



Ethernet Communication Board

CBES

Catalog

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Version	Revision date	Author	Detail
V1.0	2020/12/04	Calvin	
V1.1	2021/04/06	Calvin	

Chapter 1. CBES Ethernet Communication Board Introduction

1.1 Summary


FBs-CBES series is a small size CPU communication expansion board that does not occupy additional module space. With this expansion board, the FBs-CPU module can actively (client mode) or passive (server mode) communicate with the controller or computer on the Internet through Ethernet. This expansion board is suitable for all FBs-CPU modules. With this expansion board, the purpose of PLC remote monitoring and diagnosis can be easily achieved

When do the application, this expansion board will occupy the Port 1 and Port 2 communication ports of the host. Port1 is fixed to FATEK server working mode, which can be used for editing and debugging ladder programs. Port2 is used to support Modbus-TCP server operation mode and FATEK client operation mode. When in operating mode, Port1 and Port2 communication parameters will be automatically planned according to the set operating mode.

1.2 Product Main Function


PLC Network Data Communication

FBs-CBES series expansion board provides the solution for the PLC network connection, reaching the FATEK or Modbus application by Port 1 and Port 2 of the expansion board.

Note	
	1. FBs-CBES board series do not support the following features: <ul style="list-style-type: none">① Customize webpage design② Email sending③ Simple Network Time Protocol (SNTP)④ Remote maintenance- Active Call Back

1.3 Product Features

- Supports Multi-client simultaneous accessible function
- Provides Modbus Server operation modes
- Provides FATEK Server and Client operation modes
- 10/100 BaseT Ethernet interface
- IP access restriction security mechanism

Note	
	1. When FATEK client function is selected, Modbus server or client

function will not be provided.

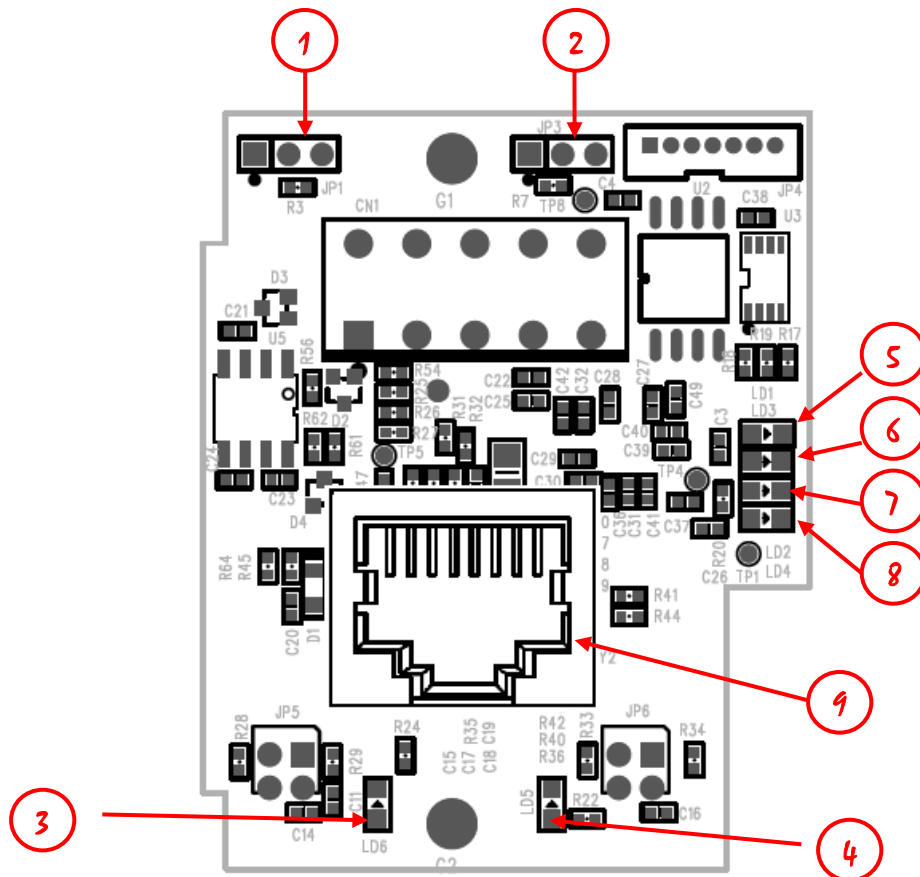
1.4 Manual Reading Guidance

For the FBs-CBES series expansion board, this manual does not need to be browsed in its entirety during application, just refer to the relevant chapters. For example, if you only use the basic FATEK network protocol application, you only need to read Chapter 3.

1.5 Product Appearance

The appearance and functional parts of the FBs-CBES series expansion board are introduced as follows:

➤ FBs-CBES:



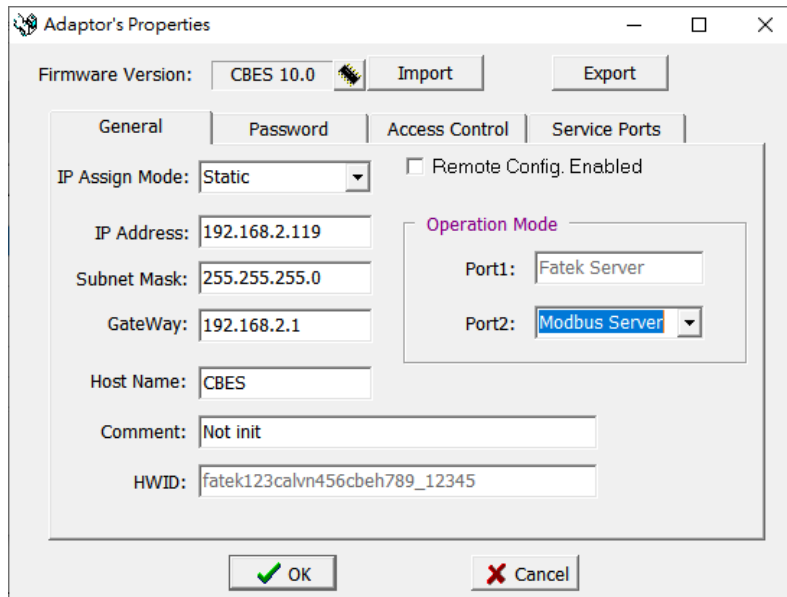
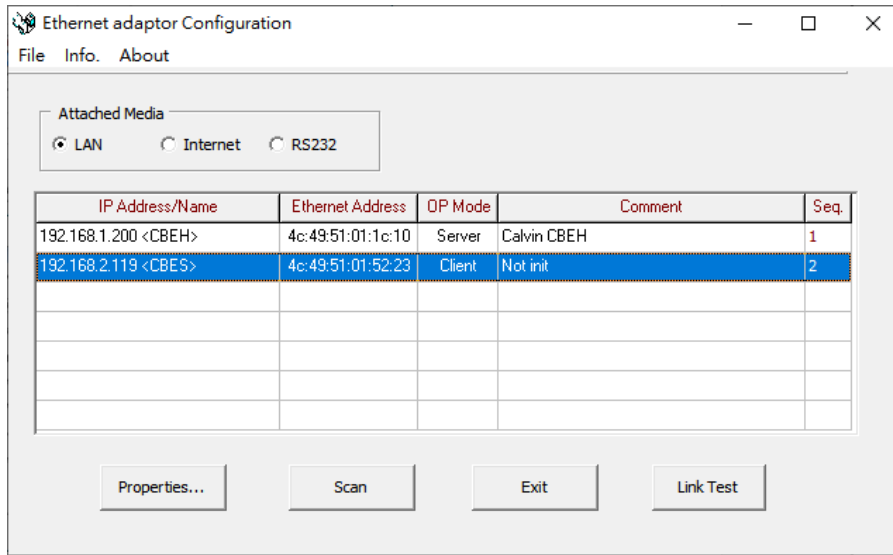
- ① NP jumper: When the left two pin headers are short circuit, refers to no password protection. (If the firmware version is less than V7.6, the NP mode is not to connect the jumper)
- ② Boot jumper: When the right two pin headers are short circuit, forced to enter Boot mode after booting.
- ③ Ethernet status indicators (Link): When light means the network connection is

normal, flash means there has data activity on the network.

- ④ Ethernet status indicators (Speed): Lights on means the connection speed is 100Base-TX, off means 10Base-T.
- ⑤ Port1 RX green signal indicator of the CPU module: Lights on means CPU module port1 has sent messages to the board.
- ⑥ Port1 TX red signal indicator of the CPU module: Lights on means the board has sent messages to the CPU module port1.
- ⑦ Port2 RX green signal indicator of the CPU module: Lights on means CPU module port2 has sent messages to the board.
- ⑧ Port2 TX red signal indicator of the CPU module: Lights on means the board has sent messages to the CPU module port2.
- ⑨ Ethernet connector: RJ45 standard connector.

1.6 Software Introduction

➤ Ether Config



In order to cooperate with the application of the FBs-CBES series expansion board, a window version of the configuration software is provided to set the basic configuration of the module, password protection, firmware update... etc. For detailed operation content, please refer to chapter 3.1.

Chapter 2. PLC and CBES Communication Board Interfaces

The communication between the PLC module and the CBES communication board during application is achieved through data exchange in the CPU register area D3950~D3999. The function configuration of each register in this area is as follows:

Register	Description	
D3950	Initialization setting command code	
	Setting value	Status
	0x3450	Reset module. When the local network parameter is changed, it can be reset without turning off the power, and will be changed to zero after the command is executed.
	0x3451	Resets to factory settings. It will be changed to zero after the command is executed.

Service Ports	
D3975	Fatek Protocol (Major Port)
D3976	Mobus Protocol (Major Port)
Local Network Parameter <small>Note*2</small>	
Register	Description
D3986	1 st decimal number of the local network mask (MY_MASK.A)
D3987	2 nd decimal number of the local network mask (MY_MASK.B)
D3988	3 rd decimal number of the local network mask (MY_MASK.C)
D3989	4 th decimal number of the local network mask (MY_MASK.D)
D3990 (CPU write) <small>Note*1</small>	Local network parameter setting mode =0x4951, Network parameters are determined by register contents. =0x4960, Obtain by DHCP. =other value, Determined by the contents of the configuration tool.
D3991	1 st decimal number of the board's network address (MY_IP.A)
D3992	2 nd decimal number of the board's network address (MY_IP.B)
D3993	3 rd decimal number of the board's network address (MY_IP.C)
D3994	4 th decimal number of the board's network address (MY_IP.D)
D3995	1 st decimal number of the local router network address (ROUTER_IP.A)
D3996	2 nd decimal number of the local router network address (ROUTER_IP.B)
D3997	3 rd decimal number of the local router network address (ROUTER_IP.C)
D3998	4 th decimal number of the local router network address (ROUTER_IP.D)
D3999	Board's serial number (S/N)

Note*1: The values in this table is written by the CPU. For D3986~D3989 and D3991~D3999, all registers are written by this product series except for when D3990 is written as 0x4951.

Note*2: Example of the network address (IP) 192.168.2.1; 1st code: 192; 2nd code: 168; 3rd code: 2; 4th code: 1, When D3990 is not 0x4951, D3986~D3989 and D3991~D3998 will display the actual setting value after boot on.

Chapter 3. CBES Basic Configuration Setting


To set up the basic configuration of the CBES, users can set it through Ether-Config software. The method of operation and when to use it are listed in the following table:

	Ether_Config software
Operation method	<ul style="list-style-type: none"> ✧ Download V4.2 or above version from the FATEK website to install. ✧ By scanning the local area network or set the correct IP address to connect to the CBES and do the configuration.
When to use	<ul style="list-style-type: none"> ✧ When you don't know the CBES IP address, you can scan and connect the device directly in the local area network through the Ether_Config software. ✧ When the users need to update the CBES firmware, they need to use the Ether_Config software.

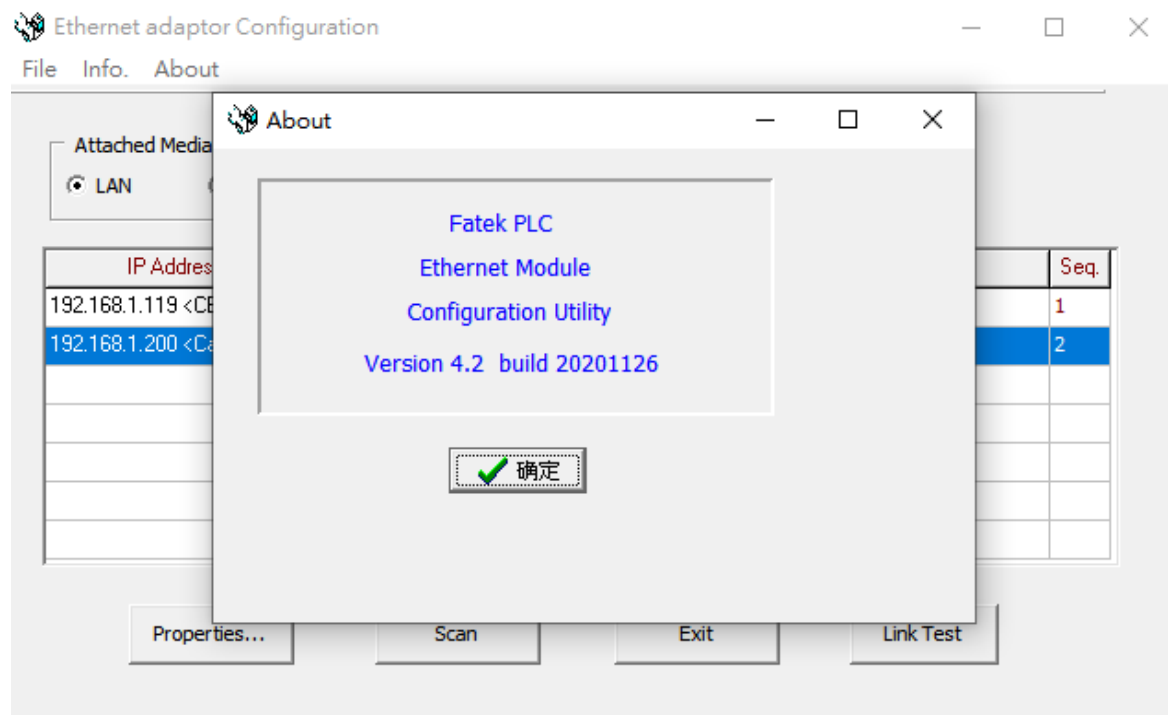
3.1 Setting through Ether_Config software

Ether_Config software provides the following features **(V4.2 or above)**:

- Basic module parameter setting: Includes IP address, GateWay, Subnet Mask, Operation Mode, Host Name and Comment, etc.
- Security setting: Authorized IP (Network address) setting, the module and the expansion board will accept only when the command message sends by the authorized IP.
- Local station number, remote network address and station number setting: The maximum number of the PLC slave stations that can be connected through the network is 254 stations, when the module is in the client mode, in order to map the local station number (For the main PLC) to the PLC slave station on the network, the mapping table must be set up first when doing the application.
- Firmware update function: Ether_Config software provides CBES expansion board to update firmware, please refer to chapter 4 for detail operation method.

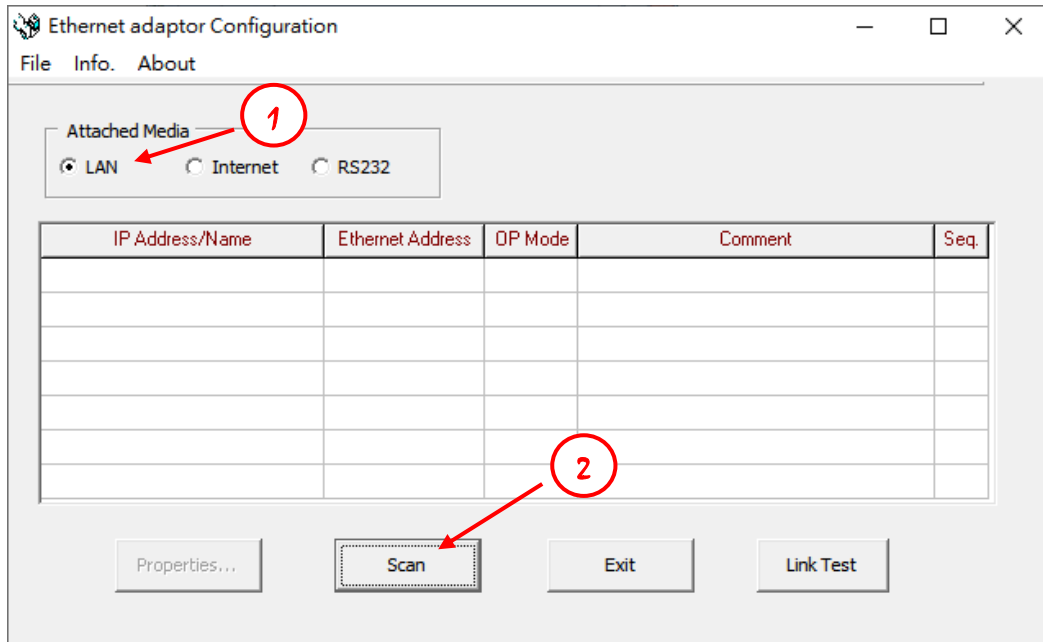
Note	
	Only Ether_Config V4.2 or above version supports CBES module board.

Confirm the software version first, or download the latest Ether_Config software directly from the FATEK website. After opening the software, pressing About in the toolbar and will show the version information, as shown in the figure below.



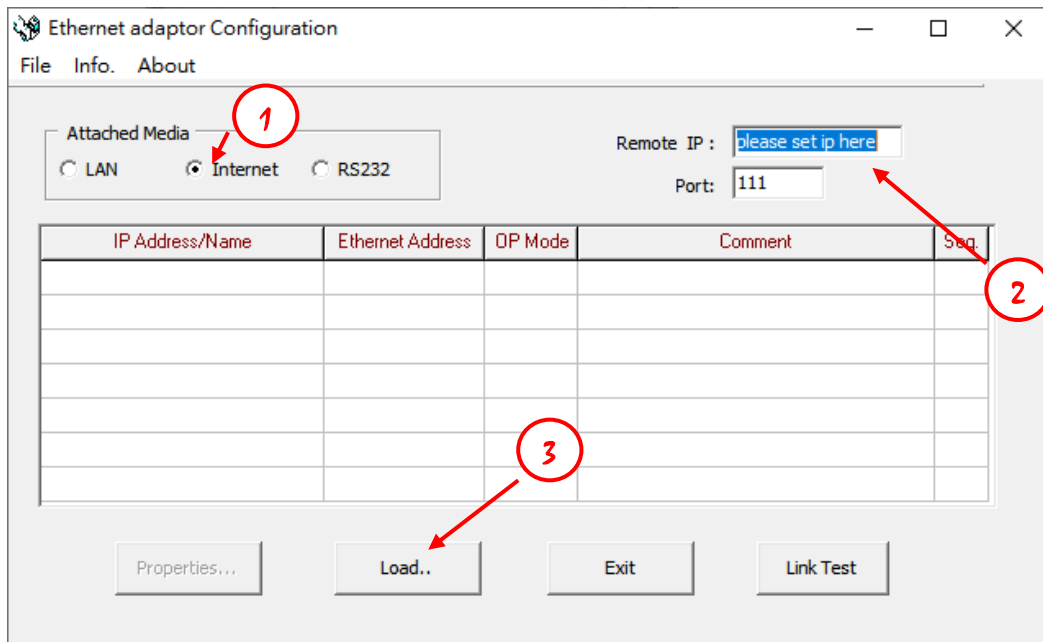
3.1.1 Use Local Area Network to Connect with CBES

When CBES and personal computer (PC) are connected by local area network (LAN) but don't know the IP address of the CBES expansion board. Under this situation, users can execute Ether_Config software to connect to the CBES expansion board through the following methods:




- ① Select **LAN** at the Attached Media
- ② Click **Scan** button to scan the online network module, the table will list the scanned modules. After finish scanning, move the cursor to the module you want to set up, then click the left mouse button-> **Properties..** or double click the left mouse button to enter the module configuration window.

If already know the IP address of the CBES expansion board and its address is in the same domain, then follow the following method to connect the board:



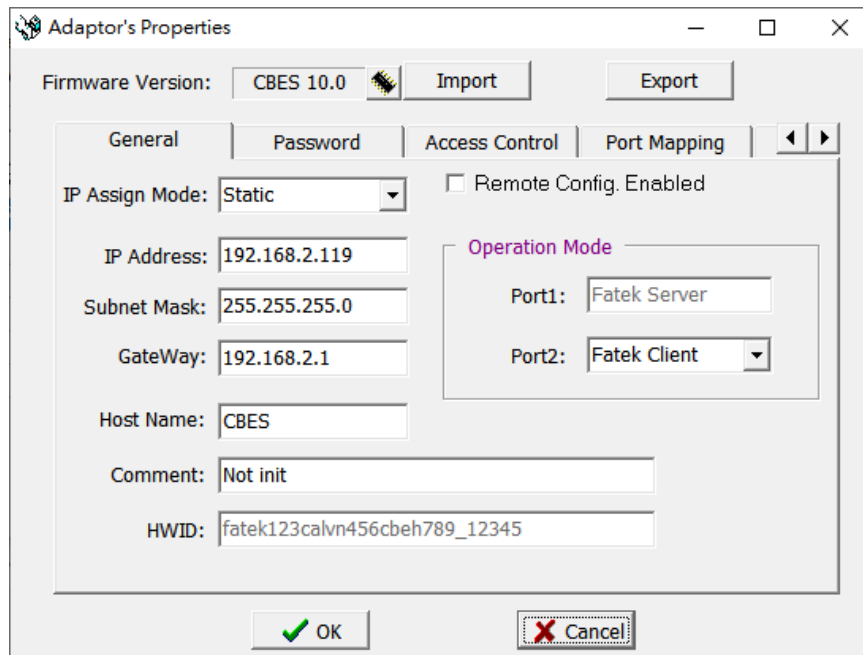
- ① Select **Internet** at the Attached Media
- ② Enter CBES expansion board's IP address and Port (Default value is 111).
- ③ Click **Load..** button and start to connect to the network module. After receiving

a response message then the module information will display in the table. Move the cursor to the module, then click the left mouse button-> **Properties..** or double click the left mouse button to enter the module configuration window.

Note	
	<ol style="list-style-type: none">1. If you want to use this method to connect a PC with CBES, but they are in a different domain, then the Remote Config. Enabled option need to be check first (Please refer to chapter 3.1.2).2. If the CBES board is behind the firewall, then need to open the firewall port 111 to do the remote configuration setting.

3.1.2 IP Address Setting

The first step after entering the configuration setting is to set up the CBES board's IP Address, Subnet Mask, and Gateway Address, as the figure set in the General function tab below.



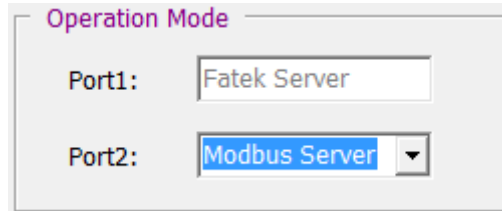
The following describes the meaning of each field for user reference:

- **IP Assign Mode:** Mode of obtaining IP. The user can do the setting according to their application needs, there are:
 1. Static: Get an IP statically. The user needs to set the network, mask, and gateway manually.
 2. DHCP: Get an IP dynamically. The user no needs to set the network, mask, and gateway. It will get the usable IP address dynamically through the DHCP server.
 3. By PLC: Decided by the PLC's register. (Please refer to Chapter 2).
- **IP Address:** The unique IP address.
- **Subnet Mask:** The subnet mask for identifying the domain.
- **GateWay:** The gateway of the domain where the module is located.
- **Host Name:** For comments, can be used to identify different modules, up to 11 characters can be input.
- **Comment:** For comments, it can be used to explain more detailed module information. You can enter up to 21 characters.
- **Remote Config. Enable:** For security settings. When check this option is to allow remote execution Ether_Config setting through the network. To use this function, it is suggested to use password protection to avoid security leakages. If it is not necessary, do not check this option in order to avoid inappropriate changes.

- **Import, Export:** Use the export function to save the configuration settings, then use import function to read the exported file or the files generated by offline editing (Please refer to chapter 0 for description) to facilitate the module configuration setting.

3.1.3 Operation Mode Setting

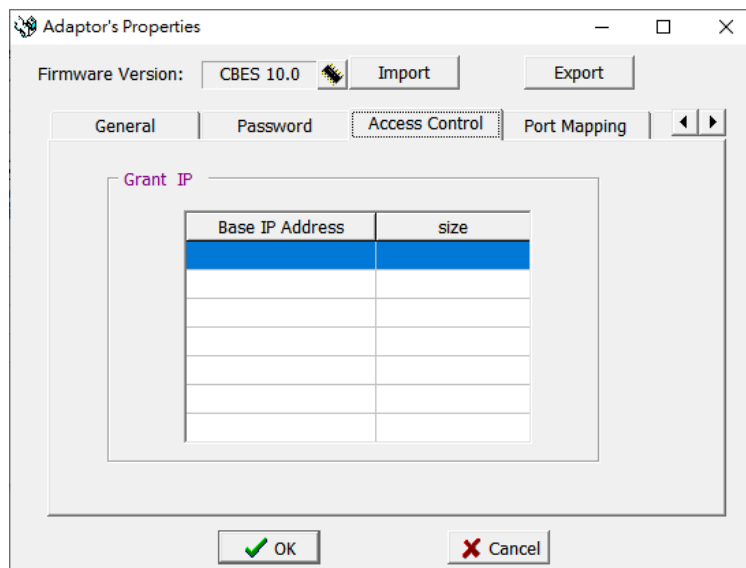
Under the **General** setting page, in addition to setting IP address and other related fields, there is an area to set the operation mode, as shown in the figure below:



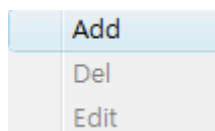
Port1 is fixed for FATEK Server, the operation mode can be used for ladder program editing, debug, or data access. Port2 is used for supporting Modbus/TCP server or FATEK client mode. When selecting Port2, the user needs to setting Port Mapping at the Properties setting page. (Please refer to chapter 3.1.4 for description).

3.1.4 Access Control

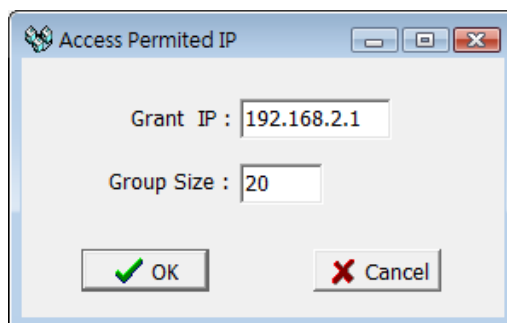
Access Control Setting: Set authorized IP to restrict inappropriate data accessing. Go to the Access Control setting page to set up the authorized IP, as shown in the figure below:



While setting, you can move the cursor to the table and click the right mouse button, then will pop-up a menu as shown below:



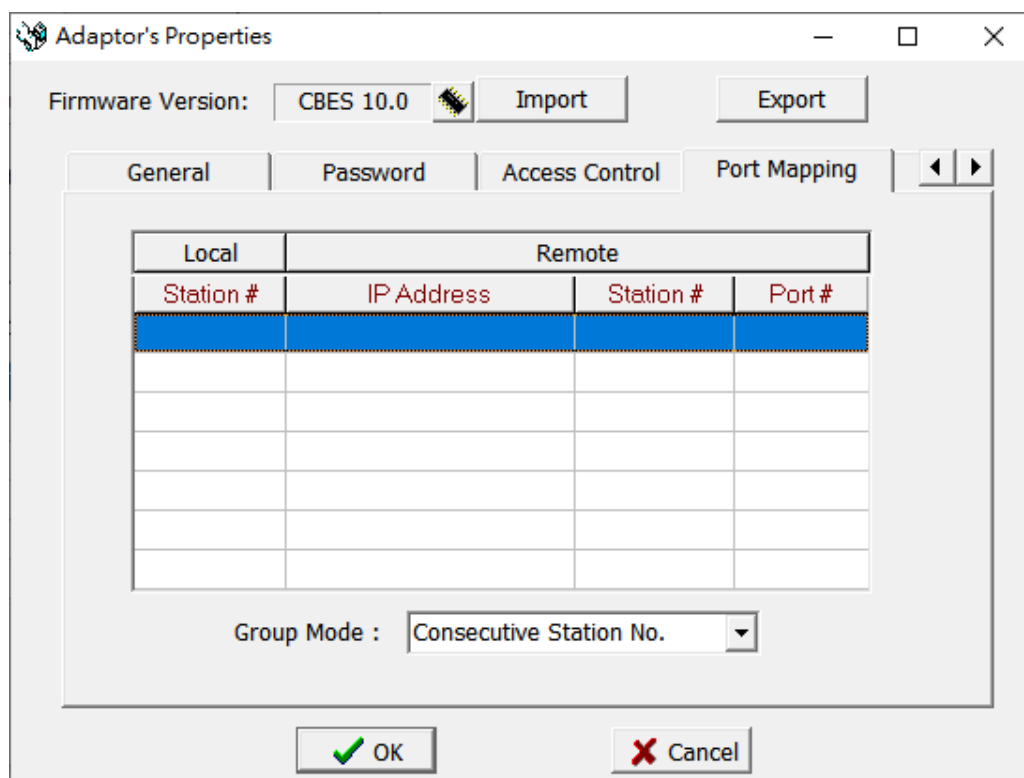
Click **Add** can add new authorized data. Click **Del** to delete an authorized data. Click **Edit** to modify authorized data. When clicking **Add** will show the following window.



This window can set a group of continuous authorized IP (or PLC station number). Please enter the smallest IP address in the Grant IP field, and enter the number of corresponding controllers in the Group Size field.

3.1.5 Port Mapping

In the basic information page, when the Port2 operating mode is set to Modbus/FATEK client mode, there will be an extra station number and IP corresponding setting page, and the following page will appear after clicking with the mouse:



At the bottom of the above figure, there is a **Group Mode** drop-down menu that provides Group Mode selection Note*1, and its meaning is as follows:

- **Consecutive Station No.:** Consecutive station number. When the Group Size is specified, its contents will be set to a fixed network address and continuous station numbers, as shown in the figure below:

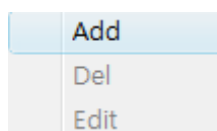
Station #	IP Address	Station #	Port #
1~3	192.168.2.1	1~3	500

- **Consecutive IP No.:** Consecutive network address. When the Group Size is specified, its contents will be set to consecutive network addresses and a fixed station number, as shown in the figure below:

Station #	IP Address	Station #	Port #
1~3	192.168.2.1~3	1	500

Note*1: The group mode is applicable to the entire table and cannot be set individually.

When you need to set, you can move the cursor to the table and click the right mouse button, a pop-up menu will appear as shown below:



Click **Add** can add new mapping data. Click **Del** to delete a mapping data. Click **Edit** to modify a mapping data. When clicking **Add** will show the following window.

Port mapping entry

Local Station : 1

Remote Station : 1

Remote IP : 1.1.1.1

Remote Port : 500

Group Size : 1

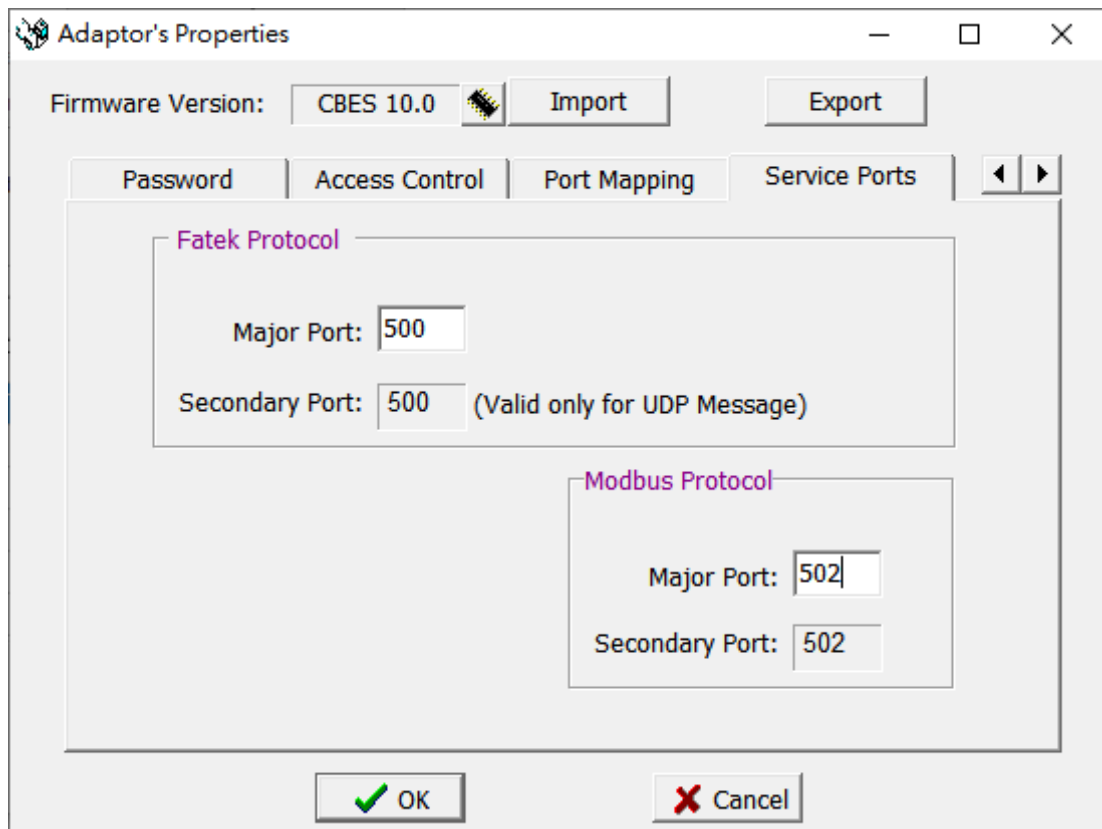
OK Cancel

The following is the explanation of each field:

- **Local Station:** Represents the remote PLC's station number at the local side.
- **Remote Station:** Represents the actual station number of the corresponding remote PLC on the network.
- **Remote IP:** The IP of the module that the remote PLC belongs to.

- **Remote Port:** Port of the module that the remote PLC belongs to.
- **Group Size:** When the **Group mode** is set to **Consecutive Station No.**, this setting can define a group of station number to compare at a time. For example, if you want to set the local station number 10~19 to correspond to the remote station number 20~29 and the remote IP is 192.168.1.3, you can set Local Station=10, Remote Station=20, Group Size=10, Remote IP=192.168.1.3 1.3, Remote Port is generally 500. Up to 18 group mapping can be set inside the Ethernet interface conversion module. When the **Group mode** is set to **Consecutive IP No.**, this setting can define a group of IP mapping to compare at a time.

3.1.6 Service Ports



When the CBES expansion board is operating under TCP or UDP server mode, the external service ports must be set so that the external client work stations can send service requests according to the set port numbers.

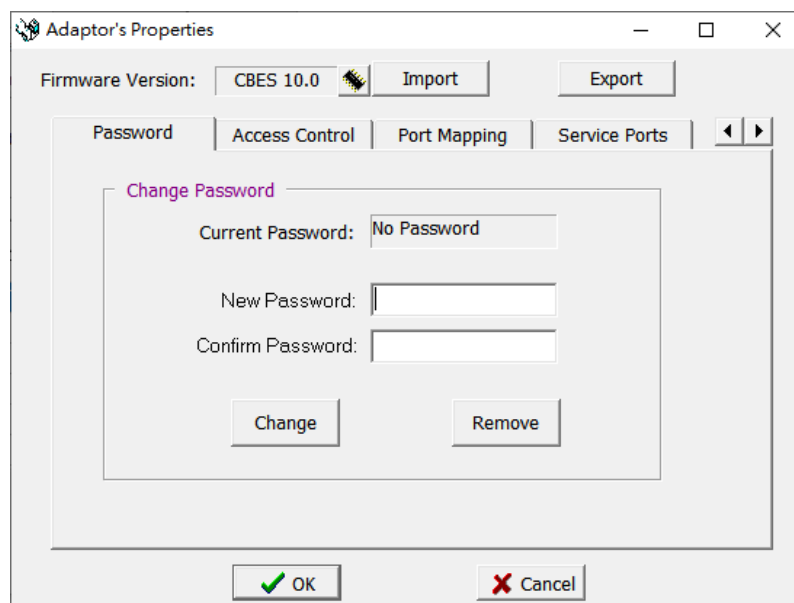
The default FATEK communication service protocol is 500, Modbus communication service port is 502.

Each service can provide up to 2 service port numbers at the same time, which are **FATEK®**

fixed default port number (Secondary Port) and a modifiable port number (Major Port), if you want to modify the major port as non-default port, you can use the **Service port** setting page to modify, just enter the port number you want to modify in the **Major Port** field.

3.1.7 Password

Password protection: The factory's default password is 1234, users can go to the password setting page to change the password, as the figure below:

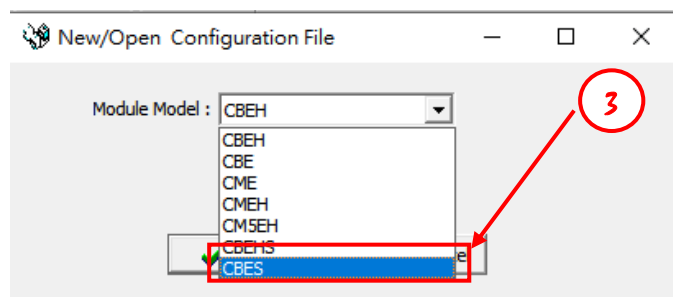
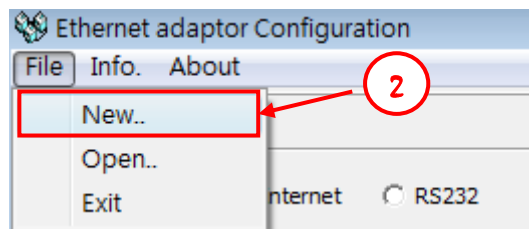
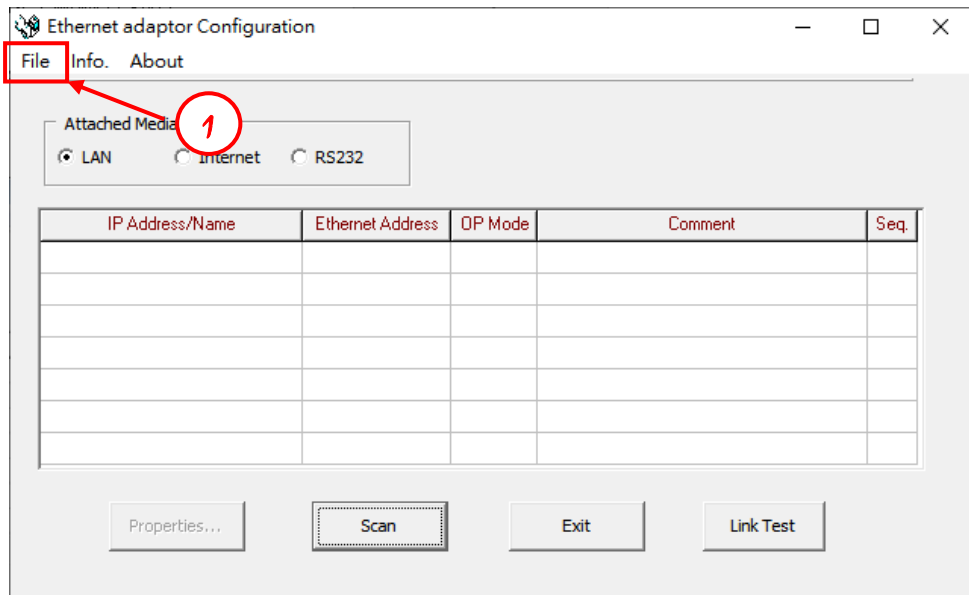


If you need to use a password then enter the same password in **New Password** and **Confirm Password**. Just need to click **Remove** to cancel the password protection.

3.1.8 Offline Configuration Setting

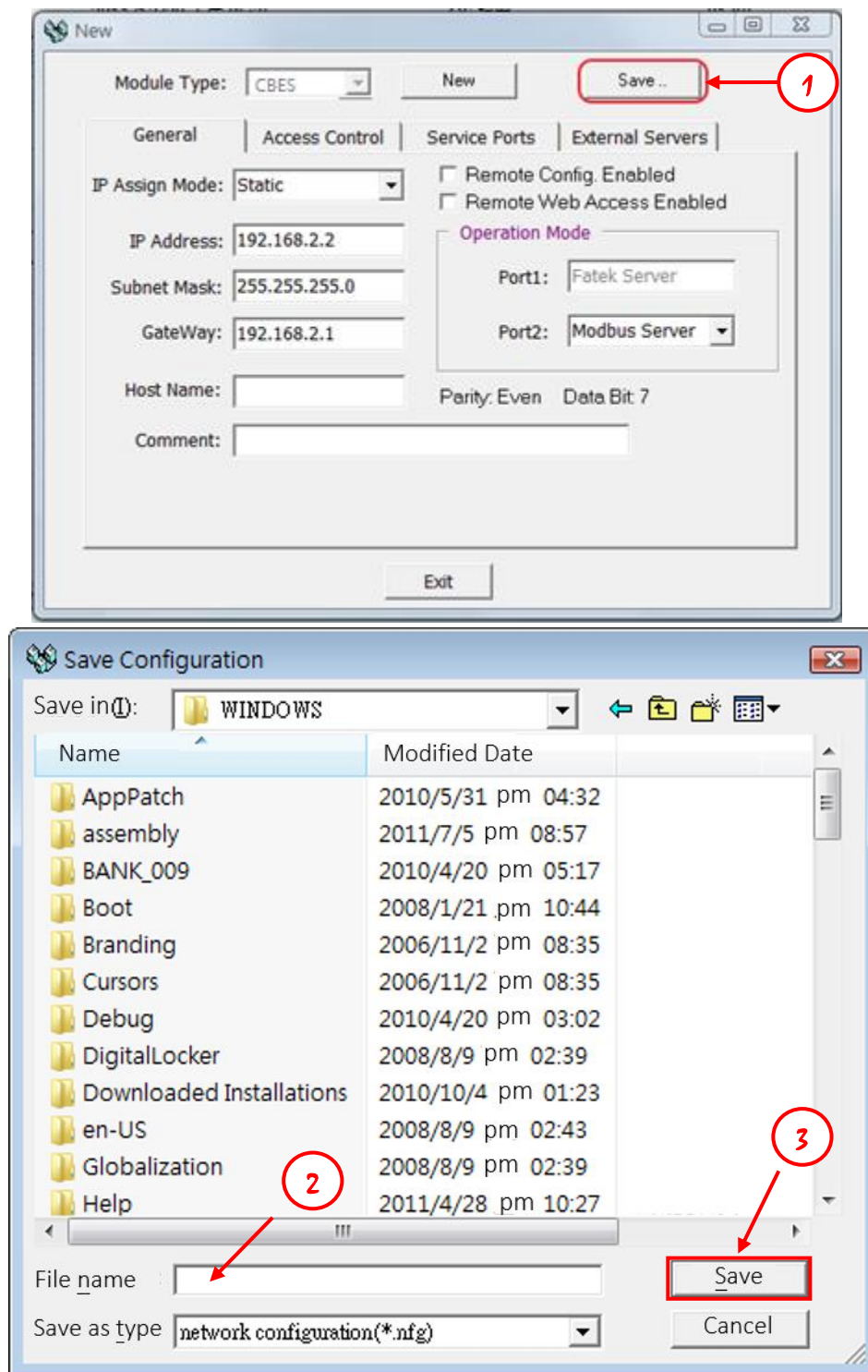
In addition to directly editing configuration by connecting the CBES, Ether_cfg software also provides offline editing. With this function, user can edit and save the configuration files without network. Thereafter, just need to import the file to CBES to use.

The following are the steps and instructions:



- ① Open Ether_Config software and click **File**
- ② Select **New...** from the menu to start creating offline configuration setting file
- ③ Module Model select CBES
- ④ Click **OK** button to start offline configuration setting. The editing method is the same as the previous chapters. (Please refer to chapter 3.1.2 to 3.1.7)

When finish setting, follow the steps to save file:



- ① Click the **Save..** button
- ② Select the location to save and enter the file name
Note: The filename extension is .nfg
- ③ Click **Save** button to save file. When the user uses the import function then this file will be used. Read file to import the previous saved configuration setting into the CBES expansion board.

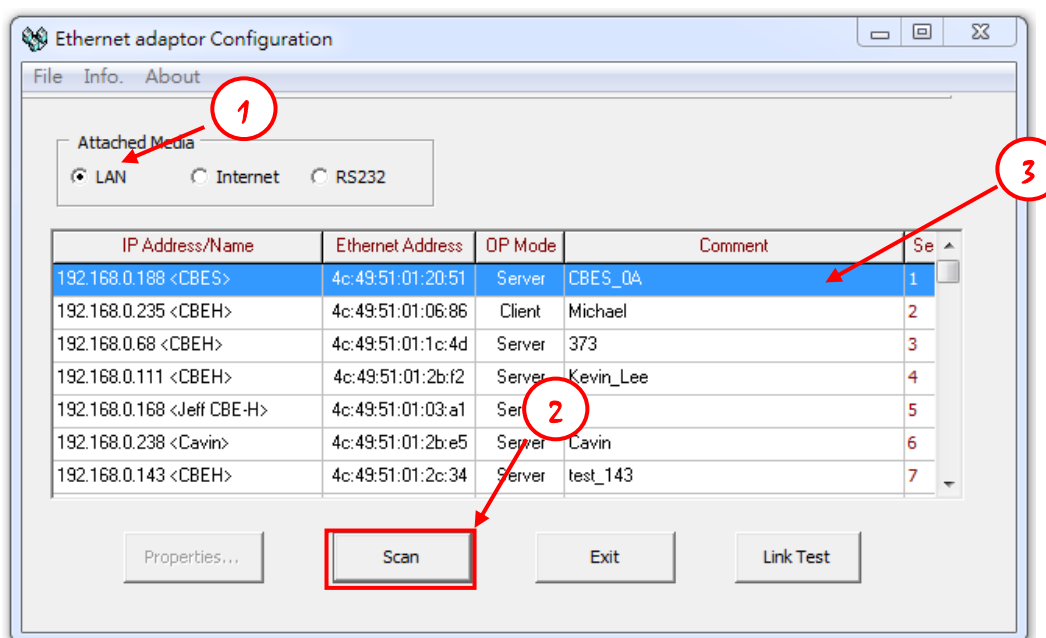
Chapter 4. CBES Firmware Update

When a new version of the CBES expansion board firmware is released, users can choose to update or not to update according to their needs.

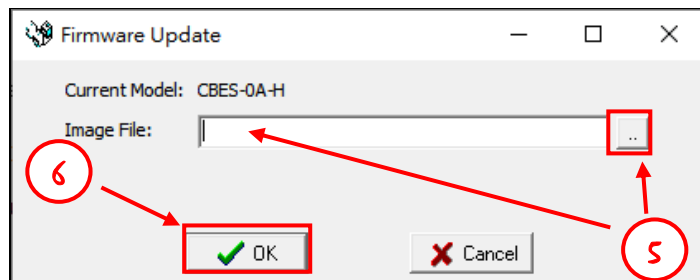
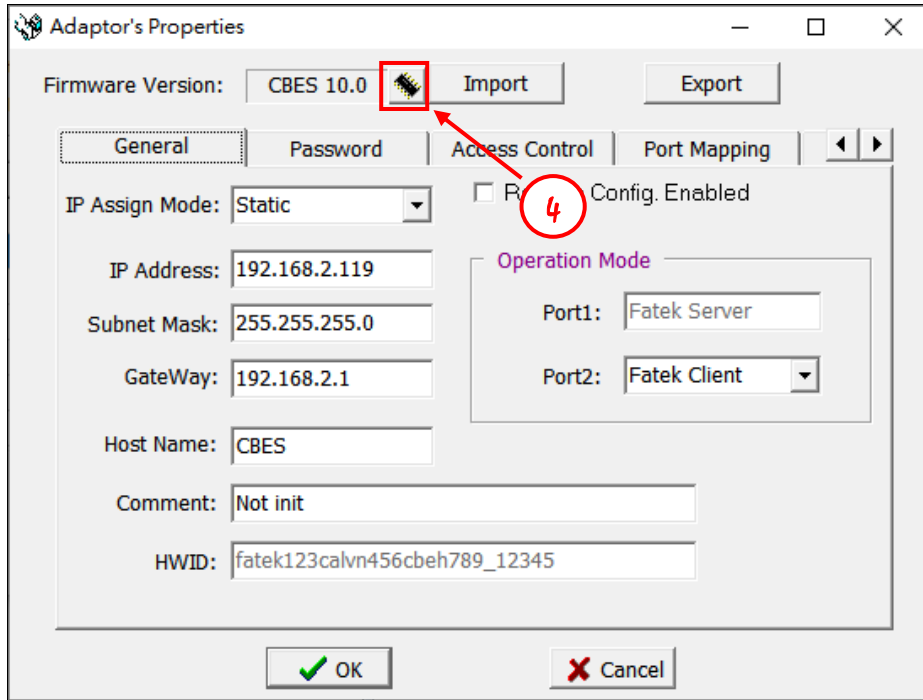
If you want to update, go to the FATEK official website to download the new image file version, and use Ether_cfg software to do the update.




※Note: The firmware update by using Ether_cfg software is only applicable to CBES, other network communication products in FATEK do not support it.

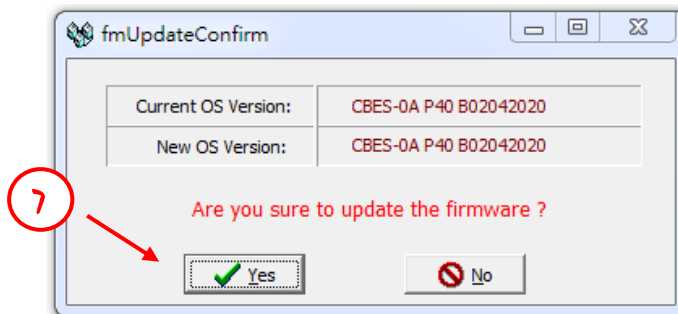
The firmware update can only operate under a local area network environment, please install the CBES expansion board in a local network area environment, then execute the Ether_cfg software and follow the steps to do the update:





- ① Select **LAN** at the Attached Media.
- ② Click **Scan** button to start scanning the online network module.
- ③ The detected module will list in the table, move the cursor to the CBES expansion board that you want to set up, double click the left mouse button to enter the configuration setting window.

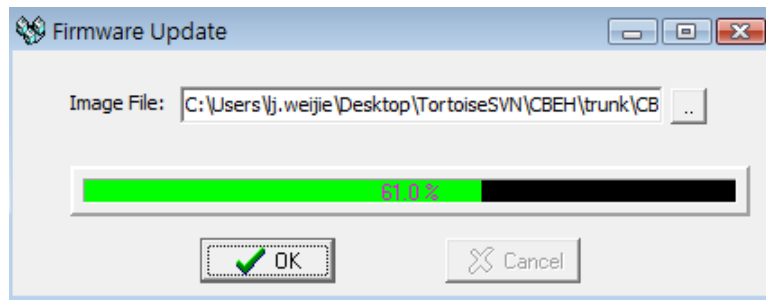



- ④ Press the  button
- ⑤ Edit the "Image file" entry: where you can directly enter the file location or press the  button to select the firmware file location through the window
Note: The filename extension of the firmware is (.os)
- ⑥ Press the  button



- ⑦ The software will show the CBES's current OS version and the user-selected OS version, and ask the user whether to update. Press  button to directly update. Press the  button if the two versions are the same or for other reasons

decided not to update.



Note	
	<p>Please take note of the following points when updating the firmware:</p> <ol style="list-style-type: none">1. Do not interrupt the power during the update2. If the update operation was interrupted due to unknown issues, you can reboot the power to execute the update again.