ViewPAC

(WinCE-Based)

User Manual

Version 1.0.11, September 2013

Service and usage information for

VP-23W1 VP-25W1 VP-4131

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Table of Contents

Table of Contents 3

1. Introduction 7

1.1. Features 8
1.2. Specifications 10
1.3. Overview 12
1.4. Dimensions 20
1.5. Companion CD 23

2. Getting Started 24

2.1. Mounting the Hardware 24
2.1.1. Installation Instructions for VP-23W1/VP-25W1 25
2.1.2. Installation Instructions for VP-4131 35
2.2. Installing the Tools and Utilities 41
2.3. Configuring the Boot Mode 42
2.4. Changing the User Interface Language 46
2.5. Testing the ViewPAC 48
2.6. Using ViewPAC Utility to manage the ViewPAC 51
2.7. Using DCON Utility to Configure the I/O Modules 52
2.8. Using Backup Utility to Backup the settings and files 55
2.9. A caution about using System_Disk 57

3. Tools and Tasks 58

3.1. DCON Utility 61

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3.2. NAPOPC_CE5 62
3.3. SendToCOM 63
3.4. VCEP 64
3.5. ViewPAC Utility 65
3.5.1. Menu Bar 66
3.5.2. Property Tabs 71

4. Your First ViewPAC Program 84

4.1. Preparing the Development Tools 84
4.2. Installing ViewPAC Platform SDKs 85
4.3. Understanding the ViewPAC APIs 86
4.3.1. ViewPAC SDK Overview 87
4.3.2. ViewPAC SDK Reference 91
4.4. Your First Program in C# 93
4.4.1. Create a new project 94
4.4.2. Add project reference for an application 96
4.4.3. Design and Build an application program 97
4.4.4. Execute the application on the ViewPAC 101
4.5. Your First Program in VB.net 103
4.5.1. Create a new project 104
4.5.2. Add project reference for an application 106
4.5.3. Design and Build an application program 107
4.5.4. Execute the application on the ViewPAC 110
4.6. Your First Program in eMbedded Visual C++ 112
4.6.1. Create a new Forms-Based project 113
4.6.2. Configure compiler options 118
4.6.3. Specify the path for project reference 119
4.6.4. Design and Build an application program 123
4.6.5. Execute the application program on ViewPAC 128

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5. APIs and Demo References 129

5.1. Demo programs with C# 130

5.1.1. C# Demo program for WinPAC Standard API 130

5.1.2. C# Demo program for PAC IO API 132

5.1.3. C# Demo program for ViewPAC Particular API 135

5.2. Demo Programs with eMbedded Visual C++ 137

5.2.1. eVC Demo program for WinPAC Standard API 138

5.2.2. eVC Demo program for PAC IO API 140

5.2.3. eVC Demo program for ViewPAC Particular API 143

6. I/O Modules and SDK Selection 145

7. ViewPAC Updates 149

7.1. OS updates 150

7.1.1. Updating the Boot Loader and the ViewPAC OS image from files 153

7.1.2. Updating the ViewPAC OS image from eshell 160

7.2. SDKs Updates 166

7.2.1. WinPAC SDK updates for C# or VB.net 167

7.2.2. WinPAC SDK updates for eMbedded Visual C++ 168

8. ViewPAC Download Center 169

9. How to change the batteries 171

Appendix A. I-8K and I-87K Modules 173

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Appendix B. Application of RS-485 Network 174

B.1. Basic RS-485 Network 175
B.2. Daisy Chain RS-485 Network 176
B.3. Star Type RS-485 Network 177
B.4. Random RS-485 Network 179
B.5.1. ViewPAC as a Master (default) 181

Appendix C. Tips – How to 184

C.1. How to add a user account to remote login the ViewPAC from PC 185
C.2.1. How to add a user account 185
C.2.2. How to Use telnet to remote login the ViewPAC from PC 187
C.2.3. How to remove the user from the login list 189
C.2. How to online debug ViewPAC 191
C.2.1. Debug ViewPAC programs in EVC++ 191
C.2.2. Debug ViewPAC programs in Visual Studio 2005/2008 201
C.3. How to recompile WinCon programs 210
C.3.1. Compiler old programs which ran on Wincon 8x3x and 8x4x..... 211
C.3.2. Modify .vcp file to upgrade the old WinCon project 215
C.4. How to use the printer 216
C.4.1. How to use network printer 217
C.4.2. How to use printer via USB 219
C.5. How to use services tool 220

Appendix D. Revision History 223

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1. Introduction

ViewPAC combines WinPAC, graphic display and keypad in one unit. It is equipped with a PXA270 CPU (520 MHz) running Windows CE.NET 5.0 operating system, various connectivity (USB, Ethernet, RS-232/485), 3 slots to expand I/O modules, 3.5”/5.7”/10.4” TFT LCD and a rubber keypad.

Its operating system, Windows CE.NET 5.0, has many advantages, includes hard real-time capability, small core size, fast boot speed, interrupt handling at a deeper level, achievable deterministic control and low cost. Running Windows CE.NET 5.0 in the ViewPAC gives it the ability to run PC-based control software such as Visual Basic.NET, Visual C#, Embedded Visual C++, SCADA software, Soft PLC …etc.

Compared with traditional IPC + PLC solutions, ViewPAC reduces overall system cost, space and gives you all the best features of IPC and PLC

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1.1. Features

The ViewPAC offers the most comprehensive configuration and remote system upgrade solutions to meet specific application requirements. The following list shows the hardware and software features designed to simplify installation, configuration and application.

Software Features

- Windows CE .Net 5.0 Inside
- Easy Remote Maintenance via Ethernet
  1. FTP Server
  2. VCEP Software
- Built-In OPC Server: NAPOPC_CE5
  1. An OPC Server for SCADA Software
  2. Integrates Local/Remote I/O Modules via RS-232/485 or Ethernet
  3. Provides Library for eVC, C#, or VB.NET
  4. Supports Modbus and DCON Protocols
- Development Software

  Visual Studio.NET 2005/2008, and eVC
- SDK/Demo Programs for C#, VB.NET & eVC

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Hardware Features

- PXA 270 CPU (32-bit & 520 MHz)
- IP65 Compliant Front Panel
- 3.5”/5.7”/10.4” TFT LCD (5.7”/10.4” LCD is with Touch Panel)
- Rubber Keypad with 24/6 Keys (for VP-23W1/VP-25W1 series only)
- Audio with MIC-In and Line-Out (MIC-in is not included with VP-41xx series)
- 64-bit Hardware Serial Number for Software Protection
- 3 Slots for High Profile I/O Modules
- Rich I/O Expansion Ability
    1. Ethernet
    2. RS-232/422/485
    3. FRnet
    4. CAN bus
- Dual Battery Backup SRAM (512 KB)
- One Ethernet Port
- 2 Serial Ports (RS-232, RS-485)
- Operating Temperature: -20 ~ +70 °C

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1.2. Specifications

The table below summarizes the specifications of the ViewPAC.

Models	VP-23W1	VP-25W1	VP-4131
System Software			
OS	Windows CE .NET 5.0		
.Net Compact Framework	2.0/3.5		
Embedded Service	FTP server, Web server (supports VB script, JAVA script), Embedded SQL server		
SDK Provided	Dll for eVC, Dll for Visual Studio.Net 2005/2008		
CPU Module			
CPU	PXA270 or compatible (32-bit and 520 MHz)		
SDRAM	128 MB		
Dual Battery Backup SRAM	512 KB (for 5 years data retention)		
Flash	96 MB	96 MB	128 MB
EEPROM	16 KB (data retention: 40 years; 1,000,000 erase/write cycles)		
Expansion Flash Memory	microSD socket with a microSD card (support up to 16 GB microSD card)		
RTC (Real Time Clock)	Provide seconds, minutes, hours, date of week /month; month and year, valid from 1980 to 2079		
64-bit Hardware Serial Number	Yes		
Dual Watchdog Timer	Yes (0.8 second)		
Rotary Switch	Yes (0 ~ 9)		
I/O Expansion Slots			
Slot Number	3 (for high profile I-8K and I-87K modules only)		
Hot Swap *Will be available	Yes (for high profile I-87K modules only)		
Communication Interface			
Ethernet Port	RJ45 * 1, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDIX, LED indicators)		
USB 1.1 (host)	1	1	2
USB 1.1 (client)	--	--	1

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COM0	Internal communication with the high profile I-87K series modules in slots		
COM2	RS-485 (D+, D-; self-tuner ASIC inside); 2500 V_{DC} isolated		
COM3	RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); Non-isolated		
Main Machine Interface			
LCD	3.5” TFT	5.7” TFT	10.4” TFT
Resolution	320 x 240	640 x 480	800 x 600
Touch Panel	--	Yes	Yes
Rubber Keypad	24 Keys	6 Keys	--
Audio	Microphone-In and Earphone-Out		Earphone-Out
LED Indicators	3 Dual-Color LEDs (PWR, RUN, LAN1, L1, L2, L3; L1 ~ L3 for user programmable)		2 Dual-Color LEDs (PWR, RUN)
Environmental			
Operating Temperature	-20 ~ +70 °C		
Storage Temperature	-30 ~ +80 °C		
Ambient Relative Humidity	10 ~ 90%, non-condensing		
Power			
Input Range	+10 V ~ +30 V_{DC}		
Isolation	1 kV		
Capacity	2.5 A, 5 V supply to I/O expansion slots		
Consumption	7.2 W (0.3 A @ 24 V_{DC})		
Mechanical			
Dimension (W x D x H)	182 mm x 158 mm x 125 mm		293 mm x 231 mm x 129 mm
Ingress Protection	Front panel: IP65		
Installation	Panel mounting		

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1.3. Overview

The ViewPAC contains several interfaces and peripherals that can be integrated with external systems. Here is an overview of the components and its descriptions. The details of these items are as follows:

1. LCM

The LCM display allows users to view the status of the backup process.

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2. LED Indicators

The diagram below shows the placement of the LED indicators for each ViewPAC.

The LED indicators which can be used to indicate the power status, OS status and network link/activity are described as follows:

LED Indicator	Color	Description
L1/L2/L3 (for VP-23-W1/VP-25W1 only)	Red, On	LED indicators controlled by user Program.
	Red, Off	
RUN	Green, On	System booted and ready.
	Green, Off	BIOS failure.
	Green, blinking	System memory mapped out, formatted or defragmented.
PWR	Green, On	System has power applied to it.
	Green, Off	System is not powered on.
LAN1 (for VP-23W1/-VP-25W1 only)	Green, On	Link between system and network.
	Green, Off	Network disconnected.
	Green, blinking	Network Access.

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3. Keypad (for VP-23W1/VP-25W1 only)

The keypad is used to provide support for keyboard input.

The F1 ~ F6 function keys can also be programmed by the user.

The Numerical Keypad allows you to enter numerical information.

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4. microSD Socket

microSD socket allows for memory expansion up to 16 GB.

5. USB Client (for VP-4131 only)

USB client allows you to connect your ViewPAC to another computer via a USB cable, and have that cable act as a network connection.

6. Rotary Switch

Rotary Switch is an operating mode selector switch which provides seven functions related to the selection of the operating mode and authorization control for the VP-2000.

For more information about the operating mode, please refer to “section 2.2. Configuring the Boot Mode”

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VP-23W1
(Back View)

VP-25W1
(Back View)

VP-4131
(Back View)

VP-4131
(Bottom View)

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7. I/O Expansion Slots

ViewPAC has three I/O expansion slots to serve in the local and remote expansion.

8. Ethernet Port

Ethernet port allows you to connect your computer or other device to the internet or to a local network.

9. Power Input and Frame Ground

The VP-23W1/VP-25W1 has a terminal with 3pins, there are 2 pins for power input and a pin for frame ground as follows:

The VP-4131 has a terminal with 5 pins; there are 4 pins for redundant power input and a pin for frame ground as follows:

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10. COM2 (RS-485)

COM2 port provides a connection to external RS-485 devices. The COM2 has 2 pins, as follows:

Baud Rate: 115200, 57600, 38400, 19200, 9600, 4800, 2400, 1200 bps

Data Bits: 7, 8

Parity: None, Even, Odd, Mark (Always 1), Space (Always 0)

Stop Bits: 1, 2

FIFO: 16 bytes

11. COM3 (RS-232)

ViewPAC offers one standard RS-232 serial communication interface port, COM3 (9-pin Sub-D plug connector), and it is located on the back of ViewPAC. Refer to figure below for RS-232 port pin assignment.

Port Type: Male

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

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Tips & Warnings

The table below shows the data bit of each COM port and their corresponding stop bit.

Word Length	Number of Stop Bits
5, 6, 7, 8	1
5	1.5
6, 7, 8	2

12. USB Port

The VP-23W1/VP-25W1 has a USB port, and the VP-4131 has two USB ports, that allow support for USB devices such as mouse, keyboard or an external USB hard drive.

13. Microphone and Earphone Jacks

Microphone and an earphone jack to allow the input and output of audio system.

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1.4. Dimensions

The diagrams below provide the dimensions of the standard VP-2000 family to use in defining your enclosure specifications. Remember to leave room for potential expansion if you are using other components in your system.

All dimensions in millimeter.

VP-23W1

Top View

Recommended Panel Cut-Out

Front View

Right Side View

Bottom View

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VP-25W1

Top View

Recommended Panel Cut-Out

Front View

Right Side View

Bottom View

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VP-4131

Recommended
Panel Cut-Out

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1.5. Companion CD

This diagram below describes the content of the companion CD, which provides the resource, tool kit, software and documentation related to the ViewPAC.

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2. Getting Started

This chapter provides a guided tour that describes the steps needed to download, install, configure, and run the basic procedures for user working with the ViewPAC for the first time.

2.1. Mounting the Hardware

Before you work with the ViewPAC, you should have a basic understanding of hardware specification, such as the dimensions, the usable input-voltage range of the power supply, and the type of communication interfaces.

For more information about the hardware details, see section 1.2., “Specifications.”

For more information about the hardware dimensions, see section 1.4., “Dimension.”

The installation instructions differ depending on the ViewPAC you have.

- **For VP-23W1/VP-25W1**

  Please see section 2.1.1. Installation Instructions for VP-23W1/VP-25W1

- **For VP-4131**

  Please see section 2.1.2. Installation Instructions for VP-4131

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2.1.1. Installation Instructions for VP-23W1/VP-25W1

Before starting any task, please check the package contents. If any of the following package contents are missing or damaged, contact your dealer, or distributor.

In addition to this guide, the package includes the following items:

VP-23W1/VP-25W1 & Touch Pen

Expansion I/O Socket * 3

Software Utility CD

A microSD Card and
A microSD to SD Adapter

Screw Driver

RJ-45 Waterproofing Kit

Panel Clip * 4

M4x35 L Screw *4

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2.1.1.1. Removing the Slot Cover

The ViewPAC has a slot cover to protect the internal components from damage during shipping. Before starting any installation, please first remove the slot cover.

Step 1: Hold the top of ViewPAC

Step 2: Pull the plastic wrap

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2.1.1.2. Installing Expansion I/O Sockets

The case (a socket and a top case) is included in the package. Before inserting the I/O modules you first need to install the expansion I/O socket.

If you do not expand the I/O module full, please keep the top case of the unused slot to protect the backplane from dirt, dust and damage from foreign objects.

Step 1: Take the socket out from the case

Step 2: Padlock the bottom of the socket into the ViewPAC

Step 3: Slide the socket into the ViewPAC until it clicks

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2.1.1.3. Inserting the I/O Modules

ViewPAC supports a complete range of I/O modules for interfacing many different field devices.

For more information about I/O expansion modules, please refer to:

http://www.icpdas.com/products/PAC/winpac/io_support_list.htm

Step 1: Hold the I/O module vertically and align the socket

Step 2: Carefully press the I/O module onto the socket

Tips & Warnings

If you do not expand the I/O module full, please keep the top case of the unused slot to protect the backplane from dirt, dust and damage from foreign objects.

Step 3: Read the relevant documentation

Manual

For high profile I-8K series:

CD:\napdos\io_module\
http://www.icpdas.com/products/PAC/winpac/io_support_list.htm

For high profile I-87K series:

CD:\napdos\io_module\
http://www.icpdas.com/products/PAC/winpac/io_support_list.htm

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Step 4 Wire the I/O channels

All documents include the I/O module specifications, pin assignments and wiring connections.

For example, Pin Assignments and Wiring connections for the I-87054W module are as follows:

Tips & Warnings

It is recommended that the power to the ViewPAC is switched off when wring the I/O module which are plugging in the ViewPAC slots.

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2.1.1.4. Mounting the Waterproof

The ViewPAC is equipped with an IP67 waterproof connector to withstand contaminant in dusty environment and immersion in water and corrosive elements.

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2.1.1.5. Mounting the ViewPAC

The ViewPAC can be mounted on a panel of maximum thickness 12 mm. Adequate access space can be available at the rear of the instrument panel for wiring and servicing purposes.

Tips & Warnings

To ensure proper ventilation for your ViewPAC, leave a minimum of 50mm space between the top and bottom edges of the ViewPAC and the enclosure panels.

Step 1: Prepare the panel and cut the hole to the specified size

Step 2: Attach the ViewPAC to the cut-out hole

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Step 3: Insert the panel mounting clips into the upper and lower ventilation holes

Step 4: Screw the panel mounting clips to the panel

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2.1.1.6. Deploying a Basic ViewPAC Application

The ViewPAC provides a variety of communication interface to suit a range of applications. Here is a simple application for using the ViewPAC that is shown below.

Step 1: Connect the positive terminal (+) of the power supply to the terminal PWR and the negative terminal (-) of the power supply to the P.GND

Tips & Warnings

The input range of power supply is +10 ~ +30 V_{DC}

Step 2: Connect PC to the Ethernet port

Step 3: Connect the USB keyboard to the USB port

Step 4: Connect the audio to the microphone and earphone jack

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2.1.2. Installation Instructions for VP-4131

Before starting any task, please check the package contents. If any of the following package contents are missing or damaged, contact your dealer, or distributor.

In addition to this guide, the package includes the following items:

VP-4131 & Touch Pen

A microSD card and

A microSD to SD Adapter

Software Utility CD

Screw Driver

Panel Clip * 4

M4x35 L Screw *4

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2.1.2.1. Installing Expansion I/O Sockets

There is a top case on each I/O socket. Before inserting the I/O module you first need to remove it.

If you do not expand the I/O module full, please keep the top case of the unused slot to protect the backplane from dirt, dust and damage from foreign objects.

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2.1.2.2. Inserting the I/O Modules

ViewPAC supports a complete range of I/O modules for interfacing many different field devices.

For more information about I/O expansion modules, please refer to:

http://www.icpdas.com/products/PAC/winpac/io_support_list.htm

Step 1: Hold the I/O module vertically and align the socket

Step 2: Carefully press the I/O module onto the socket

Tips & Warnings

If you do not expand the I/O module full, please keep the top case of the unused slot to protect the backplane from dirt, dust and damage from foreign objects.

Step 3: Read the relevant documentation

For high profile I-8K series:

CD:\napdos\io_module\
http://www.icpdas.com/products/PAC/winpac/io_support_list.htm

For high profile I-87K series:

CD:\napdos\io_module\
http://www.icpdas.com/products/PAC/winpac/io_support_list.htm

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Step 4 Wire the I/O channels

All documents include the I/O module specifications, pin assignments and wiring connections.

For example, Pin Assignments and Wiring connections for the I-87054W module are as follows:

Tips & Warnings

It is recommended that the power to the ViewPAC is switched off when wring the I/O module which are plugging in the ViewPAC slots.

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2.1.2.3. Mounting the ViewPAC

The ViewPAC can be mounted on a panel of maximum thickness 5 mm. Adequate access space can be available at the rear of the instrument panel for wiring and servicing purposes.

To ensure proper ventilation for your ViewPAC, leave a minimum of 50mm space between the top and bottom edges of the ViewPAC and the enclosure panels.

1) Prepare the panel and cut the hole to the specified size.

2) Attach the ViewPAC to the cut-out hole.

3) Insert the panel mounting clips into the upper and lower ventilation holes.

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4) Screw the panel mounting clips to the panel.

Recommended Screw Torque: 3.4 ~ 4.5 kgf-cm.

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2.2. Installing the Tools and Utilities

The ViewPAC has several tools and utility that allows and supports you quickly and easily to manage the ViewPAC. Here we will introduce two practical of them and guide you through the installation.

cerhost.exe

Remote Display is one of the Windows CE operating system toolkits. If your ViewPAC is connected to PC through the network, you can use this utility to display the device screen on the host PC and control the ViewPAC remotely through this interface.

For more information on how to use Remote Display to control the ViewPAC remotely, please refer to section 2.6. Using Remote Display to Control the ViewPAC Remotely

DCON_Utili...

DCON Utility is a toolkit that is designed to configure, manage and monitor the I/O modules from PC via COM port or Ethernet.

For more information on how to use DCON Utility to configure the I/O module, please refer to section 2.7. Using “DCON Utility” to configure the I/O Module.

Step 1: Get the DCON Utility and Remote Display

The DCON Utility and Remote Display can be installed from the CD that was provided with the package or by downloading the latest version from ICP DAS web site.

CD:\napdos\vp-2000_ce50\PC_Tools\
ftp://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/pc_tools/

Step 2: Follow the prompts until the installation is complete

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2.3. Configuring the Boot Mode

The ViewPAC has seven boot modes that can be determined through a rotary switch.

The table below lists the operation mode selection.

Position	Modes of operation
0	Normal mode (Default)
1	Safe mode
2	Debug mode
3	OS update mode
4	Development mode
5	DCON_CE
6	VCEP
7 ~ 9	(For user)

Normal Mode (Default)

Normal mode is the default mode of operation and the one you will use most of the time. Use this mode for more tasks and configurations. Programs also are executed in this mode.

Safe Mode

Safe mode is a troubleshooting option that starts your computer with only basic services and functionality. If an existing problem does not reappear when you start ViewPAC in safe mode, you can eliminate the default settings and basic device drivers as possible causes.

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Tips & Warnings

In normal mode, if the new settings are not saved when you change and save the settings using the ViewPAC Utility, to solve this problem, perform the following steps:

Step 1: Restart the ViewPAC in safe mode

Turn the rotary switch to “1”, and then restart the ViewPAC.

Step 2: Start the ViewPAC Utility to restore the default settings

Start the ViewPAC Utility, and then click the “Restore Default Settings” command and “Save” command from the “File” menu

Step 3: Restart the ViewPAC in normal mode

Turn the rotary switch to “0”, and then restart the ViewPAC.

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Debug Mode

The debug mode is a function hidden in a program that provides options used for testing and debugging that are not available to users.

Debug mode is unsupported.

OS Update Mode

OS update mode is a way that is used to update OS. To update the ViewPAC OS image, please refer to “6.1. OS updates”

DCON_CE Mode

This mode is the same as Normal mode. Besides, DCON_CE.exe will be run automatically after booting

Tips & Warnings

DCON_CE.exe must be placed on the \System_Disk\Tools\DCON_CE, or else DCON_CE.exe cannot be run automatically after booting.

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VCEP Mode

This mode is the same as Normal mode. Besides, VCEP.exe will be run automatically after booting.

Tips & Warnings

VCEP.exe must be placed on the \System_Disk\Tools\VCEP or else VCEP.exe cannot be run automatically after booting.

User Mode

Rotary switch position 7, 8, 9 are reserved for user's applications.

When ViewPAC is boot with one of these rotary switch positions, it is boot at normal mode. User's application can check the rotary switch position to run at different mode.

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2.4. Changing the User Interface Language

The "Regional Settings" is a Windows CE functionality that allows users to easily change the ViewPAC user interface to your native language.

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Step 2: Click User Interface Language tab, choose to your local language, and then click OK

Step 3: Click OK, and then run the ViewPAC Utility

Step 4: Save and reboot the ViewPAC

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2.5. Testing the ViewPAC

ViewPAC combines WinPAC, graphic display and keypad dial in one unit. The ViewPAC Quick Test is a toolkit used to check out the ViewPAC particular function compared with WinPAC.

VP-23W1:

Audio Options:

Play Audio

Play Audio button is used to check the audio output.

Buzzer Options:

Play Buzzer

Play Buzzer button is used to check the buzzer.

LED Options:

These buttons are used to check LEDs sign.

KeyPAD Option:

Checkboxes are used to check the KeyPAD.

Text field is used to check the input format.

Tips & Warnings

The shift key is a modifier key used to enter alternate upper letters or characters.

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VP-25W1:

Audio Options:

Play Audio button is used to check the audio output.

Buzzer Options:

Play Buzzer button is used to check the buzzer.

LED Options:

These buttons are used to check LEDs sign.

KeyPAD Option:

Checkboxes are used to check the KeyPAD.

LCD Backlight Options:

The slider is used to check the LCD Backlight.

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VP-4131:

Audio Options:

Play Audio button is used to check the audio output.

Buzzer Options:

Play Buzzer button is used to check the buzzer.

LED Options:

These buttons is used to check LEDs sign.

LCD Backlight Option:

The slider is used to check the LCD backlight.

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2.6. Using ViewPAC Utility to manage the ViewPAC

The ViewPAC Utility is a collection of the ViewPAC system tool that allows user quickly and easily manage and configure the ViewPAC.

For more detailed information on ViewPAC Utility applications, please refer to “3.5. ViewPAC Utility”

Step 1: Run the ViewPAC Utility located on desktop

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2.7. Using DCON Utility to Configure the I/O Modules

The DCON Utility is a client utility that runs on PC, and communicates with ViewPAC via DCON protocol. The DCON Utility allows users to remotely connect to I-7K and I-87K series I/O modules for management through the COM port and Ethernet port.

This tool is composed of two parts, a client and a server. The server is a program named DCON_CE_WP.exe running on ViewPAC. The client is a PC-based program named DCON_Utility.exe running on PC.

Step 1: Run the DCON firmware on the ViewPAC controller

The DCON firmware is located at:
\System_Disk\Tools\DCON_CE\

Step 2: Run the DCON Utility on the host PC

The DCON Utility can be obtained from:

CD:\napdos\vp-2000_ce50\PC_Tools\DCON_Utility\
http://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/pc_tools/dcon_utility/

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Step 3: Click the WIN CE button

Step 4: On the WINCE device connection, enter the IP address of the ViewPAC, and press the "Connect to WinPAC" button to search the I-87K series expansion I/O modules

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Step 5: It will display a list of I-87K series expansion I/O modules, then select the module name that you want to configure

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2.8. Using Backup Utility to Backup the settings and files

After saving the configuration settings for a ViewPAC device following the first use, it is recommended to use the Backup utility to back up all the settings and files.

Step 1: Run the Backup Utility on the ViewPAC

The DCON firmware is located at:
\System_Disk\Tools\Backup_utility\

Step 2: Click the Backup menu

Step 3: Select the options that you want to backup, enter text annotations and then click the Start backup button

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Step 4: Confirm the backup options and then click Yes button

Step 5: Choose the folder that you want to save backup file and click the Ok button

Step 6: Wait for process to finish

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2.9. A caution about using System_Disk

The System_disk is an authoritative storage device, but is not suitable for frequent copying and deleting of files and is only suitable for storing important files that are not changed frequently.

If files are copied and deleted frequently, the system will automatically perform a System_Disk defragment action, which will consume the total resources of the CPU and cause the OS not to function correctly.

When the OS System_Disk defragment action is being performed, the run LED will blink and the defragment action icon will show in the system tray in the bottom right-hand of the pc screen.

Tips & Warnings

Do not power off the ViewPAC while the defragment is being performed.

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3. Tools and Tasks

This chapter briefly describes the functions of the ViewPAC tools and utilities.

There are several tools and utilities built-in and designed for use with ViewPAC. Some of these tools and utilities are installed on the ViewPAC controller, some are available on PC.

Both the tools and utilities of the ViewPAC side and PC side tools can be found separately on the CD that was provided with the package or by downloading the latest version from ICP DAS web site.

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• DCON_CE

With Host PC running the DCON Utility, on the ViewPAC, the DCON_CE program allows user to view and monitor the I/O status from DCON Utility.

• ISQLW35

The ISQLW35 implements SQL server compact 3.5 Query Analyzer.

• Modbus

The Modbus provides various applications of Modbus protocol for configuring the ViewPAC.

• NAPOPC_CE5

NAPOPC_CE5 is an integrated omnibus software package, it allows user to quickly establish a DCS control system.

For more information about the NAPOPC_CE5, please refer to “3.2. NAPOPC_CE5”.

• RegistryViewer

The Registry Viewer allows user to view the registry value of Windows CE Operating System.

• Remote display application

The remote display application allows user to view the display remotely of the ViewPAC on a Host PC.

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• SendToCOM

The SendToCOM allows user to send/receive data to/from the expansion module via serial port.

• TaskMgr

The TaskMgr provides details about programs and processes running on the ViewPAC.

• VCEP

The VCEP allows user to manage the ViewPAC remotely on a Host PC.

For more information about the VCEP, please refer to “3.4. VCEP (Virtual CE Pro)”.

• ViewPAC Utility

The ViewPAC 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 ViewPAC Utility, please refer to “3.5. ViewPAC Utility”.

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3.1. DCON Utility

The DCON Utility is a tool kit 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 ViewPAC Utility applications, please refer to

“2.7. Using DCON Utility to configure the I/O modules”

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3.2. NAPOPC_CE5

NAPOPC_CE5 DA Server is a free OPC DA Server (The "OPC" stands for "OLE for Process Control" and the "DA" stands for " Data Access") working on WinPAC, ViewPAC & WinCon controllers provided by ICP DAS Ltd. The first standard (originally called simply the OPC Specification and now called the Data Access Specification) resulted from the collaboration of a number of leading worldwide automation suppliers working in cooperation with Microsoft. Originally based on Microsoft's OLE COM (component object model) and DCOM (distributed component object model) technologies, the specification defined a standard set of objects, interfaces and methods for use in process control and manufacturing automation applications to facilitate interoperability. NAPOPC_CE5 DA Server integrates OPC, Modbus TCP Slave and Modbus RTU Slave three kind Slave services, as well as integrates Modbus TCP Master, Modbus RTU Master and DCON three kind Master communication protocols. It also provides one advanced function “Rule Script” for use in the I/O integration and transformation, and some conditional Logic operation.

Any version before 2.1.0 of the NAPOPC_CE5 was named “Quicker”

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3.3. SendToCOM

The SendToCOM uses the serial port to communicate with expansion module. To use the SendToCOM, you can send data to expansion module through the serial port, and receive data from other device through the serial port.

For more information about these commands for communicating with expansion module, please refer to:

CD:\Napdos\io_module\87k_high_profile_modules.htm

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3.4. VCEP

ICPDAS VCEP is designed for managing your ViewPAC anywhere. No matter where you are, ICPDAS VCEP provides a convenient environment on the Desktop PC and allows you control your ViewPAC remotely.

ICPDAS VCEP is composed of two main components:

The “Server” which runs on ViewPAC.
The “Client" which runs on a Desktop PC.

Once a connection is established between the client and server (initiated by the client), the client will periodically send requests for screen updates and send mouse/key click information to the server to simulate. Each video frame is inter-compressed against the previous frame and then intra-compressed with a modified LZW scheme to minimize the amount of data transmitted from server to client.

For more detailed information on VCEP application, please refer to
http://www.icpdas.com/products/PAC/wincon-8000/wincon_VirtualCE.htm

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3.5. ViewPAC Utility

The ViewPAC Utility is a tool which is designed to quickly control and management the ViewPAC.

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3.5.1. Menu Bar

The ViewPAC Utility includes the following function menu. All function menus will be explained later.

✓ File Menu

✓ Help Menu

✓ Configuration Menu

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File Menu

The menu commands	Use to
Save	Saves the settings into Flash. The new settings don't take effect until the ViewPAC restart.
Save and Reboot	Saves the settings into Flash and restart the ViewPAC. The new settings will take effect after the ViewPAC restart.
Reboot Without Save	Restarts the ViewPAC without save the settings into Flash.
Restore Default Settings	Restarts the settings of ViewPAC to its factory default values. The settings include configuration setting, network setting, auto execution, etc.
Exit	Exits the ViewPAC Utility.

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Help Menu

The menu commands	Use to
Reset System to Default	Resets the system interrupt status to default. The operation used in the situation when the interrupt crash. You can select this operation to reset the interrupt status without rebooting the device.
Release Notes	Checks out what's new and the know issues.
About	Displays a dialog box with information about ViewPAC Utility, including the current version and copyright information.

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Configuration Menu

The menu commands	Use to
Import Registry Key	Backs up a sub-key of registry by using a registration entry (.reg) file. How to use: Step 1: Select the “Import Registry Key”, then the “Open” dialog box will appear Step 2: On the “Open” dialog box, select a specific .reg file to import Warning: 1. The .reg file which should be saved by “Export Registry Key”. 2. It will not save automatically after import a .reg file.
Export Registry Key	Makes a backup of a registry sub-key How to use: Step 1: Select the “Export Registry Key”, then the “Export Registry” box will appear Step 2: Select a specific root key Step 3: Input a specific path of sub-key Step 4: Push the “OK” button, then the “Save As” dialog box will appear prompting you to select a location where you want to save this exported file Warning: The export operation will export all the sub-keys of the specific key which you input.
Store All Registry	Stores all registry setting to flash from .das file which

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The menu commands	Use to
Setting	is saved by “Dump All Registry Setting”. How to use: Step 1: Select the “Store All Registry Setting” , then the “Open” dialog box will appear Step 2: On the “Open” dialog box, select a specific .das file to store Warning: 1. The .das file which should be saved by “Dump All Registry Setting”. 2. It will save automatically after store .das file.
Dump All Registry Settings	Dump all registries setting to .das file. How to use: Select the “Dump All Registry Setting”, then the “Save As” dialog box will appear prompting you to select a location where you want to save this exported file.

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3.5.2. Property Tabs

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

- ✓ **System Settings**
- ✓ **System Setting2**
- ✓ **Ethernet Settings**
- ✓ **Network Settings**
- ✓ **System Information**
- ✓ **Auto Execution**
- ✓ **Multi-serial port wizard**
- ✓ **System Memory Setting**
- ✓ **Backplane Compatibility**

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System Settings Tab

The System Settings tab provides functions to configure the task bar.

The tab use to	How to use
Lock or Auto-Hide the taskbar	Auto-Hide: Select the **Auto Hide** check box Lock: Select the **Always On Top** check box.
Check the status of the battery	See the **Battery1** and **Battery2** field that displays the battery status.

Note: The battery type is BR1632 (Part number is 2LB010 for ICP DAS)

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System Settings2 Tab

The System Settings2 tab provides functions to set the name of the MicroSD card and the USB hard disk.

The tab use to	How to use
Set the name of the MicroSD card ant the USB hard disk	Enter the name of the MicroSD card and the USB hard disk in the relevant fields, and then press the **Set** button

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Ethernet Settings Tab

The Ethernet Settings 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 use to	How to use
Configure the network settings	Obtaining an IP address automatically from DHCP: Select the **Use DHCP to get IP address** option, and then press the **Setting** button. Manually assign an IP address: Select the **Assign IP address** option, and then press the **Setting** button.
Monitor the MAC address	See the **MAC Address 1** fields that display the physical address of LAN1.
Set up the i-8135 Ethernet module driver	See the next page.

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8135 tab

This tab provides functions to set up the i-8135 Ethernet module driver.

The tab use to	How to use
Set up the i-8135 network settings	Obtaining an IP address automatically from DHCP: Select the **Use DHCP to get IP address** option, and then press the **Setting** button. Manually assign an IP address: Select the **Assign IP address** option, and then press the **Setting** button.

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Network Settings Tab

The Network Settings tab includes three tabs, FTP Settings, HTTP directory path, Users and Passwords and File Server Settings.

The FTP settings tab provides functions to enable/disable the FTP access, enable/disable anonymous FTP access, and configure the FTP directory path.

The tab use to	How to use
Change the HTTP directory path	Enter a new path in the C**hange HTTP document root directory \windows\www\wwwsub to** field, and then press the **Setting** button.

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FTP Settings tab

This tab provides functions to enable/disable the FTP access, enable/disable anonymous FTP access, and configure the FTP directory path.

The tab use to	How to use
Enable or disable the FTP access	Enable: Select the Enable check box in the FTP field. Disable: Select the Disable check box in the FTP field.
Enable or disable anonymous FTP access	Enable: Select the Enable check box in the Allow Anonymous field. Disable: Select the Disable check box in the Allow Anonymous field.
Enable or disable anonymous FTP upload	Enable: Select the Enable check box in the Allow Anonymous Upload field. Disable: Select the Disable check box in the Allow Anonymous Upload field.
Change the FTP directory path	Enter a new path in the Change FTP default download directory field, and then press the Setting button.

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Users and Passwords tab

This tab provides functions to maintain the FTP accounts.

The tab use to	How to use
Maintain the FTP accounts	Refer to the Appendix C.1 How to add a user account to remote login the ViewPAC from PC.

Please refer the document "w2-022_how_to configure_the_File(SMB)_Server " to use the File Server Settings tab.

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System Information Tab

The System Information tab provides functions to monitor necessary system information of the ViewPAC. The system information is the most important note of version control for upgrading system.

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Auto Execution Tab

The Auto Execute tab provides functions to configure programs running at ViewPAC startup, it allows users to configure ten execute files at most.

Tips & Warnings

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

The tab use 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 **Setting** button.

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Multi-Serial Port Wizard Tab

The Multi-serial port provides functions for installation of the RS-232/RS-422/RS-485 communication module driver.

The table below shows the expansion RS-232/RS-422/RS-485 communication modules that are compatible with the ViewPAC.

Item	RS-232	RS-422/RS-485	Isolation	Connector
I-8112iW	2	-	2500 Vrms	DB-9 x 2
I-8114W	4	-	-	DB-37 x 1
I-8114iW	4	-	2500 Vrms	DB-37 x 1
I-8142iW	-	2	2500 Vrms	Terminator block x 1
I-8144iW	-	4	2500 Vrms	Terminator block x 1

The ViewPAC can be expanded to support up to 16 I/O modules.

For more detailed information about these support modules, please refer to

http://www.icpdas.com/products/Remote_IO/i-8ke/selection_rs232_i8k.htm

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Key Property Tab (for VP-23W1/VP-25W1 only)

The Key Property tab provides functions to specify the programmable key to launch any program that you wish.

Tips & Warnings

The allowed file types are .exe and .bat.

The tab use to	How to use
Specify the programmable key to launch the program	Press the **…** button to select the execute file which you want, select the **Enable** check box, and then press the **Setting** button.
Specify the programmable key to control backlight	Select the **F6 control backlight** check box, and then press the **Setting** button.

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System Memory Tab

The SRAM Setting tab provides functions to adjust and monitor the unused RAM.

The tab use to	How to use
Adjust display	Move the slider left to release more memory running programs or move the slider right to release more storage room, and then press the Setting button

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4. Your First ViewPAC Program

This chapter describes the components of the ViewPAC SDK, and provides step by step tutorial for developer that will teach you how to create your first ViewPAC program.

Before writing your first program, ensure that you have the necessary development tools and the corresponding ViewPAC SDKs are installed on your system.

4.1. Preparing the Development Tools

There are several programming tools available for application developers targeting Windows CE-based ViewPAC. One of the following tools must be installed on the Host PC.

- ✓ Microsoft eMbedded Visual C++
- ✓ Visual Basic.net
- ✓ Visual C#

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4.2. Installing ViewPAC Platform SDKs

The ViewPAC Platform SDK is a Software Development Kit (SDK) that contains C header files, C libraries and documents.

Below is a step by step procedure for installing the ViewPAC Platform SDKs.

Step 1: Insert the CD into your CD-ROM drive

Step 2: Execute the "PAC270_SDK_YYYYMMDD.msi" which is located in

CD:\Napdos\wp-8x4x_ce50\SDK\

The installation program for the latest version of the WinPAC Platform SDKs can be obtained from:

http://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/sdk/

File name: pac270_sdk_yyyymmdd.msi

yyyymmdd: Platform SDK released date

Tips & Warnings

The released date of the installation program SDK installation package that provides the PACSDK library must be later than or equal to 2012/10/15, such as PAC270_SDK_20121015.msi

Step 3: Follow the prompts until the installation is complete

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4.3. Understanding the ViewPAC APIs

The ViewPAC SDKs includes several application programming interfaces (APIs) that allows you perform various supporting tasks when developing ViewPAC.

➢ Requirements

The ViewPAC SDK supports NET Compact Framework 2.0/3.5.

➢ Installation Path

After installing the ViewPAC SDKs, a number of functions can be installed on the Host PC, and this installation puts the header files, libraries into the following public places so they are easily changed by update the ViewPAC SDKs.

Header files:

C:\Program Files\Windows CE Tools\wce500\PAC270\Icpdas\Include\ARMV4I\

Libraries:

C:\Program Files\Windows CE Tools\wce500\PAC270\Icpdas\Lib\ARMV4I\

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4.3.1. ViewPAC SDK Overview

4.3.1.1. WinPAC Standard API

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- **SystemInformation Functions**

Provides reference information for the system status.

- **Backplane Access API**

Provides reference information for the backplane access APIs, including Hot Plug and backplane information.

- **Interrupt API**

Provides reference information for the Interrupt APIs

- **Memory Access API**

Provides reference information for the memory R/W APIs, including EEPROM and SRAM.

- **Watchdog Functions**

Provides reference information for the watchdog APIs, including hardware watchdog and OS watchdog.

- **UART API**

Provides reference information for the UART APIs.

- **Registry API**

Provides reference information for the registry.

- **microSD Management API**

Provides reference information for the microSD Manager.

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- **PAC_IO API**

Provides reference information for IO APIs, including local and remote.

In additions, no matter 8K or 87K modules use the same API.

- **Error Handling API**

Provides reference information for error handling.

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4.3.1.2. ViewPAC Particular API

- **Backlight Functions**

Provides reference information for the backlight.

- **Buzzer Beep Functions**

Provides reference information for the buzzer.

- **LED Functions**

Provides reference information for the LED

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4.3.2. ViewPAC SDK Reference

For full usage information regarding the description, prototype and the arguments of the functions, please refer to the “WinPAC Standard API Manual” and “ViewPAC Particular API Manual” located at:

CD:\Napdos\vp-2000_ce50\Document\SDK_Document\
ftp://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/document/sdk_document/

✓ WinPAC Standard API Manual

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✓ ViewPAC Particular API Manual

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4.4. Your First Program in C#

To create a demo program with C# development tool includes the following main steps:

1. Create a new project
2. Add project reference for an application
3. Design and Build an application program
4. Execute the application on the ViewPAC

All main steps will be described in the following subsection.

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4.4.1. Create a new project

Step 1: Start the Visual Studio 2005/2008

Step 2: On the "File" menu, select the "New" command, and then click the "Project" command

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Step 3: In the “New Project” dialog box do the following in this order

Step 4: Click OK to start creating an “SDKinfo” project

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4.4.2. Add project reference for an application

Step 1: On the "Solution Explorer" window, right-click the "Reference" and then click the "Add Reference…" command

Step 2: In the "Add Reference" dialog box, select the "Browse" tab, and then specify the directory of the "ViewPacNet.dll" and "PACNET.dll" file in the "File name" field

The "PACNET.dll" file can be obtained from:

CD:\Napdos\wp-8x4x_ce50\SDK\WinPacNet\

http://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/sdk/winpacnet/

The "ViewPACnet.dll" file can be obtained from:

CD:\Napdos\vp-2000_ce50\SDK\ViewPACNet\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/sdk/ViewPACnet/

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4.4.3. Design and Build an application program

Step 1: Add a

"button" object in the "From1" dialog box

Step 2: Right-click the "button" object and click the "Properties" command

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Step 3: On the "Properties" window, type "Check the SDK version" in the "Text" edit box

Step 4: Right-click the "Form1" dialog box and click the "View Code" command to open the editor window

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Step 5: Insert the “using ViewPACNet;” into the header area after “using System.Windows.Forms;”

```
using System;
using System.Linq;
using System.Collections.Generic;
using System.ComponentModel;
using System.Data;
using System.Drawing;
using System.Text;
using System.Windows.Forms;
using ViewPACNet;

namespace SDKinfo
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }
    }
}
```

Step 6: In the “Form1” dialog box, double-click the “button” object to open the editor window

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Step 7: Insert the following code in the Editor Window

MessageBox.Show(pac_GetVIEWSDKVersion());

```
namespace SDKinfo
{
    public partial class Form1 : Form
    {
        public Form1()
        {
            InitializeComponent();
        }

        private void button1_Click(object sender, EventArgs e)
        {
            MessageBox.Show(ViewPAC.pac_GetVIEWSDKVersion());
        }
    }
}
```


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4.4.4. Execute the application on the ViewPAC

Step 1: On the “Build” menu, click the “Build Solution” command

Step 2: Open the web browser and type the IP address to connect the FTP server of ViewPAC

Step 3: Upload the “SDKinfo.exe” application and the corresponding “ViewPacNet.dll” file to the ViewPAC via the ViewPAC FTP server

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Tips & Warnings

For applications programming in C# and VB.net with .net framework, when executing these application on the ViewPAC controller, the corresponding “ViewPACnet.dll” file must be in the same directory as the .exe file

Step 4: On the ViewPAC, execute the uploaded file

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4.5. Your First Program in VB.net

To create a demo program with C# development tool includes the following main steps:

1. Create a new project
2. Add project reference for an application
3. Design and Build an application program
4. Execute the application on the ViewPAC

All main steps will be described in the following subsection.

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4.5.1. Create a new project

Step 1: Start the Visual Studio 2005/2008

Step 2: On the "File" menu, select the "New" command, and then click the "Project" command

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Step 3: In the “New Project” dialog box do the following in this order

Step 4: Click OK to start creating an “SDKinfo” project

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4.5.2. Add project reference for an application

Step 1: On the "Class View" window, right-click the "Reference" and then click the "Add Reference…" command

Step 2: In the "Add Reference" dialog box, select the "Browse" tab, and then specify the directory of the "ViewPACNet.dll" and "PACNET.dll" file in the "File name" field

The "PACNET.dll" file can be obtained from:

CD:\Napdos\wp-8x4x_ce50\SDK\WinPacNet\

http://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/sdk/winpacnet/

The "ViewPacNet.dll" file can be obtained from:

CD:\Napdos\vp-2000_ce50\SDK\ViewPACNet\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/sdk/ViewPACnet/

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4.5.3. Design and Build an application program

Step 1: Add a **"button" object in the "From1" dialog box**

Step 2: Right-click the "button" object and click the "Properties" command

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Step 3: On the "Properties" window, type "Check the SDK version" in the "Text" edit box

Step 4: In the "Form1" dialog box, double-click the "button" object to open the editor window

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Step 5: Insert the following code in the Editor Window

1. Imports ViewPacNet
2. MessageBox(ViewPACNet.pac_GetOSVersion())

```
Imports ViewPacNet

Public Class Form1

    Private Sub Button1_Click(ByVal sender As System.Object, ByVal e As

        MessageBox.Show(ViewPAC.pac_GetVIEWSDKVersion())

    End Sub
End Class
```


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4.5.4. Execute the application on the ViewPAC

Step 1: On the “Build” menu, click the “Build Solution” command

Step 2: Open the web browser and type the IP address to connect the FTP server of ViewPAC

Step 3: Upload the “SDKinfo.exe” application and the corresponding “ViewPacNet.dll” file to the ViewPAC via the ViewPAC FTP server

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Tips & Warnings

For applications programming in C# and VB.net with .net framework, when executing these application on the ViewPAC controller, the corresponding “ViewPACnet.dll” file must be in the same directory as the .exe file

Step 4: On the ViewPAC, execute the uploaded file

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4.6. Your First Program in eMbedded Visual C++

To create a demo program with eMbedded Visual C++ development tool includes the following main steps:

1. Create a new Forms-Based project
2. Configure compiler options
3. Design and Build an application program
4. Execute the application on the ViewPAC

All main steps will be described in the following subsection.

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4.6.1. Create a new Forms-Based project

Step 1: Start the Microsoft Embedded Visual C++

Step 2: From the “File” menu, click the “New” command

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Step 3: In the "New" dialog, select the "Projects" tab and do the following in this order

Tips & Warnings

The selected CPU type must have "Win32 [WCE ARMV4I]"

Step 4: Click the "OK" button to start the wizard

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Step 5: On the first page of the wizard, select “Dialog based” option and then click the “Next” button to the next step

Step 6: On the next page of the wizard, leave all the options as they are, and then click the “Next” button to the next step

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Step 7: On the next page of the wizard, leave all the options as they are, and then click the "Next" button to the next step

Step 8: On the next page of the wizard, leave all the options as they are, and then click the "Finish" button to complete the wizard

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Step 9: The final summary appears, click the "OK" button to exit the wizard

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4.6.2. Configure compiler options

On the WCE configuration toolbar, select the "Win32 [WCE ARMV4] Release"

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4.6.3. Specify the path for project reference

Step 1: Click the "Options…" command from the "Tools" menu

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Step 2: In the "Option" dialog, select the "Directories" tab and do the following in this order to specify the header file include path

The "Viewpacsdk.h" file can be obtained from:

CD:\Napdos\vp-2000_ce50\SDK\ViewpacSDK\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/sdk/viewpacsdk/

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Step 3: In the "Option" dialog, select the "Directories" tab and do the following in this order to specify the library file path

The "ViewPACSDK.lib" file can be obtained from:

CD:\Napdos\vp-2000_ce50\SDK\ViewpacSDK\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/sdk/viewpacsdk/

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Step 4: Click the "Settings…" command from the "Project" menu

Step 5: In the "Project Settings" dialog box do the following in this order

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4.6.4. Design and Build an application program

Step 1: On the "Workspace" window, select the "ResourceView" tab and expand the "dialog" folder, and then double-click the "IDD_DEMO_DIALOG" to open the dialog box

Step 2: Add the "button" object in the "SDKinfo" dialog box

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Step 3: In the "SDKinfo" dialog box, right-click the button object and then click the "Properties" command

Step 4: Type the "Check the SDK version" in the "Caption" edit box and then click the "close" button

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Step 5: In the “SDKinfo” dialog box, double-Click the button object

Step 6: Type the “OnBtnCheckSDK” in the “Member function name” edit box and then click the “OK” button

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Step 7: Insert the following code into the Editor Window

```
char SDK[32];

TCHAR buf[32];

pac_GetVIEWSDKVersion(SDK);

pac_AnsiToWideString(SDK, buf);

MessageBox(buf,NULL,MB_OK);
```

```
    return TRUE;  // return TRUE unless you set
}



void CSDKinfoDlg::OnBtnCheckSDK()
{
    // TODO: Add your control notification handle
    char SDK[32];
    TCHAR buf[32];
    pac_GetVIEWSDKVersion(SDK);
    pac_AnsiToWideString(SDK,buf);
    MessageBox(buf,NULL,MB_OK);
}
```


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Step 8: Insert the “#include “Viewpacsdk.h” and #include “PACSDK.h” into the header area

```
// SDKinfoDlg.cpp : implementation file
//

#include "stdafx.h"
#include "SDKinfo.h"
#include "SDKinfoDlg.h"

#include "Viewpacsdk.h"
#include "PACSDK.h"

#ifdef _DEBUG
#define new DEBUG_NEW
#undef THIS_FILE
static char THIS_FILE[] = __FILE__;
#endif
```


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4.6.5. Execute the application program on ViewPAC

Step 1: On the "Build" menu, click the "Build systeminfo.exe" command

Step 2: Open the web browser and type the IP address to connect the FTP server of ViewPAC

Step 3: Upload the "SDKinfo.exe" application to the ViewPAC via the ViewPAC FTP server

Step 4: On the ViewPAC, execute the uploaded file

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5. APIs and Demo References

This chapter introduces demo programs that have been designed for the ViewPAC. You can examine the demo source code, which includes numerous comments, to familiarize yourself with the ViewPAC API. This will allow developing your own applications quickly by modifying these demo programs. The following details the contents of the ViewPAC demo programs.

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5.1. Demo programs with C#

The table below describes the ViewPAC demos that have been designed to demonstrate the standard operation features of the ViewPAC.

5.1.1. C# Demo program for WinPAC Standard API

The table below describes the ViewPAC demos that have been designed to demonstrate the standard operation features of the ViewPAC.

- System Information
- Backplane Access
- Interrupt
- Memory Access
- Watchdog
- UART
- Registry
- Micro SD

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Folder	Demo	Explanation
system	systeminfo	Retrieves information about the OS version, CPU version, SDK version, etc.
backplane	backplaneinfo	Retrieves information about the DIP switch, backplane ID and slot count.
memoryaccess	memory	Shows how to read/write date values from/to EEPROM
	battery_backup_sram	Shows how to read or write to the battery backup
watchdog	watchdog	Displays how the watchdog operate
microsd	microsd_management	Shows how to enables/disables Micro SD
registry	registry	Shows how to read/write date values from/to registry
UART	diag	Shows how to read the name of local I/O modules via UART

For C# application, these demo programs can be obtained from:

CD:\Napdos\wp-8x4x_ce50\Demo\WinPAC\C#.NET\Standard\

ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/c%23/standard/

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5.1.2. C# Demo program for PAC IO API

The table below describes the ViewPAC demos that have been designed to demonstrate the expansion I/O module features of the ViewPAC.

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Folder	Demo	Explanation
Local	find_io	Shows how to retrieve the module names and types which plugged in the ViewPAC.
	8k_di	Shows how to read the DI values of DI module. This demo program is used by 8K series DI modules.
	8k_do	Shows how to write the DO values to DO module. This demo program is used by 8K series DO modules.
	8k_dio	Shows how to read the DI and the DO values of the DIO module. This demo program is used by 8K series DIO modules.
	87k_basic	Shows how to send/receive a command/response application. This demo program is used by 87K series modules.
	87K_demo	Shows how use UART API and the IO modules located as slots. This demo program is used by 87K series modules.
	87k_ai	Shows how to read the AI values of AI module. This demo program is used by 87K series AI modules.
	87k_ao	Shows how to write the AO values to AO module. This demo program is used by 87K series AO modules.
	87k_di	Shows how to read the DI values of DI module. This demo program is used by 87K series DI modules.
	87k_do	Shows how to write the DO values to DO module. This demo program is used by 87K series DO modules.
	87k_dio	Shows how to read the DI and the DO values of the DIO module. This demo program is used by 87K series DIO modules.

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Folder	Demo	Explanation
Remote	7k87k_basic	Shows how to send/receive a command/response application. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_ai	Shows how to read the AI values of AI module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_ao	Shows how to write the AO values to AO module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_di	Shows how to read the DI values of DI module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_do	Shows how to write the DO values to DO module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_dio	Shows how to read the DI and the DO values of the DIO module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.

For C# application, these demo programs can be obtained from:

CD:\Napdos\wp-8x4x_ce50\Demo\WinPAC\C#.NET\IO\

ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/c%23/io/

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5.1.3. C# Demo program for ViewPAC Particular API

The table below describes the ViewPAC demos that have been designed to demonstrate the particular features of the ViewPAC.

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Folder	Demo	Explanation
Buzzer Beep	Buzzer Beep	Shows how to make a simple buzzer beep.
Keypad	Keypad	Shows how the KeyPad operates.
LCDBackLight	LCDBackLight	Shows how to control the LCD backlight.
Led	Led	Shows how to control the LEDs.
PlaySound	PlaySound	Shows how to control the microphone-in and earphone-out.

For C# application, these demo programs can be obtained from:

CD:\Napdos\vp-2000_ce50\Demo\ViewPAC\DotNET\C#.NET\

ftp://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/demo/viewpac/dotnet/c%23.net/

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5.2. Demo Programs with eMbedded Visual C++

Examples are good way to understand the ViewPAC SDK. The table below describes ViewPAC demos and covers most of the common usages of each ViewPAC API for using eMbedded Visual C++.

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5.2.1. eVC Demo program for WinPAC Standard API

The table below describes the ViewPAC demos that have been designed to demonstrate the standard operation features of the ViewPAC.

- System Information
- Backplane Access
- Interrupt
- Memory Access
- Watchdog
- UART
- Registry
- Micro SD

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Folder	Demo	Explanation
system	systeminfo	Retrieves information about the OS version, CPU version, SDK version, etc.
backplane	backplaneinfo	Retrieves information about the DIP switch, backplane ID and slot count.
memoryaccess	memory	Shows how to read/write date values from/to EEPROM
	battery_backup_sram	Shows how to read or write to the battery backup
watchdog	watchdog	Displays how the watchdog operate
microsd	microsd_management	Shows how to enables/disables Micro SD
registry	registry	Shows how to read/write date values from/to registry
UART	diag	Shows how to read the name of local I/O modules via UART

For eVC application, these demo programs can be obtained from:

CD:\Napdos\wp-8x4x_ce50\Demo\WinPAC\eVC\Standard\

ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/evc/standard/

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5.2.2. eVC Demo program for PAC IO API

The table below describes the ViewPAC demos that have been designed to demonstrate the expansion I/O module features of the ViewPAC.

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Folder	Demo	Explanation
Local	find_io	Shows how to retrieve the module names and types which plugged in the ViewPAC.
	8k_di	Shows how to read the DI values of DI module. This demo program is used by 8K series DI modules.
	8k_do	Shows how to write the DO values to DO module. This demo program is used by 8K series DO modules.
	8k_dio	Shows how to read the DI and the DO values of the DIO module. This demo program is used by 8K series DIO modules.
	87k_basic	Shows how to send/receive a command/response application. This demo program is used by 87K series modules.
	87K_demo	Shows how use UART API and the IO modules located as slots. This demo program is used by 87K series modules.
	87k_ai	Shows how to read the AI values of AI module. This demo program is used by 87K series AI modules.
	87k_ao	Shows how to write the AO values to AO module. This demo program is used by 87K series AO modules.
	87k_di	Shows how to read the DI values of DI module. This demo program is used by 87K series DI modules.
	87k_do	Shows how to write the DO values to DO module. This demo program is used by 87K series DO modules.
	87k_dio	Shows how to read the DI and the DO values of the DIO module. This demo program is used by 87K series DIO modules.

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Folder	Demo	Explanation
Remote	7k87k_basic	Shows how to send/receive a command/response application. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_ai	Shows how to read the AI values of AI module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_ao	Shows how to write the AO values to AO module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_di	Shows how to read the DI values of DI module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_do	Shows how to write the DO values to DO module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.
	7k87k_dio	Shows how to read the DI and the DO values of the DIO module. This demo program is used by 7K or 87K series AI modules which connected through a COM port.

For eVC application, these demo programs can be obtained from:

CD:\Napdos\wp-8x4x_ce50\Demo\WinPAC\eVC\IO\

ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/evc/io/

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5.2.3. eVC Demo program for ViewPAC Particular API

The table below describes the ViewPAC demos that have been designed to demonstrate the particular features of the ViewPAC.

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Folder	Demo	Explanation
BuzzerBeep	BuzzerBeep	Shows how to make a simple buzzer beep.
KeyPad	KeyPad	Shows how the KeyPad operates.
LCDBackLight	LCDBackLight	Shows how to control the LCD backlight.
Led	Led	Shows how to control the LEDs.
PlaySound	PlaySound	Shows how to control the microphone-in and earphone-out.

For eVC application, these demo programs can be obtained from:

CD:\Napdos\vp-2000_ce50\Demo\ViewPAC\eVC\

ftp://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/demo/viewpac/evc/

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6. I/O Modules and SDK Selection

This chapter describes how to select a suitable I/O expansion module and the corresponding SDK library to be used for developing programs on ViewPAC series devices.

Selecting an SDK Library for I/O Expansion

1. **Local I/O (I-8K Series & I-87K Series)**

   There are two types of I/O modules that can be inserted into local bus of a ViewPAC device, Parallel and Serial. Parallel modules (I-8K Series) are high-speed modules and only support an MCU (Main Control Unit). Serial modules (I-87K Series) can support either an MCU or an I/O expansion unit. The following table shows the appropriate SDK library to be used for I/O modules.

SDK	Modules			
	I-87K series	I-87K series with PWM functions	I-8K series	Specified I-8K series

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Native SDK	PACSDK.dll	PACSDK_PWM.dll	PACSDK.dll	Specified SDK
.NET CF SDK	PACNET.dll	PACNET.dll	PACNET.dll	Specified SDK

The detail of the SDK library to be used for a specific I/O Module is listed in the table below:

Module	Native SDK	.NET CF SDK
I-8017HW	pac_i8017HW.dll	pac_i8017HWNet.dll
I-8014W	pac_i8014W.dll	pac_i8014WNet.dll
I-8024W	pac_i8024W.dll	pac8024WNet.dll
I-8026W	pac_i8026W.dll	pac_i8026WNet.dll
I-8048W	pac_i8048W.dll	pac_i8048WNet.dll
I-8050W	pac_i8050W.dll	pac_i8050WNet.dll
I-8084W	pac_i8084W.dll	pac_i8084WNet.dll
I-8088W	pac_i8088W.dll	pac_i8088WNet.dll
I-8093W	pac_i8093W.dll	pac8093WNet.dll
I-87088W	PACSDK_PWM.dll	PACNET.dll
Other I-8K & I-87K modules	PACSDK.dll	PACNET.dll

2. RS485 (I-7K Series & M-7K series)

I-7000, M-7000, RU-87Pn and high profile I-87K series modules connect to ViewPAC series devices via a twisted-pair, multi-drop, 2-wire RS-485 network.

SDK	Modules			
	I-7K series	I-7K series with	M-7K series	RU-87Pn +

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		PWM functions		I-87K
Native SDK	PACSDK.dll	PACSDK_PWM.dll	Modbus Demo	Refer to the I-8K Series & the I-87K Series
.NET CF SDK	PACNET.dll	PACNET.dll	Modbus Demo	Refer to the I-8K Series & the I-87K Series

The detail of the SDK library to be used for a specific I/O Module is listed in the table below:

Module	Native SDK	.NET CF SDK
M7000 series	Modbus Demo	Modbus Demo
I-7088W	PACSDK_PWM.dll	PACNET.dll
Other I-7K modules	PACSDK.dll	PACNET.dll

3. Ethernet

The Ethernet I/O devices available include ET-6000, ET-7000, I-8KE4/8 and I-8KE4/8-MTCP, and support either the DCON or the Modbus/TCP communication protocol.

Module	Native SDK	.NET CF SDK
ET-6K/ET-7K series	Modbus Demo	Modbus Demo

4. FRnet

FRnet is an innovative industrial field bus technology that uses twisted pair cable as the transmission medium. The status of all I/O devices is updated on a fixed cycle, no matter how many FRnet I/O modules are connected to the FRnet network.

Module	Native SDK	.NET CF SDK

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I-8172W	pac_i8172W.dll	pac8172WNet.dll

5. **CAN Bus**

   The Controller Area Network (CAN) is a serial communication way, which efficiently supports distributed real-time control with a very high level of security. It provides the error-processing mechanisms and concepts of message priority. These features can improve the network reliability and transmission efficiency.

Module	Native SDK	.NET CF SDK
I-8120W	I8120.dll	I8120net_pac.dll

Selection Guide for an I/O Module Demo Program

I-7K series:

http://ftp.icpdas.com.tw/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/applicabled_demo_for_7k_module.pdf

I-87K series:

http://ftp.icpdas.com.tw/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/applicabled_demo_for_87k_module.pdf

I-87K series:

http://ftp.icpdas.com.tw/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/winpac/applicabled_demo_for_8k_module.pdf

Modbus demo:

http://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/demo/nmodbus/

CAN Bus demo:

ftp://ftp.icpdas.com/pub/cd/fieldbus_cd/can/slotmodule/i_8120w/demos/

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7. ViewPAC Updates

This chapter provides instructions on how to upgrade ViewPAC OS and SDK.

ICP DAS will continue to add additional features to ViewPAC SDK and OS in the future, so we advise you to periodically check the ICP DAS web site for the latest updates.

ViewPAC updates services can be divided into the following two main categories:

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7.1. OS updates

The updates files of OS image are located on:

VP-23W1:

CD:\Napdos\vp-2000_ce50\OS_image\vp-23w1\

VP-25W1:

CD:\Napdos\vp-2000_ce50\OS_image\vp-25w1\

VP-413x:

CD:\Napdos\vp-2000_ce50\OS_image\vp-413x\

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There are two different ways of ViewPAC OS image updates:

i. ViewPAC OS updates from file

(We recommend that you use this method for quick and easy to update ViewPAC OS image)

ii. ViewPAC OS updates from eshell

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The ViewPAC OS supports multi-language:

i. en- English

ii. sc- Simplified Chinese

iii. tc- Traditional Chinese

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7.1.1. Updating the Boot Loader and the ViewPAC OS image from files

There are two different ways of ViewPAC OS image update:

i. ViewPAC OS updates from files (Please refer to this section)

We recommend that you use this method for quick and easy to update the ViewPAC OS image

ii. ViewPAC OS updates from eshell tool (Please refer to section "6.1.2. Updating the ViewPAC OS image from eshell")

Step 1: Get the latest version of the execute file and the corresponding "autoinit.bat" file and run it on the ViewPAC side

Each folder contains an execute file and a corresponding "autoinit.bat" file.

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Step 2: Get the latest version of the installation package and download it to ViewPAC, then execute it

For VP-23W1:

The latest version of the installation package can be obtained from:

CD:\Napdos\vp-2000_ce50\os_image\vp-23w1\update_from_file\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/os_image/vp-23w1/update_from_file/

For VP-25W1:

The latest version of the installation package can be obtained from:

CD:\Napdos\vp-2000_ce50\os_image\vp-25w1\update_from_file\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/os_image/vp-25w1/update_from_file/

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For VP-41xx:

The latest version of the installation package can be obtained from:

CD:\Napdos\vp-2000_ce50\os_image\vp-413x\update_from_file\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/os_image/vp-413x/update_from_file/

There are several ways to download the installation package to ViewPAC:

- On the ViewPAC, you can download the installation package via an Ethernet connection.
- On the host PC, you can download the installation package to ViewPAC via a USB storage device, the removable Micro SD card or FTP server.

The latest version of the ViewPAC OS image file can be obtained from:

CD:\Napdos\vp-2000_ce50\OS_image\

http://www.icpdas.com/products/PAC/ViewPAC/download/ViewPAC_8000/download_os_images.htm

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Step 3: After execute the installation package, the "Warning !" dialog will display, then click the "OK" button to start the update instructions

Step 4: On the main dialog, click the "Update Now" button

Step 5: On the "Warning !" dialog, click the "Yes" button

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Step 6: On the main dialog, click the “Update Now” button to start installation

Tips & Warnings

Please never turn the ViewPAC off during OS load. Besides we recommend you turn off all other application before updating.

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The installation will perform the following tasks:

i. Install Boot Loader file

Important Warning

Be careful, if the boot loader broken off in this step and cannot restart in safe mode, you have to send it back to us.

ii. Erase flash disk

iii. Install OS image

iv. Set registry settings to default

Tips & Warnings

This step will reset the registry settings to default, all of your before settings will lost.

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Step 7: After completing the above-mentioned tasks, the "Warning !" dialog will appear as follow, after clicking "OK" button to finish updating OS image, be sure the ViewPAC at normal mode

Step 8: Check the ViewPAC OS version

Start the ViewPAC_Utility, and then select the "System Information" tab to check the current OS version.

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7.1.2. Updating the ViewPAC OS image from eshell

There are two different ways of ViewPAC OS image update:

i. ViewPAC OS updates from files (Please refer to this section)

We recommend that you use this method for quick and easy to update the ViewPAC OS image

ii. ViewPAC OS updates from eshell tool (Please refer to section “6.1.2. Updating the ViewPAC OS image from eshell”)

By default, the OS update from Host PC to ViewPAC via Ethernet. Therefore, to update the OS image, make sure Ethernet is connected to the PC.

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Step 1: Get the latest version of the ViewPAC OS image

For VP-23W1:

The latest version of the installation package can be obtained from:

CD:\Napdos\vp-2000_ce50\os_image\vp-23w1\update_from_Eshell\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/os_image/vp-23w1/update_from_Eshell/

For VP-25W1:

The latest version of the installation package can be obtained from:

CD:\Napdos\vp-2000_ce50\os_image\vp-25w1\update_from_Eshell\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/os_image/vp-25w1/update_from_Eshell/

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For VP-41xx:

The latest version of the installation package can be obtained from:

CD:\Napdos\vp-2000_ce50\os_image\vp-413x\update_from_Eshell\

http://ftp.icpdas.com/pub/cd/winpac/napdos/vp-2000_ce50/os_image/vp-413x/update_from_Eshell/

Step 2: Run the ESHELL software on the Host PC

ESHELL you can be obtained at:

CD:\Napdos\wp-8x4x_ce50\PC_Tools\Eshell\

ftp://ftp.icpdas.com/pub/cd/ViewPAC/napdos/wp-8x4x_ce50/pc_tools/eshell/

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Step 3: Reboot the ViewPAC at update OS mode

Turn the rotary switch to “3”, and then reboot the ViewPAC.

Step 4: Select the device which you want to update the OS image

After starting the ESHELL software, the “Select Device” dialog will appear, and then select the device which you want.

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Step 5: Select the latest version of the OS image

Step 6: Once the procedure is completed, the "Warning !" dialog box will Appear on ViewPAC screen as below shown, before clicking the "Yes" button, you must first turn the rotary switch to the "0" position

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Step 7: Check the ViewPAC OS version

Start the ViewPAC_Utility, and then select the "System Information" tab to check the current OS version.

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7.2. SDKs Updates

The updates files of SDK image are located on:

CD:\Napdos\vp-2000_ce50\SDK\

By eVC and donet development tools, the ViewPAC SDK installation is divided into the following two parts:

By eVC and donet development tools, the WinPAC SDK installation is divided into the following two parts:

i. WinPAC SDK updates for dotnet

ii. WinPAC SDK updates for eMbedded Visual C++

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7.2.1. WinPAC SDK updates for C# or VB.net

To determine the SDK version that is compatibly running on the WinPAC, you can read the “Release Note” which is located under each SDK folder, these files provides important updated information for what we fixed and added.

Step 1: Get the latest version of the C# or VB.net components

The latest version of the C# or VB.net components can be obtained from:

ftp://ftp.icpdas.com/pub/cd/WinPAC/napdos/wp-8x4x_ce50/sdk/WinPACNet/

Step 2: Copy the latest version of DLL to Host PC and WinPAC

The DLL files on Host PC are located at anywhere only the solution can reference it.

The DLL files on WinPAC are located at the same directory as the .exe file.

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7.2.2. WinPAC SDK updates for eMbedded Visual C++

To determine the SDK version that is compatibly running on the WinPAC, you can read the “Release Note” which is located under each SDK folder, these files provides important updated information for what we fixed and added.

Step 1: Get the latest version of the eMbedded Visual C++ components

The latest version of the eMbedded Visual C++ components can be obtained from:

ftp://ftp.icpdas.com/pub/cd/WinPAC/napdos/wp-8x4x_ce50/sdk/WinPACSDK/

Step 2: Copy the latest version of header files and libraries to Host PC

The header files are located at:

C:\Program Files\Windows CE Tools\wce500\PAC270\Include

The libraries are located at:

C:\Program Files\Windows CE Tools\wce500\PAC270\Lib

Step 3: Copy the latest version of DLL files to WinPAC

The DLL files are located at:

\System_Disk\ICPDAS\System

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8. ViewPAC Download Center

This chapter introduces the ViewPAC-2000 Download Center.

Visit the ViewPAC Download Center:
http://www.icpdas.com/products/PAC/viewpac/download/viewpac/download_os_images.htm

The following update categories are available from the ViewPAC Download Center.

✓ **OS images** Includes updates and the latest version of ViewPAC OS.

✓ **ViewPAC SDK** Includes updates and the latest version of each ViewPAC component SDK, such as ViewPAC SDK, NAPOPC_CE5 SDK, Modbus SDK, etc.

✓ **Utility & Tools** Includes updates and the latest version for ViewPAC toolkits

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✓ **Demo** Includes all related ViewPAC demos.

✓ **Documents** Includes updates and the latest version for related ViewPAC documents.

✓ **System Disk** Includes updates and the latest version for ViewPAC toolkits

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9. How to change the batteries

RTC and SRAM data is retained by two Li batteries, which can supply continuous power to the 512 KB SRAM to ensure that the data is retained for 5 years. The dual-battery design has the added function of preventing data from being lost while replacing the battery.

The following figures show the location of the tow batteries installed in the ViewPAC.

Checking the current battery power:

1. Run the ViewPAC utility and check the Battery1 and Battery2 fields that display the current status of each battery. Refer to Section 3.5 ViewPAC utility “System Settings Tab” for more details. If the power level for either of the batteries is low, both should be replaced. Note which battery has the lowest power level.

2. When programming this, call the pac_GetBatteryLevel() API function in the PACSDK.dll to check whether the battery power is low. When the power for either of the batteries is low, it’s recommended that the battery is replaced immediately, otherwise the data on the SRAM may be lost or RTC time will be reset.

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1 Replacing the battery without losing data

1.1 Power off the ViewPAC device.

1.2 Remove the cover of the module inserted into the slot.

1.3 First, remove the battery that is running low on power from the battery holder.

1.4 Insert a new battery.

1.5 Remove the other battery.

1.6 Insert a new battery.

Notes:

1. If the battery power for only one of the two batteries is low, you can use this method to replace the battery so as to prevent data from being lost. (In the circuit design for the ViewPAC series, When the power for one of the batteries is low, it will automatically switch to the other one to ensure continued battery power)
2. If both batteries have run out of power, the data will be lost, even if this method is used to replace the batteries.

2 Replacing the battery – 2

Back up the SRAM data using a backup utility before replacing the battery. Refer to Section 2.8 “Using the Backup Utility to back up the settings and files” to back up and restore the SRAM data.

2.1 Run the backup utility to back up the SRAM data.

2.2 Power off the ViewPAC device.

2.3 Remove the cover of the module inserted into the slot.

2.4 Remove both batteries from their respective holders.

2.5 Insert two new batteries.

2.6 Power on the ViewPAC device.

2.7 Run the backup utility to restore the SRAM data.

2.8 Set the RTC time.

Ordering information

Battery type: BR1632 (Part number is 2LB010 for ICP DAS)

For more detailed information, contact your local sales office or distributor.

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Appendix A. I-8K and I-87K Modules

There are 3 slot options to expand local I/O. And the I/O modules can be parallel bus type (high profile I-8K series) and serial bus type (high profile I-87K series).

The difference between them is

Item	I-8K Series	I-87K Series
Communication interface	Parallel bus	Serial bus
Protocol	-	DCON
Communication speed	Fast	Slow
DI latched function	-	Yes
Counter input (for digital input module)	-	Yes (100 Hz)
Power on value	-	Yes
Safe value	-	Yes
Programmable slew-rate for AO module	-	Yes

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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 1.2Km, the RS-485 repeater must be added to extend the RS-485 network.

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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.

Tips & Warnings

If PC/Laptop has no COM port, you can use the I-7561 (USB to RS-485 converter) for connection between ViewPAC and PC/Laptop.

Before using the I-7561 converter, you must install the USB driver. The USB driver can be obtained from:

ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/7000/756x/

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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.

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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.

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

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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.

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B.5. Master/Slaves Settings

There must be exist one master to have a jumper in the same network. In a master/slave application, “Master” is the default configuration of ViewPAC.

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B.5.1. ViewPAC as a Master (default)

When one of ViewPAC is set to the master mode, then all the other devices on the same network must be set to the slave mode.

Set ViewPAC to the master mode by adjusting the jumpers on the power board of ViewPAC. Refer to the following figure:

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B.5.2. ViewPAC as a Slave:

Set ViewPAC to the slave mode by adjusting the jumpers on the power board of ViewPAC. Refer to the following figure:

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The maximum distance of RS-485 without using a repeater is 1,200 meters (4,000 feet). You can extend that distance by adding an RS-485 Repeater every 1,200 meters as shown below.

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Appendix C. Tips – How to

We will continue to add flexibility and support to the ViewPAC that always can be found at:

http://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/document/faq/general_io_expansion/

The following sections will present several common application of ViewPAC.

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C.1. How to add a user account to remote login the ViewPAC from PC

C.1.1. How to add a user account

Here are step by step instructions on how to add a user account.

Step 1: Run the ViewPAC Utility

Step 2: On the Network tab, click Login tab, type the User Name and Password, and then click Add button

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Step 3: The user has been added to the allowed under the remote login and included in the following list

Step 4: On the File menu, click Save and Reboot for changes to take effect

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C.1.2. How to Use telnet to remote login the ViewPAC from PC

Here are step by step instructions on how to use telnet to remote login the XPAC from PC.

Step 1: On the PC, open a MS-DOS command prompt

Step 2: At the command prompt, type "telnet (IP address)"

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Step 3: The connection has been set up, and then type the name and password

Step 4: The remote login has been completed

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C.1.3. How to remove the user from the login list

Here are step by step instructions on how to remote the user from the login list.

Step 1: Click a user from the list which you want to remove, and the user will display in the field, and then press Delete to delete the user from the login list

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Step 2: On the File menu, click Save and Reboot for changes to take effect

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C.2. How to online debug ViewPAC

Debugging is a process that you use to find and resolve errors, or bugs, in a program.

C.2.1. Debug ViewPAC programs in EVC++

Step 1: On the "Tools" menu, click "Configure Platform Manager…" command

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Step 2: On the "Windows CE Platform Manager Configuration" dialog, click the "Properties…" button

Step 3: On the "Device Properties" dialog, click the "Configure…" button

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Step 4: On the "TCP/IP Transport Configuration" dialog, select the "Fixed port" check box, and then click the "OK" button

Step 5: On the "Windows CE Platform Manager Configuration" dialog, click the "Test" button

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Step 6: The "Manual Server - Action" dialog will appear displaying a command line, before click the "OK" button to close dialog, turn to the ViewPAC controller side to do the next two-steps

Step 7: On the ViewPAC controller side, select the "Start" menu, and then click the "Run…" command

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Step 8: On the "Run" dialog, type the command which displays in step 5 and then click the "OK" button

Step 9: Return to the Host PC side, on the "Manual Server – Action" dialog, click the "OK" button

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Step 10: On the “Testing Device Connection” dialog, click the “OK” button

Step 11: On the “Device Properties” dialog, click the “OK” button

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Step 12: On the "Windows CE platform or device to configure" dialog, click the "OK" button

Step 13: On the "Build" menu, select the "Start Debug" command and then click the "Go" command

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Step 14: The "Manual Server - Action" dialog will appear displaying a command line, before click the "OK" button to close dialog, turn to the ViewPAC controller side to do the next two-steps

Step 15: On the ViewPAC controller side, select the "Start" menu, and then click the "Run…" command

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Step 16: On the "Run" dialog, type the command which displays in step 5 and then click the "OK" button

Step 17: Return to the Host PC side, on the "Manual Server – Action" dialog, click the "OK" button

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Step 18: On the “Manual Server - Action” dialog, click the “OK” button

Step 19: Connection established. Then you can debug on line.

Tips & Warnings

If you want to quit the debugger and return to editing, you can click the “Stop Debugging “button from “Debug” menu

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C.2.2. Debug ViewPAC programs in Visual Studio 2005/2008

Debugging in Visual Studio 2005/2008 are provided by ViewPAC OS image V 1.3.0.4 or later.

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\armv4i	1. DeviceDMA.dll 2. eDbgTL.dll 3. TcpConnectionA.dll 4. clientshutdown.exe 5. CMAccept.exe 6. ConmanClient2.exe

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

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

Step 3: On the "Project" menu, click "[Project Name] Properties…" command

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Step 4: On the "SystemInfo*" tab, unselect "Deploy the latest version of the .NET compact Framework (includeing Service Packs)" check box

Step 5: On the "Tools" menu, click "Options…" command

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Step 6: On the "Options" dialog, select "PAC 270" from the "Show devices platform" list, and then click the "Properties…" button

Step 7: On the "CAYMAN-ARMV4I_Release Properties" dialog, click the "Configure…" button

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Step 8: On the "Configure TCP/IP Transport" dialog, select the "Use specific IP address" option and type the IP address of ViewPAC, and then click the "OK" button

Step 9: On the "CAYMAN-ARMV4I_Release Properties" dialog, click the "OK" button

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Step 10: On the “Options” dialog, click the “OK” button

Step 11: On the ViewPAC controller side, run the “CommanClient2” and the “CMAccept.exe” applications which is located at: \System_Disk\ICPDAS\System

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Step 12: On the “Tools” menu, click “Connect to Device…” command

Step 13: On the “Connect to Device” dialog, select “PAC 270” from “Platform” list and then click the “Connect” button

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Step 14: On the “Tools” menu, click “Connect to Device…” command

Step 15: Connection established. Then you can debug on line.

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FAQ:

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

Open the command prompt, run the "CommanClient2.exe/transport:tcpconnectiona.dll/property:port=5000/id:Con" at: \System_Disk\ICPDAS\System, and then run the "CMAccept.exe"

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C.3. How to recompile WinCon programs

To recompile Wincon programs to run on ViewPAC, certain components of the programs require adjustments that divides into two parts:

1. Compiler old programs which ran on Wincon 8x3x and 8x4x
2. Modify .vcp file to upgrade the old WinCon project

Tips & Warnings

In general, you only need to do part 1, after this, if the program still can't be compiled to an application, the part 2 just need to do.

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C.3.1. Compiler old programs which ran on Wincon 8x3x and 8x4x

Step 1: Open project which programmed in WinCon using eMbedded Visual C++

Step 2: On the "Build" menu, click "Configurations" command

Step 3: Make sure the CPU type is "STANDARDSDK"

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Step 4: On the "Configurations" dialog, click the "Add…" button

Step 5: On the "Add Project Configuration" dialog, choose one of the CPU type and then click the "OK" button.

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Step 6: On the "Project" menu, click "Settings…" command

Step 7: On the "Project Settings" dialog, select the "Link" tab and change the value of the "Entry-point symbol" field, "WinMainCRTStarup" to "wWinMainCRTStartup",

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Step 8: After performing above-mentioned steps, build the project, your project should build success. If not, it will show error message as follow. Please continue with the following steps

Step 9: On the "Project" menu, click "Settings…" command

Step 10: On the "Project Settings" dialog, select the "Link" tab and change the value of the "Project Options" field, "ARM" to "THUMB", and then built the project

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C.3.2. Modify .vcp file to upgrade the old WinCon project

Step 1: Open a text editor to modify the .vcp file

Step 2: In the .vcp file, replace “0xa301” with “0xa501”

Step 3: In the .vcp file, replace “ARMV4” with “ARMV4I”

Step 4: In the .vcp file, replace “MACHINE:ARM” with “MACHINE:THUMB”

Step 5: Save the .vcp file just edited

Step 6: Open the old WinCon project and recompile it

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C.4. How to use the printer

ViewPAC have ability to access the printer, you can connect to the printer via Ethernet network or USB.

Tips & Warnings

ViewPAC only supports HP Laser Jet Printers which support PCL6 driver. The following printer support is released by HP

- HP LaserJet 4000 series/HP LaserJet 4100 series
- HP LaserJet 2100 series/HP LaserJet 2200 series
- HP LaserJet 1200
- HP LaserJet 3200/HP LaserJet 3300
- HP LaserJet 4200 series/HP LaserJet 4300 series
- HP LaserJet 5000 series/HP LaserJet 5100 series
- HP LaserJet 8000 series
- HP LaserJet 9000 series printers

If you need the latest support of HP PCL6 printer, you can refer to following link
http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?objectID=bpl04568

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C.4.1. How to use network printer

To use a shared network printer, please perform the following steps:

Step 1: On the Host PC, check the name of the Host PC and the shared printer

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Step 2: On the ViewPAC, open a WordPad format file

Step 3: On the ViewPAC, open a WordPad format file

Step 2: Set up the printer

1. Printer: PCL Laser

2. Port: Network

3. Net Path: \\ServerName\PrinterName

The "ServerName" is your PC's name or IP.

The "PrinterName" is your printer's shared name of your PC

4. Paper Size: Select the paper size

Test !!!

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C.4.2. How to use printer via USB

To use a shared network printer via USB, please perform the following steps:

Step 1: On the ViewPAC, open a WordPad format file

Step 2: Set up the printer

1. Printer: Hewlett-Packard LaserJet
2. Port: LPT1
3. Paper Size: Select the paper size

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C.5. How to use services tool

The services tool can help you turn on, turn off and monitor the WinCE services.

Step 1: Open a MS-DOS command prompt

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Step 2: List all services

[Syntax] services list

```
File   Edit   Help
 Pocket CMD v 5.0
\> services list
NFY0:    0x00030110      NOTIFY.Dll       Running
HTP0:    0x00031570      HTTPD.DLL        Running
CRD0:    0x00032070      credsvc.dll      Running
MMQ1:    0x00036790      MSMQD.Dll        Off
OBX0:    0x00036b20      OBEXSrVr.dll     Off
FTP0:    0x00037770      FTPD.Dll         Running
TEL0:    0x00037ac0      TELNETD.Dll      Running
SMB0:    0x0003c3e0      smbserver.dll    Running
NTP0:    0x0003fff0      timesvc.dll      Running
\>
```

Step 3: Type the commands to configure service

[Syntax] services stop <services name>

For example, turn on the “FTP” service:

services stop FTP0:

```
File   Edit   Help
 Pocket CMD v 5.0
\> services stop FTP0:
\> services list
NFY0:    0x00030110      NOTIFY.Dll       Running
HTP0:    0x00031570      HTTPD.DLL        Running
CRD0:    0x00032070      credsvc.dll      Running
MMQ1:    0x00036790      MSMQD.Dll        Off
OBX0:    0x00036b20      OBEXSrVr.dll     Off
FTP0:    0x00037770      FTPD.Dll         Off
TEL0:    0x00037ac0      TELNETD.Dll      Running
SMB0:    0x0003c3e0      smbserver.dll    Running
NTP0:    0x0003fff0      timesvc.dll      Running
\>
```


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Tips & Warnings

For more information about using services tool, you just type "services help"

```
File   Edit   Help
 Pocket CMD v 5.0
\> services help
Commands:
        help - print this text
        list - lists loaded services
        load <service name> - activates a service that is inactive
        stop <service instance> stops/pauses a service (does not unl
        start <service instance> - starts/resumes a service
        refresh <service instance> - causes service to refresh its c
        unload <service instance> - causes service to be unloaded an
        register <service name> - service will be automatically load
eboot
        unregister <service name> - service will not be automaticall
next reboot
        command <service name> [arg1 arg2 ...] - send service-specif
o service
        help <service name> - get information on what service-specif
are supported

        <service name> - service's name in the registry (i.e. HTTPD)
        <service instance> - particular instantiation (i.e. HTP0:)
Flags:
        -f <file name>
        -s silent
        -d output to debugger
\>
```


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Appendix D. Revision History

Revision	Date	Description
1.0.1	August 2009	Initial issue
1.0.2	September 2009	Added information about the support of the printer driver in section C.4
1.0.3	December 2009	1. Modified the operating modes in section 2.5 2. Added the requirements of the ViewPAC SDK in section 4.3.
1.0.4	February 2010	1. Modified the specification of the Dual Battery Backup SRAM features in section 1.1. 2. Modified information about Operating Environment in section 1.2.
1.0.5	January 2011	1. Added information on how to use Backup Utility to back up the settings and files in section 2.9. 2. Added information about a caution of using System_Disk in section 2.10. 3. Added information about the ViewPAC Utility functionality in section in section 3.5.2. 4. Deleted information on how to establish a new telnet and FTP account in section C.1. 5. Added information on how to add a user account to remote login the ViewPAC from PC in section C.1.
1.0.6	July 2011	1. Added information on the Overview in section 1.4. 2. Modified information about the application of RS-485 network in appendix E.
1.0.7	February 2012	1. Modified the features of the ViewPAC in section .1.1. 2. Modified the specification of the ViewPAC in section 1.2.
1.0.8	July 2012	1. Added information about COM2 in section 1.3. 2. Added information about how to use the printer in appendix C.4.
1.0.9	October 2012	Modified information about ViewPAC Platform SDKs in chapter 4.

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1.0.10	November 2012	Added information about VP-4131 in section 1.2, 1.3, 1.4 and 2.1 Added the ViewPAC Utility function in in section 3.5.2
1.0.11	September 2013	1. Update ViewPAC utility information in section 3.5. 2. Added limitations for using Visual Studio in section 4.1. 3. Added battery change in section 9

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