

6. Ethernet Communication and Application

To keep up with the rapid growth of technology, network communication is commonly applied to data collection, analysis, and remote supervisory and control in industry. HITECH has developed Ethernet-enabled HMI which can provide application upload/download over Ethernet, communication to other Ethernet-enabled PLCs and HMIs.

Note that this newly developed Ethernet-enabled HMI must also work with the Ethernet-enabled PLCs or HMIs. Also, one must also use ADP 6.0 or later to support these new features.

The following will introduce the communication setup, application upload/download, communication to Ethernet-enabled PLCs and HMIs related to Ethernet. There are two methods for Ethernet-enabled HMI to communicate with multi-HMI/PLC over Ethernet; one is Multi-link and the other is Cross-link. Besides, the SoftPanel can read or control the PLC over Ethernet.

Note that this feature is only applied in some models; please refer to [Appendix A. - Table of the ADP 6.0 Features and the HMI models.](#)

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6.1. Link

There are two methods to set up the link. One can use RJ45 Straight Through Cable to set up the link, shown in [錯誤! 找不到參照來源。](#). Another way is to use RJ45 Crossover Cable to set up the link. See [錯誤! 找不到參照來源。](#). The RJ45 Crossover Cable requires HUB for connection.

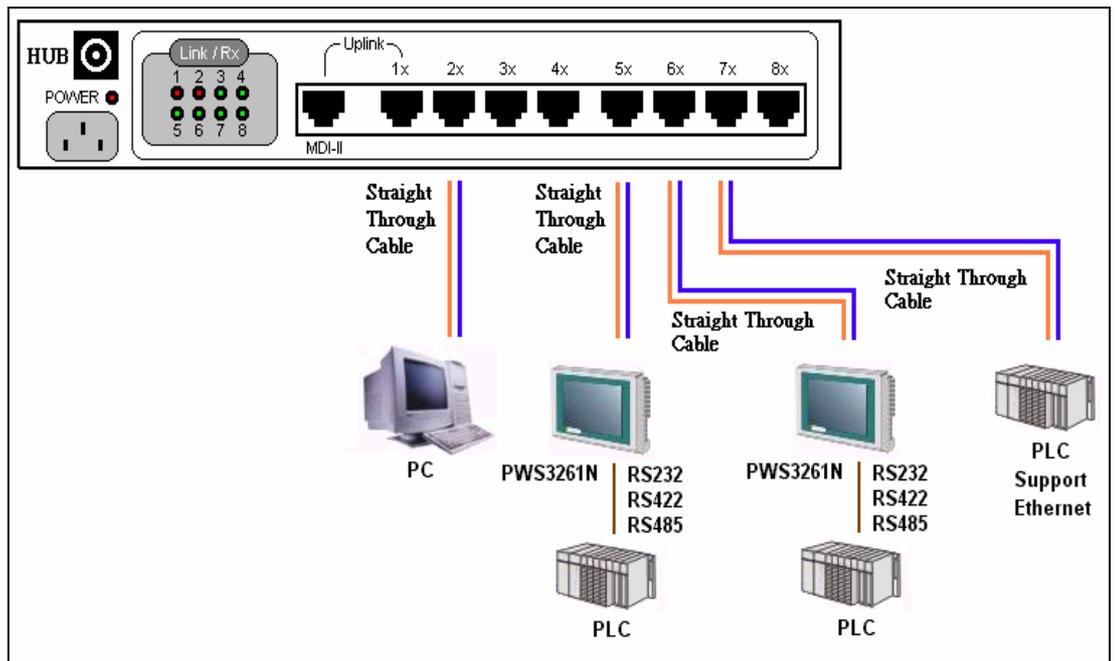


Figure 207. RJ45 Straight Through Cable

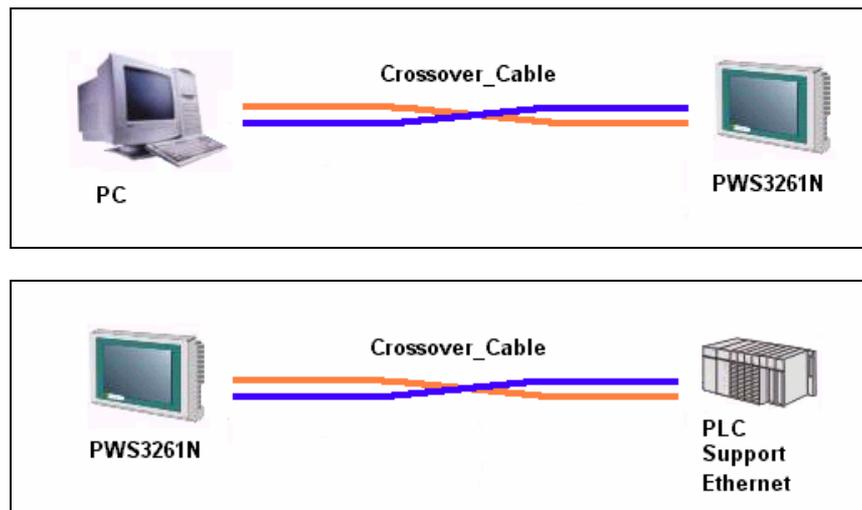


Figure 208. RJ45 Crossover Cable

The choice between these two methods depends on one's needs and available equipment. Users can refer to the following table for the differences between these two methods.

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RJ45 CrossOver Cable	RJ45 Straight Through Cable
No HUB; link to HMI directly	HUB required
1-to-1 only	Multiple link

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6.2. IP Address Setup

To read or send data from HMI over the Ethernet, user needs to set up the correct IP address.

A user can set up IP address in [Configure] of HMI system menu. The following figure is [Configuration Table] of network PWS3261.

Configuration Table	
Date (mm-dd-yy) :	08-28-03
Day of the week :	Thu
Time (hh:mm:ss) :	18:34:23
Printer :	Disabled
PLC communication port :	COM2
Synchronization :	Disabled
Baud rate :	9600
Parity, Data, Stop bits :	Even , 7 bits , 1 bit
CTS handshaking :	Disabled
Command delay (x 10 ms) :	000
Battery check :	Enabled
Screen saver time (Min.) :	00
PLC model code :	0
Workstation node address :	000
Download/Upload/Copy port :	COM1
IP address (Dec.) :	0. 0. 0. 0
Gateway address (Dec.) :	0. 0. 0. 0
Sub-network mask (Dec.) :	0. 0. 0. 0
Firmware version :	4.00.00.00
Mac address (Hex.) :	00.0C.9A.01.02.13

+↑-

←↓→

Save & Quit

Quit



1. If you upload/download over the Ethernet, please note that the first three segment of PC IP address must be the same as the first three segment of HMI IP address. For example, IP address of PC — 100.101.102.010 and IP address of HMI — 100.101.102.XXX. Please ask your MIS staff if there is any question.
2. Please note that the IP address of HMI should not be shared with others in the network.

6.3. Application Upload/Download over Ethernet

The Ethernet-enabled HMI with ADP 6.0 version or later offers user upload/download for application, firmware, recipes and source code. See Figure 209.

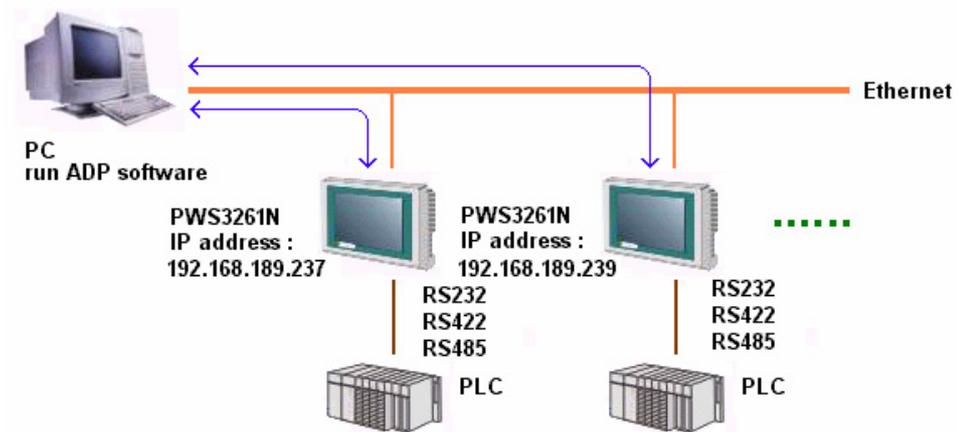


Figure 209. An Example of Upload/Download over the Ethernet

The steps to upload/download an ADP application over Ethernet:

1. First, set up IP address, Gateway address...etc in [**Configuration Table**]. Please refer to [Section 6.2. IP address](#) for complete details.
2. In ADP 6.0, select [Options]/[Transmission Setup] and select “Ethernet” from the [PC Port] list. See Figure 210.

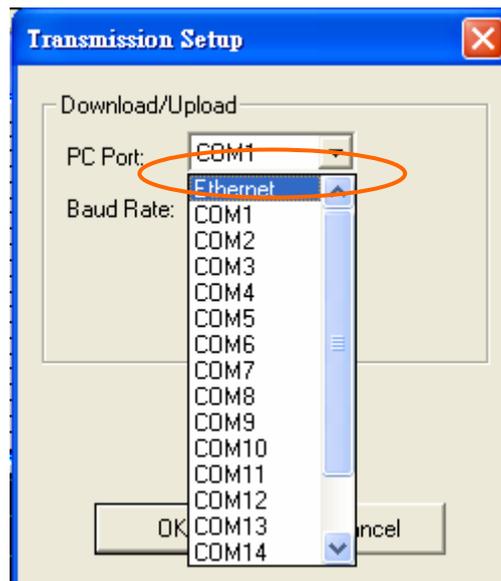


Figure 210. [Transmission Setup]

3. Enter the address to [IP Address] or select from the drop-down list. See Figure 211.

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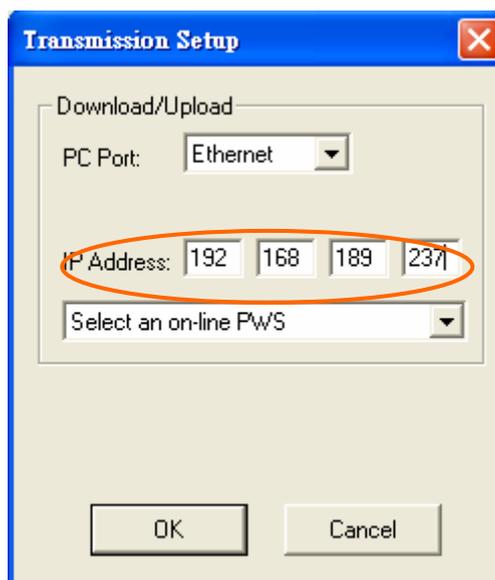


Figure 211. The [Transmission Setup] Dialog Box

4. Select [Application]/[Download Application] or [Download Firmware and Application] to download the application.

Follow the same steps, a user can use [Upload Application],[Upload Recipes],[Download Recipes],[Reconstruct Source] over Ethernet. For [Upload Application], the above-mention steps must be changed to select [File]/[Upload Application].

If the link is not set up properly, then ADP will show the error message. See below.



6.4. Communication to Ethernet-enabled PLCs

ADP 6.0 supports the HMI to communicate with Ethernet-enabled PLCs on Modbus TCP/IP. Therefore, the HMI can control or read the data from PLC. See below.

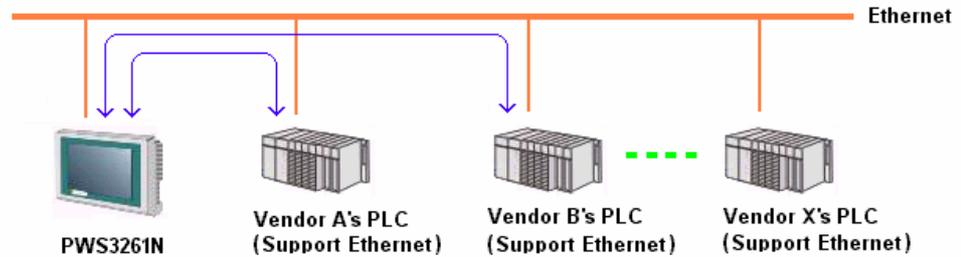
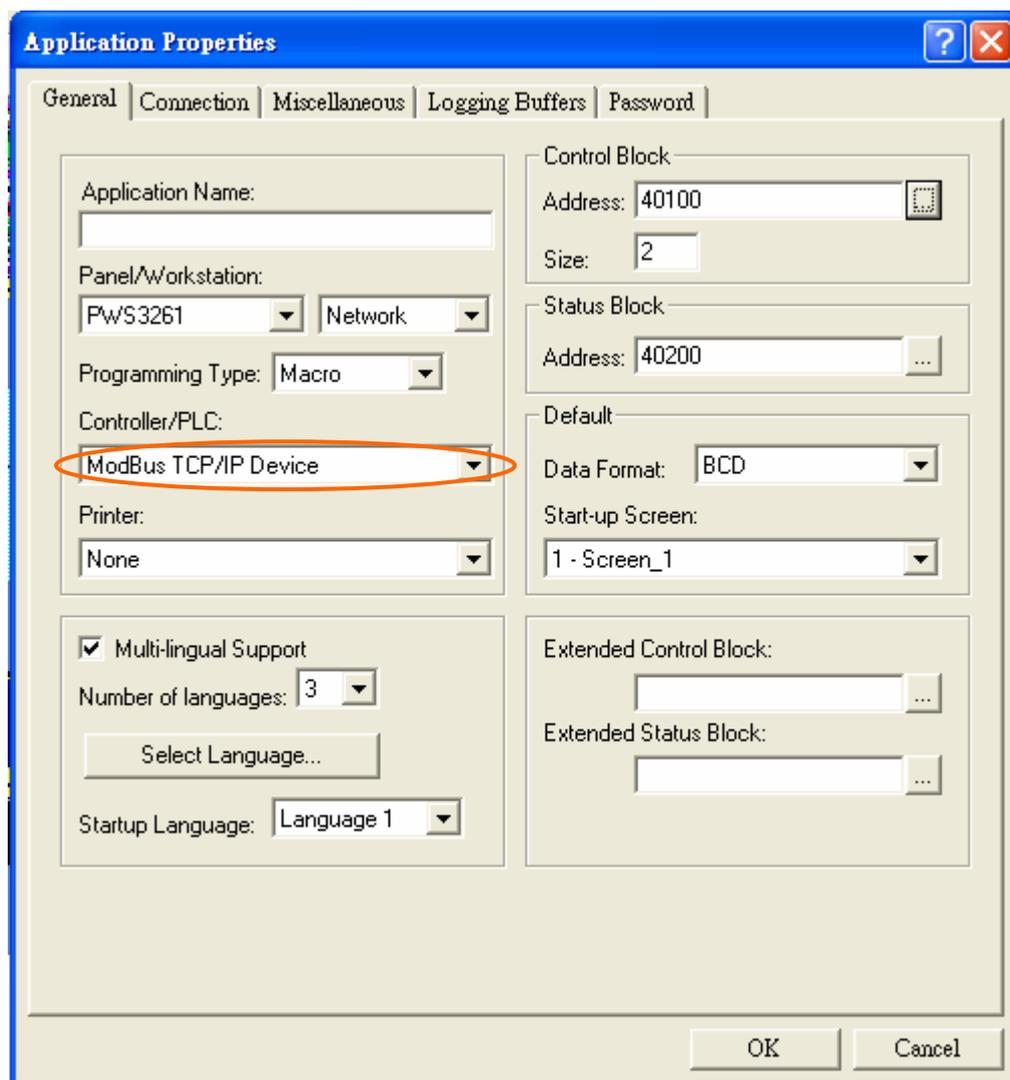


Figure 212. Connection to Ethernet-enabled PLCs

Steps to follow :

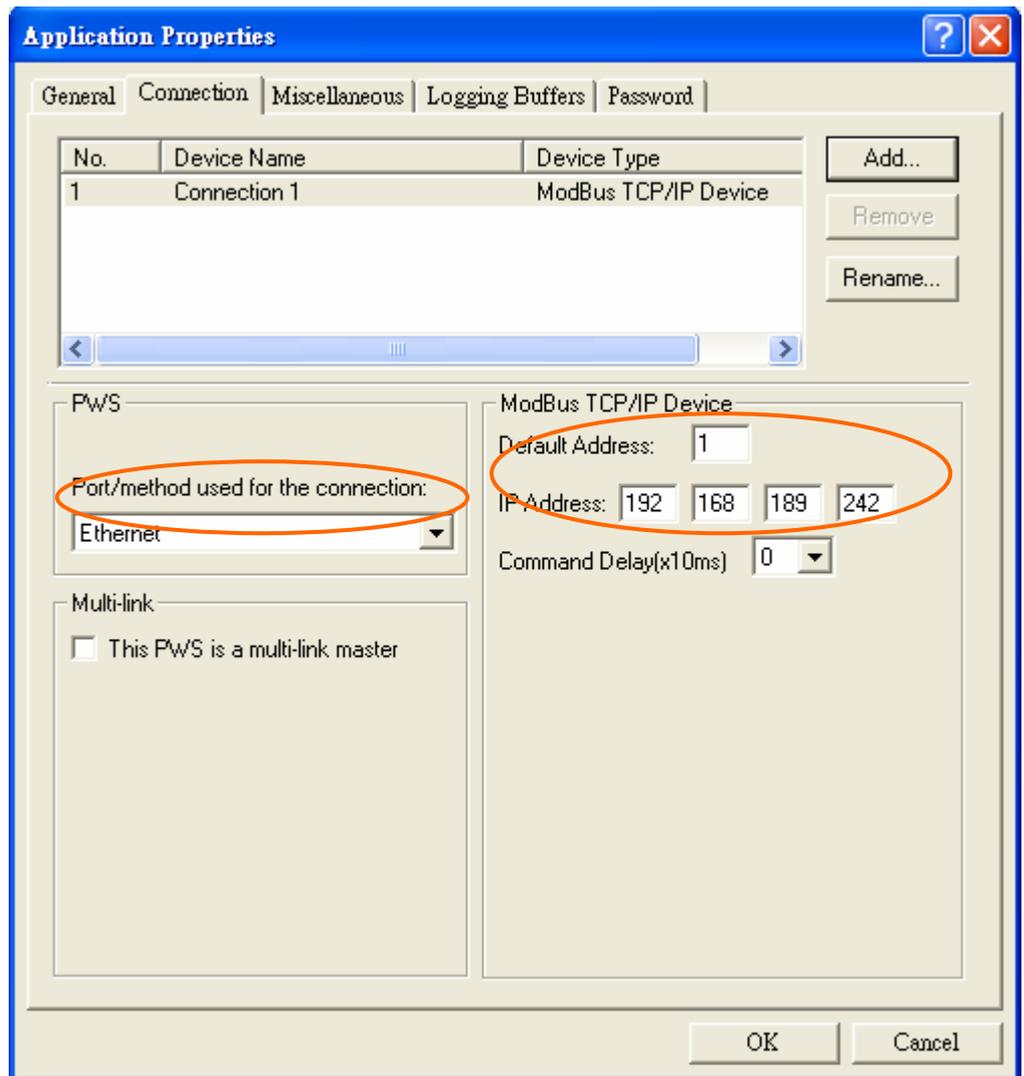
1. Select [Application]/[Workstation Setup], the [Application Properties] dialog box is displayed. On the [General] tab, select the type of PLC or Modbus TCP/IP from the [Controller/PLC] list. See below.

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2. Select the [Connection] tab. On the [Connection] tab, select “Ethernet” from the [Port/method used for the connection] list. Key in the address in the [Default Address] and [IP Address] box. See below. 錯誤! 找不到參照來源。

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3. Download the ADP application file to the HMI and set up the link to connect.

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6.5. Multi-link (One Master and Multiple Slaves)

In ADP 6.0, the Multi-Link over Ethernet function allows user to link several HMIs (one master and multiple slaves) and speeds up the communication between the HMIs.

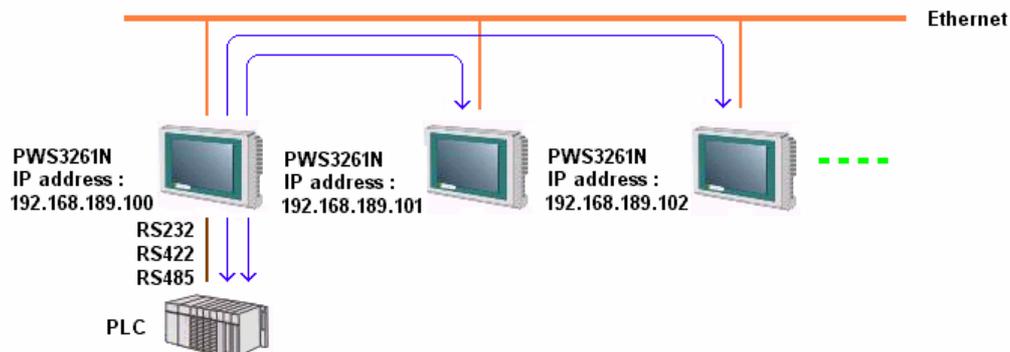
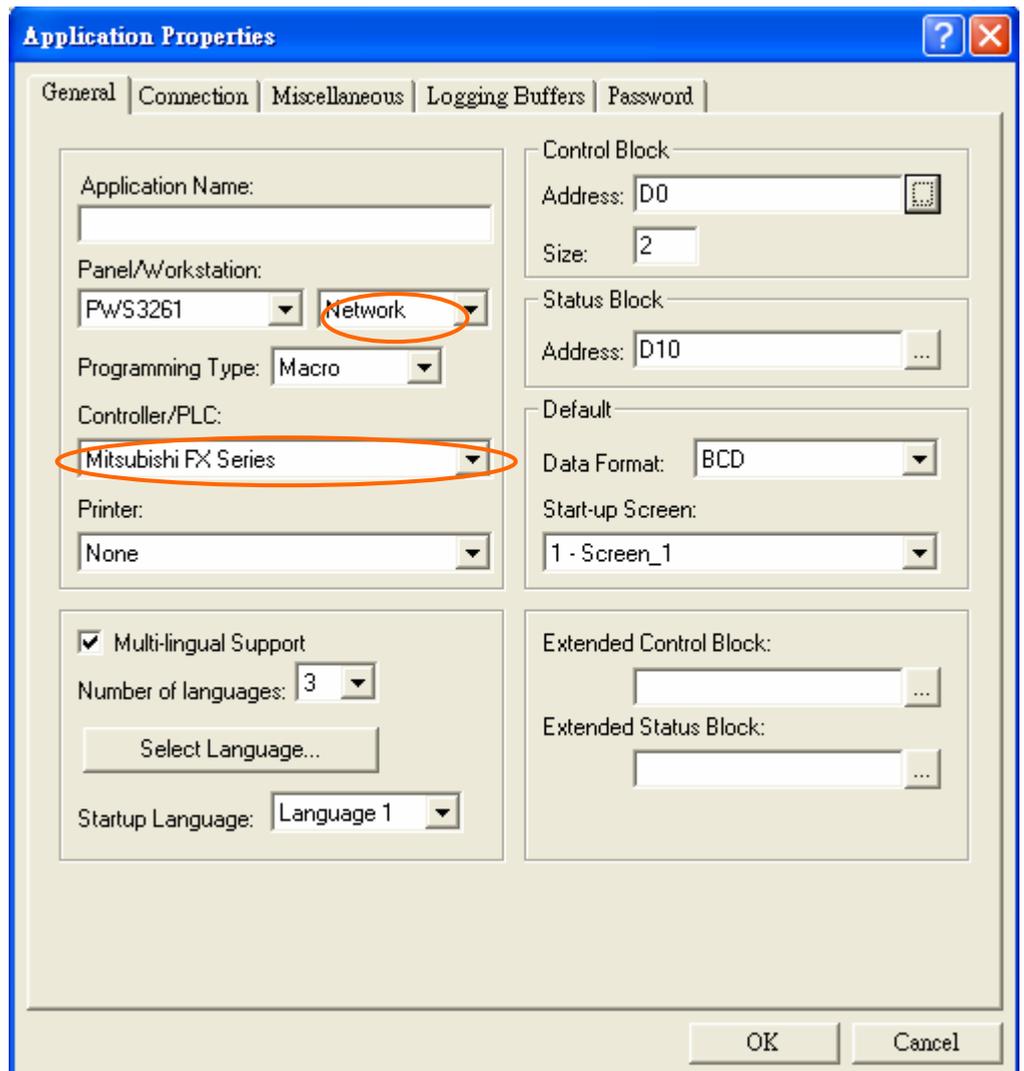


Figure 213. Multi-Link over Ethernet Function

Steps to follow :

1. **Setup the Master** – HMI linked to PLC :
 - (i) Select [Application]/[Workstation Setup]. On the [General] tab, select the model of HMI from the [Panel/Workstation] list and the type of PLC from the [Controller/PLC] list. See below.

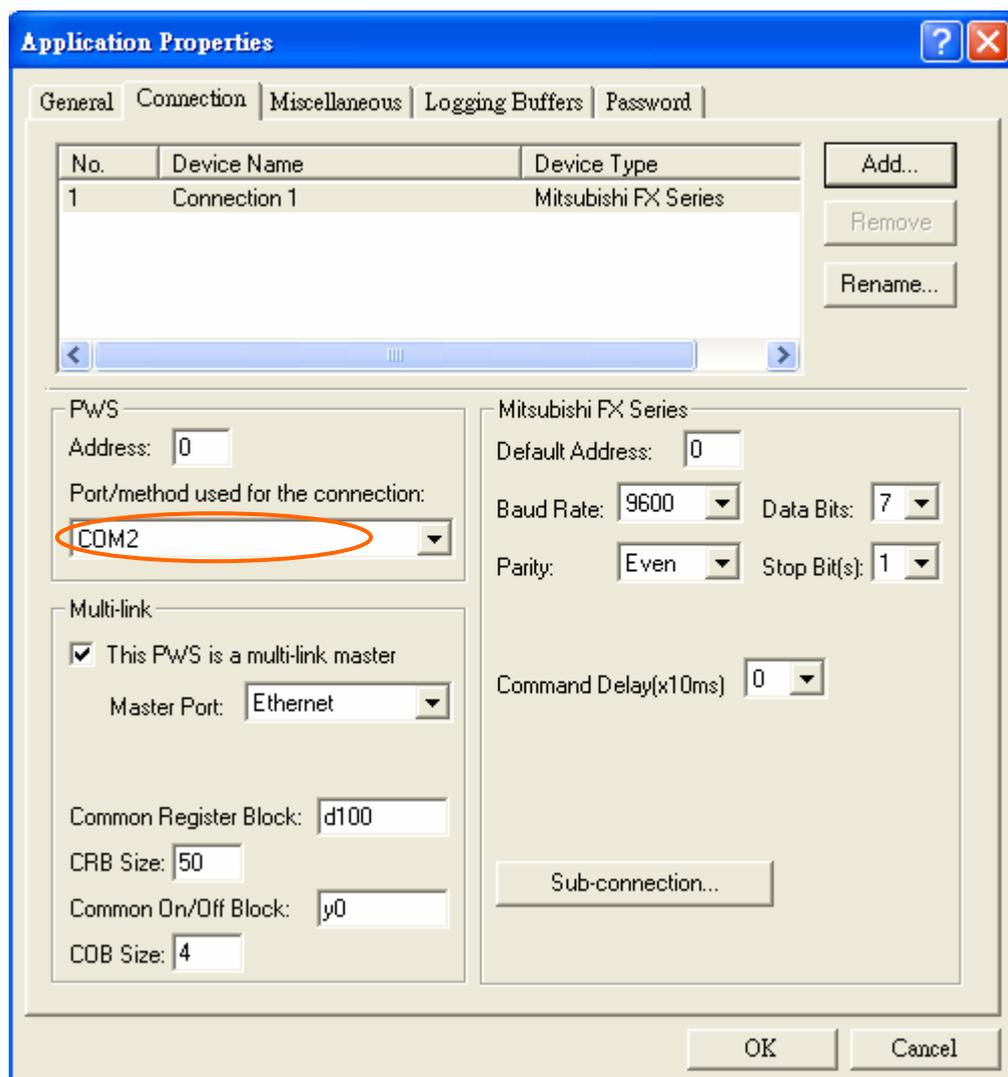
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(ii) Select the [Connection] tab. On the [Connection] tab, check the [Multi-link] box. Then select “Ethernet” from the [Master Port] list. Also, key in the block and address in the [Common Register Block], [CRB Size], [Common On/Off Block] and [COB Size] box. See [錯誤! 找不到參照來源。](#) . Setup the Multi-link on the [Connection] tab. See below.

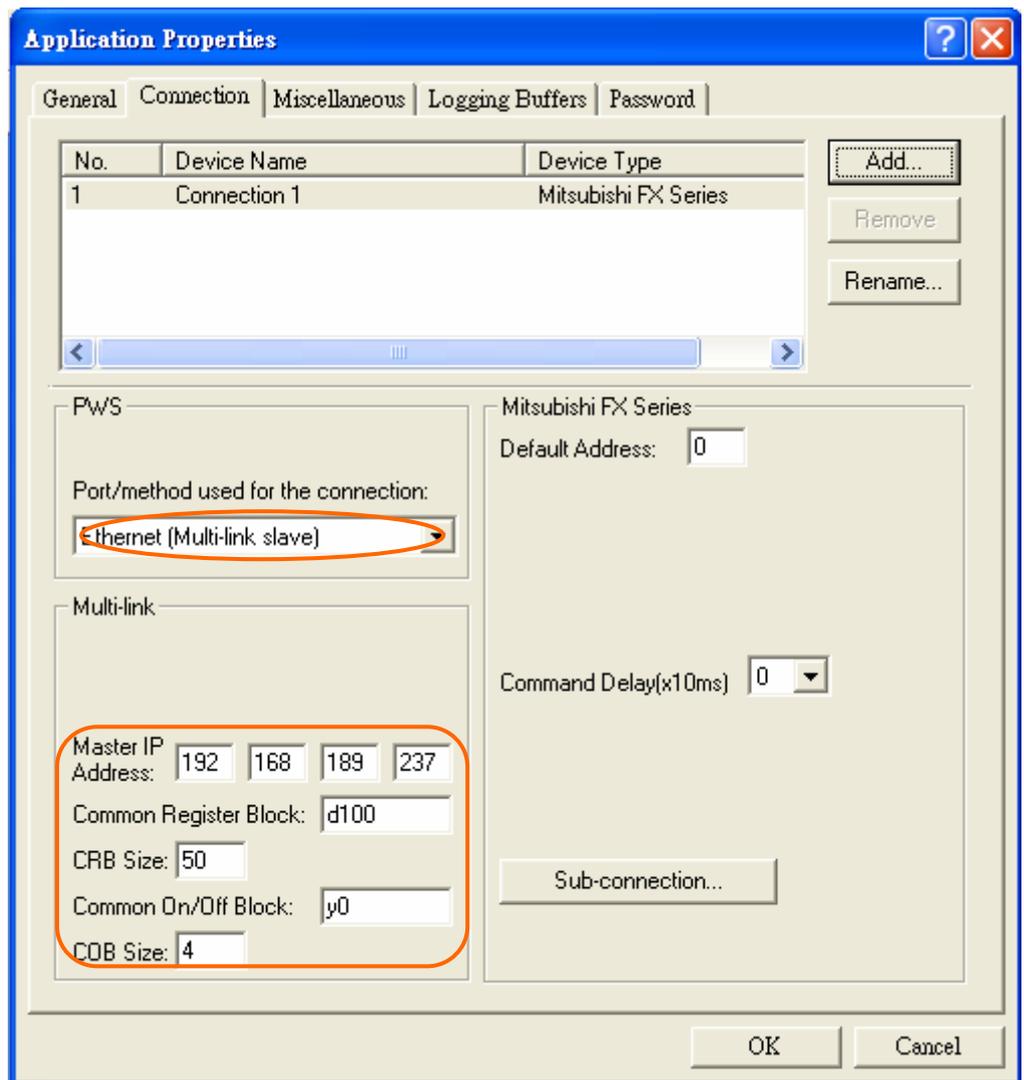
- Check the [This PWS is a multi-link master] box.
- Select “Ethernet” from the [Master Port] list.
- Key in the address and its size in the [Common Register Block],[CRB Size],[Common On/Off Block] and [COB Size] box.

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2. Download the ADP application to the Slave HMI.
3. **Set up Slave** – HMI not linked to PLC
 - (i) Select [Application]/[Workstation Setup]. On the [Connection] tab, select “Ethernet (Multi-link slave)” from the [Port/method used for the connection] list.
 - (ii) Set up [Master IP Address],[Common Register Block],[CRB Size],[Common On/Off Block] and [COB Size].

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4. Download the ADP application to the Slave HMI with linked PLC.

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6.6. Cross-link over Ethernet Function (share the data)

In ADP 6.0, the Cross-Link over Ethernet function allows user to link several HMIs and PLCs and share the data between these HMIs and PLCs. See Figure 214.

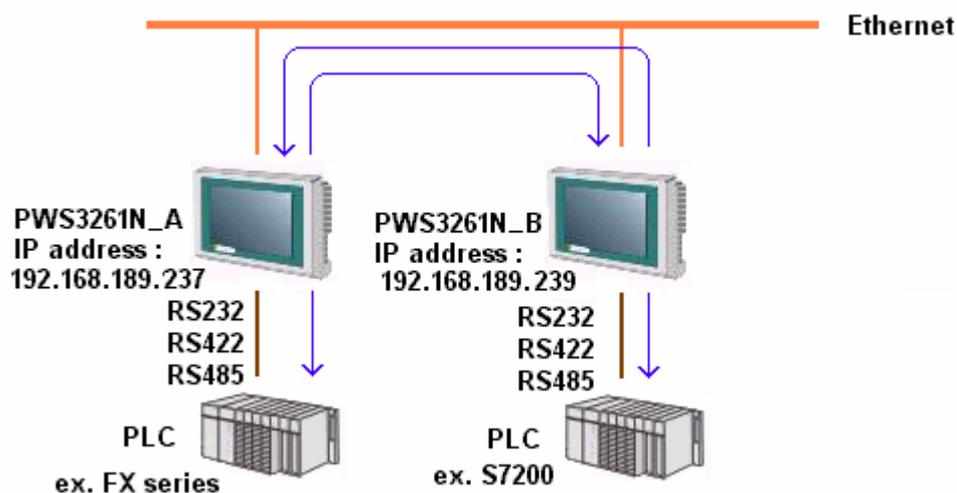


Figure 214. Cross-link Function

Use PWS3261N as an example in the following steps :

1. Setup PWS3261N_A :
 - (i) First, select [Application]/[Workstation Setup]. On the [General] tab, select the model of HMI from the [Panel/Workstation] list and the type of PLC from the [Controller/PLC] list. See Figure 215.

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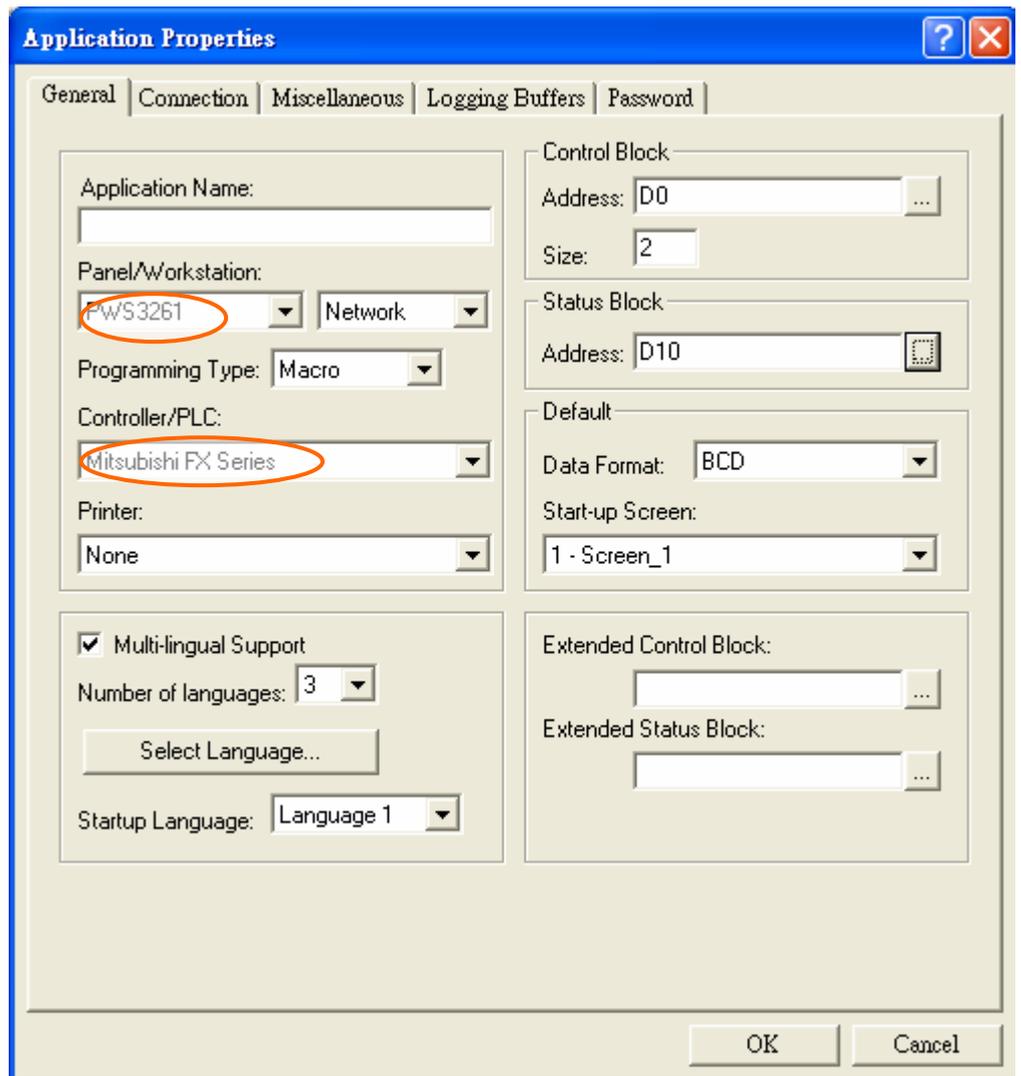


Figure 215. Set up PWS3261N_A

- (ii) To set up Cross-link on the [Connection] tab; See Figure 216.
- Click [Add] to add Connection 2 for Cross-link.
 - Select “Ethernet (Cross-link)” from the [Port/method used for the connection] list.
 - Key in [Default Address],[IP Address] and [PWS Type] for the desired device.

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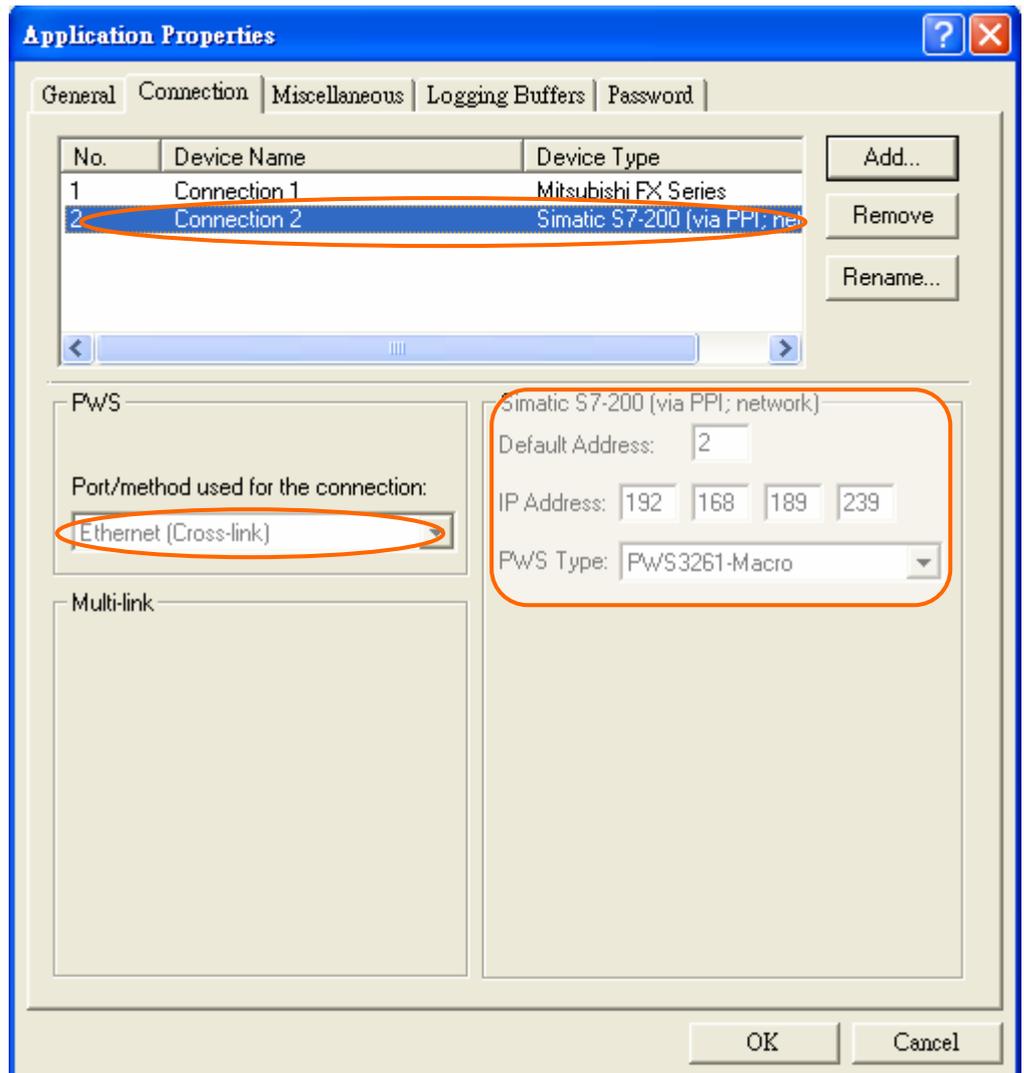


Figure 216. Add Cross-link Device

Note that Connection 1 linked to the PLC by Com Port and Connection 2 linked to the PLC by Cross-Link Ethernet.

(iii) If PWS3261N_A access the data from the PLC linked to PWS3261N_B, follow these steps:

- PLC register address setup :

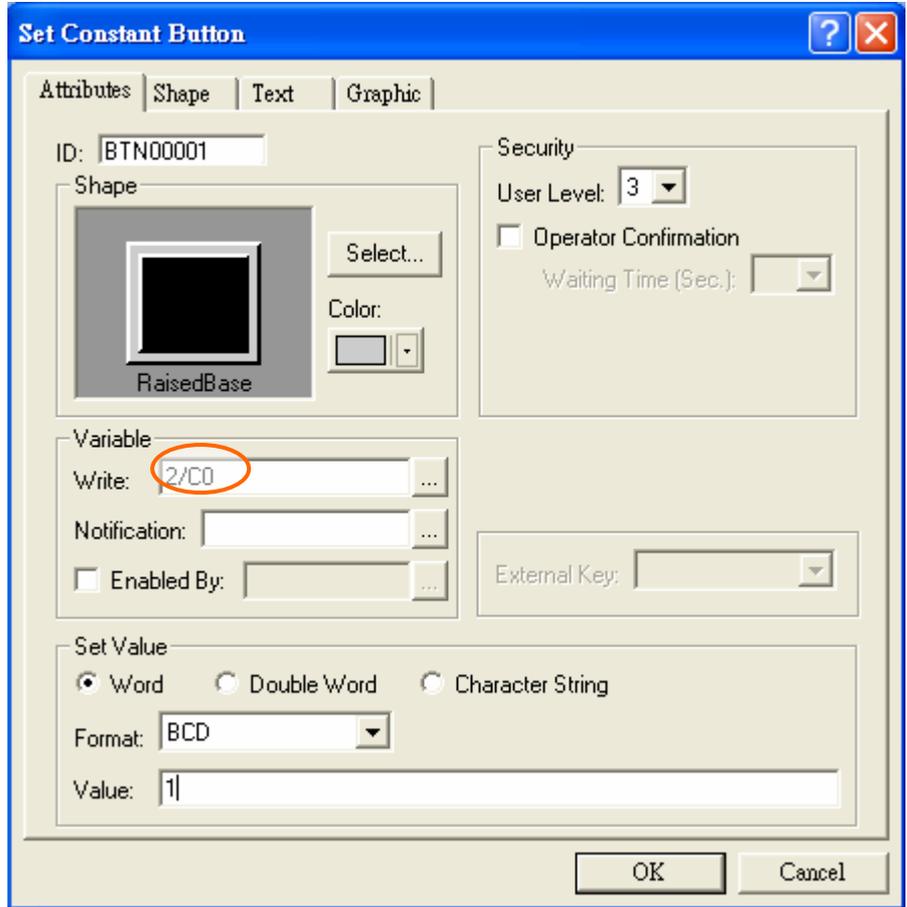
Example: Specify the address of PLC register [2/C0] for Siemens S7-200.

Note : PLC register [2/C0] refers to Connection No. 2 on the [Connection] tab. See Figure 216. [/] means the separation from register address.

There are two ways to setup :

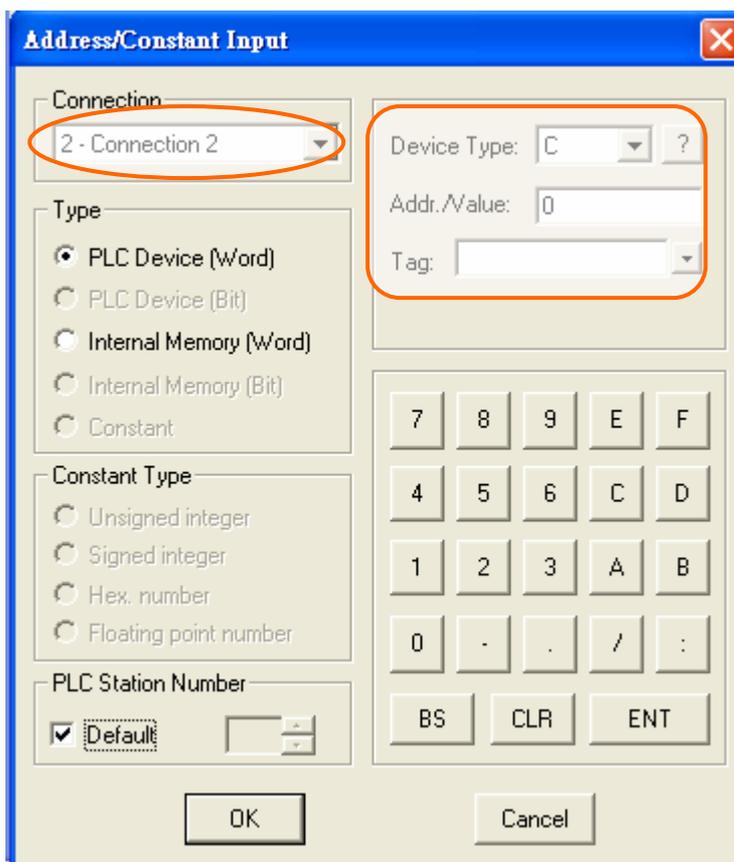
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- (a) Double-click on the object. Select the [Attributes] tab. In the [Variable] block, key in the location “2/Q0.0”. See 錯誤! 找不到參照來源。 .
- (b) Key in the address of PLC register in the object attributes dialog box. Here the address is “2/C0” , See below; or



- (c) Press  , the [Address/Constant Input] dialog box will be on the screen. See below.
Select “2-Connection 2” from the [Connection] list. Key in the address in the [Device Type] and [Add./Value] box. Here the address is C0.
Press [OK], “2/C0” will display in the object attribute dialog box.

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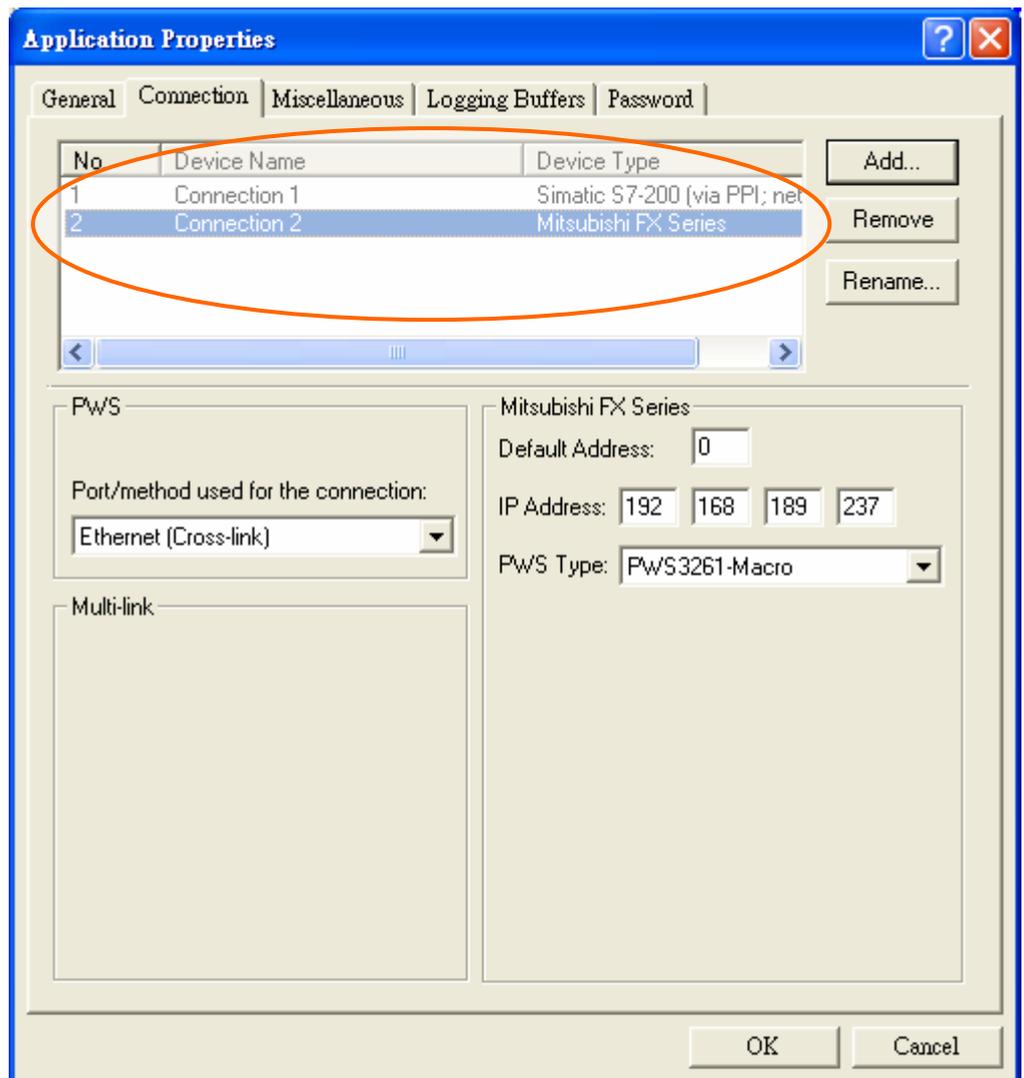
2. Download the edited application from PWS3261N_A to PWS3261N_A.
3. Setup PWS3261N_B :

The setup steps are the same as PWS3261N_A, but the PLC device Connection 1 of PWS3261N_B is the PLC device Connection 2 of PWS3261N_A . See below.

Note that the [Add./Value] of the PLC device Connection 2 must be changed.

The steps are similar to those for PWS3261N_A.

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4. Download the ADP application file of PWS3261N_B to PWS3261N_A. Connect the link to PLCs and network.

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1. Note that there are two types of driver for Cross-Link: Dedicated driver and Shared driver.
2. One HMI can only have 3 types of driver, including COM1, COM2 and Ethernet (Dedicated driver). Therefore, one HMI can only have one Ethernet (Dedicated driver).
3. Use Ethernet (Shared driver) when 3 or more connections are needed.
4. Ethernet (Dedicated driver) is more efficient than Ethernet (Shared driver).
5. Ethernet (Shared driver) is up to 16.
6. Since UDP is used in Cross-Link, Cross-Link is only adoptable to local LAN.

6.7. Supervisory and Control over Ethernet by SoftPanel

ADP 6.0 or later supports Ethernet-enabled HMI models (ex. PWS3261 Network model), Ethernet-enabled PLCs or PLCs which are connected to HMI over Ethernet. See Figure 217.

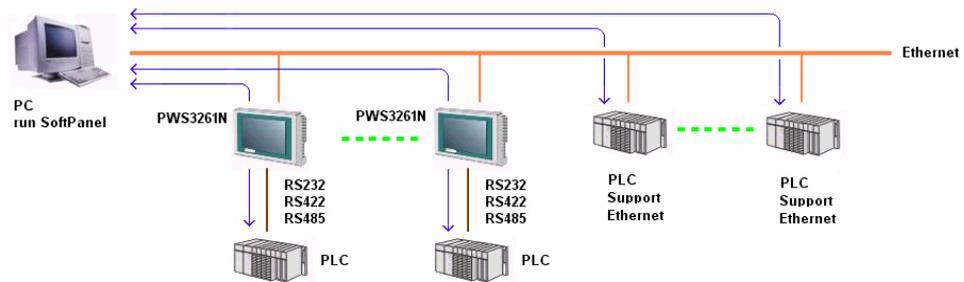


Figure 217. Control over Ethernet by SoftPanel software

For SoftPanel directly linked to PLCs, follow the steps as in [Section 6.4. Communication to Ethernet-enabled PLCs](#).

To access the PLCs via the Ethernet-enabled HMIs (ex. PWS3261 Network model), follow these steps:

1. Select [Application]/[Workstation Setup]. On the [General] tab, select SoftPanel from the [Panel/Workstation] list. See Figure 218 .
2. Select the type of PLC from the [Controller/PLC] list. See Figure 218.

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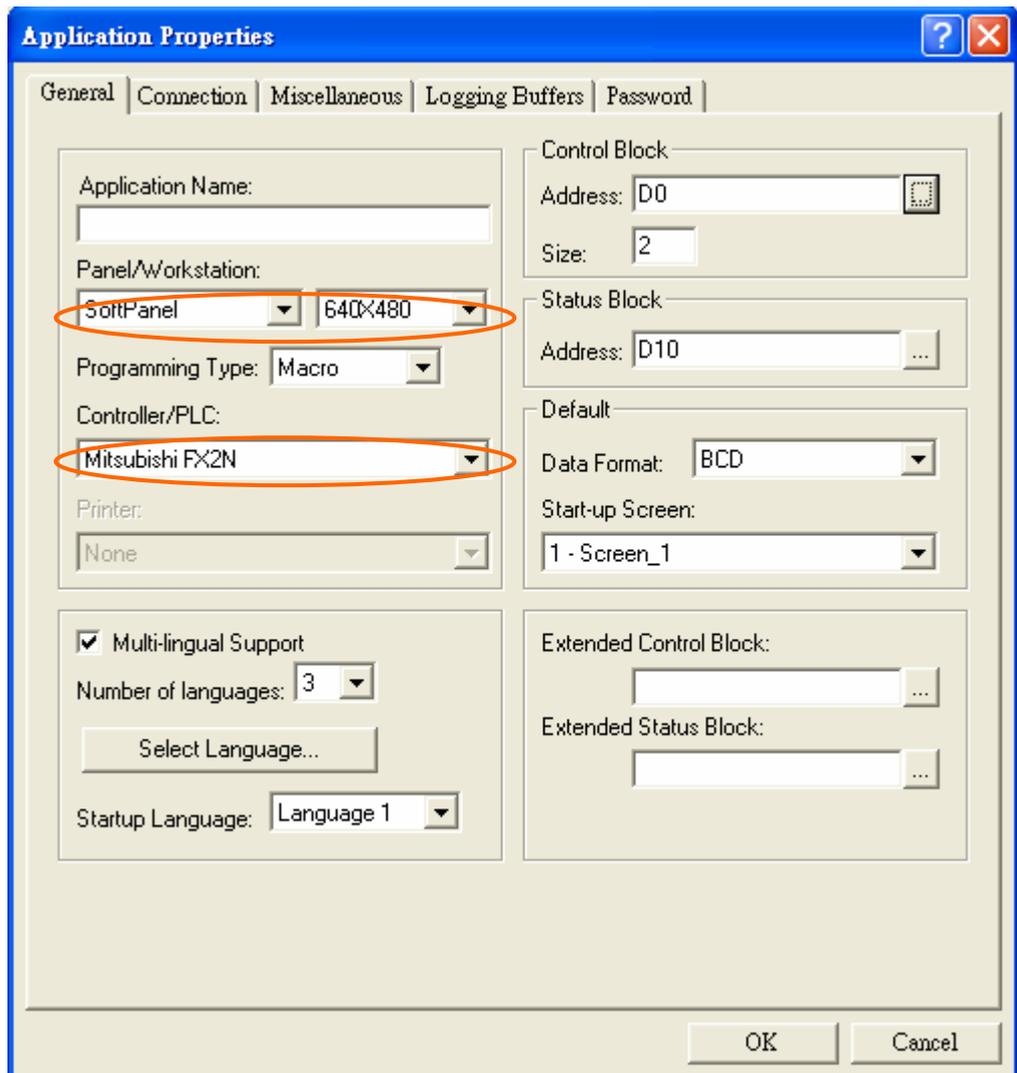


Figure 218. Select “SoftPanel” and the Type of PLC

3. Select the [Connection] tab. On the [Connection] tab, select “Ethernet (Cross-link)” from the [Port/method used for the connection] list. Then key in the default and IP address in the [Default Address] and [IP Address] box and select the [PWS Type]. See Figure 219.
4. Select type of HMI from the [PWS Type] list. See Figure 219.
5. Run the SoftPanel application and link with PLC.

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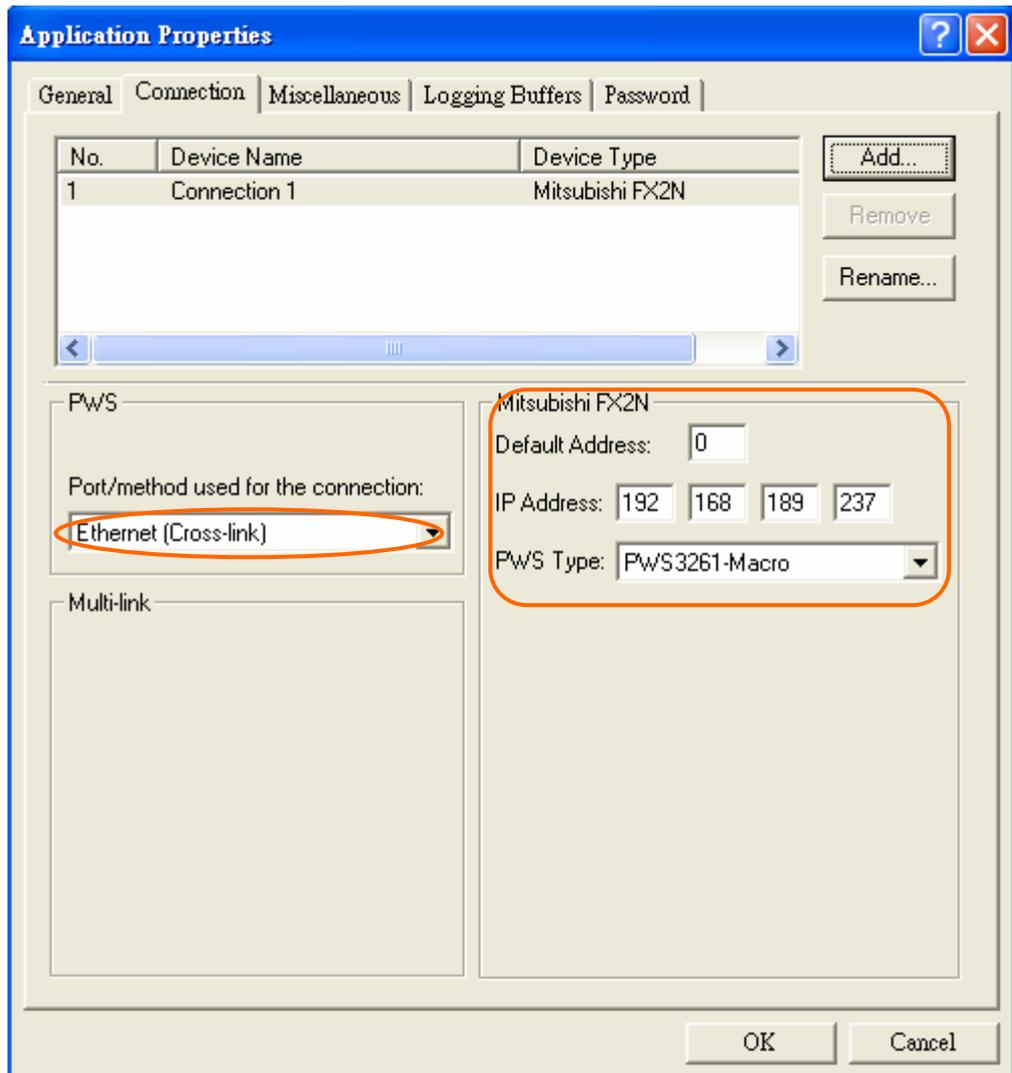


Figure 219. Key in the Address and Select PWS Type