

**WP-8148** **WP-8448**



**WP-8848**

## Features

- PXA270, 520 MHz CPU
- Windows CE 5.0
- Embedded Win-GRAF SoftLogic (IEC 61131-3)
- Hard Real-Time Capability
- VGA Port Output
- Modbus RTU/TCP (Master, Slave)
- Support eLogger HMI
- Redundant Power Inputs
- Operating Temperature: -25 ~ +75°C

## Introduction

The **Win-GRAF WinPAC-8000** Series **(WP-8148/8448/8848)** is the new generation WinCE 5.0 based Win-GRAF PAC (Programmable Automation Controller) from ICP DAS. Each WP-8xx8 is equipped with a PXA270 CPU (520 MHz) running a Windows CE 5.0 operating system, a variety of input/output ports (VGA, USB, Ethernet, RS-232/485), and a range of I/O slots that can be used to integrate high performance parallel I/O modules (high profile I-8K Series) or serial I/O modules (high profile I-87K series).

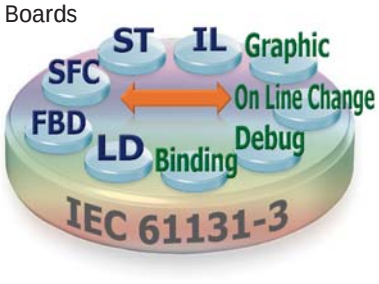
The benefits of running Windows CE 5.0 on a WinPAC device include hard real-time capability, achievable deterministic control and allowing PAC can have a PC-like window displays and operating environment. The WP-8xx8 series PACs are capable of running Win-GRAF (IEC 61131-3 Standard) software to develop logic control applications, and also supporting M.S. VS 2008 software (VB .NET, C#) to develop HMI and data management applications that can exchange data with Win-GRAF applications. So the application's design is more convenient and more practical.

## Win-GRAF

**Win-GRAF** is a powerful, PLC-like, softlogic development software. It is installed on PC with windows 7 or 8. It supports the international PLC language standard - IEC 61131-3 - Ladder Diagram (LD), Function Block Diagram (FBD), Sequential Function Chart (SFC), Structured Text (ST), Instruction Set (IL), suitable to develop applications for the full range of Win-GRAF PACs from ICP DAS.

The features of the Win-GRAF:

- IEC 61131-3 Standard Open PLC Syntax (LD, FBD, SFC, ST, IL)
- Using ST Syntax in the FBD or LD Program
- Event Triggered Data Binding (Exchange Data between PACs)
- Online Debugging/Control/Monitoring, Offline Simulation
- On Line Change
- Various Protocols:
  - Modbus TCP/UDP, Modbus RTU/ASCII Master
  - Modbus TCP, RTU Slave
  - DCON ...
- Plenty of Functions, Function Blocks, I/O Boards
- Redundancy (For XP-8xx8-CE6 PAC only)

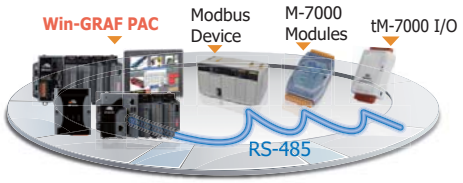




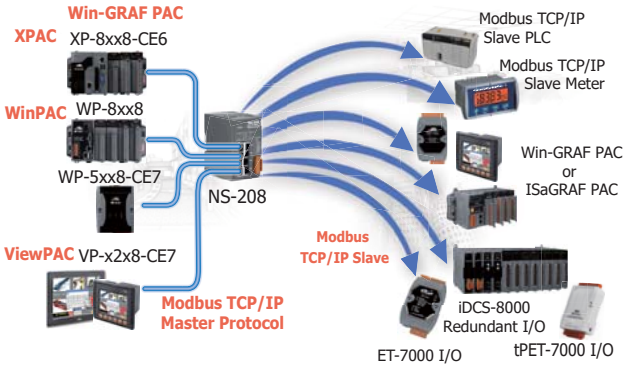

## Applications

### Modbus Master Ports

**Modbus RTU/ASCII Master**




**Modbus TCP/UDP Master**



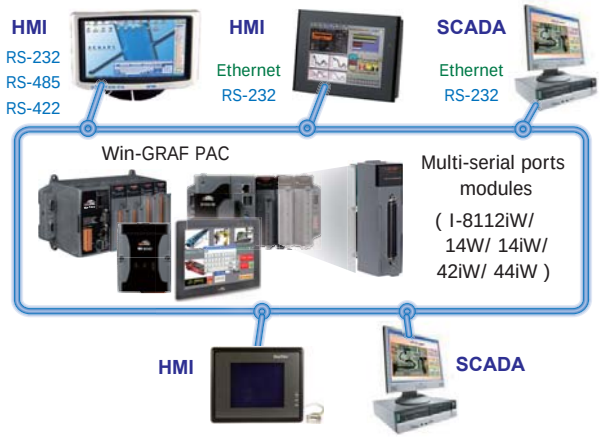

Win-GRAF XPAC support max. 200 devices.
Win-GRAF WinPAC & ViewPAC support max. 32 devices.

### On Line Change

- Replace the current running project to a new modified one without stopping the project.

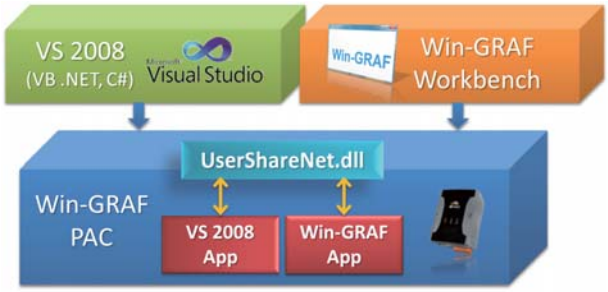



### Modbus RTU/TCP Slave Ports

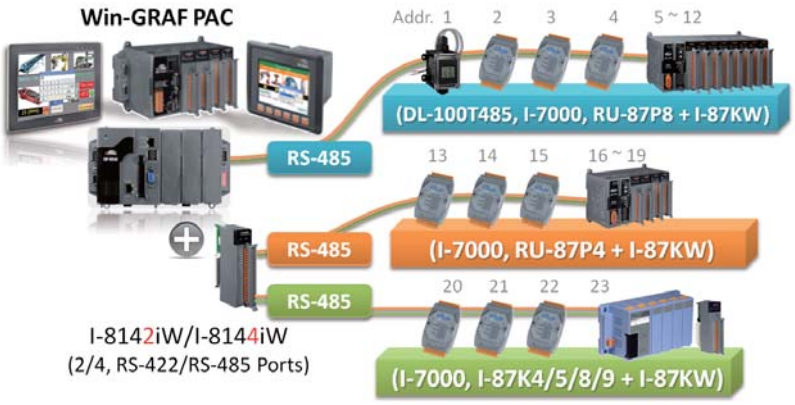



### Support VS 2008 Development

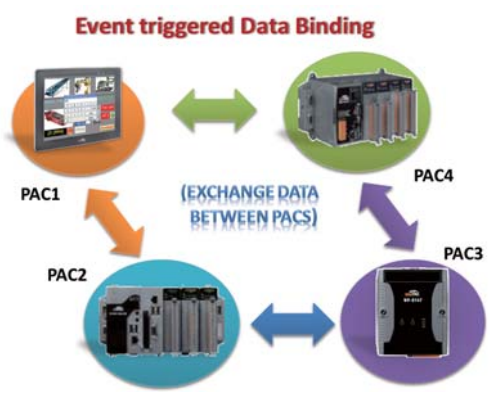
- The Win-GRAF PACs support to use VS 2008 (VB.net, C#) to develop user own HMI and data management programs, and can exchange variables with the Win-GRAF control programs.



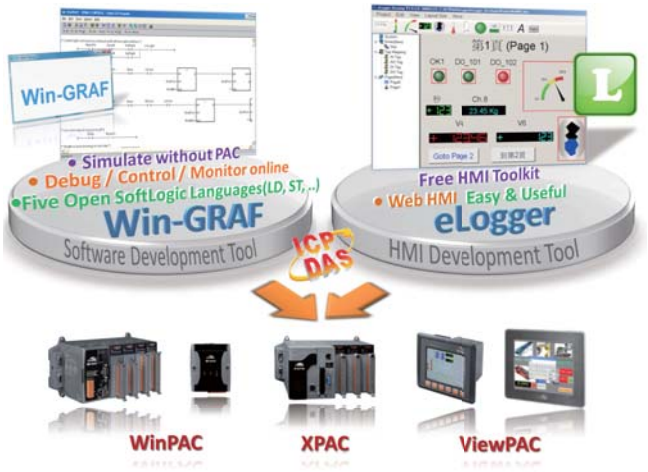

### DCON Remote I/O




### Data Binding



## eLogger HMI

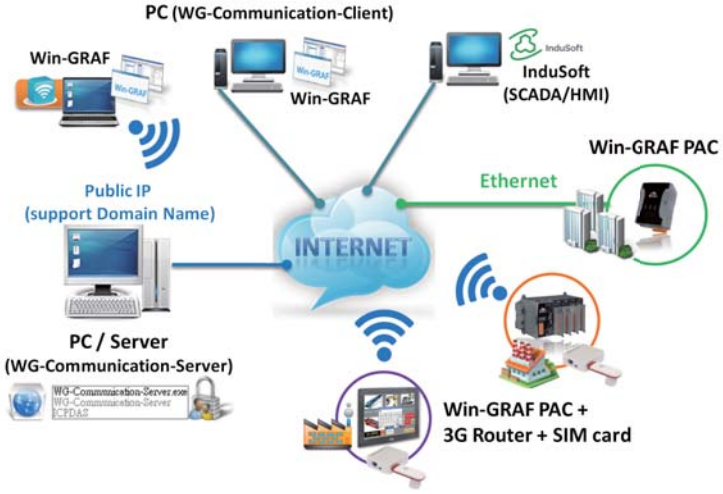



## Schedule Control



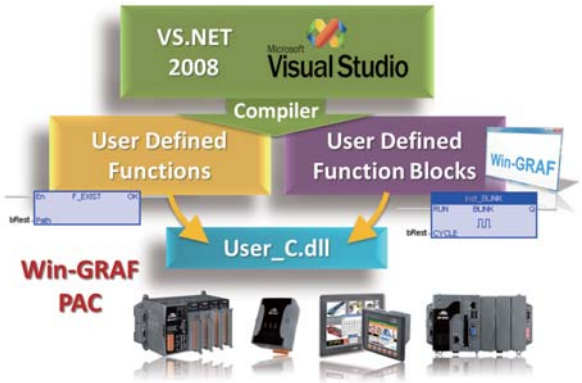

## Intelligent Win-GRAF 3G Solution

- Only the WG-Communication Server (behavior like a Cloud Server) needs a public IP (Support Domain Name). Other PACs and PCs that connect to this Server no need a public IP.
- The user can monitor the remote PAC by using a 3G wireless network or an intranet.
- The user can use the Win-GRAF Workbench to connect to a remote PAC to debug/update the Win-GRAF program or update the Win-GRAF PAC Driver.
- The PAC can actively send a Log File to a PC (WG-Communication-Server).



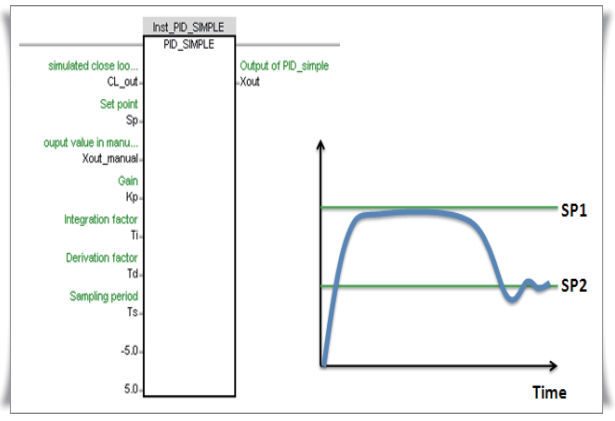

## Create Your Own Functions and Function Blocks

- For some reason (like business protection, integration with your own product protocol, and etc.), you can develop your own functions and function blocks by VS 2008. Then, you can use these functions and function blocks in the Win-GRAF project.




## PID Control

- Can Control more than 200 PID in one PAC.



## PAC Specifications

| Models | | WP-8148 | WP-8448 | WP-8848 |
|---|---|---|---|---|
| **System Software** | | | | |
| OS | | Windows CE 5.0 | | |
| .Net Compact Framework | | 3.5 | | |
| Embedded Service | | FTP server, Web server (supports VB script, JAVA script), Embedded SQL server | | |
| Multilanguage Support | | English, German, French, Spanish, Russian, Italian, Korean, Simplified Chinese, Traditional Chinese | | |
| **Development Software** | | | | |
| Win-GRAF Software | Win-GRAF | IEC 61131-3 standard. | | |
| | Languages | LD, ST, FBD, SFC & IL;<br>Support eLogger HMI: WP-8xx8, WP-5xx8-CE7, WP-8xx8-CE7, WP-9xx8-CE7, XP-8xx8-CE6 and VP-x2x8-CE7 PAC | | |
| | Max. Code Size | 2 MB | | |
| | Scan Time | 3 ~ 15 ms for normal program; 15 ~ 50 ms for complex or large program | | |
| Non-Win-GRAF | | Options: VS.NET 2008 (VB.NET, C#.NET, C) | | |
| **CPU Module** | | | | |
| CPU | | PXA270, 520 MHz | | |
| SDRAM | | 128 MB | | |
| Fast Retain Memory | | 512 KB (for retain variables) | | |
| Flash | | 96 MB | | |
| EEPROM | | 16 KB | | |
| Memory Expansion | | microSD socket with one microSD card (support up to 32 GB) | | |
| RTC (Real Time Clock) | | Provide second, minute, hour, date, day of week, month, year | | |
| 64-bit Hardware Serial Number | | Yes, for Software Copy Protection | | |
| Dual Watchdog Timers | | Yes | | |
| Programmable LED Indicator | | 1 | | |
| Rotary Switch | | Yes (0 ~ 9) | | |
| DIP Switch | | - | Yes (8 bits) | |
| **VGA & Communication Ports** | | | | |
| VGA | | Yes (640 x 480, 800 x 600) | | |
| Ethernet | | RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, LED indicators) | | |
| USB 1.1 (host) | | 1 | | |
| COM 0 | | Internal communication with the high profile I-87K series modules in slots | | |
| COM 1 | | RS-232 (to update firmware) (RxD, TxD and GND); non-isolated | | |
| COM 2 | | RS-485 (Data+, Data-) with internal self-tuner ASIC;<br>2500 $V_{DC}$ isolated for WP-8138 and WP-8148; 3000 $V_{DC}$ isolated for other models. | | |
| COM 3 | | - | Yes | |
| | | RS-232/RS-485 (RxD, TxD, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated | | |
| COM 4 | | - | Yes | |
| | | RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated | | |
| **I/O Expansion Slots** | | | | |
| Slot Number | | 1 | 4 | 8 |
| | | Note: For High Profile I-8K and I-87K Modules Only | | |
| **Mechanical** | | | | |
| Dimensions (W x L x H) | | 95 mm x 132 mm x 111 mm | 231 mm x 132 mm x 111 mm | 355 mm x 132 mm x 111 mm |
| Installation | | DIN-Rail or Wall Mounting | | |
| **Environmental** | | | | |
| Operating Temperature | | -25 ~ +75°C | | |
| Storage Temperature | | -30 ~ +80°C | | |
| Ambient Relative Humidity | | 10 ~ 90% RH (non-condensing) | | |
| **Power** | | | | |
| Input Range | | +10 ~ +30 $V_{DC}$ | | |
| Isolation | | 1 kV | | |
| Redundant Power Inputs | | Yes, with one power relay (1 A @ 24 $V_{DC}$) for alarm | | |
| Capacity | | 8 W | 30 W | 30 W |
| Consumption | | 7.3 W | 9.1 W | 9.6 W |

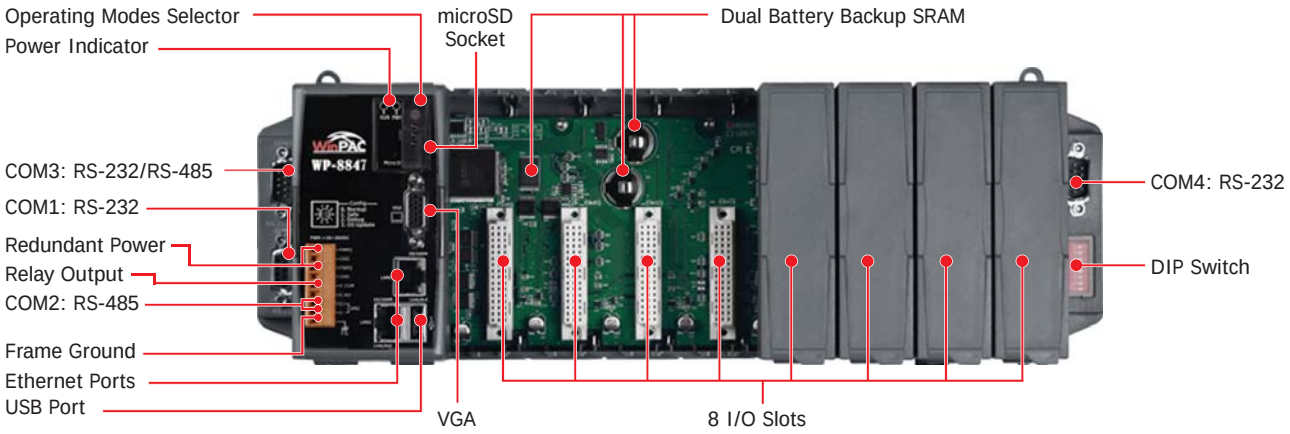
## Win-GRAF Specifications

| Protocols (Note that certain protocols require optional devices) | |
|---|---|
| NET ID | 1~255, for Modbus TCP/RTU Slave, user-assigned |
| Modbus TCP Master | A max. of 32 IP links to access/control the devices supporting Standard Modbus TCP Slave protocol. |
| Modbus RTU/ASCII Master | A max. of 36 ports: COM1 ~ 37 to connect other Modbus Slave devices (Like M-7000). Recommend connecting no more than 32 devices in each port for better scan rate. (*) |
| Modbus RTU Slave | A max. of 16 ports: COM1 ~ 37 for connecting SCADA/HMI/OPC Server. (*) |
| Modbus TCP Slave | Two Ethernet ports (LAN1 & LAN2) support up to 32 connections. If the PAC uses 1 connection to connect each PC/HMI, it can connect up to 32 PCs/HMIs; If the PAC uses 2 connections to connect each PC/HMI, it can connect up to 16 PCs/HMIs; If one of the Ethernet port malfunctions, the other one can still be used to connect the PC/HMI. |
| User-defined Protocol | Custom protocols can be applied at COM1~37 by using Serial communication functions or function blocks. (*) |
| DCON Remote I/O | A max. of 16 RS-485 ports: COM1 ~ 37. Each port can connect max. 50 nos I-7000 series modules or 50 nos I-87xxxW I/O modules in expansion units (I-87K4, I-87K8, I-87K9, RU-87P8, RU-87P4). Recommend connecting no more than 32 modules in each port for better scan rate. |
| Local I/O Modules | Supports only high profile I/O modules. Slot 0~7 supports I-8xxxW parallel I/O modules and I-87xxxW serial I/O modules. (Refer Optional I/O List) |
| App Protection | Using the unique 64-bit (8 bytes) PAC serial number to generate a protection password by your own algorithm to protect your Win-GRAF application. Then, if someone intend to copy your application in the PAC to another new PAC with the same PAC model, this application will not work properly in that new PAC. |
| Data Binding | Exchange data between ICP DAS Win-GRAF PAC via Ethernet ports (LAN1 and LAN2). The data transmission is event triggered. It is much efficient than polling way. Beside, user can setup the Redundant Binding in two ethernet ports by Software, then if one Ethernet port fail, it can switch to use the other port. |
| On Line Change | For application field that not allowed to stop the Win-GRAF program and wish to run a new program modified a little from the original program. |
| Modbus RTU I/O | When software enables Modbus RTU Master function, the PAC can connect ICP DAS M-7000 and tM series and LC series I/O modules which support Modbus RTU protocol. |
| Modbus TCP I/O | When software enable Modbus TCP Master function, the PAC can connect ET-7000, I-8KE4/8-MTCP and tPET/tET series I/O modules of ICP DAS which support Modbus TCP protocol. |
| HART Master | Support I-87H17W modules in slot 0 to 7 to communicate with other HART devices. |
| Schedule Control | Supports the "Schedule-Control Utility" (free) to implement schedule control. Each PAC can control max. 10 Targets (devices) with different schedule settings in each day / holiday / special day / season / year . |
| Retain Variables | Built-in the fast retain memory that can retain up to 12,000 Win-GRAF variables. |
| File Access & Data Log | The Win-GRAF supports file operation functions to read/write files in the PAC's micro_SD or flash memory to do data log or file access. |
| eLogger HMI | Support to run HMI program (developed by the eLogger) together with the Win-GRAF logic-control program in the same PAC. |
| **Optional I/O List** (Refer to http://www.icpdas.com/root/product/solutions/remote_io/rs-485/i-8k_i-87k/i-8k_i-87k_selection.html#a) | |
| Digital Input (DI) | I-8040W, I-8040PW, I-8046W, I-8051W, I-8052W, I-8053W, I-8053PW, I-87040W, I-87040PW, I-87046W, I-87051W, I-87052W, I-87053W, I-87053PW, I-87053W-A2, I-87053W-A5, I-87053W-E5 |
| Digital Input/Output (DIO) | I-8042W, I-8050W, I-8054W, I-8055W, I-87042W, I-87054W, I-87055W |
| Digital Output (DO) | I-8037W, I-8041W, I-8041AW, I-8056W, I-8057W, I-87037W, I-87041W, I-87057W, I-87057PW |
| Relay Output | I-8060W, I-8063W, I-8064W, I-8068W, I-8069W, I-87061W, I-87061PW, I-87063W, I-87064W, I-87065W, I-87066W, I-87068W, I-87068W-2A, I-87069W, I-87069PW |
| AC Input | I-8058W, I-87053W-AC1, I-87058W, I-87059W |
| Analog Input (AI) | I-8017DW, I-8017HW, I-8017HCW, I-87017W, I-87017RW, I-87017RCW, I-87017DW, I-87017W-A5, I-87017ZW, I-87018W, I-87018RW, I-87018PW, I-87018ZW, I-87019PW, I-87019RW, I-87019ZW |
| Analog Output (AO) | I-8024W, I-87024CW, I-87024UW, I-87024DW, I-87024RW, I-87024W, I-87028CW, I-87028UW, I-87028VW, I-87028VW-20V |
| Multifunction (DIO, AIO) | I-87026W |
| Temperature Input | T/C: I-87018W, I-87018RW, I-87018PW, I-87018ZW, I-87019PW, I-87019RW, I-87019ZW<br>Thermister: I-87005W; RTD: I-87013W, I-87015W, I-87015PW |
| Strain Gauge | I-87016W |
| Counter/Frequency Input | I-8084W, I-87082W, I-87084W |
| Encoder Input | I-8093W |
| PWM Output | I-8088W |
| HART | I-87H17W |
| GPS | GPS-721 |
| Communication Module | I-8112iW, I-8114W, I-8114iW, I-8142iW, I-8144iW |
| Temperature & Humidity Input | DL-100T485, DL-100T485-W, DL-100T485P, DL-100T485P-W (DCON Protocol)<br>DL-100TM485, DL-100TM485-W, DL-100TM485P, DL-100TM485P-W (Modbus RTU Protocol) |

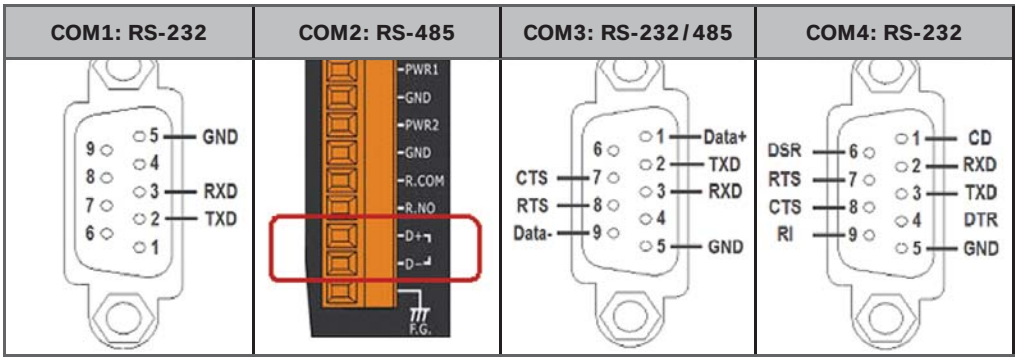
*** Note: The COM6 ~ COM37 ports are located in the expansion boards if they are installed in slot 0~7 of WP-8xx8.**
*** WP-8148 has no COM3 & COM4.**
*** ICP DAS recommends using NS-205/208 or RS-405/408 (Ring Switch) Industrial Ethernet Switches.**

## Appearance

WP-8848




## Pin Assignment




## Ordering Information

| | |
|---|---|
| **WP-8148-EN** | Win-GRAF based WinPAC-8000 with 1 I/O Slot (Multilanguage Version of OS) |
| **WP-8448-EN** | Win-GRAF based WinPAC-8000 with 4 I/O Slots (Multilanguage Version of OS) |
| **WP-8848-EN** | Win-GRAF based WinPAC-8000 with 8 I/O Slots (Multilanguage Version of OS) |
| **WP-8148-TC** | Win-GRAF based WinPAC-8000 with 1 I/O Slot (Traditional Chinese Version of OS) |
| **WP-8448-TC** | Win-GRAF based WinPAC-8000 with 4 I/O Slots (Traditional Chinese Version of OS) |
| **WP-8848-TC** | Win-GRAF based WinPAC-8000 with 8 I/O Slots (Traditional Chinese Version of OS) |
| **WP-8148-SC** | Win-GRAF based WinPAC-8000 with 1 I/O Slot (Simplified Chinese Version of OS) |
| **WP-8448-SC** | Win-GRAF based WinPAC-8000 with 4 I/O Slots (Simplified Chinese Version of OS) |
| **WP-8848-SC** | Win-GRAF based WinPAC-8000 with 8 I/O Slots (Simplified Chinese Version of OS) |
| **WP8-GUP-18000** | Upgrade WP-8x41 to WP-8x48 to support Win-GRAF. |

## Software and Accessories

| **Win-GRAF Development Software** | |
|---|---|
| Win-GRAF Workbench | Win-GRAF Workbench Software (Large I/O Tags) with one USB Dongle |
| | |
| **Accessories** | |
| DP-660 | 24 $V_{DC}$/2.5 A, 60 W and 5 $V_{DC}$/0.5 A, 2.5 W Power Supply with DIN-Rail Mounting |
| DP-1200 CR | 24 $V_{DC}$/5.0 A, 120 W Power Supply with DIN-Rail Mounting (RoHS) |
| MDR-60-24 CR | 24 $V_{DC}$/2.5 A, 60 W Power Supply with DIN-Rail Mounting (RoHS) |
| NS-205 CR / NS-208 CR | 5-port / 8-port Unmanaged Industrial 10/100 Ethernet Switch with Plastic Case (RoHS) |
| RS-405 CR / RS-408 CR | 5-port / 8-port Real-time Redundant Ring Switch (RoHS) |
| TPM-4100/TP-4100 | 10.4" (800 x 600) resistive touch panel monitor with RS-232 or USB interface |