XP-8000-CE6

User Manual

Version 1.0.6, February 2010

Service and usage information for XP-8000-CE6 series

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year, beginning from the date of delivery to the original purchaser.

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If you have any problem, please feel free to contact us.
You can count on us for quick response.

Email: service@icpdas.com
Tel: 886-3-5973366

Also, the FTP site of ICP DAS has contents about XP-8000-CE6 which you may be interested in. We believe that those contents may be helpful to your work.

FTP: ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/

Contact sales of ICP DAS for OEM or ODM services.
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Industrial Communication Products

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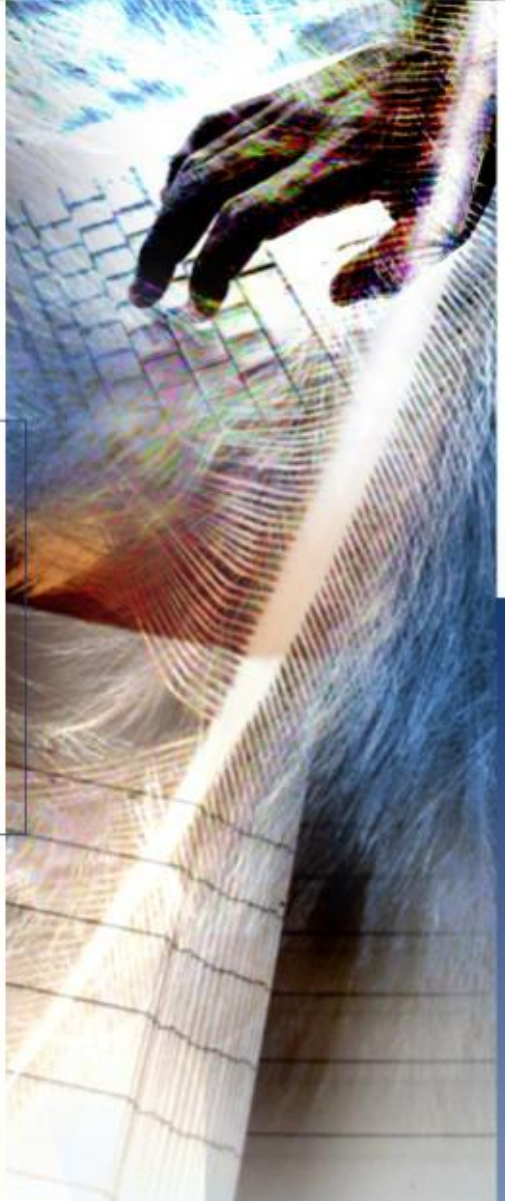


1. General Information

This chapter covers the basic information necessary to help you maximize the effectiveness of the XP-8000-CE6.

1.1. INTRODUCTION

What is XP-8000-CE6?

XP-8000-CE6 is the new generation PAC of ICP DAS. It equips a AMD LX 800 CPU (500 MHz) running a Windows Embedded CE 6.0 operating system, variant connectivity (VGA, USB, Ethernet, RS-232/RS-485) and 0/3/7 slots for high performance parallel I/O modules (high profile I-8K series) and serial-type I/O modules (high profile I-87K I/O modules).

Its operating system, Windows Embedded CE 6.0 R3, has many advantages including hard real-time capability, small core size, interrupt handling at a deeper level, achievable deterministic control and low cost. Compared with CE5.0, CE6.0 updates its virtual memory architecture to increase system robustness and security. Besides, CE 6 R3 delivers rich user experiences and a unique connection to Windows PCs, servers, services, and devices. XP-8000 also supports SoftPLC such as ISaGRAF and K.W..

1.2. FEATURES

Software Features

☑ Windows Embedded CE 6.0

Most of the popular features in Microsoft software are included, such as:

ASP Web Server (Javascript and VBScript):

ASP stands for Active Server Pages. ASP is an active scripting engine that runs on the server side and dynamically creates web pages for client's requests. In XP-8000-CE6, ASP Web Server is provided. The ASP Web Server supports both VBScript and JavaScript.

SQL Server Compact 3.5

SQL, Structured Query Language, is a computer language for database. SQL Server is a server of database that implements SQL query language. Microsoft SQL Server Compact 3.5 is an embedded database engine which provides faster, trusted, productive environments and better decision making support.

.NET Compact Framework 3.5:

Microsoft's .NET Compact Framework provides a run-time environment, CLR, and plenty of class libraries to simplify development processes. CLR is Common Language Runtime. It provides cross-language integration, enhanced security, etc. Windows Embedded CE 6.0 supports .NET Compact Framework 3.5. Therefore, we provide .NET Compact Framework 3.5 in XP-8000-CE6.

Many others:

There still are others such as Jscript, VBScript, etc.

☑ DCON Utility

DCON Utility is an application that provides an environment with easy and quick search, configure and test I/O modules in the networks.

☑ Rich Software Solutions

XP-8000-CE6 equips with Windows Embedded CE 6.0 which is compatible with the popular operating system, Windows XP. Thus there are rich software solutions users can find. The followings are commonly-used development tools:
Microsoft Visual Studio.NET 2005/2008:
ICP DAS provides SDK as well as demo programs for Visual C#.NET, Visual Basic.NET and Visual C++.
SCADA solution: InduSoft provides simple “drag and drop”, “point and click” developing environment for HMI and SCADA applications.

Hardware Features

☑ Power CPU module

The most important features of the CPU module are

AMD LX 800 CPU (32-bit and 500 MHz)
512 MB RAM
4 GB Built-in Flash Disk

☑ Built-in VGA Port

A built-in VGA port can be directly connected to a regular LCD display. Users can operate the HMI or SCADA software (running on the XP-8000-CE6) with display, keyboard and mouse just as how they usually did on regular PCs.

☑ 64-bit Hardware Serial Number

The 64-bit hardware serial number is unique and individual. Every serial number of XP-8000-CE6 is different. Users can add a checking mechanism to their AP to prevent software from pirating.

☑ Built-in Flash Disk (4 GB)

In normal situation, users can store their AP or data to the CF card or USB Flash disk. But in some vibration environment (for example, like driving ships), the two storage media would be bad connection. Then the built-in Flash disk will be the best storage media in such the vibration environment.

☑ Dual Watchdog Timer

A system could be hanged up when the OS or the AP fails. There are two watchdogs (OS watchdog and AP watchdog) designed to automatically reset the CPU when the situations happen. The design will increase the reliability of the system.

☑ Dual Battery-Backup SRAM (512 KB)

To maintain important data while power off, non-volatile memory is the ideal design. The XP-8000-CE6 equips a 512 KB SRAM with two Li-batteries to maintain data while power off.
The two Li-batteries can continually supply power to the 512 KB SRAM to retain the data for 5 years; and the dual-battery design can avoid data lost while replacing a new battery.

☑ Dual Ethernet Ports

XP-8000-CE6 provides two Ethernet ports. The two Ethernet ports can be used to implement redundant Ethernet communication and separate Ethernet communication (one for global Internet, one for private Ethernet).

☑ Redundant Power Input

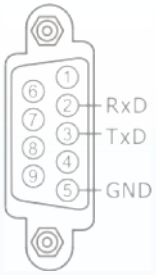
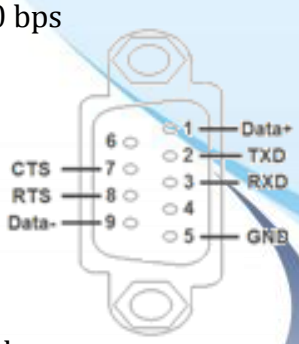
To prevent the XP-8000-CE6 from failing by the power loss, the power module is designed with two input connectors. Once a power input fails, the power module switches to the other power input. And there is a relay output for informing the power failure.

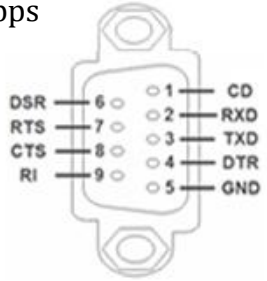
☑ Ventilated housing designed to operate between -25°C ~ +75°C

Each XP-8000-CE6 is housed in a plastic-based box with a column-like ventilator that can help to cool the working environment inside the box and allow the XP-8000-CE6 operating between -25℃ and +75℃.

1.3. SPECIFICATIONS

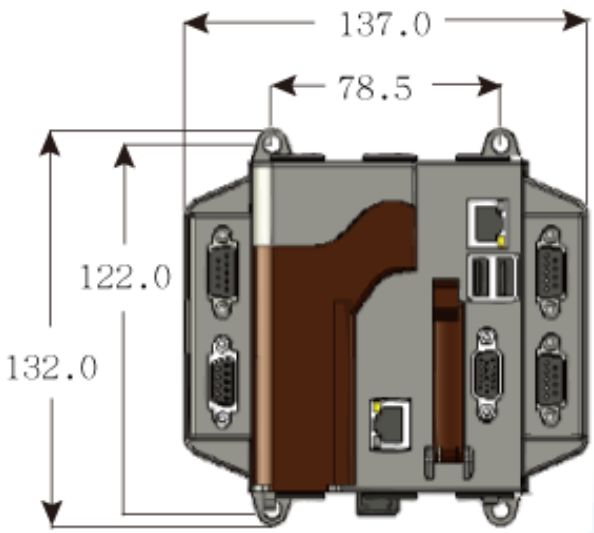
Feature	Items	Description
Processor Module	CPU	AMD LX 800 processor
	System Chipset	AMD CS5536
	System Memory	512M RAM
	BIOS	Award 4M bits flash ROM BIOS
Operating System		Windows CE6 R3
torage	Flash	4 GB as IDE Master (Flash)
	Dual Battery Backup SRAM	512 KB (for 5 years data retain)
	EEPROM	16 KB, data retention: 40 years 1,000,000 erase/write cycles.
	CF Card	- (support up to 32 GB) - (hot plug unsupported)
Graphic	Graphic Chip	AMD LX 800 integrated graphic controller
	VGA resolution	(640 x 480 ~ 1024 x 768 or above)
Ethernet	Controller	RJ-45*2, 10/100Mbps Base-TX Ethernet Controller (Auto-negotiating, Auto_MDIX, LED indicator)
Expansion Slots		One Proprietary-definition expansion for ISA and DC-in One PCI-expansion with Hirose FX8C-120P-SV6(22)
Dual Watchdog Timer		Yes
64-bit Hardware Serial Number		Yes
Rotary Switch		Yes (0 ~ 9)
DIP Switch		Yes (8 bits) (for XP-8341/8741-CE6 only)
USB2.0		x 2

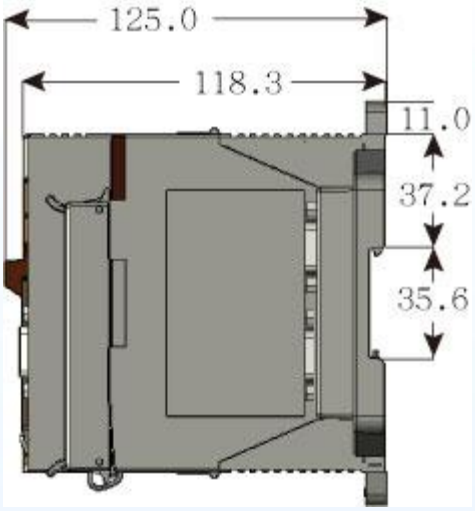
Feature	Items	Description
	COM1	RS-232 (Internal communications with I-87K modules in slots, for XP-8341/8741-CE6 only; external COM1 only for XP-8041-CE6) Baud Rate: 115200 bps Data Bits: 8 Parity: None, Even, Odd Stop Bits: 1 Note: CPU built-in UART 
	COM2	RS-232, Non-isolation (TxD, RxD and GND) (used to update firmware) Baud Rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 bps Data Bits: 7, 8 Parity: None, Even, Odd Stop Bits: 1 Note: CPU built-in UART 
Serial Port	COM3	RS-485 Baud Rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 bps Data Bits: 5, 6, 7, 8 Parity: None, Even, Odd, Mark (Always 1), Space (Always 0) Stop Bits: 1, 2 FIFO: 16 bytes Note: 16C550 compatible
	COM4	RS-232/485 Baud Rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 bps Data Bits: 5, 6, 7, 8 Parity: None, Even, Odd, Mark (Always 1), Space (Always 0) Stop Bits: 1, 2 FIFO: 16 bytes Note: 16C550 compatible 

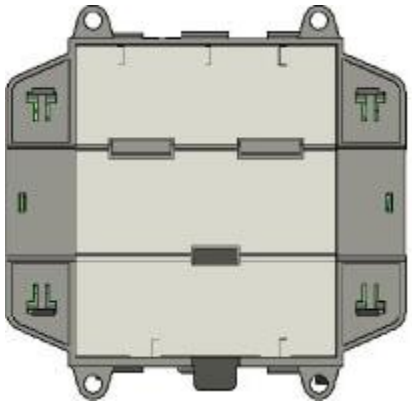
Feature	Items	Description
		COM4 can be configured as either RS-232 or RS-485, and the configuration depends on the pin connections as follows: RS-232 (RxD, TxD, CTS, RTS and GND) RS-485 (Data+ and Data-) There is no software configuration or hardware jumper needed.
	COM5	RS-232 Baud Rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 bps Data Bits: 5, 6, 7, 8 Parity: None, Even, Odd, Mark (Always 1), Space (Always 0) Stop Bits: 1, 2 Note: 16C550 compatible 
FIFO: 16 bytes Environment	Operating Temp	-25°C ~ +75°C
	Storage Temp	-30°C ~ +85°C
	Relative Humidity	5% ~ 90% RH, non-condensing
Mechanical	XP-8041-CE6	116 mm (W) x 132 mm (L) x 125 mm (H)
	XP-8341-CE6	231 mm (W) x 132 mm (L) x 125 mm (H)
	XP-8741-CE6	355 mm (W) x 132 mm (L) x 125 mm (H)
Power	XP-8041-CE6	Capacity: 1.8A, 5V supply to CPU and backplane, total 15 W Consumption:14.4 W (0.6 A @ 24 VDC)
	XP-8341-CE6	Capacity: 1.8A, 5V supply to CPU and backplane; 5.2A, 5V supply to I/O expansion slots, total 35 W Consumption:14.4 W (0.6 A @ 24 VDC)
	XP-8741-CE6	Capacity: 2.0A, 5V supply to CPU and backplane; 5.0A, 5V supply to I/O expansion slots, total 35 W Consumption:16.8 W (0.7 A @ 24 VDC)

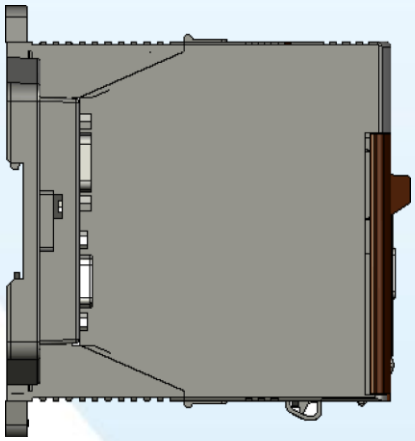
1.4. DIMENSION (UNIT: MM)

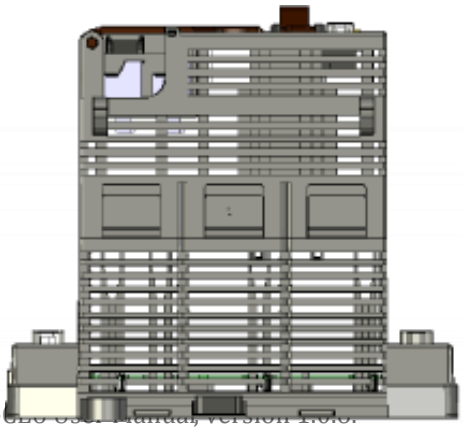
XP-8041-CE6



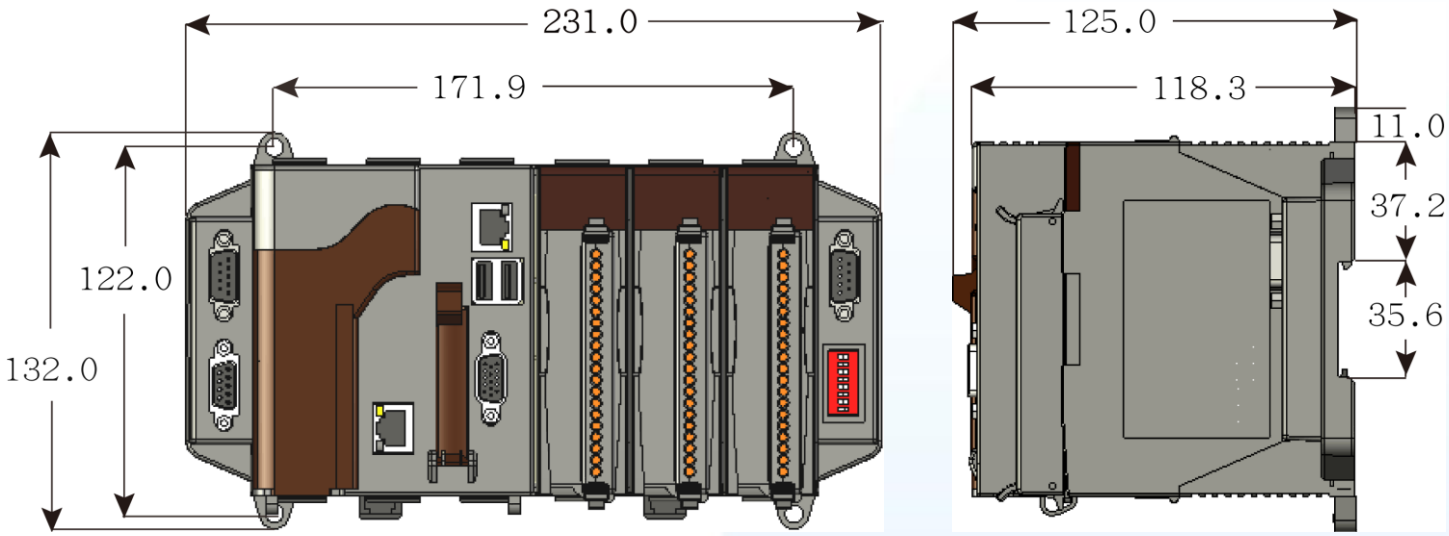


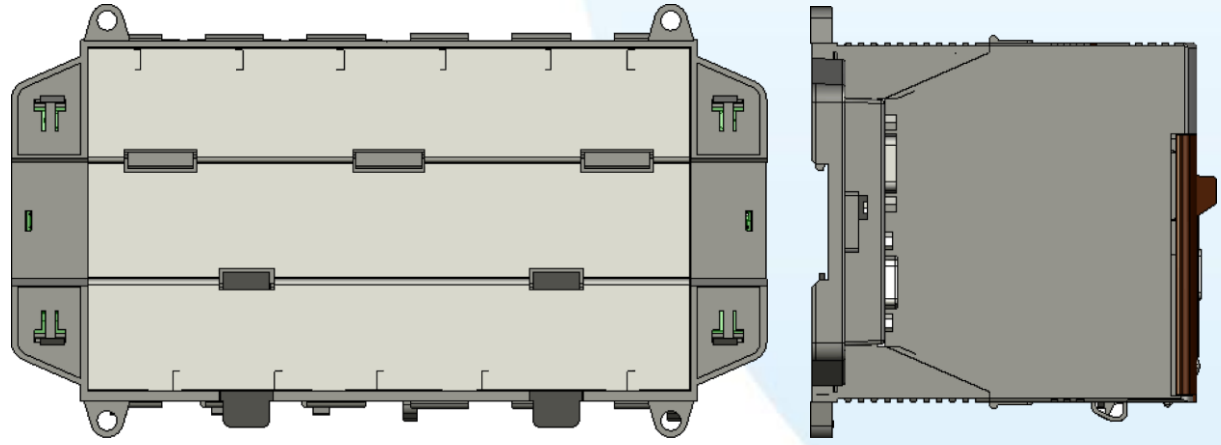


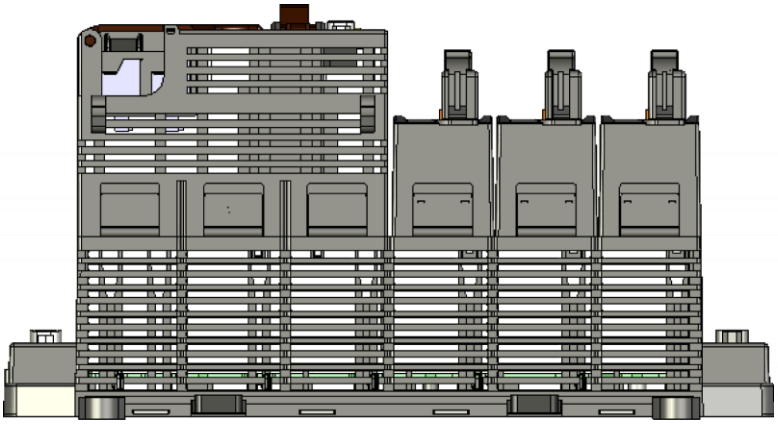




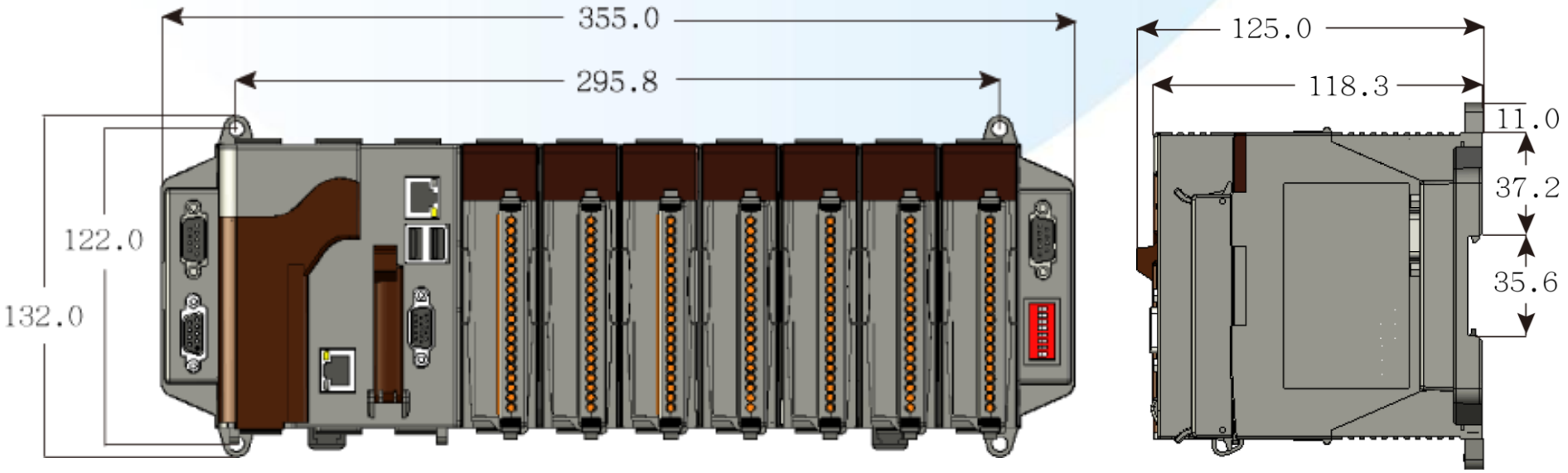
XP-8341-CE6

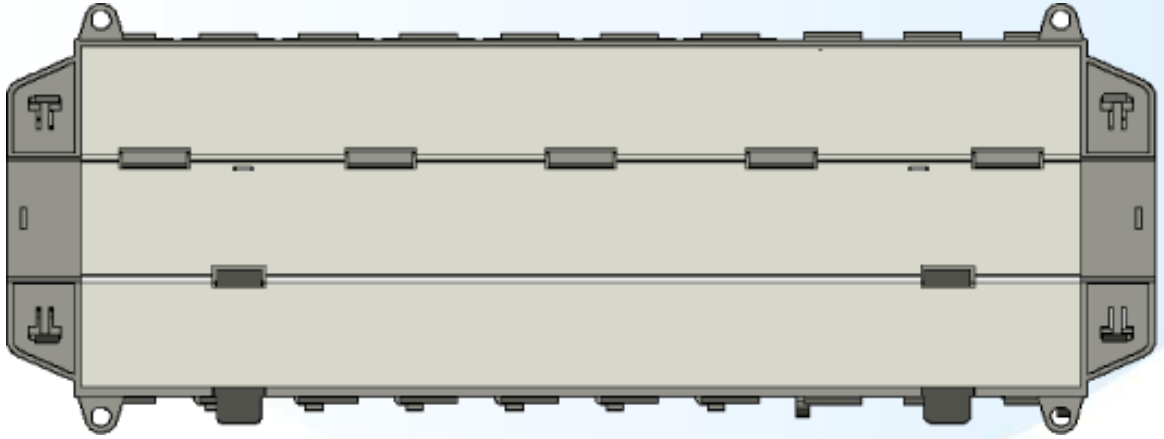


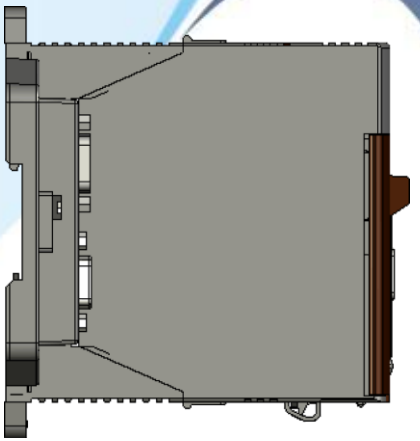


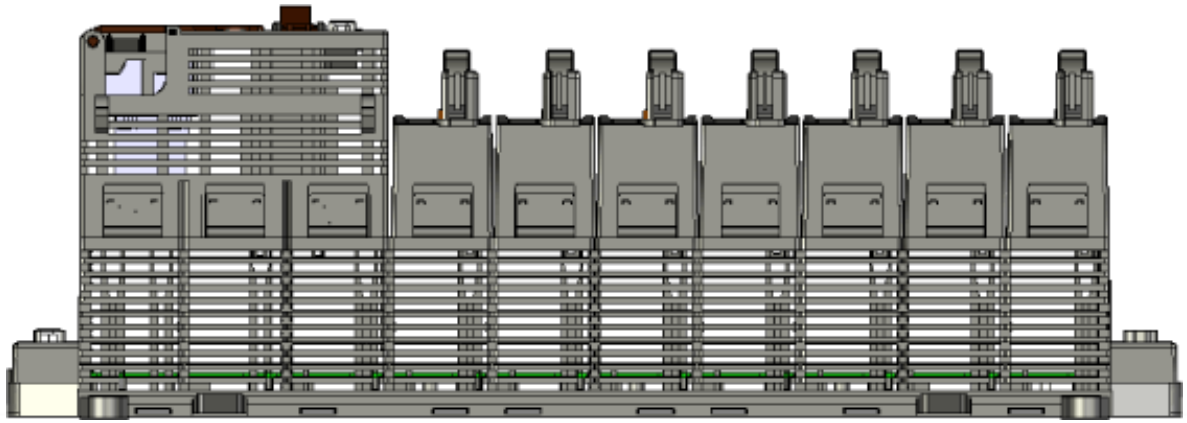


XP-8741-CE6



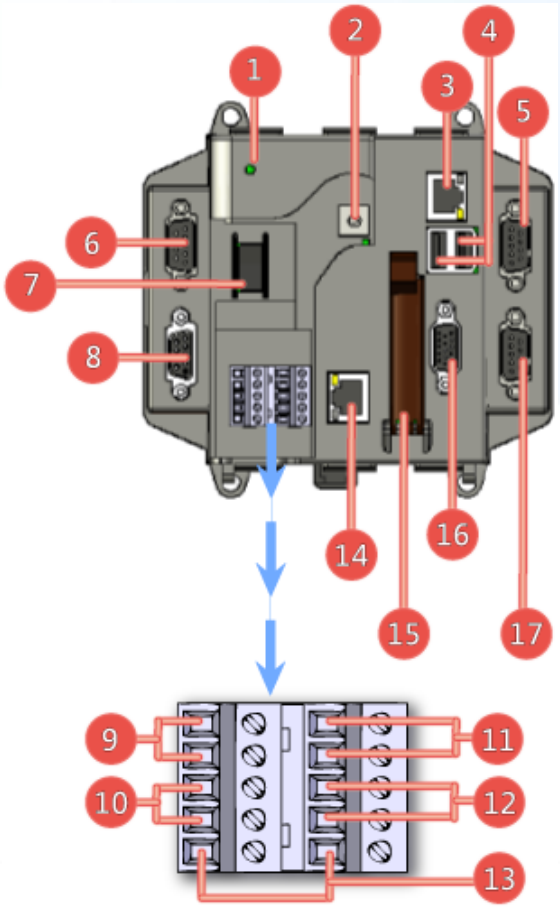






1.5. OVERVIEW

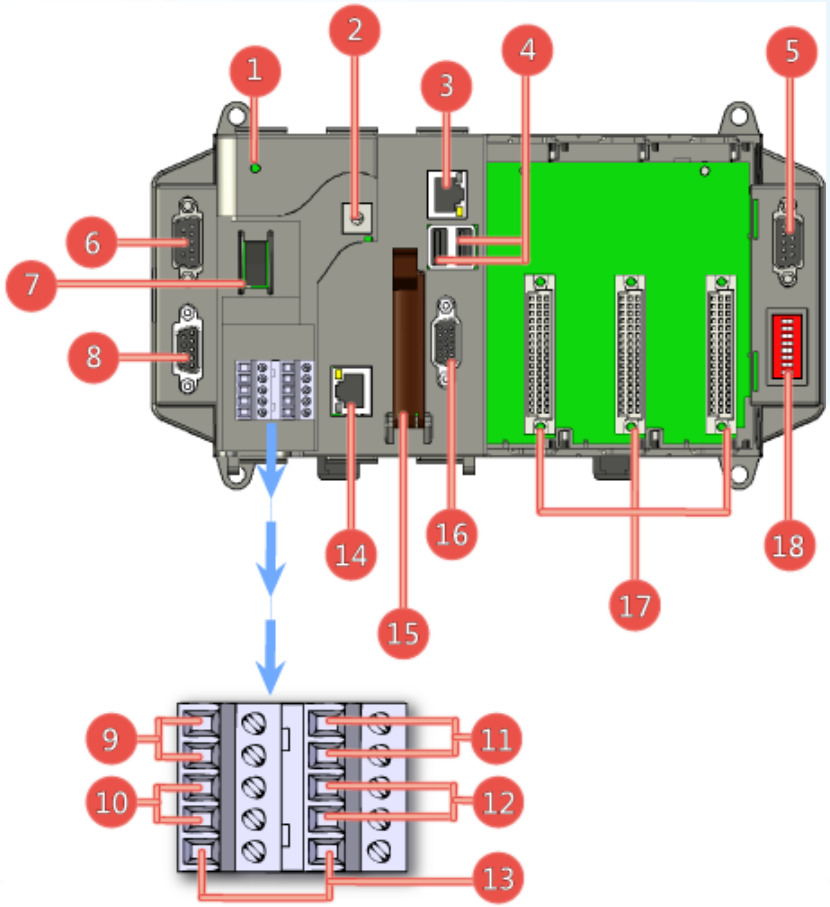
XP-8041-CE6



Overview Item Descriptions

1. Power LED Indicator
2. Rotary Switch
3. Ethernet Port 1
4. USB 2.0 Ports
5. COM Port 5 (RS-232)
6. COM Port 4 (RS-232/RS-485)
7. Power Switch
8. COM Port 2 (RS-232)
9. Power and Ground
10. COM Port 3 (RS-485)
11. Redundant Power and Ground
12. Relay Output R.COM and R.NO
13. Frame Ground
14. Ethernet Port 2
15. CF (Compact Flash) Card Slot
16. VGA Port
17. COM Port 1 (RS-232)

XP-8341-CE6



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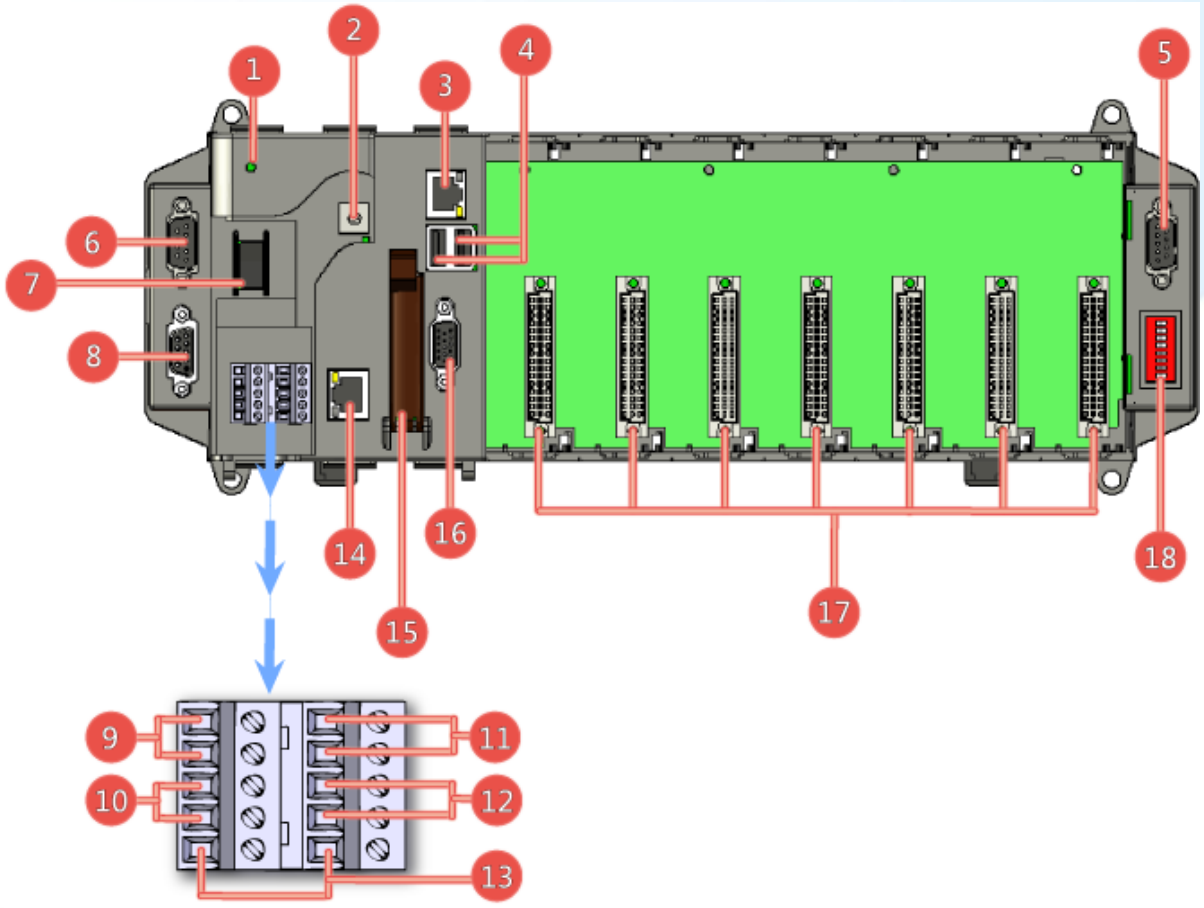
15. CF (Compact Flash) Card Slot
16. VGA Port
17. Slot 1 ~ Slot 3
18. DIP Switch

XP-8741-CE6



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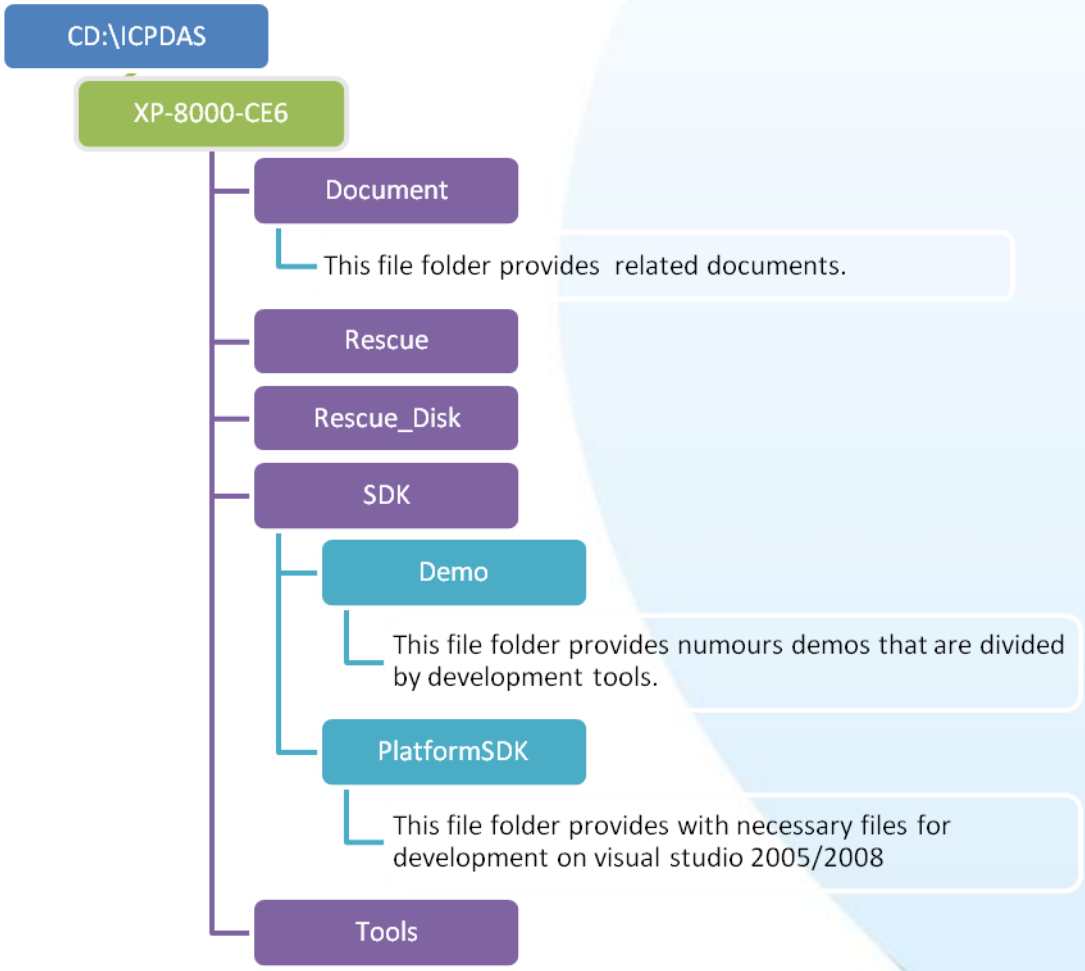
12. Relay Output R.COM and R.NO
13. Frame Ground
14. Ethernet Port 2
15. CF (Compact Flash) Card Slot
16. VGA Port
17. Slot 1 ~ Slot 7
18. DIP Switch

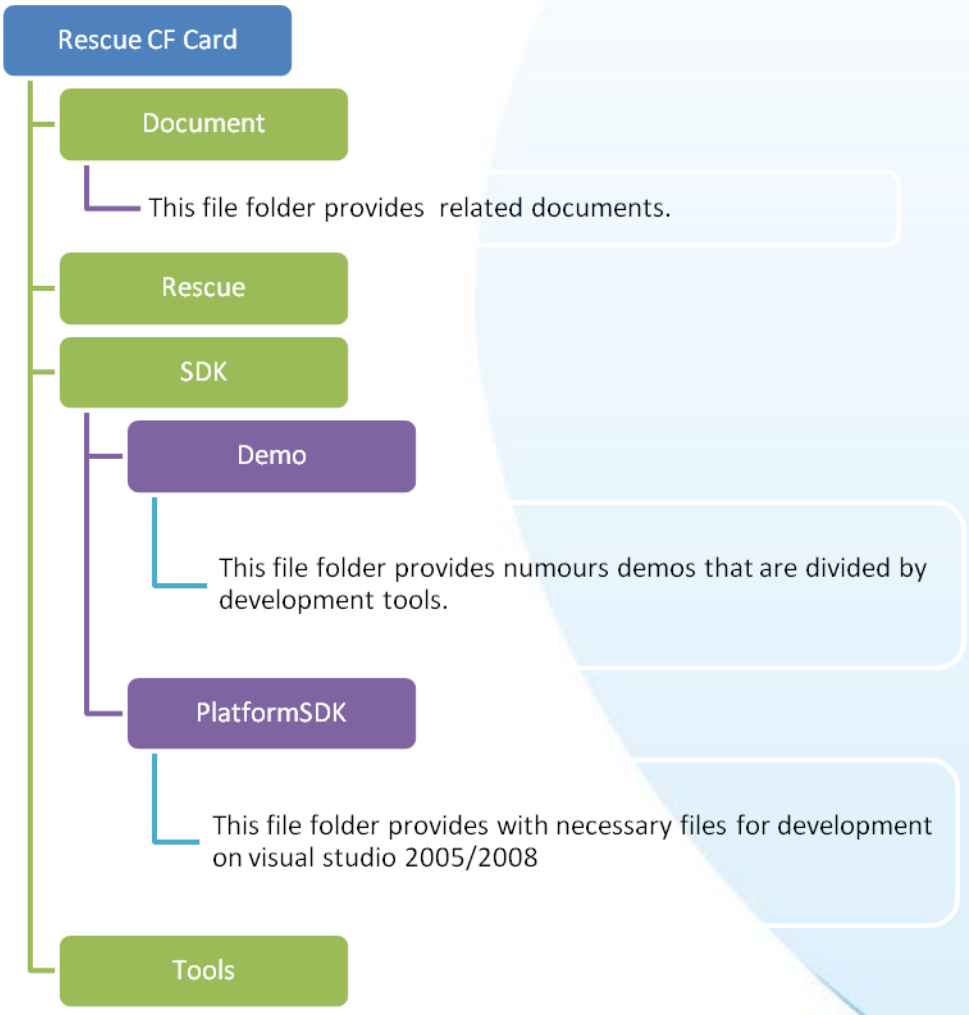
1.6. COMPANION CD

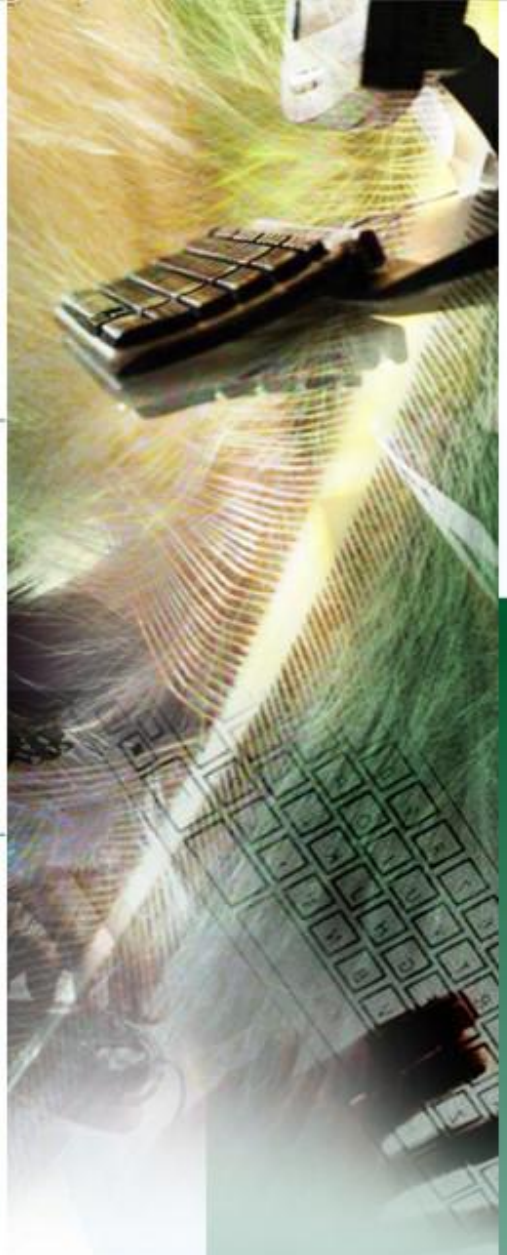
The companion CD contains full usage documents, software tools and development resources related to the XP-8000-CE6.



1.7. RESCUE COMPACT FLASH CARD

The Rescue Compact Flash Card not only support rescue mechanism but also contains full usage documents, software tools and development resources related to the XP-8000-CE6.





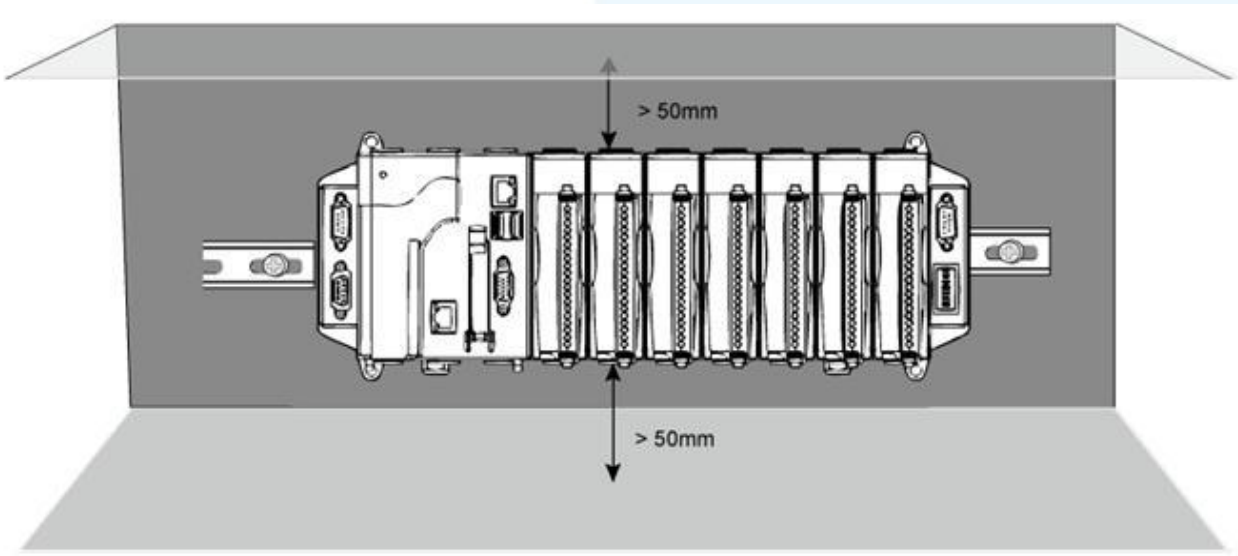
2. Quick Start and Rescue

This chapter covers basic steps required to help you install the XP-8000-CE6 and give you a brief of outline of its main functions.

2.1. GETTING STARTED WITH XP-8000-CE6 HARDWARE

Follow these steps below to install and start-up the XP-8000-CE6.

The XP-8000-CE6 installation must provide proper ventilation, spacing, and grounding to ensure the equipment will operate as specified. A minimum clearance of 50mm between the XP-8000-CE6 and the top and bottom side of the enclosure panels must be provided.

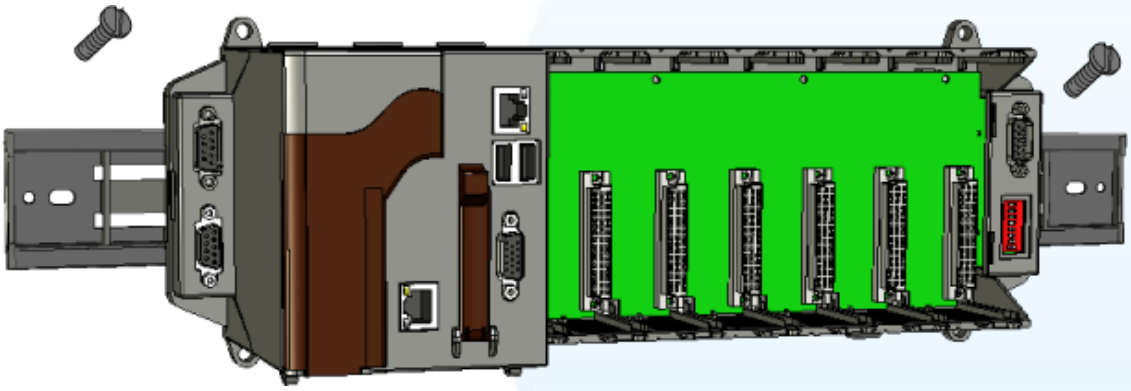


There is a minimum of 50mm clearance between the top and bottom edges of the XP-8000-CE6 and the enclosure panels.

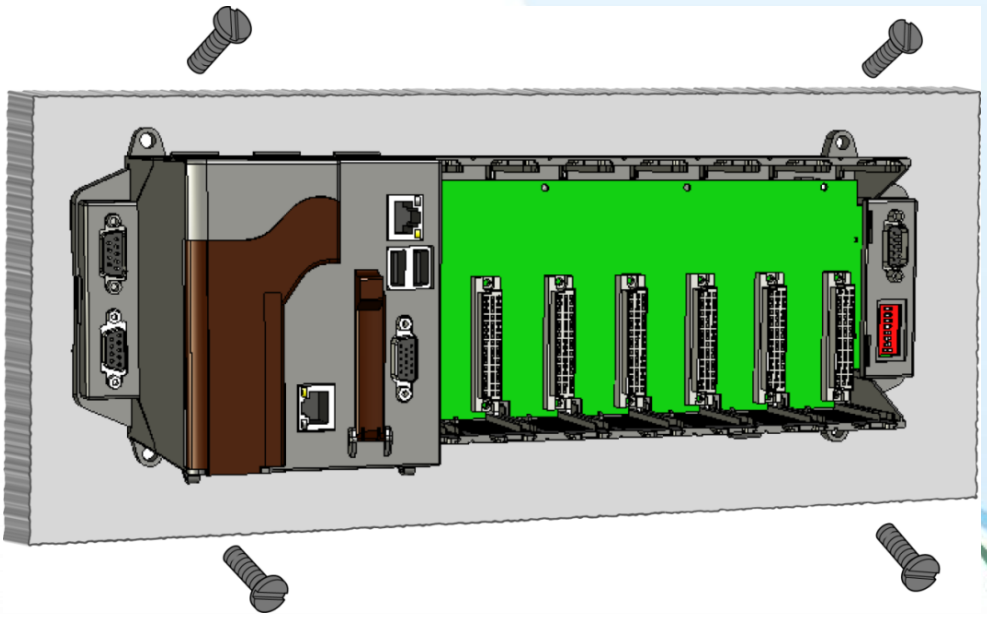
Step 1: Mount the hardware

There are two simple methods of mounting:

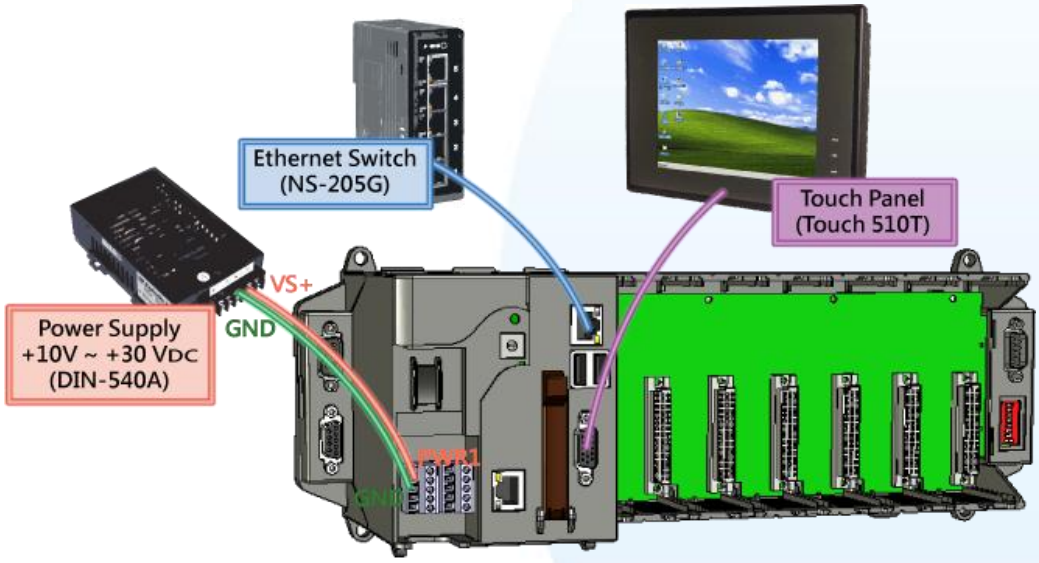
1. DIN-Rail mounting



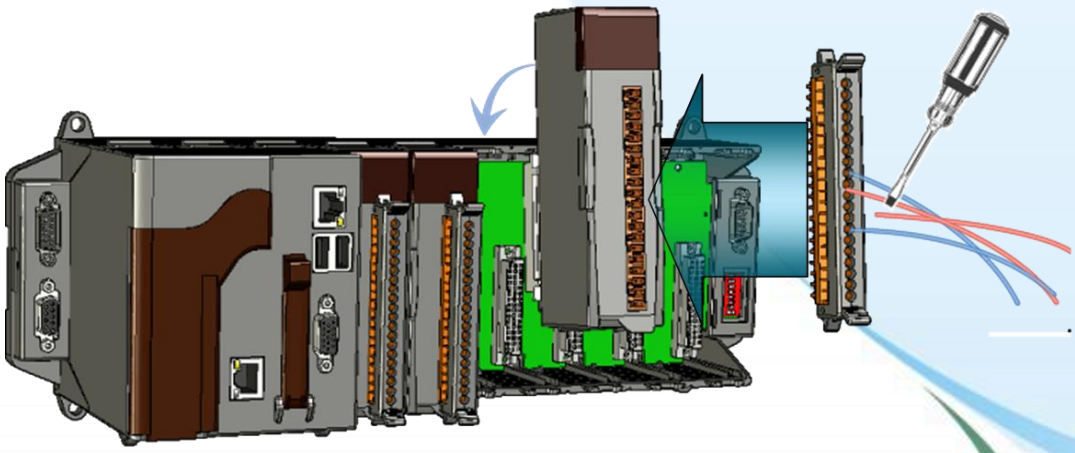
2. Screw mounting



Step 2: Connect the power, network and monitor



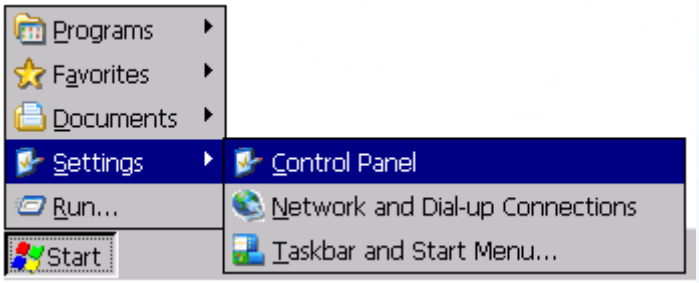
Step 3: Insert and wire the I/O modules



2.2. REGIONAL AND LANGUAGE OPTIONS

Follow these steps below to localize your environment.

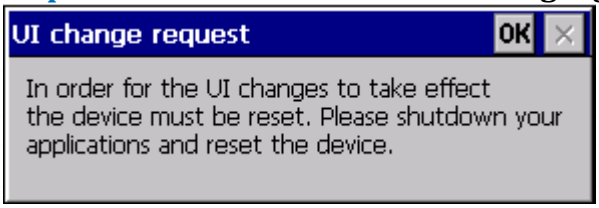
Step 1: Go to "Control Panel"



Step 2: Click on "Regional Settings"

Step 3: Change to your local language in "User Interface Language"

Step 4: Reboot the device to make language setting take effect



2.3. GETTING STARTED WITH XP-8000-CE6 SOFTWARE TOOLS

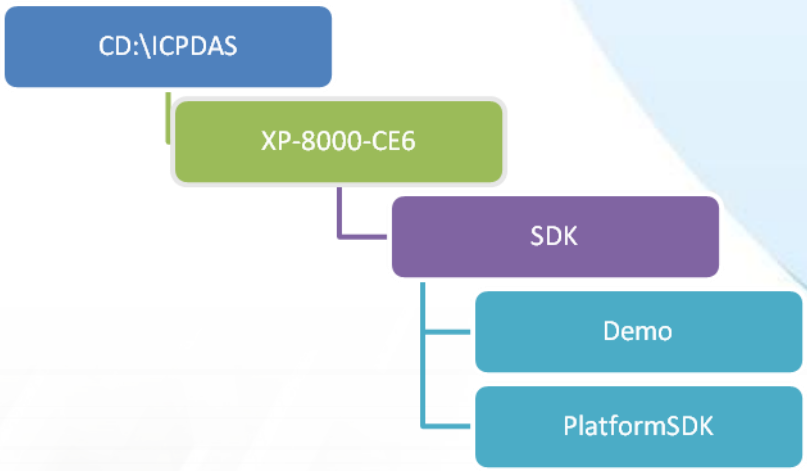
Follow these steps below to install necessary development resources and tools using companion CD, CF card or download from our FTP Server.

Step 1: Copy the PlatformSDK, XPacSDK_CE.msi, and install on the host PC.

The file is used for developing on visual studio 2005/2008 and located at:
CD root\ICPDAS\XP-8000-CE6\SDK\PlatformSDK (in the companion CD)
CF Card root\SDK\PlatformSDK
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/sdk/platformsdk/

Step 2: Copy the "Demo" file folder to the host PC

These files are located at:
CD root\ICPDAS\XP-8000-CE6\SDK\Demo (in the companion CD)
CF Card root\SDK\Demo
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/sdk/demo



Step 3: Install DCON_Utility

DCON Utility is used to set IO module from host PC, and you have to install it on your host PC. It's located at

CD root\ICPDAS\XP-8000-CE6\Tools\DCON_CE\PC

CF Card root\Tools\DCON_CE\PC

ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/tools/dcon_ce/pc

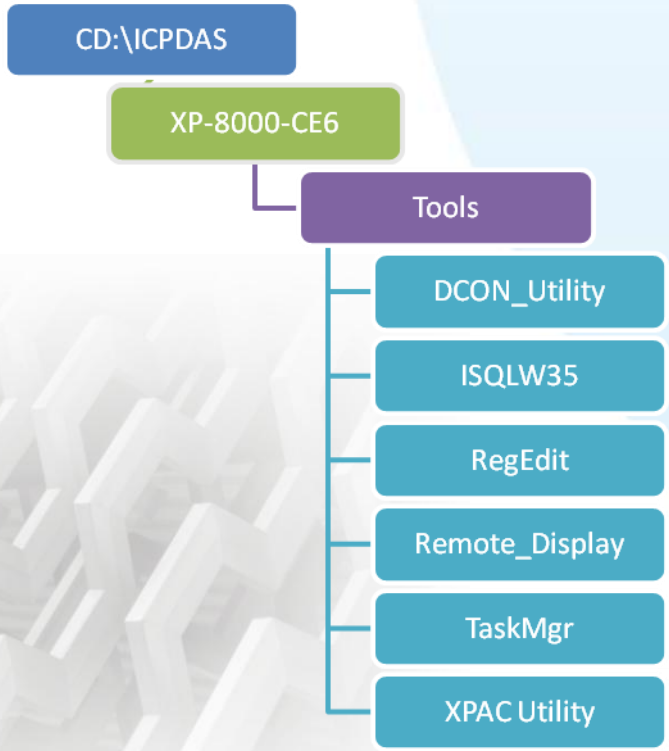
Step 4: Install Remote_Display

The tool is used to control XP-8000-CE6 remotely, and you have to install cerhost.exe on your host PC. It's located at

CD root\ICPDAS\XP-8000-CE6\Tools\Remote_Display\PC

CF Card root\Tools\Remote_Display\PC

ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/tools/remote_display/pc

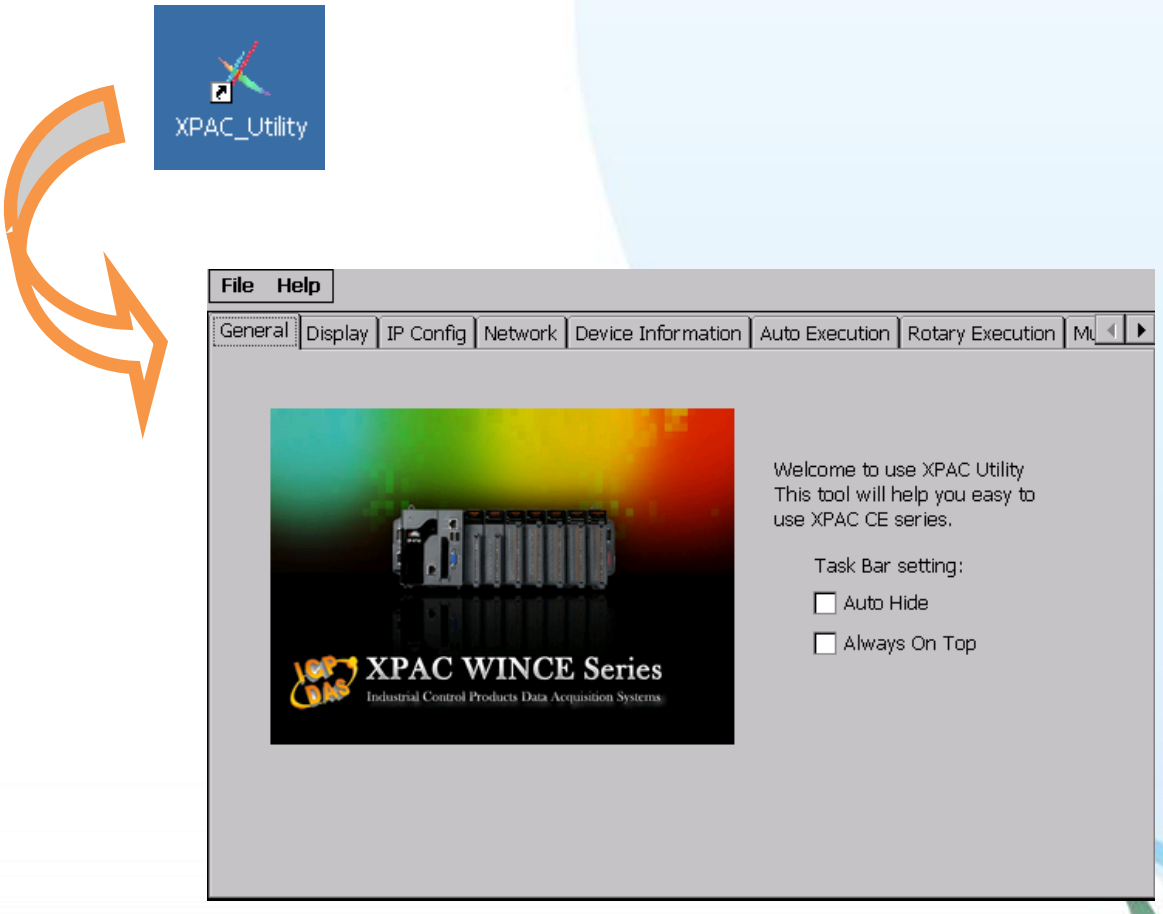


2.4. XPAC UTILITY FOR CONFIGURING XP-8000-CE6

The XPAC Utility is a tool which is designed to quickly control and management the XP-8000-CE6 controller.

Starting the XPAC Utility to configure the XP-8000-CE6

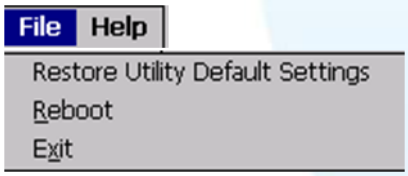
To start the XPAC Utility, you can double-click the XPAC Utility shortcut on the desktop. The XPAC Utility window contains two basic components: menu bar and property tabs.



2.4.1. XPAC Utility Menu Bar

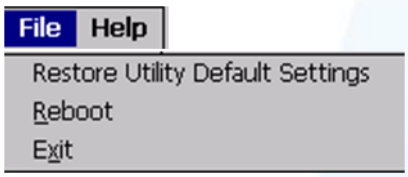
The XPAC Utility includes the following function menu; all function menus will be explained later.

➢ **File Menu**



➢ **Help Menu**

File Menu



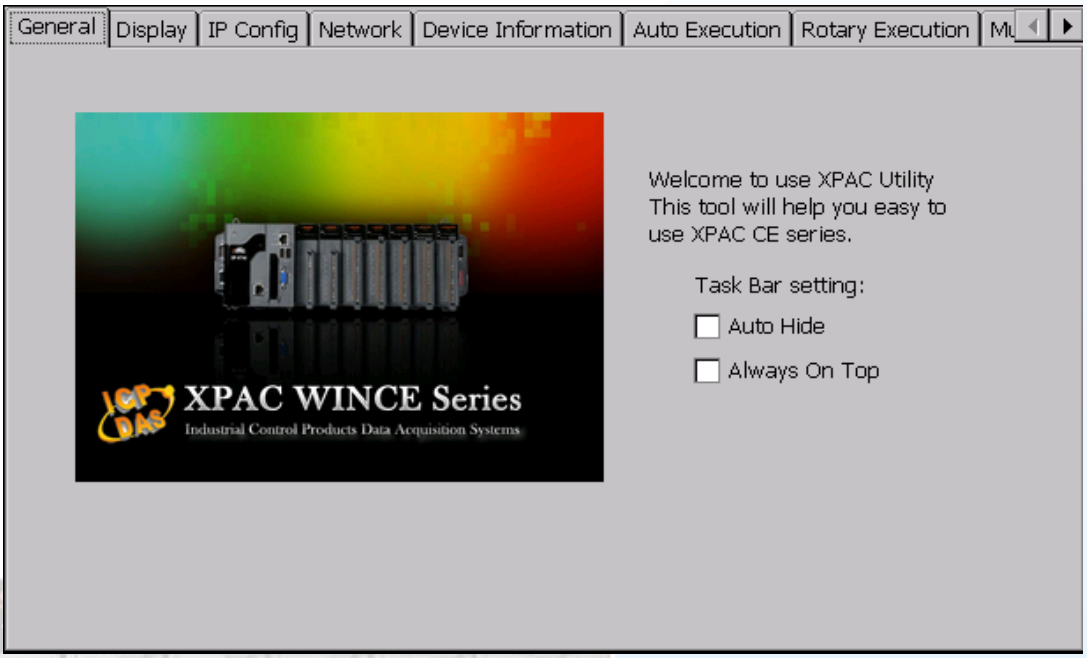
The menu commands	Used to
Restore Utility Default Settings	Restore every setting of XPAC Utility to its default.
Reboot	Restart the XP-8000-CE6.
Exit	Exits the XPAC Utility.

Help Menu

The menu commands	Used to
About	Displays a dialog box with information about XPAC Utility, including the current version and copyright information.

2.4.2. XPAC UTILITY PROPERTY TABS

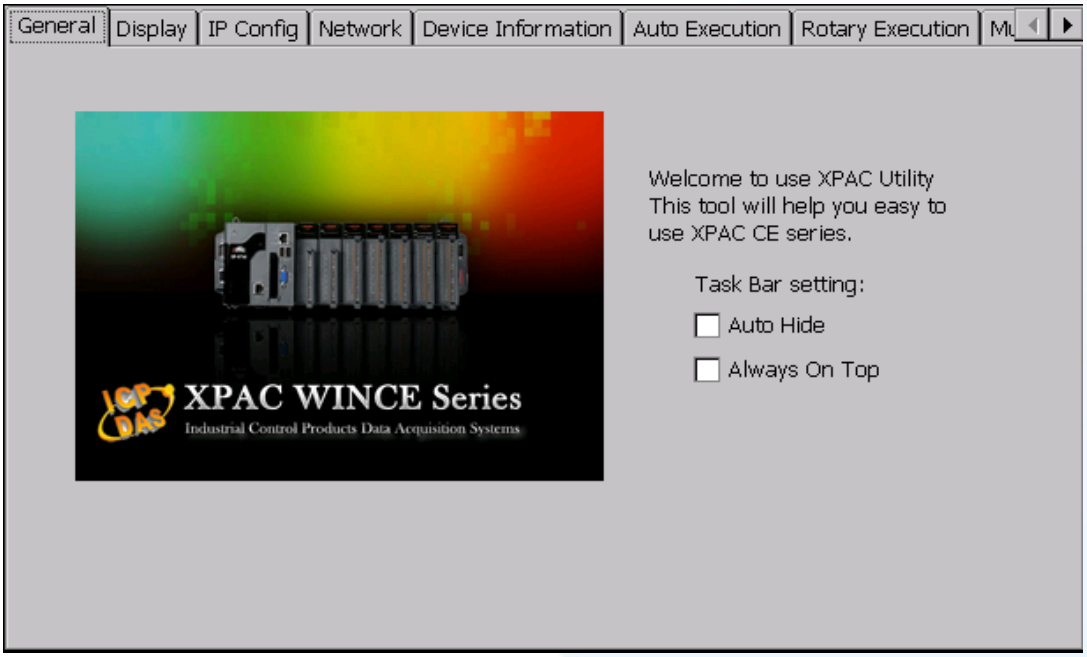
The XPAC Utility includes the following property tabs, all property tabs will be explained later.



- **General tab**
- **Display tab**
- **IP Config tab**
- **Network tab**
- **Device Information tab**
- **Auto Execution tab**
- **Rotary Execution tab**
- **Multi-IO Modules tab**

General tab

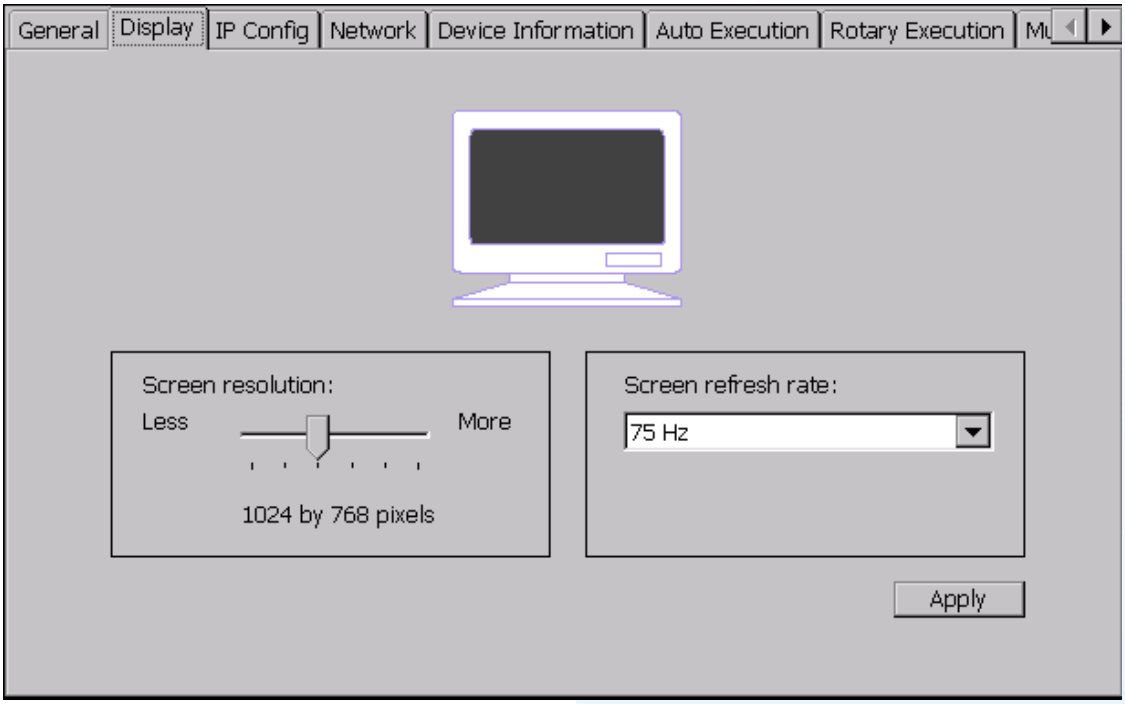
The General tab provides functions to configure the task bar.



The tab used to	How to use
Lock the taskbar	Select the **Always On Top** check box.
Auto-Hide the taskbar	Select the **Auto Hide** check box
* Be sure to reboot to make the setting take effect.	

Display tab

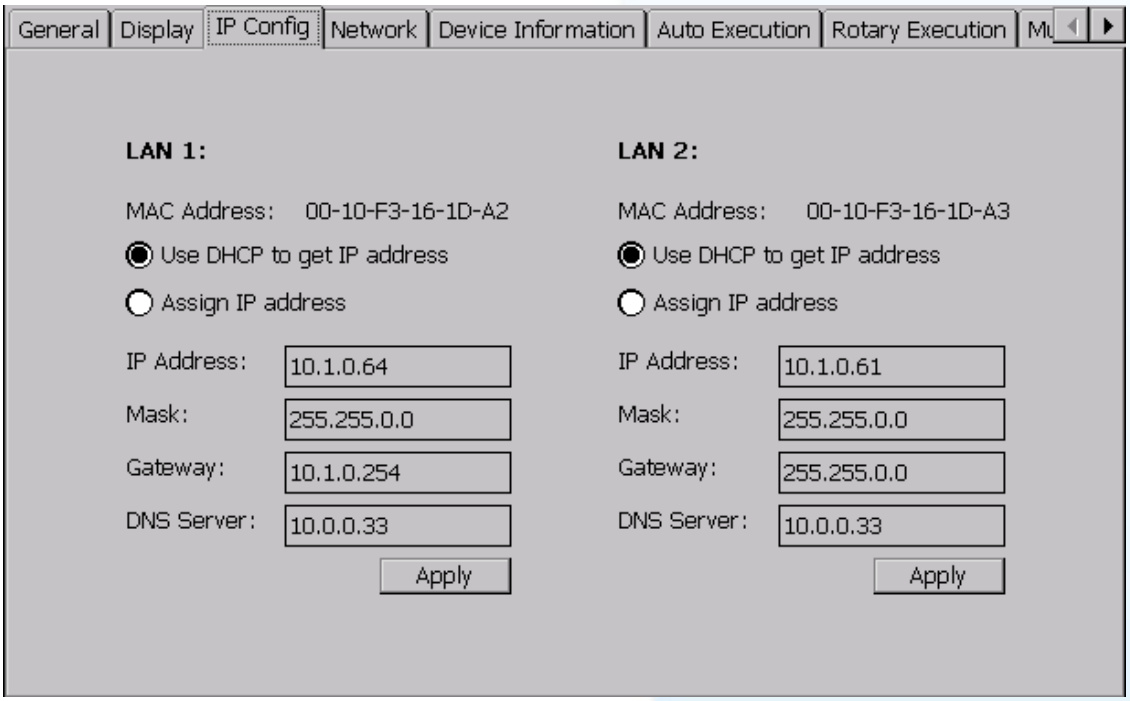
The Display tab provides functions to configure the monitor setting.



The tab used to	How to use
Screen resolution	Change the Track bar.
Screen refresh rate	Select the combo box
* Be sure to reboot to make the setting take effect.	

IP Config tab

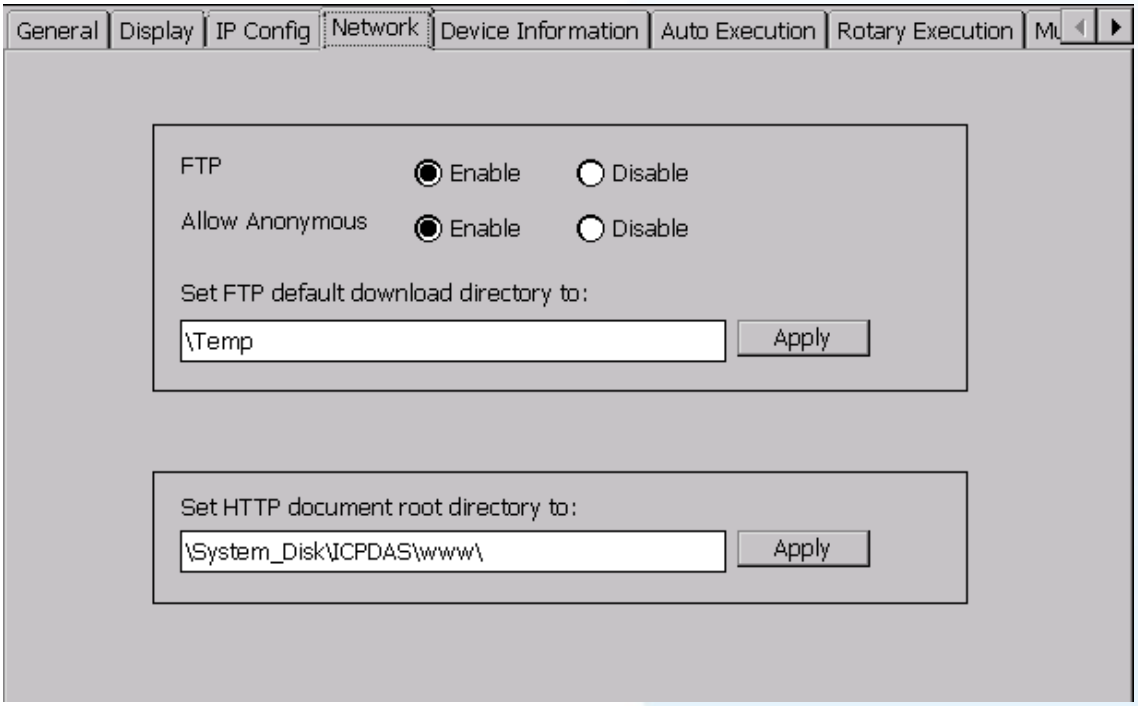
The IP Config tab provides functions to configure either DHCP (Roaming) or manually configured (Static) network settings and to monitor the MAC address. Generally, DHCP is the default settings, but if you don't have a DHCP server, you must configure the network settings by using manual configuration.



The tab used to	How to use
Configure the network settings	● Obtaining an IP address automatically from DHCP: Select the **Use DHCP to get IP address** option. ● Manually assign an IP address: Select the **Assign IP address** option.
Monitor the MAC address	See the **MAC Address 1** and **MAC Address 2** fields that displays the physical address of LAN1 and LAN2.

Network tab

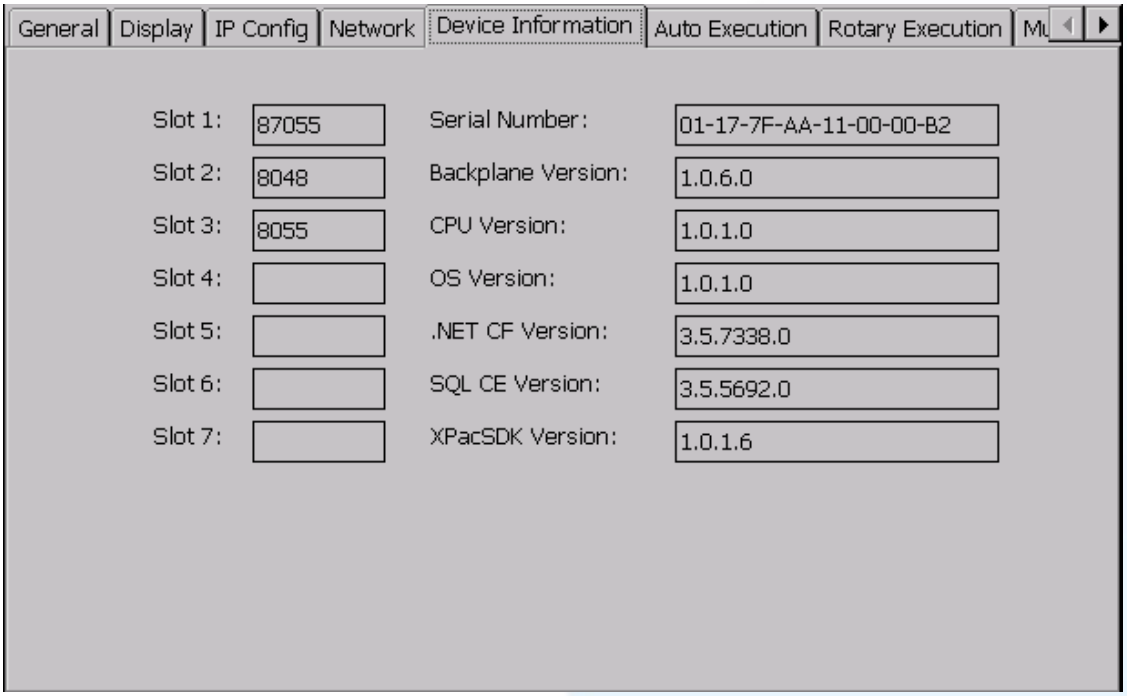
The Network tab provides functions to enable/disable the FTP access, enable/disable anonymous FTP access, configure the FTP directory path, and change HTTP document root directory.



The tab used to	How to use
Enable/disable the FTP access	● Enable: Select **Enable** in the **FTP** field. ● Disable: Select **Disable** in the **FTP** field.
Enable/disable anonymous FTP access	● Enable: Select **Enable** in the A**llow Anonymous** field. ● Disable: Select **Enable** in the **Allow Anonymous** field.
Change the FTP directory path	Enter a new path in the "**Change FTP default download directory to"** field, and then press the **Apply** button.
Change HTTP document root directory	Enter a new path in the "**Change HTTP document root directory to"** field, and then press the **Apply** button.

Device Information tab

The Device Information tab provides functions to monitor necessary system information of the XP-8000-CE6. The system information is most important note of version control for upgrading system.

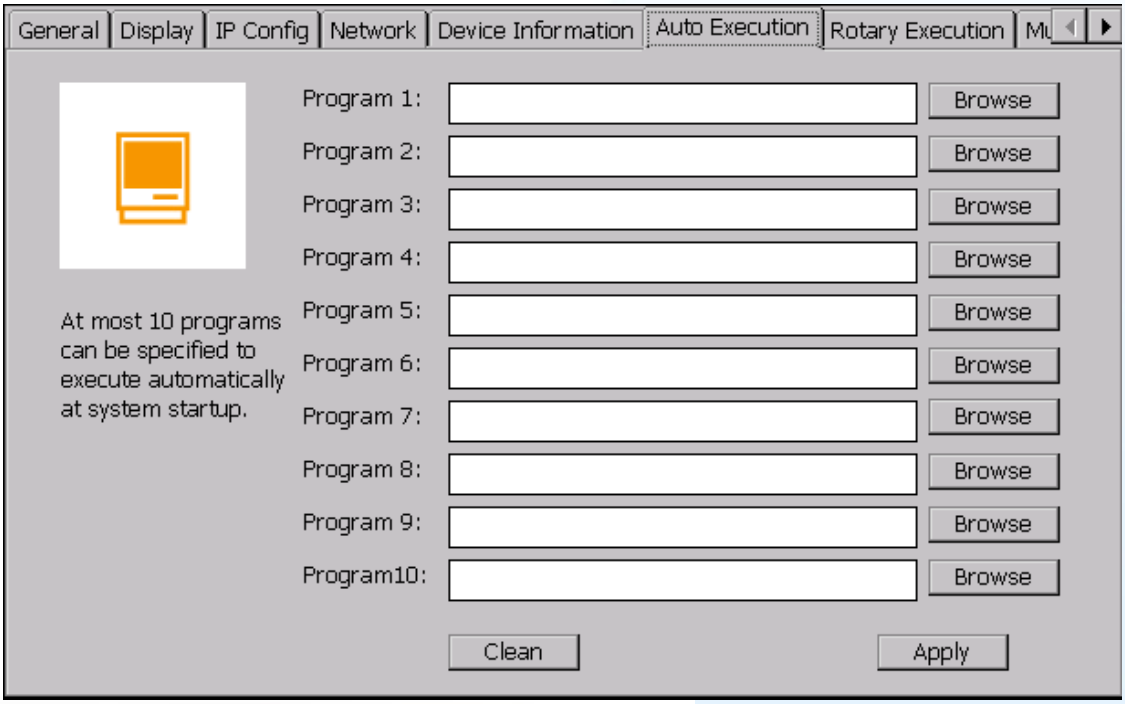


The tab used to	How to use
Monitor the local I/O slots	See the **Slot 1** ~ **Slot 7** field that displays the module names plugged in XP-8000-CE6.
Monitor the serial number	See the **Serial Number** field that displays the 64-bit hardware serial number of the XP-8000-CE6.
Monitor the backplane version	See the **Backplane Version** field that displays the backplane version of the XP-8000-CE6.
Monitor the CPU version	See the **CPU Version** field that displays the CPU version of the XP-8000-CE6.
Monitor the OS version	See the **OS Version** field that displays the OS version of the XP-8000-CE6.
Monitor the .NET compact framework version	See the **.NET CF Version** field that displays the .NET compact framework version of the XP-8000-CE6.
Monitor the SQL CE version	See the **SQL CE Version** field that displays the SQL CE version of the XP-8000-CE6.
Monitor the XPacSDK_CE.dll version	See the **XPacSDK Version** field that displays the version of XPacSDK_CE.dll.

Auto Execution tab

The Auto Execution tab provides functions to configure programs running at XP-8000-CE6 startup, it allows users to configure ten execute files at most.

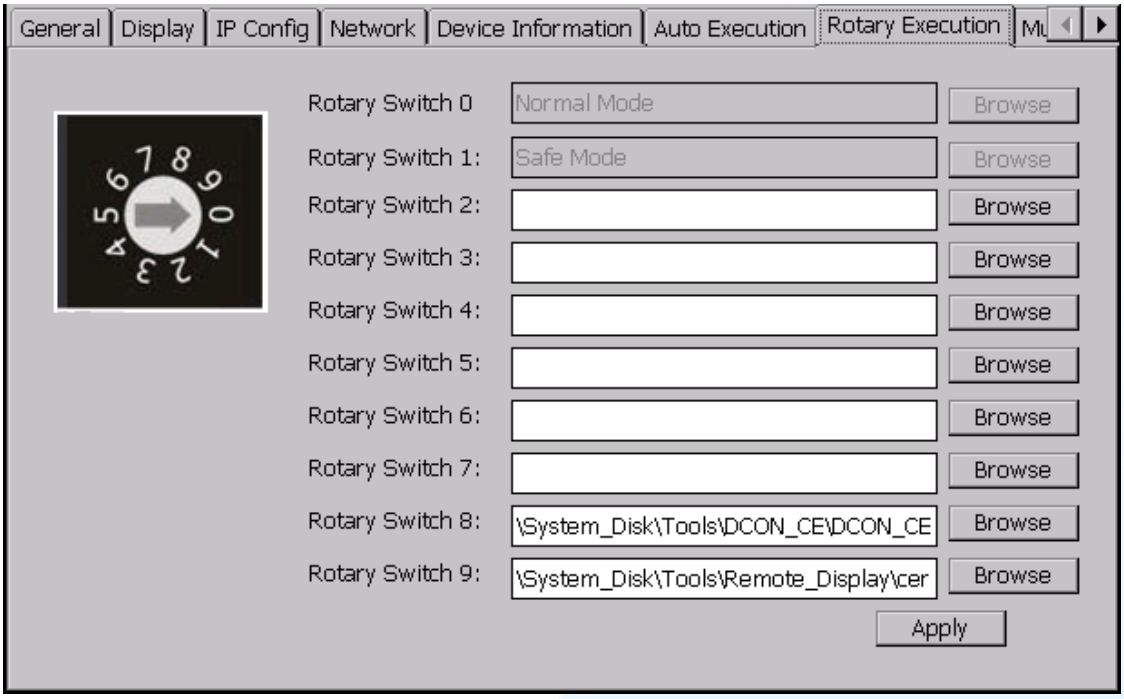
The allowed file types are .exe and .bat, and they are executed in order of program 1, program 2, etc.



The tab used to	How to use
Configure programs running at startup	Press the **Browse** button to select the execute file which you want, and then press the **Apply** button.

Rotary Execution tab

The Rotary Execution tab decides which mode XP-8000-CE6 executes at startup.



The tab used to	How to use
Run at **Normal Mode**	Rotary Switch to 0 and reboot XP-8000-CE6, and then it is in the Normal Mode.
Run at **Safe Mode**	Rotary Switch to 1 and reboot XP-8000-CE6, and then it is in the Safe Mode. (In Safe Mode, XP-8000-CE6 clears the data saved in the registry, starts as factory default, and no applications run at startup.)
Run at **Normal Mode** but execute DCON_CE_V600.exe	Rotary Switch to 8 and reboot XP-8000-CE6, and then it is in the Normal Mode but executes DCON_CE_V600.exe. This makes users can use DCON Utility on PC side to configure I/O modules without a monitor.
Run at **Normal Mode** but execute cerdisp.exe	Rotary Switch to 9 and reboot XP-8000-CE6, and then it is in the Normal Mode but executes cerdisp.exe. This makes users can use cerhost.exe on PC side to remote display Windows CE without a monitor.
Run at **Normal Mode** but execute user-specified program.	Rotary Switch to 2 ~ 7 and reboot XP-8000-CE6, and then it is in the Normal Mode but executes the program user specified in the field of “Rotary Switch 2 ~ 7”.

Multi-IO Modules tab

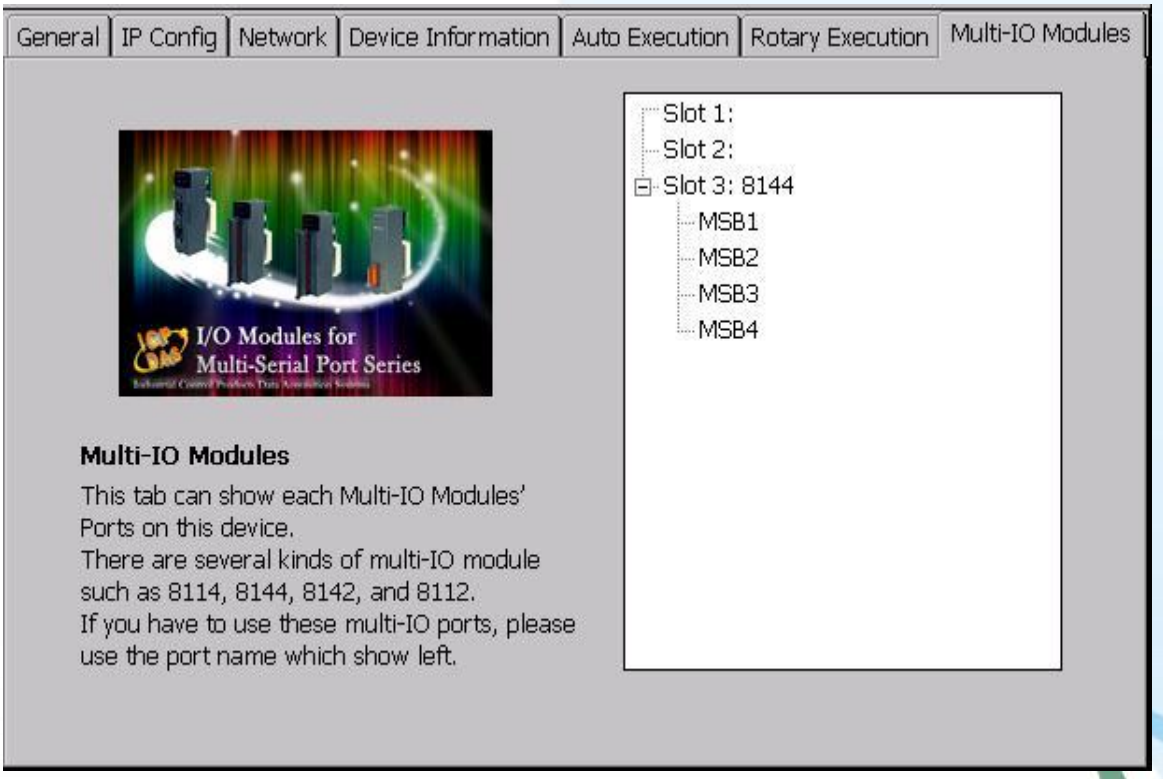
This tab displays the port names of multi-IO modules such as 8114, 8144, 8142, and 8112. These multi-IO modules are in the slots of XP-8000-CE6. If you have to use these multi-IO ports, please use the port name shown in the tree.

Take the below figure as an example, using XPacSDK_CE.dll, opening a serial port of 8144 in slot 3 is:

HANDLE hPort = uart_Open("MSB1");

8144 in the slot 3 has four serial ports, and one of the port name is "MSB1".

For more information about expansion RS-232/RS-422/RS-485 communication module that are compatible with the XP-8000-CE6, please refer to http://www.icpdas.com/products/Remote_IO/i-8ke/selection_rs232_i8k.htm



2.4.3. The factory default settings

The following table lists the factory default settings of the XPAC Utility.

General tab:

Function	Settings
Auto Hide	Uncheck
Always On Top	Uncheck

Display tab:

Function	Settings
Screen resolution	1024 by 768 pixels
Screen refresh rate	75 Hz

IP Config tab:

Function	Settings
LAN1	DHCP
LAN2	DHCP

Network tab:

Function	Settings
FTP	Disable
Allow Anonymous	Disable
FTP default download directory	\Temp
HTTP document root directory	\System_Disk\ICPDAS\www\

Auto Execution tab:

Function	Settings
All field	Empty

Rotary Execution tab:

Function	Settings
Rotary Switch 8	\System_Disk\Tools\DCON_CE\DCON_CE_V600.exe
Rotary Switch 9	\System_Disk\Tools\Remote_Display\cerdisp.exe

2.5. DCON UTILITY FOR CONFIGURING I-7K AND I-87K SERIES I/O MODULES

The DCON Utility is a tool which is designed to quickly control and management I-7K and I-87K series I/O modules via COM port and Ethernet port.

The following table summarizes the information about TCP port mapping and I-7K and I-87K series expansion modules of COM port on XP-8000-CE6.

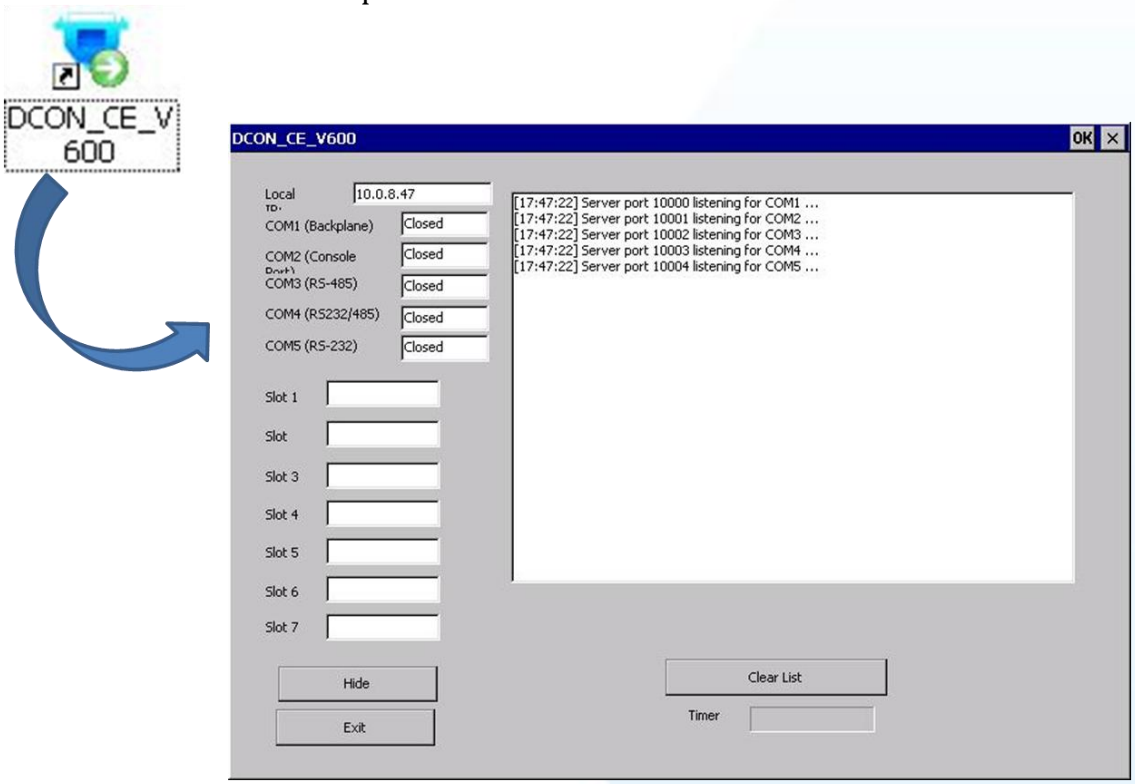
COM port of XP-800-CE6	TCP Port	Support modules
COM 1 (Backplane)	10000	87K (High profile series)
COM 2 (Console Port)	10001	7K, 87K *
COM 3 (RS-485)	10002	7K, 87K
COM 4 (RS-232/RS-485)	10003	7K, 87K
COM 5 (RS-232)	10004	7K, 87K *

* with RS-232/RS-485 converter, such as I-7520 (http://www.icpdas.com/products/Industrial/communication_module/communication_list.htm).

Starting the DCON Utility to configure I-87K series I/O modules

Step 1: On the XP-8000-CE6, execute the DCON firmware

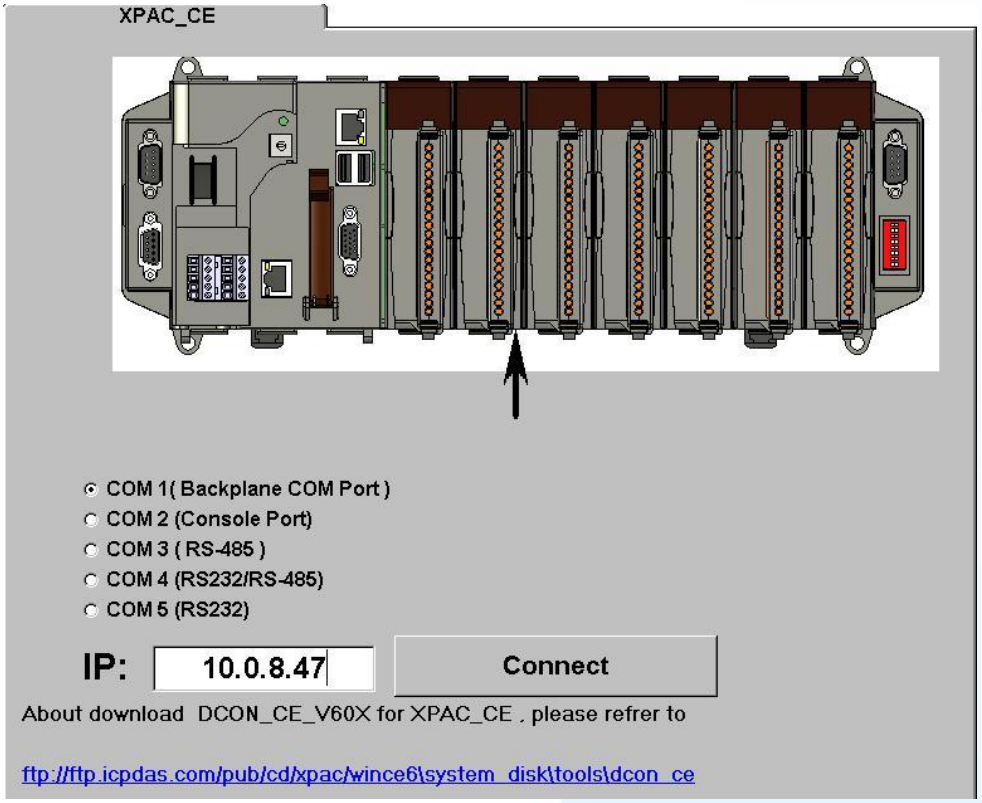
The DCON firmware can be obtained from: \System_Disk\Tools\DCON_CE or the link on the desktop.



Step 2: Double-Click the DCON Utility shortcut on the desktop of Host PC

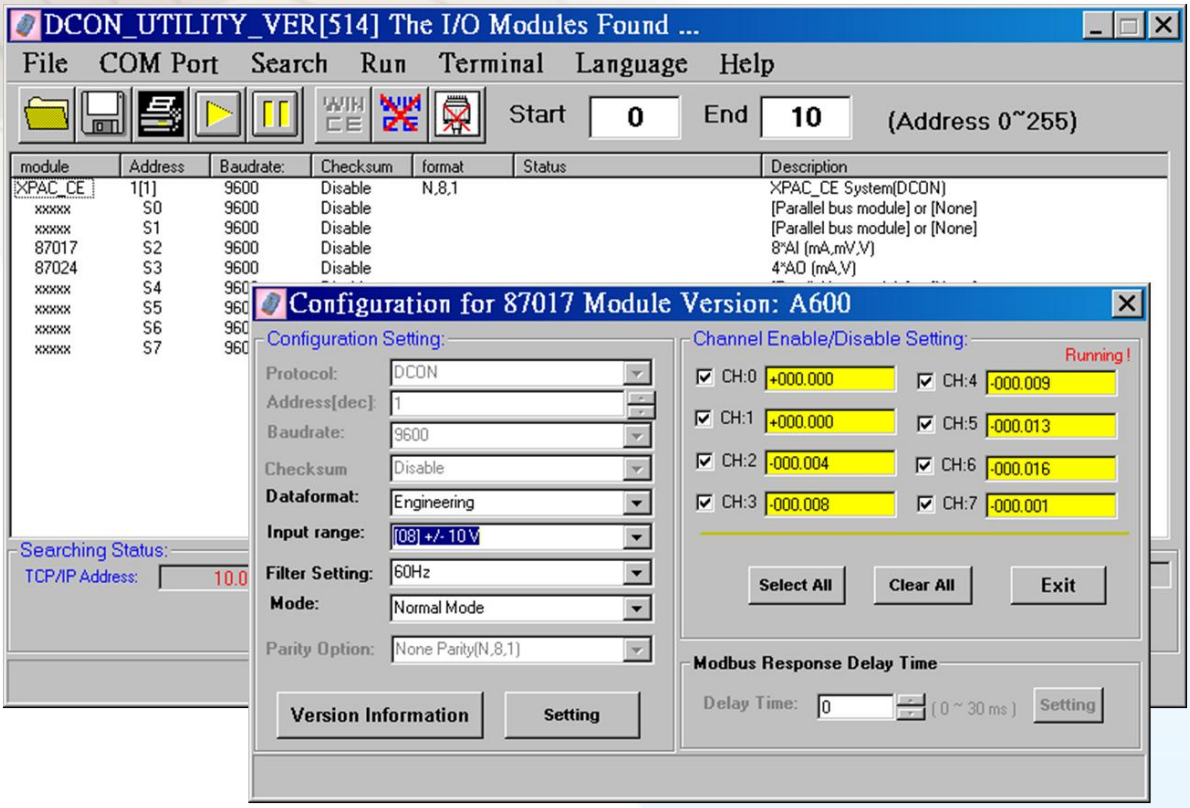
Step 3: Click on the WIN CE command button

Step 4: On the “WINCE device connection” dialog, choose a connection type and then type the IP address in the “IP” field, then click the “Connect” button to search i-7K and I-87K series I/O modules



If DCON Utility cannot connect to XP-8000-CE6, the Ethernet connection between Host PC and XP-8000-CE6 might be rejected by fire wall, please contact with MIS to open the Ethernet port.

Step 5: Click on the module name from the list to enter the configuration form.



If there is no operation within 30 seconds, the connection will automatically close to release the COM port occupied.

2.6. RESCUE THE XP-8000-CE6

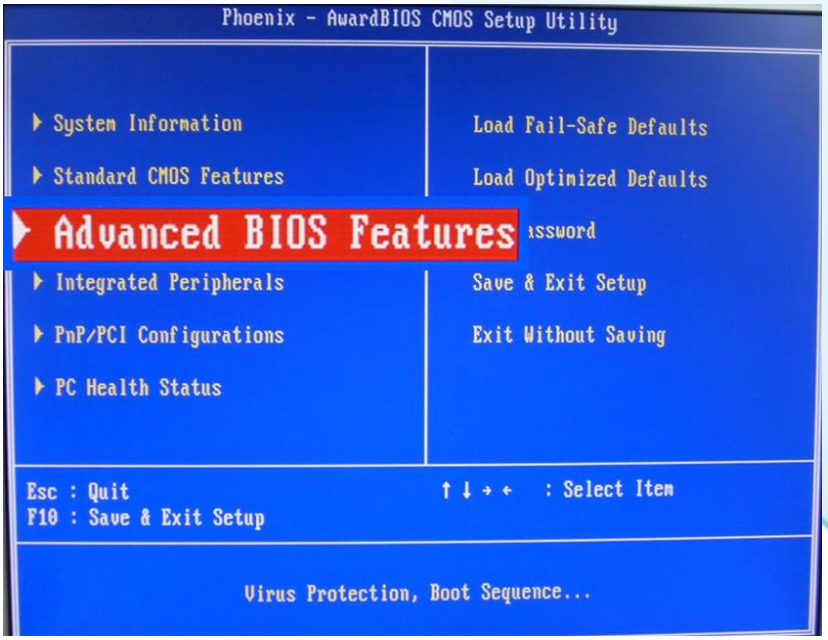
The XP-8000-CE6 rescue mechanism can help you easily and quickly restore your XP-8000-CE6 OS in case your XP-8000-CE6 cannot start or crashed.

Warning: XP-8000-CE6 has to run under **normal mode**, which means **rotary switch = 0**, to rescue XP-8000-CE6 to factory default

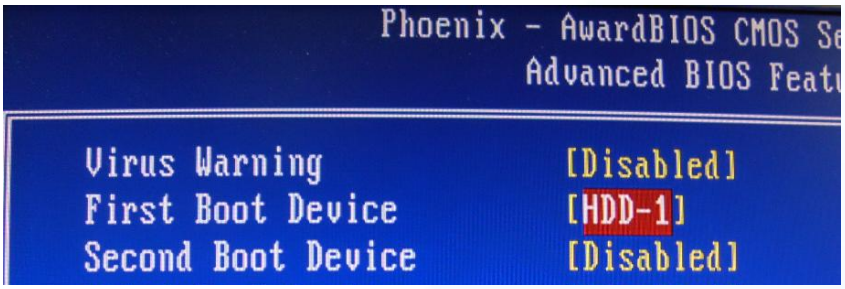
Please follow the steps below to recovery your XP-8000-CE6

Step 1: Reboot your XP-8000-CE6. While rebooting, press “delete” key to enter BIOS setup utility

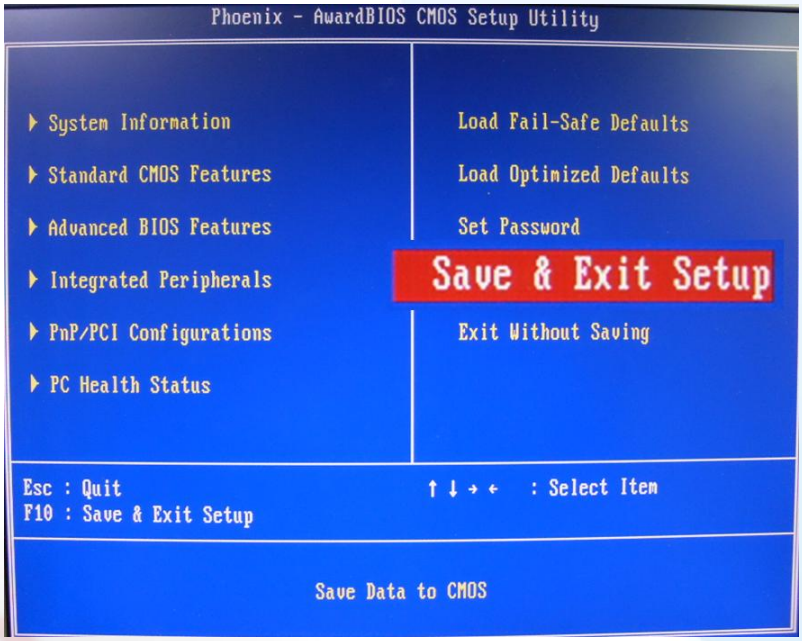
Step 2: Choose “Advanced BIOS Features” and then press “Enter” key



Step 3: Set “First Boot Device” as “HDD-1”, HDD-1 means compact flash



Step 4: Save and Exit Setup



Step 5: After restarted the devise, will enter into XP-8000-CE6 Recue Utility as following. Choose (a) or (1), create XP-8000-CE6 default partition.

```
    ================================================
    ==                  Main Menu                 ==
    ================================================

         **   the following 3 steps help you     **
         **   restore default XPAC_CE OS.        **

    (a) Step 1: create XPAC_CE default partition.
    (b) Step 2: format and restore XPAC_CE to factory default OS.
    (c) Step 3: reboot



    (i) Display directory information on built-in flash


Please enter your choice:
```

Step 6: Wait about several seconds for step 1 and reboot, then choose (b) or (2), format and restore XP-8000-CE6 to factory default OS.
(Refer to above figure)

Step 7: After finishing recovery, choose (c) or (3) to reboot. (Refer to above figure)

Step 8: Repeat step 1 ~ 4 to set "First Boot Device" as "HDD-0", HDD-0 means Built-in flash, and then reboot the XP-8000-CE6.

Step9: The XP-8000-CE6 will set itself default when the first reboot after recovery procedure. It needs about 1 min. After above steps, the XP-8000-CE6 recovery is completed.

2.7. UPDATING THE XP-8000-CE6

XP-8000-CE6 update is part of the XP-8000-CE6 services to provide additional and more efficient features and functionality for XP-8000-CE6 operating system.

There are two ways to update the XP-8000-CE6:

i. Only update OS image

Each release will contain new features, reliability, application compatibility, security, and more. Before you download any release files, we highly recommend you read the ReadMe.txt file, which contains all of this release contents.
For more information about service pack, please refer to the documents which come with every release.

ii. Reinstall XP-8000-CE6

If you don't like just update OS image, you can reinstall new version XP-8000-CE6 OS in your device.
The XP-8000-CE6 can be reinstalled with the XP-8000-CE6 Rescue Utility. Before reinstalling the XP-8000-CE6, make sure the necessary updating files have been are available on your CF card.

The necessary files can be obtained at:
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/rescue

Caution:

1. Before reinstall XP-8000-CE6, please check you have backup your data.
2. Ensure your XP-8000-CE6 running on normal mode (rotary switch = 0) during reinstall XP-8000-CE6.

2.7.1. Only update OS image

Please follow the steps below to update OS image only

Step 1: download OS image, NK.bin, form
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/rescue/ce6

Step 2: Replace old OS image which is located at \System_Disk on XP-8000-CE6 devices with the NEW OS image (download from step 1).

Step 3: After replaced the image and restarted the devise, XP-8000-CE6 has been updated completely.

2.7.2. Reinstall XP-8000-CE6

Warning:
- XP-8000-CE6 has to run under **normal mode**, which means **rotary switch = 0**, to reinstall XP-8000-CE6 to factory default
- When reinstall XP-8000-CE6, it will not only clear built-in flash (System_Disk), but also restore all files to System_Disk
- Before reinstall XP-8000-CE6, please check you have backup your data.

Pre-requires for reinstall XP-8000-CE6

Step 1: Download all updating files from
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/rescue

Step 2: Copy files, which download from Step 1, to root of CF card

Please follow the steps below to reinstall XP-8000-CE6

Step 1: Change the boot order. (It is the same as the step 1 to step 4 of above section, 2.6 Rescue the XP-8000-CE6).

Step 2: After restarted the devise, will enter into XP-8000-CE6 Rescue Utility as the same as the step 5 to step 9 of above section, 2.6 Rescue the XP-8000-CE6).

2.8. RESTORE THE RESCUE DISK

This section will show you how to restore your rescue disk in case of that the rescue disk crashed or been formatted.

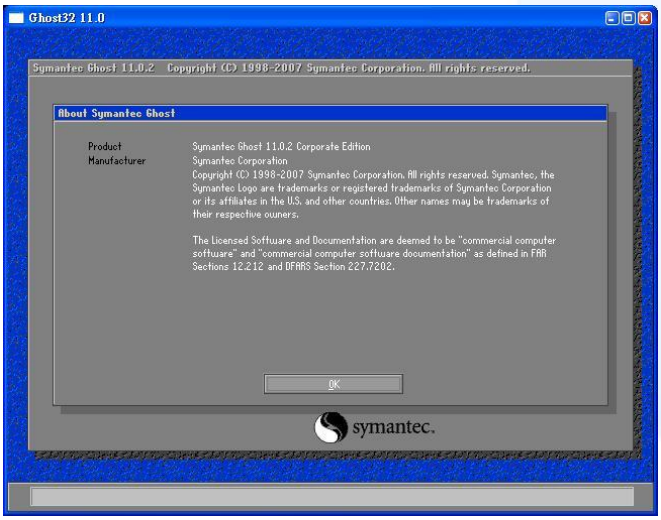
Requirements: For restoring the Rescue Disk, you should prepare Ghost 11 or later, which you could obtain by contacting Symantec (http://www.symantec.com)

There is ghost file "Rescue_Disk.gho" can recover Rescue Disk if your Rescue Disk crashed.

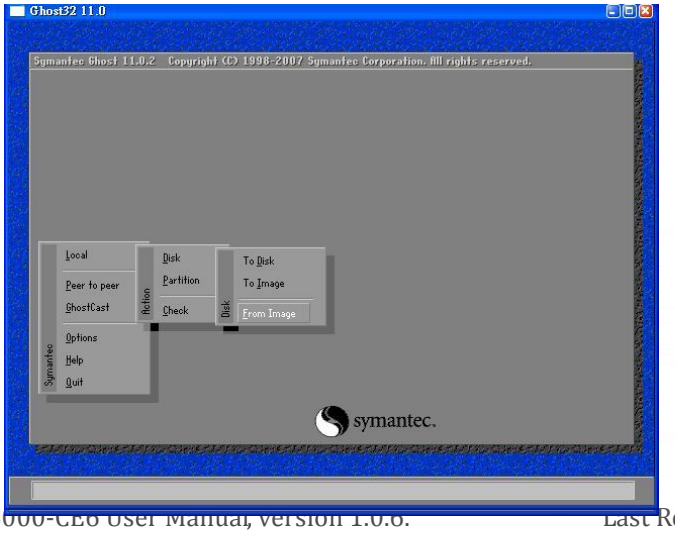
The ghost file can be obtained at:
CD root\ICPDAS\XP-8000-CE6\Rescue_Disk (in the companion CD)

Note: Below example is used "Symantec Norton Ghost32 V.11" (The "Symantec Norton Ghost V.11" or above version are recommend) as a demonstration how to do recovery the Rescue Disk.

Please follow below steps to recover Rescue Disk.

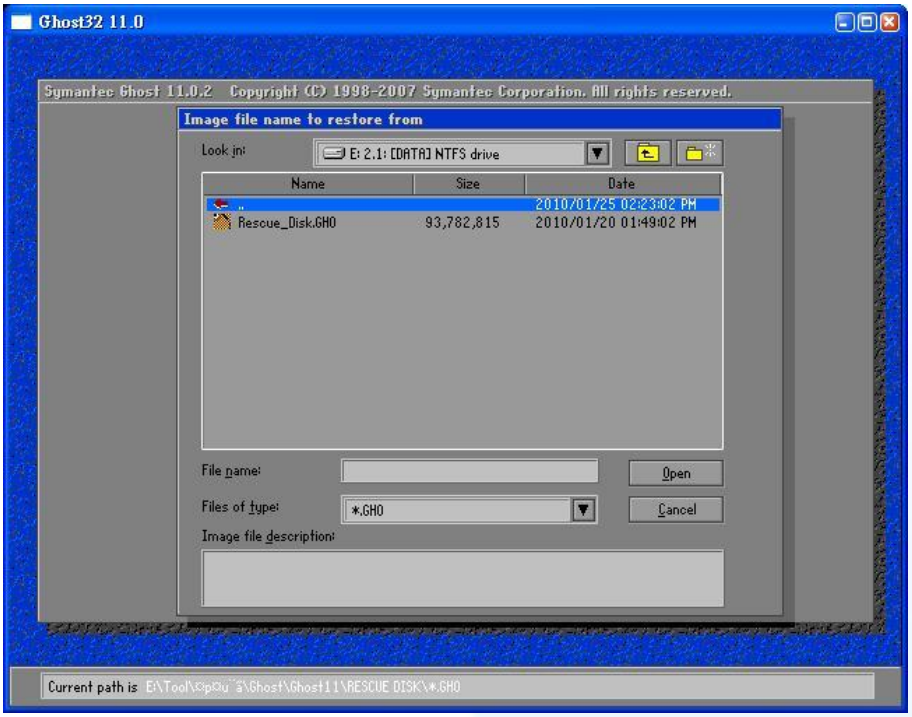


1. Open "Symantec Norton Ghost32 V.11" software and click 'OK'

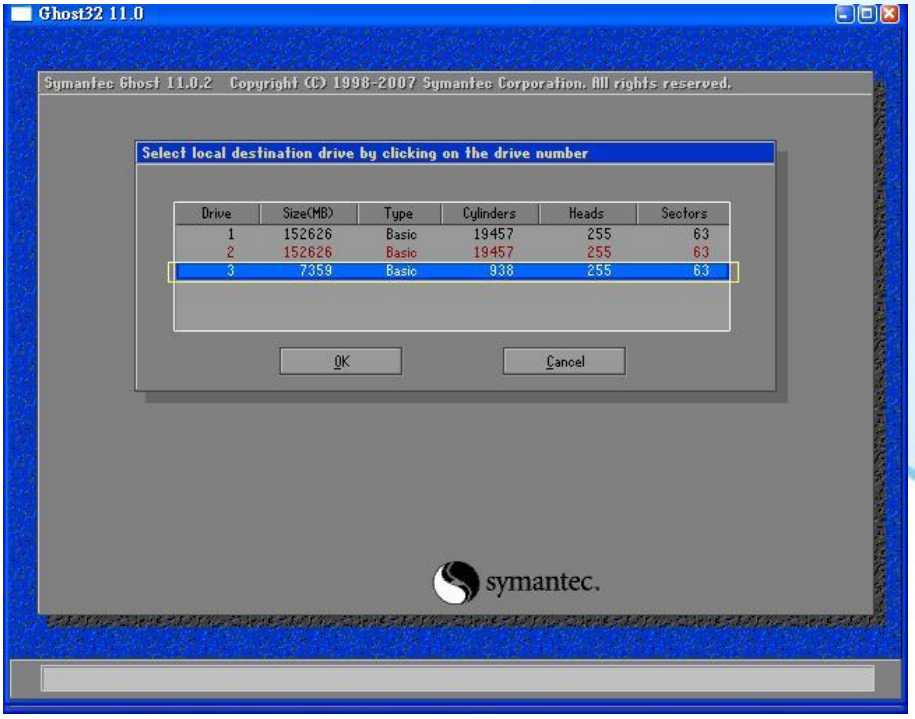


2. Select "Local - Disk - From Image" from function menu

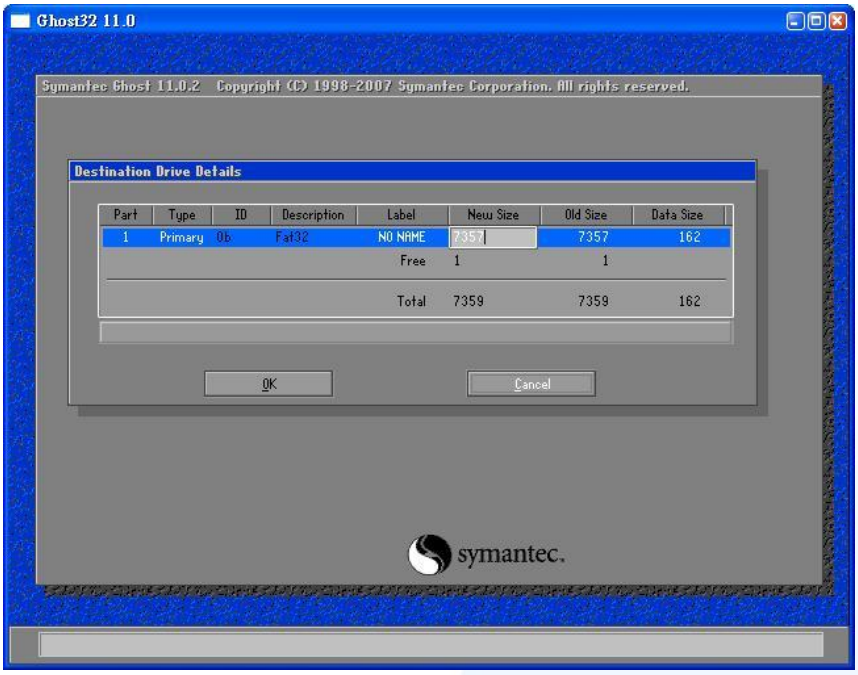
3. Select the “Rescue_Disk.gho” file



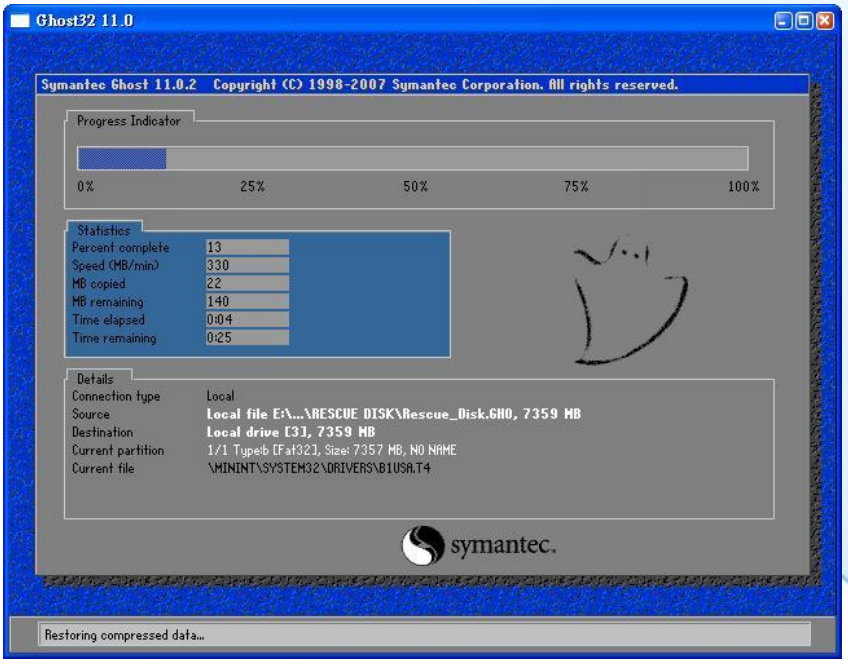
4. Select the destination to CF card and click ‘OK’



5. Recovery the “Rescue_Disk.gho” file into CF card and click ‘OK’



6. Recovering Rescue Disk

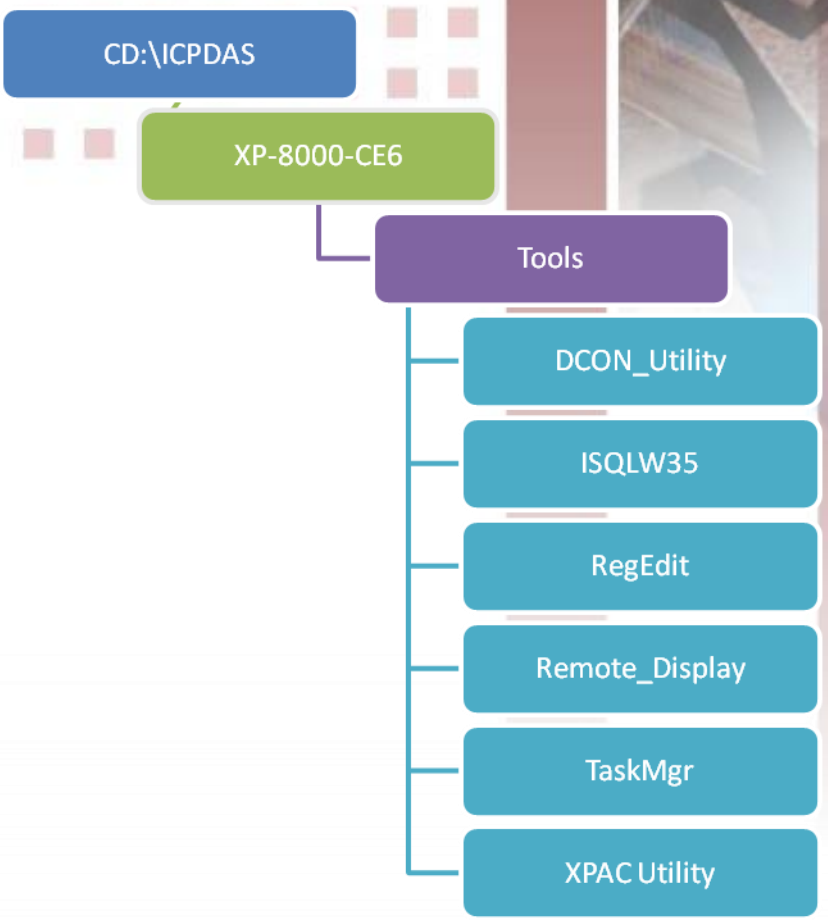


7. So far, Rescue Disk has been done.

For more information of reinstall OS, please refer to ii. Reinstall XP-8000 of Rescue the XP-8000-CE6

3.XP-8000-CE6 Tools

Following Tools has been installed on the XP-8000-CE6.



- **DCON_Utility**

  With Host PC running the DCON Utility, on the XP-8000-CE6, the DCON_CE_V600.exe allows users to view and monitor the status of I/O modules of XP-8000-CE6 through the DCON Utility.

- **ISQLW35**

  The ISQLW35 implements SQL server compact 3.5 Query Analyzer.

- **RegEdit**

  The RegEdit edits the registry of Windows Embedded CE6 on XP-8000-CE6.

- **Remote_Display**

  The remote display application allows user to view the display of XP-8000-CE6 remotely on a Host PC. Users need to run cerhost.exe on the host PC and at the same time run cerdisp.exe on XP-8000-CE6.

- **TaskMgr**

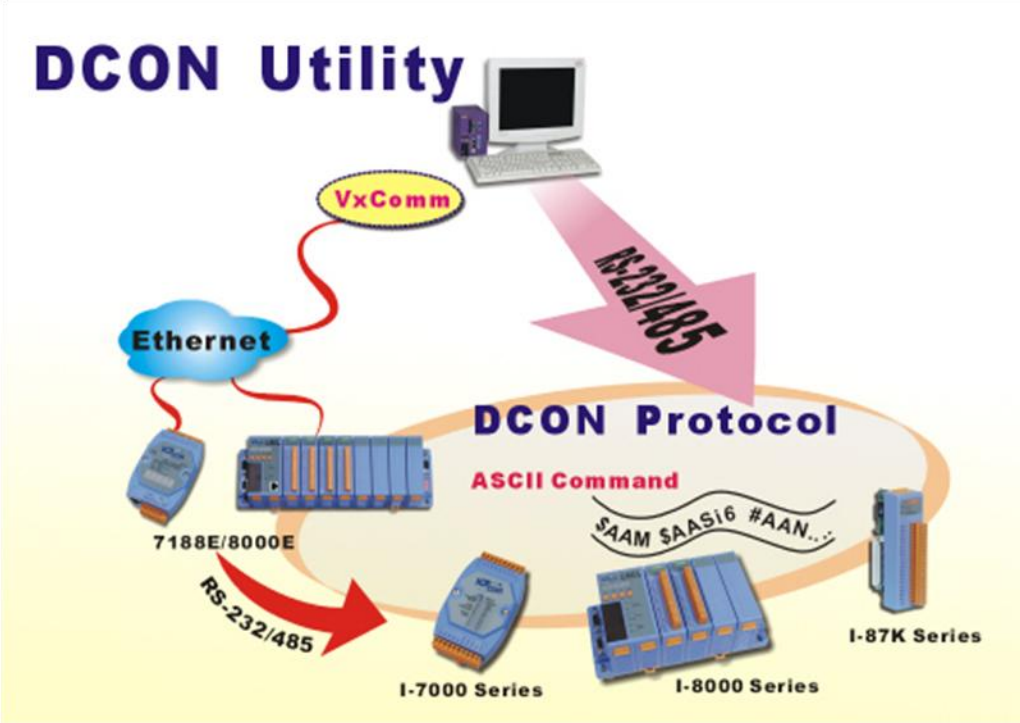
  The TaskMgr provides details about programs and processes running on the XP-8000-CE6.

- **XPAC Utility**

  The XPAC Utility provides various useful functions such as configuring Ethernet settings, monitoring system settings and FTP services .etc for easy and quick management.

  For more information about the XPAC Utility, please refer to “3.2. XPAC Utility”.

3.1. DCON UTILITY (FOR PC SIDE)



The DCON Utility is toolkits that help user search the network, easily to configure the I/O modules and test the I/O status via the serial port (RS-232/485) or Ethernet port (using virtual com port). It supports not only the DCON Protocol I/O modules but also the M Series I/O Modules (Modbus RTU M-7K,M-87K and will support Modbus ASCII M-87K) now.

For more detailed information on DCON Utility application, please refer to http://www.icpdas.com/products/dcon/introduction.htm.

3.2. XPAC UTILITY

The XPAC Utility is a tool which is designed to quickly control and manage the XP-8000-CE6.

For more detailed information on XPAC Utility applications, please refer to “2.4. XPAC Utility for configuring the XP-8000-CE6”

4. Your First Program

This chapter provides basic and necessary information to start developing your own program.

4.1. SETTING UP THE DEVELOPMENT ENVIRONMENT

Before creating your first program, you must first ensure that you have the necessary development tools and the required corresponding SDKs are installed on your PC.

Integrated Development Environment (IDE) Tools

The XP-8000-CE6 uses Microsoft Visual Studio 2005/2008 (for Visual C#.NET and Visual Basic.NET) as its IDE tools.

We have XP-8000-CE6 SDK for Visual Studio 2005/2008.

4.1.1. Installing and Setting Platform SDK

The Platform SDK, XPacSDK_CE.msi, is necessary for application developers targeting Windows CE-based XP-8000-CE6. The corresponding XPacSDK_CE must be installed on the Host PC.

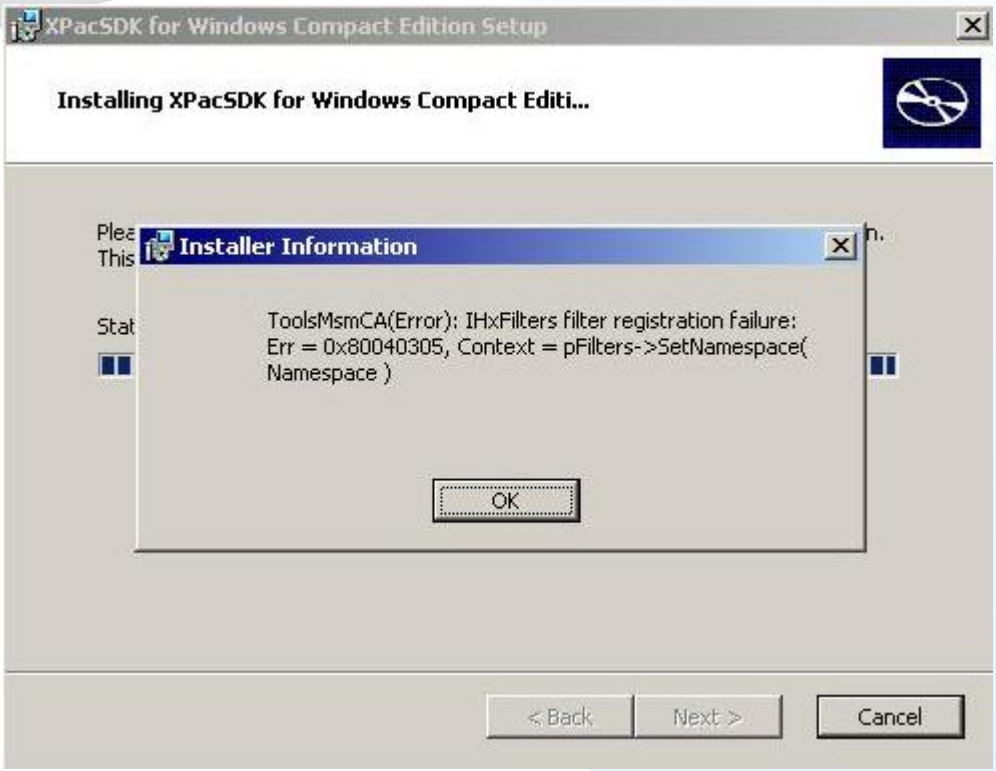
The platform SDK is located at:

CD root\ICPDAS\XP-8000-CE6\SDK\PlatformSDK (in the companion CD)
CF Card root\SDK\PlatformSDK (in the companion compact flash)
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/sdk/platformsdk/

To install the XPacSDK_CE, please perform the following steps:
Step 1: Run the XPacSDK_CE.msi
Step 2: Follow the prompts until the XPacSDK_CE installation process is complete

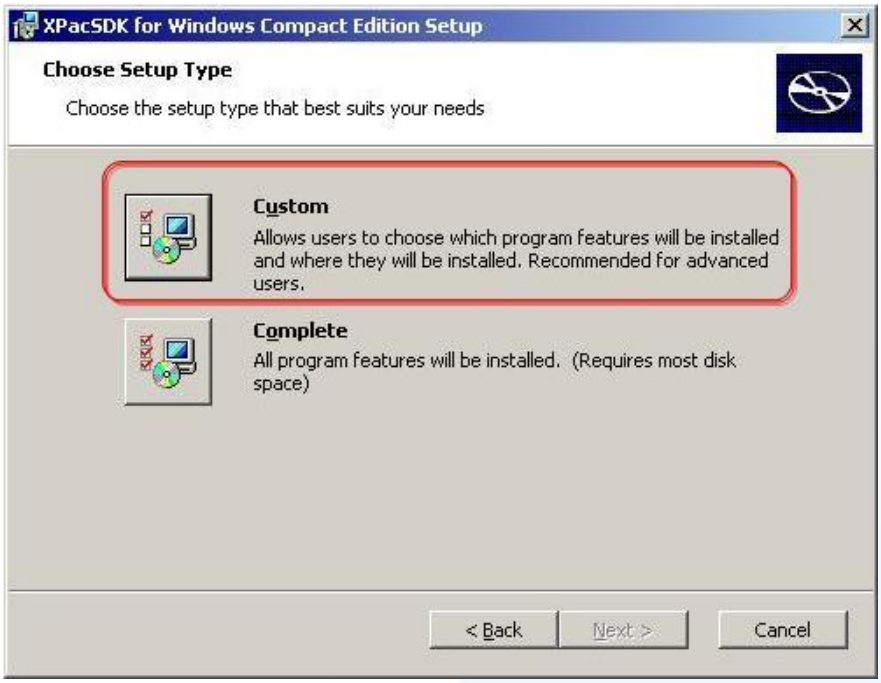
Warning:

If your PC only has installed Microsoft Visual Studio 2008 without installing Microsoft Visual Studio 2005, you might encounter an error message as below when you installing XPacSDK_CE.

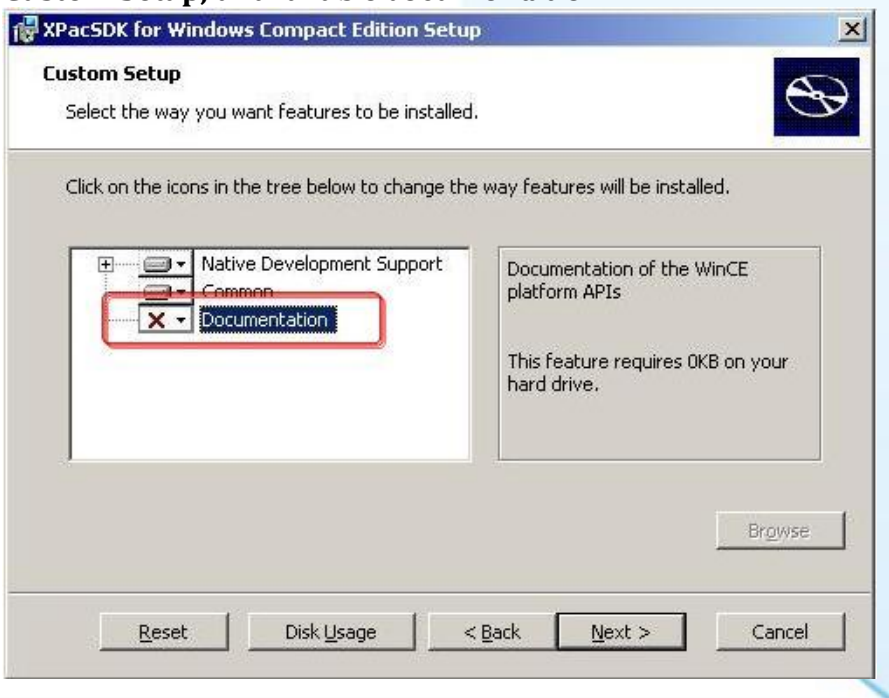


To solve this problem, you should install XPacSDK_CE as following steps:

1. **Run the XPacSDK_CE.msi**
2. **Choose Setup Type, select 「Custom」**



3. **Custom Setup, unavailable documentation**



4. **Follow the prompts until the XPacSDK_CE installation process is complete**

5. **Finish**

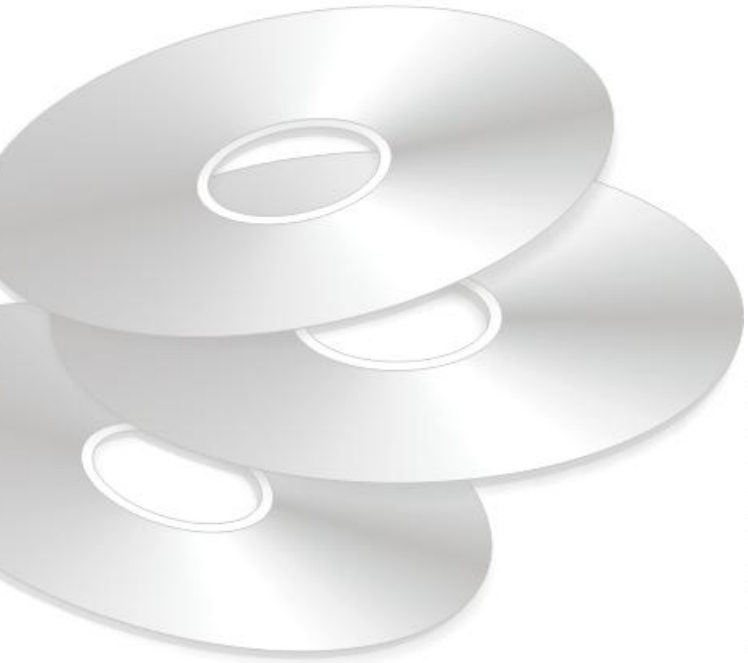
4.1.2. API and SDKs

Several SDKs are provided for XP-8000-CE6, it enables you to quickly and efficiently develop your own programs. These SDKs are located at:

CD root\ICPDAS\XP-8000-CE6\SDK (in the companion CD)
CF Card root\SDK (in the companion compact flash)
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/sdk

We will continue to add additional functions on XP-8000-CE6 SDKs,
For details of XP-8000-CE6 Standard API reference, please refer to:
CD root\ICPDAS\XP-8000-CE6\Document\SDK (in the companion CD)
CF Card root\Document\SDK (in the companion compact flash)
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/document/sdk

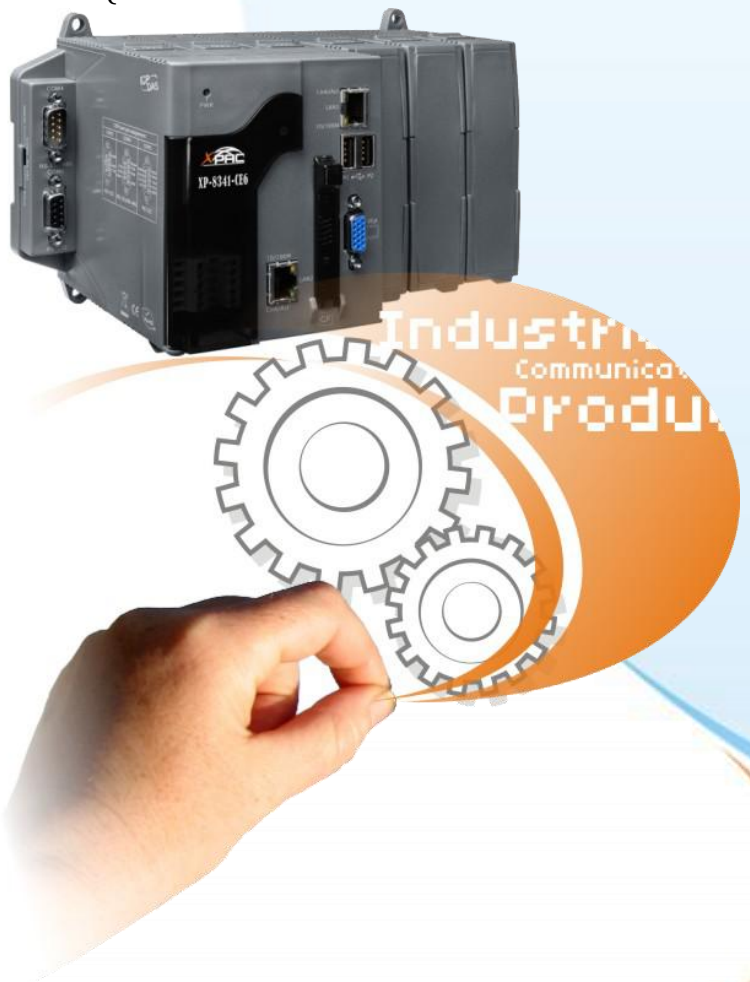
And demo programs of frequently-used APIs, please refer to:
CD root\ICPDAS\XP-8000-CE6\SDK\Demo (in the companion CD)
CF Card root\SDK\Demo (in the companion compact flash)
ftp://ftp.icpdas.com/pub/cd/xp-8000-ce6/sdk/demo



4.2. CREATING YOUR FIRST PROGRAM

ICP DAS provides SDKs to help you develop your application. The following sections briefly explain how to build your first program of different development tools and different programming languages.

Here we demonstrate how to build your first program with Microsoft Visual Studio 2008 in both C++ (section 4.2.1) and C#.NET (section 4.2.2).



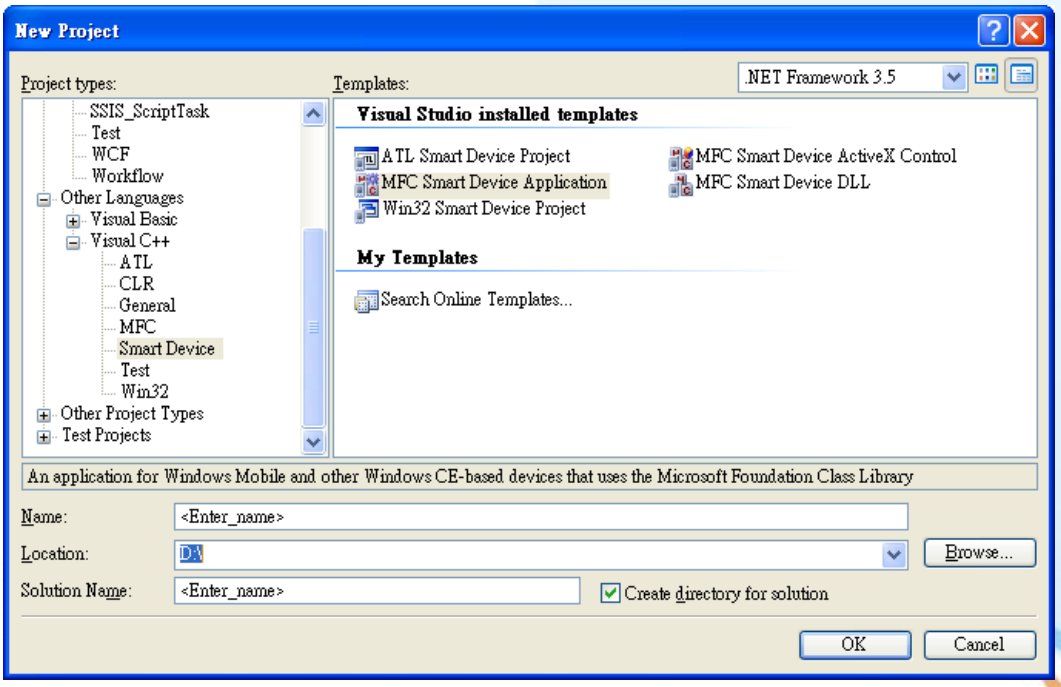
4.2.1. Your First Visual C++ Program

This section help you start developing applications by using "**MFC Smart Device Application**". Follow these steps to create a new program running on the XP-8000-CE6.

Step 1: Start Microsoft Visual Studio 2008.

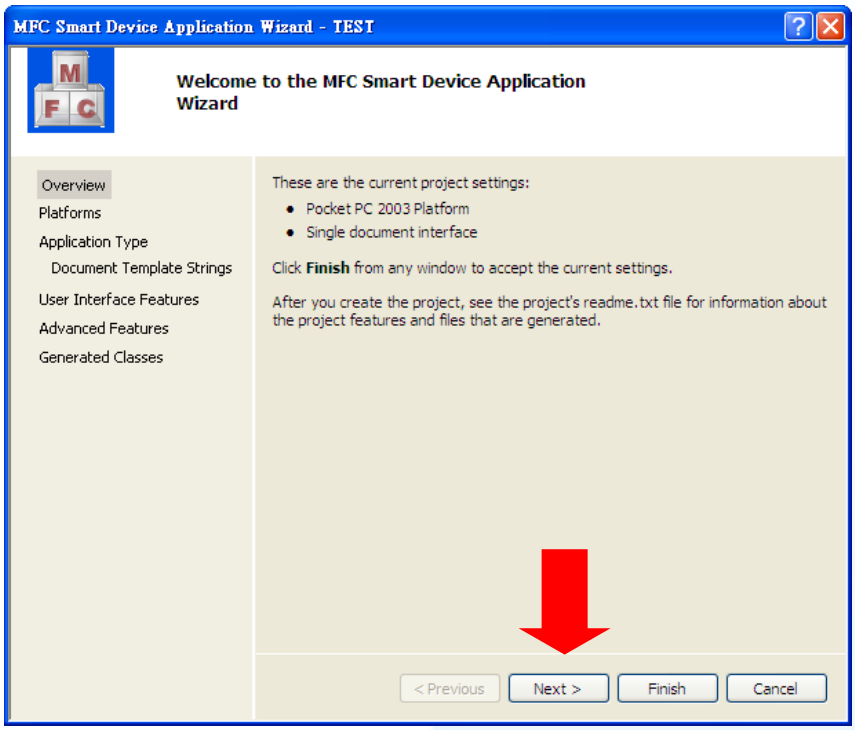
Step 2: On the **File** menu, click **New → Projects...**
The **New Project** dialog box appears.

Step 3: In the **New Project** dialog box, choose the **project type** as **Smart Device** in **Other Languages**. Then choose **MFC Smart Device Application** in **Visual Studio installed templates**. And specify project name and location.

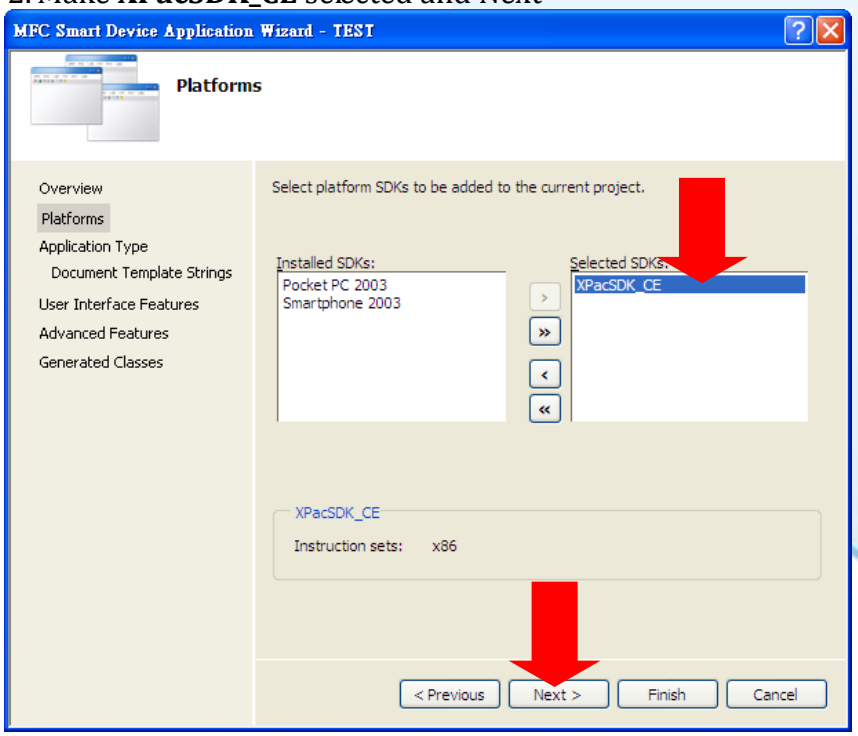


Step 4: Configure the settings of the project. Just follow the **MFC Smart Device Wizard**, as the following figures show:

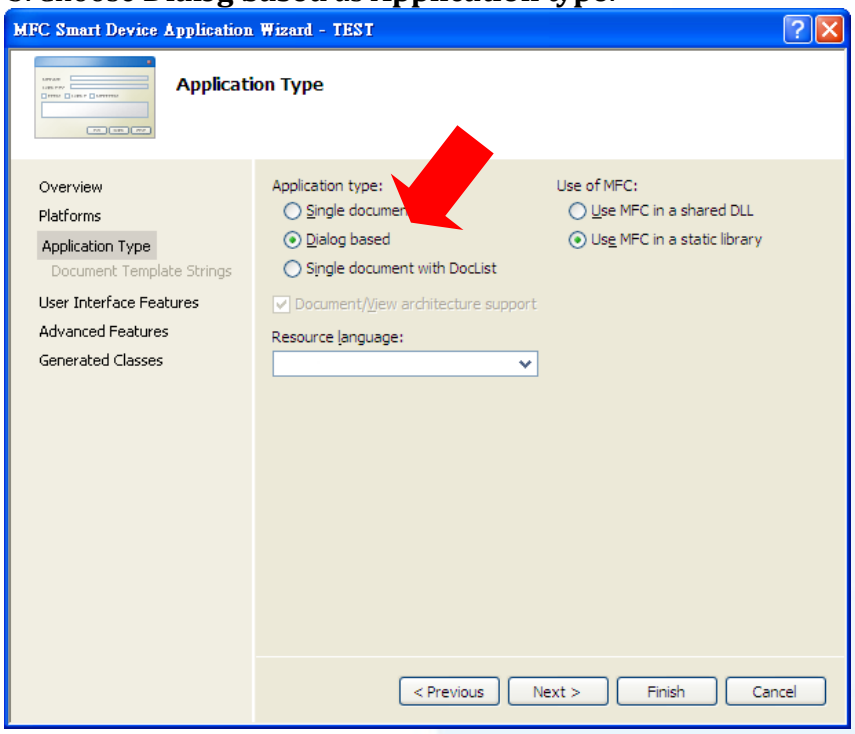
1. Next



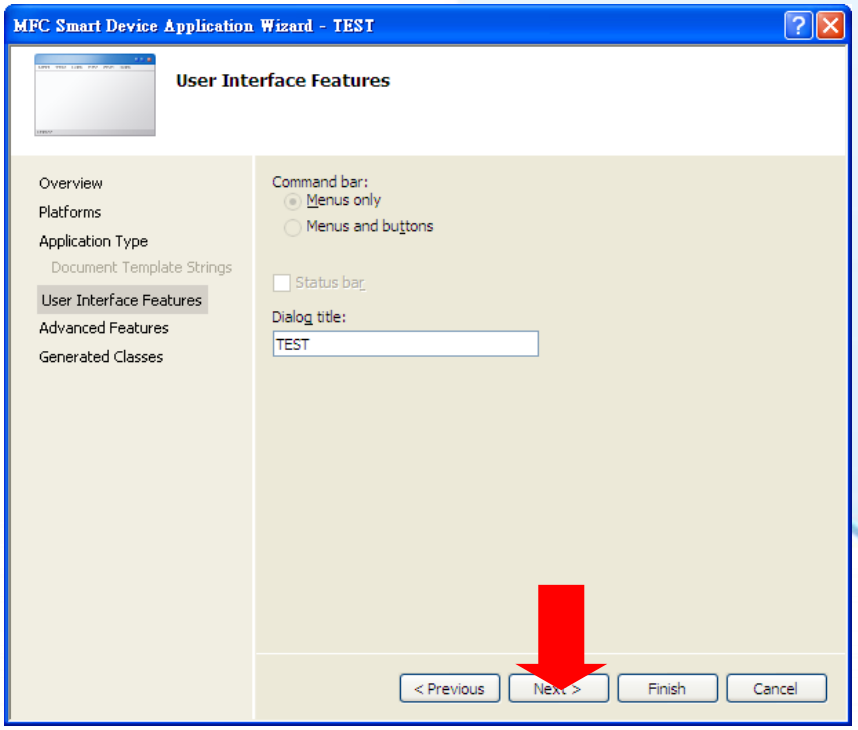
2. Make **XPacSDK_CE** selected and Next



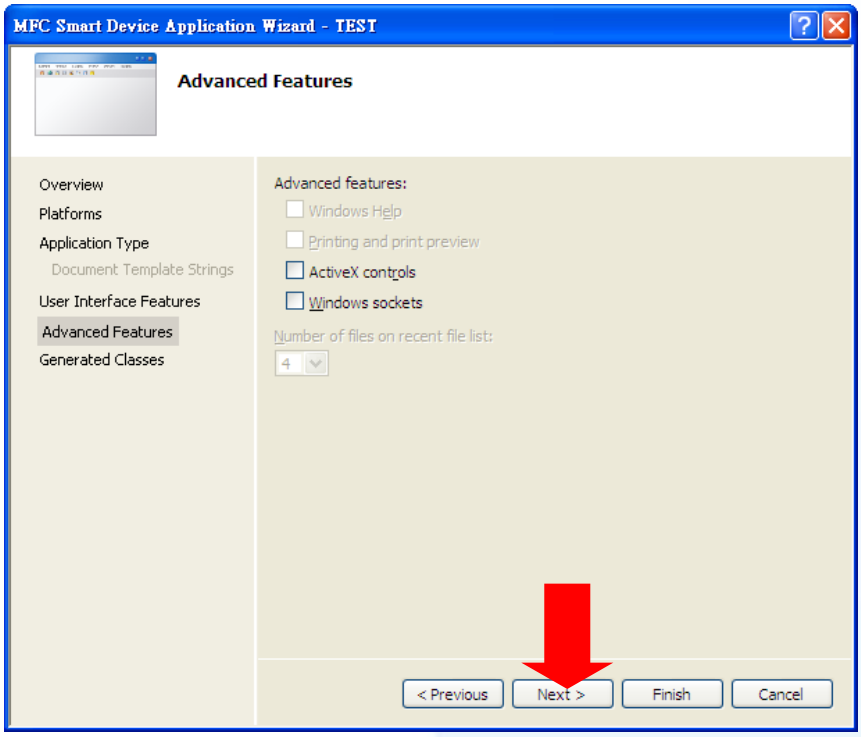
3. Choose **Dialog based** as **Application type**.



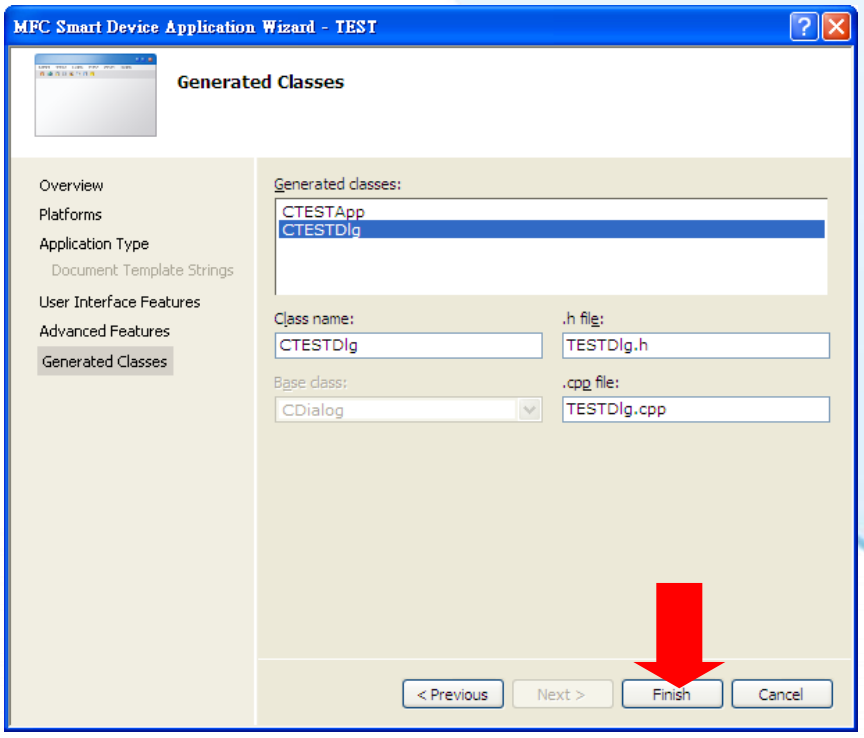
4. Next



5. Next

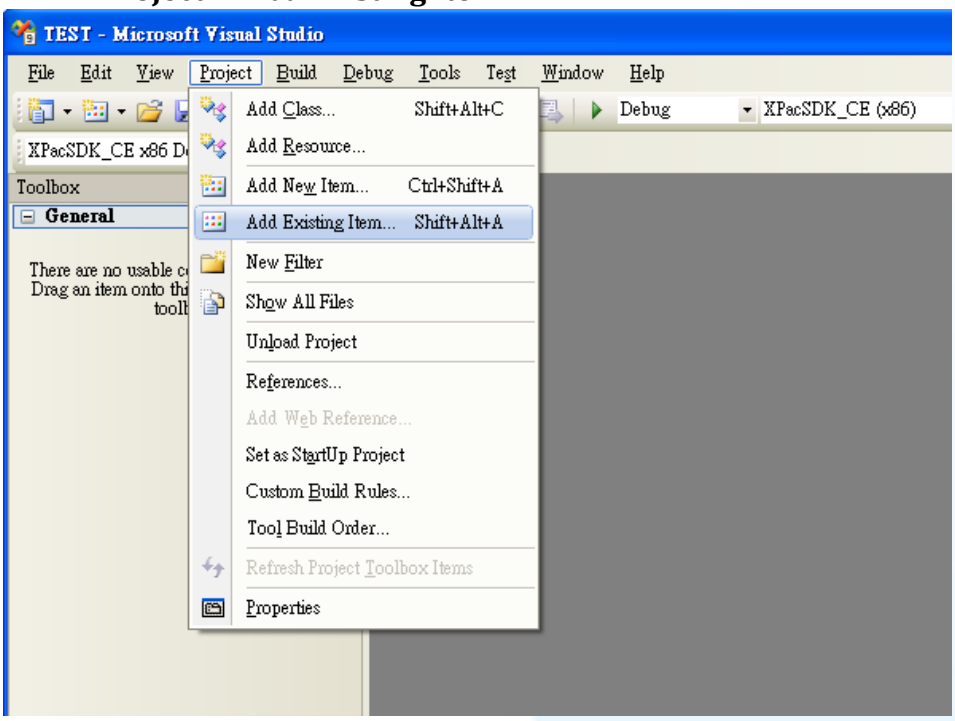


6. Finish

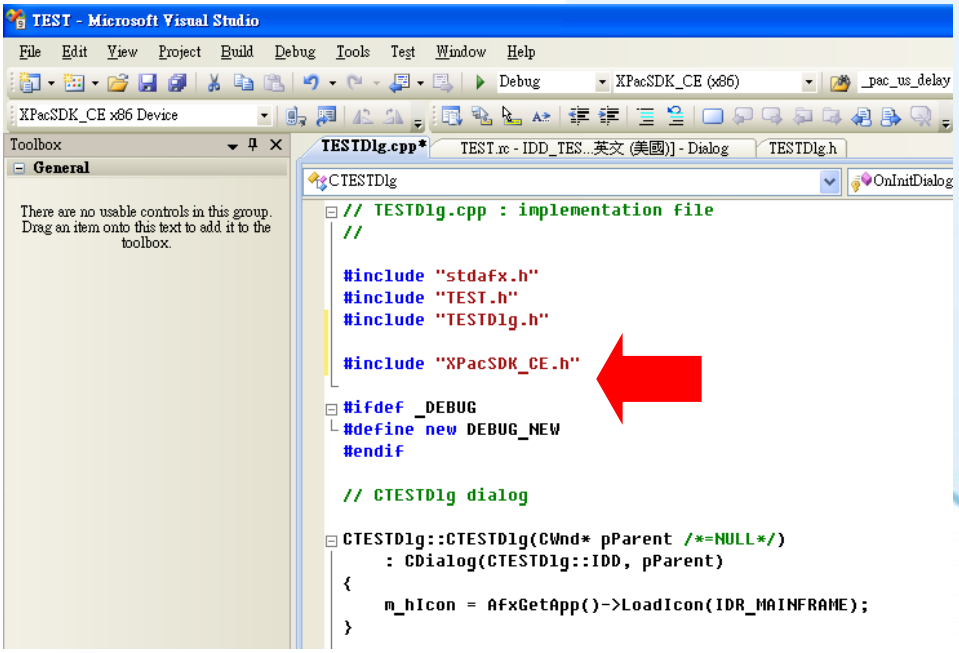


Step 5: Add XPacSDK_CE.lib and XPacSDK_CE.h to the project.

Project -> Add Existing Item…



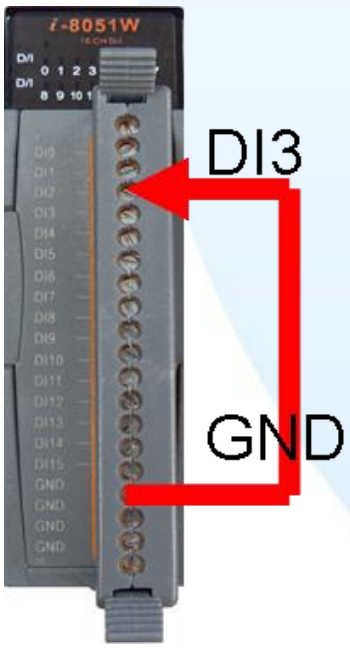
Step 6: #include “XPACSDK_CE.h” in the testDlg.cpp file



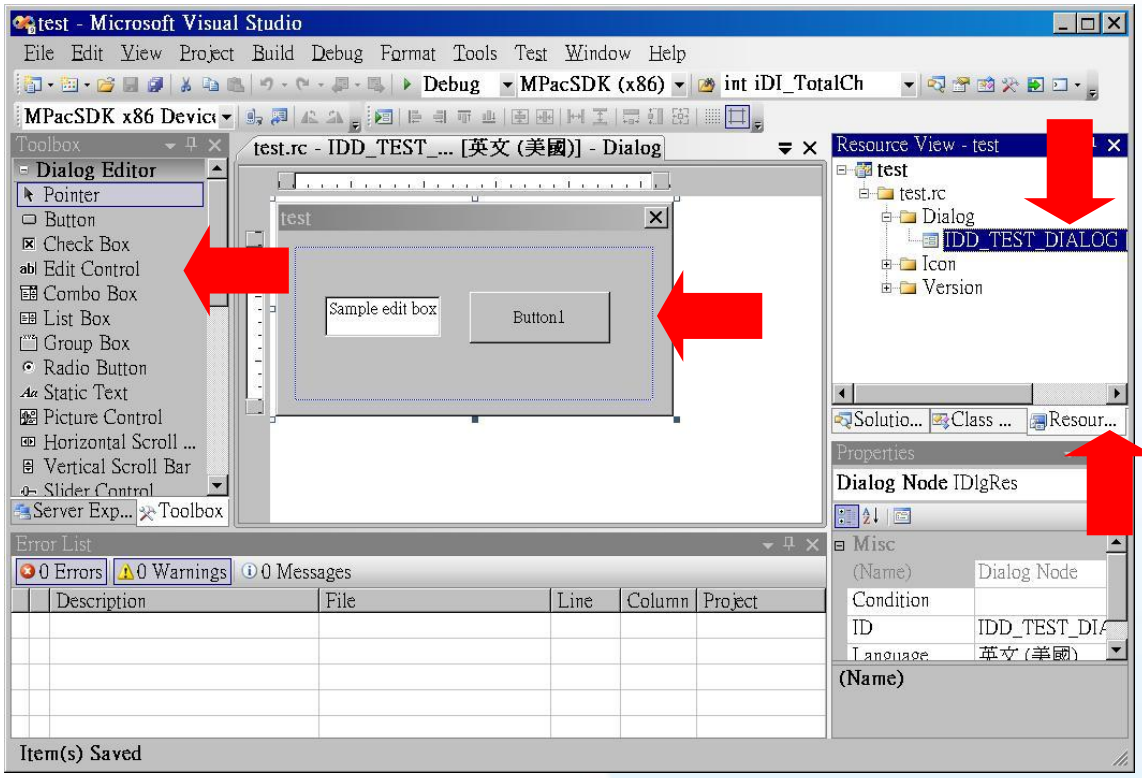
Step 7: Then you can use XPacSDK_CE to develop Visual C++ applications on the XP-8000-CE6. Here we take I-8051W, a Digital Input (DI) module, for example to demonstrate How powerful XPacSDK_CE is.

Step 7.1: Put the I-8051W in the slot 1 of the XP-8000-CE6. And connect the GND pin and the DI3 pin to turn on the digital input value of the channel 3.

You can see the detail information on the web site of ICP DAS : http://www.icpdas.com/products/Remote_IO/i-8ke/i-8051w.htm



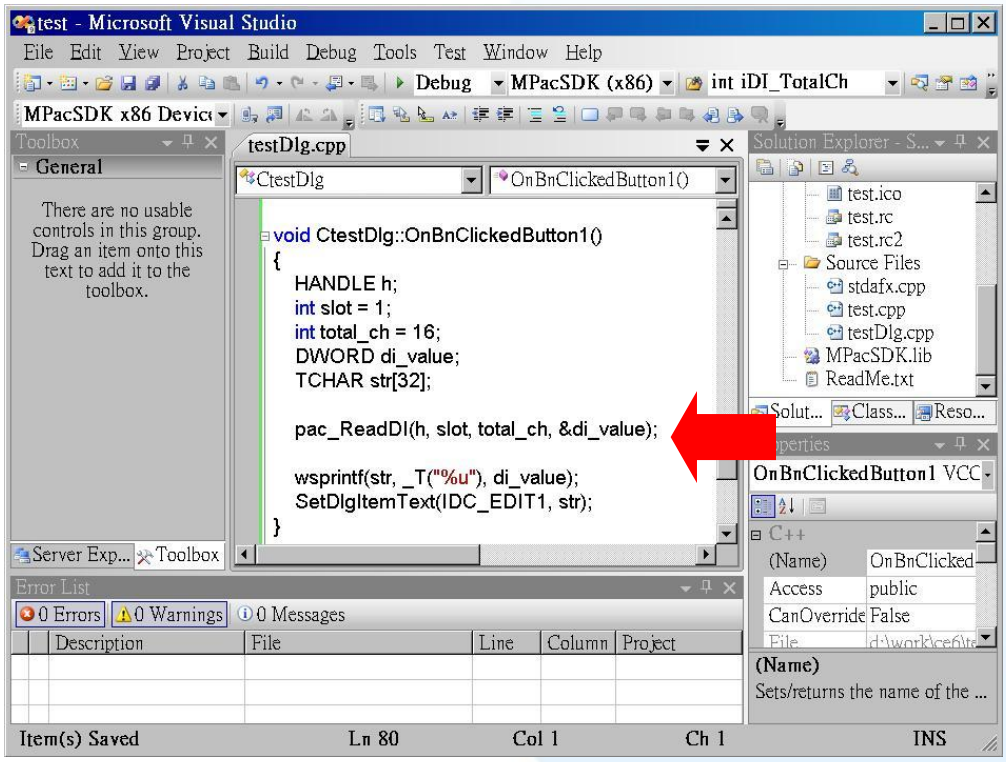
Step 7.2: Make a simple User Interface in the Dialog as the following figure shows.



1. Click on the **Resource View**
2. Double click on the Dialog item
3. Draw a **Button** and an **Edit Control**
4. Double click on the Button to write the On-Click Event

Step 7.3: Write the content of the On-Click function. You can see that simply writing one line make us have the digital input value read back. The line for reading digital value back is:

pac_ReadDI(h, slot, total_ch, &di_value);



Note

The arguments of the above example is described here:

h: handle of UART. The I-8K series I/O modules ignore this argument.

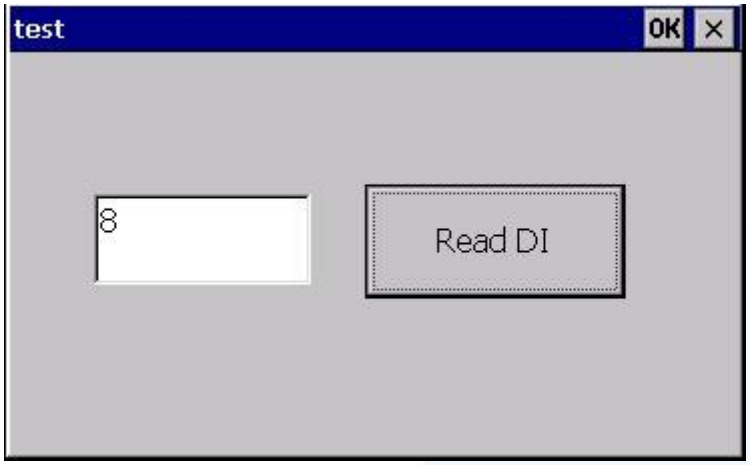
slot: the slot which I-8051W plugs in.

total_ch: the number of total DI channels. In I-8051W, total_ch=16.

di_value: the DI value read back.

See XPAC_CE6_Standard_API_manual.pdf for more information. XPAC_CE6_Standard_API_manual.pdf can be found in the companion CD or downloaded from the FTP site of ICP DAS.

Step 7.4: The snapshot of the demo program.



Note

The read back DI value is the binary representation of the total 16 DI channels. If DI3 turns on, the read back DI value is "0000,0000,0000,1000" of binary representation, that is, DI is 8 as its decimal form. Users can use pac_GetBit(DI_Value, index) to get the DI value of a specified channel. See XPAC_CE6_Standard_API_manual.pdf for details.

Note

To execute the program you build, be sure to put XPacSDK_CE.dll and the program's .exe file in the same directory.

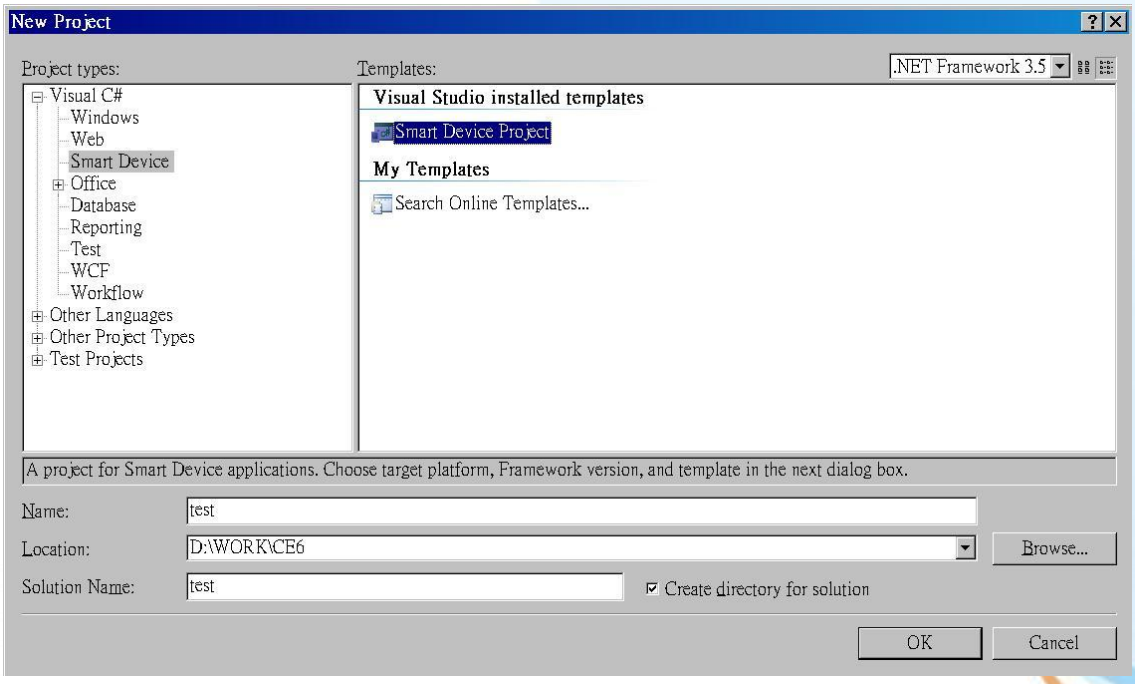
4.2.2. Your First Visual C# Program

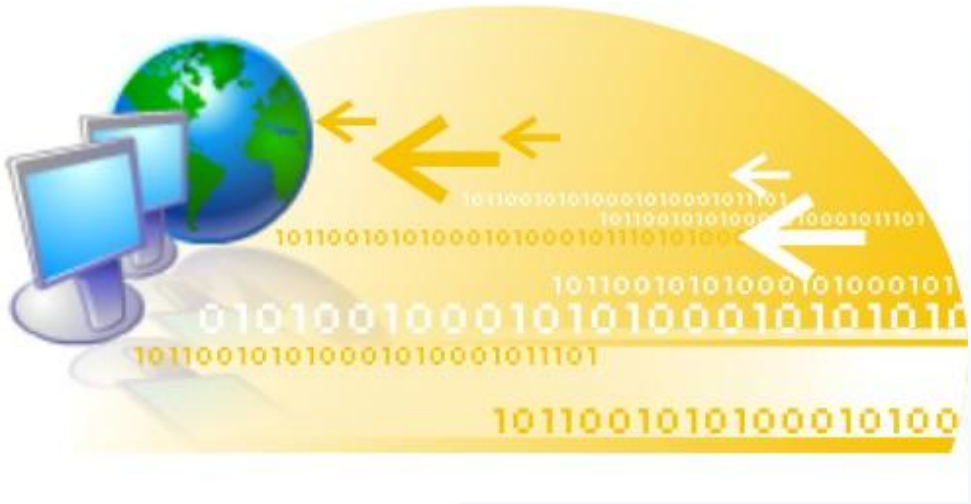
This section help you start developing applications by using "**Smart Device Project**". Follow these steps to create a new .NET program running on the XP-8000-CE6.

Step 1: Start Microsoft Visual Studio 2008.

Step 2: On the **File** menu, click **New → Projects...**
The **New Project** dialog box appears.

Step 3: In the **New Project** dialog box, choose the **project type** as **Smart Device** in **Visual C#**. Then choose **Smart Device Project** in **Visual Studio installed templates**. And specify project name and location.



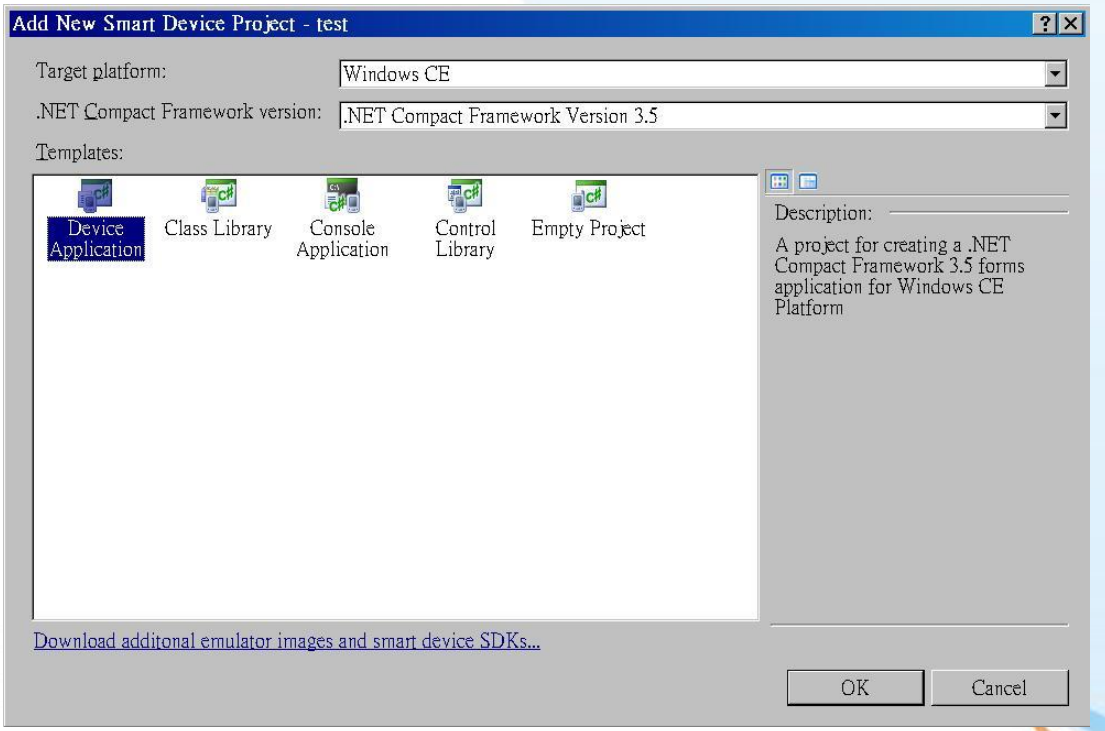


Step 4: Configure the settings of the project as below:

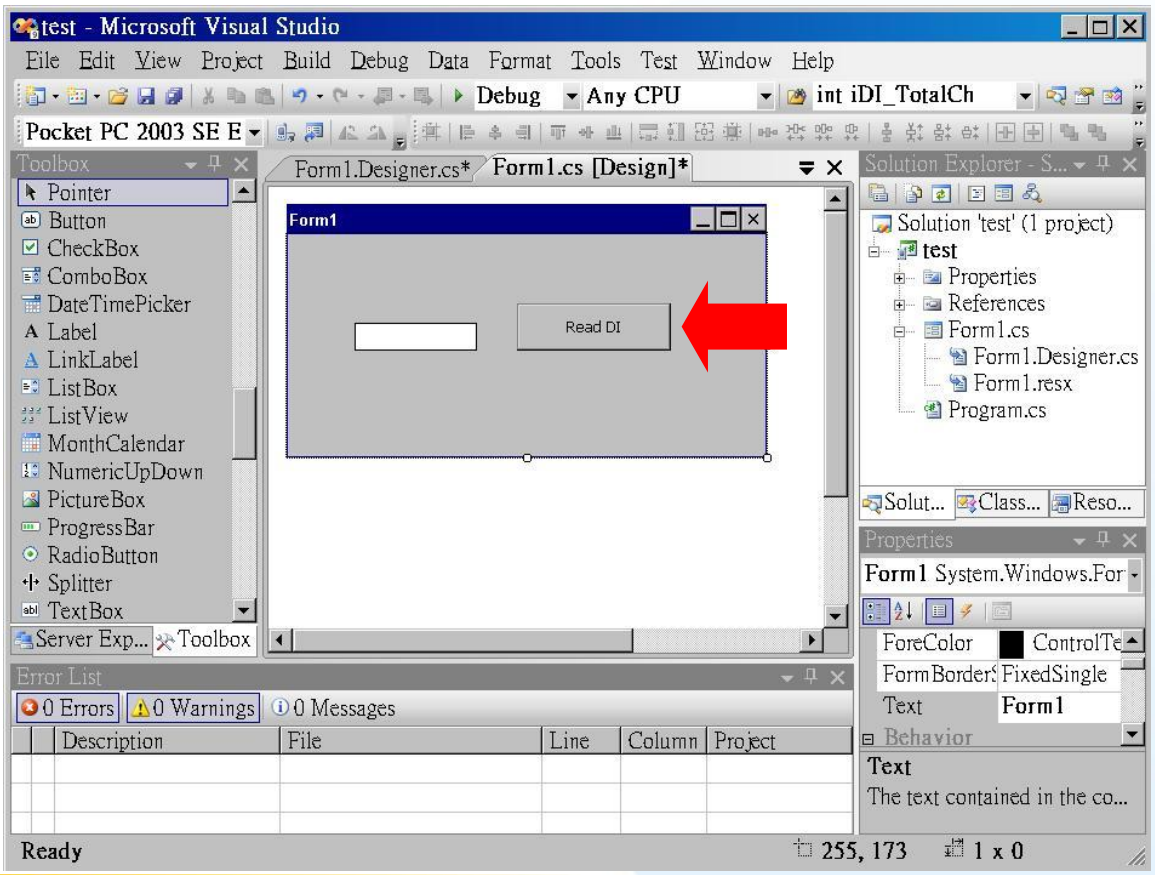
Target platform= **Windows CE**

.NET Compact Framework version= **.NET Compact Framework Version 3.5**

Templates= **Device Application**



Step 5: Make a simple User Interface in the Dialog as the following figure shows.
Then double click on the button.



Step 6: **using** System.Runtime.InteropServices to **DllImport** pac_ReadDI, then implement the function: button1_Click().

```
using System.Windows.Forms;

using System.Runtime.InteropServices;

namespace test
{
   public partial class Form1 : Form
   {
      //in MPacSDK.h, we can find that:
      //BOOL pac_ReadDI(HANDLE hPort, int slot, int iDI_TotalCh, DWORD* IDI_Value);
      [DllImport("XPacSDK_CE.dll", EntryPoint = "pac_ReadDI")]
      public extern static bool pac_ReadDI(IntPtr h, int slot, int total_ch, ref uint di_value);

      public Form1()
      {
         InitializeComponent();
      }

      private void button1_Click(object sender, EventArgs e)
      {
         IntPtr  h = new IntPtr();
         int slot = 1;
         int total_ch = 16;
         uint di_value = 0;

         pac_ReadDI(h, slot, total_ch, ref di_value);
         textBox1.Text = di_value.ToString();
      }
```

Note

In the function **pac_ReadDI**(h, slot, total_ch, di_value);

The arguments of the above example is described here:

h: handle of UART. The I-8K series I/O modules ignore this argument.

slot: the slot which I-8051W plugs in.

total_ch: the number of total DI channels. In I-8051W, total_ch=16.

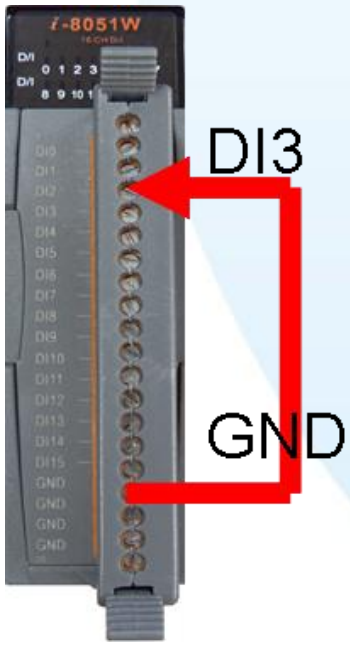
di_value: the DI value read back.

See XPAC_CE6_Standard_API_manual.pdf for more information. XPAC_CE6_Standard_API_manual.pdf can be found in the companion CD or downloaded from the FTP site of ICP DAS.

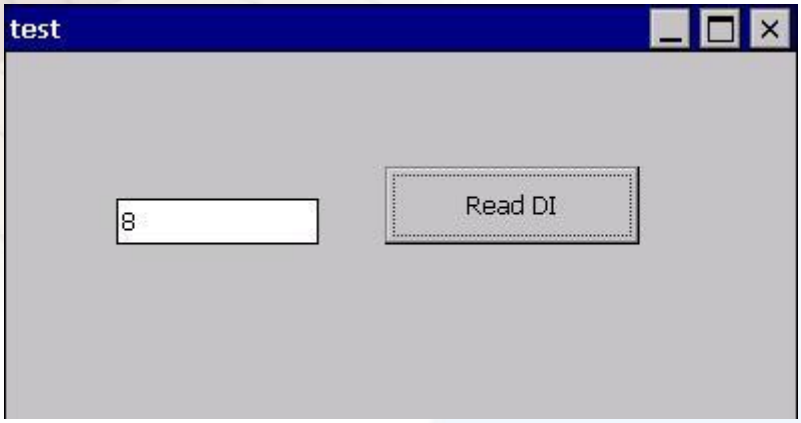
Step 7: Then you can use XPACSDK_CE to develop Visual C# applications on the XP-8000-CE6. Here we take I-8051W, a Digital Input (DI) module, for example to demonstrate How powerful XPACSDK_CE is.

Step 7.1: Put the I-8051W in the slot 1 of the XP-8000-CE6. And connect the GND pin and the DI3 pin to turn on the digital input value of the channel 3.

You can see the detail information on the web site of ICP DAS : http://www.icpdas.com/products/Remote_IO/i-8ke/i-8051w.htm



Step 7.2: The snapshot of the demo program.



Note

The read back DI value is the binary representation of the total 16 DI channels. If DI3 turns on, the read back DI value is "0000,0000,0000,1000" of binary representation, that is, DI is 8 as its decimal form. Users can use pac_GetBit(DI_Value, index) to get the DI value of a specified channel. See XPAC_CE6_Standard_API_manual.pdf for details.

Note

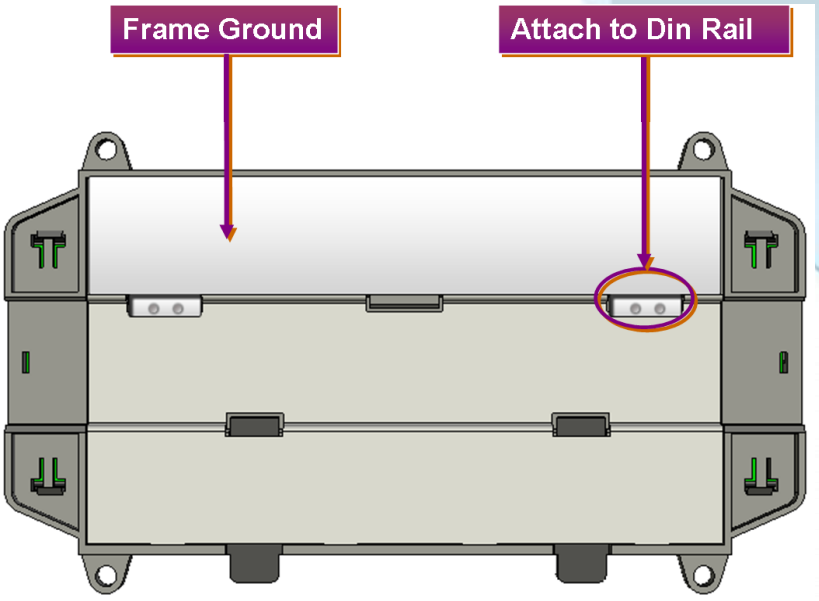
To execute the program you build, **be sure to** put XPACSDK_CE.dll and the program's .exe file in the same directory.

Appendix A. Frame Ground

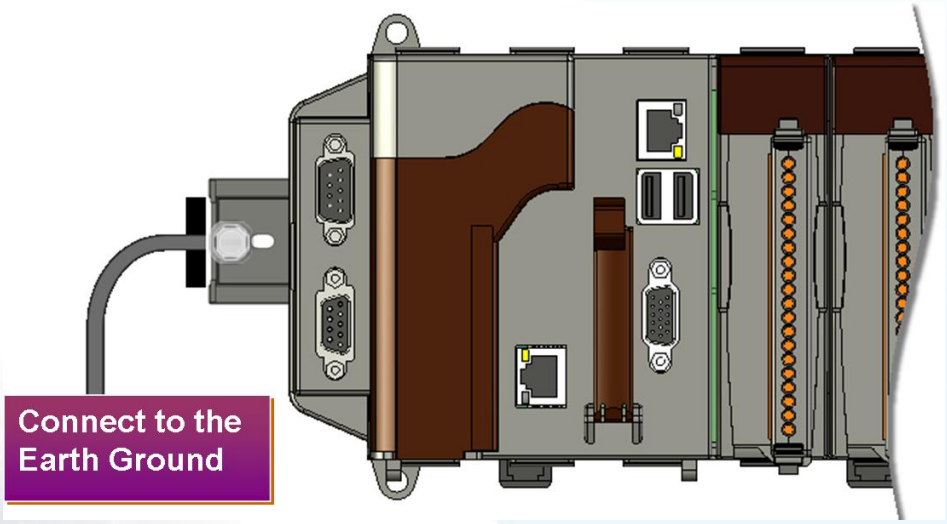
Electronic circuits are constantly vulnerable to Electro-Static Discharge (ESD), which become worse in a continental climate area. Some I-7000, M-7000 and I-8000 series modules feature a new design for the frame ground, which provides a path for bypassing ESD, allowing enhanced static protection (ESD) capability and ensures that the module is more reliable.

To protect XP-8000-CE6 from ESD damage, connect the Frame Ground pins to the earth. (In section 1.5 Overview, please refer to Item 13 in "Overview Item Description" to see where the Frame Ground pins are)

The XP-8000-CE6 Series provide another better protection from ESD:
The XP-8000-CE6 controller has a metallic board attached to the back of the plastic basket as shown in below.



When mounted to the DIN rail, be sure to connect the DIN rail to the earth ground. Because the DIN rail is in contact with the upper Frame Ground as shown in below.

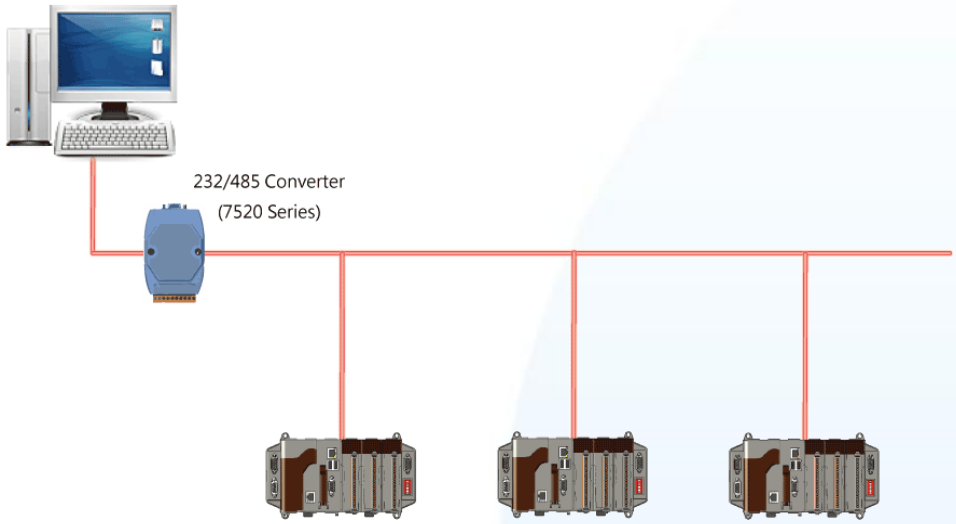


Appendix B.
Application of RS-485 Network

The RS-485 length can be up to 4000 ft or 1.2 km over a single set of twisted–pair cables, if the RS-485 network is over 4000 ft or 1.2 km, the RS-485 repeater must be added to extend the RS-485 network.

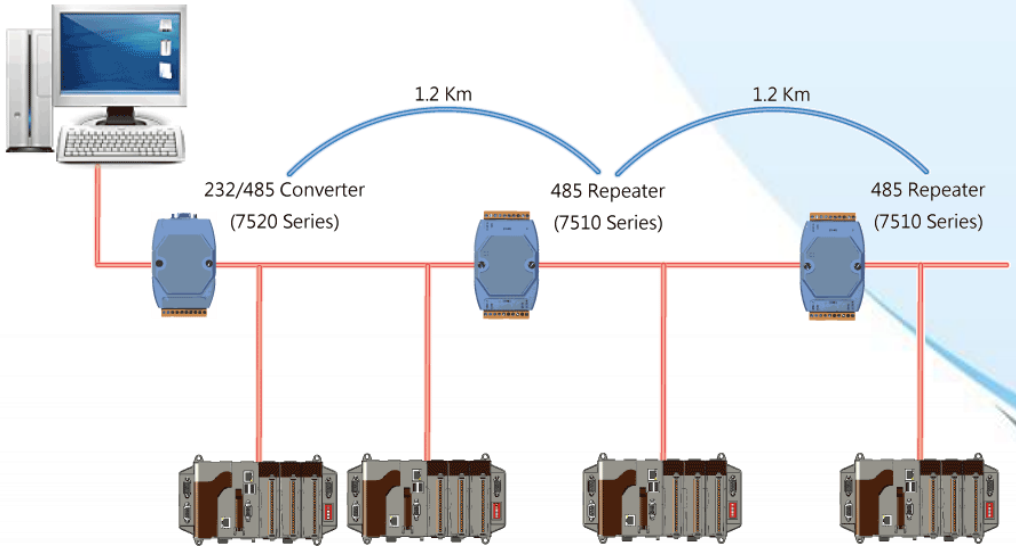
B.1. BASIC RS-485 NETWORK

The basic component of the RS-485 network consist of a Master Controller (or using a PC as a host controller), and some RS-485 devices.



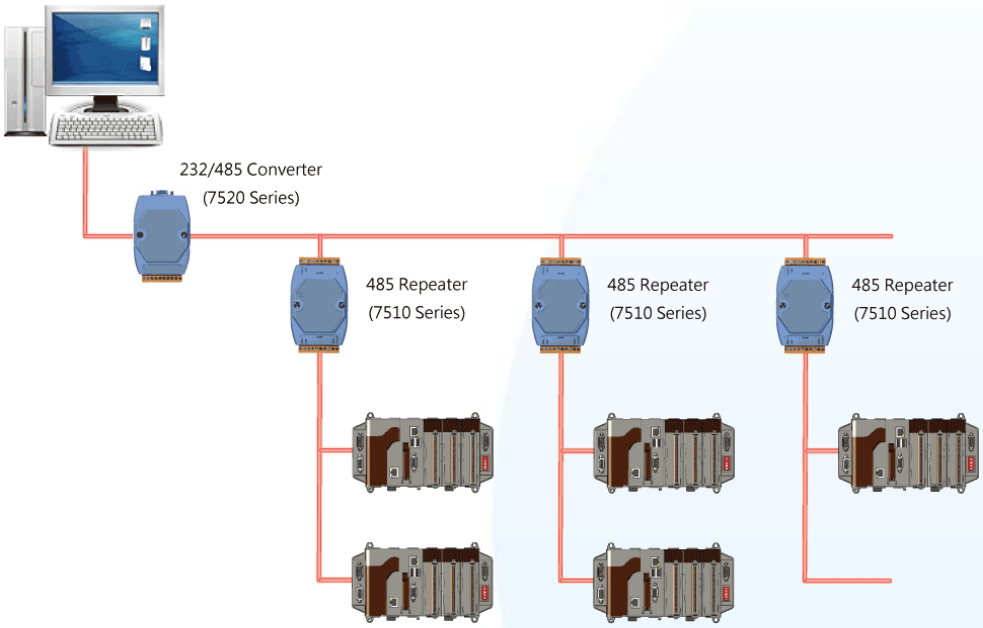
B.2. DAISY CHAIN RS-485 NETWORK

All RS-485 devices are wired directly to the main network, If the network is up to 1.2 km, it will need a repeater (7510 series) to extend the network length.

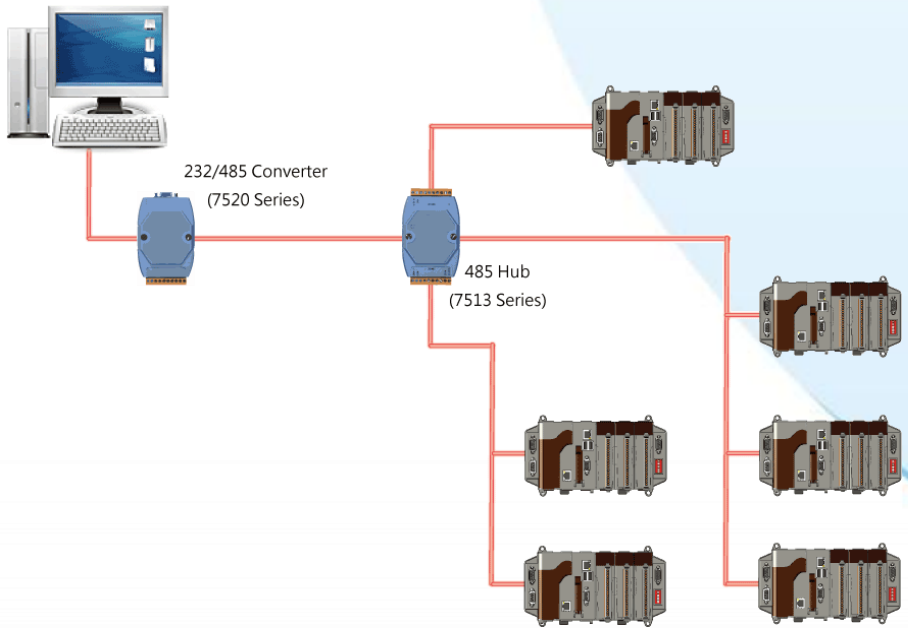


B.3. STAR TYPE RS-485 NETWORK

There are branches along the main network. In this case, it is better to have a repeater to isolate or filter the noise that is made by devices.

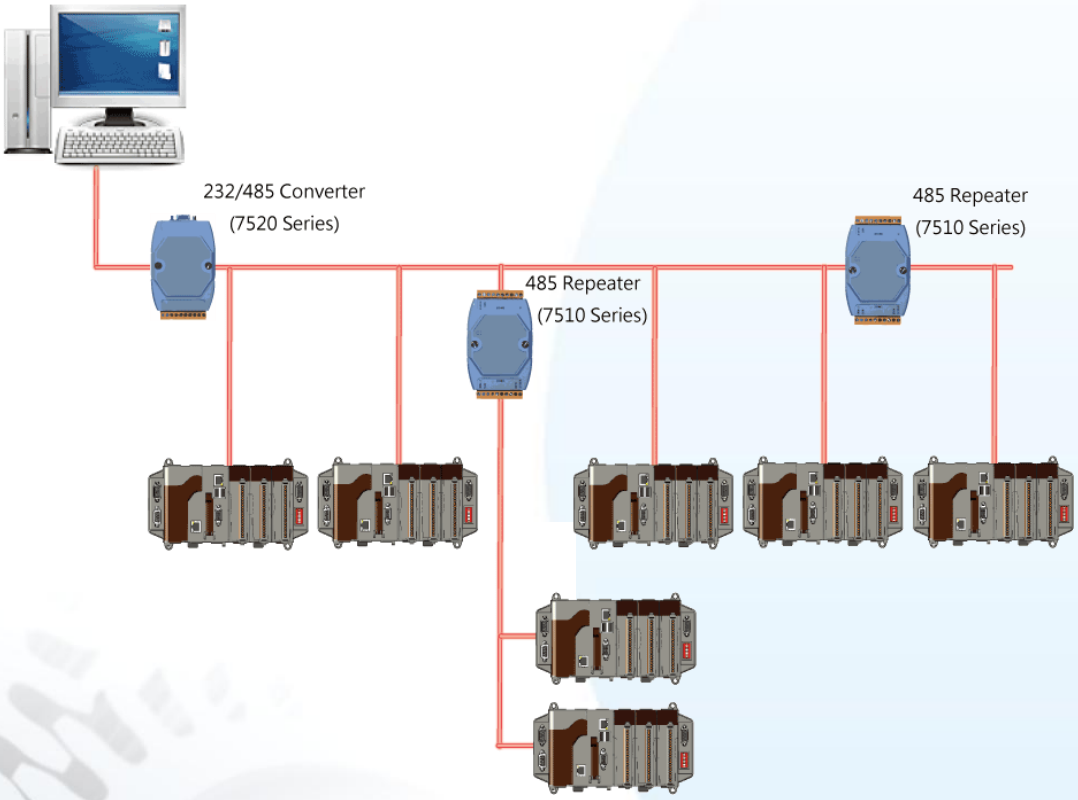


There is a better choice to use 7513 as a RS-485 hub on start type network.



B.4. RANDOM RS-485 NETWORK

There are branches along the main wire. In this case, it is better to have a repeater to isolate or filter the noise that is made by devices.



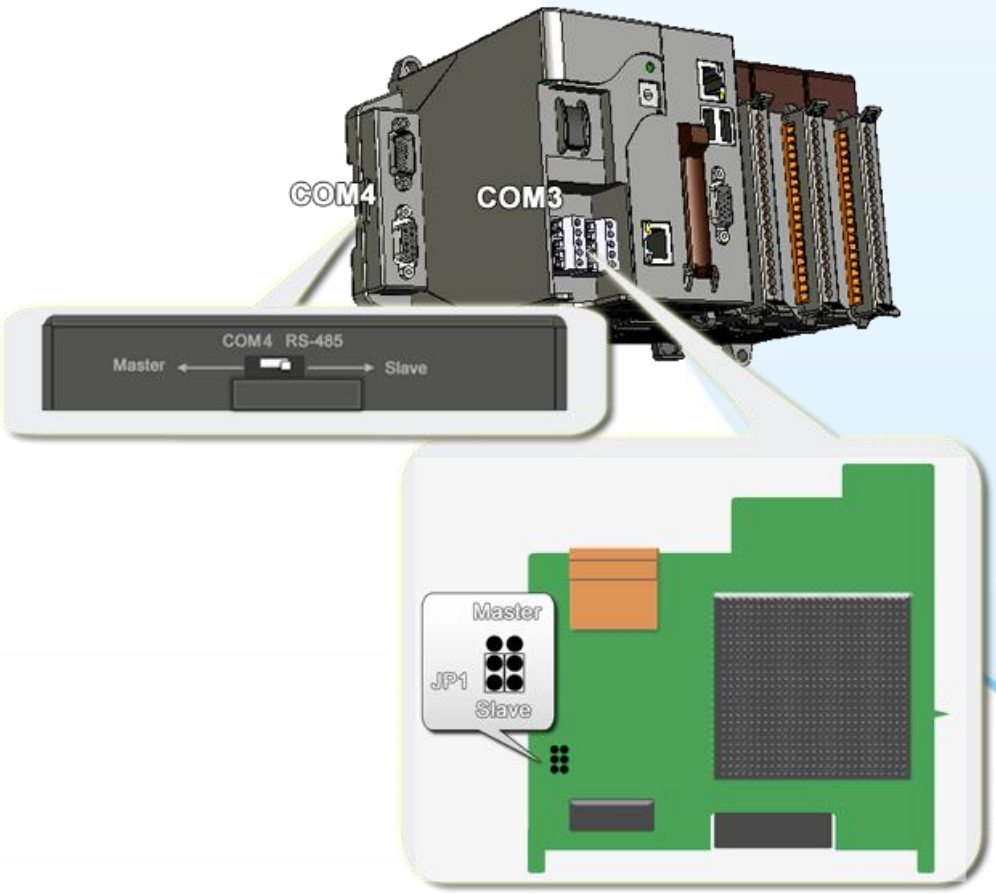
B.5. MASTER/SLAVES SETTINGS

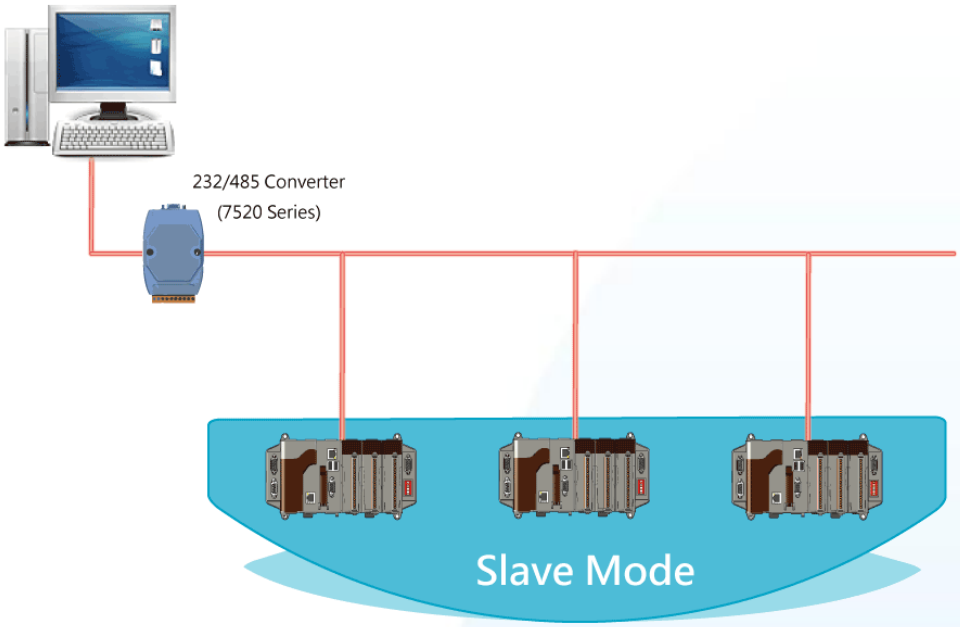
There must exist one master to have a pull-high/pull-low resistor in the same network. In a master/slave applications, "Master" is the default configuration of XP-8000-CE6.

XP-8000-CE6 as a Slave:

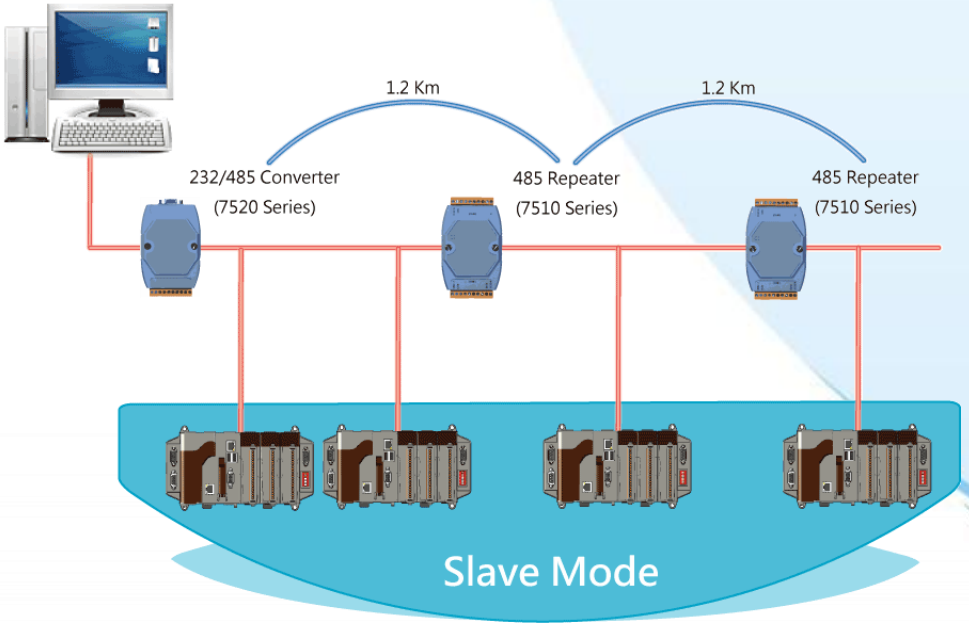
For most of application, only one 7520 series module is used as RS-232/485 converter, and its pull-high/pull-low resistors are set to be enabled. Then the XP-8000-CE6 and all the other devices on this network must be in their slave mode (the pull-high/pull-low resistors must be disabled).

Please refer to the following figure to set the jumpers to the slave mode. The jumpers are located at the power board of XP-8000-CE6.



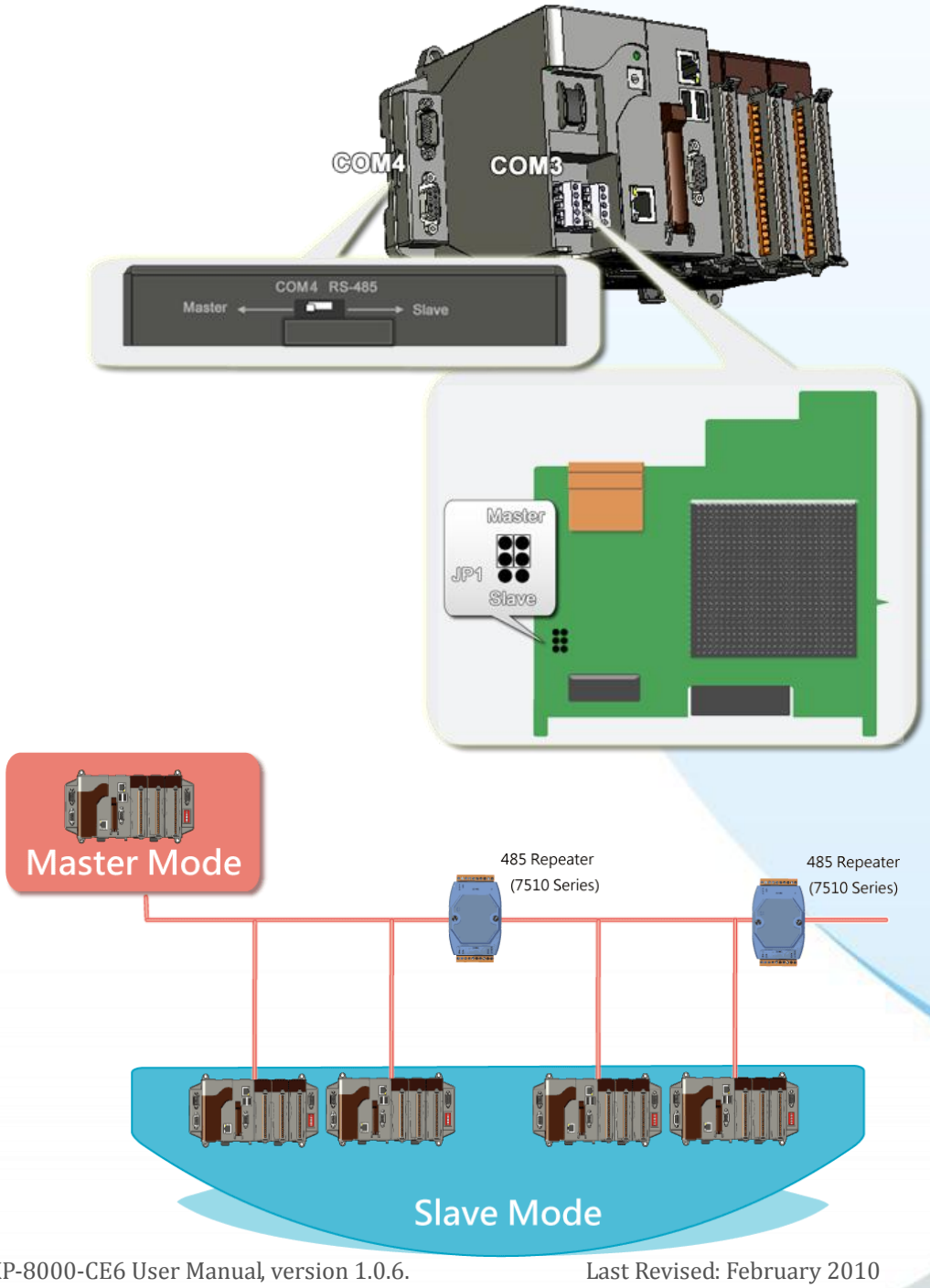


If there are repeaters on the RS-485 network, you can see that there are pull-high/pull-low resistors on both sides of the repeaters (I-7510)



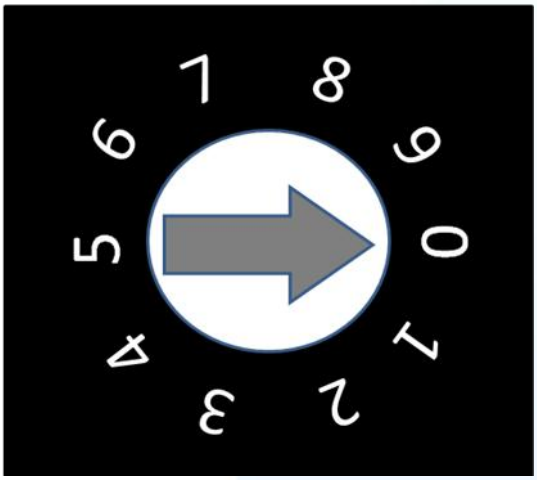
XP-8000-CE6 as a Master (default):

When one of XP-8000-CE6 is set to the master mode, then all the other devices on the same network must be set to the slave mode.
Set an XP-8000-CE6 to the master mode by adjusting the jumpers on the power board of XP-8000-CE6 (the pull-high/pull-low resistors are adjusted to be enabled.) Refer to the following figure:



Appendix C.
Tips – How To

C.1. How to Use Rotary Switch



The rotary switch is reserved for application uses.
During normal operation, the position of the rotary switch has no effects on XP-8000-CE6.

We provide XPacSDK to read back the value of the rotary switch.

int pac_GetRotaryID();

The returning value of pac_GetRotaryID() is what the arrow points to.

C.2. How to Use DIP Switch

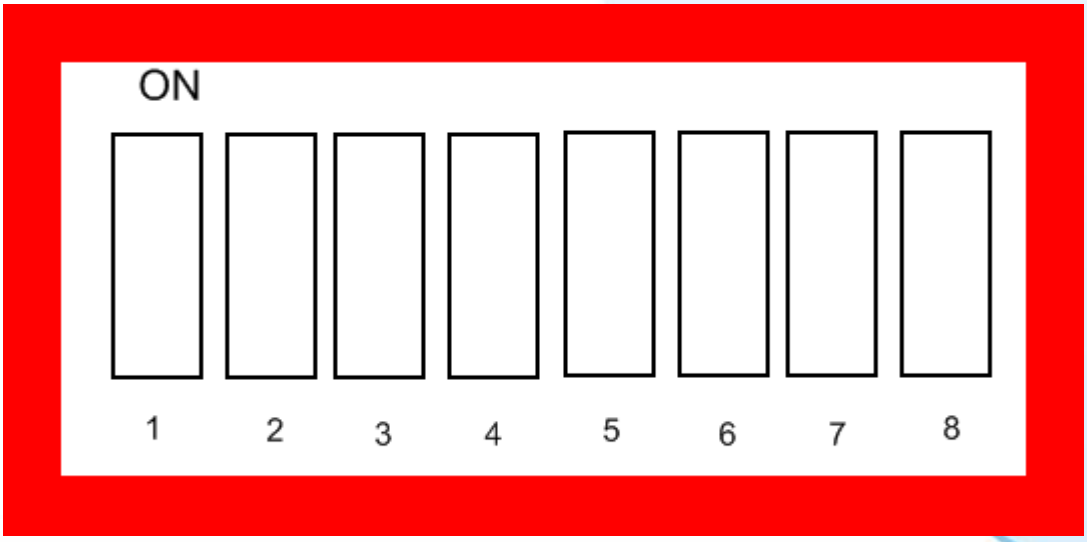
The DIP switches are reserved for application uses.
During normal operation, the positions of the DIP switches have no effects on XP-8000-CE6.

We provide XPacSDK to read back the value of DIP switches.

int pac_GetDIPSwitch();

The returning value of pac_GetDIPSwitch() is a integer ranged from 0 to 255, which corresponds to the positions of the DIP switches.

Below is the figure of DIP switches similar to that of XP-8000-CE6.
The first DIP switch is the LSB and the 8th DIP switch is the MSB.
If the DIP switch slides up to the “ON” side, it represents 1.
If the DIP switch slides down to the number side, it represents 0.
In this way, the eight-bit DIP switches can be represented by 0 ~ 255.



C.3. HOW TO ONLINE DEBUG XP-8000-CE6

Debug XP-8000-CE6 programs in Visual Studio 2005/2008

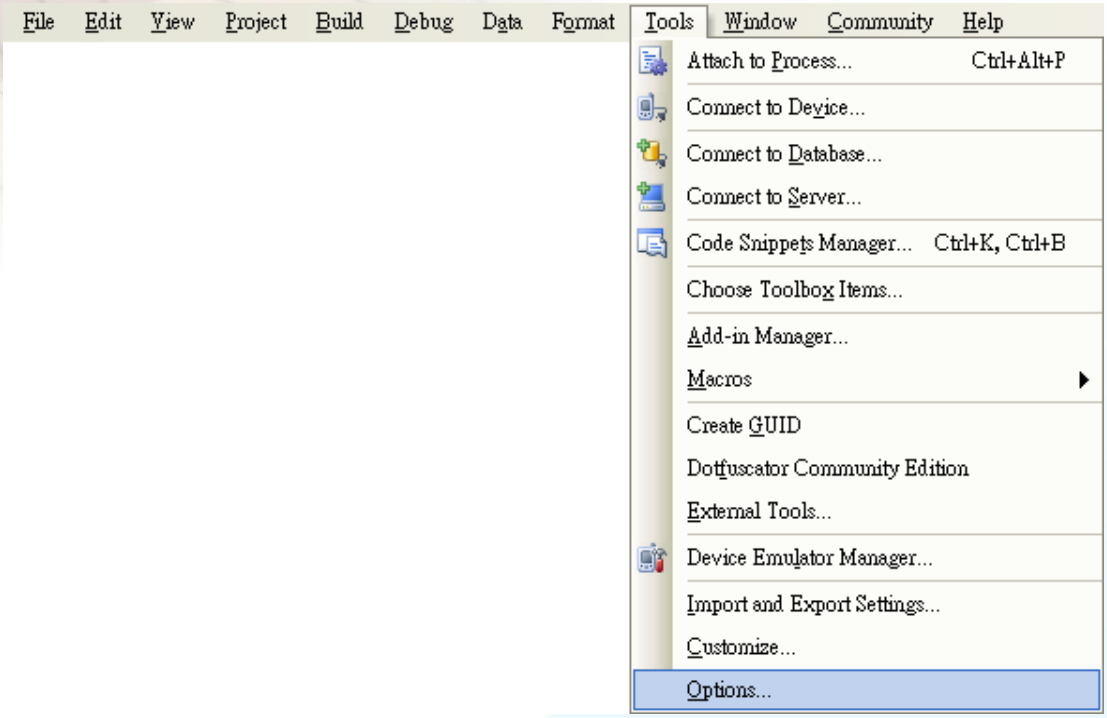
Step 1: Make sure the following file are listed with the matching version numbers

Path	File
C:\Program Files\Common Files\Microsoft Shared\CoreCon\1.0\Bin	1. ActiveSyncBootstrap.dll 2. ConMan2.dll 3. ConManPS.dll 4. DesktopDMA.dll 5. eDbgTL.dll 6. TcpConnectionC.dll
C:\Program Files\Common Files\Microsoft Shared\CoreCon\1.0\Bin\1033	conmanui.dll
C:\Program Files\Common Files\Microsoft Shared\CoreCon\1.0\Target\wce400\X86	1. Device Agent Transport.dll 2. eDbgTL.dll 3. TcpConnectionA.dll 4. clientshutdown.exe 5. CMAccept.exe 6. ConmanClient2.exe

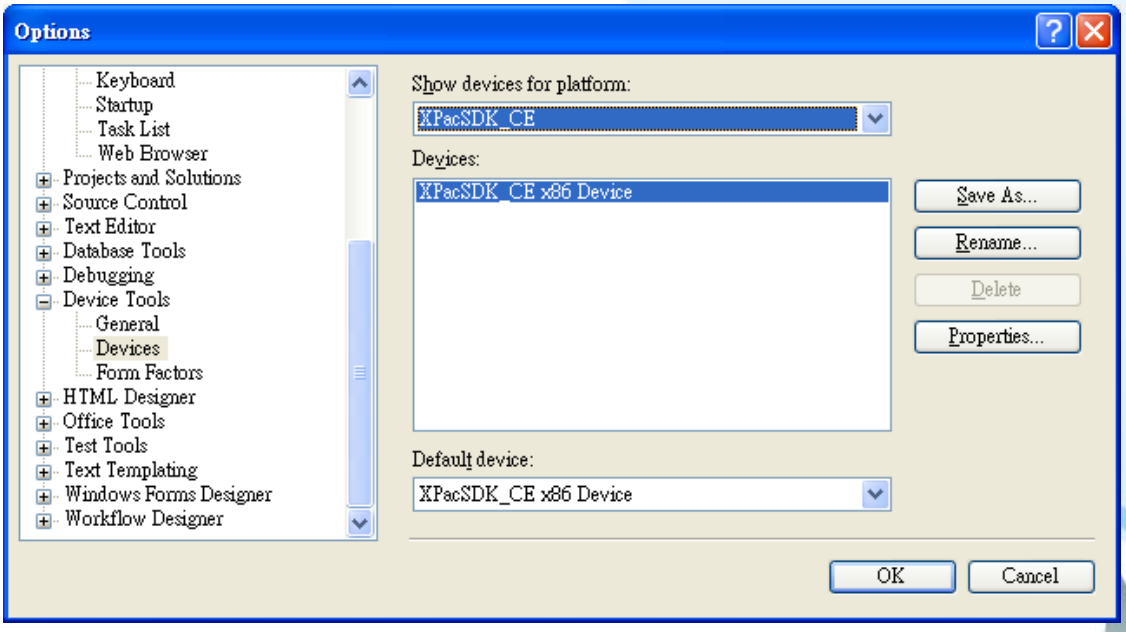
Step 2: If the version matches correctly and the entire file are there, copy the following files to XP-8000-CE6 :\ System_Disk\ICPDAS\System folder

- Clientshutdown.exe
- ConmanClient2.exe
- CMaccept.exe
- eDbgTL.dll
- TcpConnectionA.dll

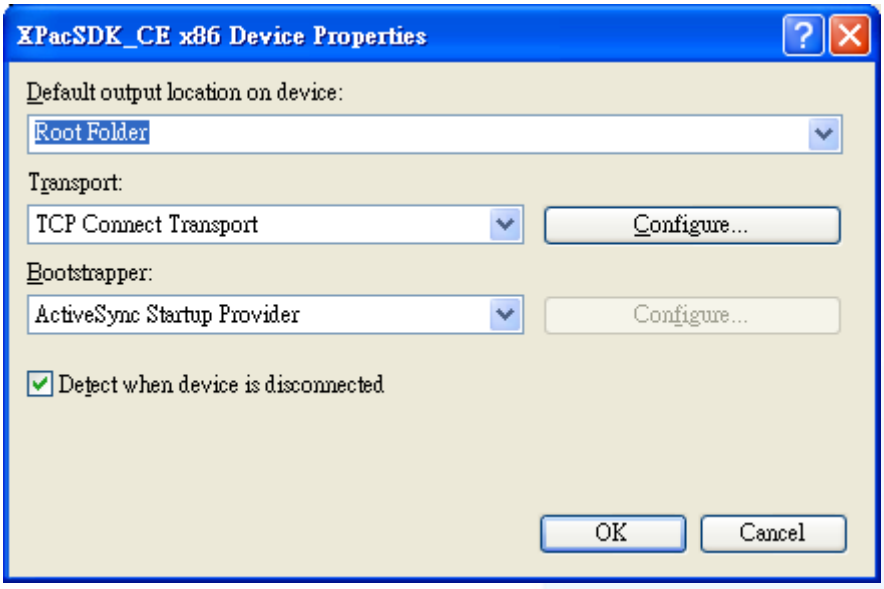
Step 3: **On the "Tools" menu, click "Options…" command**



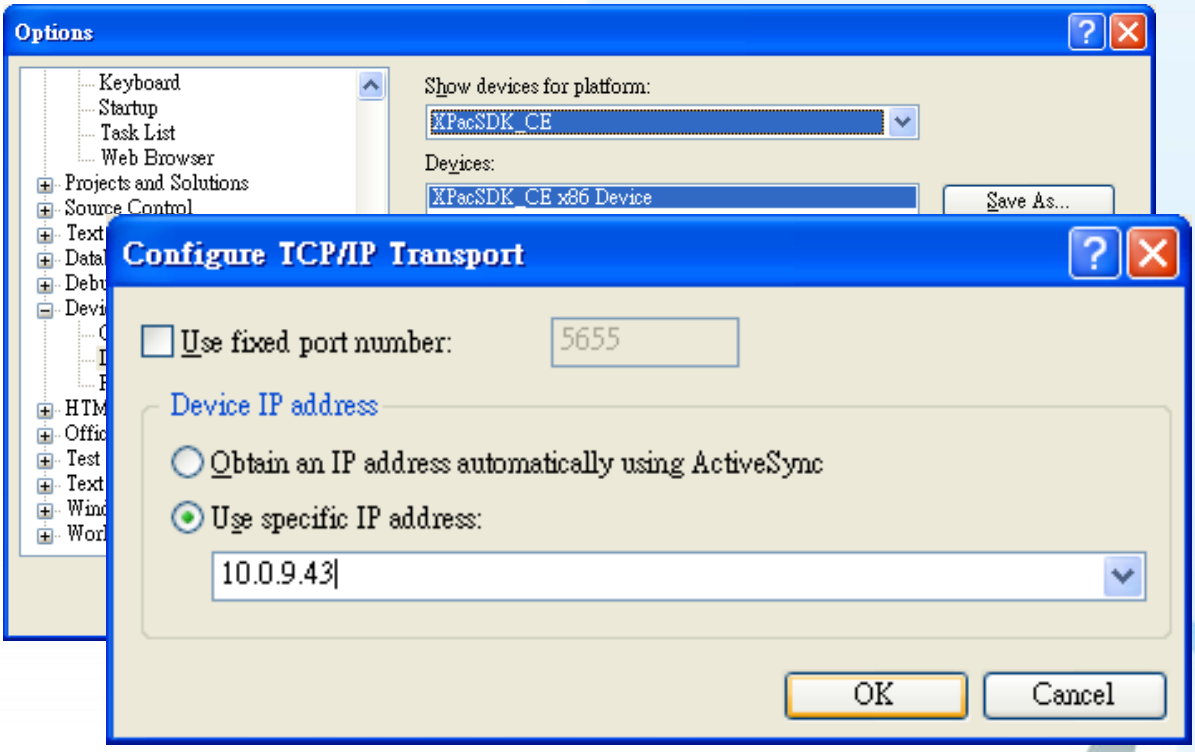
Step 4: **On the "Options" dialog, select "XPacSDK_CE" from the "Show devices platform" list, and then click the "Properties…" button**



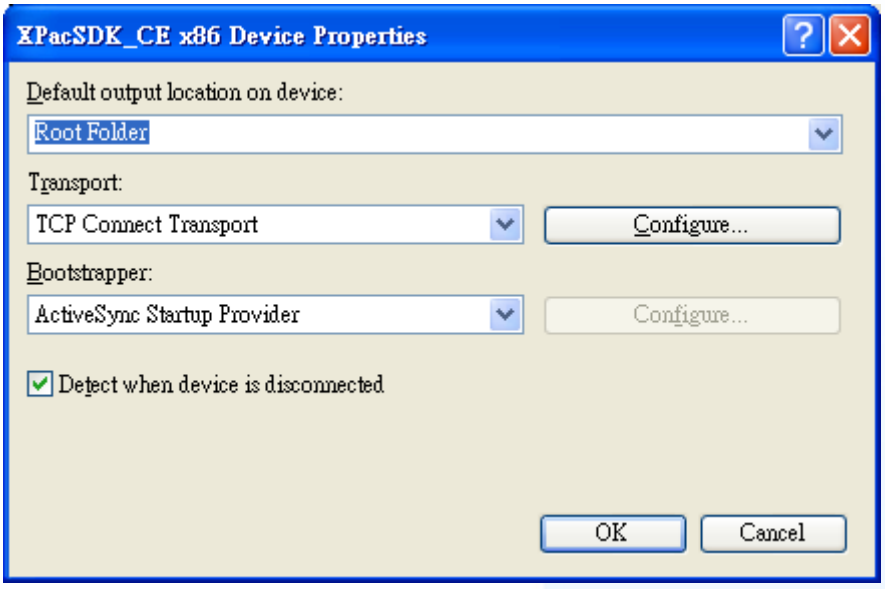
Step 5: **On the "XPacSDK_CE x86 Device Properties" dialog, click the "Configure..." button**



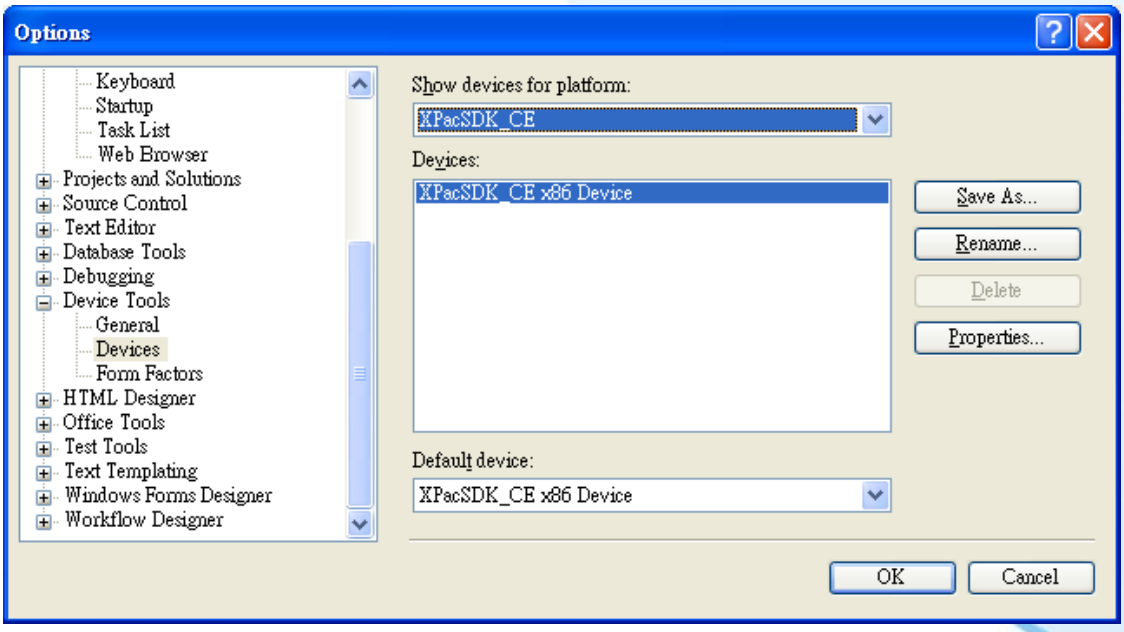
Step 6: **On the "Configure TCP/IP Transport" dialog, select the "Use specific IP address" option and type the IP address of XP-8X4X-CE6, and then click the "OK" button**



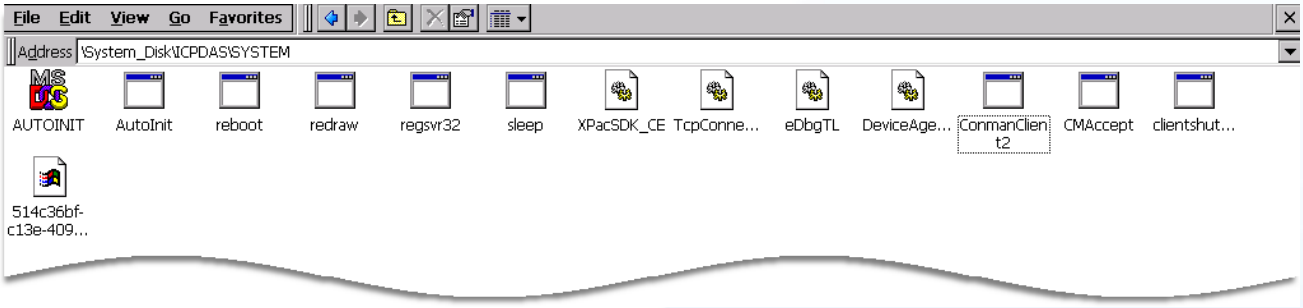
Step 7: On the "XPacSDK_CE x86 Device Properties" dialog, click the "OK" button



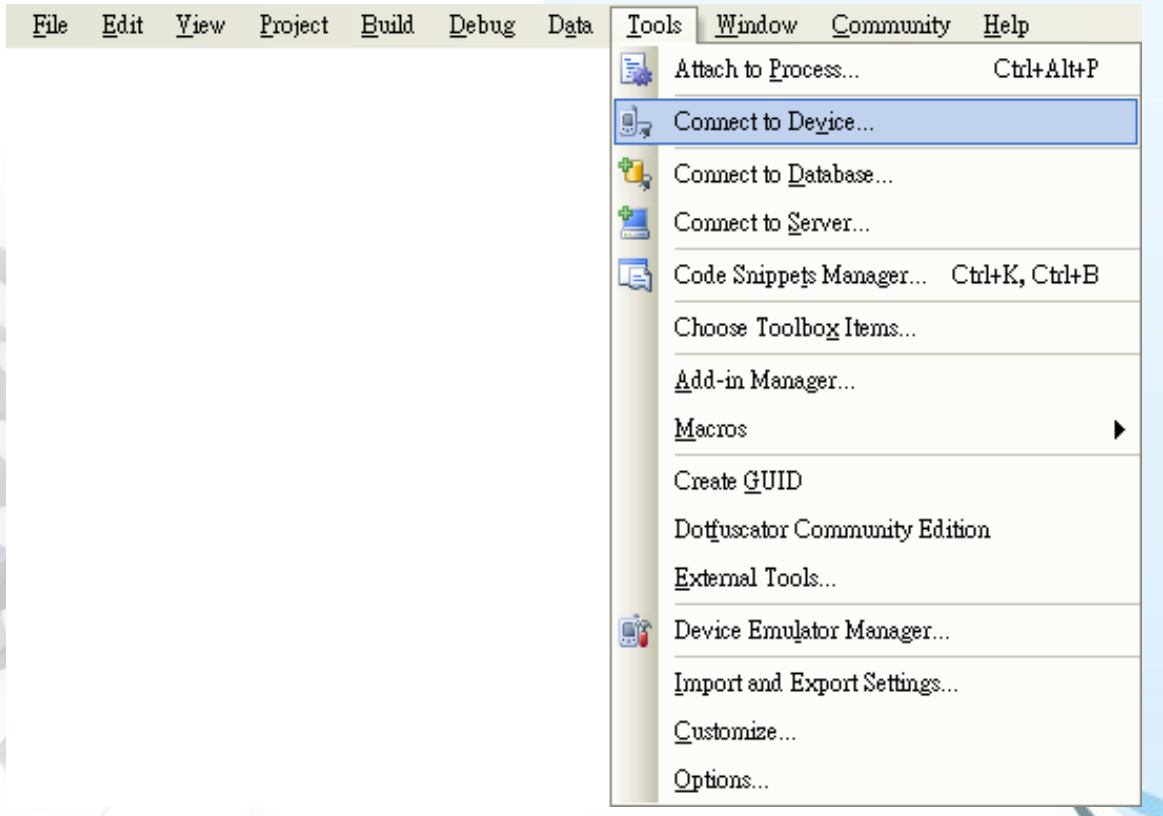
Step 8: On the "Options" dialog, click the "OK" button



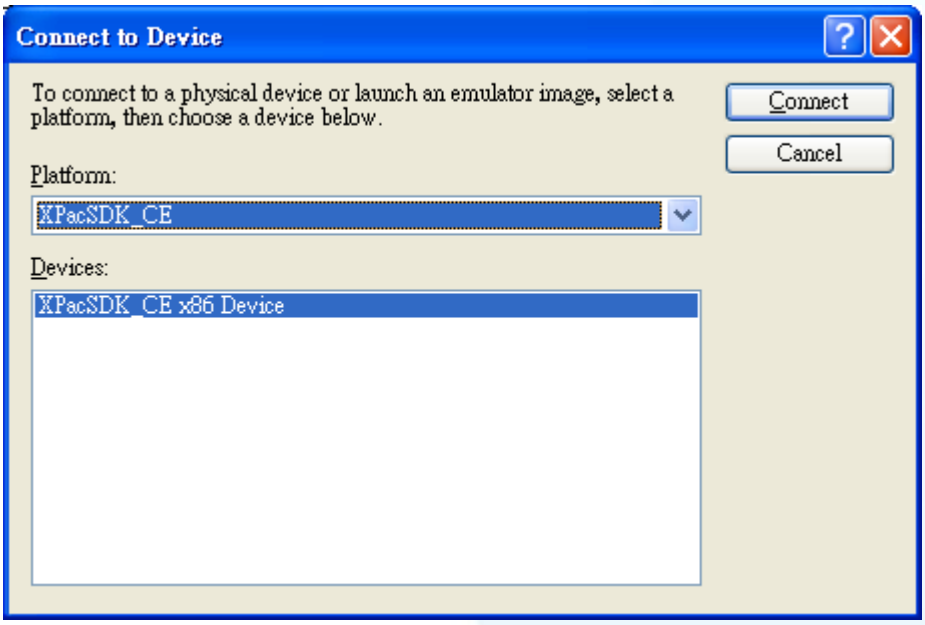
Step 9: **On the XP-8000-CE6 controller side, run the "ConmanClient2" and the "CMAccept.exe" applications which is located at: \System_Disk\ICPDAS\System**



Step 10: **On the "Tools" menu, click "Connect to Device..." command**



Step 11: **On the "Connect to Device" dialog, select "XPacSDK_CE" from "Platform" list and then click the "Connect" button**



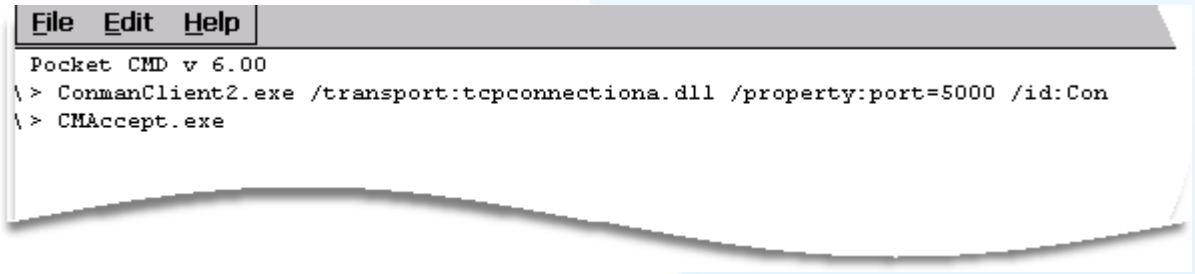
Step 12: **On the "Tools" menu, click "Connect to Device..." command**

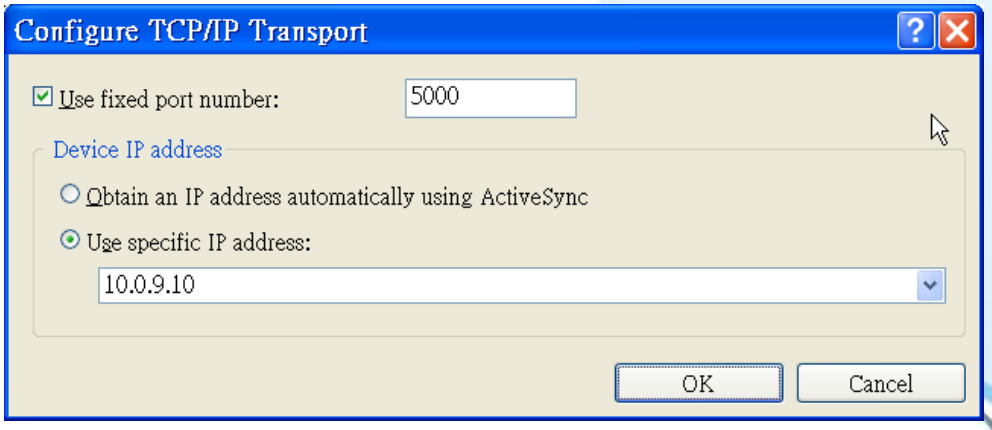
Step 13: **Connection established. Then you can debug on line.**

FAQ:

If the connection fails shown as follow, return to step 11 to do the action below

Open the command prompt, run the "ConmanClient2.exe/transport:tcpconnectiona.dll/property:port=5000/id:Con" at: \System_Disk\ICPDAS\System, and then run the "CMAccept.exe"





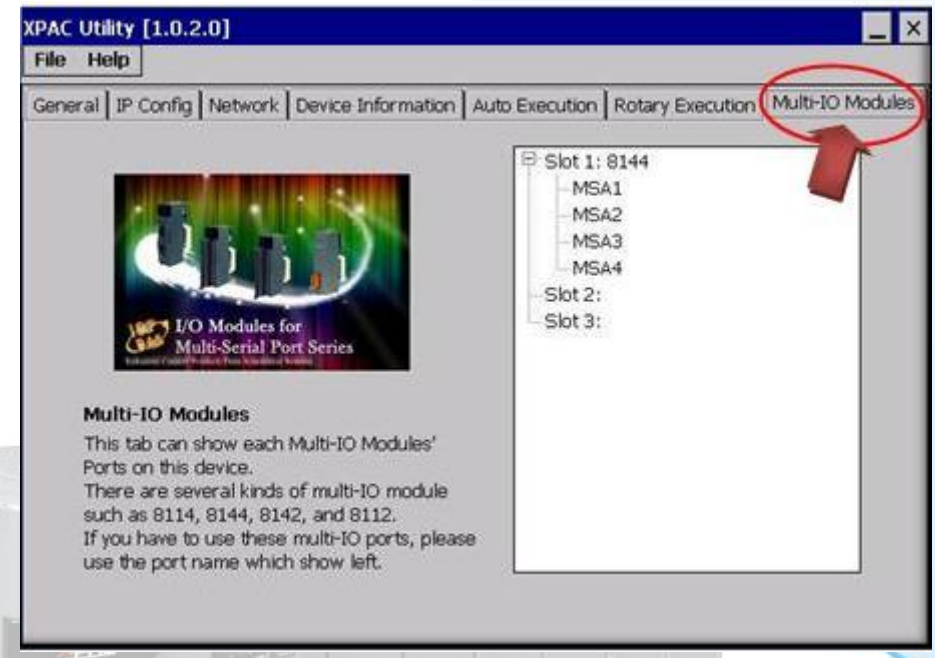
C.4. How To use Multi-IO Modules

The multi-IO modules, including I-8114W, I-8112W, I-8144W, and I-8142W, make your device have expansion COM ports. The section will describe how to use these kind modules.

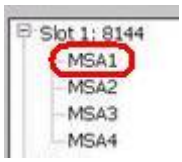
Step 1: Plug the IO Modules into XP-8000-CE6

Step 2: Open XPAC_Utility to check the ports' names of modules

Step 3: Open Multi-IO Modules Tab



Step 4: Now you can use the IO ports on your program.



➔ **Opening 8144 in Slot 1**

Code Snippets:

```
{
    BOOL ret;
    HANDLE hOpen;
    char buf[4096];

    hOpen = uart_Open("MSA1");
    ret = uart_SendCmd(hOpen,"$01M", buf);
    uart_Close(hPort);
}
```

For more information about expansion RS-232/RS-422/RS-485 communication module that are compatible with the XP-8000-CE6, please refer to http://www.icpdas.com/products/Remote_IO/i-8ke/selection_rs232_i8k.htm