity 2	Data Change	N/A	None
5	ReadStep	3	3	Read address 0, Quantity 1	Cyclic	1000	None
6	WriteStep	3	6	Write address 0, Quantity 1	Data Change	N/A	None
7	ReadBS32	4	3	Read address 0, Quantity 2	Cyclic	1000	None
8	WriteBS32	4	16	Write address 0, Quantity 2	Data Change	N/A	None
9	ReadMN	5	3	Read address 0, Quantity 1	Cyclic	1000	None
10	WriteMN	5	6	Write address 0, Quantity 1	Data Change	N/A	None
11	ReadMS	6	3	Read address 0, Quantity 1	Cyclic	1000	None
12	WriteMS	6	6	Write address 0, Quantity 1	Data Change	N/A	None
13	ReadMF	7	3	Read address 0, Quantity 2	Cyclic	1000	None
14	WriteMF	7	16	Write address 0, Quantity 2	Data Change	N/A	None
15	ReadCounter	8	3	Read address 0, Quantity 2	Cyclic	1000	None

### Step 4. Configuration of Protocol 2 (IEC 60870-5-104 Server Settings)

In **IEC 60870-5-104 Sever Settings**, there are **Basic Settings** and **Advanced Settings**.

For **Basic Settings**, we configure the parameters as below:

- COT size as "2"
- ASDU address as "3"
- Listen Port as **2404** port.

**Basic Settings**

COT size	<input type="radio"/> 1 <input checked="" type="radio"/> 2
ASDU address	<input type="text" value="3"/> (1 - 65534)
Listen port	<input type="text" value="2404"/> (1024 - 60000)

For **Advanced Settings**, we configure the parameters as below:

**Advanced Settings - Application Layer**

Enable cse active termination	<input type="text" value="Enable"/>
Enable cmd active termination	<input type="text" value="Enable"/>
Select timeout	<input type="text" value="10"/> (0 - 600 s)
General interrogation time tag	<input type="text" value="56bits"/>
Event time stamp	<input type="text" value="56bits"/>
Measured value(N) cyclic interval	<input type="text" value="0"/> (0 - 2073600 s)
Measured value(S) cyclic interval	<input type="text" value="0"/> (0 - 2073600 s)
Measured value(F) cyclic interval	<input type="text" value="0"/> (0 - 2073600 s)
Point Status Timeout	<input type="text" value="60"/> (5 - 3600 s, 0 for disable)
Endian Swap	<input type="text" value="Byte"/>

**Note:** If the data can't be read correctly, it may be caused by the big-endian/little-endian. You can try to adjust the **Endian Swap** parameters. The default value "Byte" is for most scenarios.

The Modbus RTU slave values need to be monitored or controlled by IEC 60870-5-104 Client. At this stage, we have to plan the data mapping table between IEC 60870-5-104 and Modbus RTU. The mapping table should show as below:

Mapping IEC 60870-5-104 Data Object	Modbus Data Type	Modbus Command	Points Mapping
Single Points	Coil	ReadSP, WriteSP	SP 1 → Coil 1
Double Points	Coil	ReadDP, WriteDP	DP 1 → Coil 1~2
Step position	Register	ReadStep, WriteStep	Step 1 → Register 1
Bitstring32	Register	ReadBS32, WriteBS32	BS32 1 → Register 1 and 2
Measure value(N)	Register	ReadMN, WriteMN	MN 1 → Register 1
Measure value(S)	Register	ReadMS, WriteMS	MS 1 → Register 1
Measure value(F)	Register	ReadMF, WriteMF	MF 1 → Register 1 and 2
Integrated totals	Register	ReadCounter	Counter 1 → Register 1 and 2

Based on the above mapping table, we have to set **Object Point Numbers** in IEC 60870-5-104 as below:

Point Settings

+ Add
✎ Edit
📄 Clone
🗑 Delete
↕ Move

Index	Memory Access		Object Type	IOA
1	Read	Write	Single point	1 - 1
2	Read	Write	Double point	1 - 1
3	Read	Write	Step position	1 - 1
4	Read	Write	Bitstring of 32 bit	1 - 1
5	Read	Write	Measure value(N)	1 - 1
6	Read	Write	Measure value(S)	1 - 1
7	Read	Write	Measure value(F)	1 - 1
8	Read	Write	Integrated totals	1 - 1




### Step 5. I/O Data Mapping


After protocol 1 and 2 settings, go to **I/O Data Mapping** to check whether the mapping table is correct. There are two dataflow directions; they are "Read" and "Write" respectively. In this table, make sure all of IEC 60870-5-104 object points are mapping to Modbus commands correctly.

**Data flow direction** IEC60870-5-104 Client --> Modbus RTU/ASCII Slave


**Mapping address arrangement** Automatic




Your device :  
IEC60870-5-104 Client




**write**





**write**




Your device :  
Modbus RTU/ASCII Slave

Type	IOA	Internal Address	Data Size
Single point (value)	1 - 1	0 .. 0	1 bytes
Double point (value)	1 - 1	1 .. 1	1 bytes
Step position (value)	1 - 1	2 .. 3	2 bytes
Bitstring of 32 bit (value)	1 - 1	4 .. 7	4 bytes
Measure value(N) (value)	1 - 1	8 .. 9	2 bytes
Measure value(S) (value)	1 - 1	10 .. 11	2 bytes
Measure value(F) (value)	1 - 1	12 .. 15	4 bytes


Name	Function	Internal Address	Quantity
WriteSP	5	0 .. 0	1 bytes
WriteDP	15	1 .. 1	1 bytes
WriteStep	6	2 .. 3	2 bytes
WriteBS32	16	4 .. 7	4 bytes
WriteMN	6	8 .. 9	2 bytes
WriteMS	6	10 .. 11	2 bytes
WriteMF	16	12 .. 15	4 bytes

**Data flow direction** IEC60870-5-104 Client <-- Modbus RTU/ASCII Slave


**Mapping address arrangement** Automatic




Your device :  
IEC60870-5-104 Client




**read**





**read**



Your device :  
Modbus RTU/ASCII Slave

Type	IOA	Internal Address	Data Size
Single point (value)	1 - 1	0 .. 0	1 bytes
Double point (value)	1 - 1	1 .. 1	1 bytes
Step position (value)	1 - 1	2 .. 3	2 bytes
Bitstring of 32 bit (value)	1 - 1	4 .. 7	4 bytes
Measure value(N) (value)	1 - 1	8 .. 9	2 bytes
Measure value(S) (value)	1 - 1	10 .. 11	2 bytes
Measure value(F) (value)	1 - 1	12 .. 15	4 bytes
Integrated totals (value)	1 - 1	16 .. 19	4 bytes

Name	Function	Internal Address	Quantity
ReadSP	1	0 .. 0	1 bytes
ReadDP	1	1 .. 1	1 bytes
ReadStep	3	2 .. 3	2 bytes
ReadBS32	3	4 .. 7	4 bytes
ReadMN	3	8 .. 9	2 bytes
ReadMS	3	10 .. 11	2 bytes
ReadMF	3	12 .. 15	4 bytes
ReadCounter	3	16 .. 19	4 bytes


For example, Modbus RTU Master sends a “ReadSP” to read the value from the Modbus slave device. If IEC 60870-5-104 Client wants to read the value through the “Single point IOA 1”, **the settings of internal address should be the same.** If you want to make adjustments, please change the default arrangement “Automatic” to “Manual” first, then you can adjust the Internal Address.

Data flow direction IEC60870-5-104 Client <-- Modbus RTU/ASCII Slave ▼


---

Mapping address arrangement Automatic ▼


---




Your device :  
IEC60870-5-104 Client




**Role 1 of MGate 5114 :**  
IEC60870-5-104 Server





**Role 2 of MGate 5114 :**  
Modbus RTU/ASCII Master



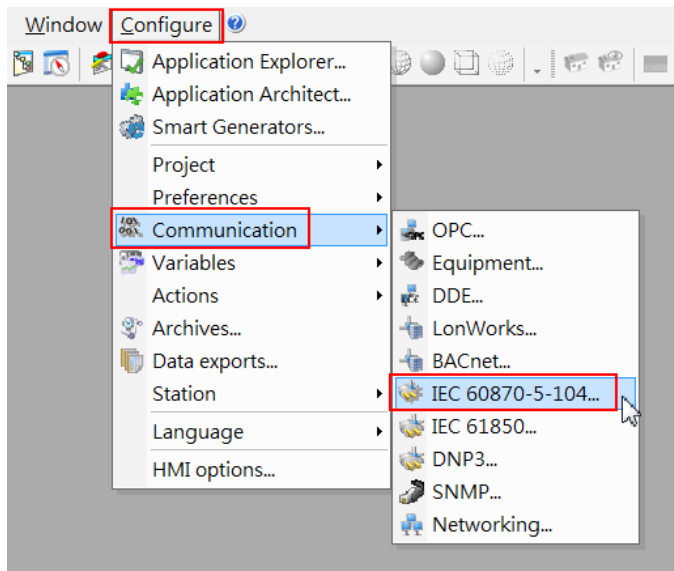
Your device :  
Modbus RTU/ASCII Slave

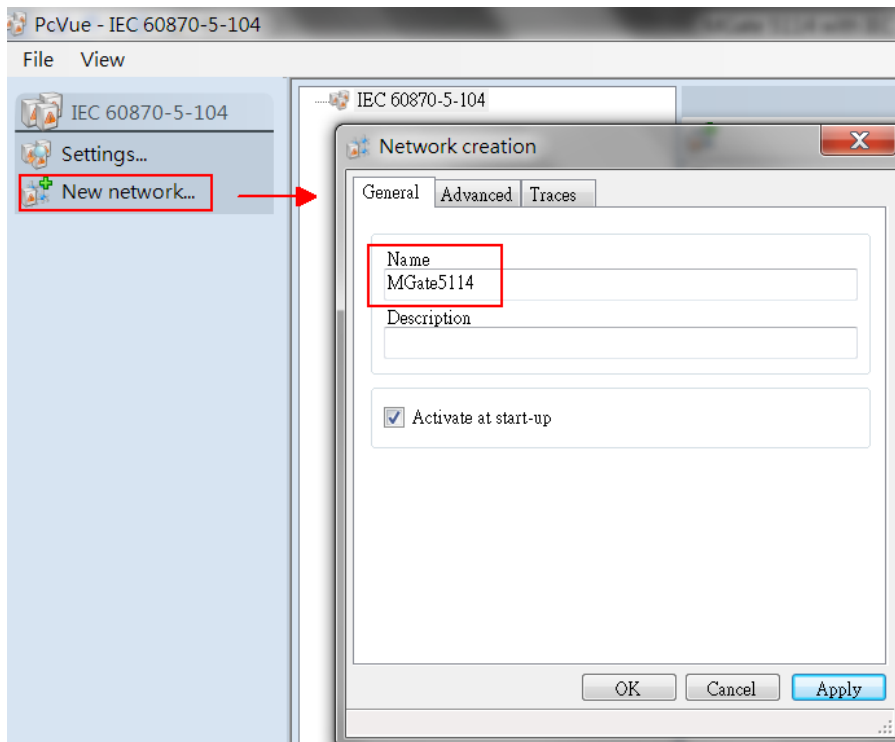
Type	IOA	Internal Address	Data Size	Name	Function	Internal Address	Quantity
Single point (value)	1 - 1	0 .. 0	1 bytes	ReadSP	1	0 .. 0	1 bytes
Double point (value)	1 - 1	1 .. 1	1 bytes	ReadDP	1	1 .. 1	1 bytes
Step position (value)	1 - 1	2 .. 3	2 bytes	ReadStep	3	2 .. 3	2 bytes
Bitstring of 32 bit (value)	1 - 1	4 .. 7	4 bytes	ReadBS32	3	4 .. 7	4 bytes
Measure value(N) (value)	1 - 1	8 .. 9	2 bytes	ReadMN	3	8 .. 9	2 bytes
Measure value(S) (value)	1 - 1	10 .. 11	2 bytes	ReadMS	3	10 .. 11	2 bytes
Measure value(F) (value)	1 - 1	12 .. 15	4 bytes	ReadMF	3	12 .. 15	4 bytes
Integrated totals (value)	1 - 1	16 .. 19	4 bytes	ReadCounter	3	16 .. 19	4 bytes

## 5 Simulation of IEC 60870-5-104 Setting by PcVue

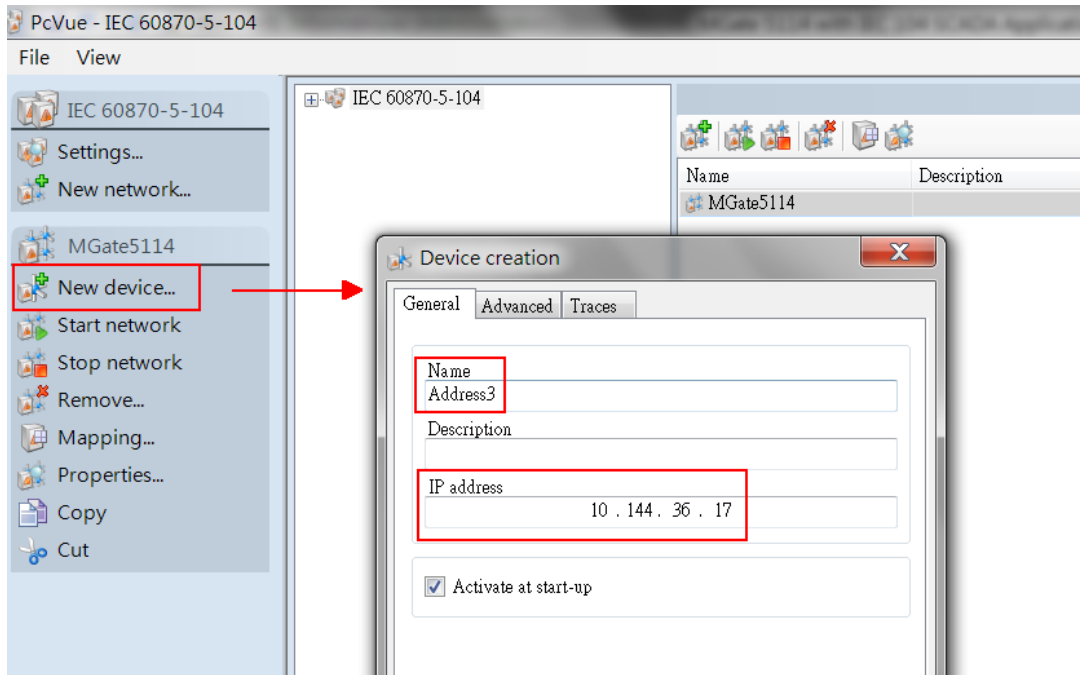
Here, PC1 runs PcVue as IEC 60870-5-104 Client, trying to connect the MGate 5114. The following shows how to configure IEC 60870-5-104 Client. For PcVue, click **Configure** → **Communication** → **IEC 60870-5-104** to establish a connection.



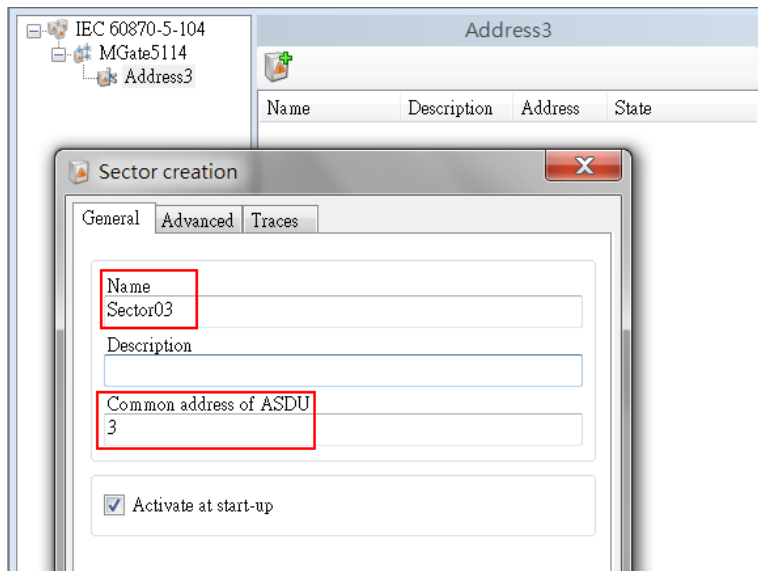
Click **"New network"** to add an IEC 60870-5-104 network.



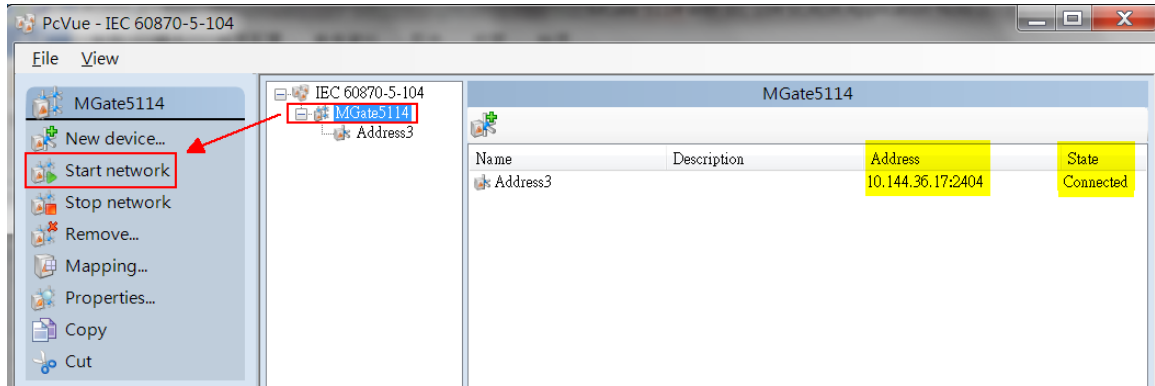
Click "New device" to create a device. Input name and input the MGate 5114's IP address.



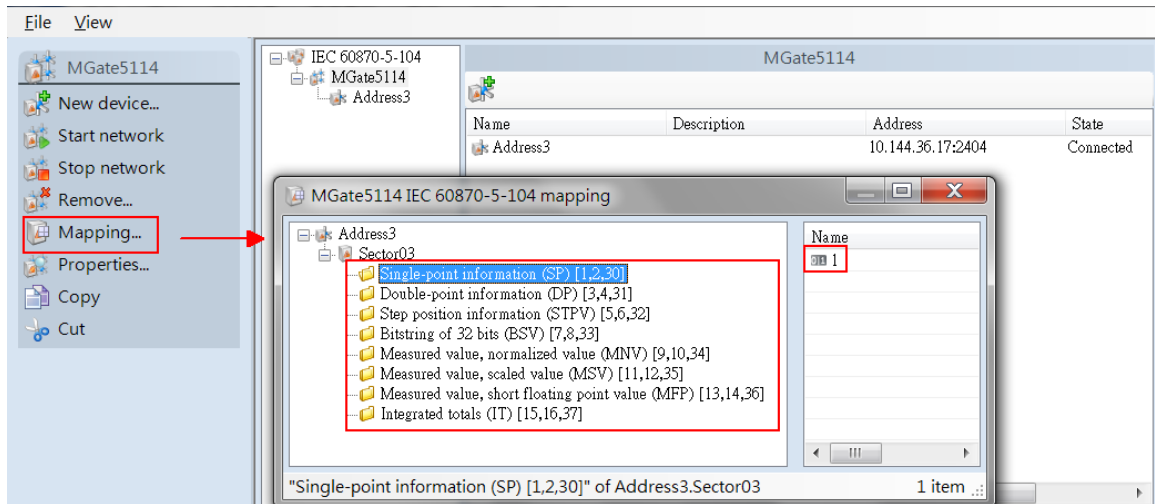
Click "Add Sector" to create a Sector. Input "Common address of ASDU" as 3, which is the same as that of the MGate 5114.



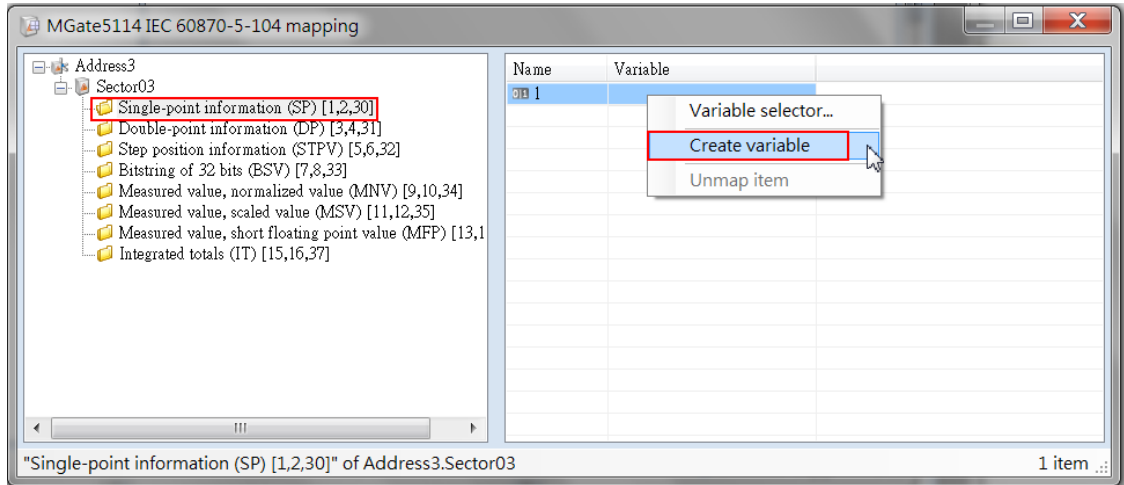
Select MGate5114 network, click "Start network" and SCADA will try to connect the MGate 5114. If the MGate 5114 is connected, the State would show "Connected".



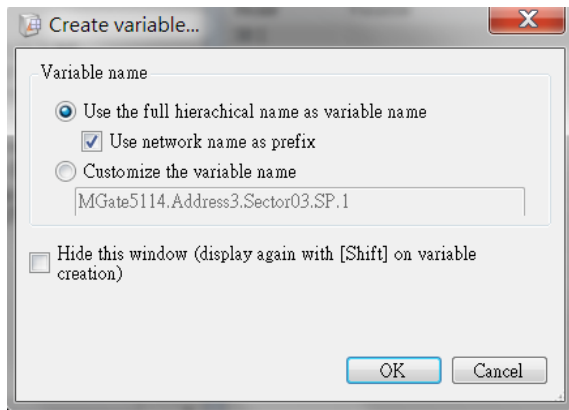
Click **Mapping** and an IEC 60870-5-104 object window will pop up. You can see several object points that are detected by the PcVue after making a connection according to the IEC 60870-5-104 communication characteristics. The objects include single-point information, double-point information, etc. They should be the same IEC 60870-5-104 server objects (MGate 5114).



Create variables to show the values for these points with the following steps:  
For example, choose Single Point IOA 1, right-click and select **"Create variable"**.

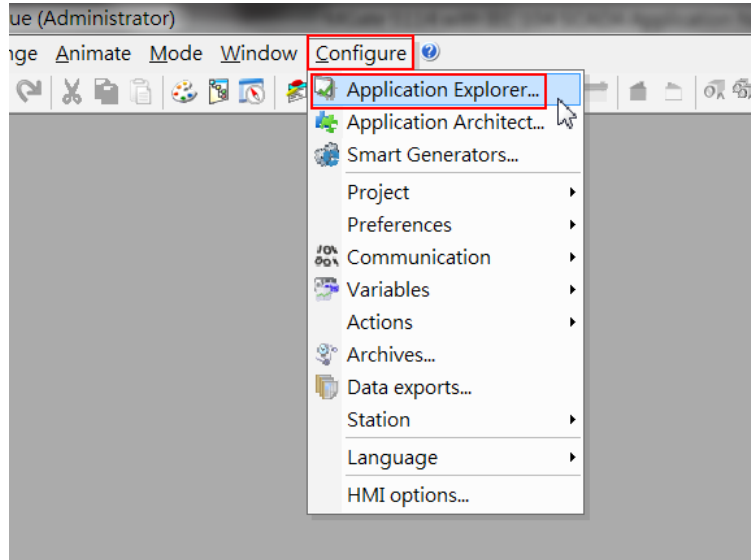


Choose **"Use the full hierarchical name"** and click **OK**.

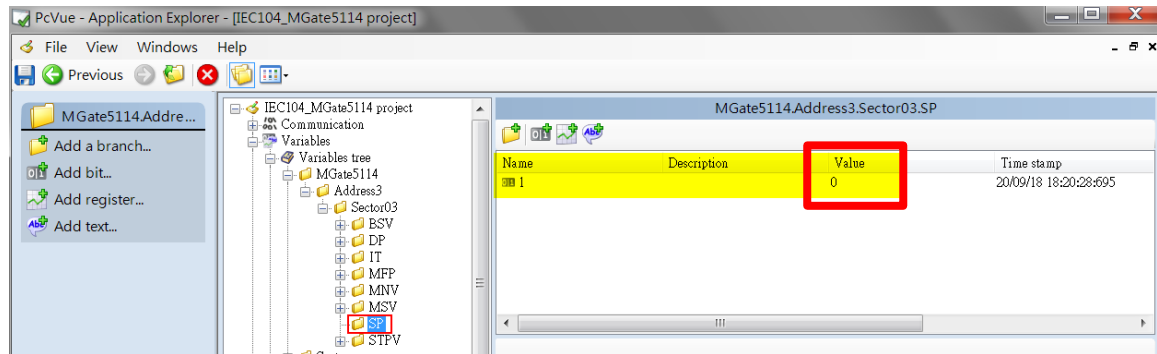


Use the same method to create variables for other object points.

**Open Configure → Application Explorer Windows.**



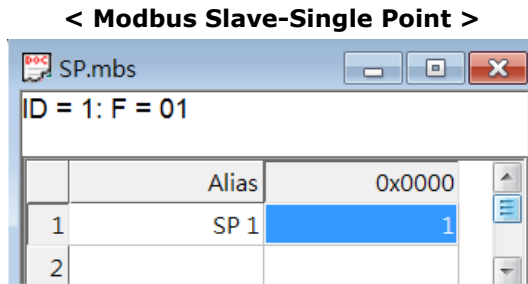
We can check each object's value as below:



## 6 Communication Test

### 6.1 Read Single-Point Test

Modify Modbus Slave ID 1's Alias SP 1 status from 0(OFF) → 1(ON) as below:



You can go to the Diagnose page to check whether the value has been updated in the MGate IEC 60870-5-104 server.

**<MGate IEC 60870-5-104 Diagnose>**

### ⚙️ IEC60870-5-104 Server Diagnose

Auto refresh

**Server Statistics**

Error Message	OK
Received Requests	59
Sent Non-spontaneous Responses	426
Sent Spontaneous Responses	2
Connected Client IP	10.144.36.1

**Point Information**

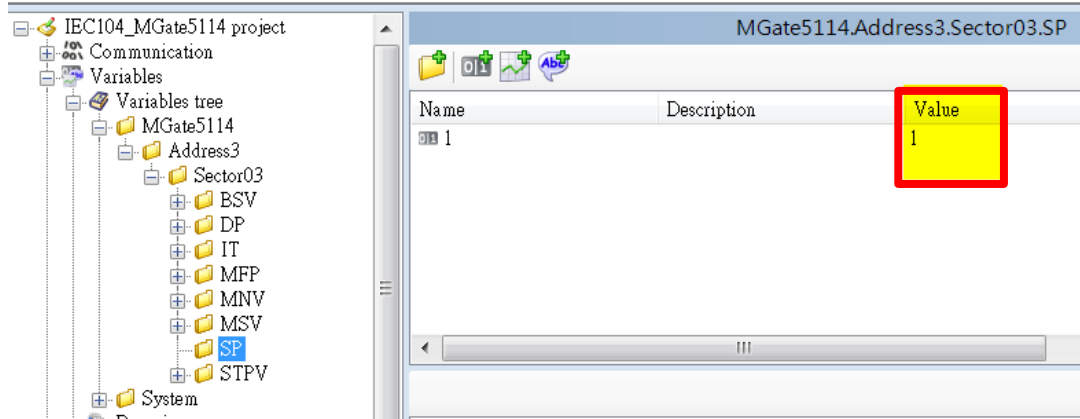
Single Point ▼

IOA	Value	Flags	Time Tag	Point Status	Time Updated
1	ON	VALID	2018-09-20 17:57:37	OK	2018-09-20 17:57:37



PcVue as IEC 60870-5-104 Client shows receiving the value "1(ON)" in the object.

< PcVue SCADA Single Point Status >



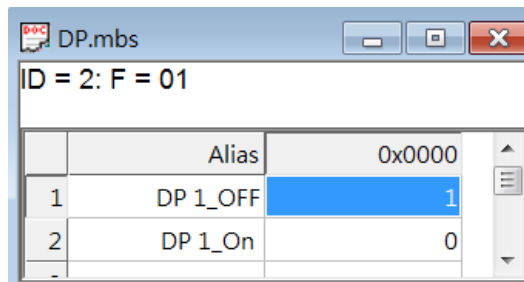
6.2 Read Double Point Test

Double point indicates 2-bit status; the status shows in the table below:

0 0	Indeterminate or intermediate state
1 0	Determined state <b>OFF (0)</b>
0 1	Determined state <b>ON (1)</b>
1 1	Indeterminate state

Modify Modbus Slave ID 2's Alias DP 1\_Off status as "1" as below:

< Modbus Slave-Double Point >



Check the following status in the MGate's diagnose page

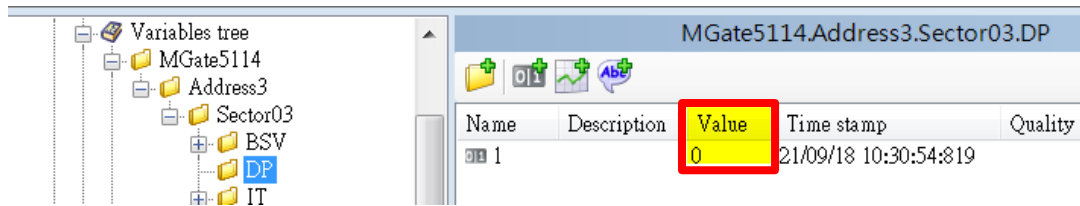
<MGate IEC 60870-5-104 Diagnose >

Point Information

Double Point ▾

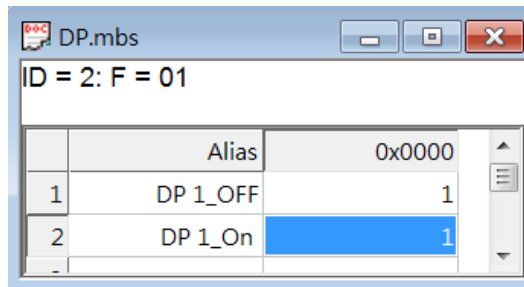
IOA	Value	Flags	Time Tag	Point Status	Time Updated
1	Off	VALID	2018-09-21 10:30:53	OK	2018-09-21 10:30:53

< PcVue SCADA Double Point Status >



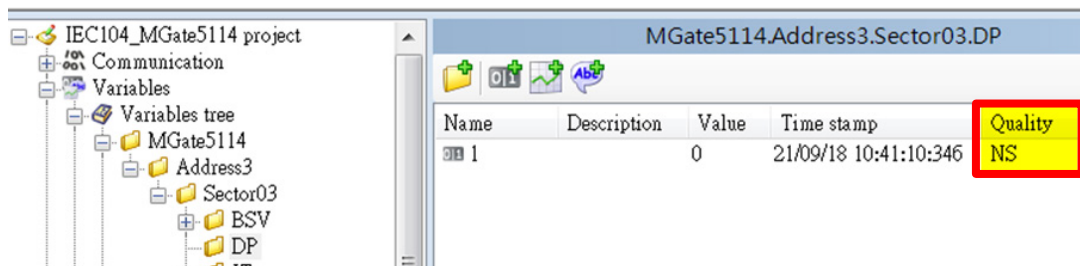
Modify Modbus Slave ID 2's Alias DP 1\_On status as "1" as below:

< Modbus Slave-Double point >



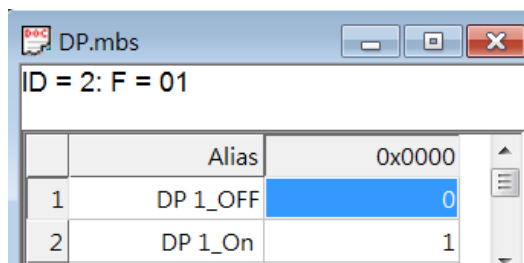
Check PcVue DP 1 status: its value is still 0, but Quality is "NS". It means this DP status is under "Indeterminate" State.

< PcVue SCADA Double Point Status >



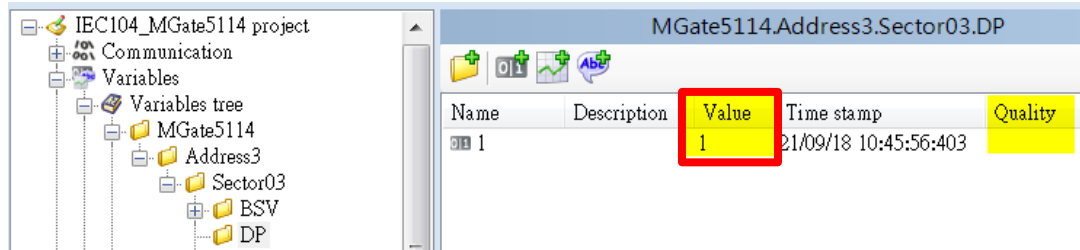
Modify Modbus Slave ID 2's Alias DP 1\_OFF status as "0" as below:

< Modbus Slave-Double Point >



Check PcVue DP 1 status; its value is 1:

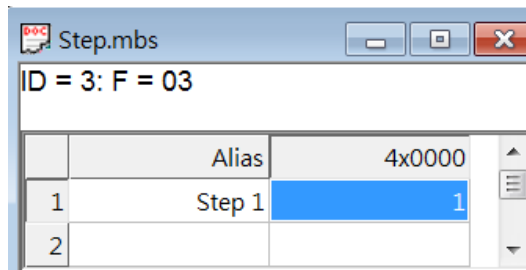
< PcVue SCADA Double Point Status >



6.3 Read Step Position Test

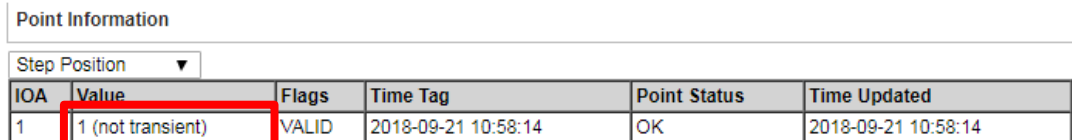
Modify Modbus Slave ID 3's Alias Step 1 status as "1" as below:

< Modbus Slave-Step Position Point >



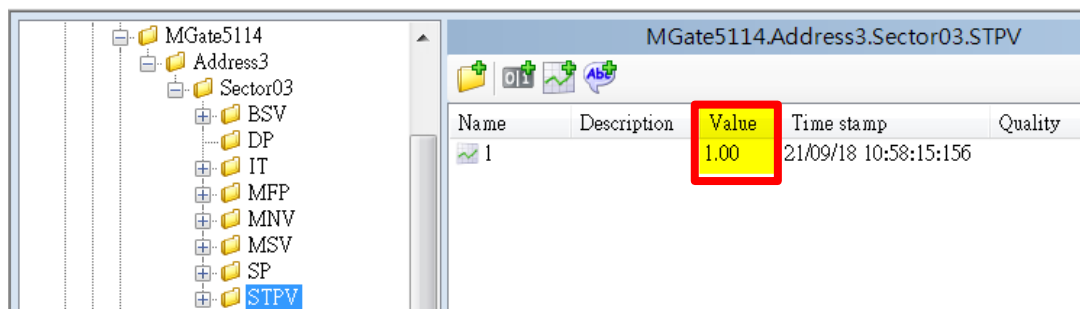
Check following status in the MGate's Diagnose page:

< MGate IEC 60870-5-104 Diagnose >



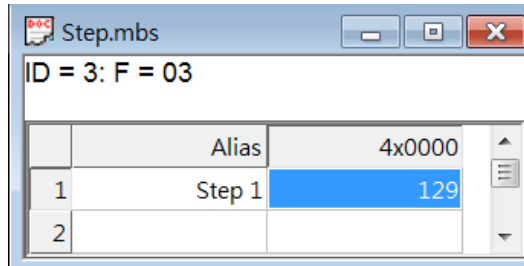
Check PcVue DP 1 status; its value is 1:

< PcVue SCADA Step Position Status >



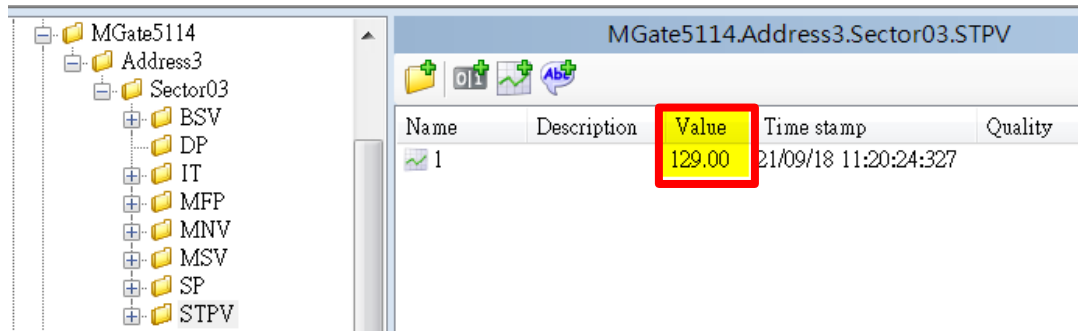
Modify Modbus Slave ID 3's Alias Step 1 status as "129" as below:

< Modbus Slave-Step Position Point >



PcVue shows this point's raw data as 129.

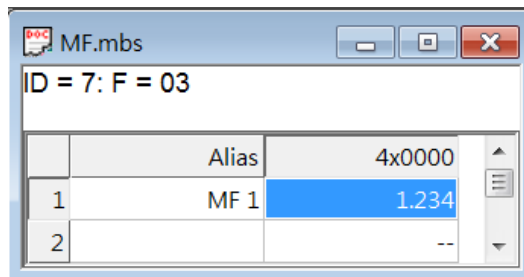
< PcVue SCADA Step Position Status >



6.4 Read MF Test

Modify Modbus Slave ID 7's Alias MF 1 status as "1.234" as below:

< Modbus Slave-MF Point >



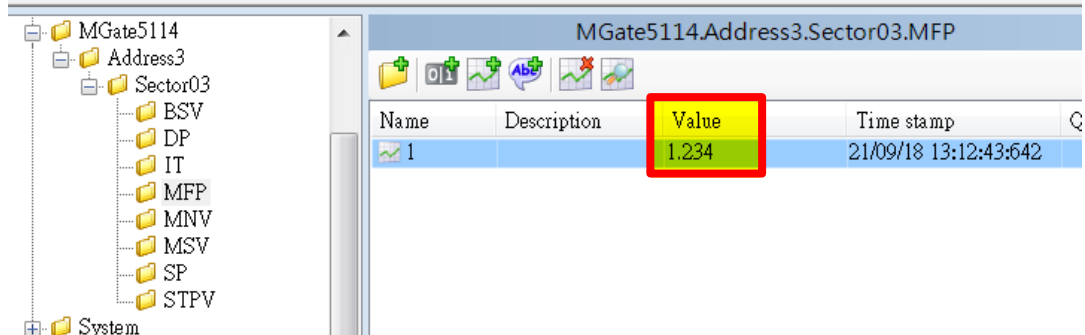
Check the following status in the MGate's diagnose page

<MGate IEC 60870-5-104 Diagnose>

Point Information					
Measure Value(F)					
IOA	Value	Flags	Time Tag	Point Status	Time Updated
1	1.234	VALID	2018-09-21 13:12:43	OK	2018-09-21 13:12:43

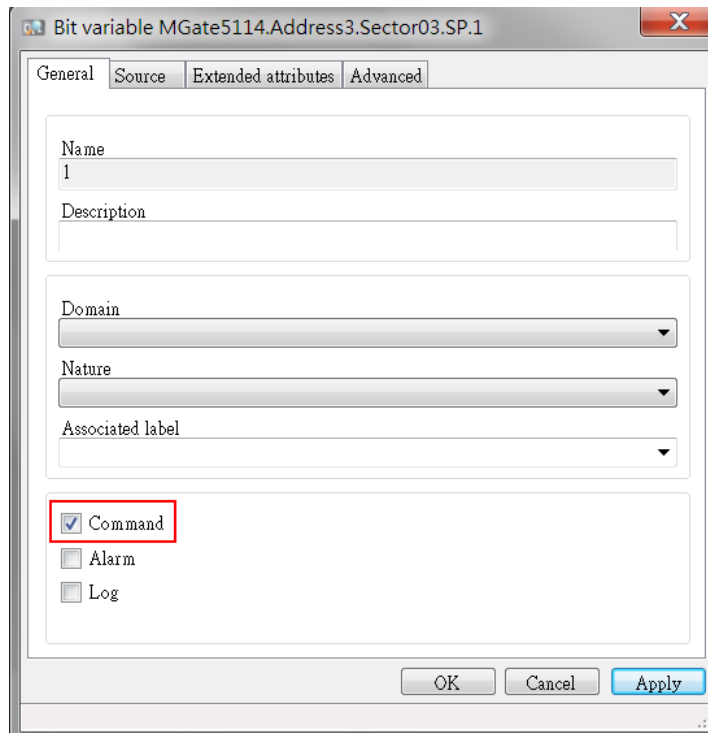
The value has been changed to 1.234

< PcVue SCADA Step Position Status >

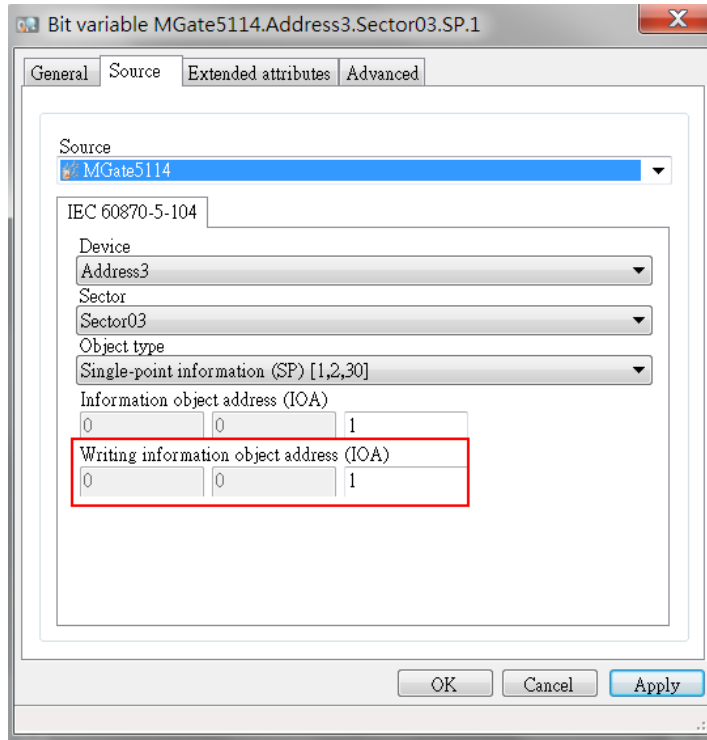


### 6.5 Write SP Test

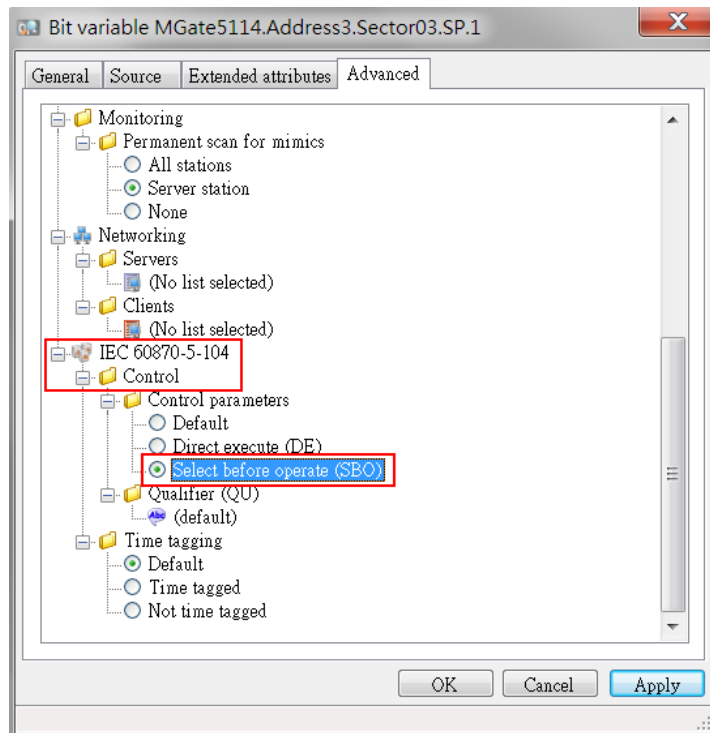
In order for the variable to trigger a command, we should enable "Command" property. In the "General" tab, enable "Command".



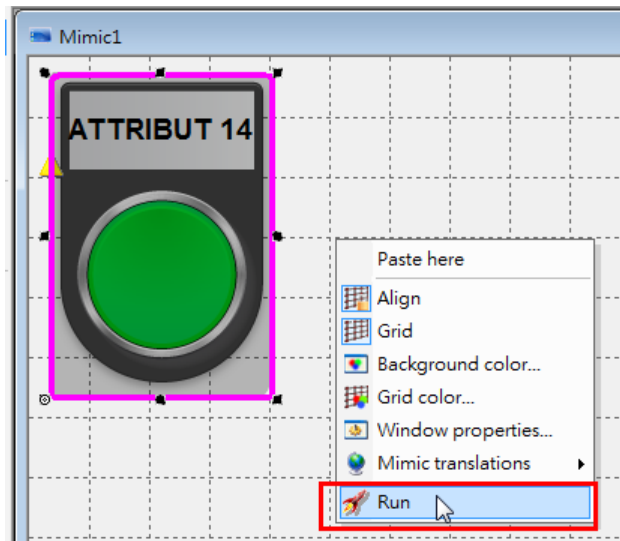
In the "Source" tab, modify "Write information object address (IOA)" as 1:



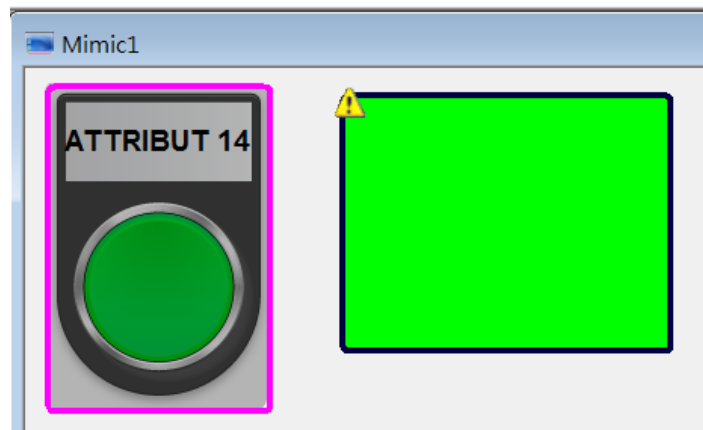
In the "Advanced" tab, choose "Select before operate (SBO)" under IEC 60870-5-104 → Control:



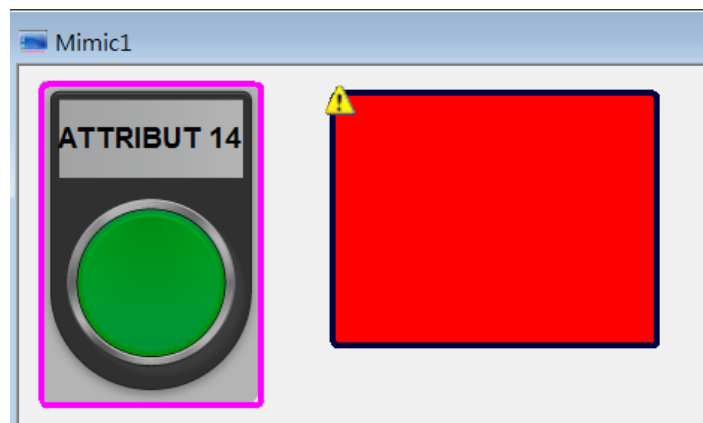
Right-click on Mimic to execute "Run" mode.



The rectangle will be Green, standing for SP 1 "1(On)".



Click the button, the rectangle will then be Red, standing for SP 1 "0(Off)".



We can then check the following status:

<MGate IEC 60870-5-104 Diagnose>

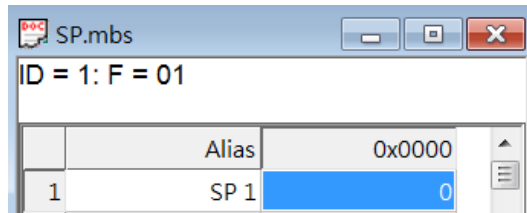
Point Information

Single Point ▾

IOA	Value	Flags	Time Tag	Point Status	Time Updated
1	OFF	VALID	2018-09-21 16:23:00	OK	2018-09-21 16:23:01

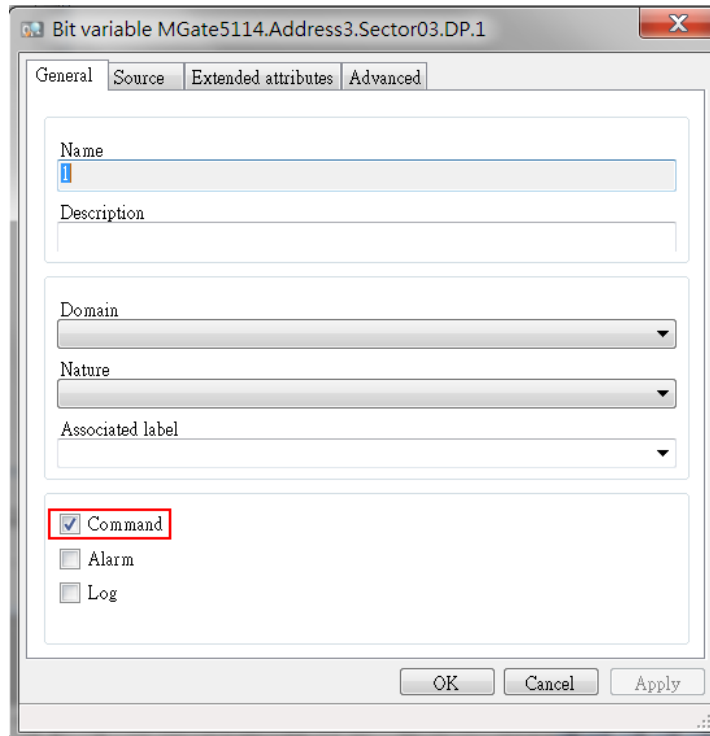
The value has been written to the Modbus Slave:

< Modbus Slave-Single Point >



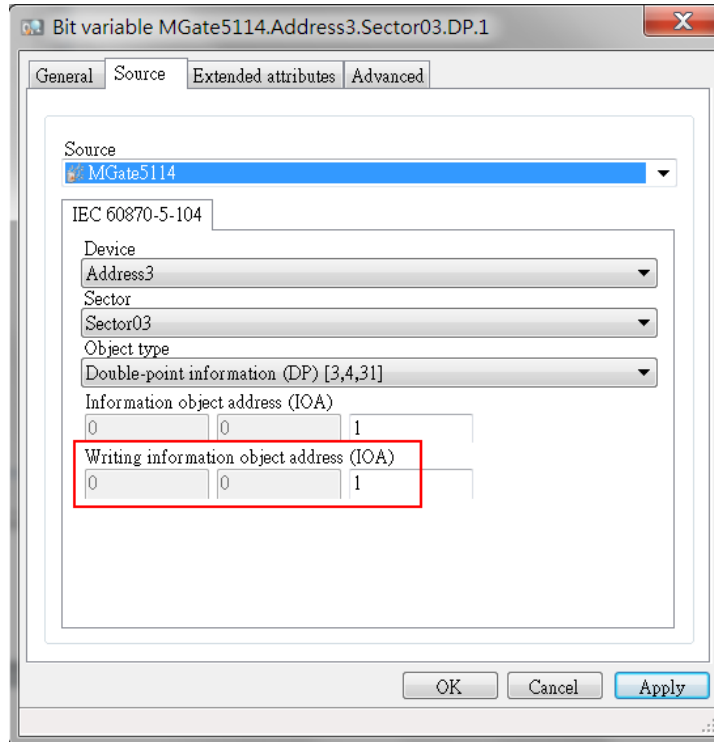
### 6.6 Write DP Test

In DP 1's General tab, enable "Command".

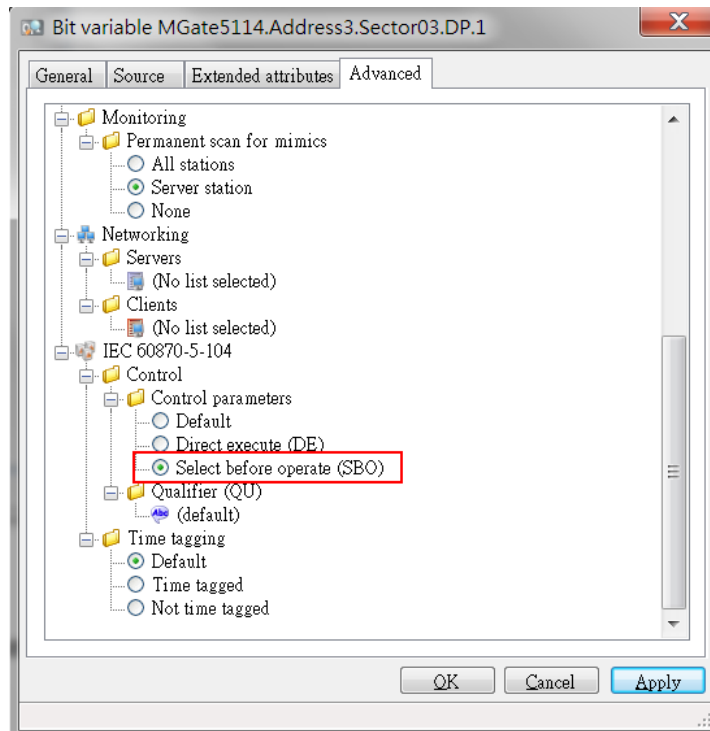




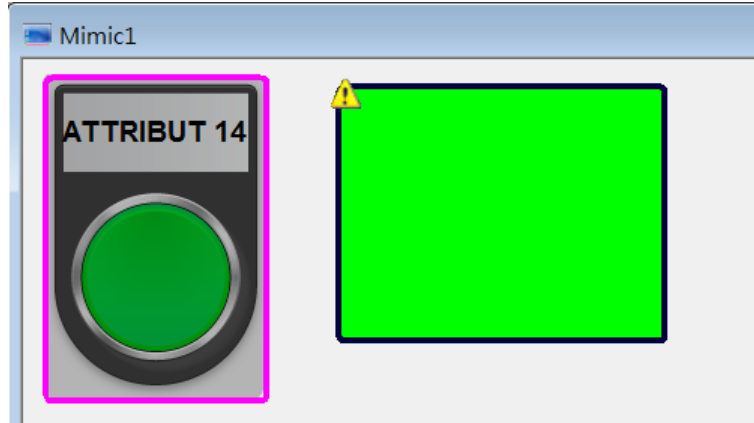
In the Source tab, modify "Write information object address (IOA)" as 1:



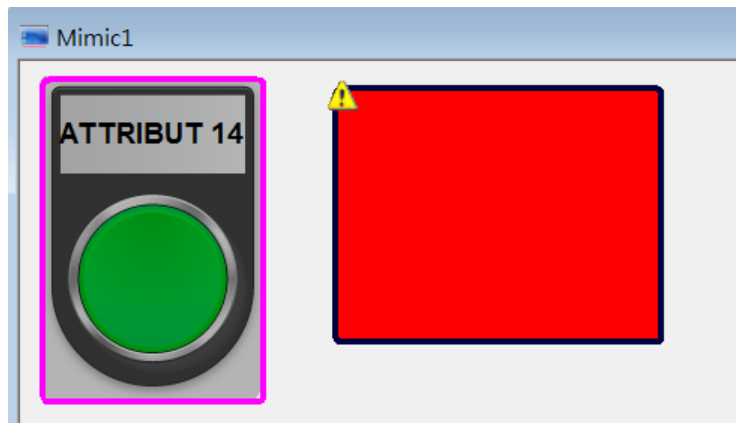
In the Advanced tab, choose "Select before operate (SBO)" under IEC 60870-5-104 → Control:



Right-click on Mimic to execute "Run" mode. The rectangle shows Green, standing for DP 1 "1(On)".



Click the button. The rectangle's turns Red, standing for DP 1 "0(Off)".



When Double Point shows "Off", we can check the following status:

**<MGate IEC 60870-5-104 Diagnose>**

Point Information

Double Point ▾

IOA	Value	Flags	Time Tag	Point Status	Time Updated
1	Off	VALID	2018-09-21 17:03:06	OK	2018-09-21 17:03:07

< Modbus Slave-Double Point >

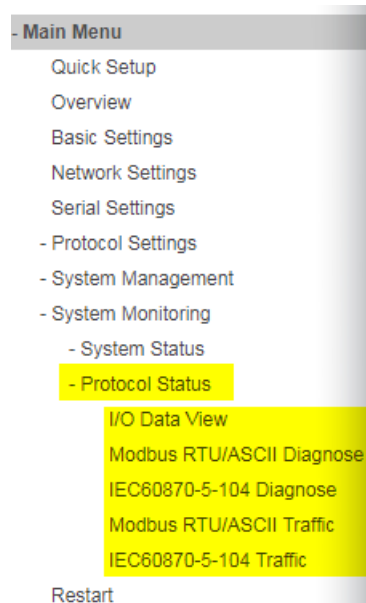
	Alias	0x0000
1	DP 1_OFF	1
2	DP 1_On	0

## 7 Troubleshooting Tool

### 7.1 MGate Protocol Diagnose Introduction

In the MGate 5114 web console, there is "Protocol Status" to diagnose Protocol Status, which include two powerful troubleshooting tools, "Protocol Diagnose" and "Protocol Traffic", as below:

< Protocol Status >



In the "IEC 60870-5-104 Diagnose" web page, we can monitor IEC 60870-5-104 Server connection status and the Object Points status.

< IEC 60870-5-104 Server Diagnose >

### ⚙️ IEC60870-5-104 Server Diagnose

Auto refresh

#### Server Statistics

Error Message	OK
Received Requests	21
Sent Non-spontaneous Responses	148
Sent Spontaneous Responses	0
Connected Client IP	10.144.36.1

#### Point Information

Single Point ▾

IOA	Value	Flags	Time Tag	Point Status	Time Updated
1	OFF	VALID	2018-09-20 16:29:15	OK	2018-09-20 16:30:28

## 7.2 MGate Traffic Monitor Introduction

In the "IEC 60870-5-104 Traffic" web page or "Modbus RTU Traffic" web page, these running communication traffics can be captured by clicking "Start". After clicking "Stop", we can export them in TXT file or PCAP file formats. the PCAP file can be executed by Wireshark tool, which helps to analyze the data easily.

### ⚙️ IEC60870-5-104 Traffic

Auto scroll

Ready to capture.

No.	Time	Send/Receive	Remote IP : port	Data
1	0.968	Receive	10.144.36.1:31533	68 0E 02 00 04 00 64 01 06 63 03 00 00 00 14
2	0.979	Receive	10.144.36.1:31533	68 0E 04 00 04 00 64 01 07 63 03 00 00 00 14
3	0.979	Receive	10.144.36.1:31533	68 15 06 00 04 00 1E 01 14 63 03 00 01 00 00 00 B8 B5 89 09 94 09 12
4	0.979	Receive	10.144.36.1:31533	68 15 08 00 04 00 1F 01 14 63 03 00 01 00 00 00 B8 B5 89 09 94 09 12
5	0.980	Receive	10.144.36.1:31533	68 16 0A 00 04 00 20 01 14 63 03 00 01 00 00 01 00 B8 B5 89 09 94 09 12
6	0.980	Receive	10.144.36.1:31533	68 19 0C 00 04 00 21 01 14 63 03 00 01 00 00 00 00 00 B8 B5 89 09 94 09 12
7	0.980	Receive	10.144.36.1:31533	68 17 0E 00 04 00 22 01 14 63 03 00 01 00 00 00 00 B8 B5 89 09 94 09 12
8	0.980	Receive	10.144.36.1:31533	68 17 10 00 04 00 23 01 14 63 03 00 01 00 00 00 00 B8 B5 89 09 94 09 12
9	0.980	Receive	10.144.36.1:31533	68 19 12 00 04 00 24 01 14 63 03 00 01 00 00 00 00 00 B8 B5 89 09 94 09 12
10	0.980	Receive	10.144.36.1:31533	68 0E 14 00 04 00 64 01 0A 63 03 00 00 00 14
11	0.983	Receive	10.144.36.1:31533	68 04 01 00 06 00

### Modbus RTU/ASCII Traffic

Auto scroll

Start

Stop

Export TXT File

Export PCAP File

Ready to capture.

No.	Time	Send/Receive	Slave ID	Function Code	Data
1	0.043	Send	1	1	01 01 00 00 00 01 FD CA
2	0.084	Receive	1	1	01 01 01 00 51 88
3	0.133	Send	2	3	02 03 00 00 00 01 84 39
4	0.176	Receive	2	3	02 03 02 00 00 FC 44
5	0.182	Send	3	3	03 03 00 00 00 01 85 E8
6	0.225	Receive	3	3	03 03 02 00 01 00 44
7	0.243	Send	4	3	04 03 00 00 00 02 C4 5E
8	0.286	Receive	4	3	04 03 04 00 00 00 00 AF 33
9	0.312	Send	5	3	05 03 00 00 00 01 85 8E
10	0.355	Receive	5	3	05 03 02 00 00 49 84
11	0.373	Send	6	3	06 03 00 00 00 01 85 BD
12	0.415	Receive	6	3	06 03 02 00 00 0D 84
13	0.443	Send	7	3	07 03 00 00 00 02 C4 6D
14	0.486	Receive	7	3	07 03 04 00 00 00 00 9C 33
15	0.492	Send	8	3	08 03 00 00 00 02 C4 92
16	0.540	Receive	8	3	08 03 04 00 00 00 00 63 33