BNET-5304/5310
User's Manual v1.00

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1. General Information

1.1 BACnet Introduction

BACnet stands for Building Automation Control network which is a data communication protocol developed by ASHRAE, BACnet is known as "ANSI/ASHRAE standard 135-2001" and now also known as the international standard "ISO 16484-5." The protocol has been designed specifically to meet the communication needs of building automation and control systems for applications such as heating, ventilating, air-conditioning control…etc. Its purpose is also to standardize communications between building automation devices from different manufacturers, allowing data to be shared and equipment to work together easily.

1.2 About BNET-5304 and BNET-5310

The BNET-5304 and BNET-5310 are multi-function BACnet/IP modules. The BNET-5304 provides 6 AI channels, 1 AO channel, 4 DI channels and 4 DO channels. The BNET-5310 provides 4 AI channels, 2 AO channels, 3 DI channels and 3 DO channels. The modules contain number of BACnet objects (Device, AI, AO, BI, BO) with multiple BIBBS (DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM, DS-COV-B…etc.) supported. The modules also feature a built-in web server which allows remote configuration by using a regular web browser for an easy and safe access at anytime anywhere.

1.3 Hardware Specification

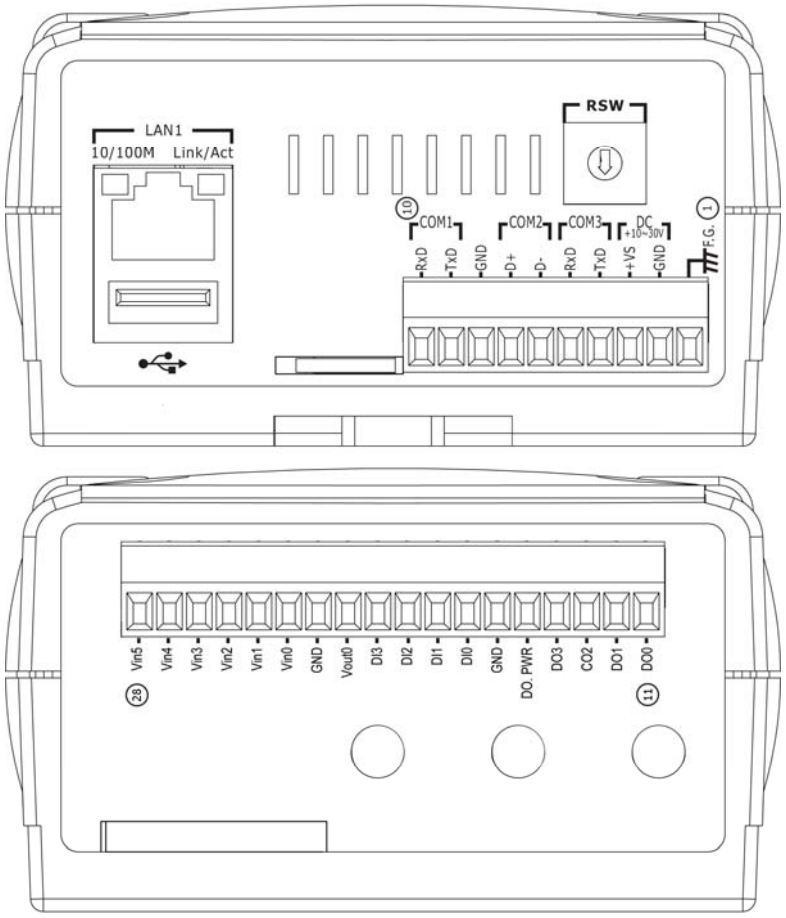
Model	BNET-5304	BNET-5310
System		
COM1	Reserved	
COM2	No use	
COM3	No use	
Ethernet	10/100 Base-TX	
Security	ID and Password	
Built-in Watchdog	Yes	
LED Indicator	Power and Status	
Protocol		
BACnet	BACnet/IP	
BACnet Objects	1 Device, 6 AI, 1 AO, 4 BI, 4 BO	1 Device, 4 AI, 2 AO, 3 BI, 3 BO
BIBB	DS-RP-B, DS-RPM-B, DS-WP-B, DS-WPM-B, DS-COV-B, DM-DDB-B, DM-DOB-B, DM-DCC-B, DM-TS-B, DM-UTC-B, DM-RD-B	

Analog Input			
Channel		6	4
Wiring		Single-Ended	Differential
Range		+/- 5 V, 0 ~ +5 V	+/- 10 V
Resolution		12-bit	
Sampling Rate		4 KHz	
Input Impedance		1 M Ohm	
Over Voltage Protection		+/- 30 VDC	
Isolation		Non-isolated	
Analog Output			
Channel		1	2
Range		+/- 5V	+/- 10 V
Resolution		12-bit	
Output Capacity		20 mA	
Isolation		Non-isolated	
Digital Input			
Channel		4	3
Contact		Dry	
Dry Contact	On Voltage Level	Close to GND	
	Off Voltage Level	Open	
Overvoltage Protection		30 VDC	
Digital Output			
Channel		4	3
Type		Open Collector	
Sink/Source (NPN/PNP)		Sink	
Load Voltage		+10 VDC ~ 40 VDC	
Max. Load Current		200 mA/channel at 25 °C	
Overload Protection		1.4 A	
Environmental			
Dimensions (W x L x H)		91mm x132mm x 52mm	
Operating Temp.		-25 ~ +75 °C	
Storage Temp.		-30 ~ +85 °C	
Humidity		5_90% PH, non-condesing	
Power Input Range		+10V to +30+10V to +30VDC	

Power Consumption	4.8W (0.2A @ 24VDC)	5.4W (0.2A @ 24VDC)

2. Hardware

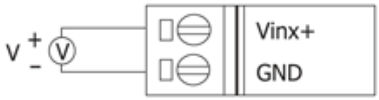
2.1 BNET-5304 Pin Assignment and Wire Connection



BNET-5304							
Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	F.G.	8	GND	15	DO.PWR	22	GND
2	GND	9	TxD	16	GND	23	Vin0
3	+VS	10	RxD	17	DI0	24	Vin1
4	--	11	DO0	18	DI1	25	Vin2
5	--	12	DO1	19	DI2	26	Vin3
6	--	13	DO2	20	DI3	27	Vin4
7	--	14	DO3	21	Vout0	28	Vin5

XW304 Wire Connection

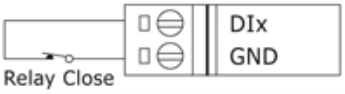
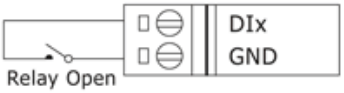
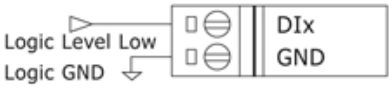
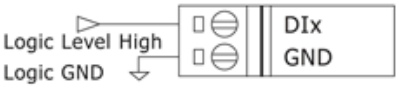
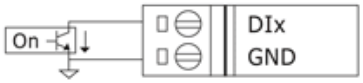
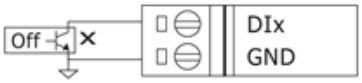
Voltage Input Wire Connection

Input Type	

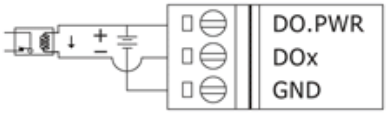
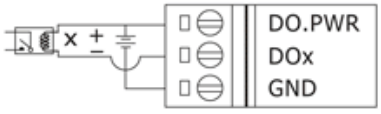
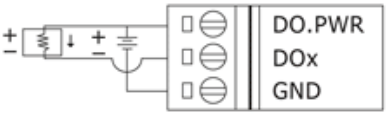
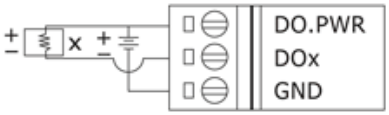
Voltage Output Wire Connection

Output Type	

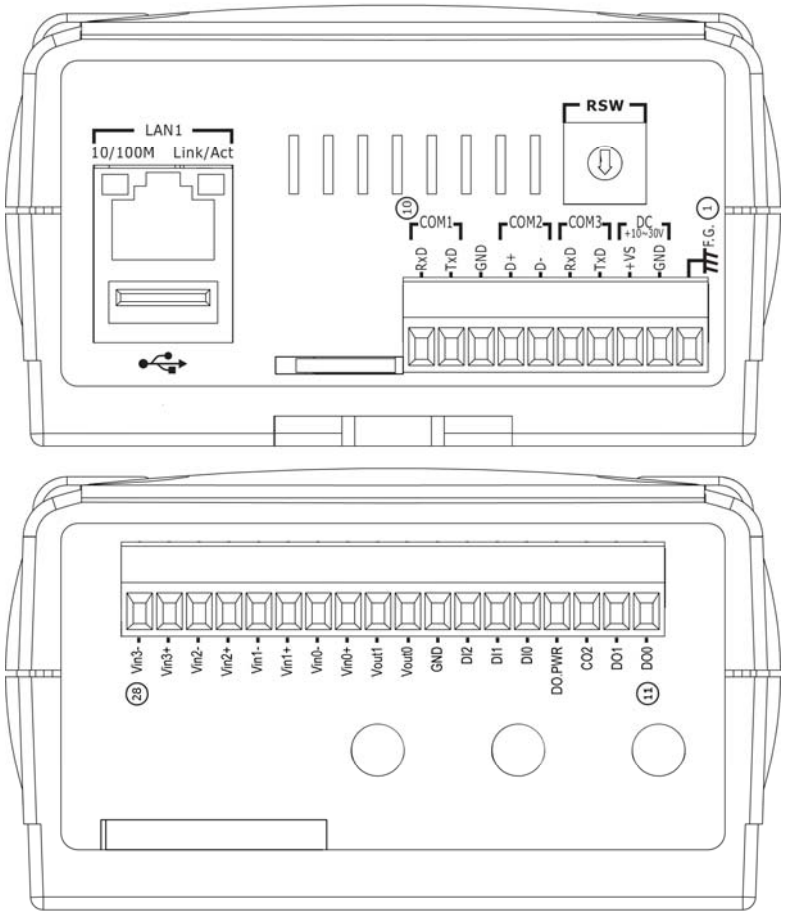
Digital Input Wire Connection

Input Type	DI Value as 0	DI Value as 1
Relay Contact	Relay On	Relay Off
		
TTL/CMOS Logic	Voltage < 1V	Voltage > 3.5V
		
Open Collector	Open Collector On	Open Collector Off
		

Digital Output Wire Connection

Output Type	DO Command as 1	DO Command as 0
Drive Relay	Relay ON	Relay Off
		
Resistance Load		
		

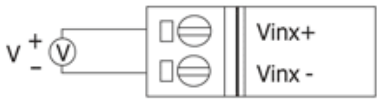
2.2 BNET-5310 Pin Assignment and Wire Connection



BNET-5310							
Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	F.G.	8	GND	15	DI0	22	Vin0-
2	GND	9	TxD	16	DI1	23	Vin1+
3	+VS	10	RxD	17	DI2	24	Vin1-
4	--	11	DO0	18	GND	25	Vin2+
5	--	12	DO1	19	Vout0	26	Vin2-
6	--	13	DO2	20	Vout1	27	Vin3+
7	--	14	DO.PWR	21	Vin0+	28	Vin3-

XW310 Wire Connection

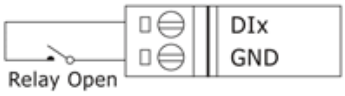
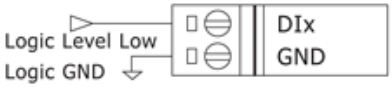
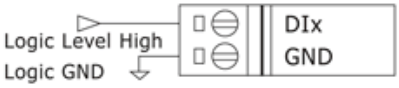
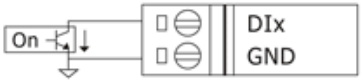
Voltage Input Wire Connection

Input Type	
	

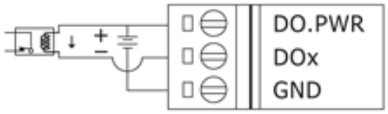
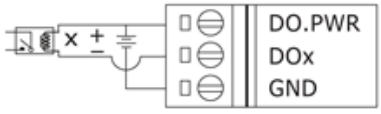
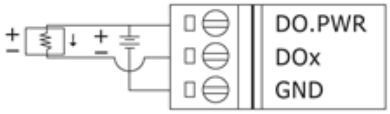
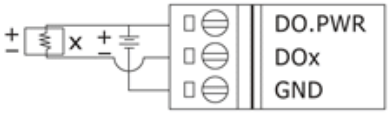
Voltage Output Wire Connection

Output Type	
	

Digital Input Wire Connection

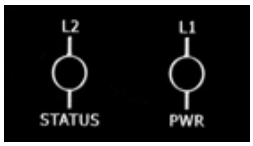
Input Type	DI Value as 0	DI Value as 1
Relay Contact	Relay On	Relay Off
		
TTL/CMOS Logic	Voltage < 1V	Voltage > 3.5V
		
Open Collector	Open Collector On	Open Collector Off
		

Digital Output Wire Connection

Output Type	DO Command as 1	DO Command as 0
Drive Relay	Relay ON	Relay Off
		
Resistance Load		
		

2.3 LED Indication

BNET-5304/BNET-5310 provides two LEDs to indicate what situation is in the module. They are described as follows.



2.3.1 Power LED

The BNET-5304/BNET-5310 needs +10 ~ +30 VDC power input and consumes 4.8W and 5.4W. The PWR LED (Power LED) will be turn on after applying power and it will be flashing two times per second.

2.3.2 Module Status indicator LED

The STATUS LED indicates the communication status of the BNET-5304/BNET-5310. The following description shows the conditions of error status.

- Green light flashes: BACnet/IP Client is communicating with BNET-5304/BNET-5310.
- Red light flashes: Time out or unknown Object/Service error.
- Red light on: BNET-5304/BNET-5310 initial error.

3. Web Based Configuration Tool

This chapter is to describe the web structure and software operating interfaces.

BNET-5304/BNET-5310 provides Web-based configuration for the BACnet devices and objects settings. The functions include:

- System information and configuration
- Network settings
- BACnet objects configuration and management

3.1 Device Selection

- BNET-5304: BACnet/IP Multi-function I/O Module with 6 AI, 1 AO, 4 BI, and 4 BO.
- BNET-5310: BACnet/IP Multi-function I/O Module with 4 AI, 2 AO, 3 BI, and 3 BO

3.2 Using Web-based Configuration Tool

Connect the BNET-5304/BNET-5310 to network, and use standard web browser (Internet Explorer, Mozilla Firefox) to launch the user interface. The default link and network settings are as followed:

Web Address: http://192.168.255.1

IP Address: 192.168.255.1

Subnet Mask: 255.255.0.0

Gateway: 192.168.0.254

For security reason, user will have to login with user name and password before entering the configuration pages. The default user name and password are **admin** and **admin**.

Figure 1. Logon screen

Screen opened as image shown in Figure 2, if success login. Select a hardware to enter a correspond page.

Figure 2. Module or Device selection page

3.3 Tab menu of Configuration Tool

The configuration tool had divided into four sections System, Modbus, BACnet, and Modbus/BACnet Mapping. Please refer to the following clause for detail information.

3.3.1 System

System information and settings consist of

- BACnet Firmware status and operations (start or stop)
- Network settings
- Firmware Updating
- User name and password configuration

3.3.2 Modbus

The section is only available for GW-549x series.

3.3.3 BACnet

BACnet Server Configuration consists of

- BACnet/IP Port Setting
- Management of the BACnet basic information
- Instance Table (shows the number of object on the device)

3.3.4 BACnet Object

Definition and management of BACnet Objects

3.4 System tab

As shown in Figure 3, the system tab provides an operation mode, a network setting, firmware updating, and user account settings.

1. System Process: Monitors the BACnet Firmware running status, and operate its' state (start or stop)
2. Network Settings: LANs are provided for BACnet/IP protocol.
3. Upload and Updating Firmware: Uploading and updating firmware.
4. Change User Names & Password: Modify the current user name and password.

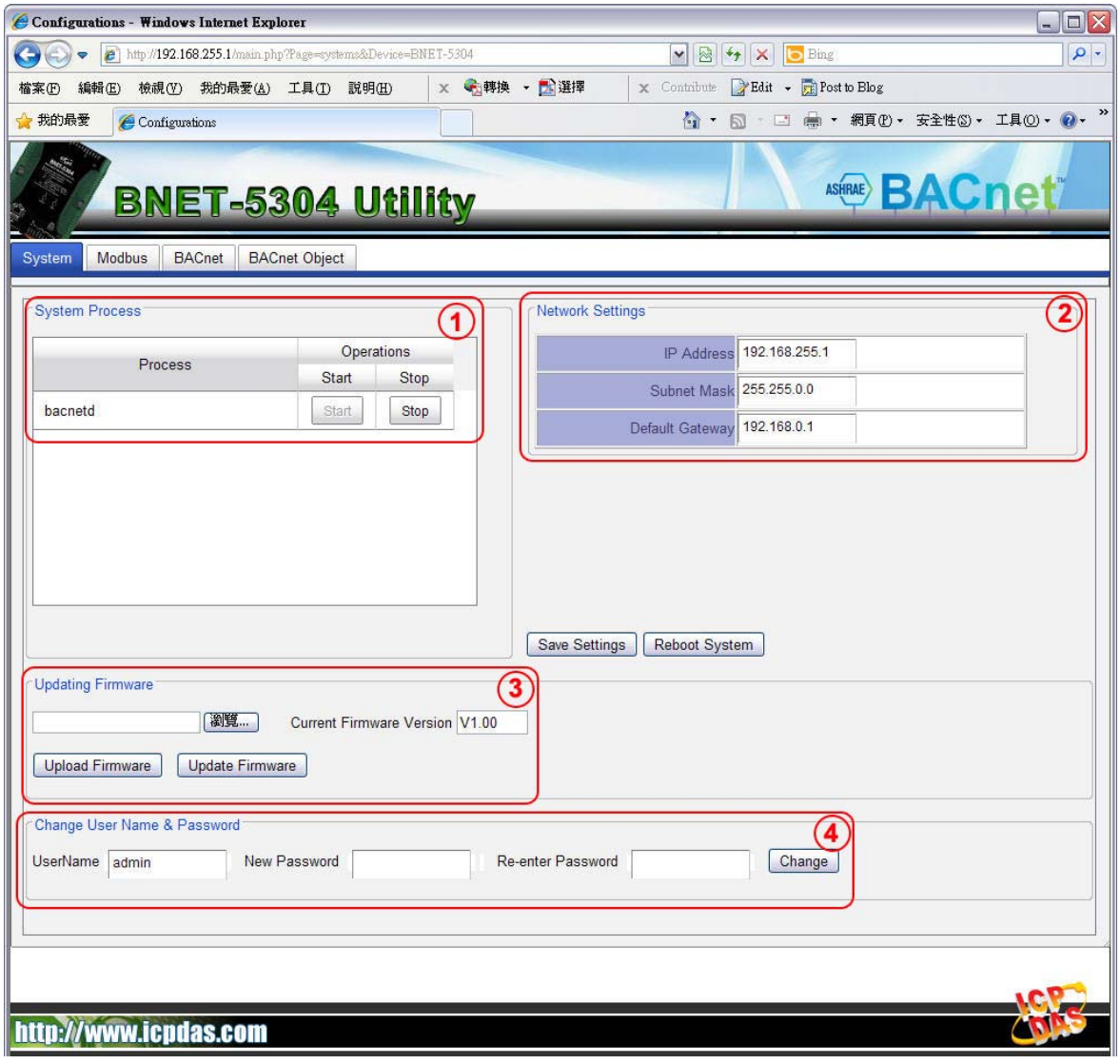


Figure 3. System tab

3.4.1 System Process

Figure 4 shows the System Process frame. The Process column shows the firmware name and the Operations column shows the firmware status. The Start/Stop buttons are able to start/stop the firmware by clicking the buttons.

Figure 4. System Process

3.4.2 Network Settings

Network Settings consists an Ethernet LAN settings provided for BACnet/IP protocol. All information isn't saved until clicking the **Save Settings** button. User will need to reboot the system or restart it to apply the changes. After hardware rebooted, user will also need to re-open the web user interface.

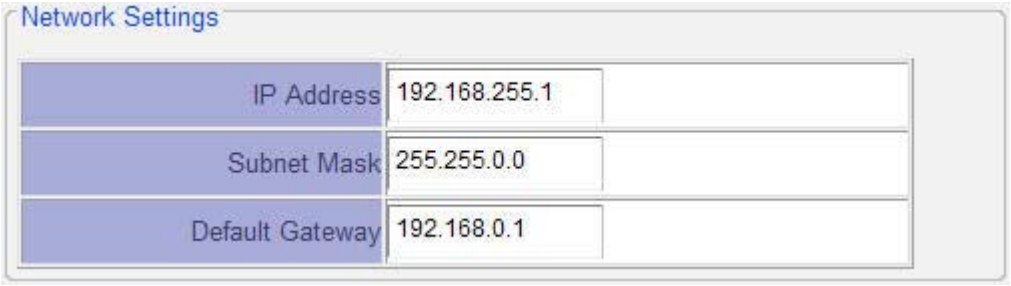


Figure 5. Network Settings

3.4.3 Uploading and Updating Firmware

Figure 6 shows the Upload and Update Firmware tool. The current firmware version is showed. The firmware can also be updated from a .fw file downloaded from ICP DAS by choosing the file path and click "Upload Firmware" to upload file to device. After .fw file uploaded, click "Update Firmware" button to update firmware. After firmware updated, please restart the BNET-5304/BNET-5310 and User Interface.

Figure 6. Import/Export/Updating Firmware

3.4.4 Change User Name & Password

The section provides an interface which allows user to modify the user name and password. User will need to reboot the system or restart it to apply the changes.

Figure 7. Change User Name & Password

3.5 BACnet tab

The Figure 8 shows the BACnet Device configuration. The detail description as follows:

1. BACnet basic information and configuration
2. BACnet Object Types and max instance information

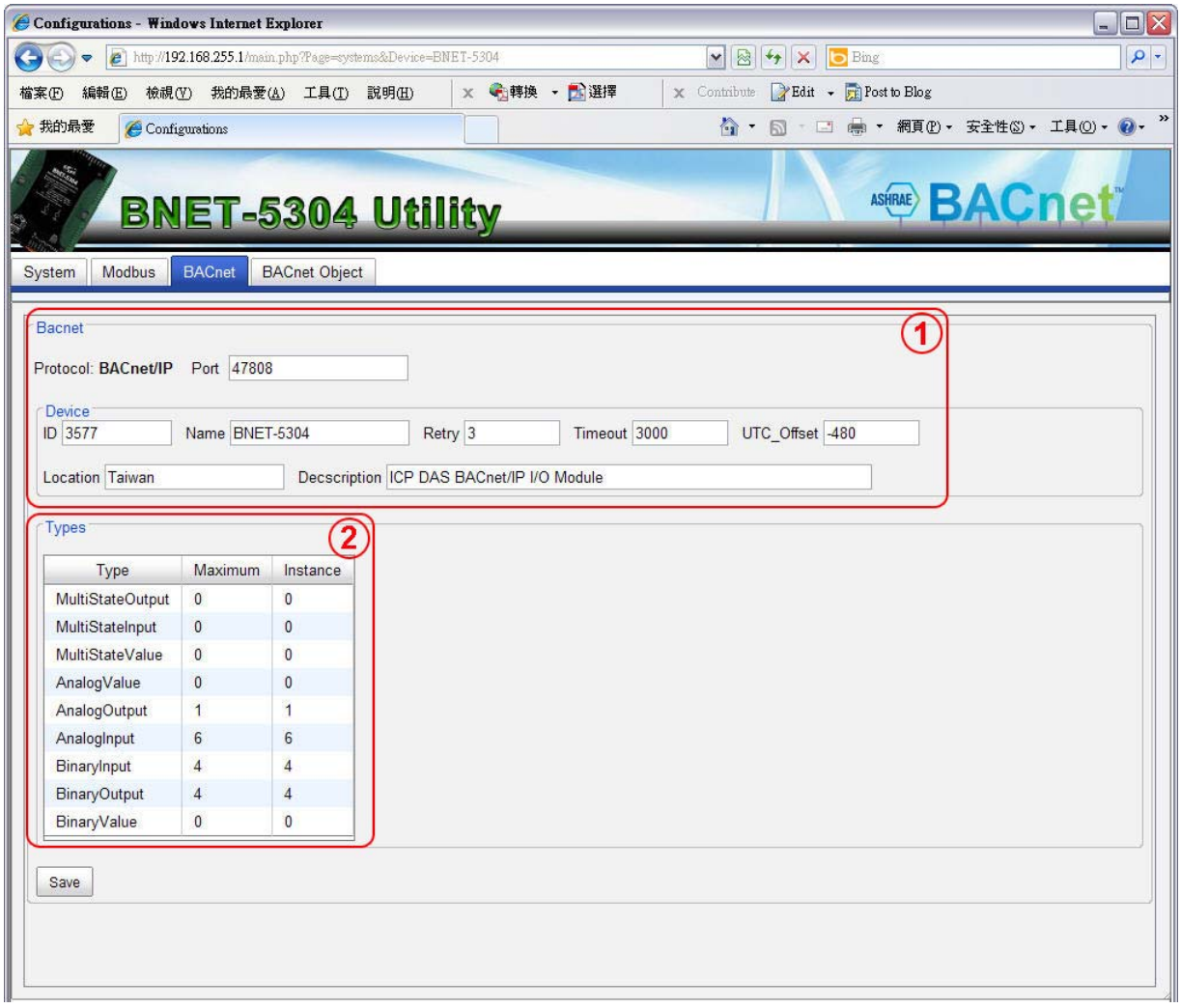


Figure 8. BACnet tab

3.5.1 BACnet basic information configuration

Figure 9 shows the BACnet basic information, consisting of Protocol, Communication and Device Object properties settings.

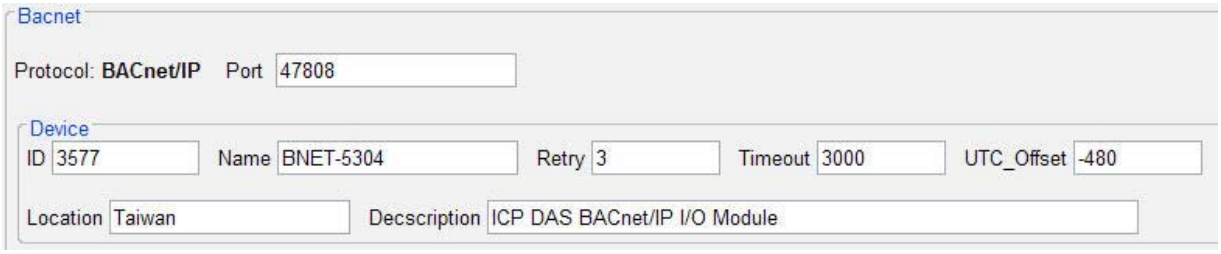


Figure 9. BACnet basic information

- Port: BACnet Port. Default port is 47808 (0xBAC0)
- ID: Device_Identifier property, range from 0 to 4194302
- Name: The device name showed on BACnet network.
- Retry: Number_Of_APDU_Retries property
- Timeout: APDU_Timeout property
- UTC_Offset: The time offset from Coordinated Universal Time
- Location: Location property
- Description: Object Description property

3.5.2 BACnet Object Types and instance settings

The BNET-5304/BNET-5310 supports several types of standard BACnet Objects including Analog Input, Analog Output, Binary Input, Binary Output and Device. Figure 10 shows the 9 types of BACnet Objects, the 3-column sub fame consisting of Type, Maximum, and Instance number.

Types

Type	Maximum	Instance
MultiStateOutput	0	0
MultiStateInput	0	0
MultiStateValue	0	0
AnalogValue	0	0
AnalogOutput	1	1
AnalogInput	6	6
BinaryInput	4	4
BinaryOutput	4	4
BinaryValue	0	0

Figure 10. BACnet Object list

3.6 BACnet Object tab

The BACnet Object tab provides a list of BACnet Objects, as shown in Figure 16.

1. BACnet Object type list
2. BACnet Object list

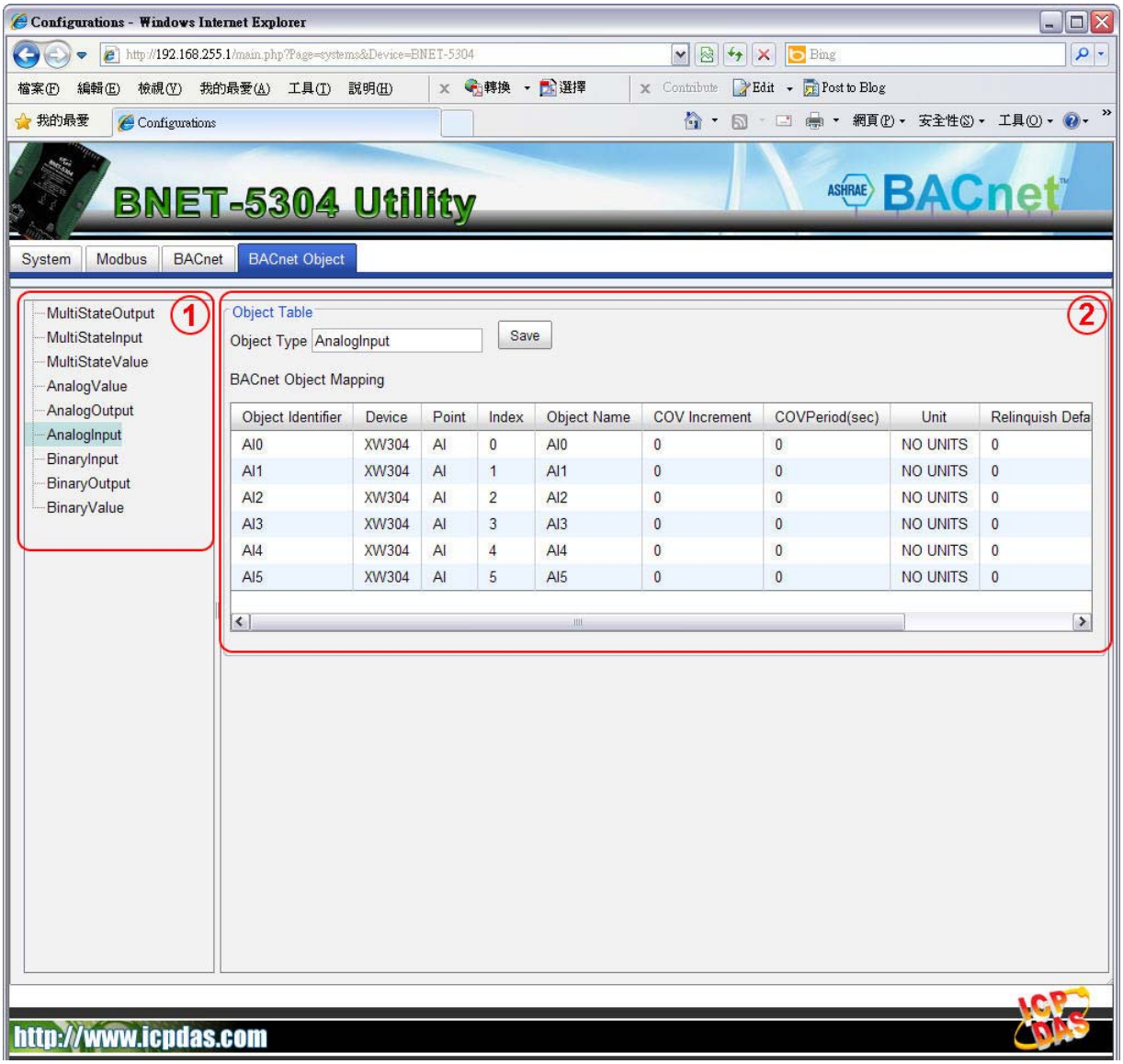


Figure 11. BACnet Object tab

3.6.1 BACnet Object Type List

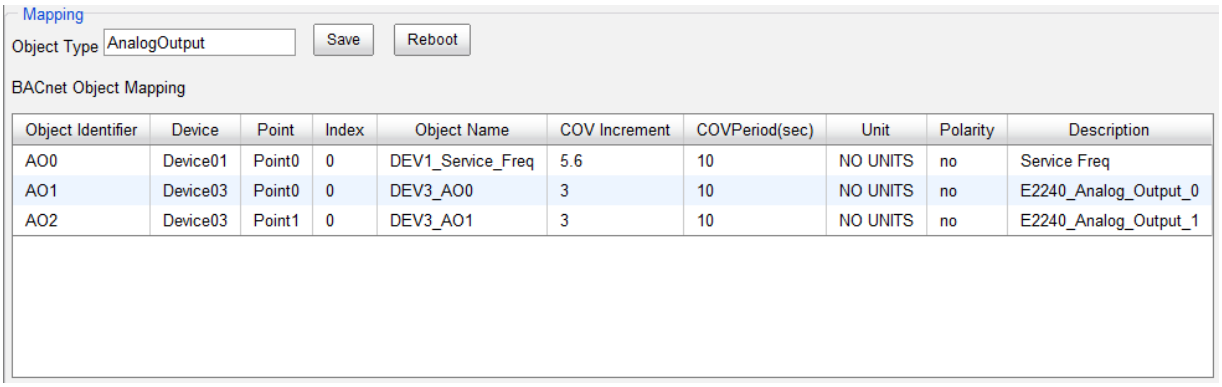
Select an object type from Object Type list to show the corresponding BACnet object in the Object Table. After object type selected , it should be showed in the textbox.

3.6.2 BACnet Object Type List

The Object Table consists varies BACnet object properties which allow user to modify it. Please refer to description below about each column in the table.

BACnet Object Table:

- Object Identifier: BACnet Object_Identifier property
- Device: Modbus Device name
- Point: Indicates the channel type of the module.
- Index: Indicates the channel number of the module.
- Object Name: BACnet Object_Name property
- COV Increment: COV_Increment property. For the Analog object type only.
- COVPeriod: The period time of COVNotification required service.
- Unit: BACnet Unit property. For the Analog object type only.
- Polarity: BACnet Polarity property mode. For the Binary object type only.
- Description: BACnet Description property



Object Identifier	Device	Point	Index	Object Name	COV Increment	COVPeriod(sec)	Unit	Polarity	Description
AO0	Device01	Point0	0	DEV1_Service_Freq	5.6	10	NO UNITS	no	Service Freq
AO1	Device03	Point0	0	DEV3_AO0	3	10	NO UNITS	no	E2240_Analog_Output_0
AO2	Device03	Point1	0	DEV3_AO1	3	10	NO UNITS	no	E2240_Analog_Output_1

Figure 20. Mapping