1.1 Hardware System Diagram

APAX-5071 coupler with APAX-5000 I/O modules will be controlled by any PROFINET master. Here, we use Siemens S7-300 PLC as example. The complete system includes APAX series, S7-300 PLC and a PC used to configure the setting of S7-300 PLC. The system hardware architecture can be shown as figure below.



Note!!

1. Do not use hub between the Ethernet/IP master and APAX-5072. Only Ethernet switch is acceptable.

2. Quality of the network will influence the Ethernet/IP communication performance, so make the network as simple as possible.

1.2 Installing the ADAM/APAX .NET Utility

Advantech provides the ADAM/APAX .NET utility which allows developers and end users to see APAX-5071 and connected I/O modules, perform configurations, and simple testing of the I/O. This software can be helpful when checking wiring inputs prior to installing the runtime project. It is also able to detect and test other Advantech supported hardware for this product such as Ethernet or Serial I/O. (ADAM-4000, ADAM-5000 ADAM-6000 series). Therefore, and vou need to install ADAM/APAX .NET utility first to configure APAX-5071 and related APAX-5000 I/O modules. After that, you can use other software package which supports PROFINET protocol (such as Siemens S7-300 series) to perform write or read action to APAX-5072. The installation file is contained in the CD. When you launch the CD,

select the APAX Software button and click the ADAM/APAX .NET Utility button to find the installation file. Besides, you can link to the web site *http://www.advantech.com* and click into the **Download** area under the Support site to get the latest version of the ADAM/ APAX .NET utility.

1.3 Configuring APAX-5071 with ADAM/APAX .NET

Launch ADAM/APAX .NET utility by selecting Start >> All Programs >> Advantech Automation >> AdamApax .NET Utility >> AdamApax .NET Utility. On the left side of the utility window, you can see several items showing IP address under the Ethernet item. (These items represent the Ethernet port on your computer). Click on the item standing for the IP address of the LAN port which you use it to connect with APAX-5071 module, and then click the icon **Search Modules** on the toolbar. (Or you can right click the item and select **Search** option.) Then you should be able to see a new item appearing, showing the APAX-5071 IP address. Click that item (showing APAX-5071 IP address). All the connected APAX-5000 I/O modules will show, as figure below.

🔀 Advantech Adam/Apax .NET Utility (Win32) Version 2.02.12				
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 Serial COM1 COM2 COM3 Ethemet 172.18.3.52 192.168.0.200 10.0.0.200 APAX-5046 (S0) APAX-5017H (S1) APAX-5028 (S2) APAX-5080 (S3) 20.0.0.200 Others COM1 COM2 COM3 Favorites group Wireless Sensor Networks Serial COM1 COM2 COM3 Ethermet 172.18.3.52 192.168.0.200 10.0.0.200 20.0.200 Others 	Information Setting APAX-5071 Firmware Firmware Firmware Firmware Version A1.01 Download -FPGA Firmware Version A1.01 Download Firmware Version A1.01 Download Exceed Pewice Name Device Apply Description Profinet coupler Apply Description Support Modules Apply Switch ID Module Description Module 1 S017H 12-CH High Speed Analog Input Module The second secon			

Note! Before you start search the APAX-5071 module in utility, remember to change that APAX-5072 module's mode to <u>Utility mode</u>.



On the right window, you can perform all related configurations toward APAX-5071 through the three tabs: **Information**, and **Setting**. You can upgrade related firmware to selected APAX-5071 coupler on the **Information** tab. Click the I/O modules items, then you can configure or read/write specific I/O modules.

1.4 Configure & Access Data in PROFINET Master

Here, Siemens S7-300 CPU 315-2 PN/DP PLC is used as PROFINET master, to connect with APAX-5071 and APAX-5000 I/O modules. So we need to use Siemens STEP 7 software to configure the connection between S7-300 PLC and APAX-5071. First, launch Siemens STEP 7 software, create a new project as figure below.

New Project			
User projects Libraries Multiprojects Name Storage path TEST C:/Program Files/Siemens/Step7%7proj/Test test1 C:/Program Files/Siemens/Step7%7proj/test1			
Add to current multiproject	<u>Т</u> уре:		
Demo			
Storage location C.Program Files\Siemens\Step7\s7proj	E Library		
OK Ca	uncel Help		

Note: *Remember to change that APAX-5072 module's mode to <u>PROFINET mode</u> for PROFINET connection.*

Right Click the project item and select **Insert New Object >> SIMATIC 300 Series** to create the object representing the Siemens S7-300 PLC.



Double click the **Hardware** item on the right window. One new **HW Config** window will pop-up. Select **Install GSD File** on the **Options** menu to import GSDML file offered by Advantech, importing APAX-5071 and I/O modules' configuration into STEP 7 software.



Click the **Browser** button and choose the GSDML file in your computer. After that file is shown on the window, click the **Close** button.

Install GSD Files			
I <u>n</u> stall GSD Files:	from the directory		
C:1			<u>B</u> rowse
File GSDML-V2.1-Advantech-APAX5071-20	Release	Version v2.1	Languages English
Install Show Log	Select <u>All</u> Deselect All		
Close			Help

You can see APAX-5071 and APAX-5000 I/O modules showing on the right side window now, as shown by figure below.

2 HW Condig - SIMATIC 300(1)				E 6 🗙
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You can drag the component you want to the left window for programming usage. First, a PROFINET bus needs to be established. Then, APAX-5071 component needs to be dragged to attach on the PROFINET bus on the upper left window. After that, APAX-5000 I/O components can be dragged to selected "slot" raw on the lower left window.

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2 APAX-5017H	256279				_
3 APAX-5028		256271			
4 APAX-5080					
5	842	37			=
	842	37			
6	842	37			
6 7	842	37			
6 7 8	842	37			
6 7 8 9	842	37			
6	842	37			
6	842	37			
6 6 7 7 8 9 9 0 10 1 11 1 12 0	842	37			
6 7 7 8 9 10 10 11 12 13	842	37		Image:	

When you complete your program, you need to configure networking setting for APAX-5071. Select **Ethernet >> Edit Ethernet Node** on the **PLC** menu.

Station Edit Insert	<u>PLC View Options Window Help</u> Download Ci Upload	ti+L
(0) UR	Download Module Identifi <u>c</u> ation Upload Module Ide <u>n</u> tification to PG <u>F</u> aulty Modules	
2 CPU XI MPI X2 PN-J X2 PI Port 3 4 A04 5 DII6	Module Information Ci Operating Mode Ci Clear/Reset Ci Set Time of Day Monitor/Modify Update Firmware Ci	trl+D trl+I thermet(1): PROFINET-IO-System (100)
7	Save De <u>v</u> ice Name to Memory Card Ethemet	▶ Edit Ethernet Node
	<u>P</u> ROFIBUS Save Service Data	▶ Verify Device Name Assign Device Name

A **Edit Ethernet Node** window will pop-up. Ethernet node means APAX-5071 coupler module. You can type the correct MAC address into the MAC address text box or select it by clicking the **Browser** button. You also need to type the correct IP address of APAX-5071 on the **IP address** text box in the **Set IP configuration** area. After the configuration is done, click the **Close** button.

lit Ethernet Node		
Ethernet node		
		Nodes accessible online
MAC <u>a</u> ddress:	00-D0-C9-01-50-71	Browse
-Set IP configuration -		
⊙ Use I <u>P</u> parameter	s	
IP address:	192.168.0.2	Gateway © Do not use router
Subnet mas <u>k</u> :	255.255.255.0	⊂ <u>U</u> se router
		Addr <u>e</u> ss: 192.168.0.3
Client ID:		
Client ID:		
Assign IP Config	uration	
-Assign device name -		
<u>D</u> evice name:	apax-profinet-device	Assign Name
- Reset to factory settin		
110301 10 100101 9 30111	e.	Reset

After the configuration is done, you can download your program to the Siemens S7-300 PLC by selecting **Download** item on the **PLC** menu. If all configurations are correct, you should be able to see the NETWORK LED on APAX-5071 flash with green color, and it means the AR connection is built.

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Station Edit Insert	<u>PLC View Options Window Help</u>
🗅 🗃 🔓 🗳	Download Ctrl+L Upload
	Download Module Identification Upload Module Ide <u>n</u> tification to PG Faulty Modules
1 189 2 CPU XI MPI X2 PN-1 X2 PI Port 3 4	Module Information Ctrl+D Operating Mode Ctrl+I themet(1): PROFINET-IO-System (100) Clear/Reset Set Time of Day Monitor/Modify
5 DI16 6 7	Update Firmware Save Device Name to Memory Card
	Ethernet
	PROFIBUS •

Appendix: Error Handling and Diagnostics

There are four LED for diagnostics on the front panel of APAX-5071. Below are the meanings for the 4 LEDs.

LED	Color	Status	Definition
PWR	Green	Stable	APAX-5071 is power-on.
	Dark	-	APAX-5071 is power-off or broken.
DUN	Green	Flash	Utility mode
RUN	Orange	Flash	PROFINET mode
NETWORK	Green	Flash	AR connection is okay.
	Orange	Flash	AR connection is not ready.
I/O	Green	Stable	APAX I/O modules are normal.
	Orange	Stable	I/O Error
	Dark	-	No I/O are detected