Using DAQ Cards in Windows XP Embedded

This paper introduces how to add ICP DAS I/O card drivers into Microsoft Windows XP Embedded (XPe) system, and then the I/O cards can work with XPe.

Driver Installation In A Single Machine

First method, as standard Windows XP system, we can run ICP DAS I/O card driver setup program directly in the system after the Windows XP Embedded device boots up successfully. The ICP DAS I/O card drivers for Windows 2000 are fully compatiable to Windows XP and Windows XP Embedded (XPe) systems.

Driver Installation In Multiple Machines

Second method is to make a driver component and add it into Windows XP Embedded, then we can create an OS image including this driver component. This is good for mass system creation. Next are the procedures of making a driver component.

- 1. Run setup program to install I/O card driver. Reboot the system and test the card with driver to see if it works well. This ensures the driver you are going to make into a component is correct.
- 2. Launch the "Microsoft Component Designer" program. Click the "File / Import... " menu item to import the INF setup information file.



3. The "Choose File for Import" dialog box pops up. Change directory to the driver installed folder(i.e: C:\DAQPro\PIO-DIO_Win2K\Driver), change "File Type(T)" to "Setup Information Files (*.inf)", and select the required setup information file(i.e: PIODIO.inf), then click "Open(O)". 4. In the "INF Processing Options" dialog box, select "Automatic" then click "OK".

Parsing Options	
Automatic <u>C</u> ustom	
Section Name 🔺	Туре
	<u>A</u> aa <u>Delete</u>
	OK Cancel

5. In the "Import File" dialog box, click "Start".

<u>F</u> ile:	C:\DAQPro\PIO-DIO_Win2K\Driver\PIODIO.INF
<u>L</u> og file:	
<u>S</u> tatus:	Click start to import file.
🖓 Ready f	o start import session
	Start Close Help
	<u>Start</u> <u>C</u> lose <u>H</u> elp

5. After imp	port operat	tion finished, click " <mark>Close</mark> ".	
	Import I	File	
	<u>P</u> latform:	Windows XP Embedded Client (x86)	
	<u>F</u> ile:	C:\DAQPro\PIO-DIO_Win2K\Driver\PIODIO.INF	
	<u>L</u> og file:		
	<u>S</u> tatus:	Completed processing file [Import succeeded]	
	Creating Creating	g: PIO-D64/D48 Digital I/O Card x: PIO-D24/D56 Digital I/O Card	
	Creating	g: PIO-DIO Series Digital I/O Card tod executive file Functional and the CADA OB-1910 DIO Win	OPUDation
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8. Give a new name in the "Name" field(i.e: PIO-DIO Series DI/DO Cards Repository). Select the file folder in the "Source Path" field(i.e: .\Driver). Note: It's recommended to copy required files to the same folder of sld (component) file.

🗉 🚞 PIODIO.sld	- Repository pror	perties			
Gomponents	<u>N</u> ame:	PIO-DIO Series DI/DO Cards Repository			
PIO-D168 Digital I/O C:	Version:	1.0	Bevision:	- -	
🖬 🏐 PIO-D144 Digital I/O C:	Dwners:		Authors:		
PIO-D96 Digital I/O Ca	Vendor:		Copuriabt		
PIO-D24/D56 Digital I/	Date created:	2006/10/30下午 05:58:14	Data revised:	2006/10/31 下午 06:10:01	
DIO-DIO Series Dighal					
	Description:				
Croup Memberships					~
Dependencies					
Packages Repository Sets	Platface	Windows XP Embedded Client (x86)			Platforms
,	Source <u>P</u> ath:	.\Driver			Browse
	B <u>u</u> ild type	Helease 🛛	1		

9. Right-click on the "Packages" item and click "Add Package".

 PIODIO.sld
 Windows XP Embedded Clien
 Components
 PIO-D168 Digital I/O Ca
 PIO-D144 Digital I/O Ca
 PIO-D96 Digital I/O Ca
 PIO-D64/D48 Digital I/(PIO-D24/D56 Digital I/(PIO-D10 Series Digital I/ Pependencies

Add Package

10.Give a new name in the "Name" field(i.e: PIO-DIO Series DI/DO Cards Package).

🖻 Packages

🚞 Repo



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11.Select the first " Repositories "	component (i.e: PIO-D168 Digital I/O ('.	Card) and then click
 PIODIO.sld* Windows XP Embedded Clier Components PIO-D168 Digital I/O C PIO-D96 Digital I/O C PIO-D96 Digital I/O C PIO-D4/D48 Digital I/O PIO-D64/D48 Digital I/O PIO-D10 Series Digital Repositories PIO-DIO Series DI/DO Group Memberships Dependencies Packages Repository Sets 	Component Properties Name: PIO-D168 Digital I/O Card Versign: 2.0.7.0 Revisi Gary-Lin Autho Yendor: ICPDAS Co. LTD Copyri Date created: 2006/10/30 下午 05:53:51 Date r Description: PIO-D168 Digital I/O Card PIO-D168 Digital I/O Card Plation: Windows XP Embedded Client (x86) PIO-D10 Series DI/D0 Cards Repository Prototype: Component help: Component help:	on: 1 s: Gary-Lin ght: ICPDAS Co. LTD(c)2006 evised: 2006/10/30下午 06:05:26 Platforms Platforms Platforms Platforms
12.Select the reposit and then click "(Select Rep Use the reposit Name (Do not use GY2 Display FIO-DIO Ser Nealek HTL Windows XF Windows XF	tory we just created(i.e: PIO-DIO Ser OK". ository ory or repository set selected in the list below Type a repository or repository set) Popository (Version 1.0,R1) es DI/DO Cards Repository (Version 1.0,R1) Embedded Client (x86) (Version 5.1.2600.1106,R1507) Embedded Client (x86) Service Pack 1 (Version 5.1.2600.1106,R Embedded Client EEF (x86) (Version 5.1.2600.1106,R Embedded Client Main (x86) (Version 5.1.2600.1106,R	ies DI/DO Cards Repository),
Description:	OK Cancel	
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13. Expand the component and select "Files" item. We can see files (i.e: PIODIO. INF and PIO.sys) that imported from INF file(step 2 ~6). Right-click mouse button and click "Files / Add / File" to add other required files.

🖃 🗀 PIODIO.sld*	Name 🔺	Path
😑 🗀 Windows XP Embedded Clien	📄 PIO.sys	%10%\System32\Drivers
🖨 🗁 Components	DIODIO.INF	%17%
🖨 🍣 PIO-D166 Digital I/O Ci		
Group Memberships		
Filmen Fi		
Re Add Fil	le 💦	
Co M	ultiple Files 🗟 🚽	
Bi <u>Fi</u>	les in Folder	
Resources		
🖻 🍪 PIO-D144 Digital 1/0 Ca		
🖶 🙈 PIO-D96 Digital I/O Ca		
$= \bigcirc DIO DGA/DAO Distal 1/$		
🖬 🥣 PIO-D64/D48 Digital I/(
🗊 🌍 PIO-D24/D56 Digital I/(
😐 🎯 PIO-DIO Series Digital 1		

Note: PIO.SYS is a PnP (Plug&Play) driver. It comes with the PIODIO.INF file when importing. And we have to add I/O driver (Napwnt.sys) and DLL file manually.

14.In the "Add Component File Resources" dialog box, add "Napwnt.sys" to the "Target name:" field and set "%12%" to the "Destination:" field (equal to Windows\System32\drivers folder). Finally, click "OK" to finish the setting.

image. Unange	the source name if it differs from the target name.	
<u>T</u> arget name:	Napwnt.sys	Bro <u>w</u> se
Des <u>c</u> ription:		
<u>S</u> ource name:		
	Folder only	
Destination:	%12%	
Effective path:	C:\WINDOWS\system32\drivers\Napwnt.sys	
Applicable build t	ypes V Belease V Debug	
		<u>A</u> dvanced
	OK Cancel Add	Help



15.Following previous step 13 ~ 14 to add other rquired DLL file(i.e.: PIODIO.DLL), and set it destination to "%11%"(equal to Windows\System32 folder).

🖃 🗀 PIODIO.sld*	Name 🔺	Path
🖕 🗀 Windows XP Embedded Clien	📄 PIO.sys	%10%\System32\Drivers
🖨 🗀 Components	📄 PIODIO.INF	%17%
😑 🇠 PIO-D168 Digital I/O Ci	📄 Napwnt.sys	%12%
🖓 🖓 🖓 🖓 🖓 🖓 🖓 🖓 🖓	📄 PIODIO.dll	%11%
Files		
🔠 Registry Data		
- 🦓 Component or Group		
- 🦓 Build Order Depende		
Resources		
	l	

16.Right-click on "**Registry Data**" and then select "Add / Registry Branch" to add Napwnt.sys registry.(Note: PnP driver registration is no required.)



17.In "Add Component Registry Branch" dialog box, click "HKEY_LOCAL_MACHINE", and then select "SYSTEM\CurrentControlSet\Services\Napwnt" item. Finally click "OK".

Name:	EY_LOCAL_MACHINE\S	YSTEM\CurrentControlSe	et\Services\Napwnt
	🗄 💼 mssmbios	;	~
	🛓 🛅 MSSQLS	ERVER	_
	🖮 🚞 MSSQLS	erverADHelper	
	🗄 🛅 msvsmon	80	
	😟 🚞 ms_mpu4	01	
	🖻 🧰 Mup		
	🕀 🚞 NaiAvFilt	er1	
	🗈 🔽 NaiAvi di		
	- 🔁 Napwrit		
		43	
	🗄 🔚 Noistapi		
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	ia (⊡ NetBIOS		
	🖬 🦲 NetBT		
	i → Contractor NetDDE		
	🗄 🧰 NetDDEc	dsdm	
	📥 🦳 Netlogon		×
	build types		
	Release	🔽 Debug	
		OK Cancel	Help



22.In the "Add Component Group Memberships" dialog box, select the package we just created(i.e: PIO-DIO Series DI/DO Cards Package), and then click "OK".

E	Categories			^
	Dependencies Packages			
	Class Installer Con CompactPCL bot s	nponents [Version 5.1.2 wap support Mersion 5	2600.1106,R1507]	
	File System Comp	onents [Version 5.1.260	0.1106,R1507]	=
	SX3 Display Pack	age Mersion 1 0 B21 I/D0 Cards Package N	/ersion 1.0.R21	
		VOICX Family Fast Ethe	anet NIC (Version 1.0,D	2]
	STM Qfe [Version] Windows Embedd	i 1.0,R2] Jed Test Kit [Version 5.1	1.2600.1106,R1507]	
	Windows NT 4.01	Embedded legacy capa	ability components [Versi	ion 5.1.26(
	Windows NT 4.01 Windows NT 4.01	Embedded legacy com Embedded standard leo	ponents [Version 5.1.26 jacy components [Versi	00.1106,R on 5.1.260
	蘂 Windows XP Emb	edded Client (x86) Serv	vice Pack 1 Package [V	ersion 5.1. 🗸
<		III		>
Descrip	tion:			~
				~
Findt				Find Next
<u>F</u> ind:				Find <u>N</u> ext
<u>F</u> ind:		TK Cancel		Find <u>N</u> ext

Registry data informations **for each component**. (Note: You can use "Copy" and "Paste" to simplify the operations for adding "Files" and "Registry data" items.

24.Click the "File / Save" menu item to save this component information.

25.Click the "Tools / Component Database Manager" menu item.

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26.In the "Database" tab page, click "Import".			
Microsoft Component Database Manager	×		
Database Fatform Package Component Repository Group			
Database connection			
Target Designer and Component Designer must connect to a component database server to function connectly.			
Database server location:	_		
GARY-P4			
C <u>h</u> ange			
_ Import			
Import an SLD file into the component database.			
Import			
27.In the "Import SLD" dialog box, select the component informatio	n file (SLD fi	le,
repository files to repository root" item and then click "Impor	heck the t".	"С <u>о</u> ру	
School SLD			
SLD file: E-XPE/PII30/PIODIO sld			
<u>Repository toot.</u>	μ		
WGARY-P4\Repositories\			
Regults:			
Copy repository files to repository root			
Import Close Help			
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28.Wait for the import operation complete, and then click "Close".

SLD file:	_
E-XPEAPIBODAPIODIO.sld	
Repository zoot:	
\\GARY-P4\Repositories\	-
Regults:	
25% Importing 'PIO-DIO Series DI/DO Cards Package' Group 38% Importing 'PIO-D168 Digital I/O Card' Component 50% Importing 'PIO-D144 Digital I/O Card' Component 62% Importing 'PIO-D96 Digital I/O Card' Component 75% Importing 'PIO-D64/D48 Digital I/O Card' Component 88% Importing 'PIO-D64/D48 Digital I/O Card' Component 100% Importing 'PIO-D10 Series Digital I/O Card' Component Import Succeeded Changes to the database have been committed File(s) Processed : 1, File(s) Succeeded : 1	<
	>
Copy repository files to repository root	
Import Close	Help

29.Click "Close" to exit "Component Database Manager".

30.Click "File / Exit" to exit "Component Designer".

31.Run "Target Designer" program and load your project.

32.In "Components" list, right-click mouse boutton on the required component(i.e: PIO-D144 Digital I/O Card) and click "Add".

Microsoft Target Designer - PII300B2K.slx *				
<u>File Edit View Configuration Tools Help</u>				
[*] 2				
Filter: All Components	PII300B2K.slx *	Name:		
Search:	🛛 🤕 Components	Versio		
9963 components	Accessibility Core [Version 5.1.260	Ownei		
- 🌍 Linkup Systems USB Sync	🔄 💿 🌍 Active Directory Service Interface (Vendo		
PIO-D144 Digital I/O Card PIO-D168 Digital I/O Card	Add Active Directory Service Interface (Service Interface (Library (ATL) [Vc	Create		
PIO-D100 Digital 1/0 C PIO-D24/D56 Digital 1/0 C PIO-D64/D48 Digital 1/0 C	Copy Ctrl+C ontrol Panel [Vers: grams Control Par	Descri		
PIO-D96 Digital I/O Card	Estimate Footprint upport Tools [Vers			
Portatec USB Sync	Properties Alt+Enter patibility Core [Ve	Build ț		
	Component Help AN [Version 5.1.2			
Sony Memory Stick controller	er Audio Codecs [Version 5.1.2600,R Audio Volume Control [Version 5. Base Performance Counters [Versic Base Support Binaries [Version 5.1 CD DOM Drive [Version 5.1			
deviceo(n)	Certificate MMC Shap In [Version >	<		

33.Add other required components(i.e: PIO-D168 Digital I/O Card, PIO-D24/D56 Digital I/O Card, PIO-D64/D48 Digital I/O Card, PIO-D96 Digital I/O Card and PIO-DIO Series Digital I/O Card) by following above step 32.

- 🎯 Microsoft USB Sync	💼 🎯 Phone and Modem Control Panel 🚺	Versi
- 🄄 PIO-D144 Digital I/O Card	🗉 🧠 PIO-D144 Digital I/O Card [Version	Revis
- 🄄 PIO-D168 Digital I/O Card	😥 🚳 PIO-D168 Digital I/O Card [Versio]	
- 🌍 PIO-D24/D56 Digital I/O Card	🔠 🌍 PIO-D24/D56 Digital I/O Card [Vei	Pack
- 🌍 PIO-D64/D48 Digital I/O Card	🙃 🧠 PIO-D64/D48 Digital I/O Card [Vei	
- 🎯 PIO-D96 Digital I/O Card	🙃 🚳 PIO-D96 Digital I/O Card [Version	Categ
- 🎯 PIO-DIO Series Digital I/O Cai	🗊 🛞 PIO-DIO Series Digital I/O Card [V	
- Voltatec USB Sync	😨 🧐 Plug and Play Software Device Enu) (inibi

34.Click the "File / Save" menu item to save this configuration.
35.Click the "Configuration / Check Dependencies" menu item to check configuration.
36.Click the "Configuration / Build Target Image..." menu item to build OS image.

Writer: Gary Lin (2006/11)