
Getting Started: WP-8147/8447/8847

The WinPAC-8xx7/WP-8x47 is the abbreviation of the WP-8147/8447/8847.

Important Notice

1. **WP-8x47/8xx6 supports only High profile I-8K and I-87K I/O cards in its slot 0 to 7.** Visit the website: http://www.icpdas.com/en/product/guide+Remote__I__O__Module__and__Unit+Software__Support__+I-8K_I-87K__Software__Support
1. Only set a fixed IP address to the WP-8x47. (No DHCP)
2. Only set WP-8x47's LAN2 as disabled if not using it (refer to Appendix D).
3. Recommend to use the Industrial Ethernet Switch (e.g., NS-205/208 or RS-405/408) for PAC.
4. **Please store your application programs and data files in the \Micro_SD. Don't store them in the \System_disk.** That is because the \System_Disk is using NOR Flash memory. Its size is small and the major purpose is for storing OS, ISaGRAF driver, some basic utilities and DLL. **The NOR Flash memory is not good for frequently updating files.** If update files frequently in the \System_Disk (for example, update a file every 1 to 5 seconds, then it will be about ten thousand more updates in one day), the data or files in the \System_disk may crush or lost for some days or months later.

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Development Software

Two options:

- 1) **ISaGRAF:** Ver. 3.4x (or Ver. 3.5x), IEC 61131-3 standard. LD, ST, FBD, SFC, IL & FC
- 2) **Non-ISaGRAF:** Microsoft EVC++4.0 or VS.NET 2008/2005/2003 (VB.net, C#.net)

- ISaGRAF Website:

https://www.icpdas.com/en/product/guide+Software+Development__Tools+ISaGRAF

- ISaGRAF Download Center

<https://www.icpdas.com/en/download/index.php?nation=US&kind1=&model=&kw=isagraf>

Technical Service

Please contact local agent or email problem-report to service@icpdas.com .

Visit the www.icpdas.com for more information about products.

ISaGRAF FAQ : <https://www.icpdas.com/en/faq/index.php?kind=280#751>

Written by Chun Tsai; Edited by Janice Hong / Eva Li.

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Revision History

The table below shows the revision history.

Revision	Date	Editor	Description
V2.0	Oct. 2020	Janice	<ul style="list-style-type: none">• Update the new URLs, some pictures• Remove some FTP URLs and the path of CD• Adjust layout and font and reword some sentence• Appendix I.3 Change the serial touch driver

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Reference Guide

ISaGRAF Resource on the Internet:

Newly released ISaGRAF IO libraries, PAC drivers, demo, and manuals can be found on:

<https://www.icpdas.com/en/download/index.php?nation=US&kind1=&model=&kw=isagraf>

ISaGRAF User's Manual:

<https://www.icpdas.com/en/download/show.php?num=333>

ISaGRAF FAQ:

<https://www.icpdas.com/en/faq/index.php?kind=280#751>

WP-8000 (Hardware) Manual:

<https://www.icpdas.com/en/download/show.php?num=461>

Related Products:

- Industrial Ethernet Switch:
http://www.icpdas.com/en/product/guide+Industrial__Communication+Ethernet__Communication+Ethernet__Switch
- RS-232 to RS-422/485 Converter:
http://www.icpdas.com/en/product/guide+Industrial__Communication+Serial__Communication+Converter
- Power Supply :
http://www.icpdas.com/en/product/guide+Accessories+Power__Supplies+Power__Supply
- High Profile I-8K/87K Series I/O Modules
[http://www.icpdas.com/en/product/guide+Remote__I__O__Module__and__Unit+PAC__%EF%BC%86amp;__Local__I__O__Modules+I-8K_I-87K__Series__\(High__Profile\)](http://www.icpdas.com/en/product/guide+Remote__I__O__Module__and__Unit+PAC__%EF%BC%86amp;__Local__I__O__Modules+I-8K_I-87K__Series__(High__Profile))

I/O Modules Selection Guide

WP-8x47 support only the **I-8K / I-87K High Profile** I/O modules and RS-485/FRnet remote I/O modules.
Please refer to ICP DAS website:



http://www.icpdas.com/en/product/guide+Remote_I_O_Module_and_Unit+Software_Support_+I-8K_I-87K_Software_Support

PRODUCTS

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WinPAC/ViewPAC
(WinCE 5.0/7.0 PAC)

XPAC (WinCE 6.0 PAC)

XPAC/iPPC (WES 2009/7 PAC)

iPAC-8000/ViewPAC (MiniOS7)

LinPAC (Linux PAC)

Remote I/O Expansion Unit (DCON)

Remote I/O Expansion Unit (Modbus)

I-8000 (MiniOS7)

Module Name	WP-8x21-CE7, WP-8x41, WP-8x31 VP-x231-CE7, VP-2xW1, VP-4131				WP-8xx7 VP-2xW7 VP-4137	WP-8x39 WP-8x49 VP-x239-CE7 VP-2xW9 VP-4139	WP-8x28-CE7 WP-8x48 VP-1238-CE7
	Standard PAC						
		SDK 5.0	SDK 7.0	DCON Utility Pro	eLogger	ISaGRAF	InduSoft

Analog I/O Modules

I-8014W	Y	Y	Y	-	Y	-	Y
I-8014CW	Y	Y	Y	-	-	-	-
I-8017DW	Y	Y	Y	-	Y	-	Y
I-8017HW	Y	Y	Y	Y	Y	-	Y
I-8017HCW	Y	Y	Y	-	Y	-	Y
I-8024W	Y	Y	Y	Y	Y	-	Y
I-8024UW	Y	Y	Y	-	-	-	-
I-8026W	Y	Y	Y	Y	Y	-	Y
I-8028UW	Y	Y	Y	-	-	-	-

Digital I/O Modules

I-8037W	Y	Y	Y	Y	Y	Y	Y
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Specifications: WP-8147/8447/8847

Refer to WP-8x47 data sheet: <http://www.icpdas.com/en/download/show.php?num=2919>

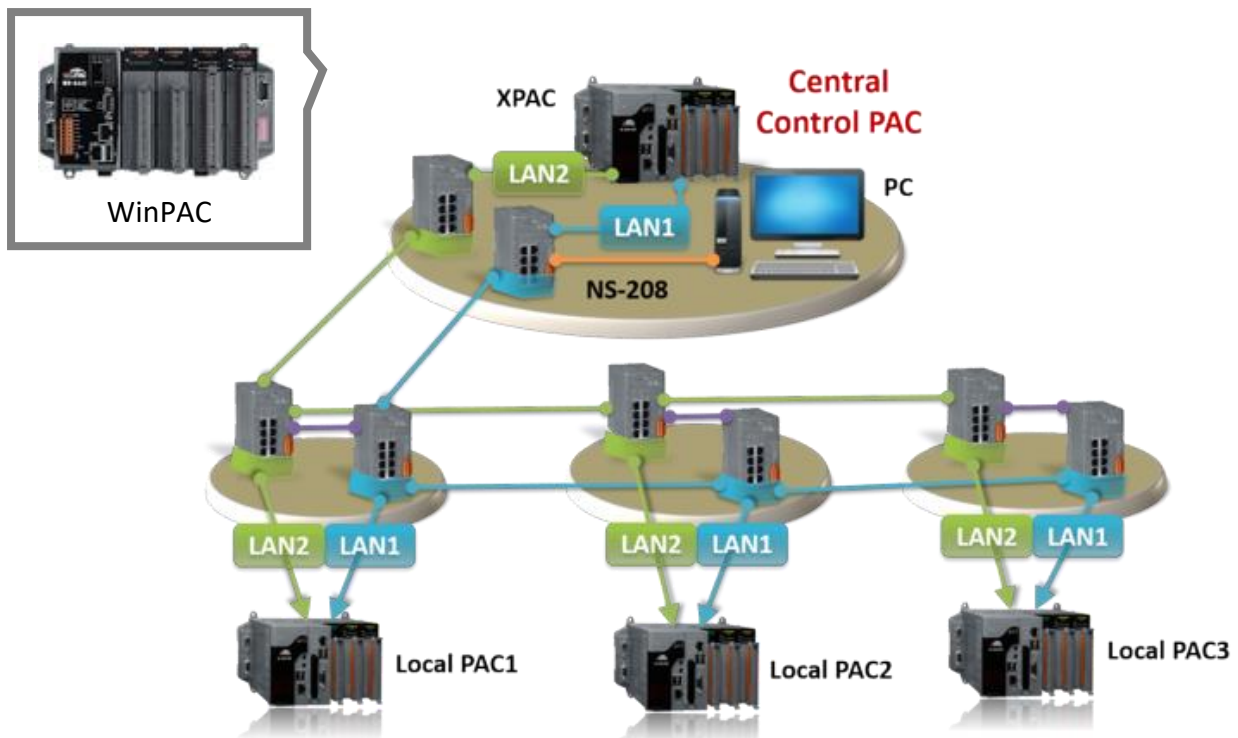
Models		WP-8147	WP-8447	WP-8847
System Software				
OS		Windows CE 5.0		
.Net Compact Framework		3,5		
Embedded Service		FTP server, Web server		
Multilanguage Support		English, German, French, Spanish, Russian, Italian, Korean, Simplified Chinese, Traditional Chinese		
Development Software				
ISaGRAF Software	ISaGRAF Ver.3	IEC 61131-3 standard		
	Languages	LD, ST, FBD, SFC, IL & FC		
	Max. Code Size	1 MB		
	Scan Time	3 ~ 15 ms for normal program; 15 ~ 50 ms for complex or large program		
Non-ISaGRAF		Options: MS eVC++ 4.0 or VS.NET 2005/2008 (VB.NET, C#.NET)		
Web Service				
Web HMI		PC running Internet Explorer can monitor/control PAC via Internet/modem		
Security		Support three levels username and password protection. (high/middle/low)		
CPU Module				
CPU		PXA270, 520 MHz		
SDRAM		128 MB		
Dual Battery Backup SRAM		512 KB; data valid up to 5 years (for retain variables)		
Flash		96 MB		
EEPROM		16 KB		
Expansion Flash Memory		microSD socket with a 4 GB microSD card (support up to 32 GB)		
RTC (Real Time Clock)		Provides seconds, minutes, hours, date, day of the 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)	
Audio		-		
VGA & Communication Ports				
VGA		Yes 640 x 480, 800 x 600		
Ethernet		RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
USB 1.1 (host)		1		
USB 1.1 (client)		-		
COM 0		Internal communication with the high profile I-87K series modules in slots		
COM 1		RS-232 (to update firmware) (Rx/D, Tx/D and GND); non-isolated		
COM 2		RS-485 (Data+, Data-) with internal self-tuner ASIC; 2500 VDC isolated for WP-8147; 3000 VDC isolated for other models		
COM 3		-	RS-232/RS-485 (Rx/D, Tx/D, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated	
COM 4		-	RS-232 (Rx/D, Tx/D, 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 VDC		
Isolation		1 kV		
Redundant Power Inputs		Yes, with one power relay (1 A @ 24 VDC) for alarm		
Capacity		8 W	30 W	30 W
Consumption		7,3 W	9,1 W	9,6 W

Protocols (Note that certain protocols require optional devices)	
NET ID	1~255, user-assigned by software
Modbus TCP/IP Master	Link to a max. of 100 devices that support Standard Modbus TCP/IP Slave protocol (FAQ-113)
Modbus RTU/ASCII Master	A max. of 10 ports: COM1 ~ 14 (To connect to other Modbus Slave devices). Support Multi-ports. (*)
Modbus RTU Slave	A max. of 5 ports: COM1; one of COM2/3, COM4 ~ 8 (For connecting ISaGRAF, PC/HMI/OPC Server & HMI panels). (*)
Modbus TCP/IP 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 to up to 32 PCs/HMIs; If the PAC uses 2 connections to connect each PC/HMI, it can connect to up to 16 PCs/HMIs; If one of the Ethernet port malfunctions, the other one can still be used to connect to the PC/HMI.
Web HMI Protocol	Ethernet Ports for connecting a PC running Internet Explorer;
User-defined Protocol	Custom protocols can be applied at COM1~14 using Serial communication function blocks. (*)
I-7000 & I-87K RS-485 Remote I/O	One of COM2~3 supports I-7000 I/O modules, I-87K base + I-87K Serial I/O boards, or RU-87Pn + I-87K High Profile I/O boards as remote I/O. A max. of 255 I-7000/87K remote I/O modules can connect to one PAC. (*)
M-7000 Series Modbus I/O	A max. of 10 RS-485 ports (COM1~14). Each port can connect to up to 32 M-7000 Modules. (*)
Modbus TCP/IP I/O	LAN2 supports ICP DAS Ethernet I/O: I-8KE4-MTCP and I-8KE8-MTCP. If LAN2 malfunctions, it will automatically switch to LAN1 to continuously work. (The IP address for LAN1 and LAN2 should be set in the same IP domain) (FAQ-042)
FRnet I/O	Enable a max. of 8 pcs, I-8172W boards in slot 0~7 to be used to connect to FRnet I/O modules, such as FR-2057, FR-32R. Each I-8172W board can link to a max. of 256 DI plus 256 DO channels. (FAQ-082, 154)
Send Email	Provide functions to send email with a single attached file via the Ethernet port.
Ebus	Used to exchange data between ICP DAS ISaGRAF Ethernet PACs via the Ethernet port. (LAN2 Port only)
SMS: Short Message Service	WP-84x7/88x7's COM4/5 and WP-81x7's COM1/COM5 can link to a GSM Modem to support SMS. The user can request data or control the controller via a cellular phone. The controller can also send data and alarms to the user's cellular phone. Optional GSM Modem: GTM-201-RS232 (850/900/1800/1900 GSM/GPRS External Modem)
MMICON/LCD	COM4 or COM5 supports the ICP DAS MMICON. (*)
UDP Server & UDP Client : Exchange Message & Auto-report	LAN1 or LAN2 supports the UDP Server and UDP Client protocols allowing messages to be sent/received to/from a PC/HMI or other device. For example, data can be automatically reported to the InduSoft's RXTX driver.
TCP Client : Exchange Message & Auto-report	LAN1 or LAN2 supports the TCP Client protocol allowing messages to be sent/received to/from a PC/HMI or other device that supports the TCP server protocol. Ex: automatically report data to InduSoft's RXTX driver, or to connect a location camera.
GPRS/SMS	Enable the I-8212W (2G/3G) card allowing short messages to be sent/received to/from or to access a dial up connection to link to the Internet and using a GPRS connection to send an email or communicate with remote stations using the FTP Client (FAQ-151) or the TCP Client / UDP Server / UDP Client (FAQ-143) protocols.
SQL Client	Support for the SQL Client function that allows data to be written (or read from) a Microsoft SQL Server (2000 SP3, 2005, 2008).
Hot-Swap and Redundant System	This redundant system has setup two "Active IP" address point to the active LAN1 and LAN2 ports always. One or more PC/HMI/SCADA can communicate with this redundant system via one of the two given active IP. So the PC/HMI/SCADA can access to the system easily without any notice about which WP-8xx7 is currently active. Moreover, the new redundant system can integrate with the RU-87P4/87P8 Expansion Unit plus the I-87K high-profile I/O cards to support the hot-swap application. If the I/O card is damaged, the maintenance person just takes one good-card with same model number to hot-swap the damaged one without stopping this redundant system. (FAQ-093)
CAN/CANopen	COM1, COM3~14 can connect to one I-7530 (converter: RS-232 to CAN) to support CAN/CANopen devices and sensors. One WP-8xx7 supports a max. of 10 RS-232 ports to connect a max. of 10 I-7530. (*) (FAQ-086)
CANopen Master	Enable the I-8123W CANopen Master card to connect to other CANopen Slave devices. (FAQ-145)
HART Solutions	Enable I-87H17W modules in slots 0 to 7 used to communicate with other HART devices.
FTP Client	Enable the FTP Client to upload files from the PAC to a remote FTP server on a PC. (FAQ-151)
Optional I/O Functions (Refer to the ISaGRAF PAC I/O Selection Guide for I/O Module list)	
PWM Output	High Speed PWM Module
	I-7088, I-8088W, I-87088W: 8-ch PWM outputs, software support 1 Hz~100 kHz (non-continuous), duty cycle: 0.1 ~ 99.9%
Counter, Encoder, Frequency	DO Module as PWM
	Optional DO Boards: I-8037W, 8041W, 8041AW, 8042W, 8050W, 8054W, 8055W, 8056W, 8057W, 8060W, 8063W, 8064W, 8068W, 8069W. (Relay Output boards cannot generate fast square wave) Support max. 8-ch for one PAC; Max. frequency: 250 Hz for OFF=2 & ON=2 ms. Output square wave: OFF: 2~32766 ms, ON: 2~32766 ms.
	Parallel DI Counter
	Optional I-8K DI boards: I-8040W, 8040PW, 8042W, 8046W, 8048W, 8050W, 8051W, 8052W, 8053W, 8053PW, 8054W, 8055W, 8058W, 8063W. Support max. 8-ch for one PAC; Max. count/frequency: 32-bit, 250 Hz; Min. pulse width > 2 ms
	Serial DI Counter
	Optional I-87K DI boards: I-87040W, 87046W, 87051W, 87052W, 87053W, 87053W-A5, 87054W, 87055W, 87058W, 87059W, 87063W. Max. count/frequency: 16-bit (0~65535), 100 Hz.
Motion	Remote DI Counter
	All remote I-7000 & I-87K DI modules support counters, Max. count/frequency: 16-bit (0~65535), 100 Hz.
	High Speed Counter
	Max. count/frequency for I-87082W: 32-bit, 100 kHz ; Max. count/frequency for I-8084W: 32-bit, 250 kHz
Encoder	I-8093W: 3-axis Encoder Module, max. 1M Hz for quadrant input mode, max. 4 MHz for Pulse/Direction and CW/CCW input mode.(FAQ-112)
	I-8084W: 250 kHz max., 4-ch encoder, can be Pulse/Direction, or Up/Down or A/B Phase (Quad. mode) Not support Encoder Z-index. (FAQ-100)
Frequency	I-87082W: 2-ch, 1 Hz ~ 100 kHz; I-87088W: 8-ch, 0.1 Hz ~ 500 kHz
	I-8084W: 8-ch, 1 Hz ~ 250 kHz
Motion Control	
Can be integrated with one I-8091W (2-axis) or two I-8091W (4-axis)	
* Note: The COM5 ~ COM14 ports are located in the expansion boards if they are installed in slots 0 ~ 7 of WP-8xx7. WP-8147 has no COM3 & COM4.	

Refer to WP-8x47 data sheet: <http://www.icpdas.com/en/download/show.php?num=2919>

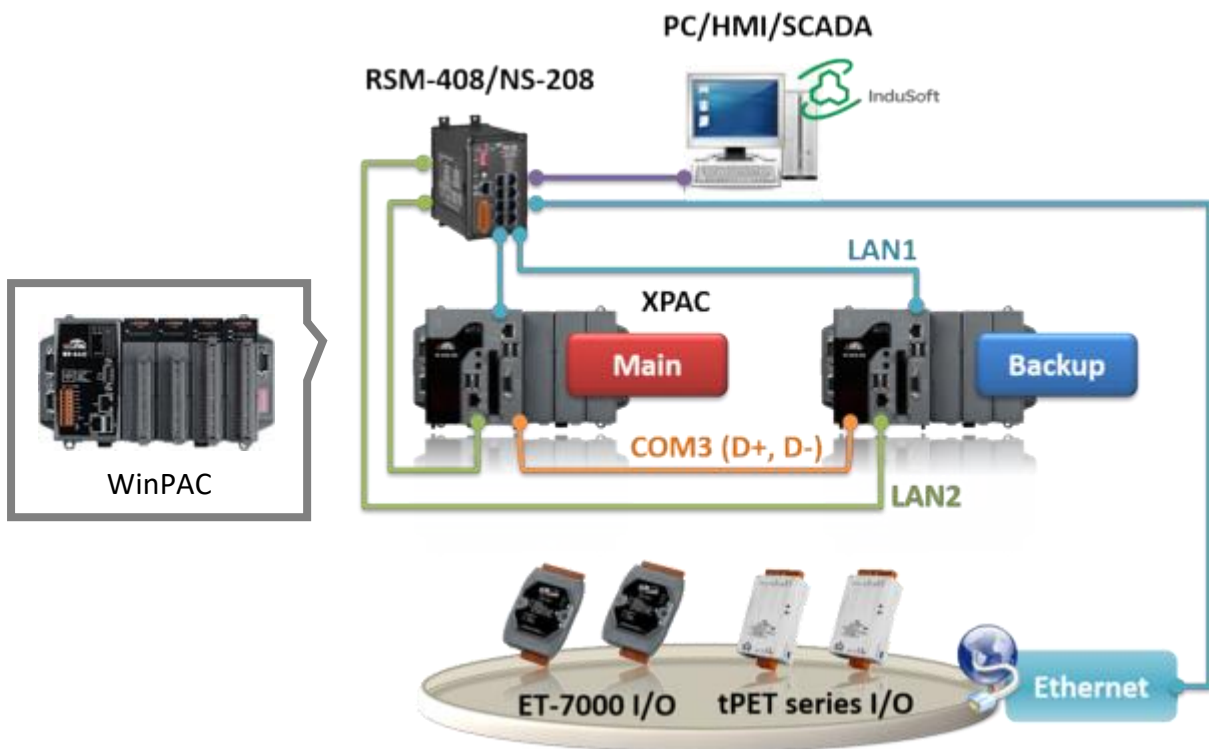
1.1 Redundant Communication System

- RS-485 or Ethernet redundant communication mechanism/applications.
- For XP-8x37-CE6 and WP-8x47 series.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-119



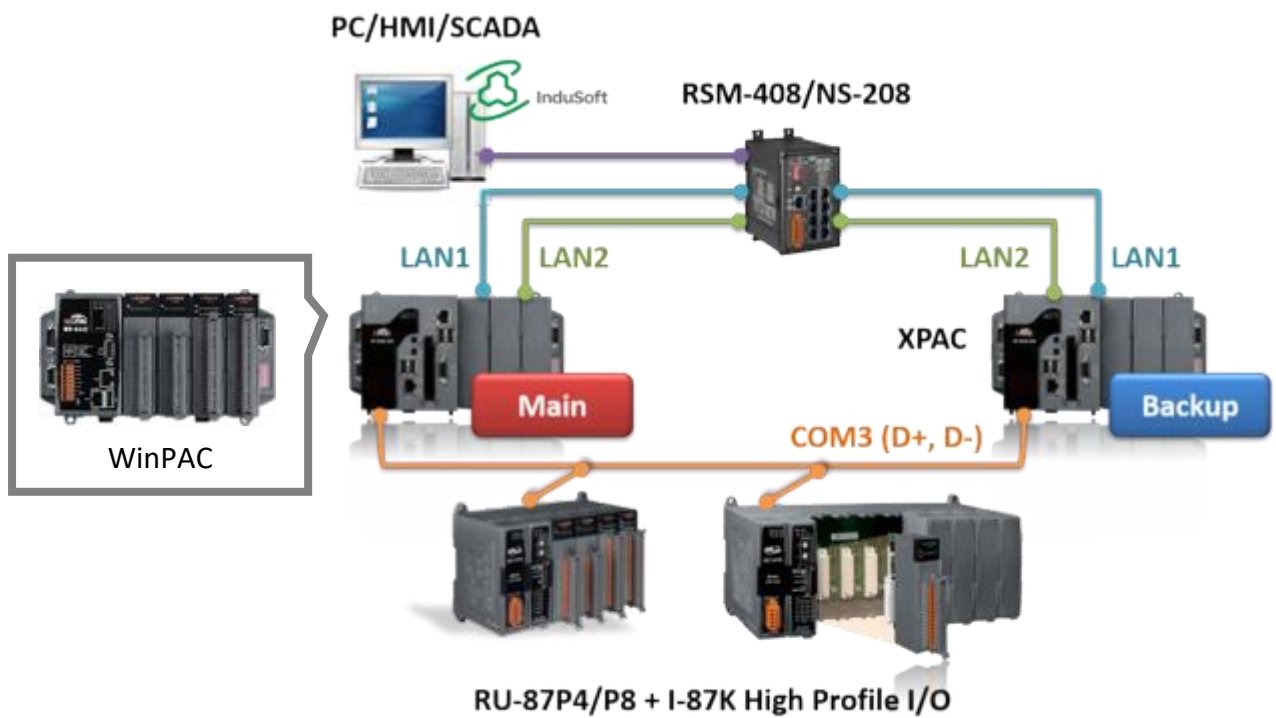
1.2 Redundant System - Ethernet I/O

- If one Ethernet cable is broken or damaged, the other one will still handle the Ethernet I/O and exchange data with the other redundant PAC.
- The scan of Ethernet I/O is much faster than that of RS-485 I-7K or I-87K I/O.
- For XP-8x37-CE6 and WP-8x47 series.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-093



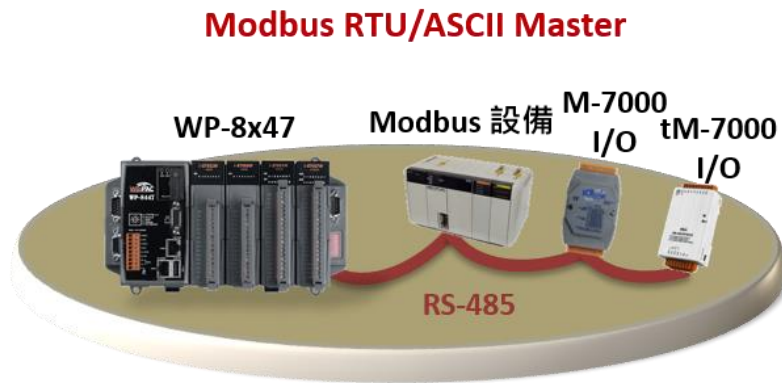
1.3 Redundant System - RS-485 I/O

- If one Ethernet cable of WP-8x47 is broken or damaged, the other one will still work.
- If one PAC is dead, the other one will take over the control of the RS-485 I/O.
- PC/HMI can connect to this redundant system by one or two active IP.
- For XP-8x37-CE6 and WP-8x47 series.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-093 、FAQ-125 、FAQ-138



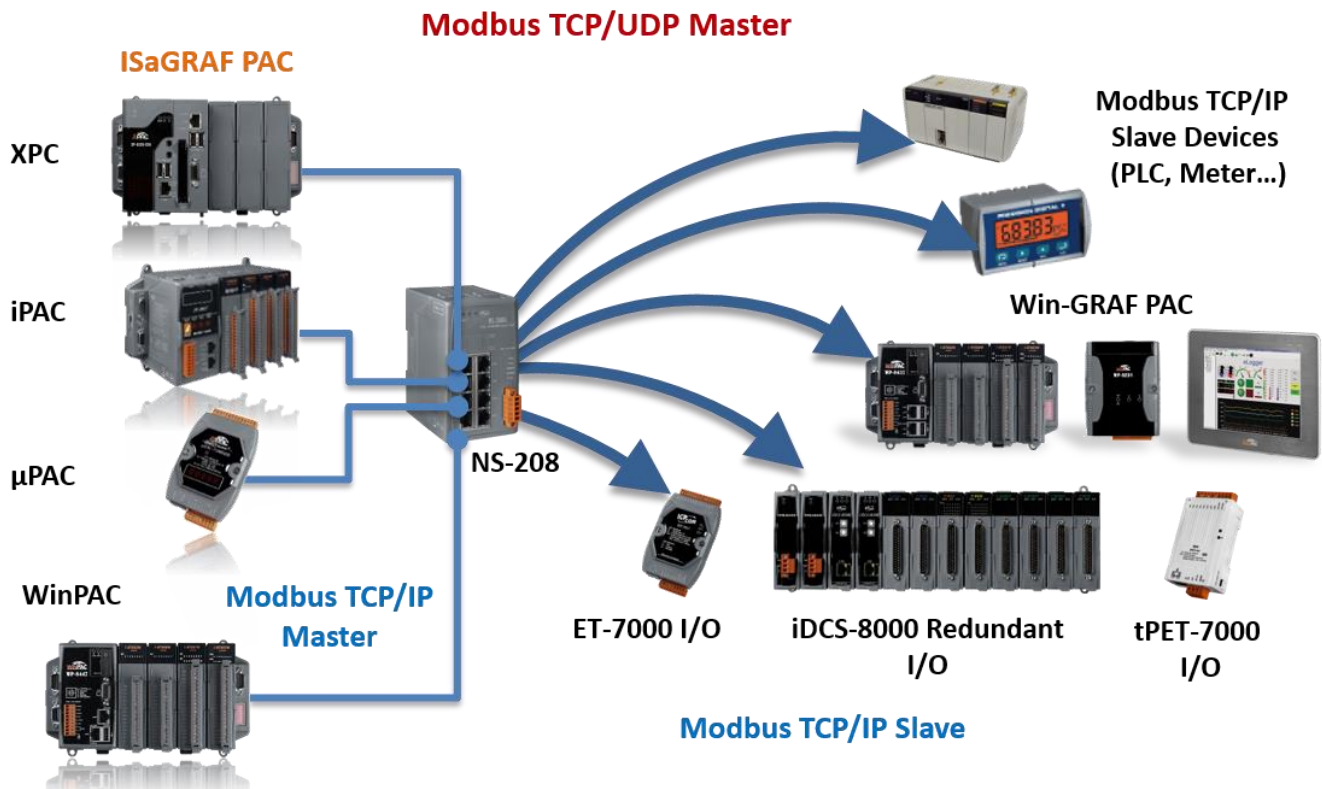
1.4 Modbus Master: RTU, ASCII, RS-232/485/422

- Support up to 10 ports:
COM1 ~ COM4 & COM5 ~ COM14 (if I-8112iW/ 14W/ 14iW/ 42iW/ 44iW in Slot0 ~ 2).
- Can link to Modbus PLC or M-7000 I/O or Modbus devices.
(Power meter, temperature PAC, inverter etc.)



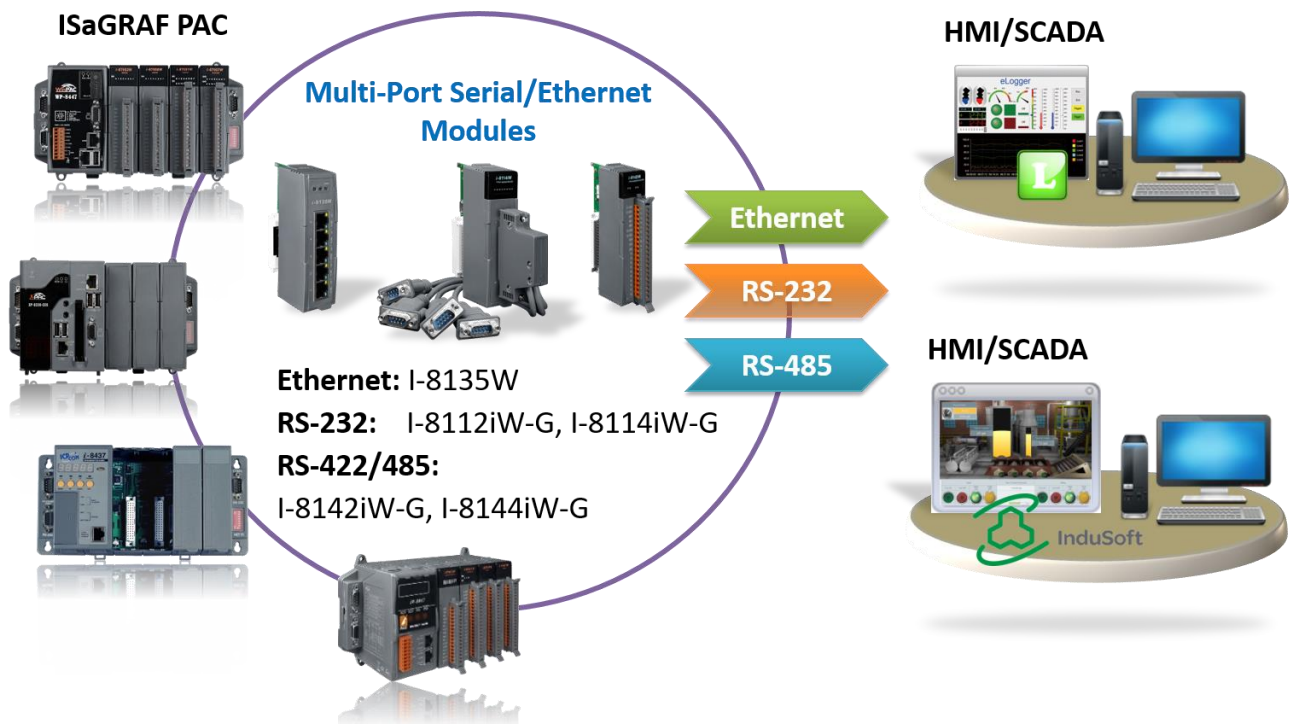
1.5 Modbus Master: TCP/IP

- Each WP-8x47 supports to link to max. 100 Modbus TCP/IP Slave devices.
- Support various Standard Modbus TCP/IP Slave devices.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-113

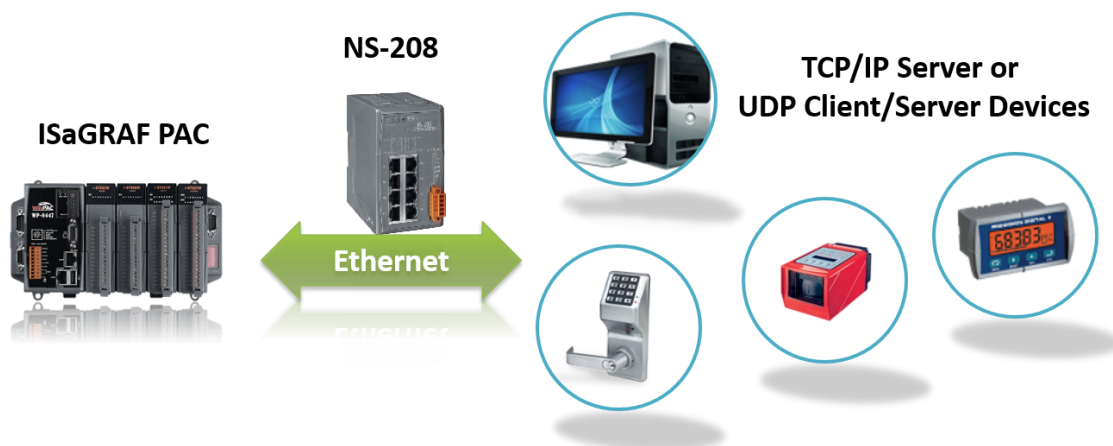


1.6 Modbus Slave: RTU/TCP

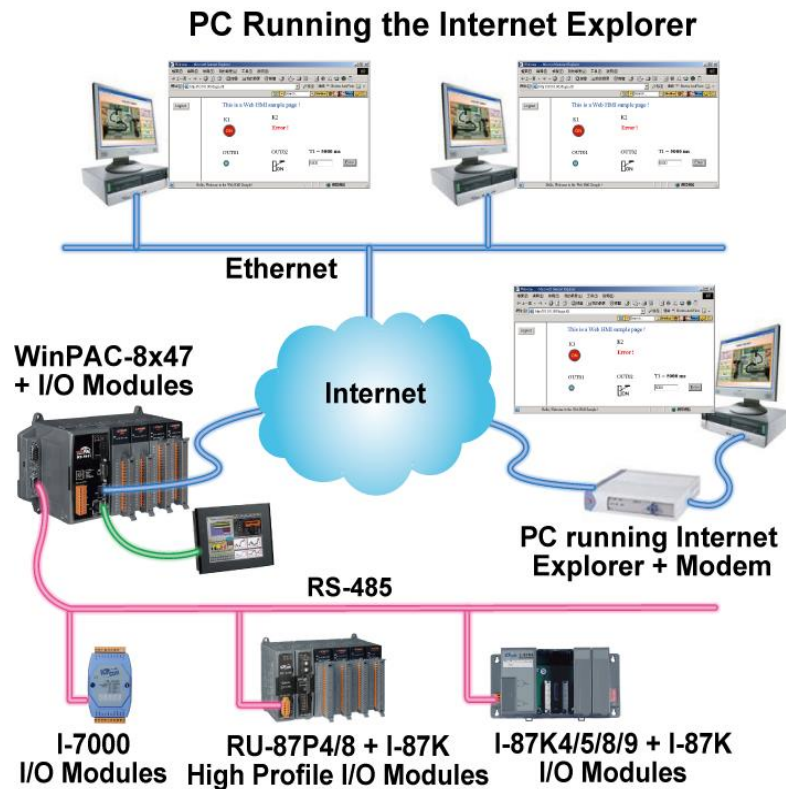
- Modbus RTU (RS-232/485/422): max. 5 ports.
- Modbus TCP/IP: max. 32 connections.



1.7 Communicate with Other TCP/IP Server or UDP Client/Server Devices

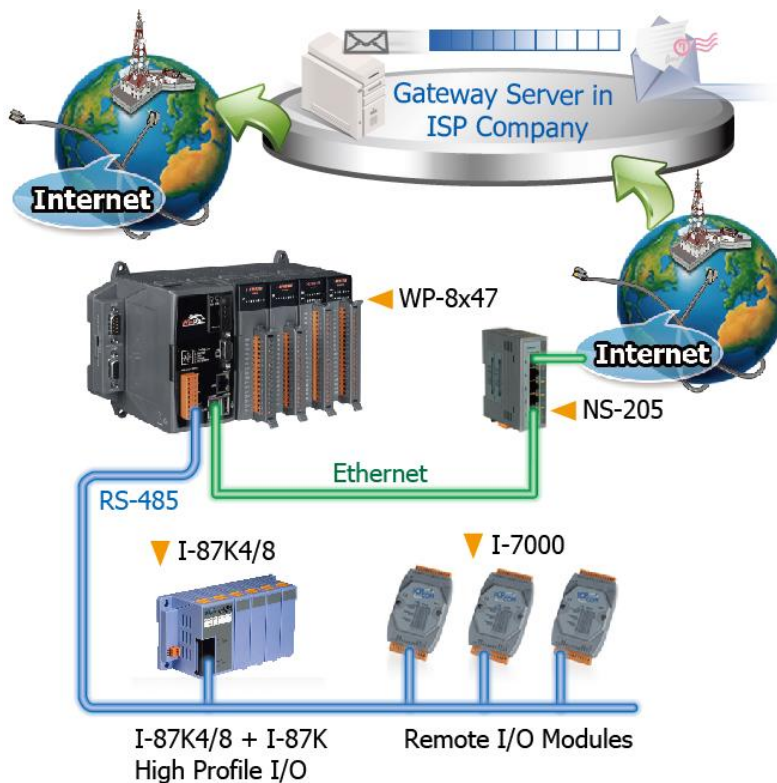


1.8 Multiple Web HMI – Monitor & Control Everywhere!

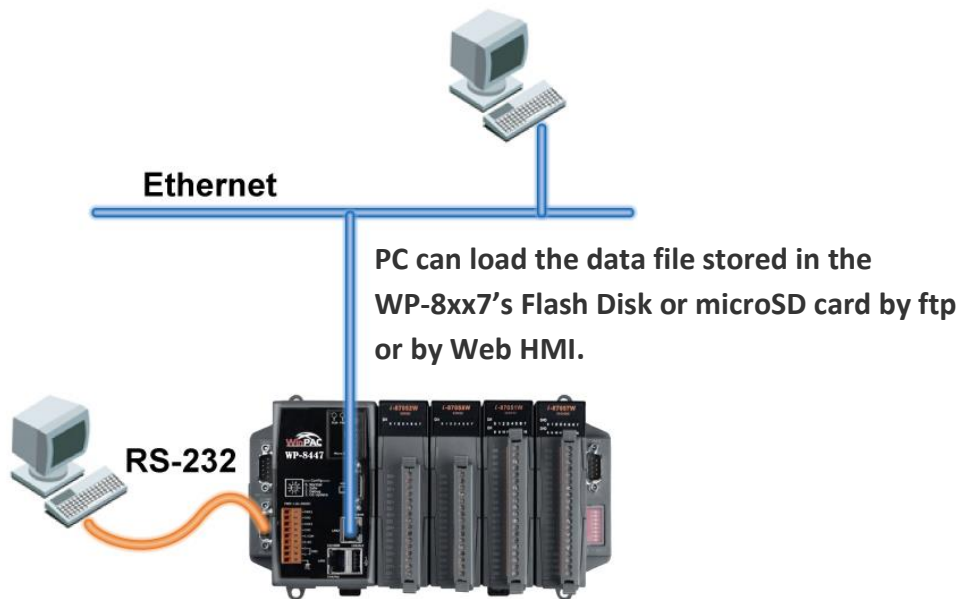


1.9 Send Email with One Attached File

- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-067



1.10 Data-Recorder & Data-Logger



1.11 Remote I/O Application

- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-001 、 FAQ-050



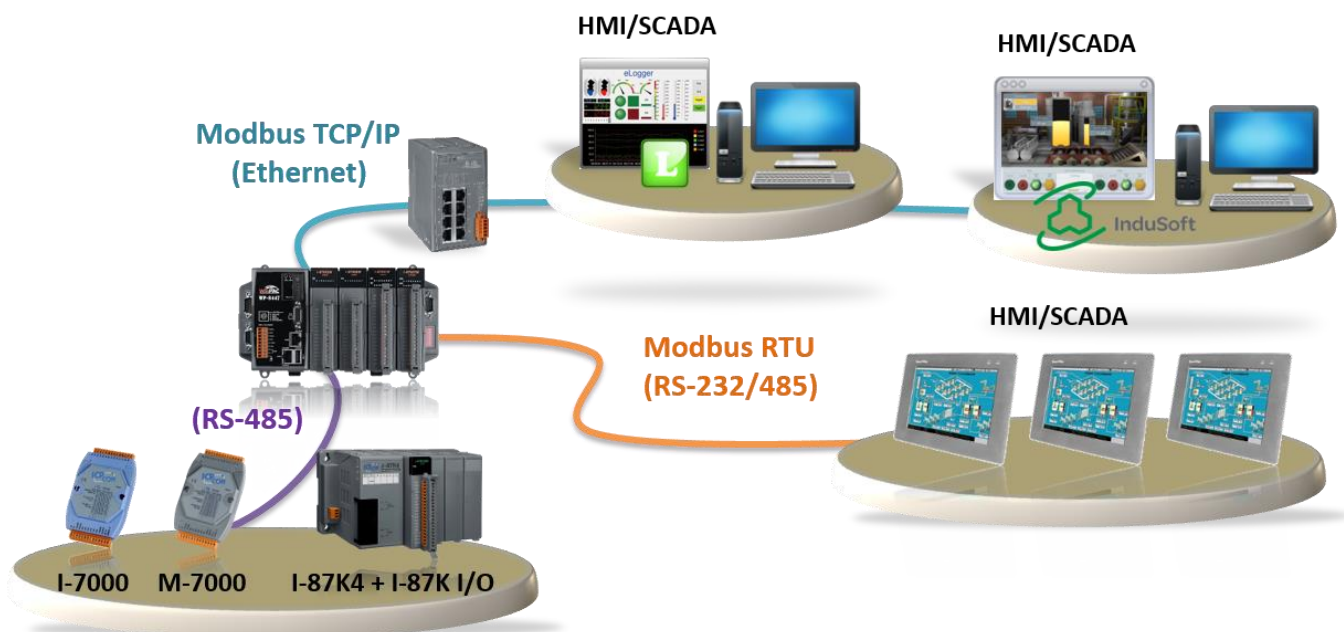
1.12 SMS: Short Message Service

- Short message can be sent in multiple language format (like Chinese, English... others)
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-111



1.13 As a Modbus Gateway for the Remote I/O Modules

- The ISaGRAF PACs **with Ethernet port**:
can be a **Modbus RTU or a Modbus TCP/IP gateway** of I-7000 & I-87K Series I/O modules.
- The ISaGRAF PACs **without Ethernet port**:
can be a **Modbus RTU gateway** of I-7000 & I-87K Series I/O modules.



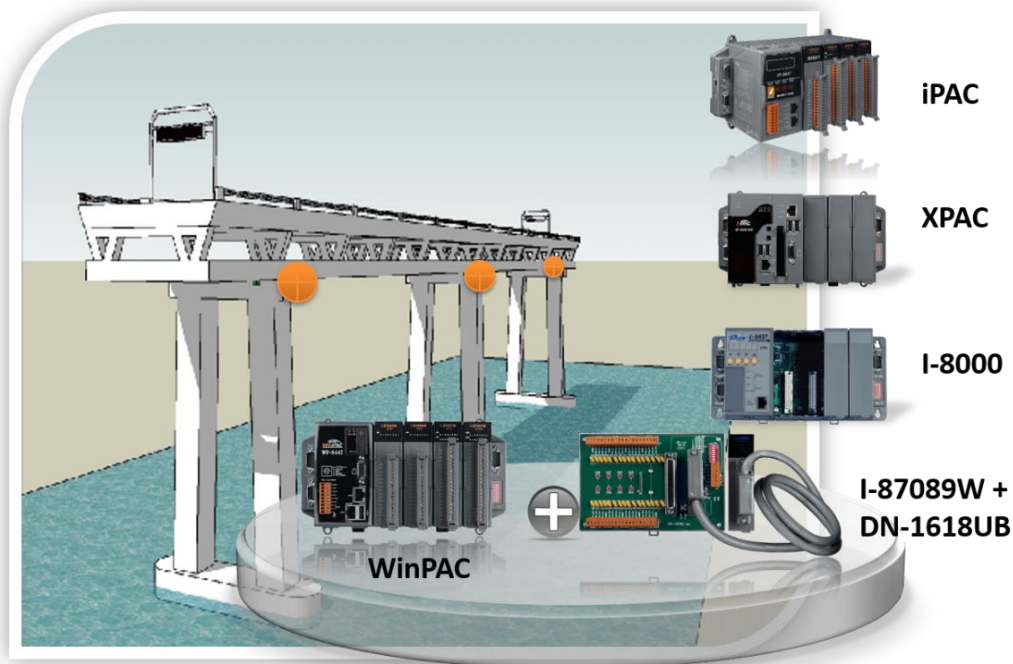
1.14 Motion Control

- One **I-8091W** can control 2 axes: X-Y plane, or 2 axes independent
- Two **I-8091W** can control 4 axes: X-Y plane + 2 axes independent, or 4 axes independent
- Encoder Modules:
 - I-8084W**: 4-axis, without Z-index
 - I-8090W**: 3-axis
 - I-8093W**: 3-axis



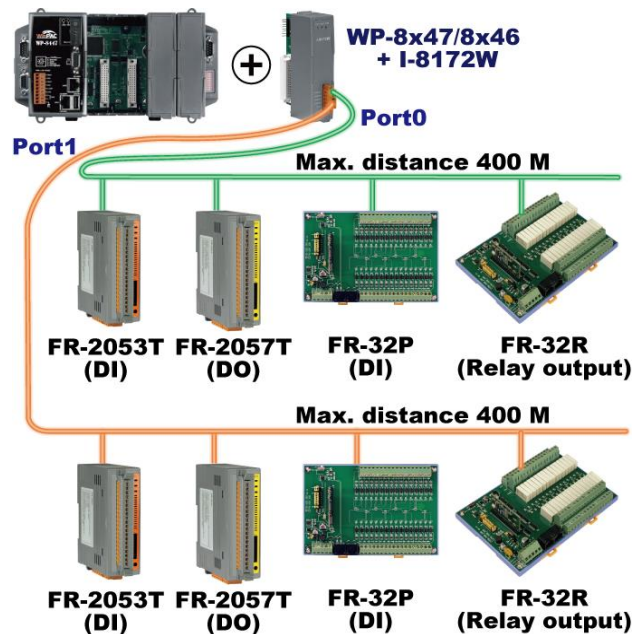
1.15 Stress Monitoring Application of Constructions

- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-091 、 FAQ-128



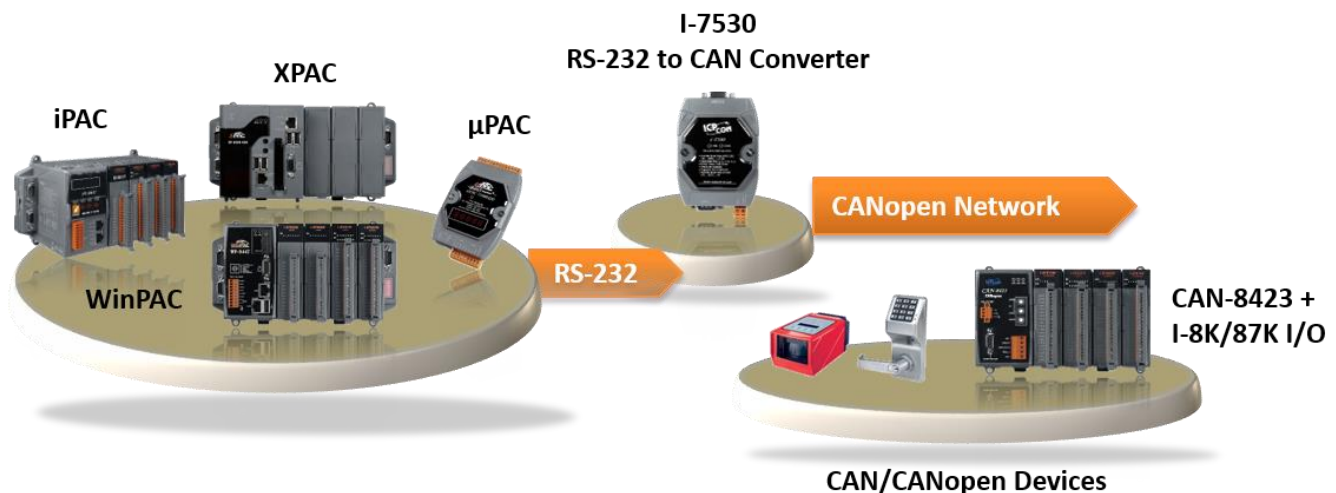
1.16 Fast FRnet Remote I/O

- **Advantage of FRnet I/O:** Fast I/O scan: About 3 ms/scan.
It depends on your program's PLC scan time. E.g., if the ISaGRAF program's PLC scan time is about 9 ms, then the scan time for all will be 9 ms, not 3 ms.
- Support FRnet DI, DO, AI and AO I/O modules.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-082 、 FAQ-154



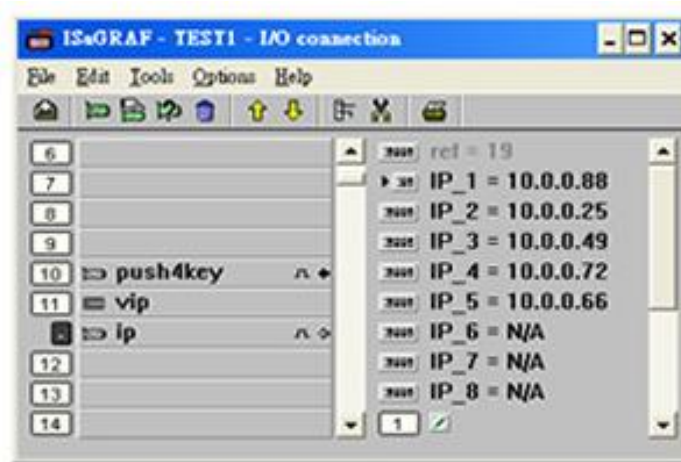
1.17 Integrate with CAN/CANopen Devices & Sensors

- WP-8x47 supports max. **10** I-7530 modules (RS-232 to CAN Converter)
- Support I-8123W CANopen Master card, too. (FAQ-145)
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-086 、 FAQ-145



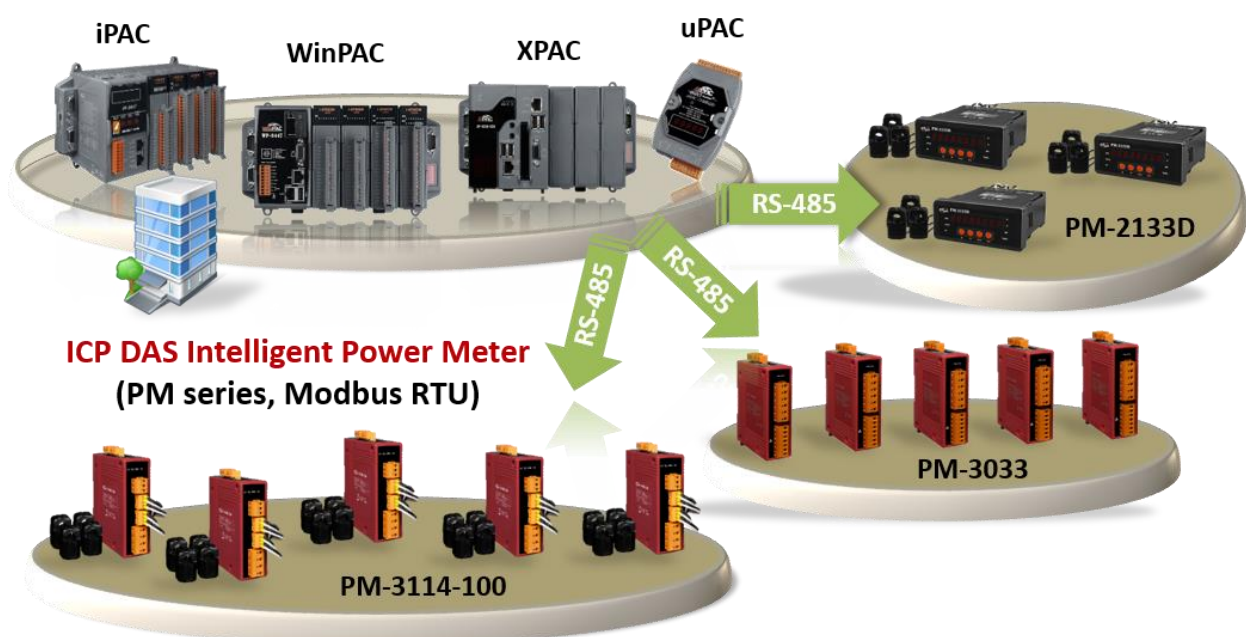
1.18 VIP Communication Security

- Set VIP (Very Important IP No.) for Modbus TCP/IP security.



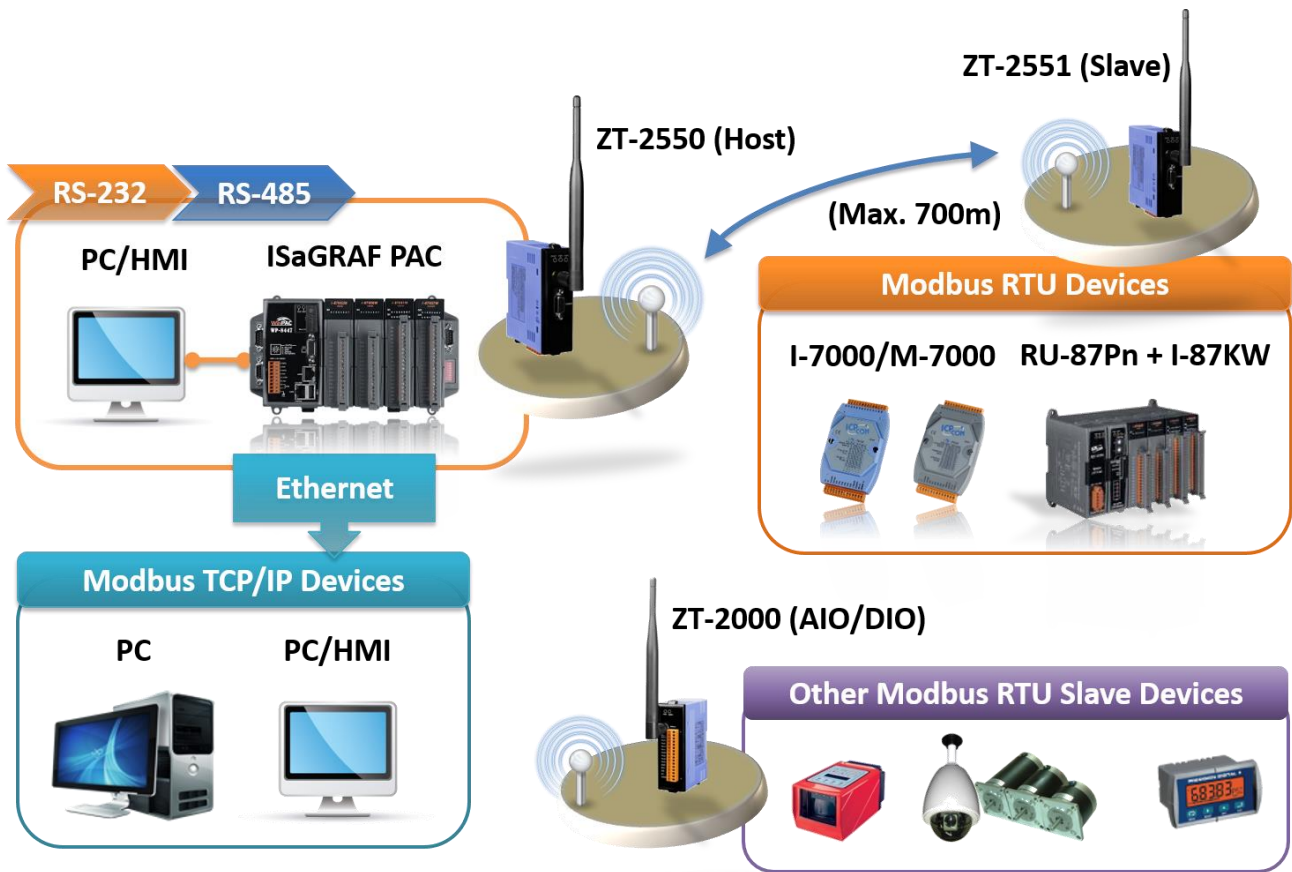
1.19 ISaGRAF PAC Connects the Smart Power Meter

- Support standard Modbus protocol, support multiple RS-485 ports to connect to multiple PM-213x Smart meters
- PM-213x is a series of 3 Phase/4 Loops 1 Phase Compact Smart Meter with true RMS energy and power parameters measurement in compact size. The ISaGRAF PACs combining with PM-213x can apply to various control/monitor systems about intelligent electric power measurement.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-129



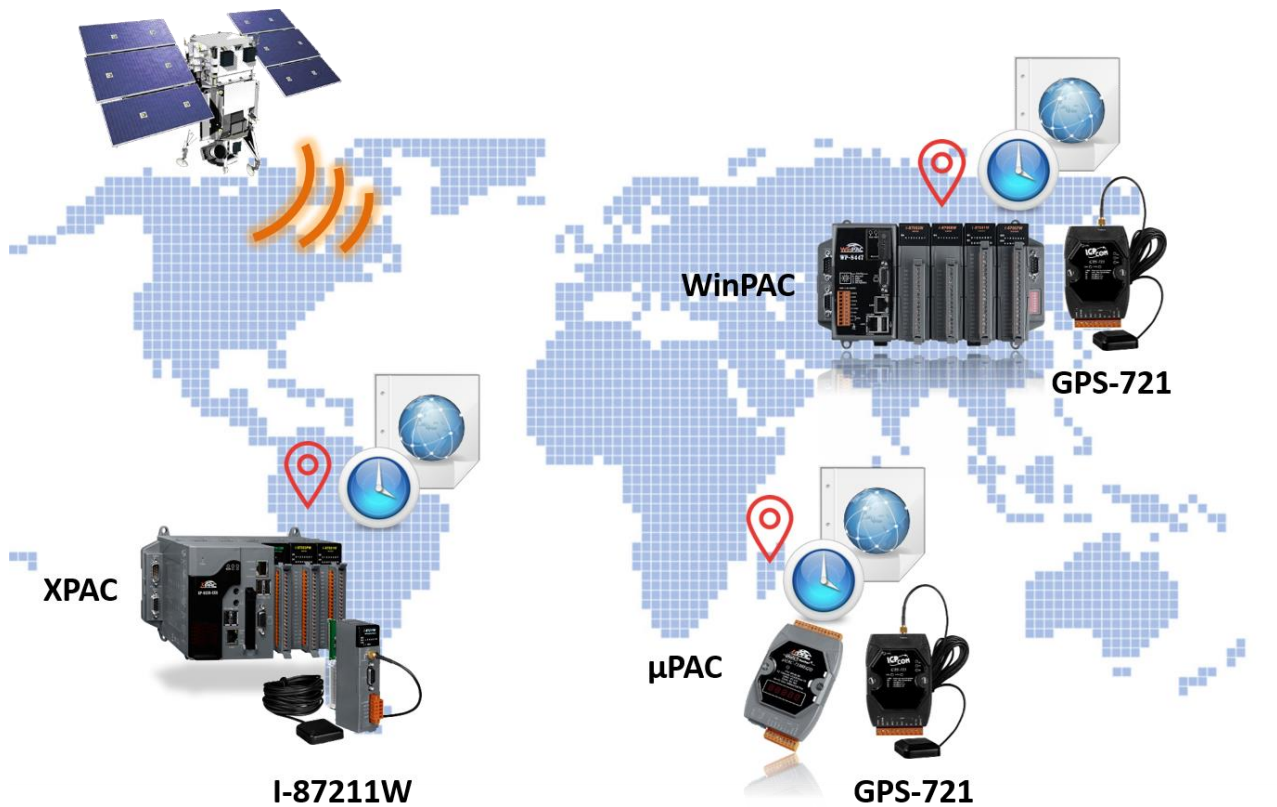
1.20 ZigBee Wireless Solution

- The ISaGRAF PAC plus ZB-2550P and ZB-2551P RS-232/RS-485 Converters can apply wireless communication, reduce the wiring cost, and achieve the mission of remote I/O control and data acquisition.
- Please refer to <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-110



1.21 GPS Application: ISaGRAF PAC Plus I-87211W & GPS-721

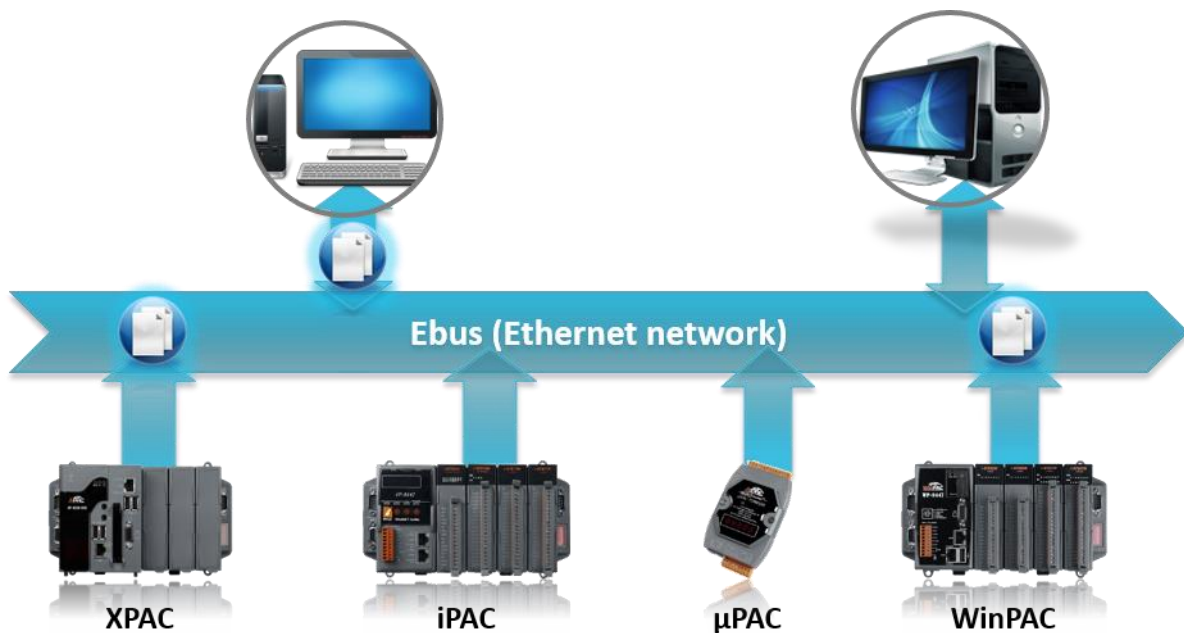
- WP-8x47, iP-8x47, and μ PAC-7186EG can support one I-87211W (slot 0 to 7) or I-87211W / GPS-721 as RS-485 remote GPS I/O.
- For doing auto-time-synchronization and getting local Longitude and Latitude.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-107



1.22 Data Exchange: Ebus

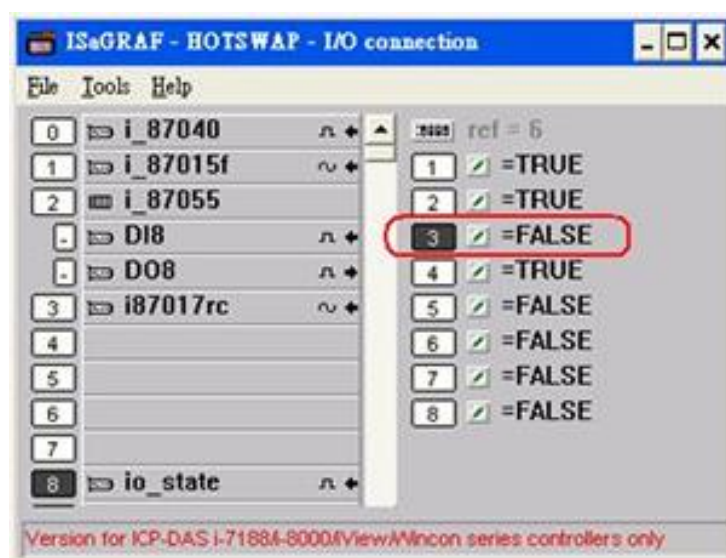
- **Ebus (Ethernet Network)**

Each ISaGRAF PAC can use its Ethernet port to talk to each other via the Ebus communication mechanism. When PC is talking with PACs via Ethernet, the PACs can also talk to each other via the same Ethernet; It makes the configuration more flexible and faster.



1.23 Detect Hot-Swap I-87K (High Profile) I/O Status

- In ISaGRAF Workbench, you must connect the I/O board to the "I/O connection" windows correctly and select the "io_state" board then you can observe the I/O status. When you Hot-Swap the I-87K (High Profile) I/O, the message will show on the front panel of ISaGRAF PAC.



1.24 Database Application

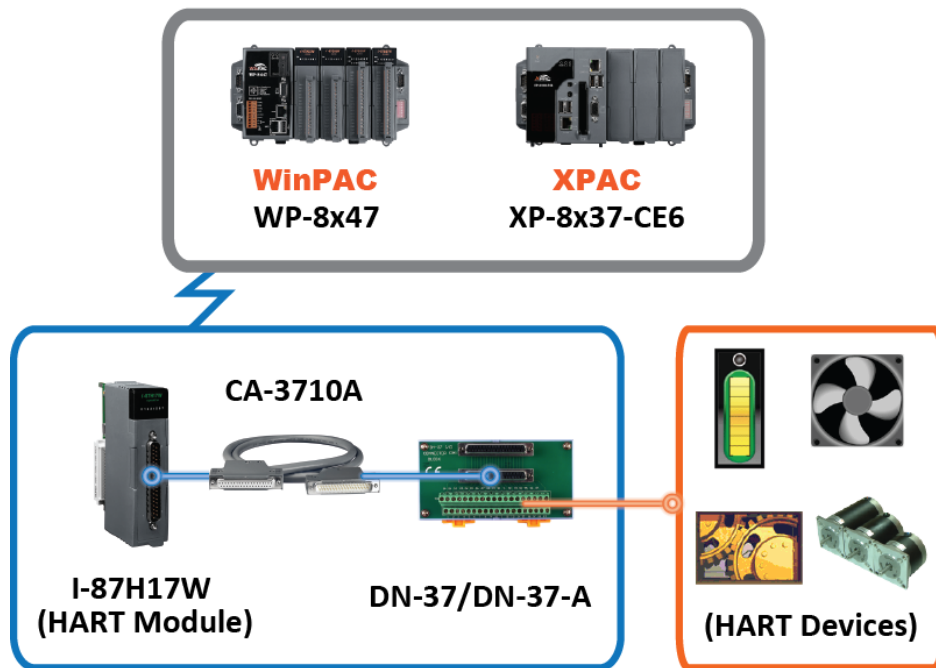
- Supports SQL Client functions to write data to (or read data from) Microsoft SQL Servers (2000 SP3, 2005, 2008).
- One PAC can connect max. 4 Servers.
- The PAC supports Multi-Language (depends on the model number), include Traditional Chinese Simplified Chinese, English, French, German, Italian, Portuguese, Russian, Spanish and others.
- Integrating Machine-Business Automation Application.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-135



1.25 HART Solutions

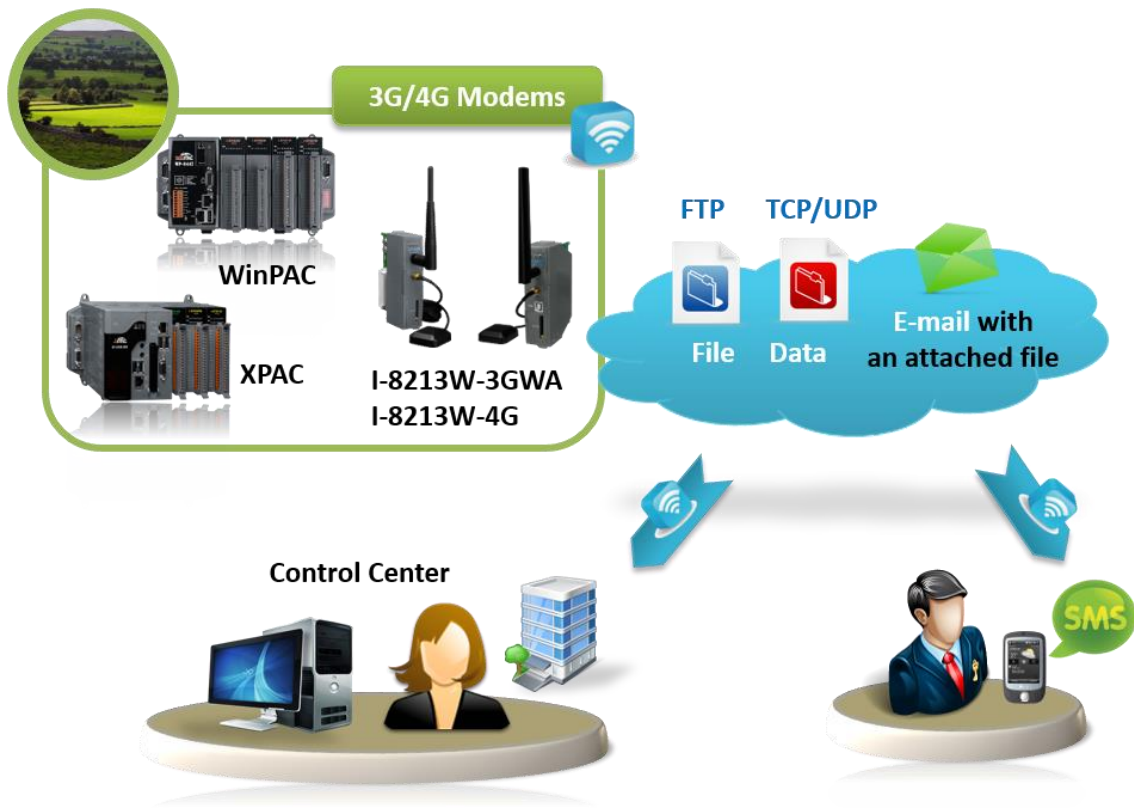
- ISaGRAF PAC support I-87H17W modules to communicate with other HART Devices.
(Driver version- WP-8x47: 1.35)
- ISaGRAF PAC support I-87H17W modules in its main control unit only (WP-8x47: slot 0 ~ 7). They don't support I-87H17W modules plugged in the RS-485 remote I/O expansion unit.
- I-87H17W provides eight Analog Input channels to measure 4 to 20 mA current input. It also can be used as 8-ch HART communication ports.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-136

ICP DAS HART Solutions for the ISaGRAF PAC



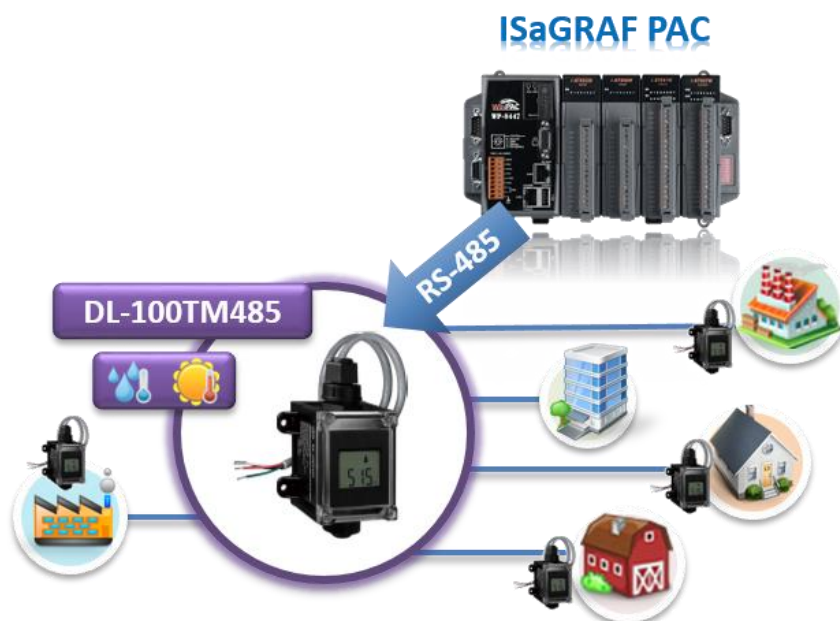
1.26 3G/4G Wireless Application

- The XP-8x37-CE6 and WP-8x47 can communicate with remote Server by 3G/4G wireless modem.
- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-143, 151, 153



1.27 Measure Humidity and Temperature Values via DL-100TM485

- More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-156



2.1 Step 1 - Installing the ISaGRAF Software

The following software must be installed before programming for ISaGRAF PAC system.

<http://www.icpdas.com/en/download/show.php?num=368>

- A. ISaGRAF Workbench
- B. ICP DAS Utilities for ISaGRAF

User has to purchase at least one pcs. of ISaGRAF Workbench Version 3 (ISaGRAF-256 ver. 3.4x or 3.5x) to install on his PC to edit, download, monitor & debug the PAC system.

Operating system Requirements:

One of the following computer operating systems must be installed on the target computer system before you can install the ISaGRAF Workbench software program.

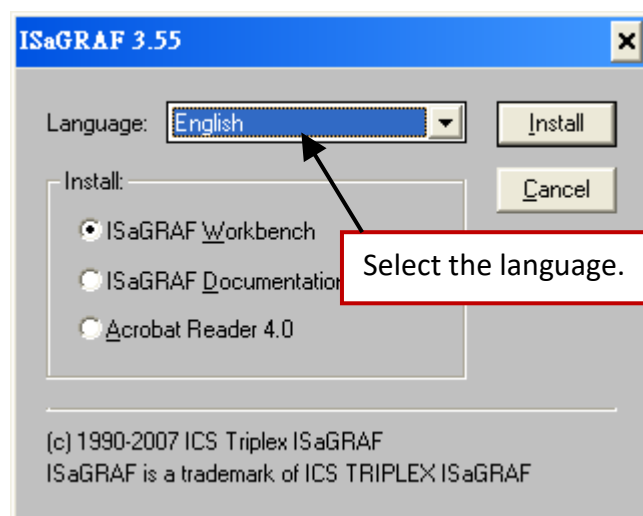
- Windows 95 / Windows 98 / Windows 2000
- Windows NT Version 3.51 or Windows NT Version 4.0
- Windows XP or Vista or XP mode in Windows 7 (refer to [FAQ-117](#))

Steps to Installing the ISaGRAF Workbench:

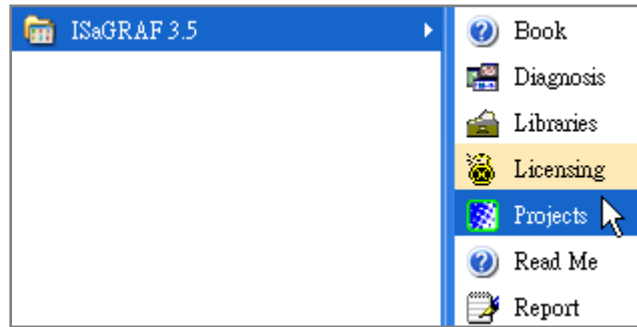


If your operating system is Windows Vista or Windows 7 (32-bit), refer to [2.1.4](#).
If your operating system is Windows 7 (64-bit), refer to [2.1.5](#).

Since 2020, ICP DAS no longer provides ISaGRAF Workbench CD. Please download the software on [ISaGRAF Download Center](#) and extract the zip file. Then, double-click on the "ISaGRAF.exe" file to start the installation process.



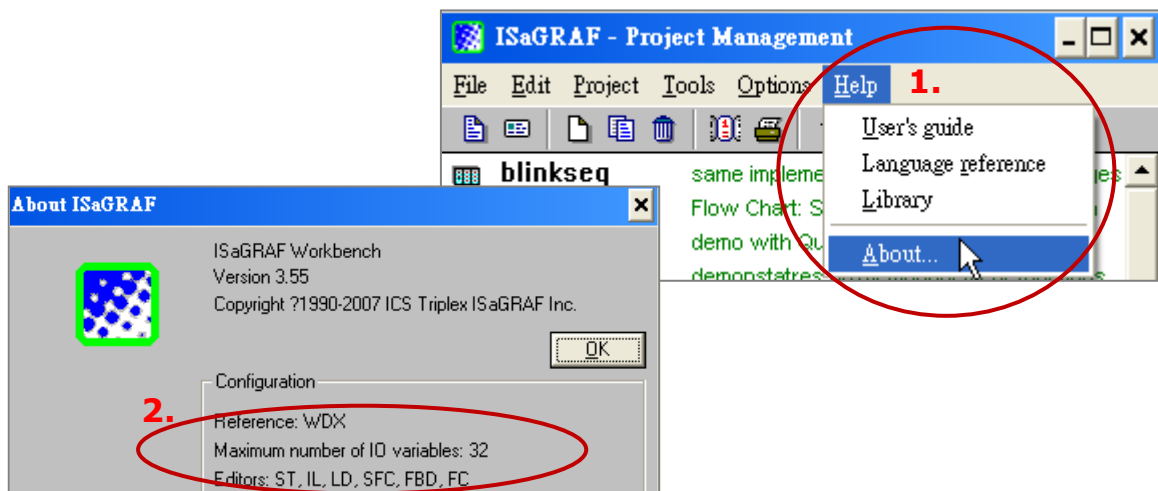
After the installation, click the Windows “Start” and point to “Programs” and “ISaGRAF 3.5”, then click “Project” to open the ISaGRAF.



2.1.1 The Hardware Protection Device (Dongle & USB Key-Pro)

You must install the hardware protection device (dongle) provided with the ISaGRAF software on your computers parallel port to for the ISaGRAF program to achieve fully authorized functionality.

While using ISaGRAF and the dongle is plugged well, if the “Help” – “About” says “Maximum number of IO variables: 32”, it means ISaGRAF workbench cannot find the dongle well. Please reset your PC and then check the “Help” – “About” again.



If it still displays “Maximum number of IO variables: 32”, the driver may not be installed well. Please do the following steps.

Dongle Protection:

Execute the following drivers in the ISaGRAF installation folder and restart the PC.

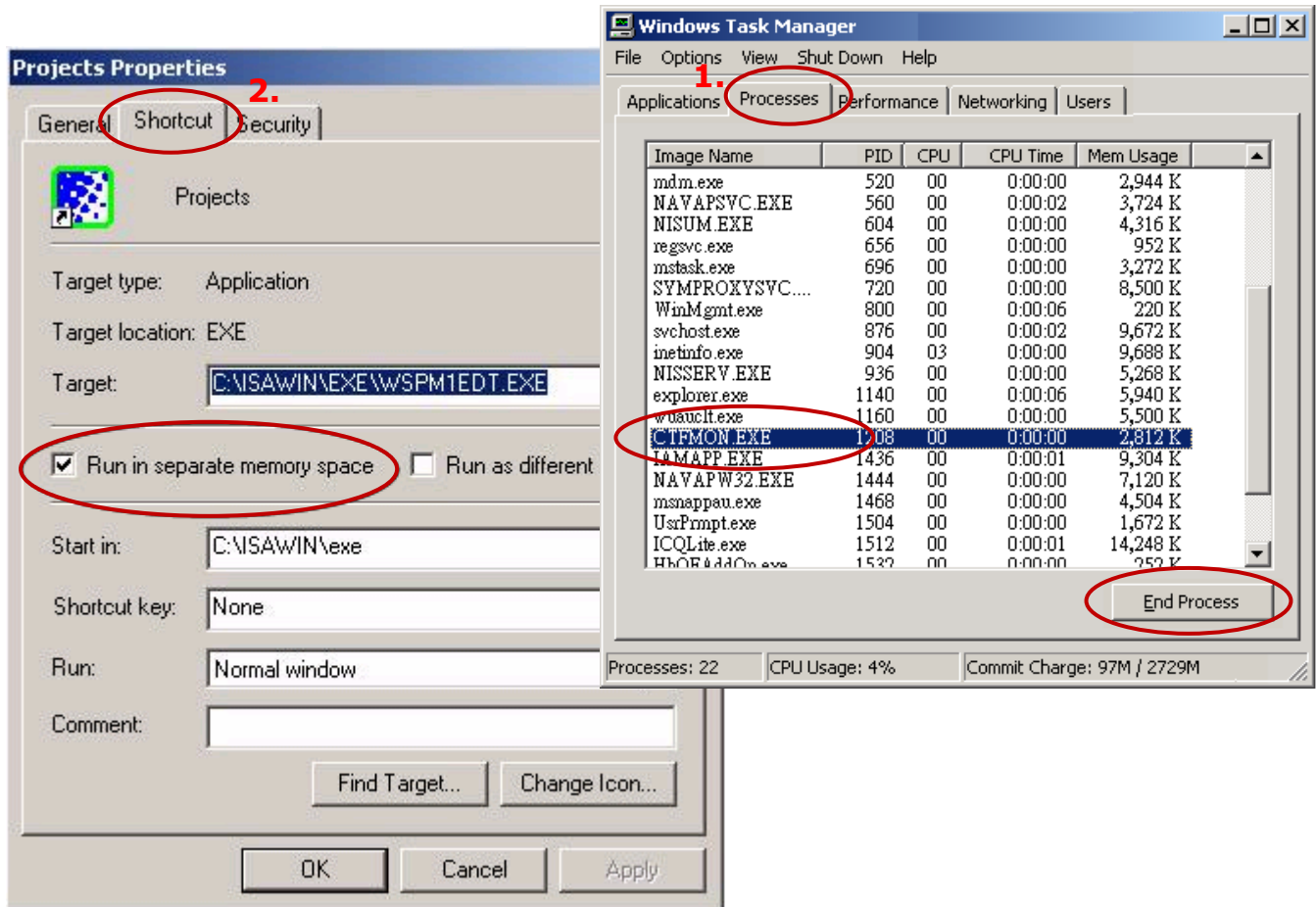
- For ISaGRAF-80: \Sentinel5382\setup.exe or
- For other versions: \Sentinel\setup.exe

USB Key-Pro Protection:

1. To make your PC recognize the ISaGRAF USB protection-key, un-plug the USB protection-key from your USB port first, then run “\Sentinel\SSD5411-32bit.exe” in the ISaGRAF installation folder after you have installed the ISaGRAF. Then reset your PC.
2. Before executing ISaGRAF Ver. 3.5x, plugging the USB protection-key in the USB port on the PC.

2.1.2 Important Notice for Window 2000 Users

If you close some ISaGRAF windows, it holds about 20 ~ 40 seconds (No response). This may be caused by the procedure “CTFMON.EXE” of Windows 2000. First click on “Ctrl & Alt & Del” at the same time to stop the “CTFMON.EXE” process, and then you may create a short cut for the “ISaGRAF project manager”. And then check on “run in separate memory space” option in the shortcut property.



2.1.3 Important Notice for Window NT Users

If your computer is using the Windows NT operating system, you will need to add one line to the “isa.ini” file in the ISaGRAF Workbench “EXE” subdirectory.

C:\ISAWIN\EXE\isa.ini

You can use any ASCII based text editor (such as Notepad or UltraEdit32) to open the “isa.ini” file. Locate the [WS001] header in the “isa.ini” initialization file (it should be at the top of the file). Anywhere within the [WS001] header portion of the “isa.ini” initialization file, add the entry shown below within the [WS001] header:

```
[WS001]
NT=1
Isa=C: \ISAWIN
IsaExe=C: \ISAWIN\EXE
Group=Samples
IsaApl=c: \isawin\sm
IsaTmp=C: \ISAWIN\TMP
```

2.1.4 Important Notice for Windows Vista or Windows 7 (32-bit) Users

Before installing the ISaGRAF; If your operating system is Windows Vista or Windows 7 (32-bit), change the User Account Control settings to avoid some of the setup restrictions.

How to disable “UAC” (User Account Control)?



The “UAC” (User Account Control) setting requires administrator-level permission.

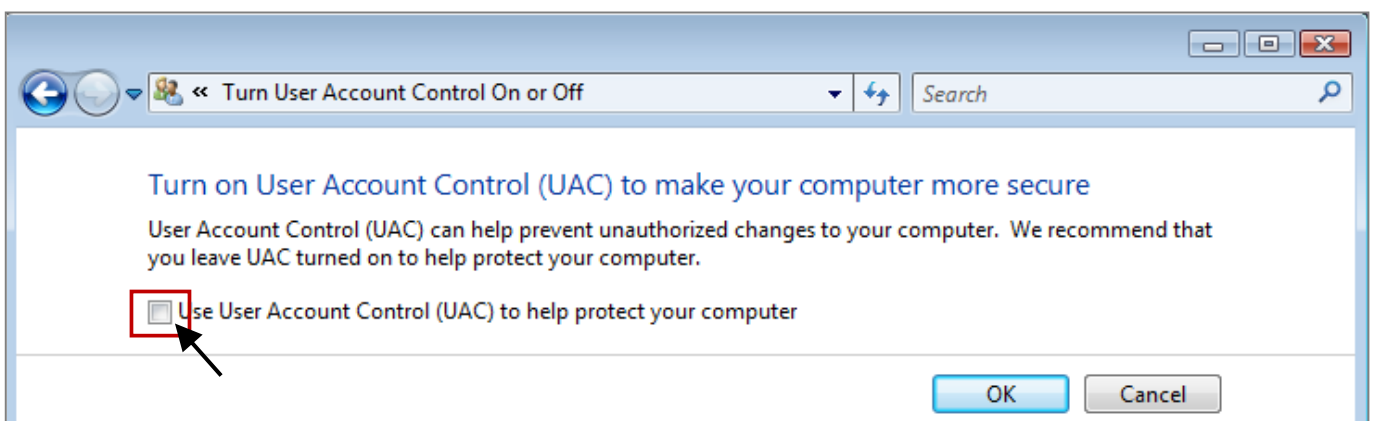
1. From the “Start” menu, choose “Control Panel > User Accounts and Family Safety > User Accounts”, then click “Change User Account Control settings” or “Turn User Account Control on or off”.



2. After clicking, it will show up the screen as below.

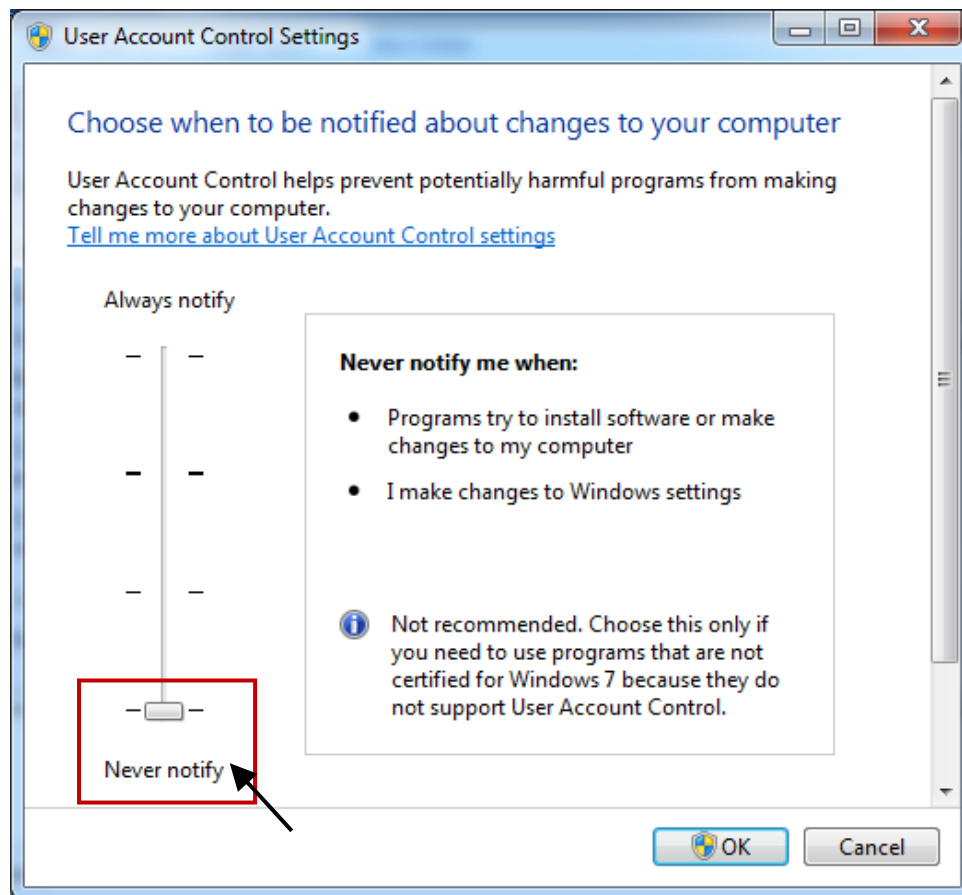
Windows Vista:

Uncheck the option – “Use User Account Control (UAC) to help you protect your computer” and then click on “OK”.



Windows 7:

Move the slider down to “Never Notify” and then click on “OK”.



3. Reboot your computer to apply the change.
4. After rebooting, refer to section [2.1 Installing the ISaGRAF Software](#).

2.1.5 Important Notice for Windows (64-bit) Users

Because the ISaGRAF Workbench can only be installed on a 32-bit version of Windows operating system, users can use the following ways to create a proper installation environment for the ISaGRAF Workbench 3.55. If using **Windows XP Mode** that can be installed on 64-bit version of Windows 7 Professional, Enterprise, and Ultimate editions. If using **VMware Workstation/Player** that can be installed on any 64-bit version of Windows OS (e.g., Windows 7 or Windows 8).

Using Virtual PC and XP Mode:

1. Download Windows Virtual PC and Windows XP Mode installers from the Windows Virtual PC Web site (<http://go.microsoft.com/fwlink/?LinkID=160479>)
2. Double-click on "WindowsXPMode_**nn-NN**.exe" (where nn-NN is the locale, e.g. en-US) and follow the instructions in the wizard to install Windows XP Mode.
3. Double-click on "Windows6.1-KB958559-x64.msu" to install Windows Virtual PC.
4. Reboot your computer.
5. After rebooting, click on "Star > All Programs > Windows Virtual PC" and then click Windows XP Mode.
6. Follow the instructions in the wizard to complete Windows XP Mode Setup and Configuration.
Note: It is important to remember the password provided during the installation, which is used to log on to the virtual machine.
7. Now, go back to [Section 2.1](#) to install the ISaGRAF.

Using VMware Workstation/Player:

1. Download and install VMware Workstation 10 (trail version) on VMware website.
https://my.vmware.com/web/vmware/info/slug/desktop_end_user_computing/vmware_workstation/10_0
2. Create a virtual machine running Windows XP (32-bit, SP3).
3. Install ISaGRAF Workbench 3.55 on a virtual machine.
4. Install ISaGRAF I/O Library on a virtual machine.
5. The related settings for a virtual machine.
6. Install USB dongle driver on a virtual machine.

More at <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-174

2.1.6 Important Setting for Using Variable Arrays

Please add two more lines on the top of the **c:\isawin\exe\isa.ini** file to enable the usage of variable arrays.

```
[DEBUG]
Arrays=1
```

Step 2 - Installing the ICP DAS Utilities for ISaGRAF

Visit to the website to download the latest version of “ICP DAS Utilities for ISaGRAF” (io_lib.zip).
<http://www.icpdas.com/en/download/show.php?num=368>

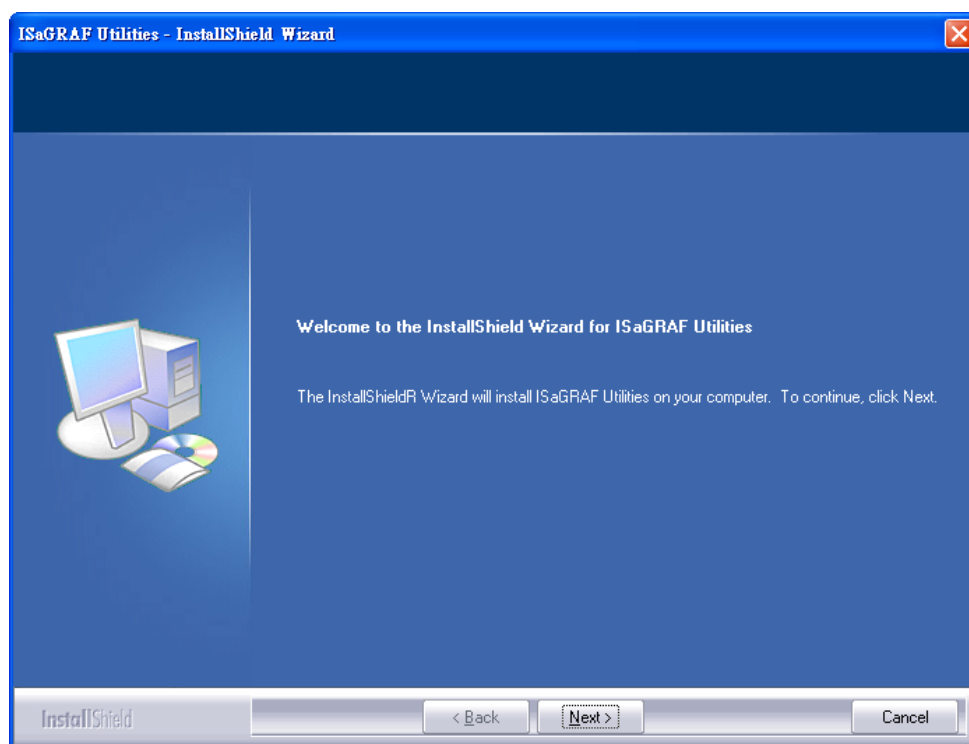
The “ICP DAS Utilities for ISaGRAF” consists of 3 major items.

- I/O libraries (for all ISaGRAF PAC)
- Modem_Link utility
- Auto-scan I/O utility

Note:

Make sure you have already installed the ISaGRAF Workbench program, IF NOT, refer to [Chapter 2.1 Step 1](#) before continuing.

Execute **setup.exe** and follow the instructions of the InstallShield Wizard to install ISaGRAF Utilities.



Chapter 3 Setting Up a Web HMI Demo

Important Notice:

1. Only set a fixed IP address for the WP-8x47. (No DHCP)
2. Disable the LAN2 port of the WP-8x47 If you are not using it.

3.1 Web Demo List

Visit the ISaGRAF Demo page to download these demo programs.

<http://www.icpdas.com/en/download/show.php?num=1005>

Demo list:

Name	Description	IO board
sample	A Web HMI sample	No I/O board
example1	A simple example listed in Chapter 4	slot 0: I-87055W
wphmi_01	Display PAC's date & time	No I/O board
wphmi_02	DI & DO demo	slot 0: I-87055W
wphmi_03	Read / Write Long, Float & Timer value	No I/O board
wphmi_04	Read / Write PAC's String	No I/O board
wphmi_05	Multi-Pages demo: Page menu is on the Left	slot 0: I-87055W
wphmi_05a	Multi-Pages demo: Page menu is on the Top	slot 0: I-87055W
wphmi_06	AIO demo, scaling is in ISaGRAF	slot 2: I-87024W slot 3: I-8017HW
wphmi_07	AIO demo, scaling is in PC	slot 2: I-87024W slot 3: I-8017HW
wphmi_08	download PAC's file to PC	slot 0: I-87055W
wphmi_09	pop up an alarm window on PC	slot 0: I-87055W
wphmi_11	Trend curve.	slot 2: I-87024W slot 3: I-8017hW
wphmi_12	Record the voltage of channels 1 to 8 of the I-8017HW every 50ms and draw trend curve by MS Excel	slot 3: I-8017hW slot 2: I-8024W
wphmi_13	Record the voltage of channels 1 to 4 of the I-8017HW every 10ms and draw trend curve by MS Excel	slot 3: I-8017hW slot 2: I-8024W

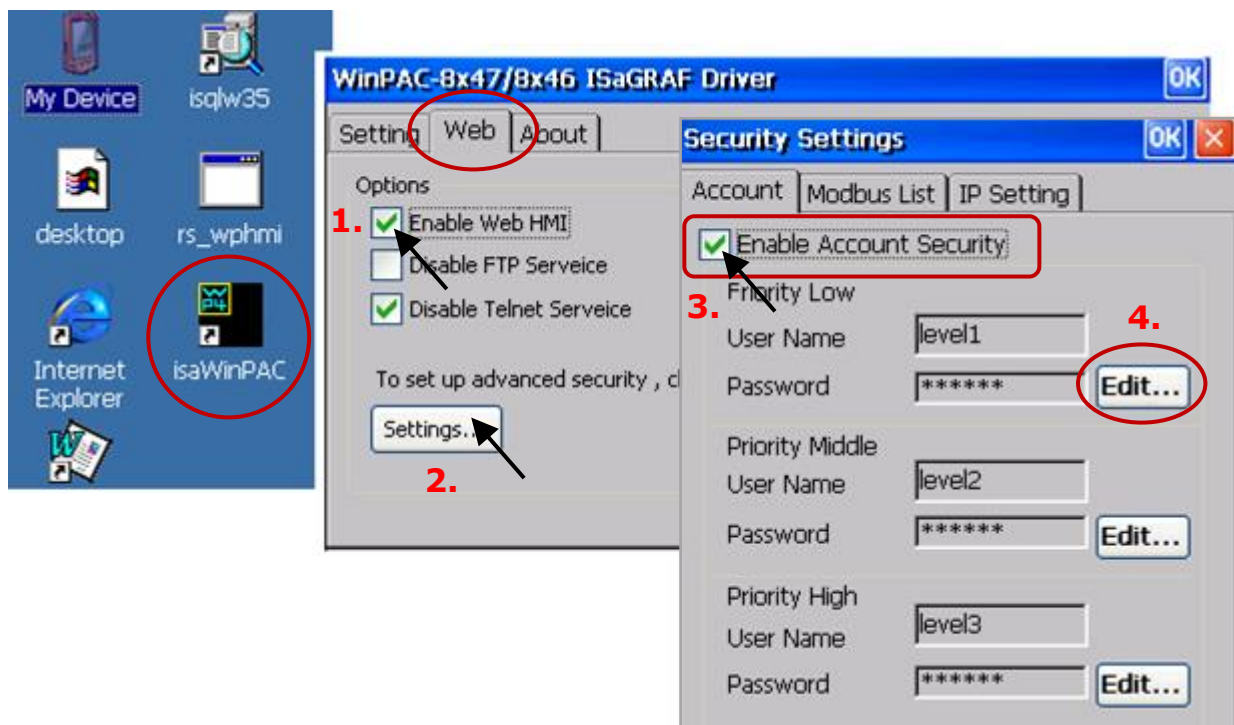
3.2 Steps to Set Up a Web HMI Demo

3.2.1 Step 1 - Setup the Hardware

- A. Prepare one WP-8147/8447/8847 and then plug one I-87055W module in its slot 0.
If you don't have the I-87055W (8 IN & 8 OUT board), using the "wphmi_01" demo not "wphmi_05" and follow the same steps as below.
- B. Prepare one VGA monitor, one USB mouse and one Ethernet cable and then connect them to the WP-8x47. Also, the software keyboard can be used on the bottom-right of the PAC screen.
- C. Power the WP-8x47 up.

3.2.2 Step 2 - Setting the Web Options

- A. Refer to Appendix A.3 to set a **fixed IP** address to the WinPAC. (No DHCP)
- B. Run ISaGRAF Driver and check the "Enable Web HMI" option and then click the "Setting" button. Next, check the "Enable Account Security" and click the "Edit" button to set the username and password. Then, click "OK" to exit the window.



Note: If "Enable Account Security" is not checked, any users can easily get access to your WinPAC through the Internet Explorer.

3.2.3 Step 3 - Download ISaGRAF Project

If you are familiar with how to restore the “wphmi_05.pia” program to ISaGRAF Workbench and how to download the project to the WP-8x47, go ahead to [Section 3.2.4](#).

If not, make sure that ISaGRAF Workbench has been installed on the PC (refer to [Section 2.1 & 2.2](#)) before conducting with the following steps.

Visit the ISaGRAF Demo page to download the demo program. (...\\isagraf_winpac_demo**wphmi_05.pia**)
<http://www.icpdas.com/en/download/show.php?num=1005>

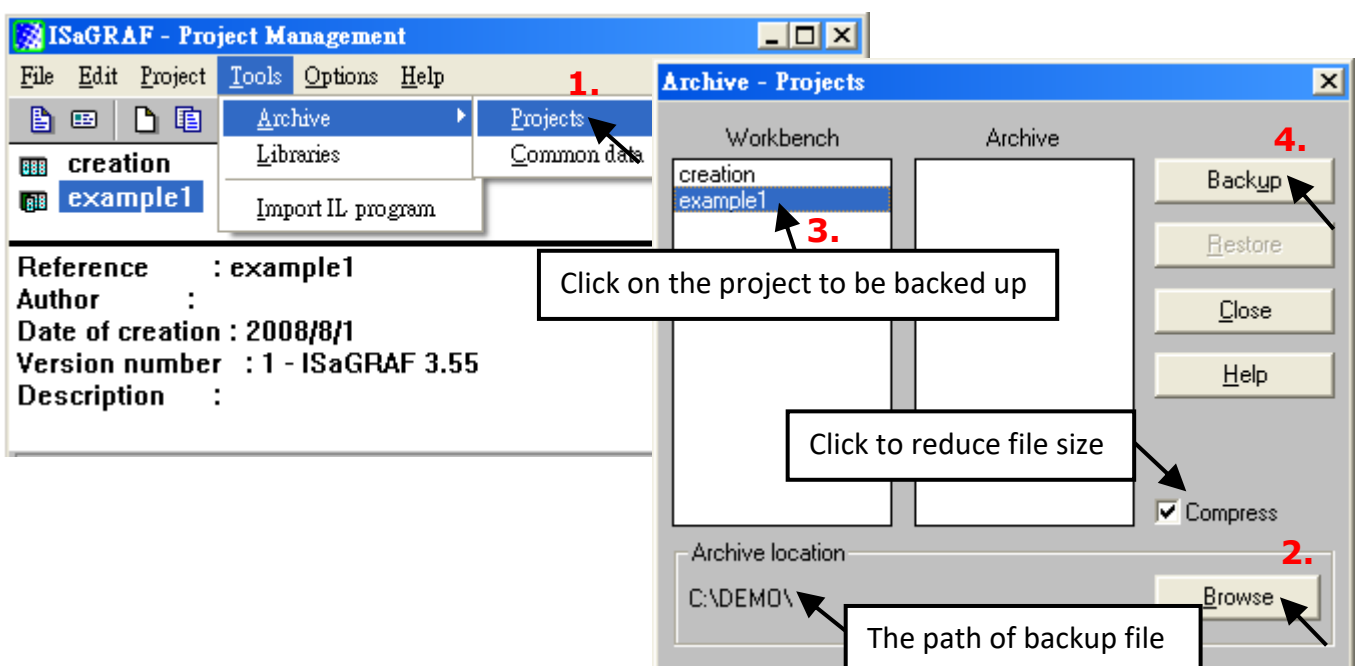
I-87055W (8 inputs and 8 outputs) I/O module is needed for using the **wphmi_05** demo. If there is no I-87055W, downloading the **wphmi_01** demo (...\\isagraf_winpac_demo**wphmi_01.pia**).

Steps to Back Up & Restore an ISaGRAF Project:

For archiving purposes, you can "Back Up" and "Restore" an ISaGRAF project. For example, you want someone to test your program or email it to service@icpdas.com for ICP DAS's technical service.

Backing Up an ISaGRAF Project

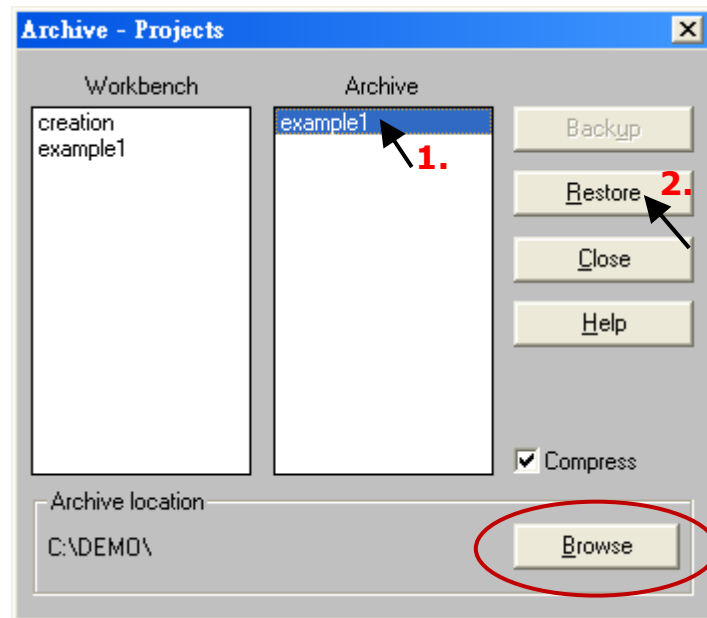
1. Open the “ISaGRAF Project Management” window. On the **Tools** menu, point to **Archive**, and then click **Projects**.
2. In the **Archive-Projects** window, click **Browse** to designate where you want to save the ISaGRAF project (e.g., ‘C:\\Demo’). Also, check the Compress box if you want to reduce the size of the file.
3. In the **Workbench** section, choose the project you want to back up.
4. Click **Backup** to store the file to the specified location (e.g., ‘C:\\Demo\\example1.pia’).



Restoring an ISaGRAF Project

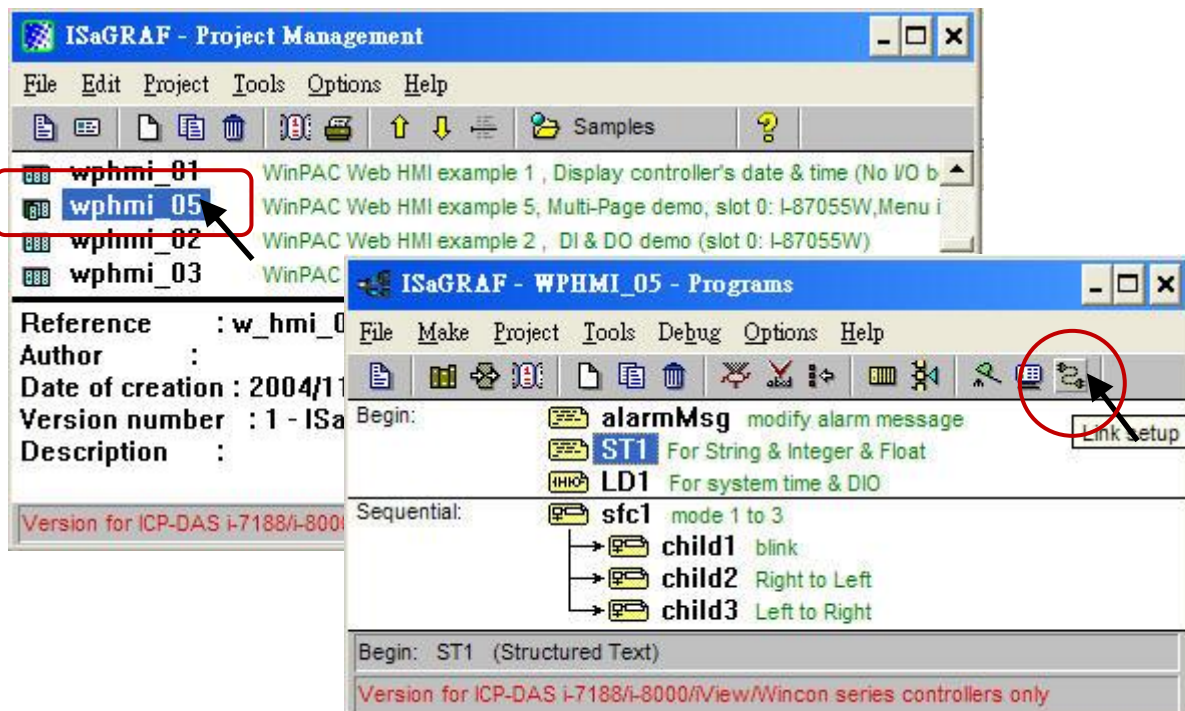
Follow the same ways as noted before to open “Archive Projects” window, and restore the ISaGRAF project from the backup location.

1. In the **Archive** section, choose the project you want to restore.
2. Click **Restore** to restore the file to the ISaGRAF Workbench.

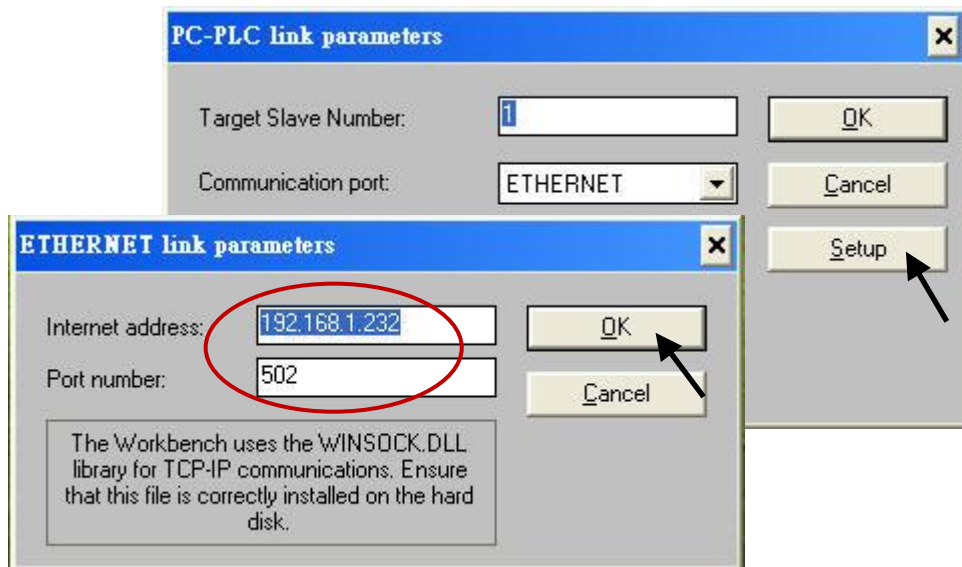


Steps to Download an ISaGRAF Project to the PAC:

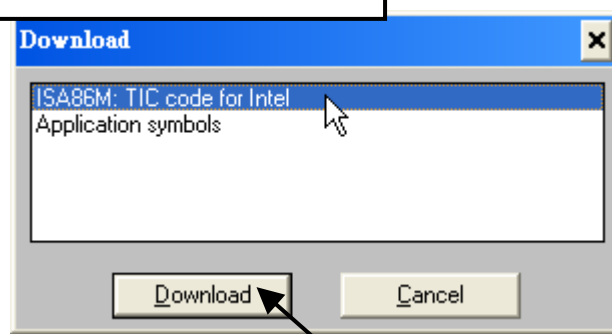
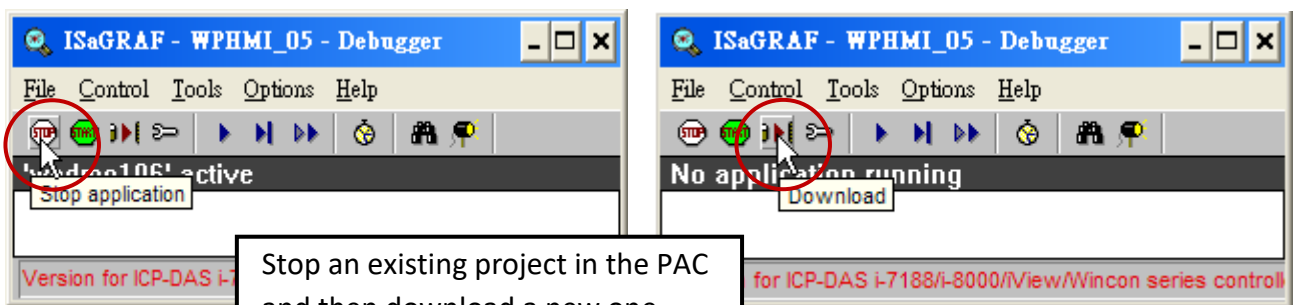
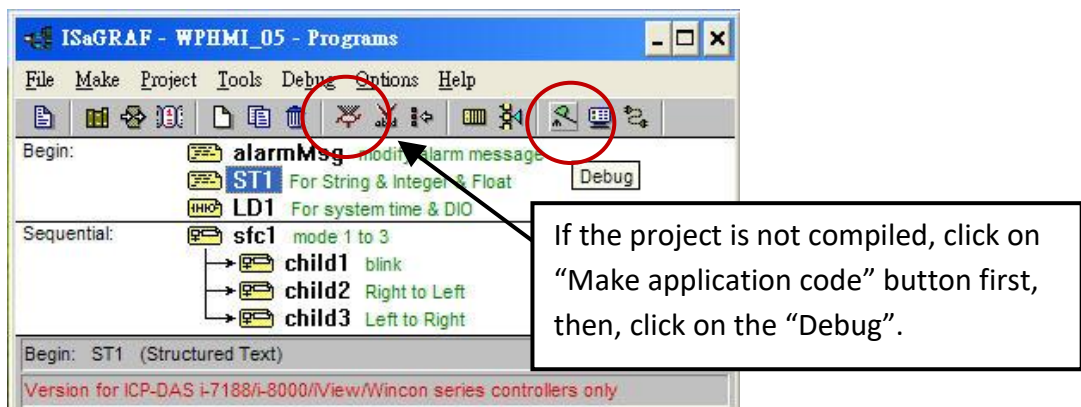
Double-click on the “wphmi_05” to get into the project. Then click on “Link setup”.



Click on “Setup” first and then entering the IP address of your PAC. The port number should be 502.



To download “wphmi_05” project to the WP-8x47, Click on “Debug”. If communication is established, click on “stop” first to stop the old project that is running on the PAC. Then click the “Download” button to download the project to the PAC.

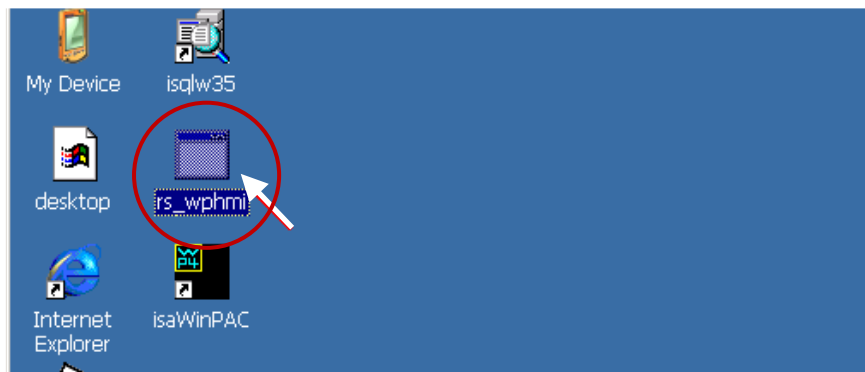


3.2.4 Step 4 - Download Web Pages to the WinPAC

- A. Please copy all files in the demo folder (...\\isagraf_winpac_demo\\wp_webhmi_demo\\wphmi_05*.*) to the WP-8x47 's \\Micro_SD\\Temp\\HTTP\\WebHMI\\

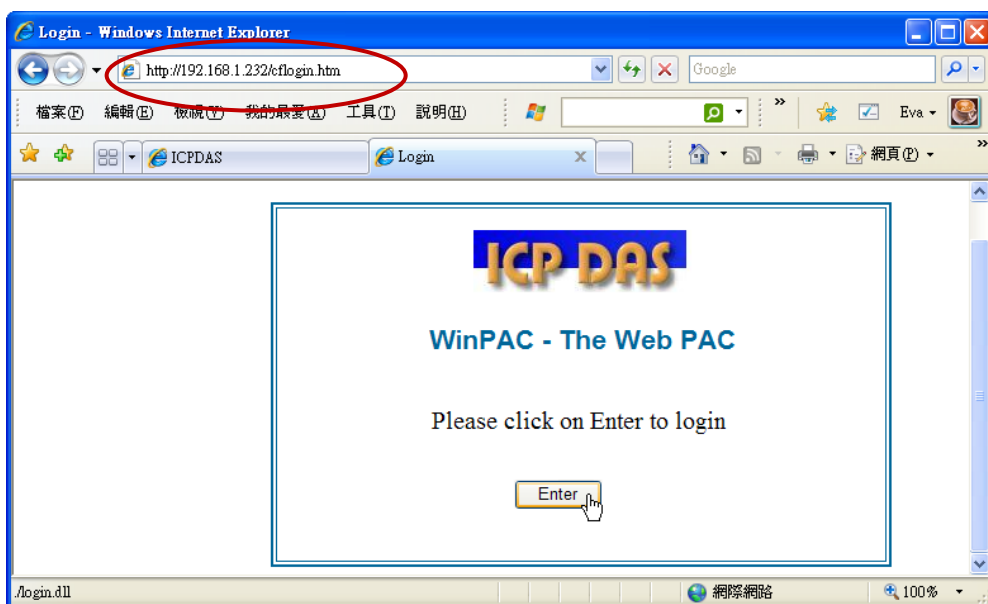
When using wphmi_05 demo, it requires to plug one I-87055W in the slot 0 on the PAC. If you don't have the I-87055W (8 inputs and 8 outputs) I/O module, you may download "wphmi_01".

- B. Once the Web Pages are modified or new copied, run "rs_wphmi.exe" to reset the Web server. **The "rs_wphmi.exe" must be run every time when the user has modified any file in the WP-8x47 's \\Micro_SD\\Temp\\HTTP\\WebHMI**



3.2.5 Step 5 - Show Time

Please run Internet Explorer (Rev. 6.0 or higher), key in the IP address of your WP-8x47. For example: 192.168.1.232 or <http://192.168.1.232>



Chapter 4 Programming A Web HMI Example

This chapter shows you how to build a simple ISaGRAF project and Web HMI pages.

The WinPAC-8xx7/WP-8x47 is the abbreviation of the WinPAC-8147/8447/8847/8137/8437/8837.

The WinPAC-8xx6/WP-8xx6 is the abbreviation of the WinPAC-8146/8446/8846/8136/8436/8836.

Important Notice:

1. WP-8x47 supports only I-8K and I-87K High profile I/O modules in slots 0 to 7.

For more information about available modules, visit the webpage:

http://www.icpdas.com/en/product/guide+Remote__I_O__Module__and__Unit+Software__Support__+I-8K_I-87K__Software__Support

2. Please always set a **fixed IP address to the WP-8x47. (No DHCP)**

3. Recommend to use Industrial Ethernet Switch for WinPAC.

For more information about the Ethernet switch, visit the webpage:

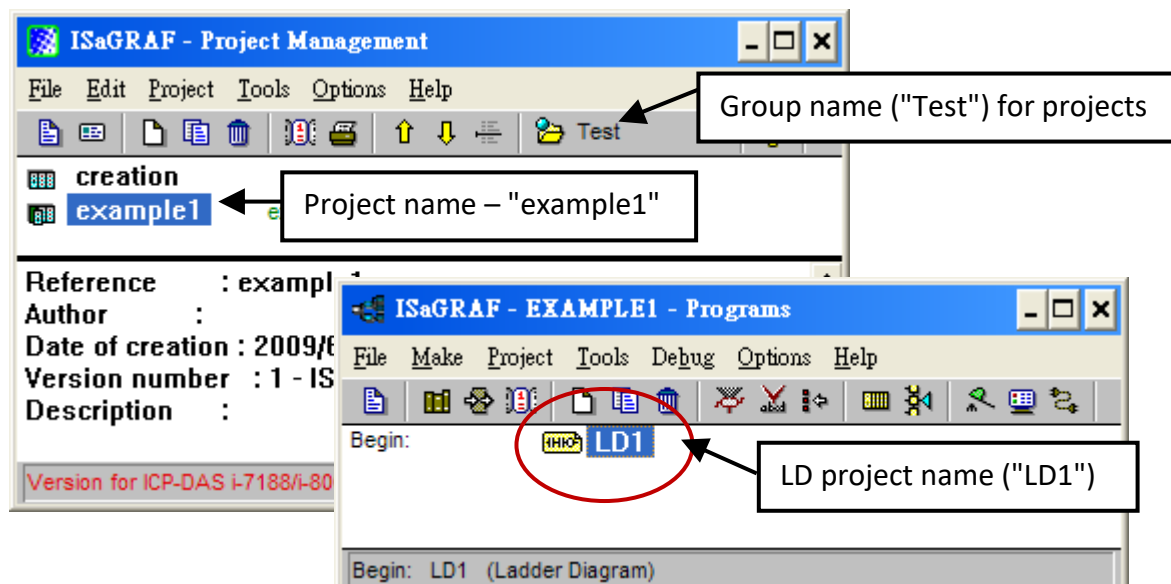
http://www.icpdas.com/en/product/guide+Industrial__Communication+Ethernet__Communication+Ethernet__Switch

If the user would like to program WP-8x47 by using both ISaGRAF and EVC++ (or VS.net), it is also possible. Please refer to [Chapter 6](#) or [Chapter 7](#).

4.1 Writing a Simple ISaGRAF Program

We are going to use ISaGRAF Workbench to write a simple ISaGRAF program, then download it to the WP-8x47 (with one **I-87055W** I/O module in its slot 0) to make it work. If you haven't installed "ISaGRAF" & "ICP DAS Utilities for ISaGRAF", go back to read chapter 2.

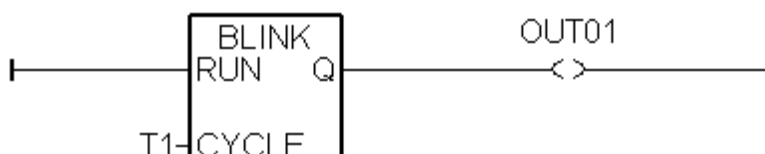
This example contains one Ladder program. "example1.pia" resides at "...\\isagraf_winpac_demo\\".



Variables declaration:

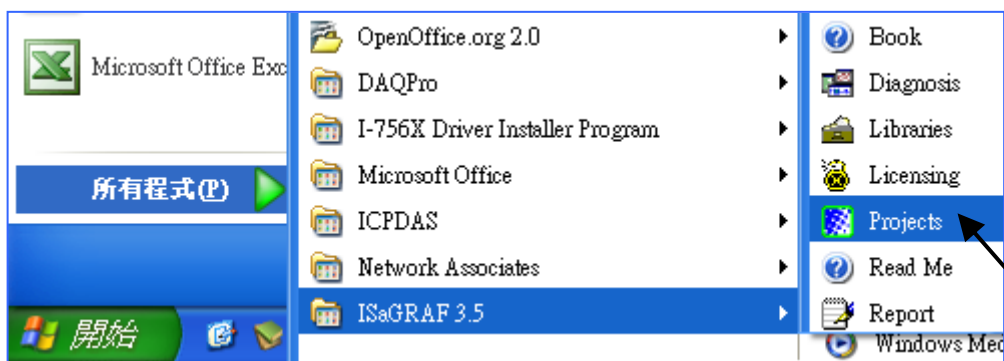
Name	Type	Attribute	Description
OUT01	Boolean	Output	Output 1 in the I-87055W, Modbus network address = 1
OUT02	Boolean	Output	Output 2 in the I-87055W, Modbus network address = 2
K1	Boolean	Input	Input 1 in the I-87055W, Modbus network address = 11
K2	Boolean	Input	Input 2 in the I-87055W, Modbus network address = 12
T1	Timer	Internal	Time Period of blinking, initial value set as T#8s Modbus network address = 21

Ladder Logic Program Outline:



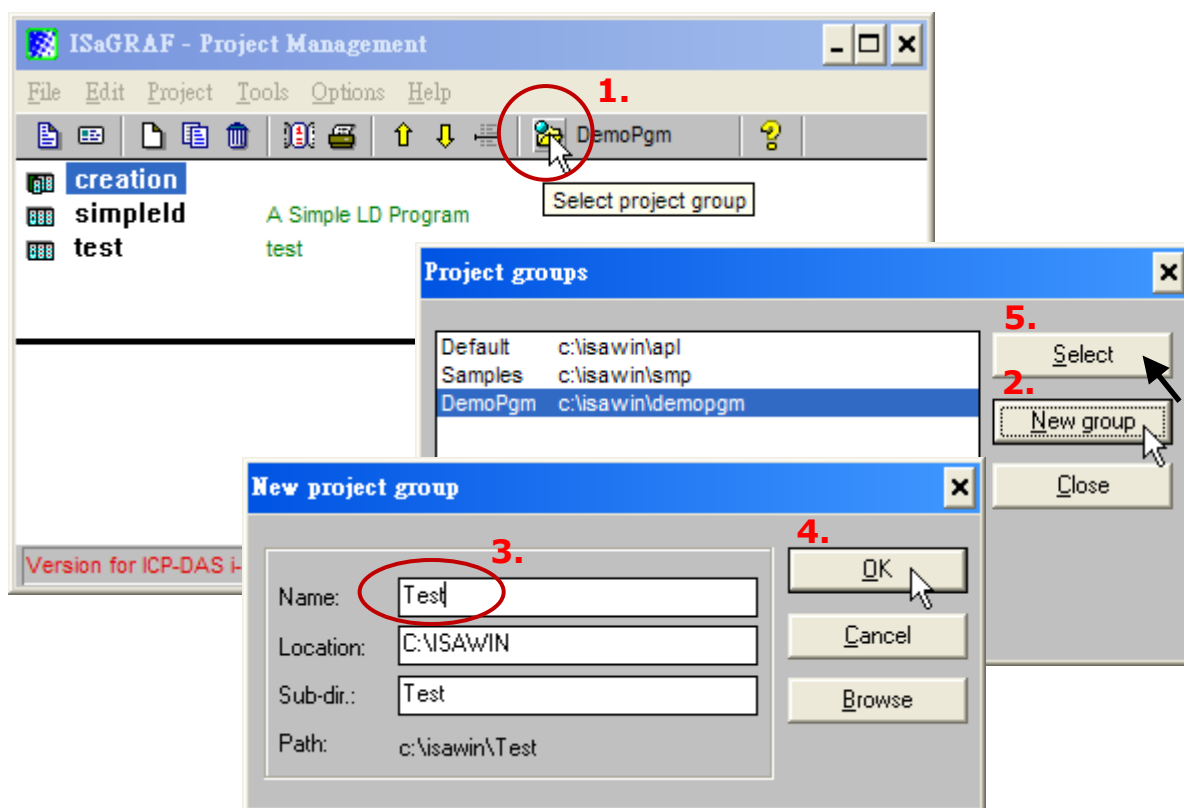
4.1.1 Open ISaGRAF - Project Management

Click the Windows "Start" > "All Programs" > "ISaGRAF 3.5" > "Projects" as shown below.



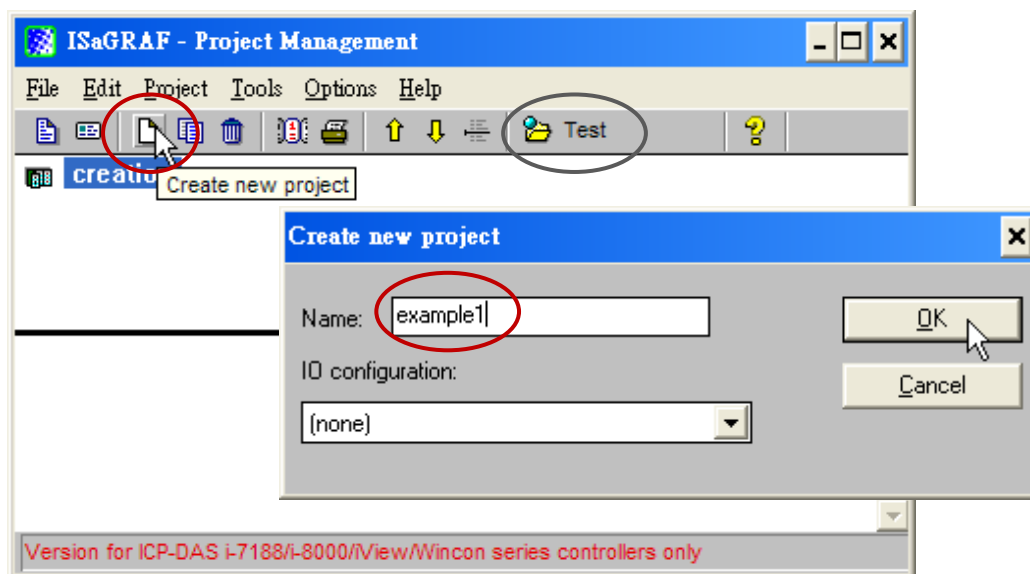
4.1.2 Creating an ISaGRAF User's Group

Click the "Select project group" and the "New group" buttons, then enter the name for the new user group, and click "OK". Then, select the new group name and click the "Select" button.

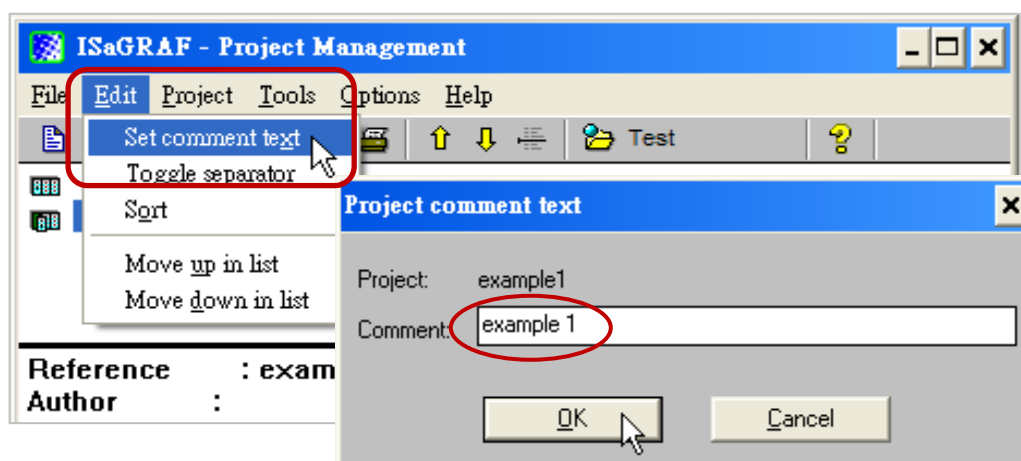


4.1.3 Creating a New ISaGRAF Project

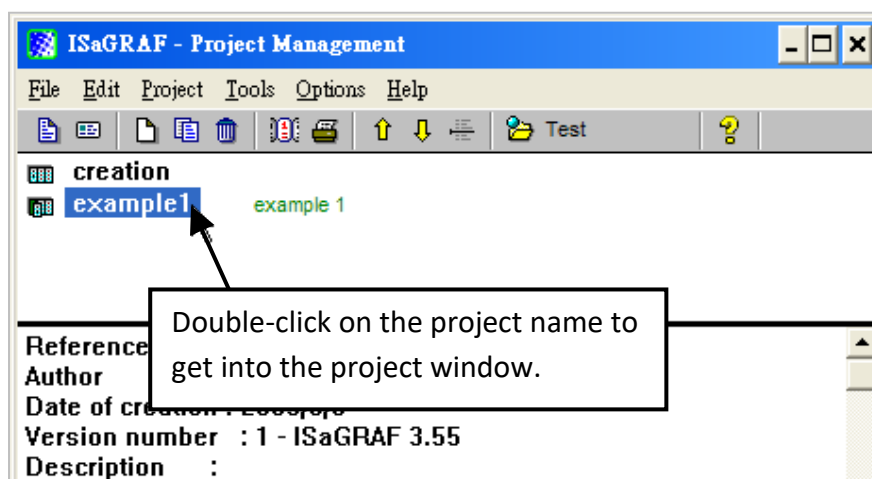
To start a new ISaGRAF project, click the "Create New Project" button and enter the name for the new project, then click OK.



Also, click "Edit" and "Set Comment Text" to add notes for the project.



The new project will be displayed in the "Project Management" window. Double-click on the project name to open the project.

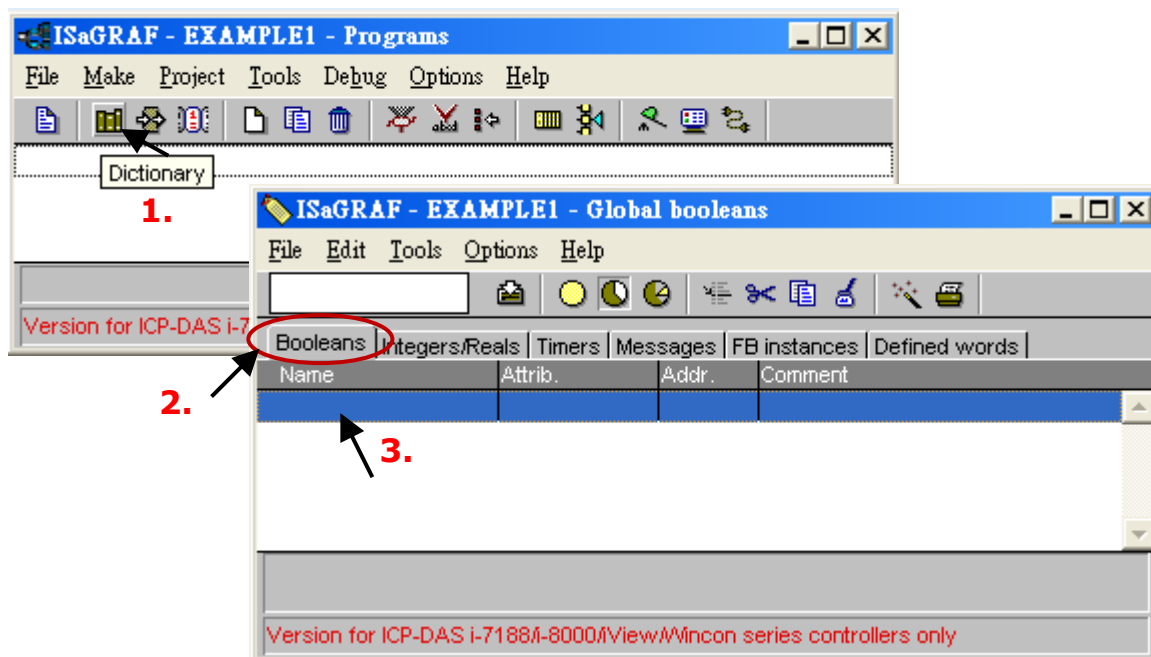


4.1.4 Declaring the ISaGRAF Project Variables

First, you must declare the variables that will be used in the ISaGRAF program.

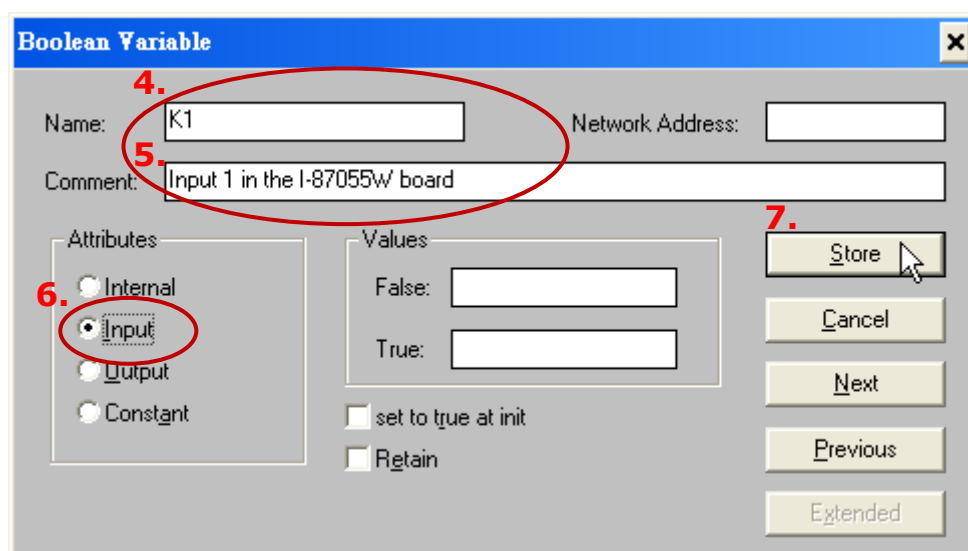
Declare the Boolean Variables

1. To begin this process, click the "Dictionary" button.
2. Click the "Booleans" tab to declare the Boolean.
3. Double-click the first blank row below the "Booleans" tab to open the "Boolean Variable" window.



(Please refer to [ch4.1 Variables declaration](#))

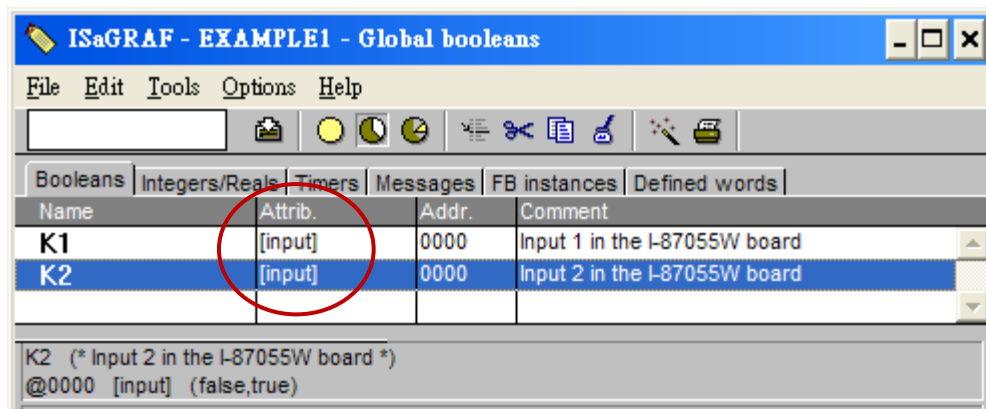
4. As the figure below, enter a name in the Name field (e.g., "K1").
5. Add notes in the Comment field (e.g., " Input 1 in the I-87055W board ").
6. Set the attribute for the "K1" variable (e.g., "Internal").
7. Click the "Store" button to save it. A new Boolean variable has now been declared.



NOTE:

Make sure that each variable has the proper attribute assigned. Also, you can double-click the variable name to change the setting.

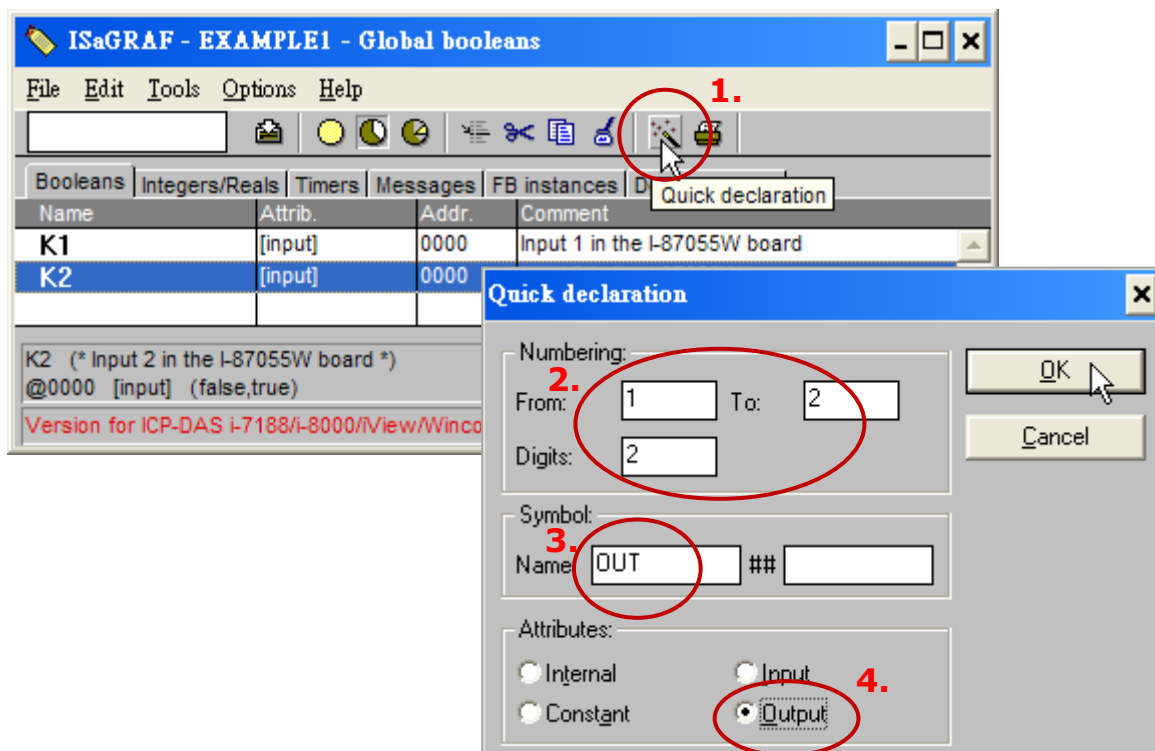
Follow the similar steps as noted to add the Boolean variable – “K2”. The result will be shown as follows.



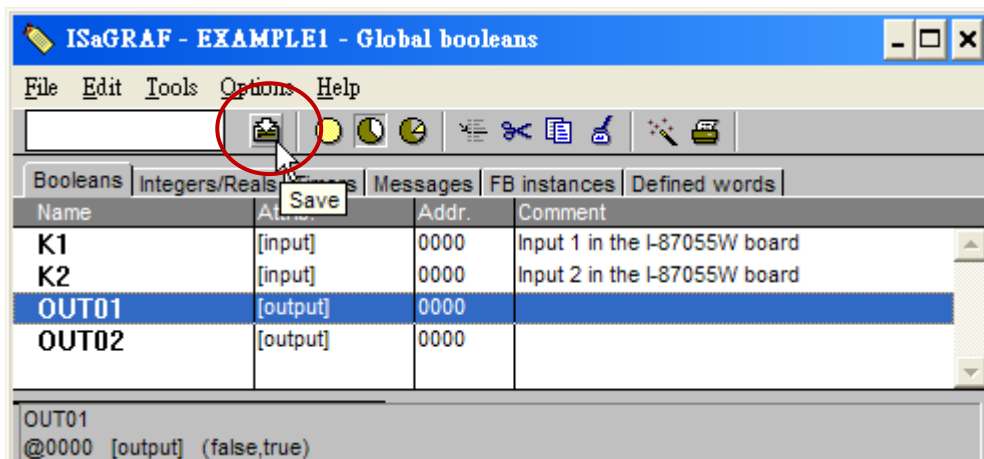
Quick way to declare

There are two outputs used in this example program named "OUT1 and OUT2". ISaGRAF provides a quick and easy way to declare like variables that are sequentially ordered. To begin this process,

1. Click the "Quick Declaration" button.
2. Enter in the output number that you will start with the "Numbering" in "from" and "To" fields (this example uses from 1 to 2).
3. Enter the name for the output variables being declared.
4. Set the attribute to "Output" and then click "OK".



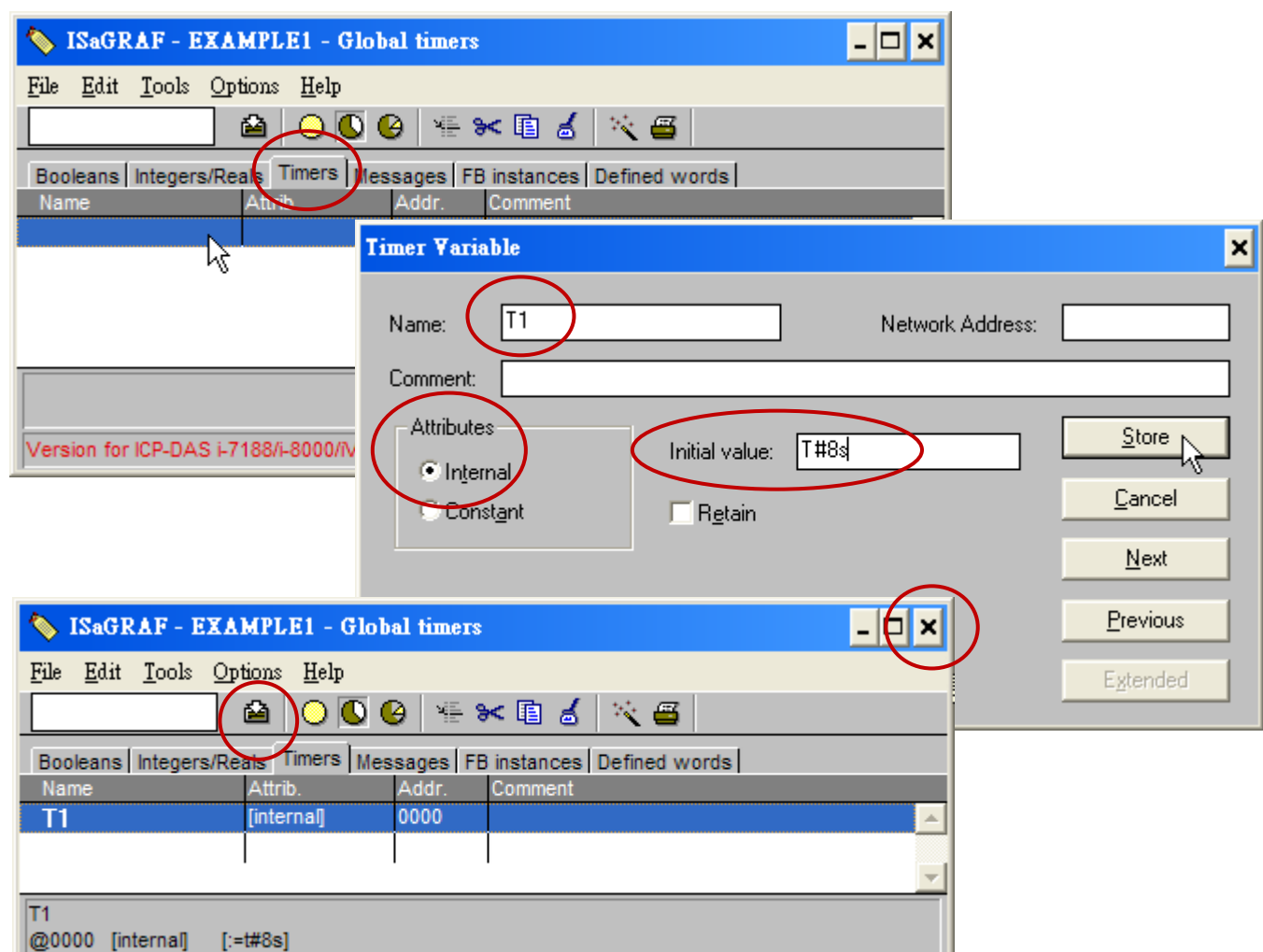
All two outputs have been added to the "Global Booleans" window. Click the "Save" button to save the settings.



Declare the Timer Variables

To declare the timer (T1) variable used in this example program:

1. Click the "Timers" tab in the setup screen and double-click on the blank row.
2. Enter the Name as "T1" and set the "Attributes" to "Internal".
3. Set the "Initial Value" to "T#8s", then click on the "Store" button.
4. Click the "Save" button and click on "X" to close the window.



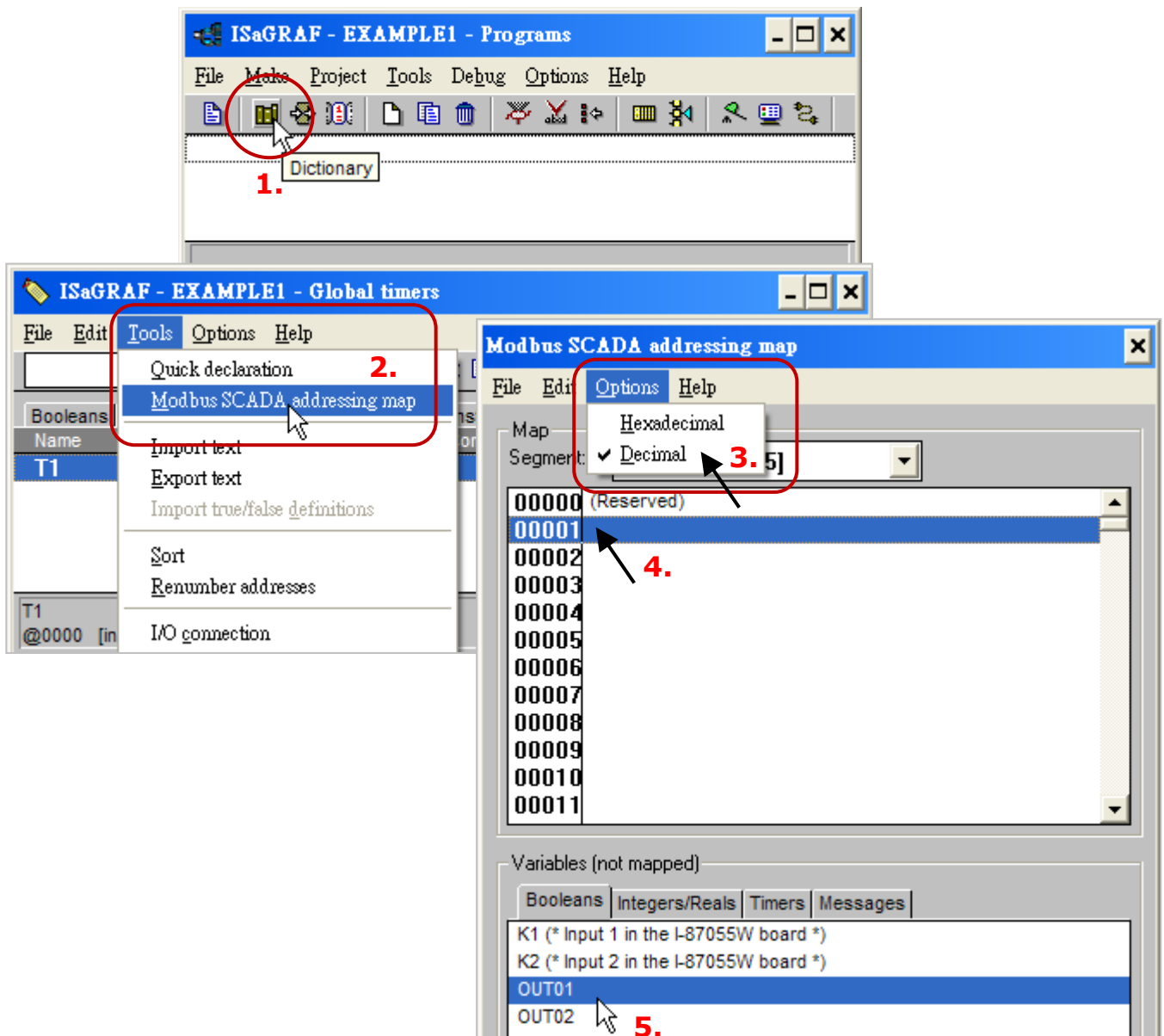
4.1.5 Assign Modbus Network Address No. to Variables

The Web HMI can exchange the variable value with the ISaGRAF project if they have assigned the proper “Modbus network address”. The Web HMI only recognize Modbus No. from 1 to 1024. However other SCADA software may R/W the Modbus No. from 1 to 8191 in the WP-8x47.

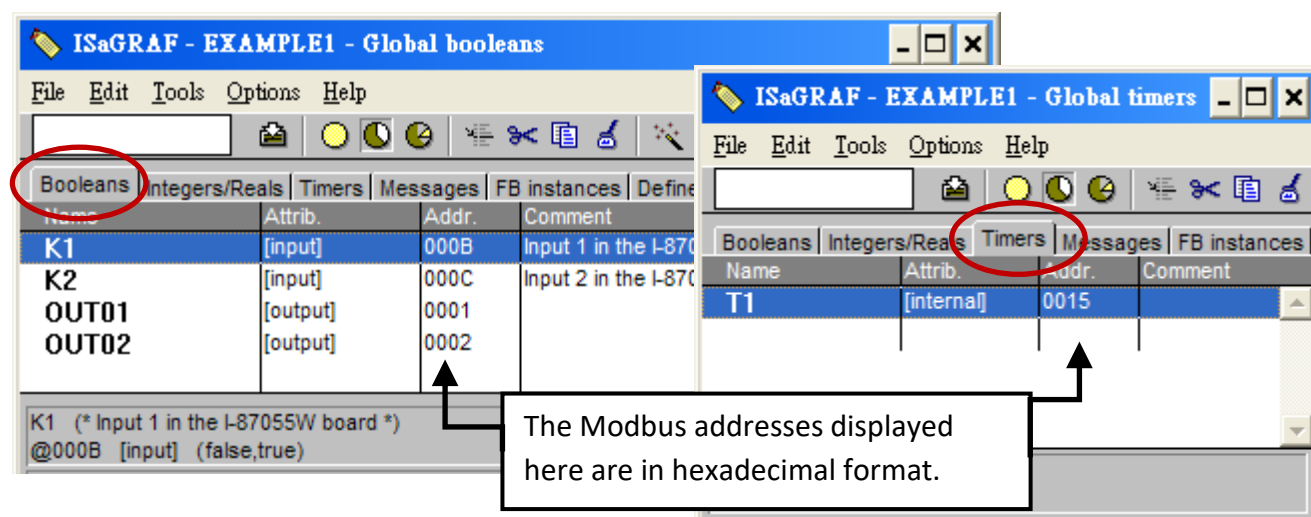
Variables without assigning Modbus No. will not be available by Web HMI and other SCADA software or HMI devices.

For more details about assigning Modbus network address, refer to section 4.1 & 4.2 of the ISaGRAF User Manual. Download the file at <http://www.icpdas.com/en/download/show.php?num=333>.

1. Click on “Dictionary” icon.
2. Click [Tools] > [Modbus SCADA addressing map].
3. Select [Options] > [Decimal], or the address will be displayed in hexadecimal format by default.
4. Click the address “00001” and double-click the “OUT01” variable to set its Modbus address to 1.



Follow the same way to set the Modbus address for OUT01 (address =2), K1 (address =11), K2 (address =12), and T1 (address =21). Then we have below window.



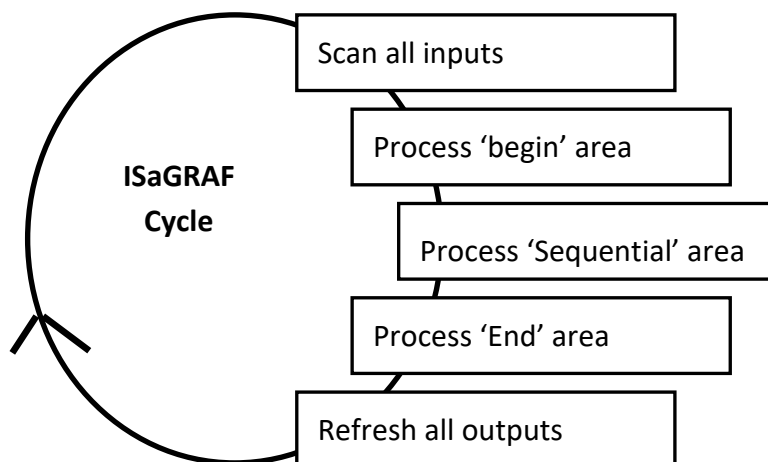
Very Important:

When using Long integer or Float or Timer variables, two Modbus address numbers are required.

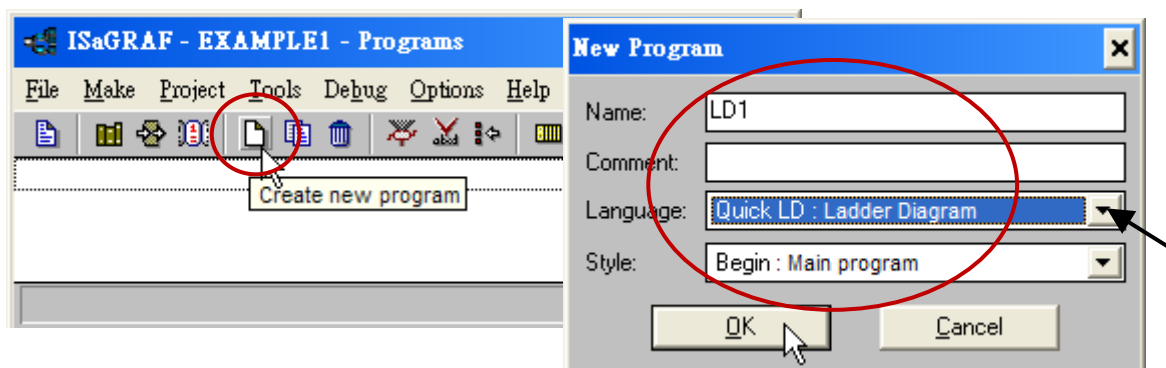
For more details about Modbus network address, refer to section 4.2 of the ISaGRAF User Manual. Download the file at <http://www.icpdas.com/en/download/show.php?num=333>.

4.1.6 Create the LD Program - "LD1"

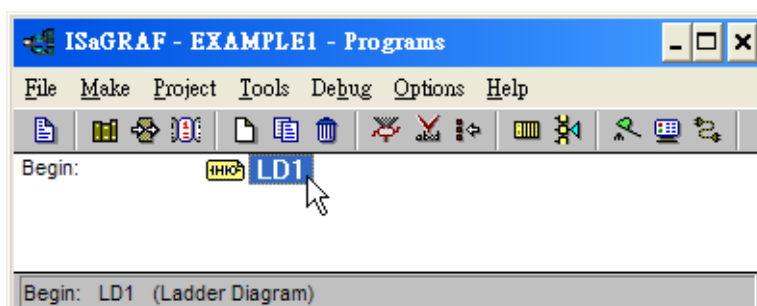
ISaGRAF will run every program one time in each PLC scan cycle. Programs in the "begin" area will run first, then the "Sequential" area, and last the "End" area. An ISaGRAF cycle runs in the way as the below scheme.



Click the "Create New Program" button and the "New Program" window will appear. Next, enter the program name (e.g., "LD1") and select "Quick LD: Ladder Diagram" in the Language field. Make sure that "Begin: Main Program" is selected in the Style field. Also, add notes in the Comment field if necessary.

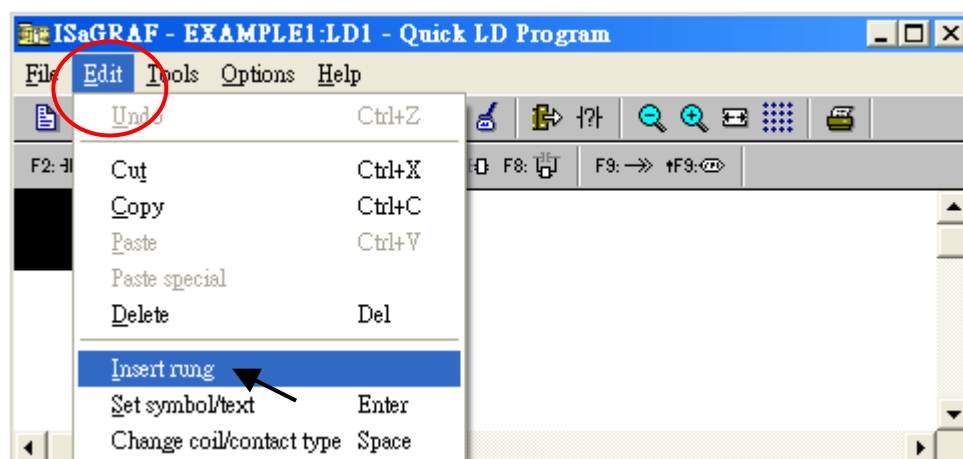


Now we have one program inside this project. Double-click on the "LD1" to get into it.

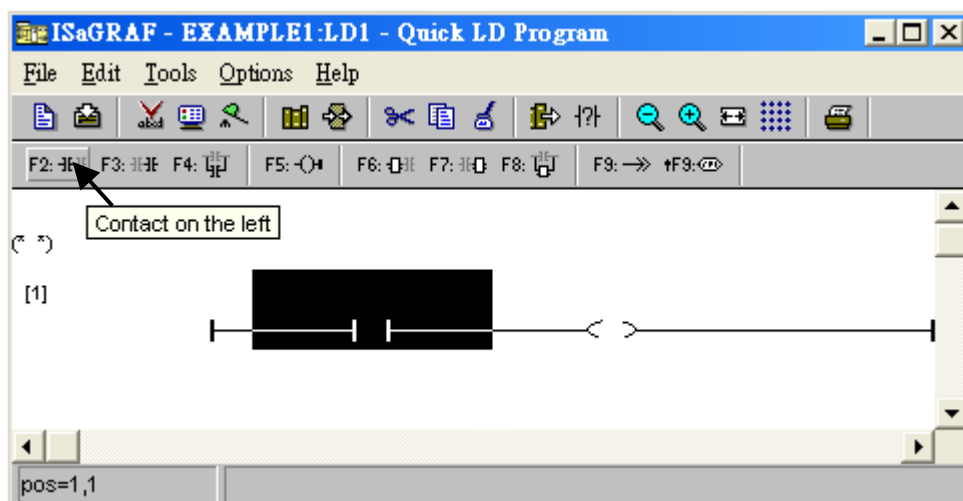


4.1.7 Edit the "LD1" Program

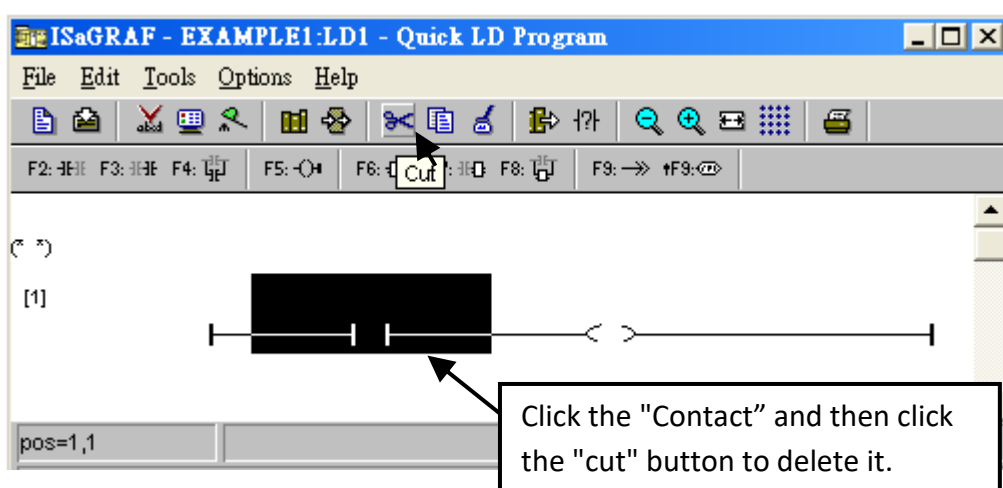
In the "LD1" program window, click "Insert Rung" from the Edit menu.



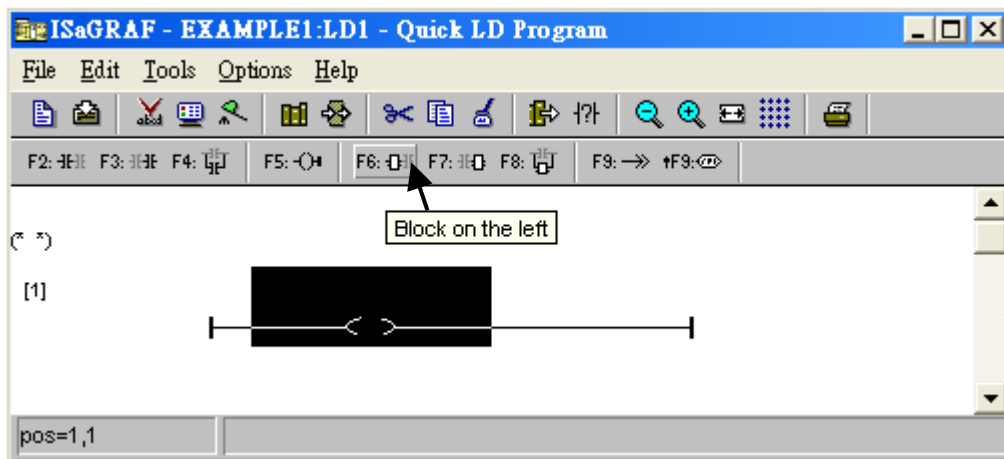
Or, just click the "F2 (Contact on the Left)" button and the screen will be shown as below.



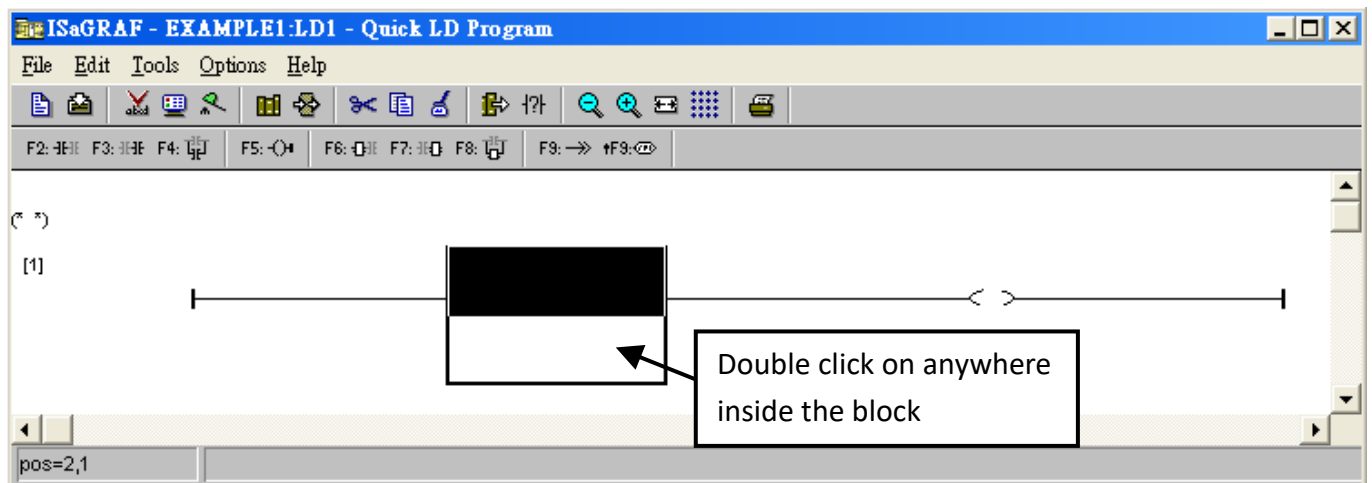
We are going to write the first line of the LD1 program. Click the first "contact" and then click the "cut" button to delete it.



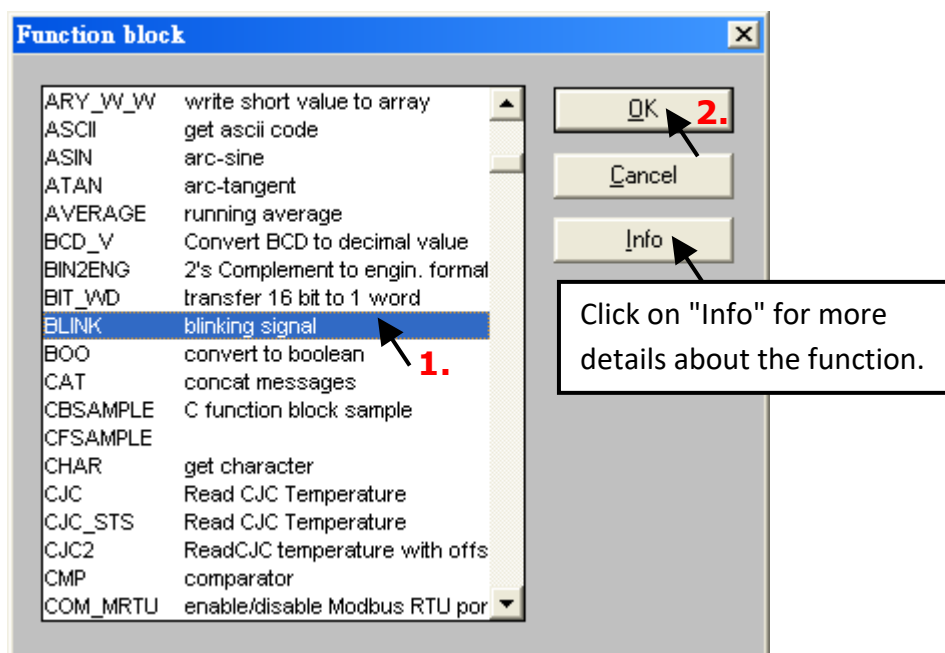
Click the "F6 (Block on the left)" button to create a block on the left of the "coil".



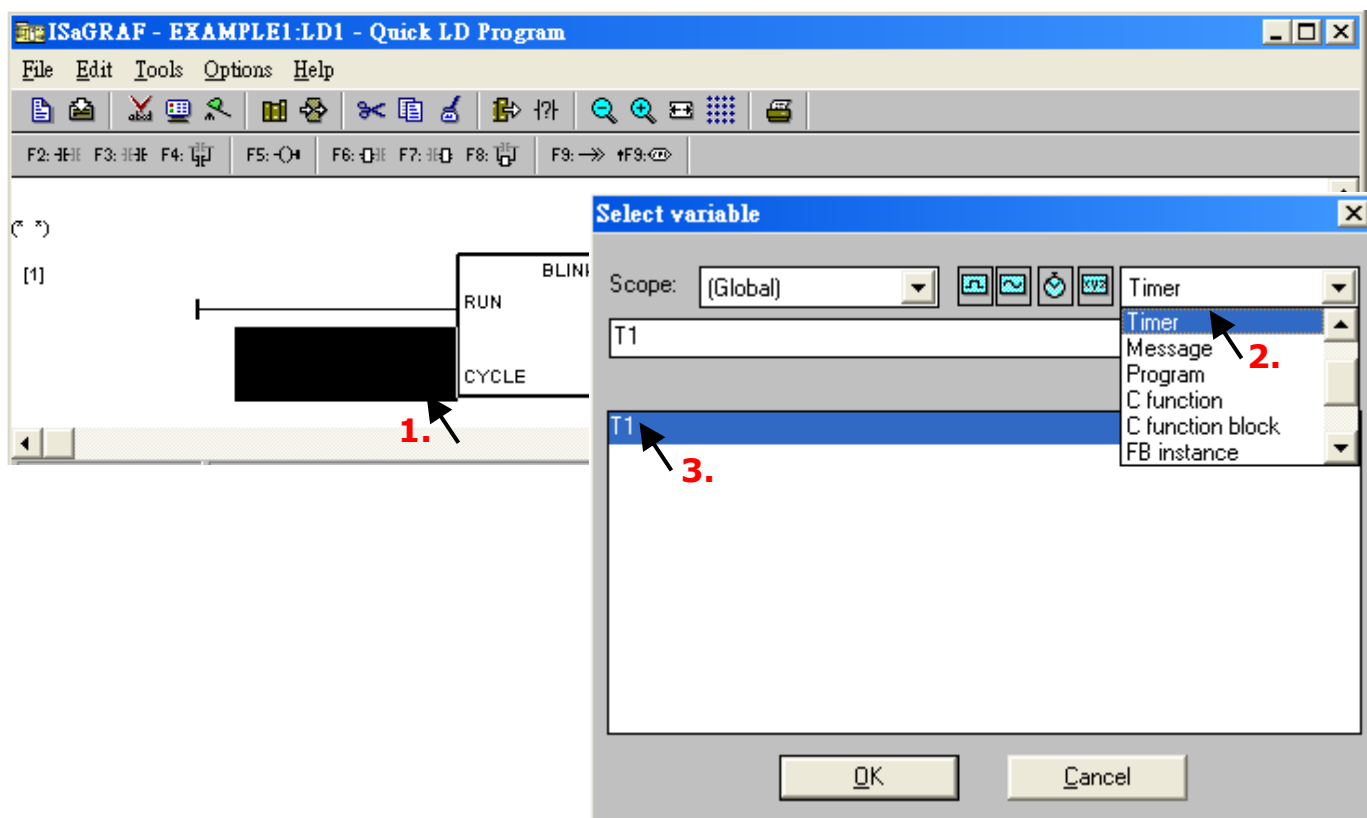
Now we are going to choose a function block. Double-click anywhere inside the block and the "Function Block" window appears.



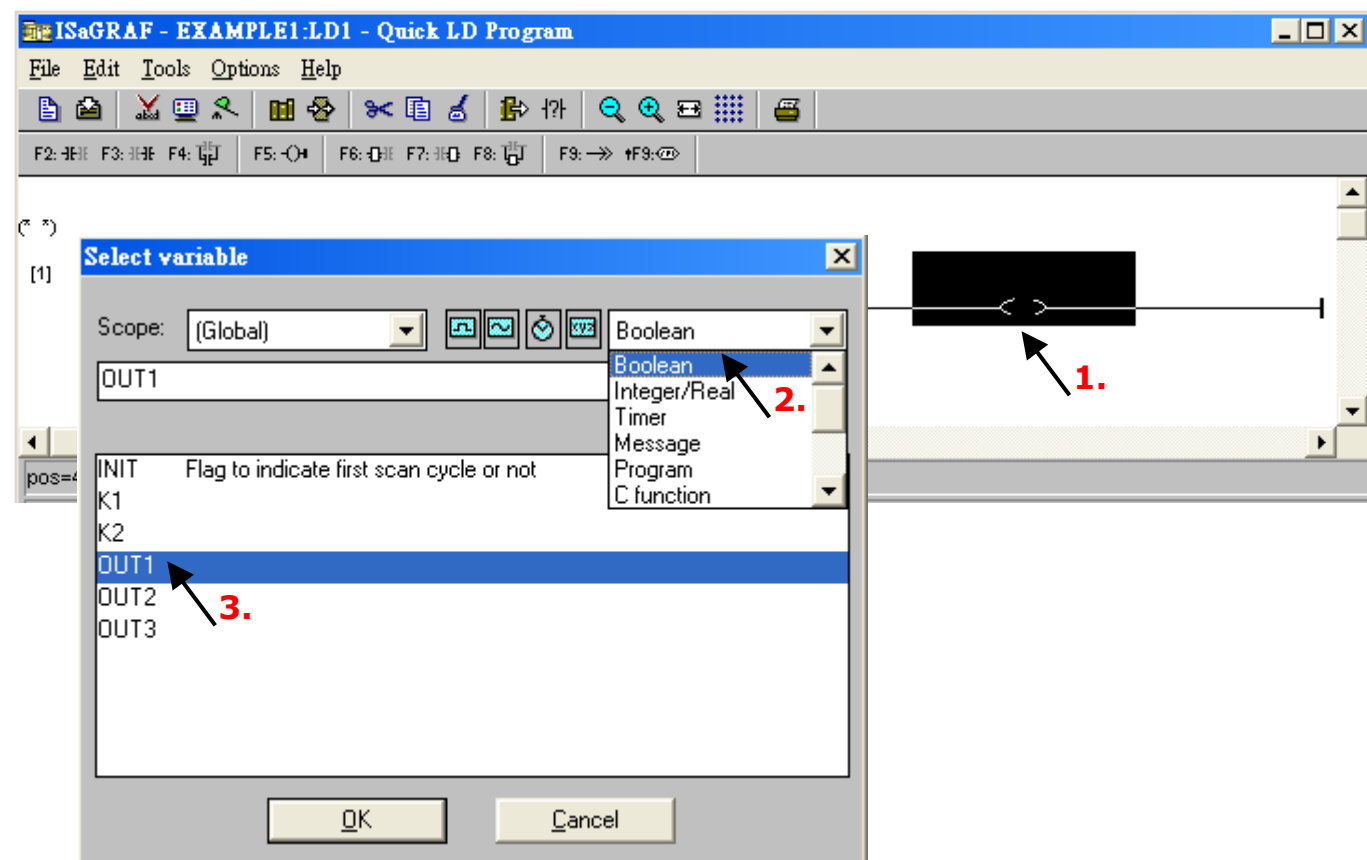
Select the "BLINK" function block and click OK. Also, click the Info button for more information about the function.



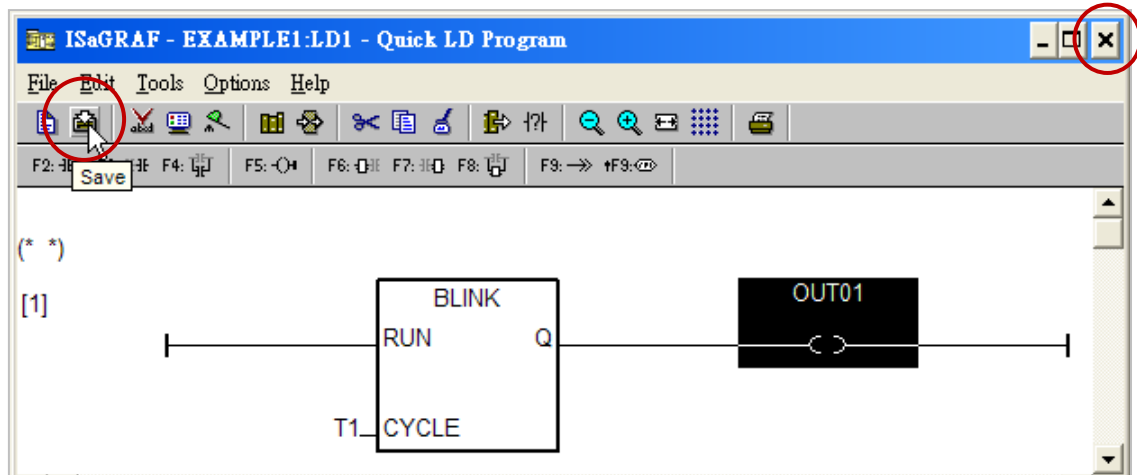
Double-click on the left of the "CYCLE" parameter, select "Timer" from the drop-down menu, and then double-click "T1" to specify this variable.



Double-click the "coil", select "Boolean" from the drop-down menu, and then double-click the "OUT1" variable.



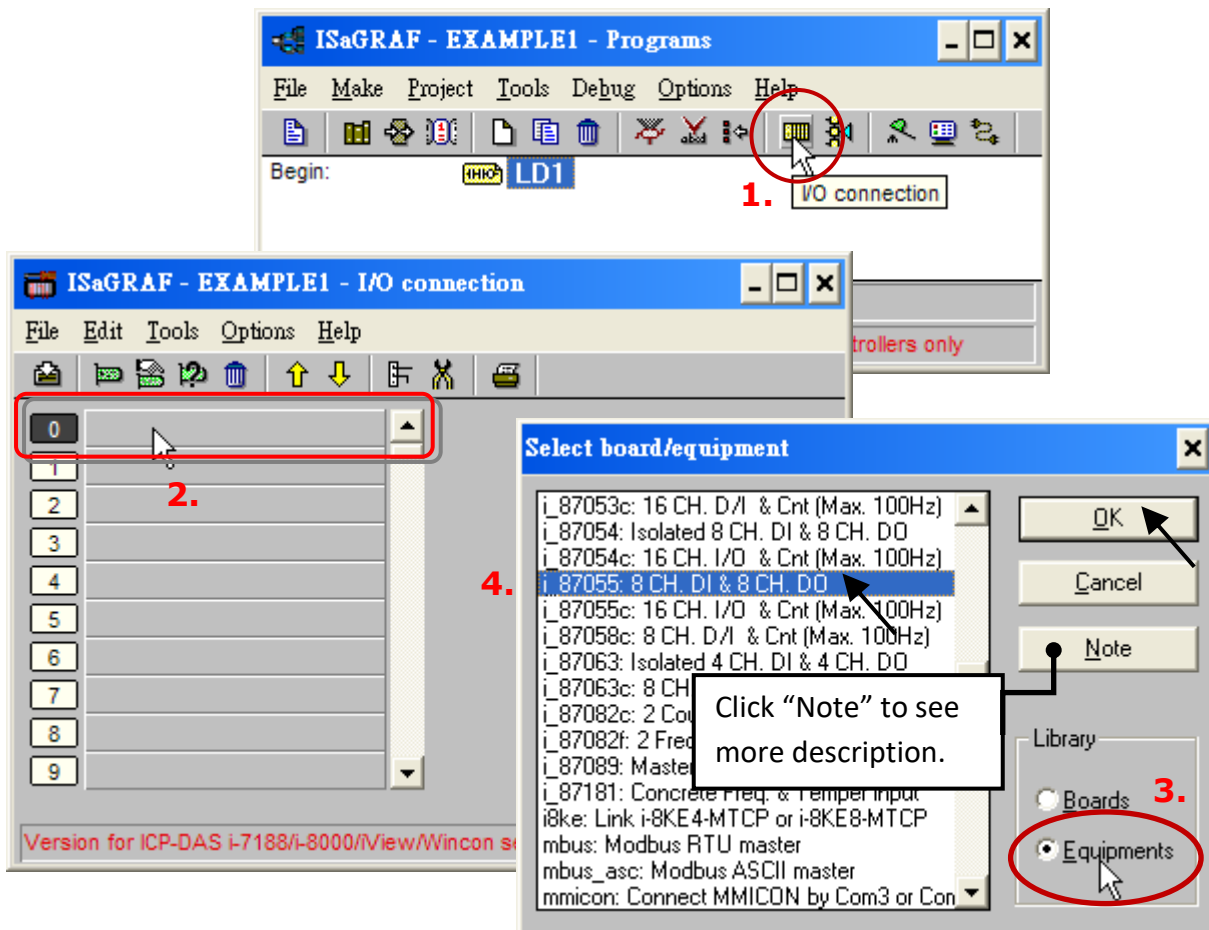
Now, you have done the LD1 program, click the "Save" button to save settings and then close the window.



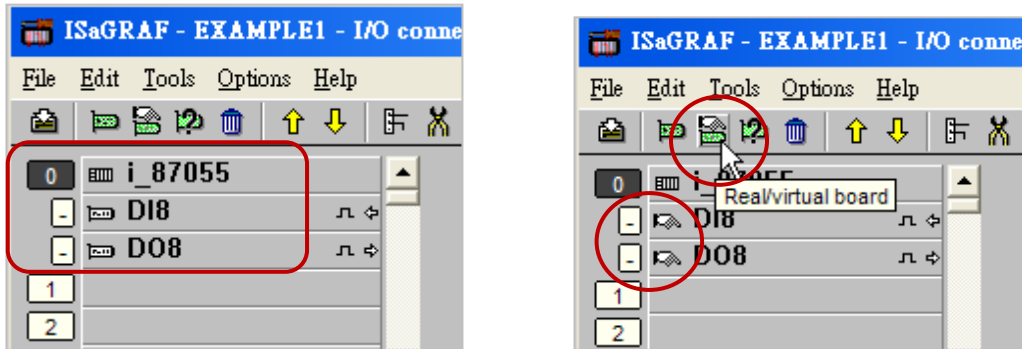
4.1.8 Connecting the I/O

In Section 4.1.4, "OUT01" and "OUT02" variables are declared as "output" attribution, while "K1" & "K2" as "input" attribution. These "Input" & "Output" variables should be mapped to I/O channels on the PAC before they can work.

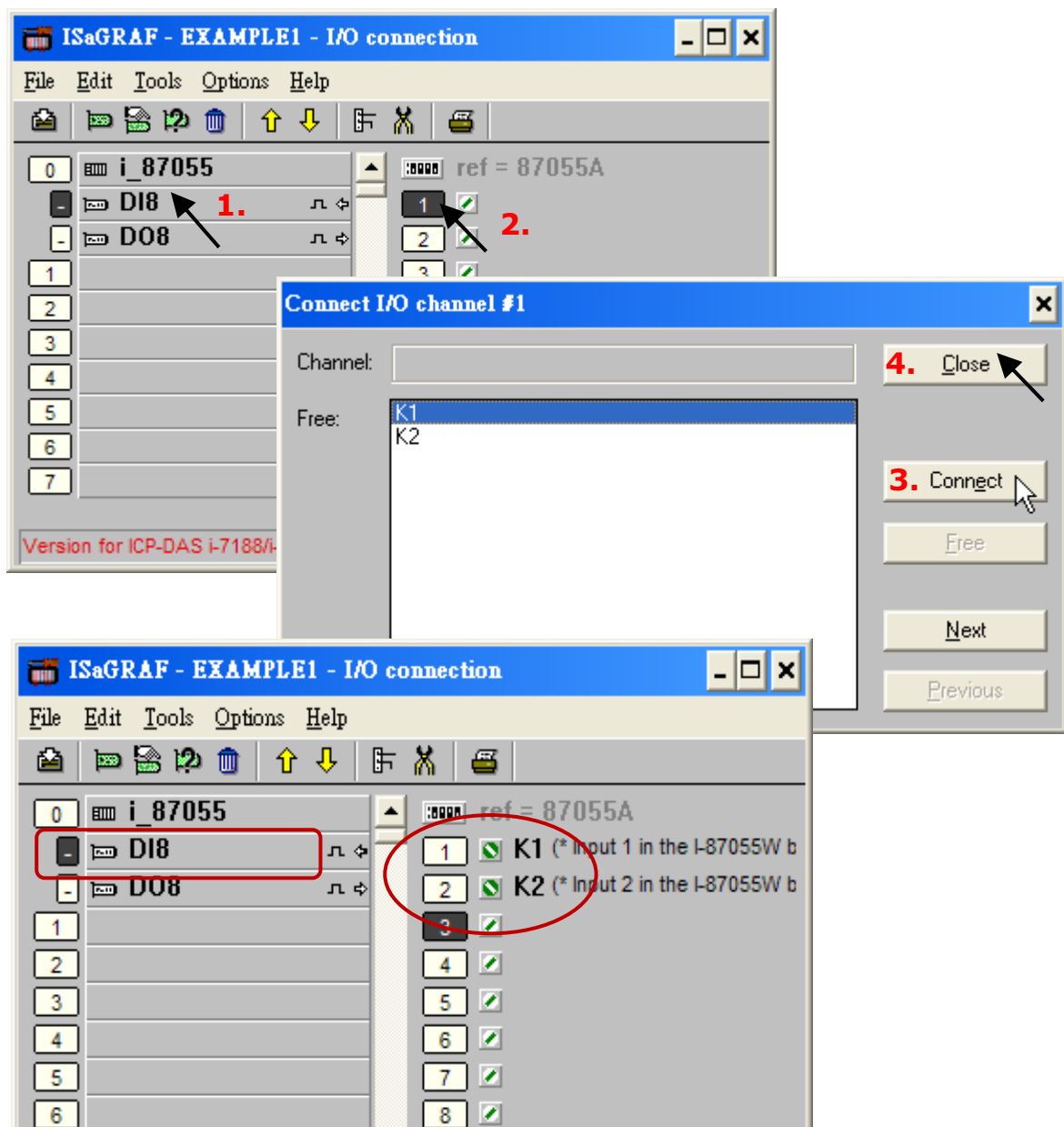
To do that, click the "I/O connection" button and then double-click the first slot (i.e., slot0). Make sure that I-87055W module is plugged in the slot 0 of the WP-8x47. Check the "Equipments" item and double-click the "I_87055: 8 CH. DI & 8 CH. DO", then click OK.



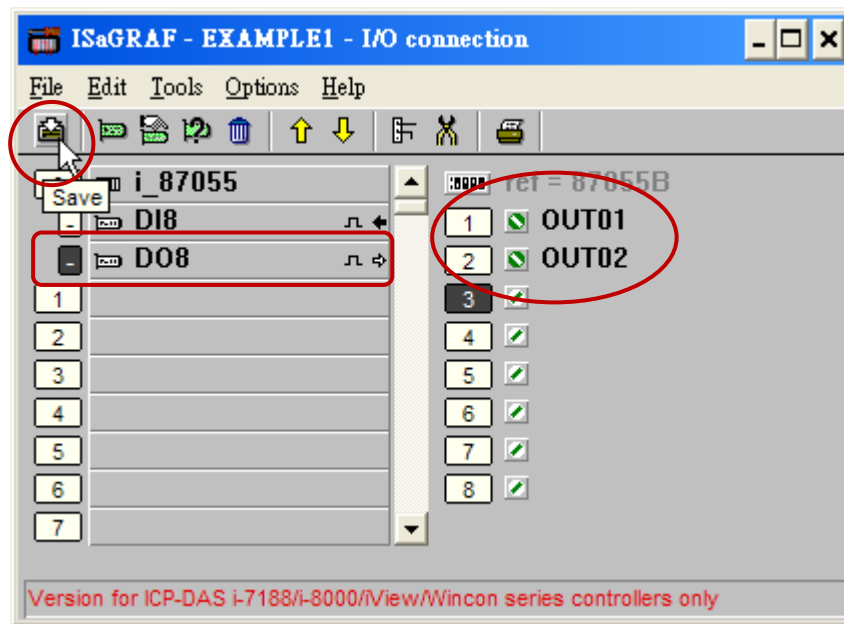
If you don't have the I-87055W module, you may click the “Real / Virtual board” to make it becomes a virtual board.



Mapping input variables “K1” & “K2” to input channels 1 & 2 of the “i_87055” board, click on “DI8” and double-click on the channel 1 and then click “Connect” twice to connect “K1” and “K2”. Also, click Close to close the window.



By the same way, connect "OUT01", "OUTPUT02" to output channel 1 to 2. Then we have below window. Click on "Save" and then exit.



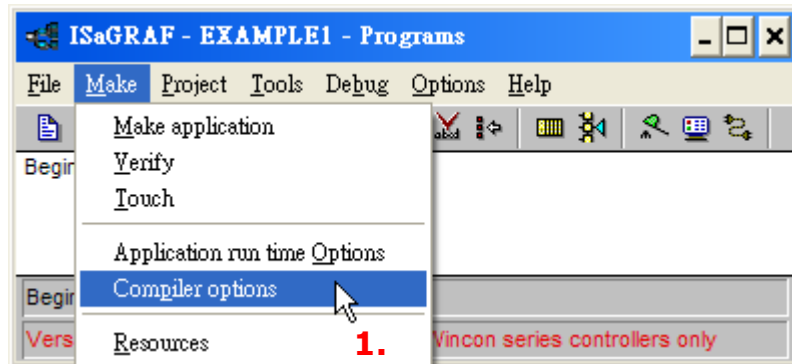
Important Notice:

1. In the I/O connection window, slots 0 to 7 are reserved for mapping to I/O modules used on the PAC. Using slot 8 or above for additional I/O functionality.
2. All of the variables with the "Input" or "Output" attribute **must be linked to the I/O function board** to ensure that the program compiles successfully. Only variables with either "Input" or "Output" attributes will be displayed in the "I/O connection" window. In this example, two Boolean output variables (i.e., OUT01 and OUT02) and two Boolean input variables (i.e., K1 and K2) will be displayed.

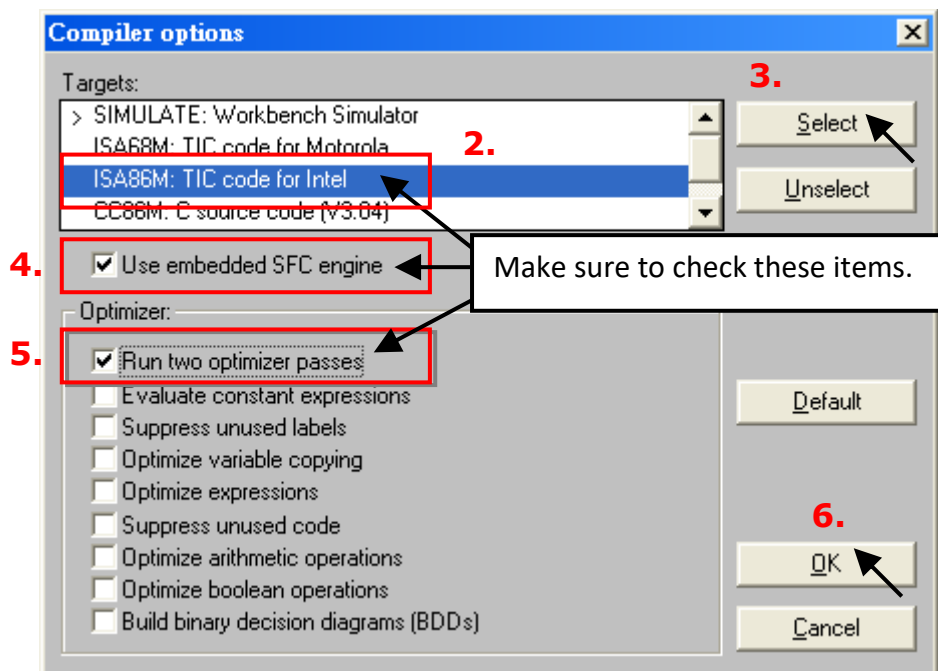
4.2 Compiling & Simulating the Example Project

For the ISaGRAF program can work properly on the PAC, the user must choose the correct ISaGRAF "Compiler Options", i.e., the **"ISA86M: TIC Code for Intel"** option.

To begin the compilation process, first click on the "Make" option from the main menu bar, and then click on "Compiler Options" as shown below.



Make sure that three items illustrated in the figure below are selected and then click the "OK" button.



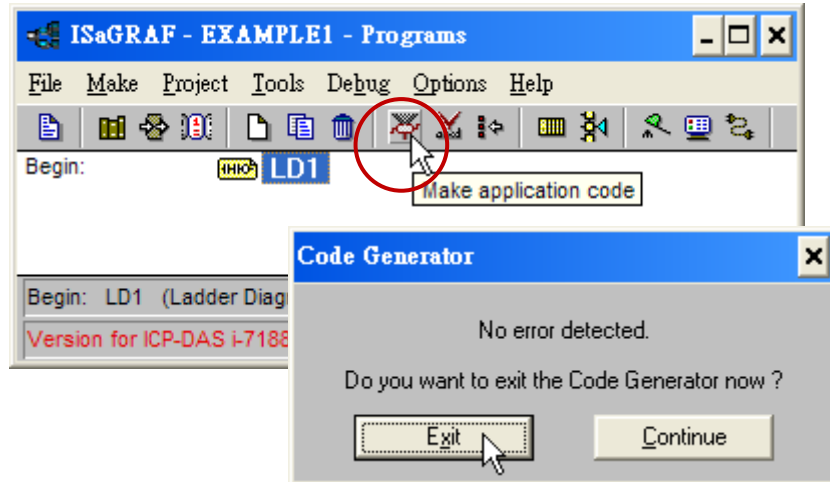
Note:

When using "Variable Array" in the program, **DO NOT** check the 2nd , 7th , 8th and 9th Optimizer options, or the value of the variable array will be incorrect.

Recommend to check only the first option– "Run two optimizer passes".

Time to Compile the Project!

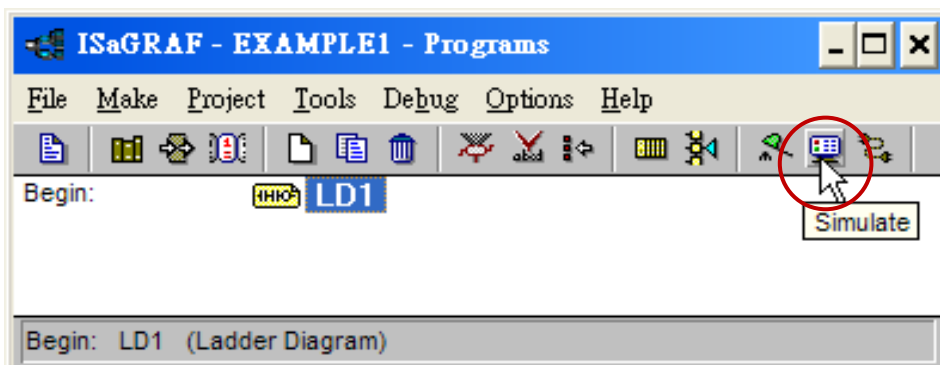
Now that you have selected the proper compiler options, click the "Make application code" button to compile the project. If there are no compiler errors detected during the compilation process, CONGRATULATIONS, you have successfully completed our example program.



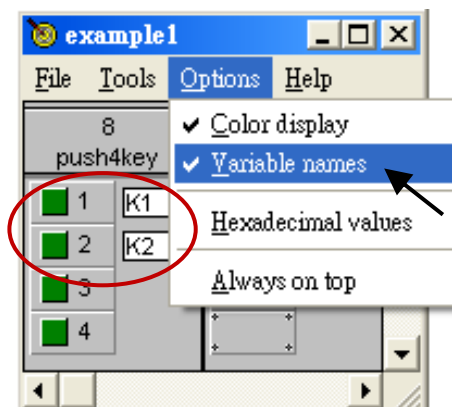
If errors are detected during the compilation process, just click on the "Continue" button to review the error messages. Return to the Project Editor and correct the errors as outlined in the error message window.

Time to Simulate the Project!

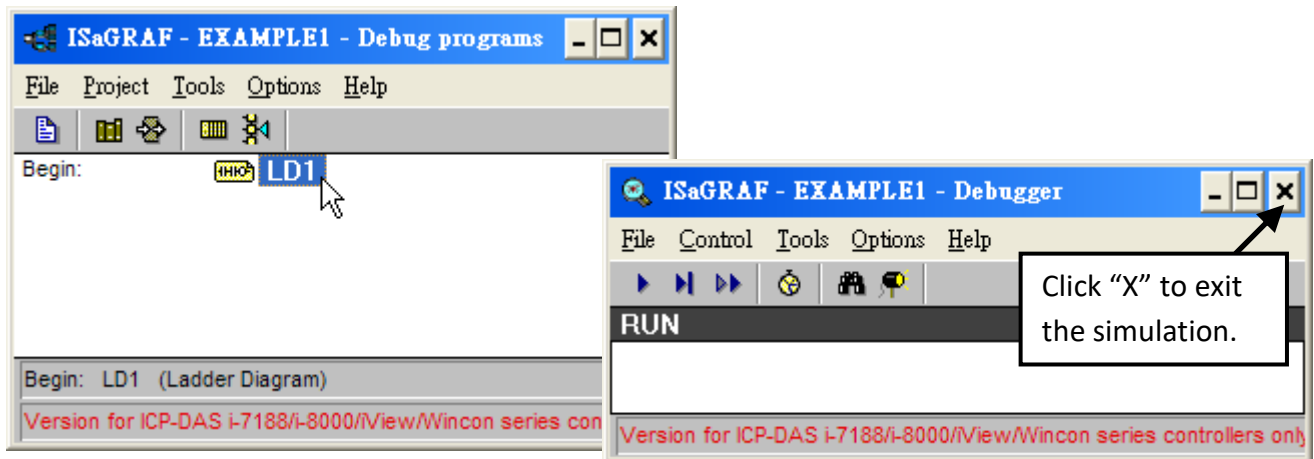
If the compilation is Ok, you may simulate the project on the PC to see how the program works without the PAC. To do that, click on the "Simulate" icon.



Then, you can see the "I/O Simulator", "ISaGRAF Debug Programs", and "ISaGRAF Debugger" window. If I/O variables are not displayed in the simulating window, select the "Variables names" item from the Options menu to show the variable name.



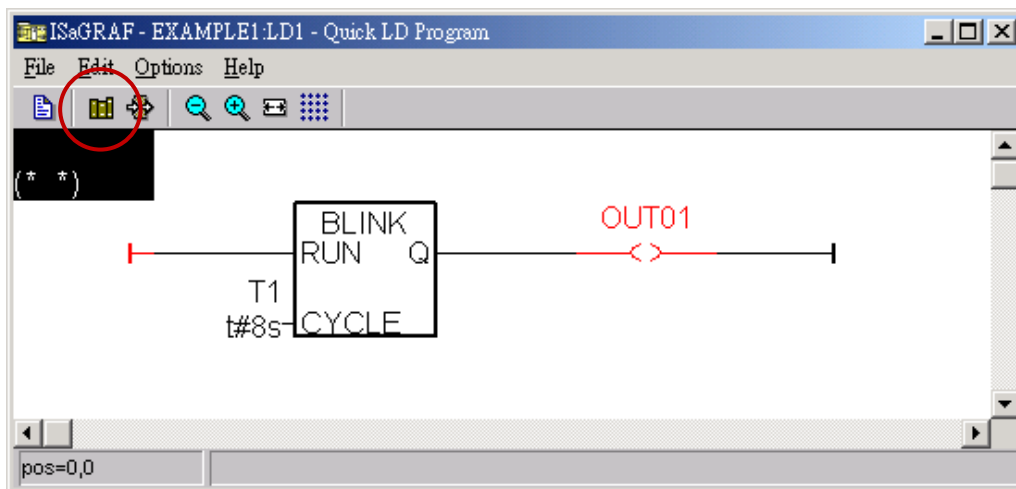
In the "ISaGRAF Debug Program" window, double-click the "LD1" to see the status of the simulation.



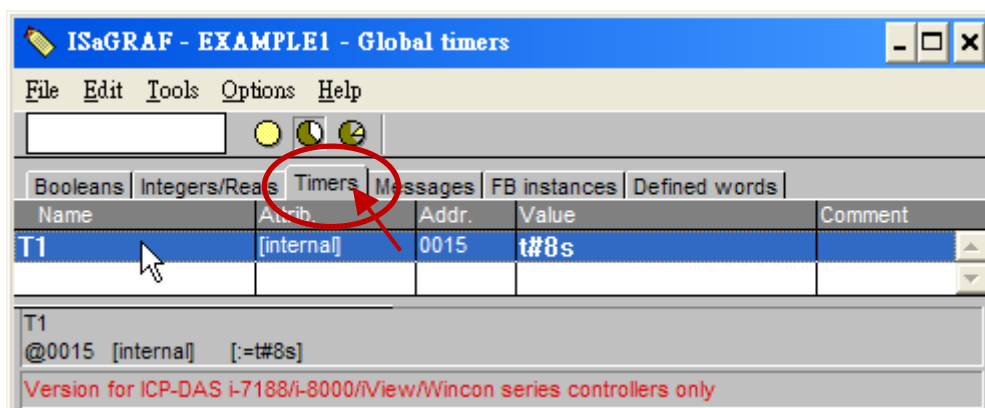
Running the Simulation Program

When you open the "LD1" program, the outputs "OUT01" is blinking every 8 seconds. You can adjust the "T1" variable while the program is running. To accomplish this,

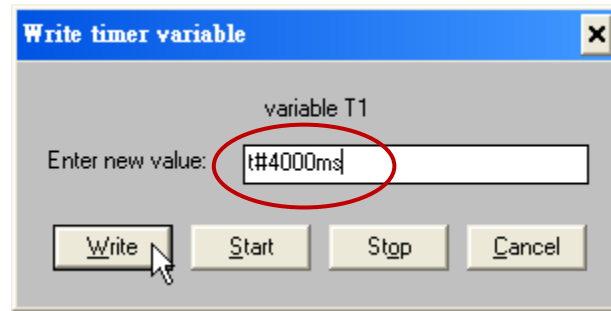
1. Click on the "Dictionary" button to open the "ISaGRAF Global Variables" window.



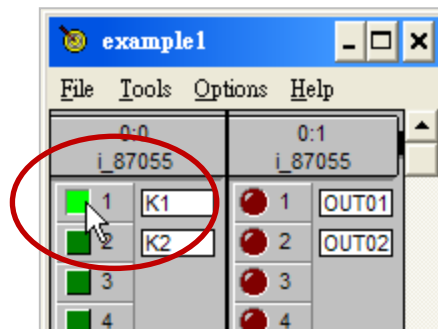
2. Click on "Timer" tab and then double-click on "T1".



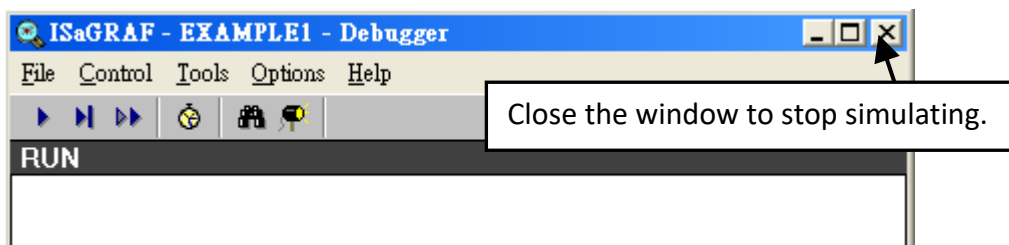
3. Set the timer value to “T#4000ms” (i.e., 4000 ms) and click the “Write” button. Then, “OUT01” will be blinking every 4 seconds.



Now we are going to simulate the “K1” & “K2” input. Click on the “K1” (or “K2”) button.



To exit simulation, close the debugger window.



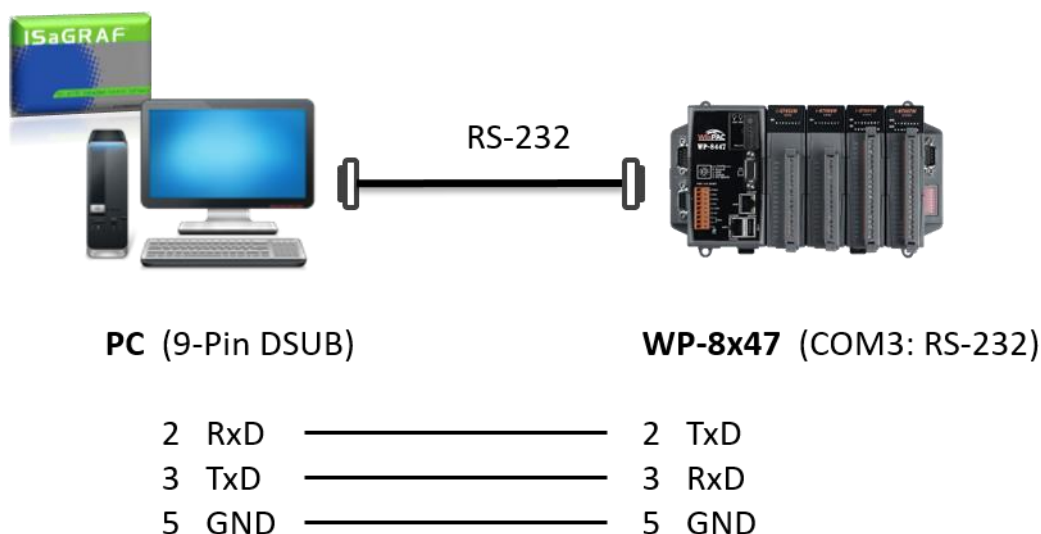
4.3 Download & Debug the Example Project

There are two ways to download the project to the PAC. One is using Ethernet cable, the other one is using RS-232 cable. Here will describe the RS-232 way. Also, refer to Section 3.2.3 for using the Ethernet way.

Wiring the Hardware

To begin this process, set up the hardware as below. **Make sure the “Modbus RTU Slave Port” is set as COM3, refer to Appendix A.2, or it can only be download via Ethernet.**

The Pin Assignments of RS-232 cable:

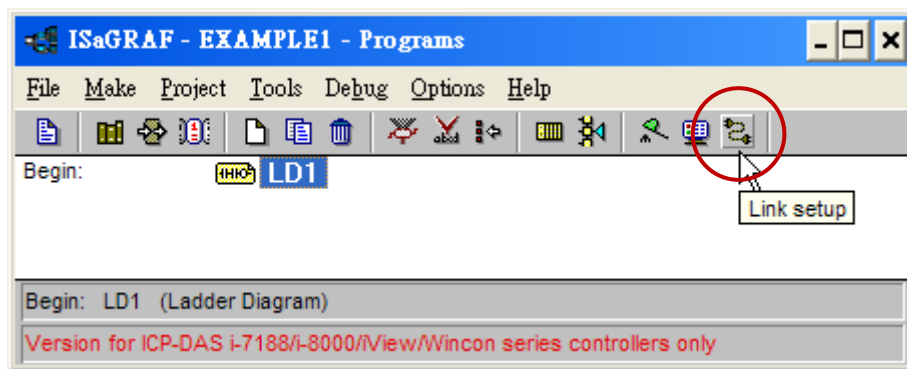


Note: The WP-8147 doesn't have COM3. Only WP-8447 / 8847 have.

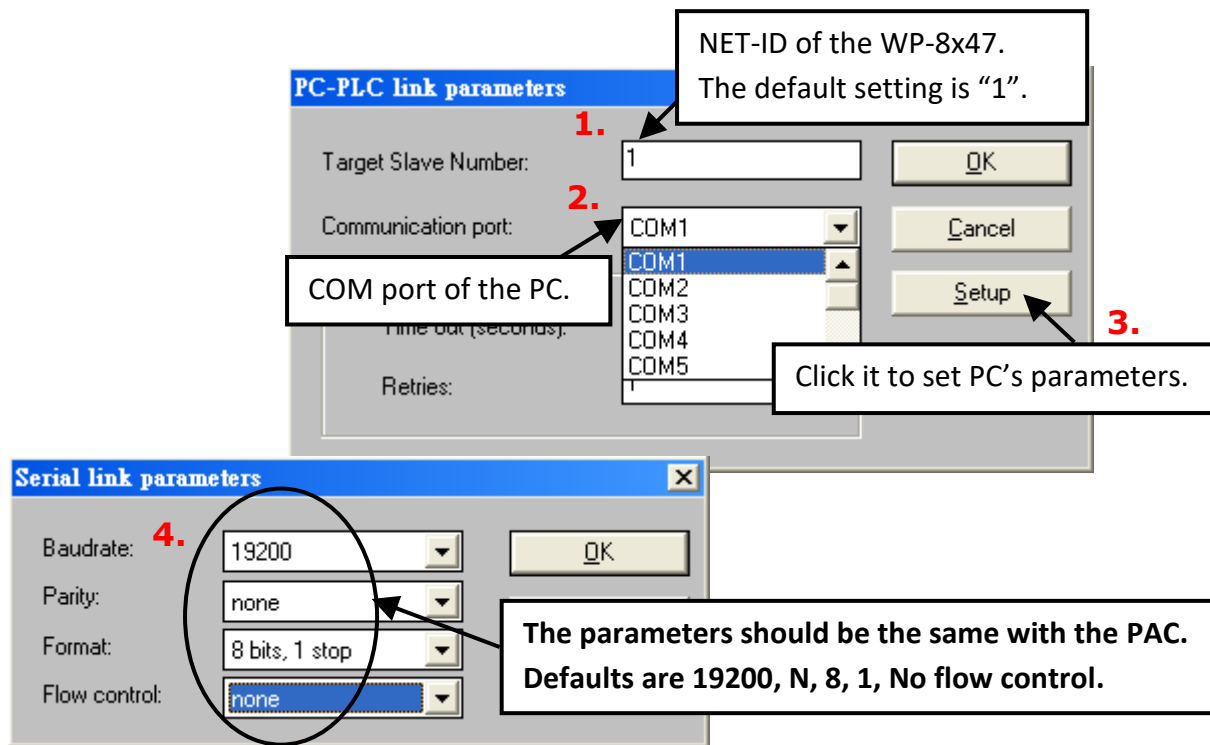
The following explained how to download the ISaGRAF program to the PAC by using RS-232 cable. If the user would like to use an Ethernet cable, refer to section 3.2.3.

Setup Link Parameters

Click the "Link Setup" button in the "ISaGRAF Programs" window.



In the "PC-PLC Link parameters" window, set the communication parameters properly.



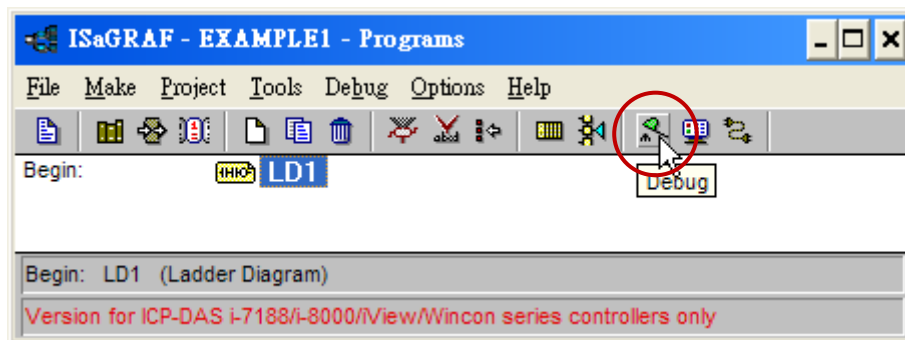
The RS-232 communication parameters for the WP-8x47 MUST be set to the same serial communication parameters for the development PC. For WP-8x47, the default parameters for COM3 (RS-232) port are:

Baud rate:	19200
Parity:	none
Format:	8 bits, 1 stop
Flow control:	none

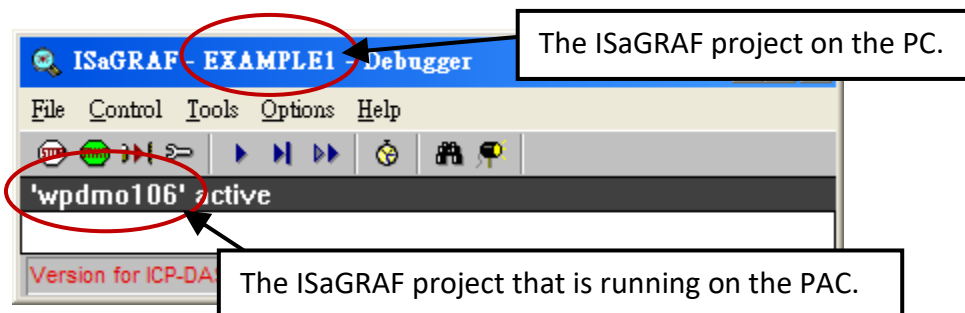
Also, refer to Appendix A.2 to setup COM3 as Modbus RTU Slave port.

Downloading the Example Project

Before downloading the project to the PAC, make sure that the communication between the PAC and PC is functional. To do that, click the "Debug" button in the "ISaGRAF Programs" window.



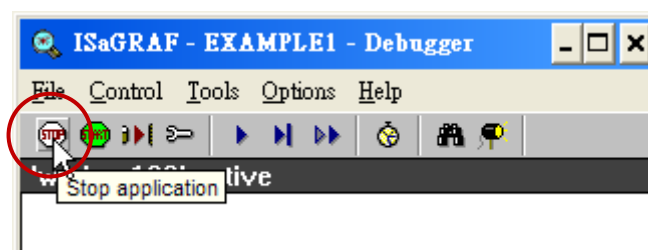
If the PC is communicating with the PAC, you can see the project name in the "Debugger" window.



If the message in the "Debugger" window says "Disconnected", which means the PAC is unable to communicate with PC.

The most common causes for this problem is either the serial port cable not being properly configured, or the development PC's serial port communications DO NOT match that of the PAC. Check the wired cable on both sides and refer to the previous section to modify the COM port settings in the ISaGRAF "Serial Link Parameters" window.

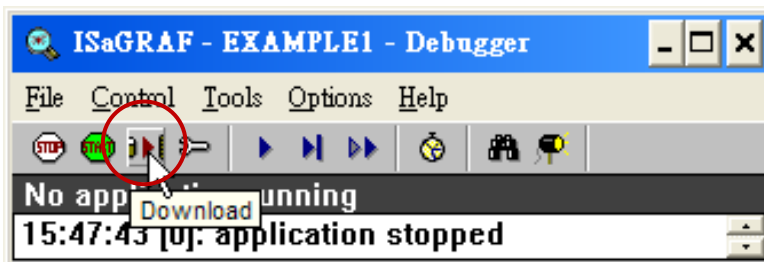
If there is a project already in the PAC before downloading the project. Click the "Stop application" button to halt the project.



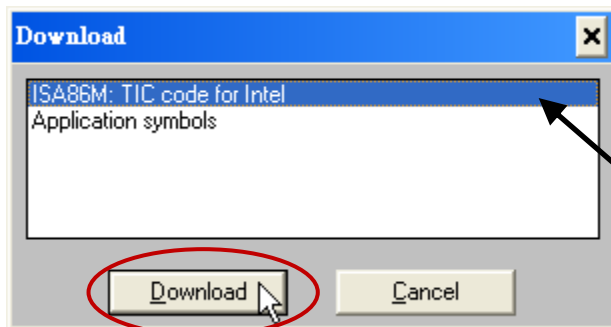
Then, you can start to download the "Example1" project to the PAC.

Starting the Downloading Process

Click on the "Download" button in the "ISaGRAF Debugger" window.

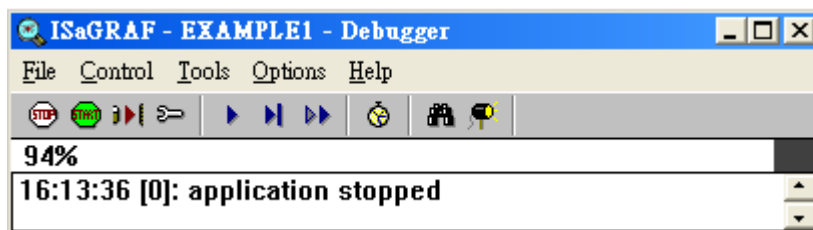


Then click the "ISA86M: TIC Code For Intel" compiler option.

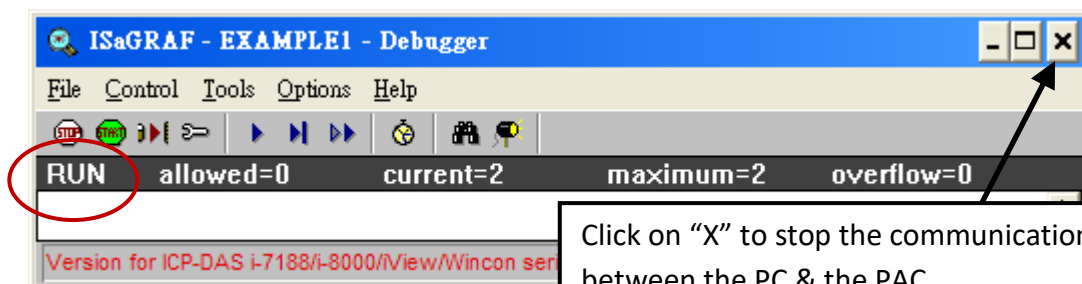


If "ISA86M: TIC code for Intel" is not found here, which means the compiler option - "ISA86M: TIC code for Intel" is not checked. Refer to section 4.2 to tick the option and re-compile the project again.

Click the Download button to download the project to the WP-8x47. A progress bar will display to show the project downloading progress.



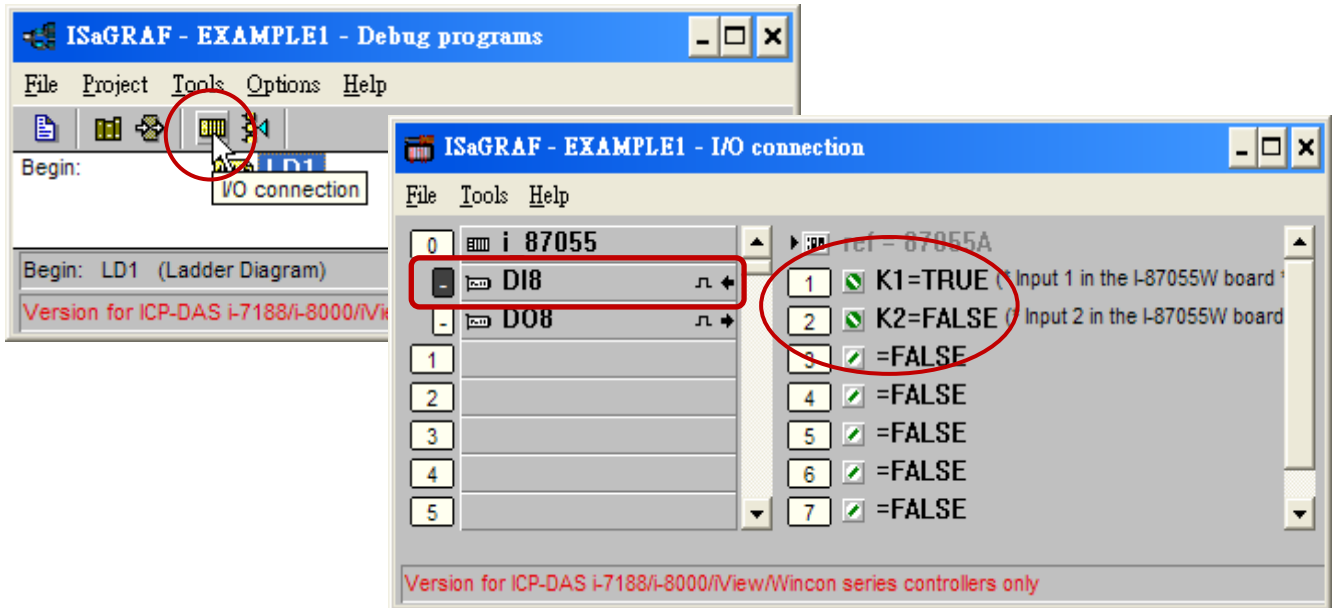
After successful downloading, the window displays as follows.



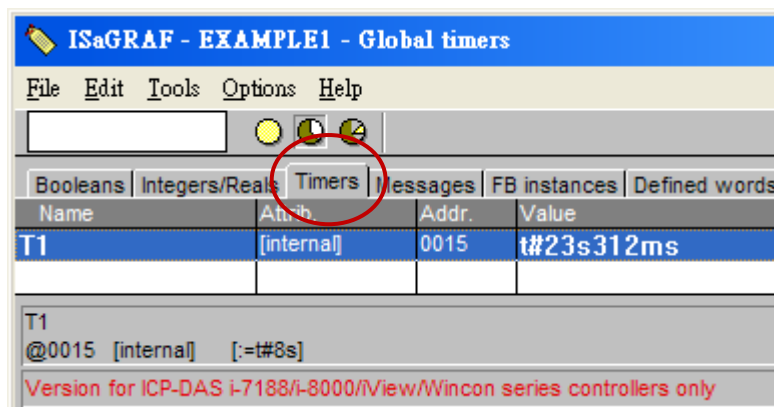
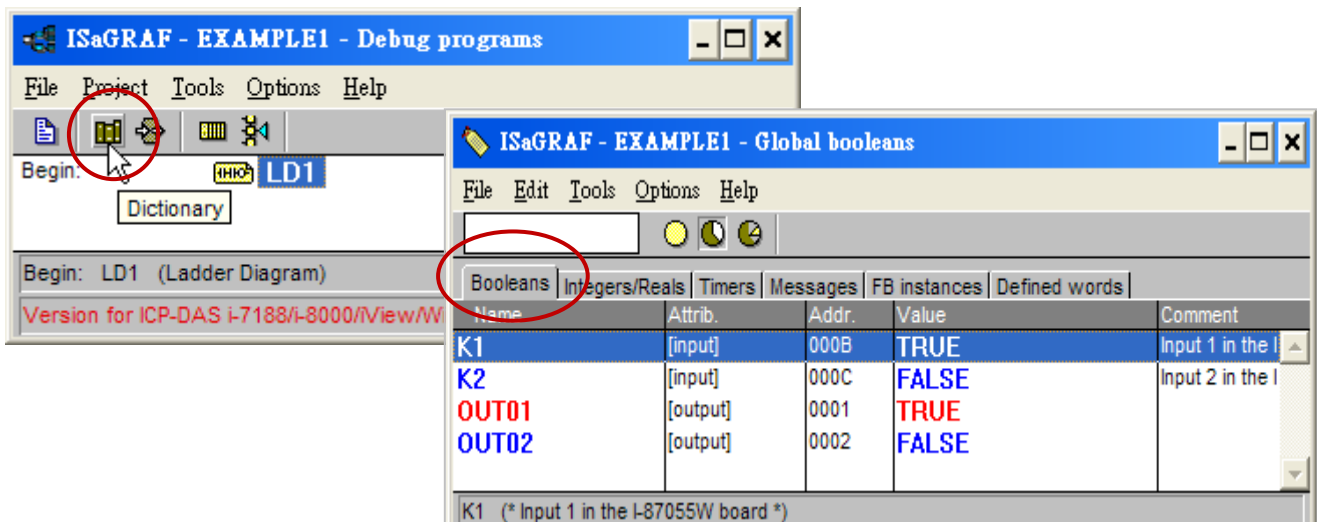
Click on "X" to stop the communication between the PC & the PAC

Running the Example LD Program

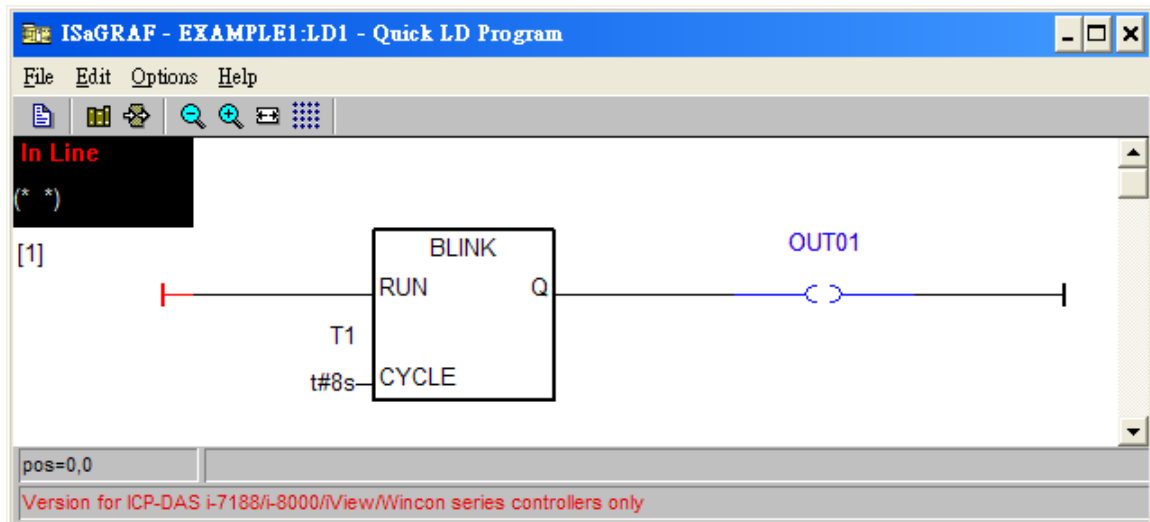
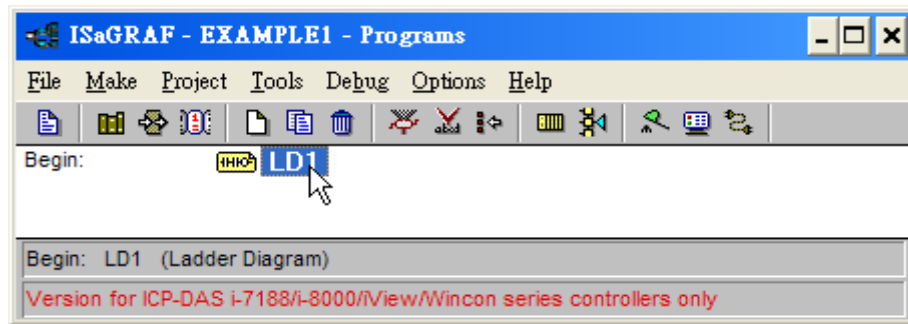
The user can observe the I/O status while the project is running. The way is to click the "I/O Connection" button in the ISaGRAF "Debug Programs" window. The user may set DI channels 1 or 2 of the I-87055W module to ON or OFF, and to see if the "K1" or "K2" status (TRUE/FALSE) is updated in time.



Moreover, click the "Dictionary" button to see the real-time state for Boolean and Timer variables.



Also, the user can open LD program to observe the running states in the "Quick LD Program" window.



4.4 Design the Web Page

After finishing the ISaGRAF project and downloading it to the WP-8x47, we are going to design the Web Page for this ISaGRAF project. **If you haven't practiced "Setting Up a Web HMI Demo" listed in the Chapter 3, it's better to do it once to get familiar with it.**

We will use "**Microsoft Office FrontPage 2003**" (or advanced version) to build web pages in this manual. User may choose any web page editor to do the same thing.

You may refer to the finished web pages of this example in the WP-8x47 demo folder at design time. However, it is better to do it one time by yourself to get more understanding.

Download the demo: <http://www.icpdas.com/en/download/file.php?num=5495>

WP-8x47 demo folder: ...\\isagraf_winpac_demo\\wp_webhmi_demo\\example1\\

4.4.1 Step 1 – Copy the Sample Web HMI Pages

This is a sample Web HMI pages in the WP-8x47 demo folder:

...\\isagraf_winpac_demo\\wp_webhmi_demo\\sample\\

Please copy this "sample" folder to your drive and rename it, for example, "**example1**".

The basic Web HMI files include 2 folders and 3 DLL files and 4 HTM files as below.

./img/	(default image files - *.jpg , *.bmp, *.gif)
./msg/	(default message files – wincon.js & xxerror.htm)
whmi_filter.dll	(three DLL files)
login.dll	
main.dll	
index.htm	(first default page)
login.htm	(the Web HMI welcome page)
menu.htm	(the page-menu page, normally on the left on the Internet Explorer)
main.htm	(first page when successfully login)

User may put his own image files into the folder named as "user_img". And put user-defined java script file or CSS file into the folder named as "user_msg". Other folder name is not acceptable by the WinPAC Web HMI.

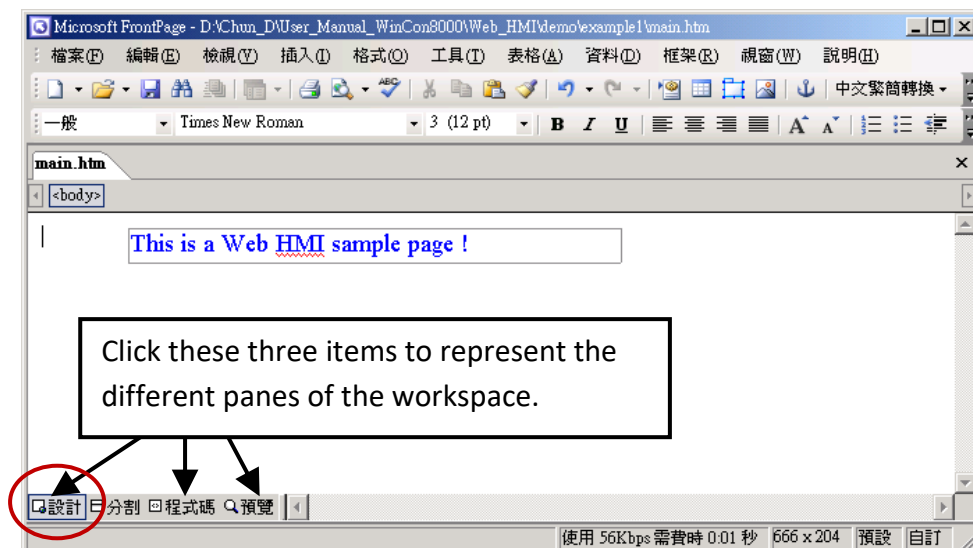
The "index.htm" file is the default main page of the web server. User should not modify it. The "index.htm" re-directs to the "login.htm" file in 1 to 2 second when someone visits the WP-8x47 via the Internet Explorer.

User may modify the "login.htm", "menu.htm" & "main.htm" to fit his own need. We will only modify the "main.htm" in this example.

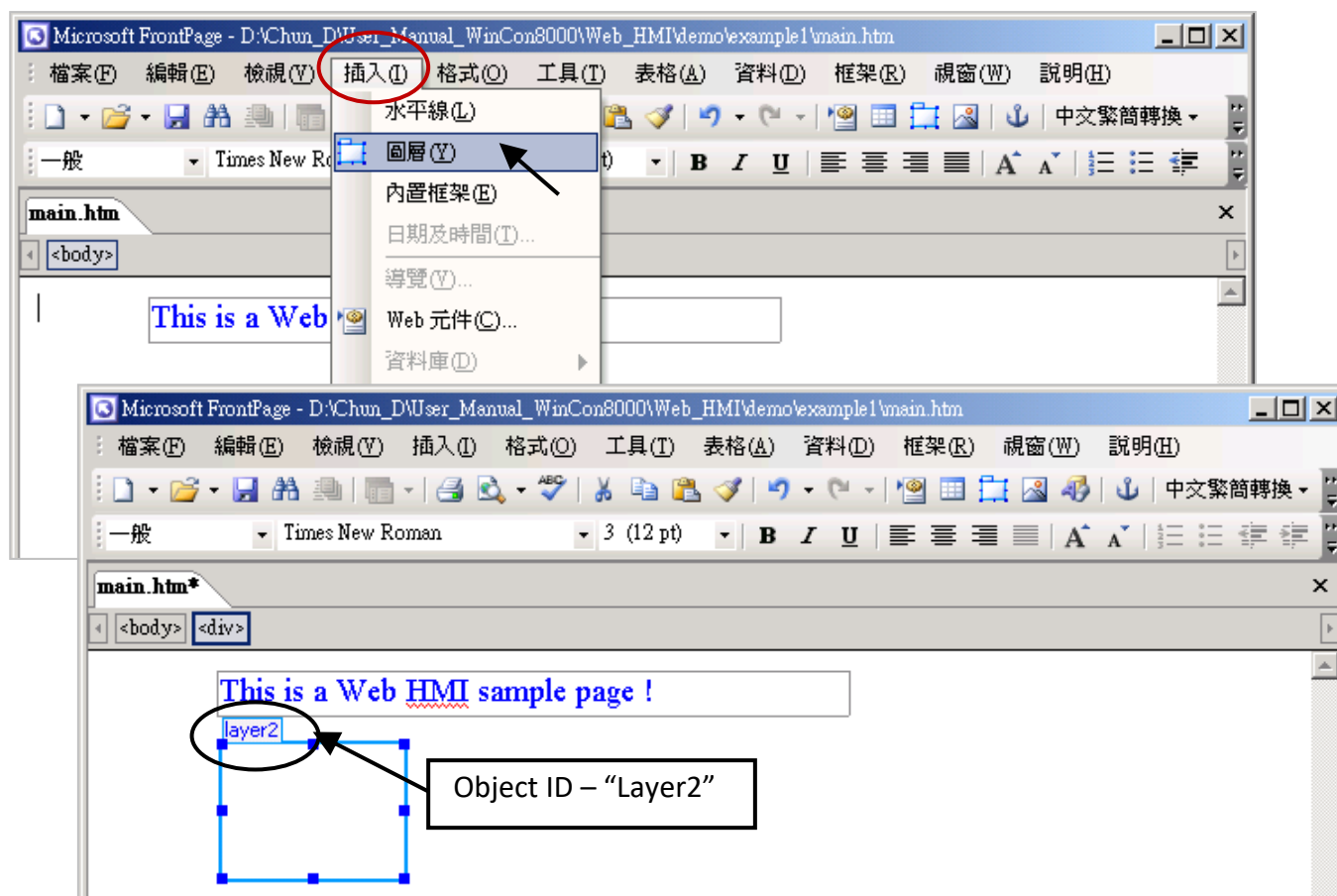
4.4.2 Step 2 – Building the Main.htm

Execute the Microsoft Office FrontPage 2003 (or advanced version) and open the “main.htm”.

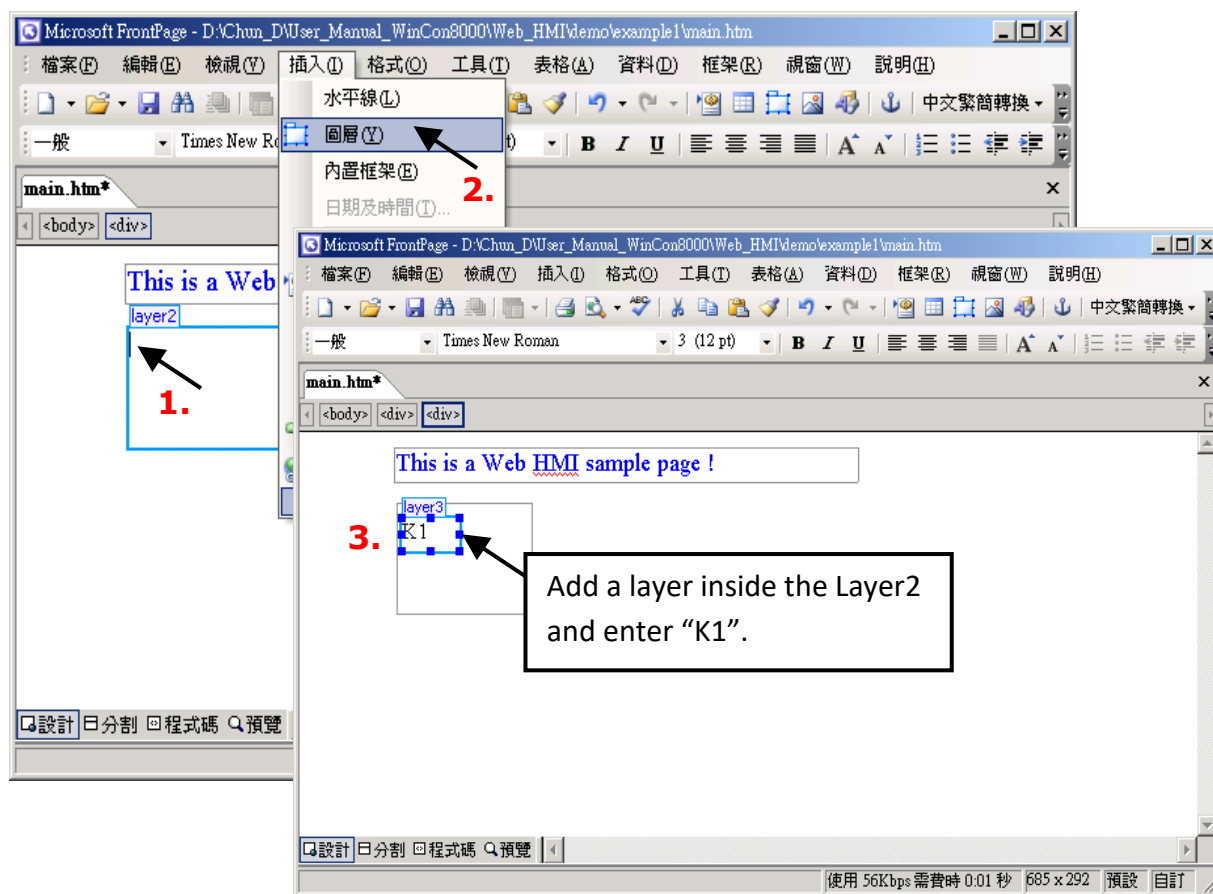
Click on the “Design” page.



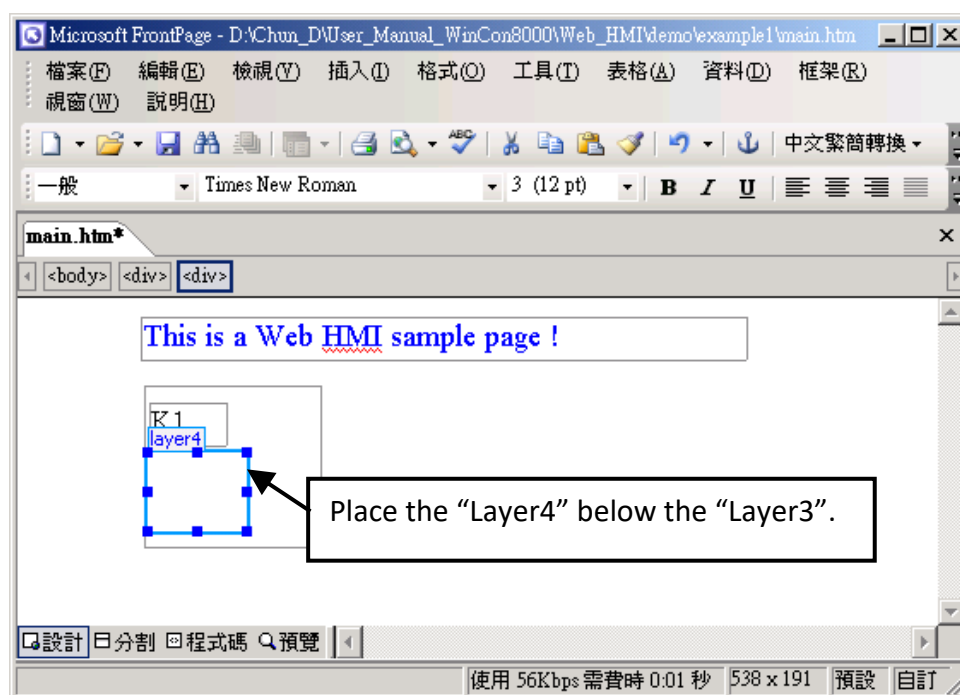
Click Layer from the Insert menu to insert a “Layer2” layout object as below.



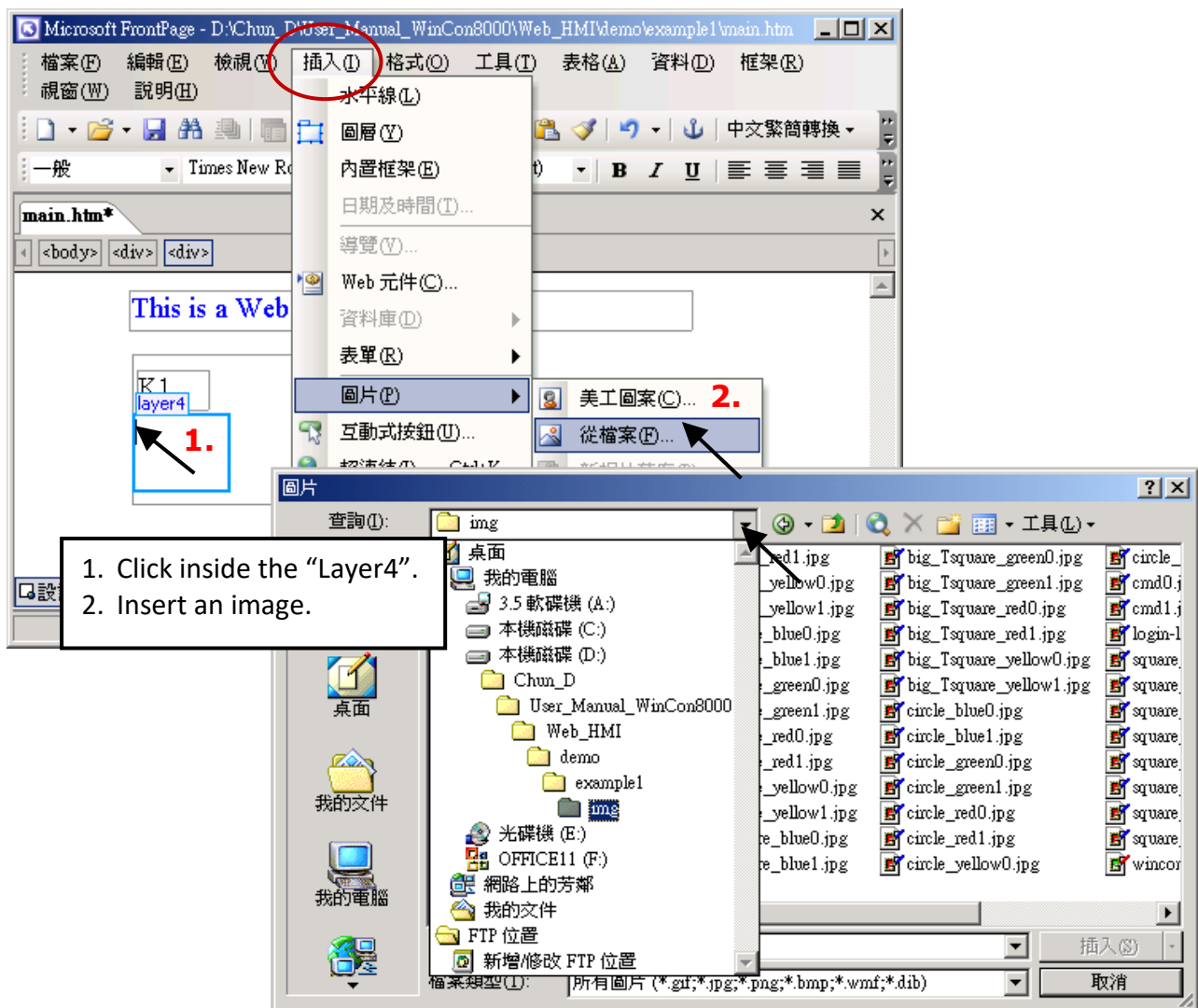
Click inside this “Layer2” and click Layer from the Insert menu to add a new layer inside it, then enter “K1”.



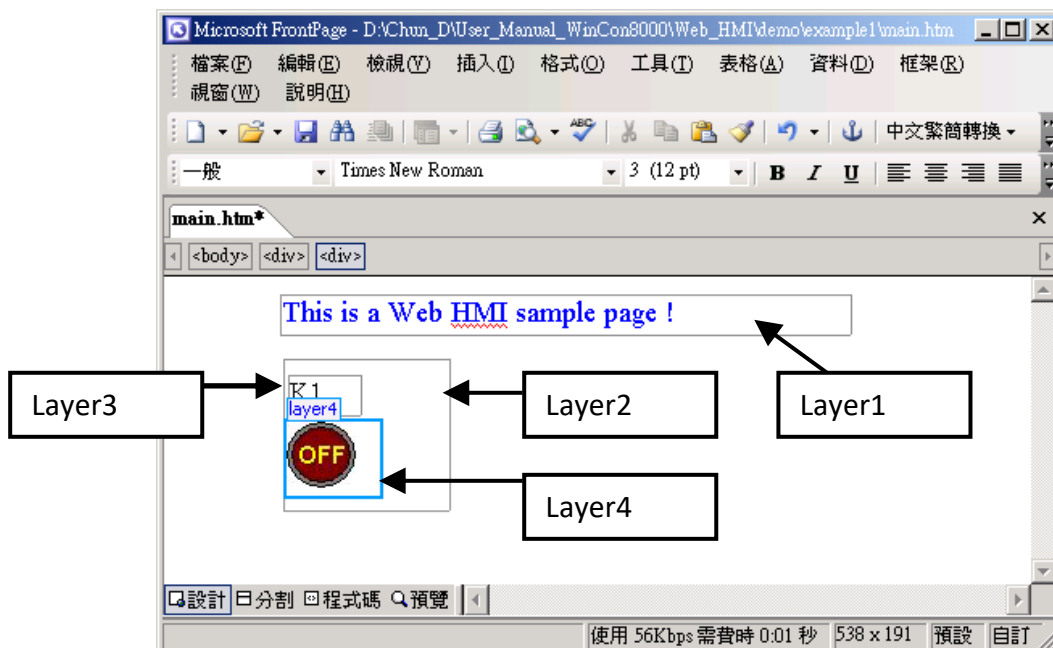
Follow the same steps to insert a “Layer” below the “Layer3” as below.



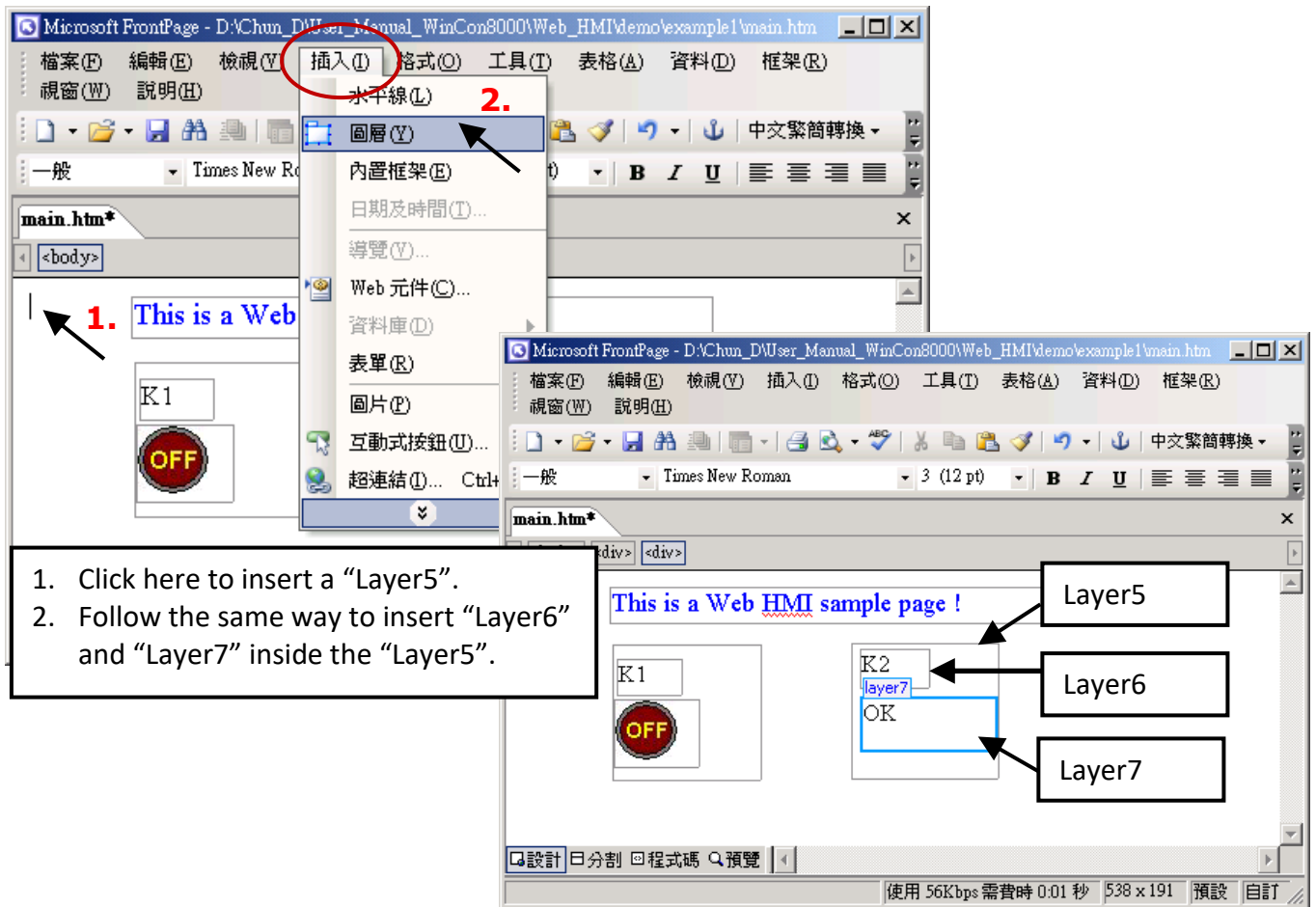
Inside the “Layer4”, we are going to insert one image file to it as below. The image file name is “./img/big_Tcircle_red0.jpg”. Please browse to the correct folder in your hard drive. Here we use “example1/img/” in this example.



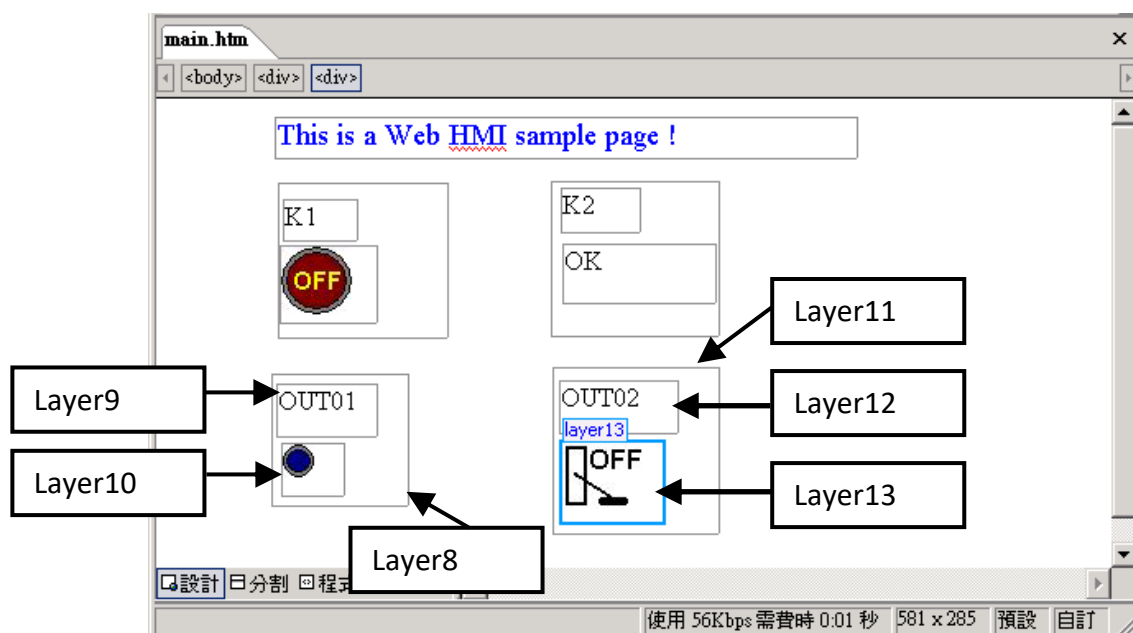
You will see a window as below.



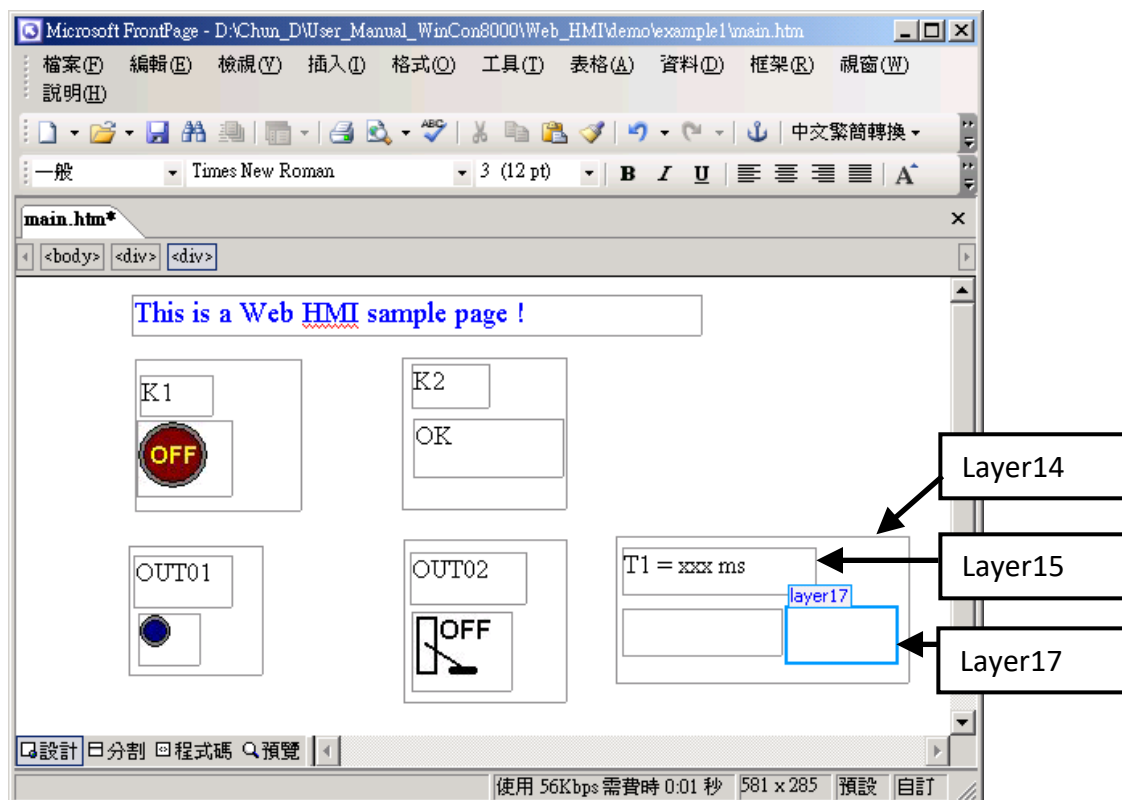
Follow the similar steps to insert one “Layer5” and one “Layer6” with a “K2” symbol inside it, and also a “Layer7” with a “OK” symbol inside it as below. We will use “K1” to display the state of the first input of the I-87055W board, and “K2” for its second input.



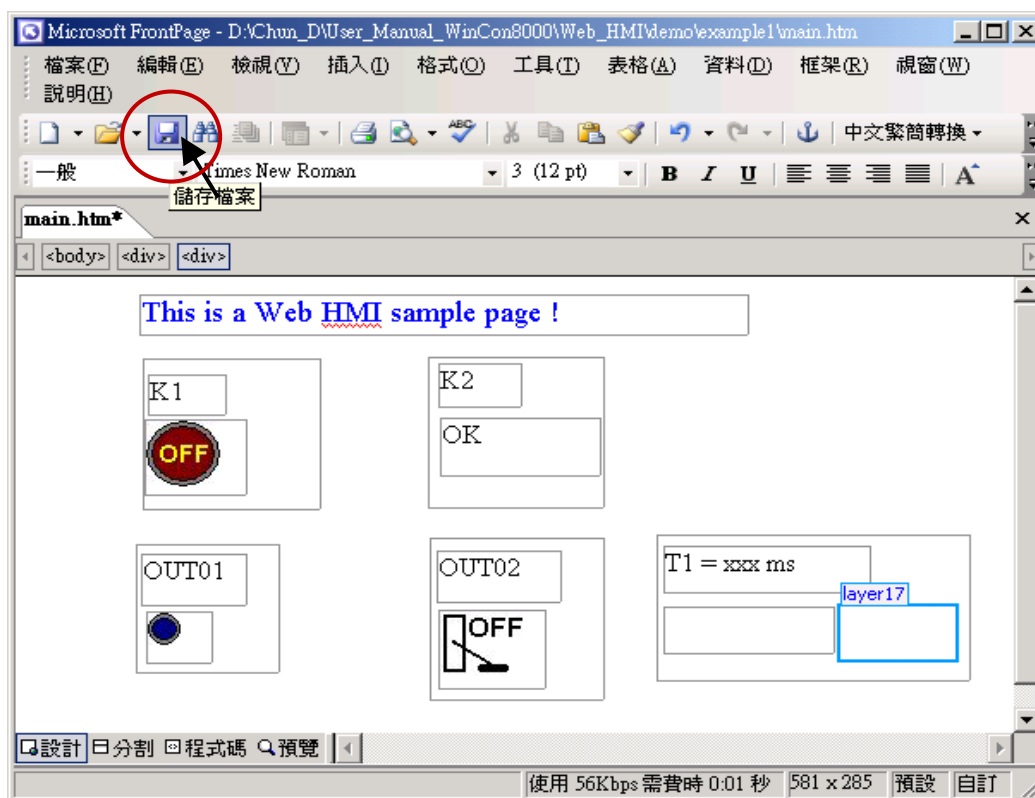
Follow the similar steps to insert “OUT01” & “OUT02” as below.
The OUT01 uses “./img/circle_blue0.jpg” as its image source, while OUT02 using “./img/cmd0.jpg”.
We will use OUT01 to display the state of the first output of the I-87055W board, while “OUT02” is for controlling and displaying the second output of the I-87055W.



Now insert one another “Layer14”. Inside the “Layer14” insert one “Layer15” with a “T1 = xxx ms” symbol. And two empty Layers – “Layer16” & “Layer17” just below the “Layer15”. We will use T1 to display the Timer value “T1” in the ISaGRAF project.

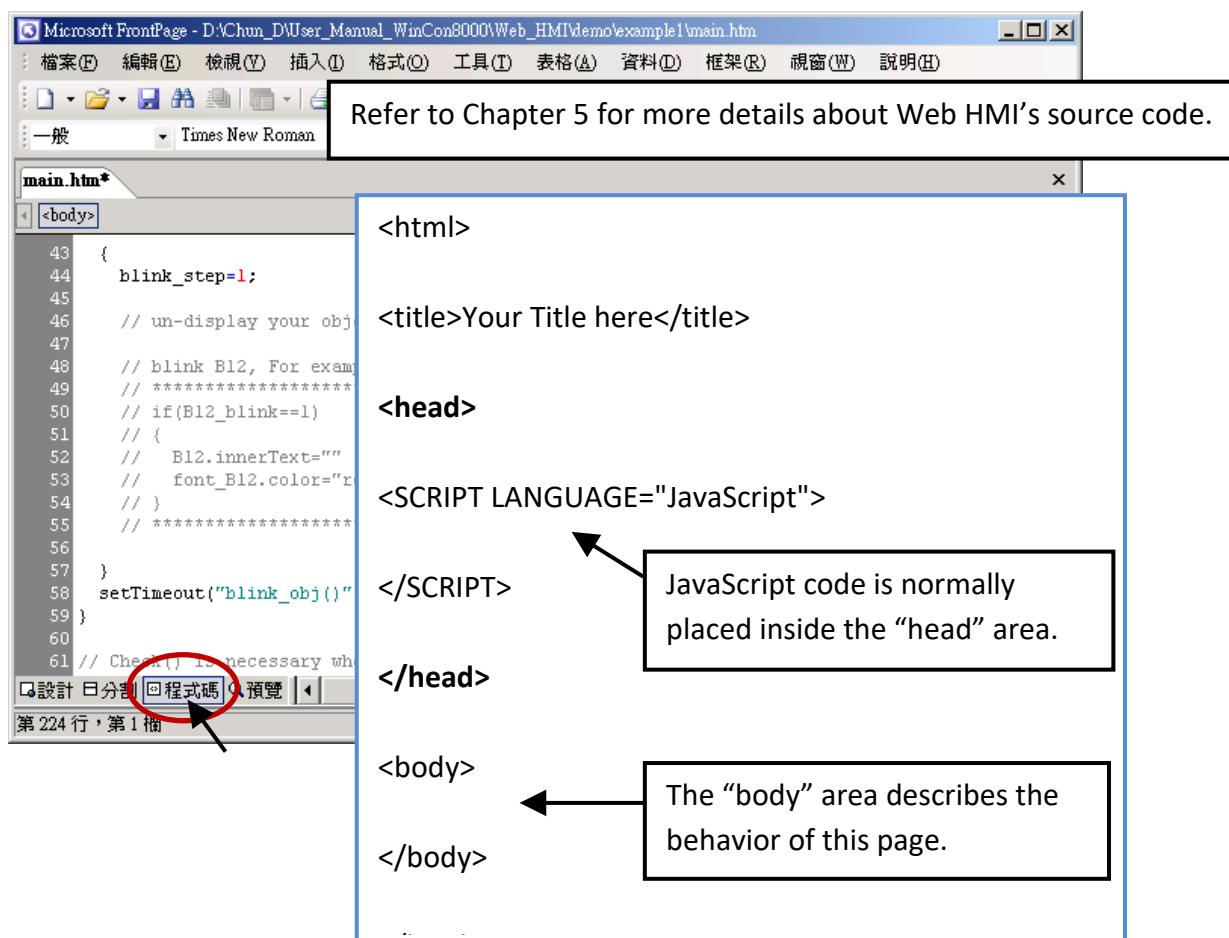


Click on “Save” to save this page.



4.4.3 Step 3 – Adding Control Code to the Main.htm

Click the Code tab to view the HTML code for the Web page. A valid HTML document will contain the following basic objects.



Go to the <body> area and then modify the code as below.

Caption Area: Layer1

A Layer is starting with <div> and ending with </div> tag

<!-- Caption -->

<div style="position: absolute; width: 353px; height: 24px; z-index: 1; left: 73px; top: 12px" id="layer1">

This is a Web HMI sample page!</div>

K1 Area: Layer2 to Layer4

```
<div style="position: absolute; width: 102px; height: 93px; z-index: 2; left: 75px; top: 52px" id="layer2">
<div style="position: absolute; width: 44px; height: 24px; z-index: 1; left: 3px; top: 10px" id="layer3">
K1</div>
<div style="position: absolute; width: 58px; height: 46px; z-index: 2; left: 1px; top: 38px" id="layer4">
</div>
<p>&nbsp;</p></div>
```

Insert **name= "B11"** just after the "<img "

K2 Area: Layer5 to Layer7

```
<div style="position: absolute; width: 101px; height: 93px; z-index: 3; left: 241px; top: 51px" id="layer5">
<div style="position: absolute; width: 47px; height: 26px; z-index: 1; left: 6px; top: 4px" id="layer6">
K2</div>
<div style="position: absolute; width: 92px; height: 35px; z-index: 2; left: 7px; top: 38px" id="layer7">
```

```
<font id="font_B12" color="blue" size="3">
```

```
<b id="B12"> OK </b>
```

```
</font> </div>
```

```
<p>&nbsp;</p></div>
```

modify "OK <div>" to become

```
<font id="font_B12" color="blue" size="3">
<b id="B12"> OK </b>
</font> </div>
```

OUT01 Area: Layer8 to Layer10

```
<div style="position: absolute; width:82px; height:79px;z-index:4; left:71px; top:168px" id="layer8">
<div style="position: absolute; width: 60px; height: 31px; z-index: 1; left: 3px; top: 6px" id="layer9">
OUT01</div>
<div style="position: absolute; width: 37px; height: 31px; z-index: 2; left: 6px; top: 42px" id="layer10">
</div>
<p>&nbsp;</p></div>
```

Insert **name="B11"** just after the "<img "

OUT01 Area: Layer11 to Layer13

```
<div style="position: absolute; width:100px; height:100px; z-index: 5; left:242px; top:164px"
id="layer11">
<div style="position: absolute; width: 71px; height: 31px; z-index: 1; left: 4px; top: 8px" id="layer12">
OUT02</div>
<div style="position: absolute; width: 61px; height: 48px; z-index: 2; left: 5px; top: 45px" id="layer13">
</div>
```

After the "<img" tag, insert the following code:

Style="cursor:hand" name="B2" onclick="ON_OFF(form_B2, form_B2.B2, boolean_val[2])"

```
<form name="form_B2" method="post" action="./main.dll">
  <input name="BEGIN" type="hidden">
  <input name="B2" type="hidden" value="0">
  <input name="END" type="hidden">
</form>
```

```
<p>&nbsp;</div>
```

Insert the following code:

```
<form name="form_B2" method="post" action="./main.dll">
  <input name="BEGIN" type="hidden">
  <input name="B2" type="hidden" value="0">
  <input name="END" type="hidden">
</form>
```

T1 Area: Layer14 to Layer17

```
<div style="position: absolute; width: 181px; height: 90px; z-index: 6; left: 374px; top: 162px"
id="layer14">
<div style="position: absolute; width: 119px; height: 28px; z-index: 1; left: 4px; top: 7px" id="layer15">
```

```
T1 = <b id="T1">xxx ms</b></div>
```

Modify "T1 = xxx ms </div>" to become:
T1 = <b id="T1">xxx ms</div>

```
<div style="position: absolute; width: 98px; height: 28px; z-index: 2; left: 4px; top: 45px" id="layer16">
```



```
<form name="form_L21" method="post" action="./main.dll">
  <input name="BEGIN" type="hidden">
  <input name="L21" type="text" size="8" value="xxx">
  <input name="END" type="hidden">
</form>
```

```
&nbsp;  </div>
```

Insert the following code inside the "Layer16":

```
<form name="form_L21" method="post" action="./main.dll">
  <input name="BEGIN" type="hidden">
  <input name="L21" type="text" size="8" value="xxx">
  <input name="END" type="hidden">
</form>
```

```
<div style="position: absolute; width: 67px; height: 33px; z-index: 3; left: 106px; top: 44px"
id="layer17">
```

```
<input type="button" value="Enter" onclick="Check_L21( )">
```

```
&nbsp;  </div>
```

```
<p>&nbsp;  </div>
```

Insert the following code inside the "Layer17":

```
<input type="button" value="Enter" onclick="Check_L21( )">
```

We have finished the code in the <body> </body> area.

Next, find out the “head” area and modify the code inside it as follows:

```
// variable to record object's blink state , 0: not blink , 1: blink , For example:  
// *****  
var B12_blink=0; // init as 0: not blink  
// *****
```

```
// function to blink object  
var blink_step=0;  
function blink_obj()  
{
```

```
  if(blink_step==1)  
  {  
    blink_step=0;
```

```
    // display your object here  
    // blink B12 , For example:
```

```
    // *****
```

```
    if(B12_blink==1)  
    {  
      B12.innerText="Error !" ;  
      font_B12.color="red";  
    }
```

```
    // *****
```

```
  }  
  else
```

```
  {  
    blink_step=1;
```

```
    // un-display your object here  
    // blink B12 , For example:
```

```
    // *****
```

```
    if(B12_blink==1)  
    {  
      B12.innerText="";  
      font_B12.color="red";  
    }
```

```
    // *****
```

```
  }  
  setTimeout("blink_obj()" , blink_period);  
}
```

The “Error !” symbol will blink when the K2 = True in this example. Please un-mask the code inside these 3 areas.

Find out function Check_L21() and un-mask the sample code. function Check_L21() can be used to check the entered T1 value and post it to the PAC.

```
// form sample , to check value of L21 & then post val to controller
// For example:
// *****

function Check_L21()
{
    var val=form_L21.L21.value;
    if(val>12000 || val<4000)
    {
        alert("T1's value should be in the range of 4000 to 12000");
        return;
    }
    Check(form_L21); // post value to the controller
}

// *****
```

Moreover, find out function refresh_data() and insert the following code.

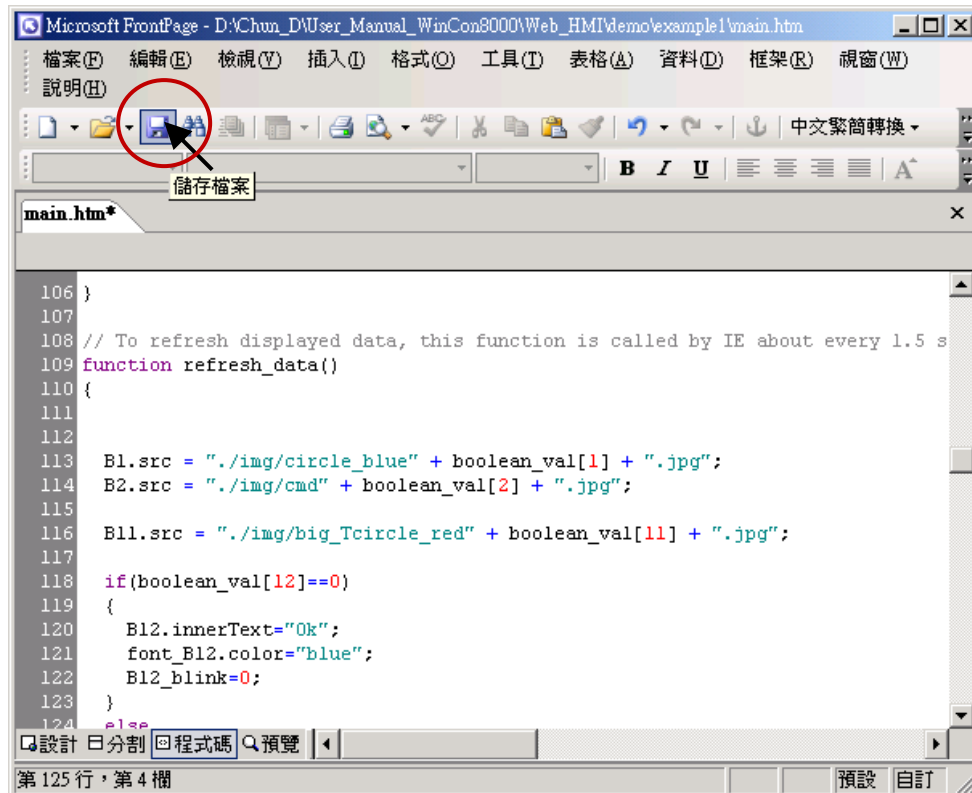
```
// To refresh displayed data , this function is called by IE about every 1.5 sec later
```

```
function refresh_data()
{
    B1.src = "./img/circle_blue" + boolean_val[1] + ".jpg";
    B2.src = "./img/cmd" + boolean_val[2] + ".jpg";

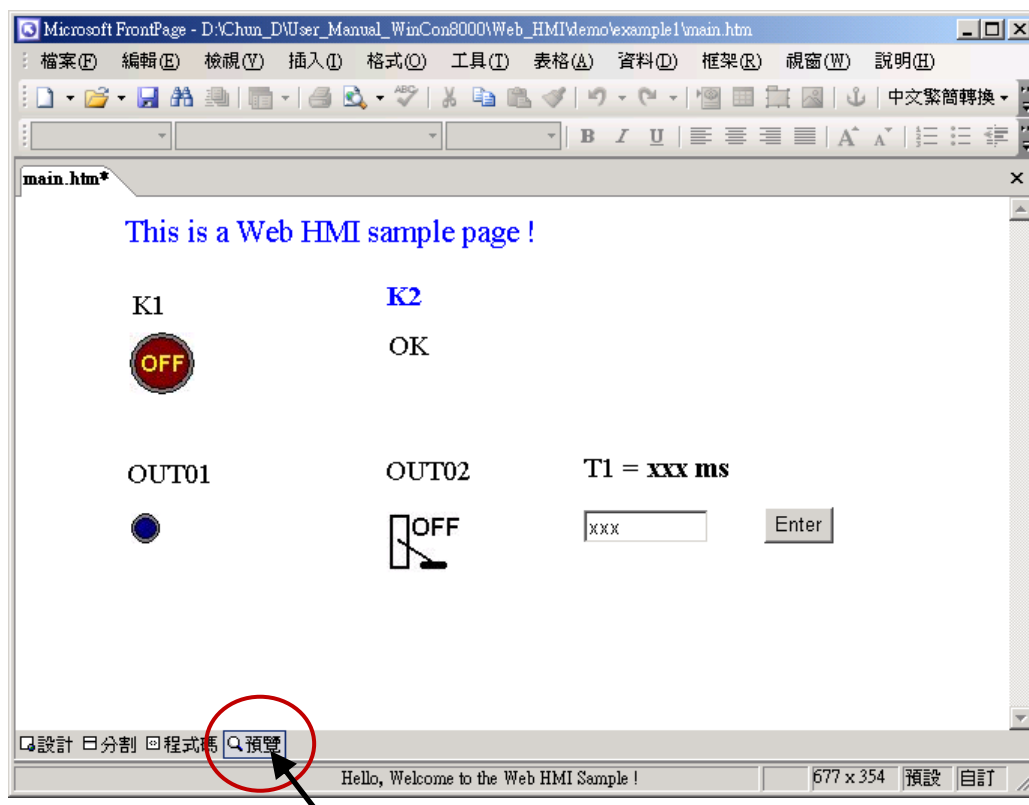
    B11.src = "./img/big_Tcircle_red" + boolean_val[11] + ".jpg";

    if(boolean_val[12]==0)
    {
        B12.innerText="Ok";
        font_B12.color="blue";
        B12_blink=0;
    }
    else
    {
        B12_blink=1;
    }
    T1.innerText=timer_val[21] + " ms";
}
```

Now we have finished all the code. Please save it.



You may click on "Preview" to simulate its run time behavior.



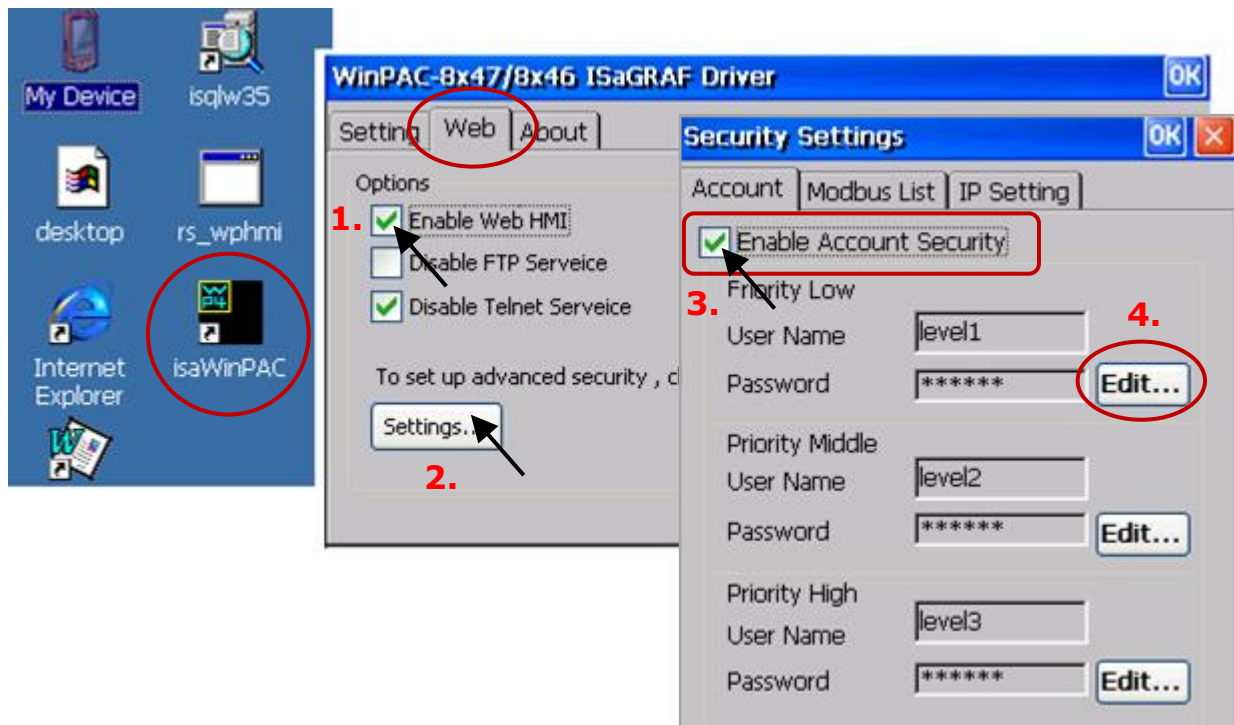
4.4.4 Step 4 – Download Web HMI Pages to the PAC

The steps are similar as listed in Section 3.2. If you haven't practiced "Setting Up a Web HMI Demo" listed in the Chapter 3, it's better to do it once to get familiar with it. Then, start the PAC to do the following steps.

First set the web options

1. Run the ISaGRAF driver - "isaWinPAC".
2. On the Web page, check the "Enable Web HMI" option and click the "Setting" button.
3. Check the "Enable Account Security" and click the "Edit" button to set the username and password. Then, click "OK".

Note: If "Enable Account Security" is not checked, any user can easily get access to your PAC through the Internet Explorer.



And then, copy all files in this example1 folder to the ISaGRAF PAC.

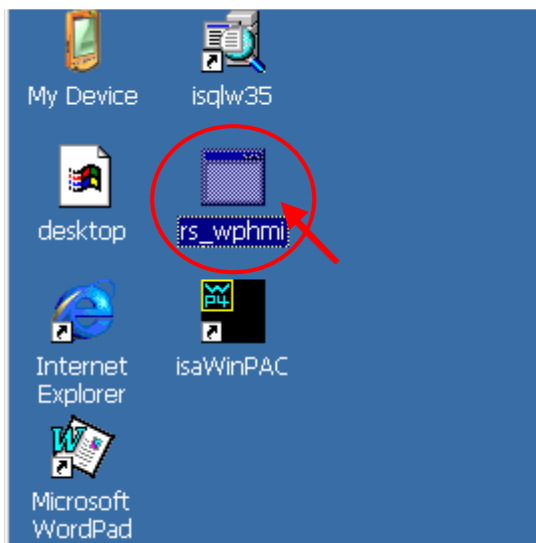
Copy all files from:

<your hard drive>: \example1\ *.*

Paste files to:

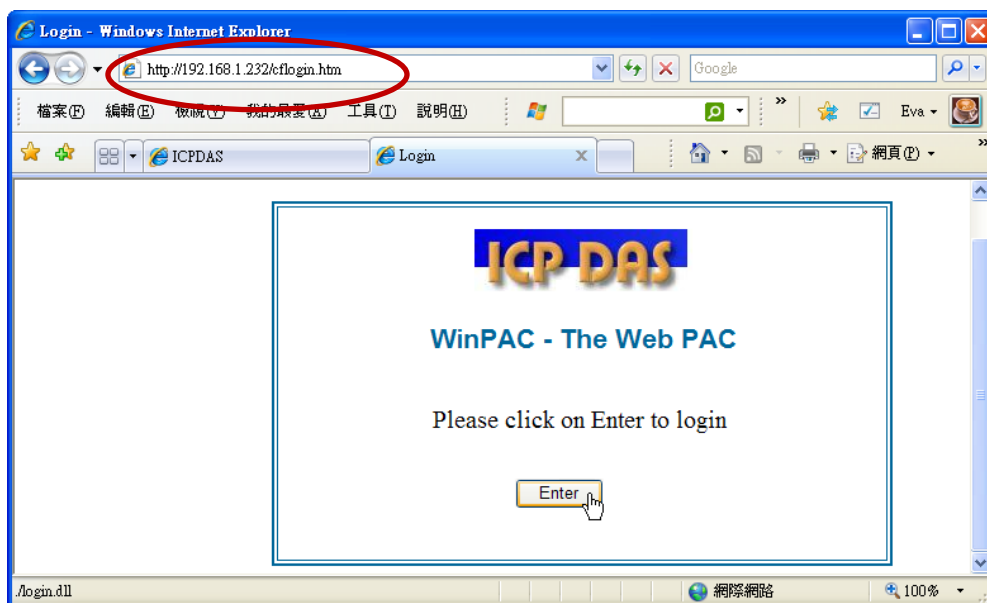
<ISaGRAF PAC>: Micro_SD\Temp\HTTP\WebHMI\

Once the web pages are modified or new copied, run “rs_wphmi.exe” to reset the Web Server. **Execute the “rs_wphmi.exe” file** whenever any file stored in the WP-8x47’s folder \Micro_SD\Temp\HTTP\WebHMI\ is modified.

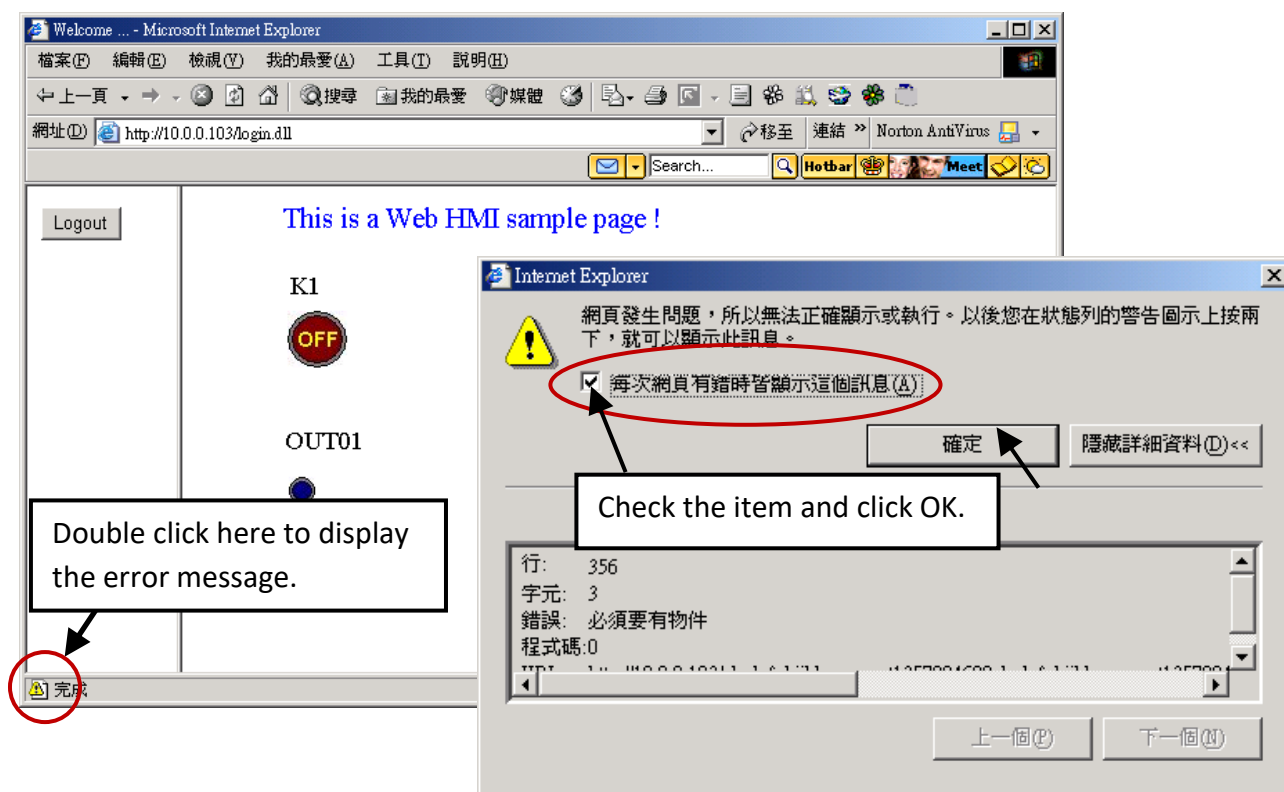


Show Time:

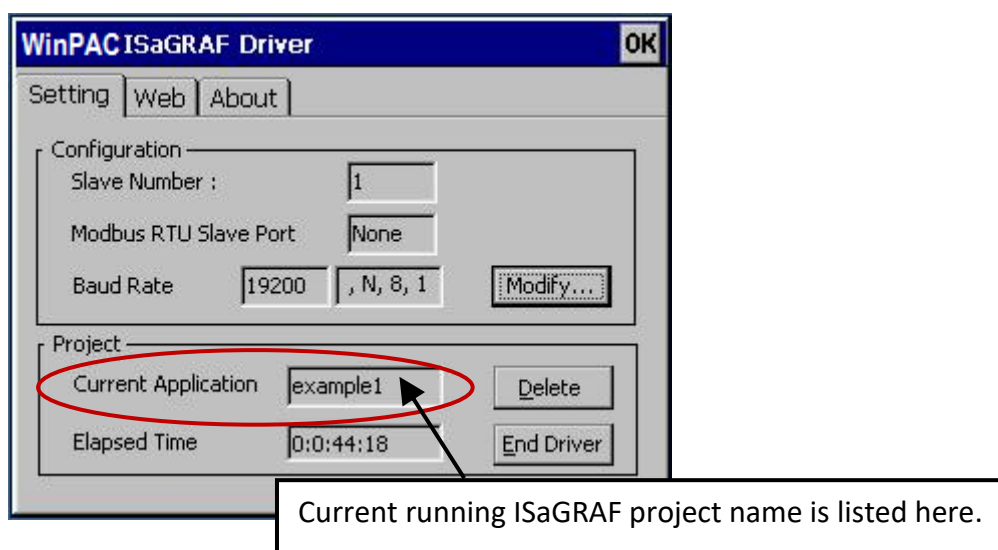
Run Internet Explorer (Rev. 6.0 or higher) and enter the IP address of the WP-8x47.
For example: 61.218.42.10 or http://61.218.42.10



If there is something wrong with the web page. You may enable the below item to display the debug message every time it has error.



And also check if your ISaGRAF project already downloaded to the PAC? ([Section 4.3](#) or [section 3.2.3](#)). And do you assign the correct Modbus Network address to the respective ISaGRAF variables? ([Section 4.1.5](#)).



Important Notice:

1. WP-8x47 supports only High profile I-8K and I-87K I/O cards in its slot 0 to 7.

Visit the website, for more information about the supported modules:

http://www.icpdas.com/en/product/guide+Remote_I_O_Module_and_Unit+Software_Support_I-8K_I-87K_Software_Support

2. Only set a fixed IP address to the WP-8x47. (No DHCP)

Note:

1. This chapter describes the programming basics for the Web HMI. We will not focus on the HTML basics. If you want to know more about the HTML programming, the best way is to “buy a HTML related book” from the bookstore. There are a lot of books doing this job.
2. The Web HMI only supports the basic HTML tags. It doesn't support ASP, PHP or JSP or other Page Server language.
3. Please do not use <frameset> </frameset>, <frame> </frame> in the Web HMI.
4. The object name, object ID, code, variable name and function name is case sensitive. For example, refresh_data() and Refresh_data() is different.
5. There are more than ten Web HMI examples in the WP-8x47's demo folder. Refer to section 3.1.

5.1 Basic Files for the Web HMI

The basic Web HMI files include 2 folders and 3 DLL files and 4 htm files as below.

./img/	(default image files - *.jpg , *.bmp , *.gif)
./msg/	(default message files – wincon.js & xxerror.htm)
whmi_filter.dll	(three DLL files)
login.dll	
main.dll	
index.htm	(first default page)
login.htm	(the Web HMI welcome page)
menu.htm	(the page-menu page, normally on the left on the Internet Explorer)
main.htm	(first page when successfully login)

User may put his own image files into the folder named as “user_img”. And put user-defined JavaScript file or CSS file into the folder named as “user_msg”. Other folder name is not acceptable by the WinPAC Web HMI.

The “index.htm” file is the default entry page of the web server. User must not modify it. The “index.htm” re-directs to the “login.htm” file in 1 to 2 seconds when someone visits the WP-8x47 via the Internet Explorer.

User may modify the “login.htm”, “menu.htm” and “main.htm” to fit the requirement.

5.2 Login.htm

Login.htm is the first welcome page when a user visiting in. It can be modified. Below is the basic code for the login.htm

```
<html>
<head>

<title>Login</title>

<meta http-equiv=pragma content=no-cache>

<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" >

<script language="JavaScript">
var random_val=123;
function get_random_val()
{
    var rightNow = new Date();
    random_val += 323456789*rightNow.getMinutes() +
        107654321*(rightNow.getTime()%1000);
    setTimeout("get_random_val()", 197); // repeat call
}

//check if username and possword are empty
function validate(fm)
{
    setKey(fm);
    return true;
}

//Embed key whille submitting
function setKey(fm)
{
    var rightNow = new Date();
    cookieVal = random_val+rightNow.getTime();
    fm.key_.value = cookieVal;
}

</script>

</head>
```

This line is only for the "Login.htm", please do not apply to other pages, for example, the "menu.htm" & "main.htm" & other .htm pages.

Please apply your charset here.
For example,
English: UTF-8
Traditional Chinese: big5
Simplified Chinese: gb2312
or other language

get_random_val() should be always called at the beginning of the Login.htm . It is the entry point of the Login.htm

<body onload="get_random_val()">

<div style="position: absolute; width: 332px; height: 34px; z-index: 5; left: 147px; top: 27px" id="layer1">

Welcome !</div>

Your caption is here.

<div style="position:absolute; width:122px; height:38px; z-index:4; left: 171px; top: 95px;" id="layer2">

"form1" is necessary

<form name="form1" action="./login.dll" method="post">

<input type="hidden" name="key_">

<input type="submit" name="Submit" value=" **Enter** " style="cursor:hand" onClick="return validate(this.form)">
</form>

You may modify "**Enter**" to your own word. For example, "請進". This may require user to modify the related "charset" at the beginning of this page.

</div>

</body>

<!-- To ensure no-cache work -->

<head>

<meta http-equiv=pragma content=no-cache>

</head>

</html>

This code is only for the "Login.htm", please do not apply to other pages, for example, the "menu.htm" & "main.htm" & other .htm pages.

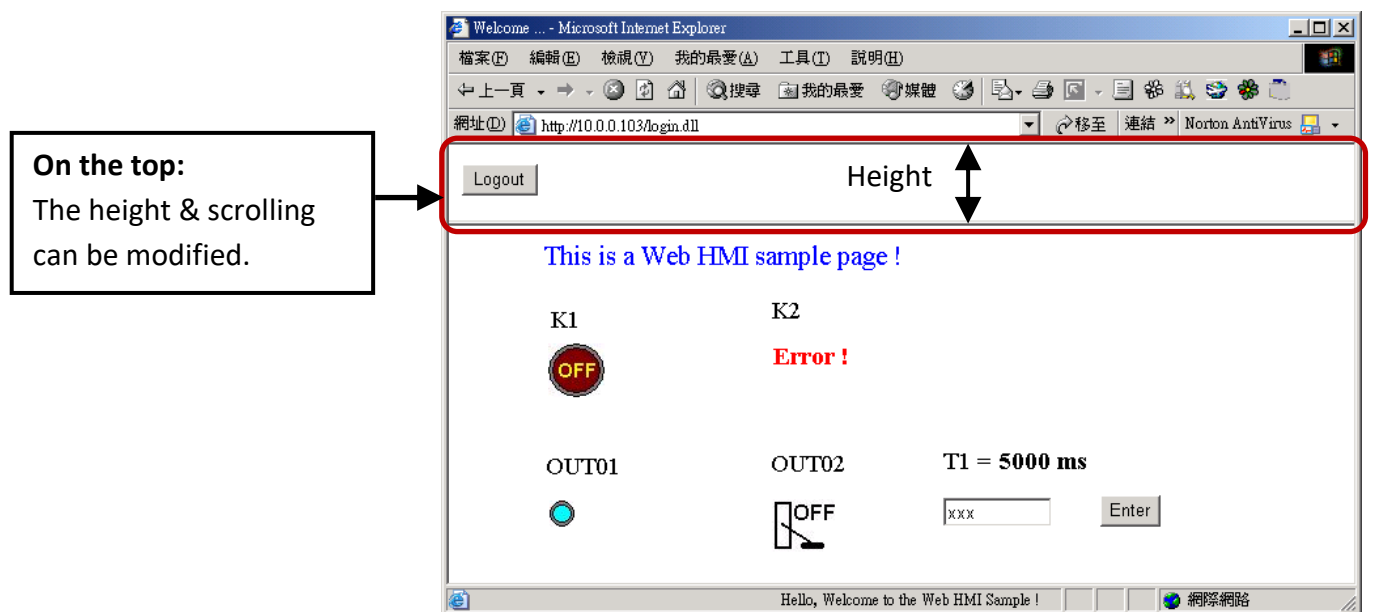
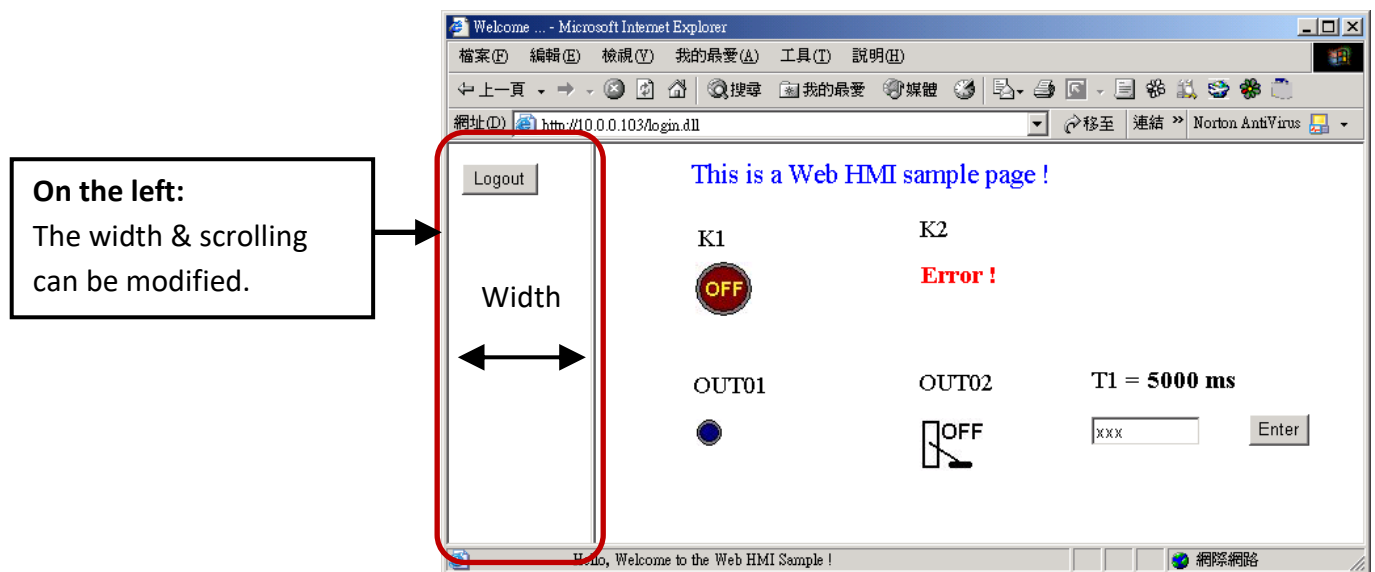
That's all the login.htm need. You can insert more images or text to it. Only remember to keep its basic code.

5.3 Menu.htm

Note:

If you want to know more about the multi-page application, there are two demos in the WP-8x47 demo folder: ...\\isagraf_winpac_demo\\wp_webhmi_demo**wphmi_05** and **wphmi_05a**. The “wphmi_05” place its page-menu on the left, while “wphmi_05a” on the top.

The “Menu.htm” defines the Page-menu of the Web HMI especially for the multi-page application. The page-menu can place only on the left or on the top.



Below is the basic code for the menu.htm

```
<!-- top_or_left=1 , scrolling=0 , width=60 , resize=1 -->
```

```
<html>
<head>
<title>Title1</title>
```

The first row is not a comment, it defines the Page-Menu behavior

top_or_left: 1: Top, 0: Left

scrolling: 1: Yes, 0: No

width: width of the Menu Frame, 0 – 999 (unit is pixel)

resize: 1: Yes, 0: No

```
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" >
```

```
<SCRIPT LANGUAGE="JavaScript" src="./msg/wincon.js"></SCRIPT>
```

```
<SCRIPT LANGUAGE="JavaScript">
```

```
function start1()
{
  A_11();
}
function refresh_data()
{
  if(run_at_pc==1) return;
}
</SCRIPT>
```

This row is necessary for
menu.htm, main.htm &
other multi-pages

Please apply your charset here.
For example,
English: UTF-8
Simplified Chinese: gb2312
Traditional Chinese: big5
or other language

```
</head>
```

start1() is the entry point of the menu.htm

```
<body onload="start1()">
```

form_logout is for the logout button.

```
<!-- Logout button -->
```

```
<form name="form_logout" method="post" action="./login.dll">
```

```
<input style="cursor:hand" name="CMD" type="submit" value="Logout" onClick="return  
logout(this.form)">
```

```
</form>
```

```
</body>
```

```
</html>
```

5.4 Main.htm

5.4.1 A Simple Main.htm Example

Before going further in the main.htm, first take a look at a simple main.htm example. This example only displays a “Hello !” message when successfully login, nothing else.

```
<html>
<head>
<title>Title1</title>
<meta http-equiv="Content-Type" content="text/html; charset=UTF-8" >
```

Apply your charset here. For example, English: UTF-8, Simplified Chinese: gb2312, Traditional Chinese: big5, or other language.

```
<SCRIPT LANGUAGE="JavaScript" src="./msg/wincon.js"></SCRIPT>
```

This line is necessary for menu.htm, main.htm & other multi-pages.

```
<SCRIPT LANGUAGE="JavaScript">
show_scroll_word(200,"Hello , Welcome to the Web HMI Sample !");
```

```
function refresh_data()
{
}
```

Calling show_scroll_world() will display a moving word at the bottom of the Internet Explorer. Here 200 means 200 ms. You may make it slower, for example, using 500.

```
</SCRIPT>
</head>
```

refresh_data() is called when the Internet Explorer has received the requested data from the controller. It is called in the period about 1.25 to 5 seconds depends on the

```
<body onLoad="init()">
```

init() is the entry pint of the main.htm & other multi-pages.

```
<font color="blue" size="4">
<div style="position: absolute; width: 353px; height: 24px; z-index: 1; left: 73px; top: 12px" id="layer1">
Hello !</div>
</font>
```

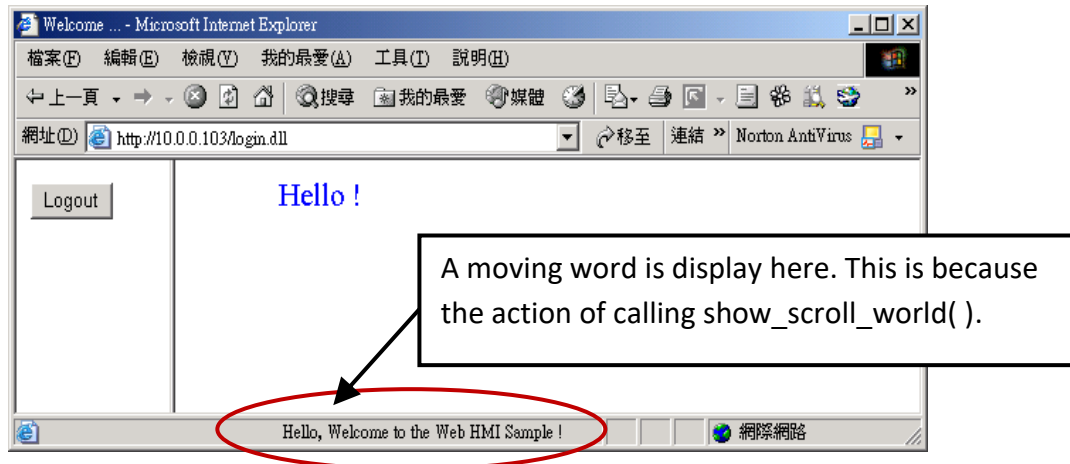
A layout object is starting with “<div>” and ending at “</div>” tags. Here only show a message “Hello !”

```
</body>
</html>
```

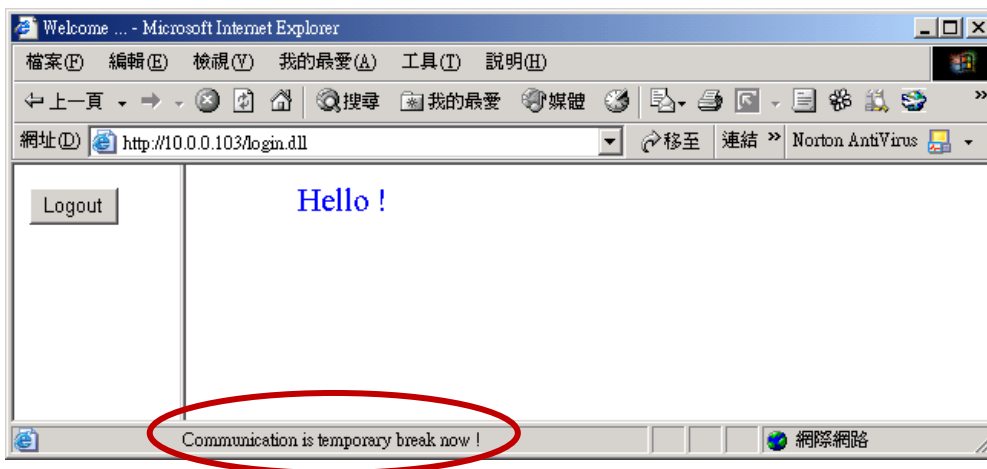
You may replace the above main.htm with the **main.htm** in the WP-8x47 demo folder:

...\isagraf_winpac_demo\wp_webhmi_demo\sample

Then, download it to the PAC (refer to [section 4.4.4](#)). You will see the below window when logging in successfully.



User may try to plug out the Ethernet cable of the PAC or of your PC. You will see it show “Communication is temporary break now !” in about 10 seconds. When you plug the cable back, the communication will be recovered in about 10 to 45 seconds.



If the communication broken time exceeds 120 seconds, it will show the below message. You have to close the Internet Explorer & open it again to re-login.



5.4.2 More About the refresh_data() Function and Dynamic Data

Note: The code, variable name and function name is case sensitive. For example, refresh_data() is correct, however Refresh_data() is not correct.

The refresh_data() function must always apply in the main.htm and other multi-pages. It is called when the Internet Explorer has received the requested data from the PAC. The calling period is about 1.25 to 5 seconds depends on the communication quality

The refresh_data() is often used for refreshing the dynamic data. For example, the Boolean value, integer value, timer value or float value of the variables in the ISaGRAF project.

The Internet Explorer can access to the data in the ISaGRAF project only when they are assigned a unique Modbus Network Address No (refer to section 4.1.5). The Web HMI only accepts Network Address No in the range of 1 to 1024. IE browsers cannot receive data without a network address number (No. =0) or a number that is not within the permitted range (1 to 1024).

The main.htm and other multi-pages can use the below variable array to access to the ISaGRAF data (case sensitive). The identifier appeared in the [] is the related Network Address No. For example, boolean_val[2] means the Boolean value of the ISaGRAF Boolean data which is assigned with the Network Address No. = 2.

boolean_val	boolean value in the ISaGRAF
word_val	word value in the ISaGRAF, -32768 to +32767
float_val	real value in the ISaGRAF, for ex, 1.234 , -0.456E-02
timer_val	timer value in the ISaGRAF, unit is ms, max = 86399999 (< 1 day)
string_val	message value in the ISaGRAF, max string length is 255

To access to long integer value (32-bit integer) use get_long_val() function. For example, get_long_val(11) , get_long_val(13) , get_long_val(15).

get_long_val()	long integer value in the ISaGRAF, -2147483648 to +2147483647
-----------------	--

Note:

The long integer, timer and float variable's Network Address No. must occupy 2 No. in the ISaGRAF project. Refer to section 4.2 of the ISaGRAF User Manual at <http://www.icpdas.com/en/download/show.php?num=333>

This means that if you specify a network address as 11 for the Real or Timer or integer variable (32-bit values - greater than 32767 or less than -32768), the next address 12 can't be assigned to any variable. It must be specified from address 13.

5.4.2.1 Displaying Dynamic Boolean Data

Demo example: whmi_02 and whmi_05 (section 3.1)

Let's look back to the refresh_data function. If user want to display the dynamic Boolean value, the below code can be used.

```
...
function refresh_data()
{
  B1.src = "./img/circle_blue" + boolean_val[1] + ".jpg" ;
}
```

The action of the image object "B1" is defined here.
if boolean_val[1]=1, it display image "B1" as "img/circle_blue1.jpg".
if boolean_val[1]=0, it display image "B1" as "img/circle_blue0.jpg".

```
<body onLoad="init()">
```

The layout (or location) of the image object "B1" is defined here by the "<div" and "</div>" tags.

```
<div style="position: absolute; width: 214px; height: 53px; z-index: 2; left: 102px; top: 79px">
</div>
```

```
</body>
```

The declaration of image "B1" is defined here by the "img" tag & name="B1" src= ... ← "src=" defines the initial value of B1

5.4.2.2 Displaying Dynamic Float & Word & Timer Data

Demo example: wphmi_01 , wphmi_03 and wphmi_05 (section 3.1)

If user want to display the dynamic float value, the below code can be used.

```
...
function refresh_data()
{
  F21.innerText = float_val[21] ;
}
```

The action of the Text object "F21" is defined here.
If want to display Word data, please use "word_val[]"
If want to display Timer data, please use "timer_val[]".
For example, F21.innerText = timer_val[21] + " ms";

```
<body onLoad="init()">
```

The layout (or location) of the Text object "F21" is defined here by the "<div>" "</div>" tags.

```
<div style="position: absolute; width: 214px; height: 53px; z-index: 2; left: 102px; top: 79px">
<b id="F21"> xxxx </b> </div>
```

```
</body>
```

The declaration of Text object "F21" is defined here by the "<b" tag & id="F21" & "" tag initial value of this F21 is "xxxx"

5.4.2.3 Displaying Dynamic Long Integer Data

Demo example: wphmi_03 and wphmi_05 (section 3.1)

If user want to display the dynamic long integer value (32-bit format), the below code can be used.

```
...
function refresh_data()
{
  L11.innerText = get_long_val(11) ;
}
...
<body onLoad="init()">
...
<div style="position: absolute; width: 214px; height: 53px; z-index: 2; left: 102px; top: 79px">
<b id="L11"> xxx </b> </div>

...
</body>
```

The action of the Text object "L11" is defined here.

The layout (or location) of the Text object "L11" is defined here by the "<div>" and "</div>" tags.

The declaration of Text object "L11" is defined here by the "" tag and id="L11" and "" tag, the initial value of this L11 is "xxx".

5.4.2.4 Displaying Dynamic String Data

If user want to display the dynamic string value (max length is 255), the below code can be used.

```
...
function refresh_data()
{
  S31.innerText = string_val[31] ;
}
...
<body onLoad="init()">
...
<div style="position: absolute; width: 214px; height: 53px; z-index: 2; left: 102px; top: 79px">
<b id="S31"> empty </b> </div>

...
</body>
```

The action of the Text object "S31" is defined here.

The layout (or location) of the Text object "S31" is defined here by the "<div>" and "</div>" tags.

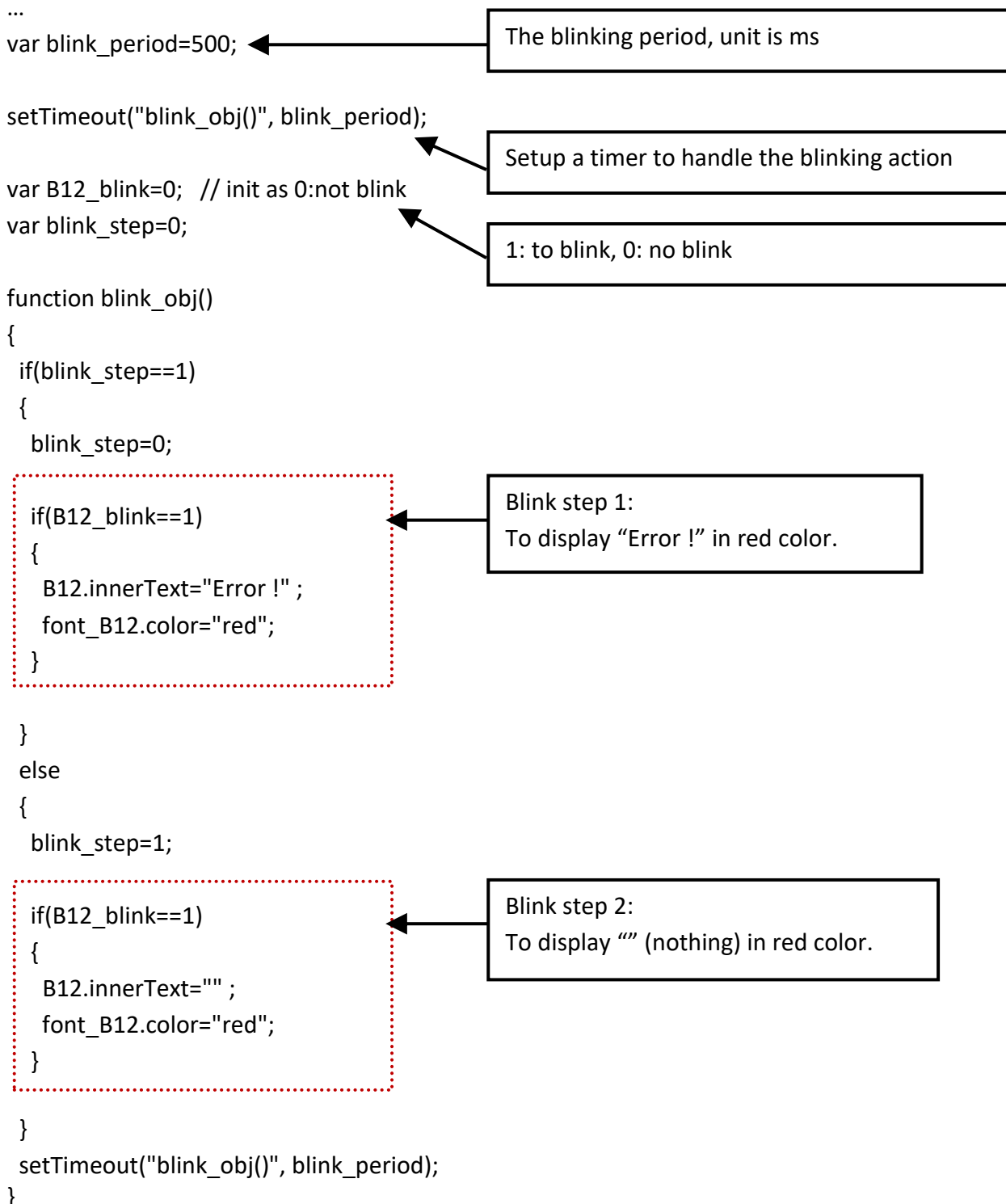
The declaration of Text object "S31" is defined here by the "" tag and id=" S31" and "" tag , the initial value of this S31 is "xxx".

5.4.2.5 Trigger a Boolean Object to Blink

Demo example: wphmi_02 and wphmi_05 (section 3.1)

Some application may need a message to blink when the Boolean value changes. For example, If `boolean_val[12]` is False, it means "OK". However, if `boolean_val[12]` is True, it means "Error !". User may want to make this "Error !" blink to attract viewer's attention.

The below code can do this job.



```
...function refresh_data()
```

```
{  
  if(boolean_val[12]==0)  
  {  
    B12.innerText="Ok";  
    font_B12.color="blue";  
    B12_blink=0;  
  }  
  else  
  {  
    B12_blink=1;  
  }  
}
```

The action of the Text object "B12" is defined here.
If boolean_val[12]=0, no blink.
If boolean_val[12]=1, blink.

```
...  
<body onLoad="init()">  
...
```

The layout (or location) of the Text object "B12" is defined here by the "<div>" and "</div>" tags.

```
<div style="position: absolute; width: 214px; height: 53px; z-index: 2; left: 102px; top: 79px">
```

```
<font id="font_B12" color="blue" size="3">
```

```
<b id="B12">OK</b>
```

The "" & "" tags can be used for controlling the font's color and font's size.

```
</font>
```

```
</div>
```

```
</body>
```

The declaration of Text object "B12" is defined here by the "" tag and id="B12" and "" tag, the initial value of this B2 is "OK"

5.4.2.6 Displaying Float Value with Fixed Digit Number Behind the "." Symbol

Demo example: wphmi_06 and wphmi_07 (section 3.1)

The float_str1(para1, para2) function can convert float value to a string with fixed digit number behind the dot "." symbol

para1 is the float value to be converted, for ex, 1.234567

para2 is the digit number behind the "." dot symbol, 0 to 6

for example, float_str1(1.234567, 3) return "1.234",

float_str1(1.234567, 2) return "1.23"

```
...  
function refresh_data()  
{
```

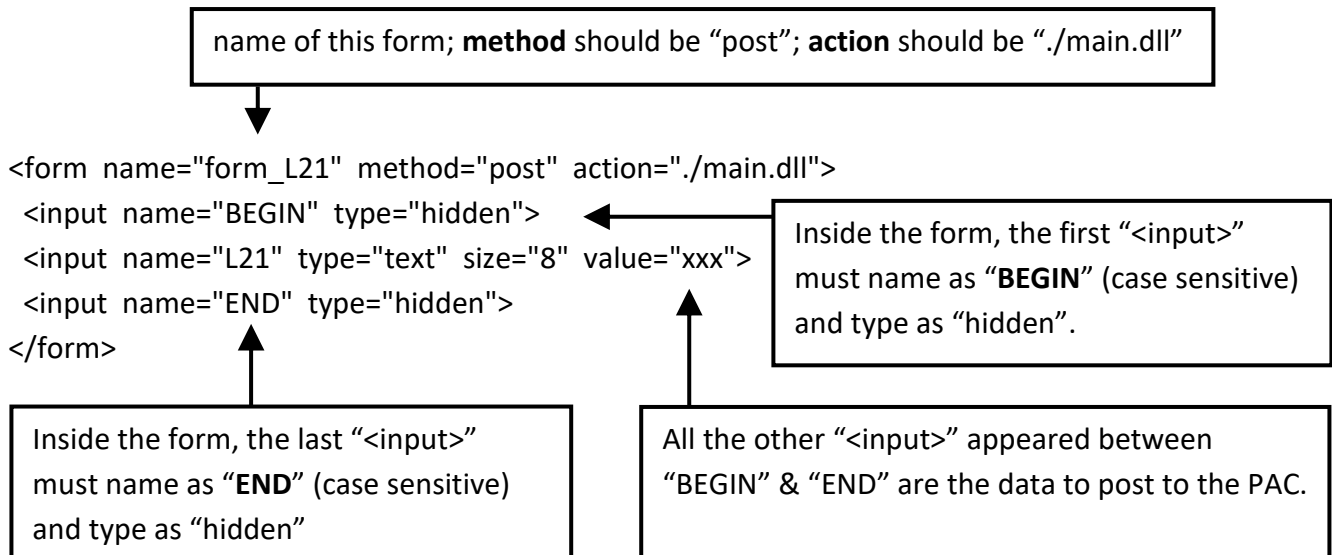
Convert float val at Network Address 21 to a string with digit number = 3 behind the "." dot symbol.

```
  F21.innerText = float_str1( float_val[21] , 3) ;  
}
```

5.4.3 Post Data to the PAC

The former section 5.4.2 listing how to get and display data from the PAC. This section focuses on posting data to the PAC, in other word to control the WinPAC via the Internet Explorer.

To set a new value to the Boolean, word, long integer, float, timer and string variables in the ISaGRAF project, we need “form” object appeared in the main.htm or other multi-pages. A “form” object looks like as below.



The “<input>” name to control the WinPAC’s data must follow below format. The number followed behind the first letter should be in the range from 1 to 1024. This number is point to the variable name in the ISaGRAF project with the same Modbus Network Address No.

B	point to the ISaGRAF Boolean data, for ex, B5, B109
W	point to the ISaGRAF word data (-32768 to +32767), for ex, W9, W1001
L	point to the ISaGRAF long integer data (-2147483648 to +2147483647), for ex, L21. This “L” Also point to the ISaGRAF timer data
F	point to the ISaGRAF real data, for ex, F13, F235
S	point to the ISaGRAF message data, for ex, S18

Note:

The long integer, timer and float variable’s Network Address No. must occupy 2 No. in the ISaGRAF project. Refer to section 4.2 of “ISaGRAF User Manual:

<http://www.icpdas.com/en/download/show.php?num=333>

That means if you assign a Network Address No.= 11 to a Real type variable (or Timer or integer will have 32-bit value – larger than 32767 or smaller than -32768), the next No. 12 should not be assigned to any other variable in the ISaGRAF project. However, you may assign No.=13 to one another variable.

5.4.3.1 Post Boolean Value to the PAC

A. To post by the image

Demo example: wphmi_02 and wphmi_05

```
...  
function ON_OFF (form_obj, obj, current_boo_value)
```

```
{  
  if(current_boo_value==0)  
  {  
    flag = confirm("turn ON ?");  
    if(flag) obj.value=1;  
  }  
  else  
  {  
    flag = confirm("turn OFF ?");  
    if(flag) obj.value=0;  
  }  
  if(flag)  
  {  
    if(GetUserID(form_obj)==true) form_obj.submit();  
  }  
}
```

ON_OFF function is used for posting the current Boolean value to the PAC.
The first parameter is the name of the "form".
The second parameter is the "<input>" name inside the form.
The last parameter is the current Boolean value.

```
function refresh_data()  
{
```

```
  B2.src = "img/cmd" + boolean_val[2] + ".jpg" ;  
}
```

Display the current boolean image. In this example,
0: display "img/cmd0.jpg", 1: "img/cmd1.jpg"

```
...  
<body onLoad="init()">  
...
```

The layout (or location) of the image object "B2" is defined here by the "<div>" and "</div>" tags.

```
<div style="position: absolute; width:100px; height:100px; z-index: 5; left: 242px; top: 164px" >
```

"cursor:hand" will display the mouse arrow as a hand when entering the image area.

```

```

The onclick will call ON_OFF () when the mouse click on it.
The first parameter is the name of the "form". Here is "form_B2".
The second parameter is the "<input>" name inside the form.
Here is "form_B2.B2".
The last is the current Boolean value. Here is boolean_val[2].

Name of the form

```
<form name="form_B2" method="post" action="./main.dll">
```

```
  <input name="BEGIN" type="hidden">
```

```
  <input name="B2" type="hidden" value="0">
```

```
  <input name="END" type="hidden">
```

```
</form>
```

```
</div>
```

```
...
```

```
</body>
```

Name of "<input>" inside the form. Here is "B2". Because it is inside "form_B2", then we must use the name of "form_B2.B2" to identify it.

B. To post by buttons

Demo example: wphmi_02 and wphmi_05

function ON_(form_obj, obj)

```
{  
  flag = confirm("turn ON ?");  
  if(flag)  
  {  
    obj.value=1;  
    if(GetUserID(form_obj)==true) form_obj.submit();  
  }  
}
```

ON_ function is used to post Boolean value as "True" to the PAC.

function OFF_(form_obj, obj)

```
{  
  flag = confirm("turn OFF ?");  
  if(flag)  
  {  
    obj.value=0;  
    if(GetUserID(form_obj)==true) form_obj.submit();  
  }  
}
```

"OFF_ function is used to post Boolean value as "False" to the PAC .

function refresh_data()

```
{  
  B2.src = "img/big_Tcircle_red" + boolean_val[2] + ".jpg";  
}
```

Display the current Boolean image.

0: "img/big_Tcircle_red0.jpg" ,
1: "img/ big_Tcircle_red1.jpg"

...

```
<body onLoad="init()">
```

...

```
<div style="position: absolute; width: 56px; height:40px; z-index: 5; left: 82px; top: 69px" >  
  
</div>
```

The layout (or location) of the image object "B2" is defined here by the "<div>" and "</div>" tags.

```
<div style="position:absolute; left:85px; top:124px; width:42px; height:27px;">
```

```
<input type="button" value="ON" style="cursor:hand" onClick="ON_(form_B2, form_B2.B2)">
```

A button to call ON_ (). First parameter is the name of the form. Here is "form_B2"
The second is the name of the "<input>" inside the form. Here is "form_B2.B2"

```
<form name="form_B2" method="post" action="/main.dll">
```

```
  <input name="BEGIN" type="hidden" value="">
```

```
  <input name="B2" type="hidden" value="1">
```

```
  <input name="END" type="hidden" value="">
```

```
</form>
```

```
</div>
```

Name of "<input>" inside the form. Here is "B2". Because it is inside "form_B2", then must use the name of "form_B2.B2" to identify it.

```
<div style="position:absolute; left:85px; top:166px; width:47px; height:31px">
```

```
<input type="button" value="OFF" style="cursor:hand" onClick="OFF_(form_B2, form_B2.B2)">
```

```
</div>
```

...

```
</body>
```

A button to call OFF_ (). First parameter is the name of the form. Here is "form_B2".
The second is the name of the "<input>" inside the form. Here is "form_B2.B2".

5.4.3.2 Post Word & Long & Float & Timer & String Value to the PAC

```
...
function Check(form_obj)
{
  flag = confirm("Are you sure?");
  if(flag)
  {
    if(GetUserID(form_obj)==false) { return false; }
    form_obj.submit();
    return true;
  }
  else
  {
    return false;
  }
}

```

Check() is used to post any "form".

Demo example:

wphmi_03, wphmi_04, wphmi_05,
wphmi_06 and wphmi_07

```
function refresh_data()
{
  L15.innerText=get_long_val(15);
  F17.innerText=float_val[17];
}

```

Display dynamic value here.

If data is word, please use word_val[]

If data is timer, please use timer_val[]

If data is string, please use string_val[]

```
...
<body onLoad="init()">
...

```

The layout (or location) of the text object "L15" & "F17" are defined here by the "<div>" "</div>"

```
<div style="position: absolute; width: 195px; height: 25px; z-index: 2; left: 45px; top: 52px" >
L15 = <b id="L15">xxxx</b></div>
<div style="position: absolute; width: 196px; height: 29px; z-index: 3; left: 45px; top: 82px" >
F17 = <b id="F17">xxxx</b></div>

```

```
<div style="position:absolute; left:47px; top:131px; width:204px; height:60px">
<form name="form1" method="post" action="/main.dll">
  <input name="BEGIN" type="hidden" value="">
  <input name="L15" type="text" value="Enter long val (L15)">
  <input name="F17" type="text" value="Enter float val (F17)">
  <input name="END" type="hidden" value="">
</form>
</div>

```

Text input L15 & F17 inside the "form1". If data is timer, please use "L"; And "W" for word; "S" for string.

```
<div style="position:absolute; width:74px; height:31px; left: 234px; top: 150px;">
  <input type="button" style="cursor:hand" onClick="return Check(form1)" value="Enter">
</div>

```

"cursor:hand" will display the mouse arrow as a hand when entering the button area.

When mouse click on this button, it calls Check() to post to the PAC.

5.5 Multi-Pages

The Web HMI in the WP-8x47 supports multi-page application. You may refer to Chapter 3 to setup the multi-page demo – “wphmi_05” to see how it work.

5.5.1 Level 2 and Level 3 Page

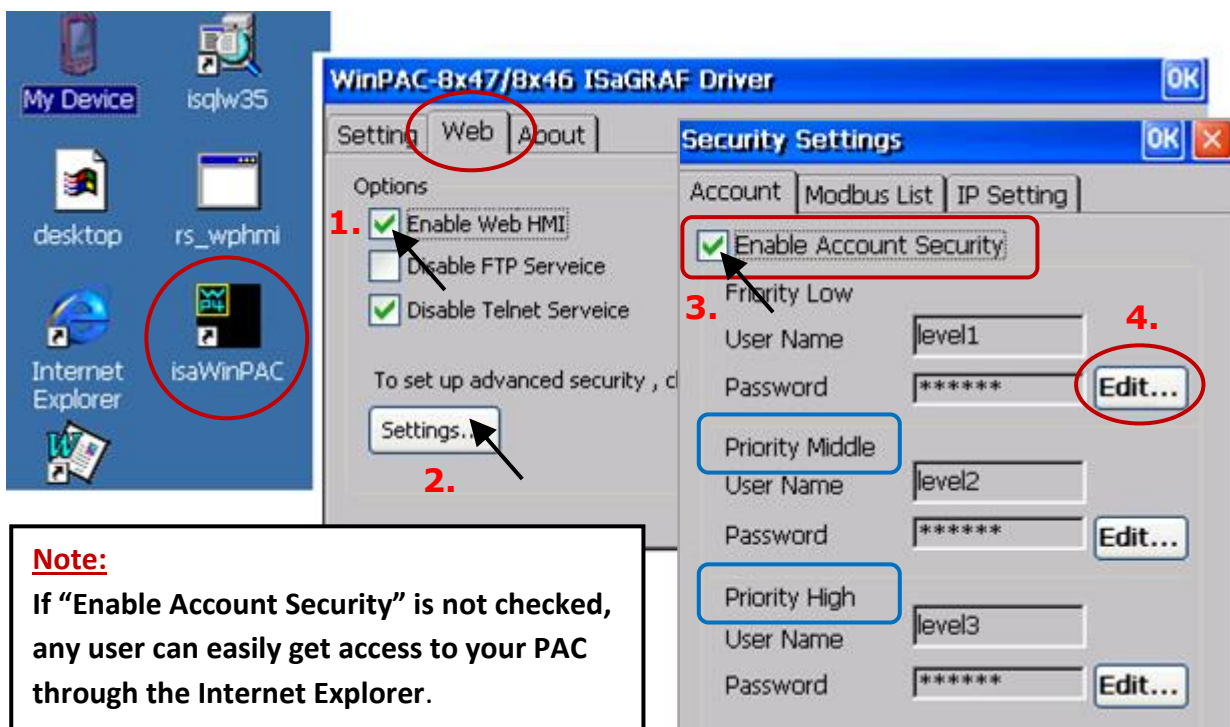
The multi-page name can be any valid html file name. For example, “page2.htm”, “kitchen.htm”, “u2-page4.htm”.

If “u2-” appear in front of the page name, the page will become a Level 2 page. For example, the “u2-Page4.htm” in the “wphmi_05” demo.

If “u3-” appear in front of the page name, the page will become a Level 3 page. For example, the “u3-time.htm” in the “wphmi_05” demo.

What is a Level2 page? Only the user login with the Middle or High priority can get access to it. To access to the Level3 page, users have to login as a High priority user. The page name without “u2-” and “u3-” is identified as Level 1 page. That means any user successfully login can access to it. For example: the “main.htm”.

The other rules for multi-pages are almost the same as “main.htm” (section 5.4).



5.5.2 Switch One Page to One Another Page

Please take a look at the “menu.htm” of the “wphmi_05” demo as below. The “goto_R_page()” function can be used for switching to other page.

```
<!-- top_or_left=0 , scrolling=0 , width=110 , resize=1 -->

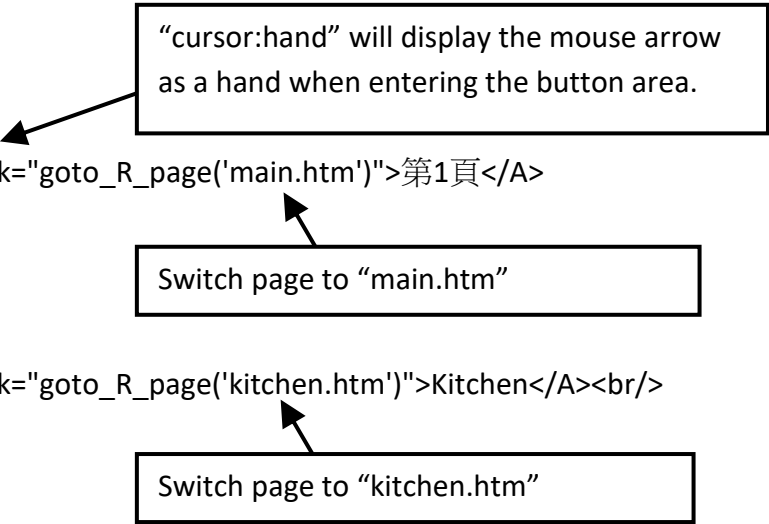
<html>
<head>
<title>Title1</title>
<meta http-equiv="Content-Type" content="text/html; charset=big5" >
<SCRIPT LANGUAGE="JavaScript" src="./msg/wincon.js"></SCRIPT>

<SCRIPT LANGUAGE="JavaScript">
function start1()
{
  A_11();
}
function refresh_data()
{
  if(run_at_pc==1) return; // if simulate at the PC, just return
  ...
}
</SCRIPT>
</head>
<body onload="start1()">

<!-- Logout button -->
<form name="form_logout" method="post" action="./login.dll">
  <input style="cursor:hand" name="CMD" type="submit" value="Logout" onClick="return
logout(this.form)">
</form>
<br/>
<br/>

<!-- Goto main.htm -->
<A style="cursor:hand" onClick="goto_R_page('main.htm')">第1頁</A>
<br/>
<br/>

<!-- Goto kitchen.htm -->
<A style="cursor:hand" onClick="goto_R_page('kitchen.htm')">Kitchen</A><br/>
<br/>
<br/>
```



“cursor:hand” will display the mouse arrow as a hand when entering the button area.

Switch page to “main.htm”

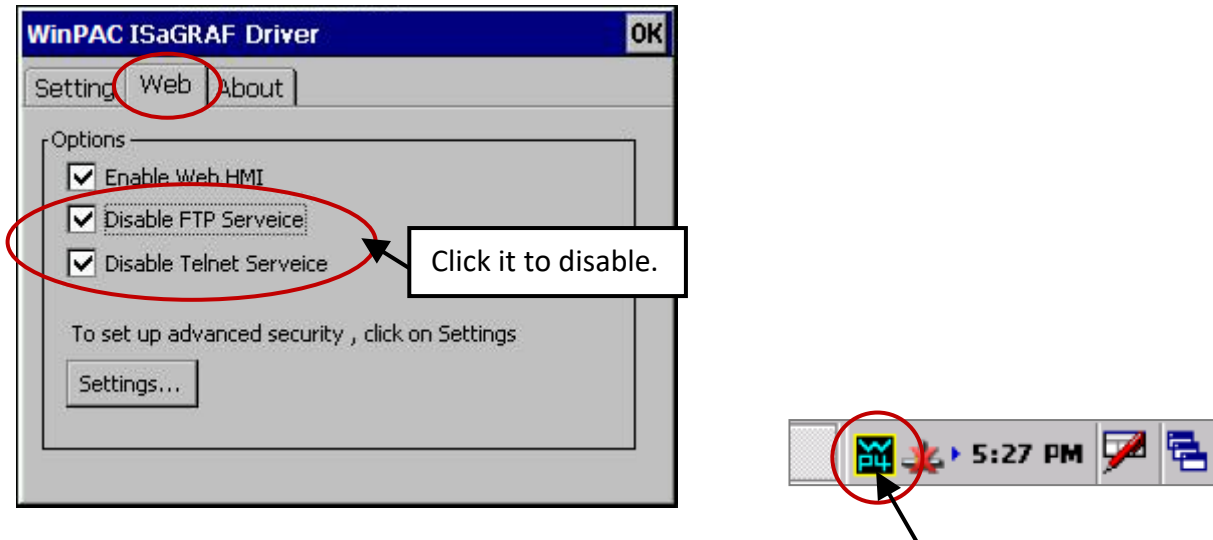
Switch page to “kitchen.htm”

5.6 Web Security

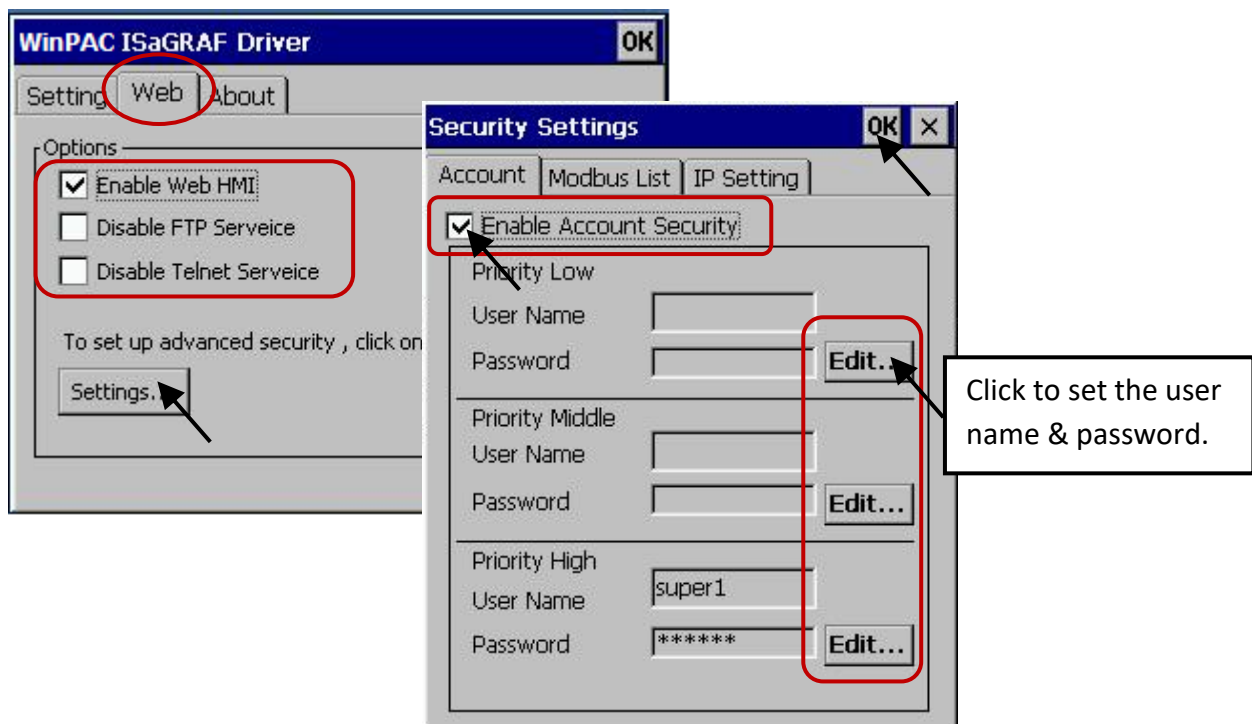
There are some ways user can get access to the WP-8x47 via Ethernet port.

- 1) Using Modbus TCP protocol at port No.= 502. (ISaGRAF & other HMI do this)
- 2) Using FTP (for example, key in “ftp://10.0.0.103” on the Internet Explorer)
- 3) Using Telnet (for example, key in “telnet 10.0.0.103 in the “command” window)
- 4) Using the Web Server (The Web HMI does)

For security concerns, untick options 2 and 3 on the Web page in the ISaGRAF Driver window.

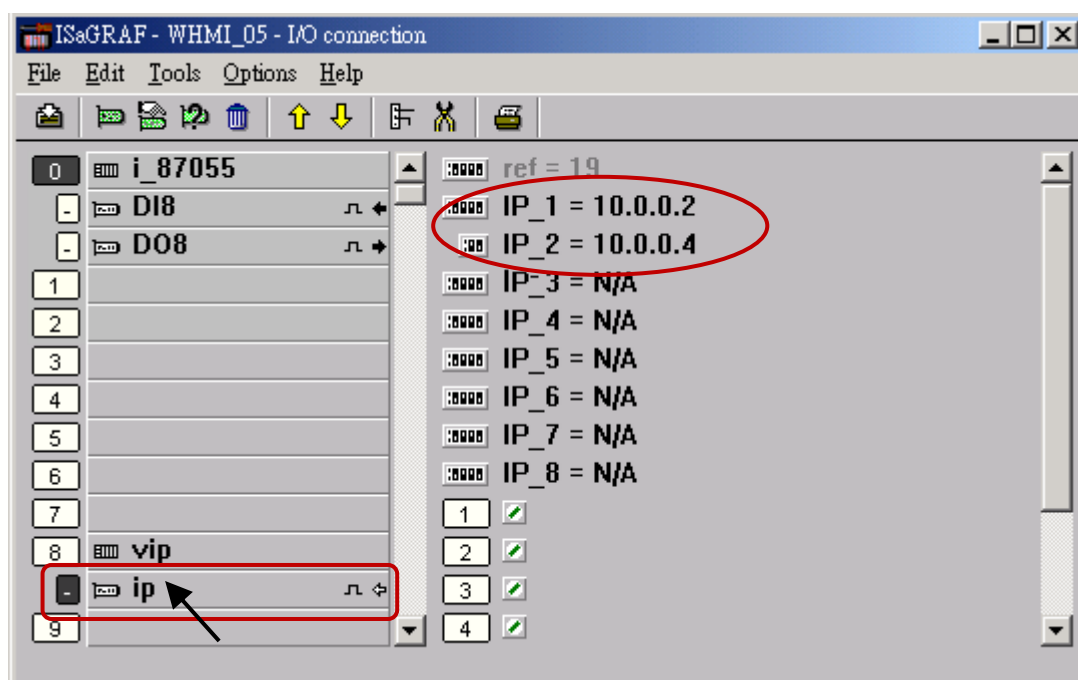
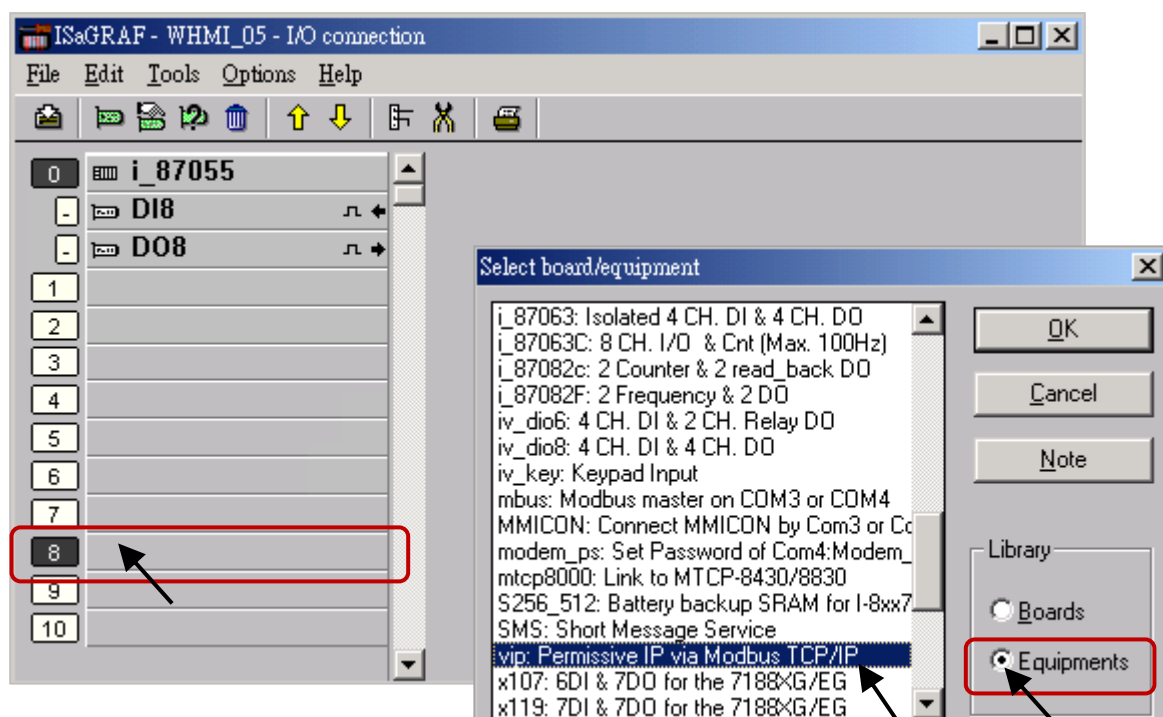


And click the Settings... button to set the proper username & password for the Web HMI.



About the method 1, user may set up to 8 IP address for ISaGRAF or other HMI to get access to the WP-8x47 via the Modbus TCP/IP protocol as below.

On the ISaGRAF IO connection window, connect “vip” and enter the IP address which can get access to the WP-8x47 via Modbus TCP/IP protocol. If “vip” is not connected, any remote IP address can get access to your WP-8x47 via Modbus TCP/IP protocol. If “vip” is connected and No IP is set (all assigned as “N/A”), No TCP device can get access to it anymore.



Please re-compile your ISaGRAF project and download it to the PAC if you have modified the IO connection.

Chapter 6 Using VB.net 2008 Program to Access ISaGRAF Variables

Important Notice:

Please store your application programs and data files in the \Micro_SD. Don't store them in the \System_disk. That is because the \System_Disk is using NOR Flash memory. Its size is small and the major purpose is for storing OS, ISaGRAF driver, some basic utilities and DLL.

The NOR Flash memory is not good for frequently updating files. If update files frequently in the \System_Disk (e.g., update a file every 1 to 5 seconds, then it will be about ten thousand more updates in one day), the data or files in the \System_disk may crush or lost for some days or months later.

This chapter lists the procedure for creating the first demo program by Visual Studio .NET 2008 development tool. There are some sample programs in the WP-8x47 demo folder.

WP-8x47 demo folder: ...\\isagraf_winpac_demo\\vb.net_2008_demo

wp_vb01: Digital I/O demo with one I-87055W in slot 0 of the WP-8x47.

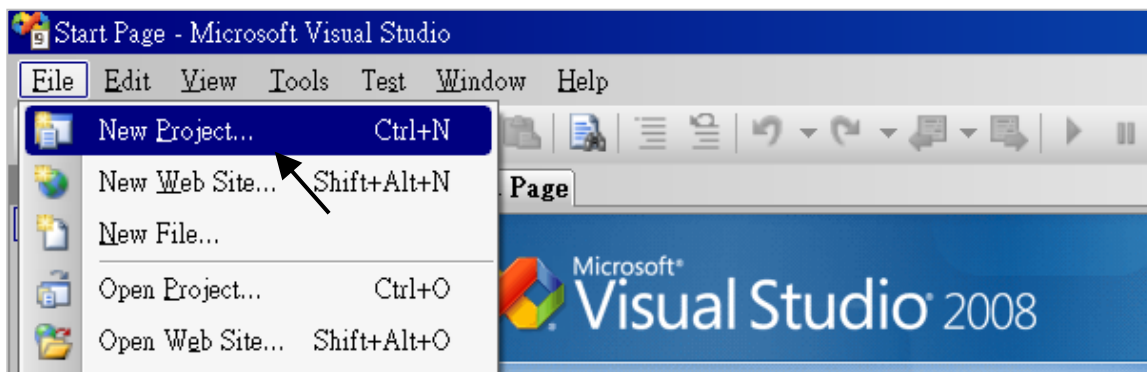
wp_vb02: Analog I/O demo with one I-87024W in slot 1, one I-8017HW in slot 2.

wp_vb03: Read/Write ISaGRAF internal integers, timers & real variables. (No I/O is needed)

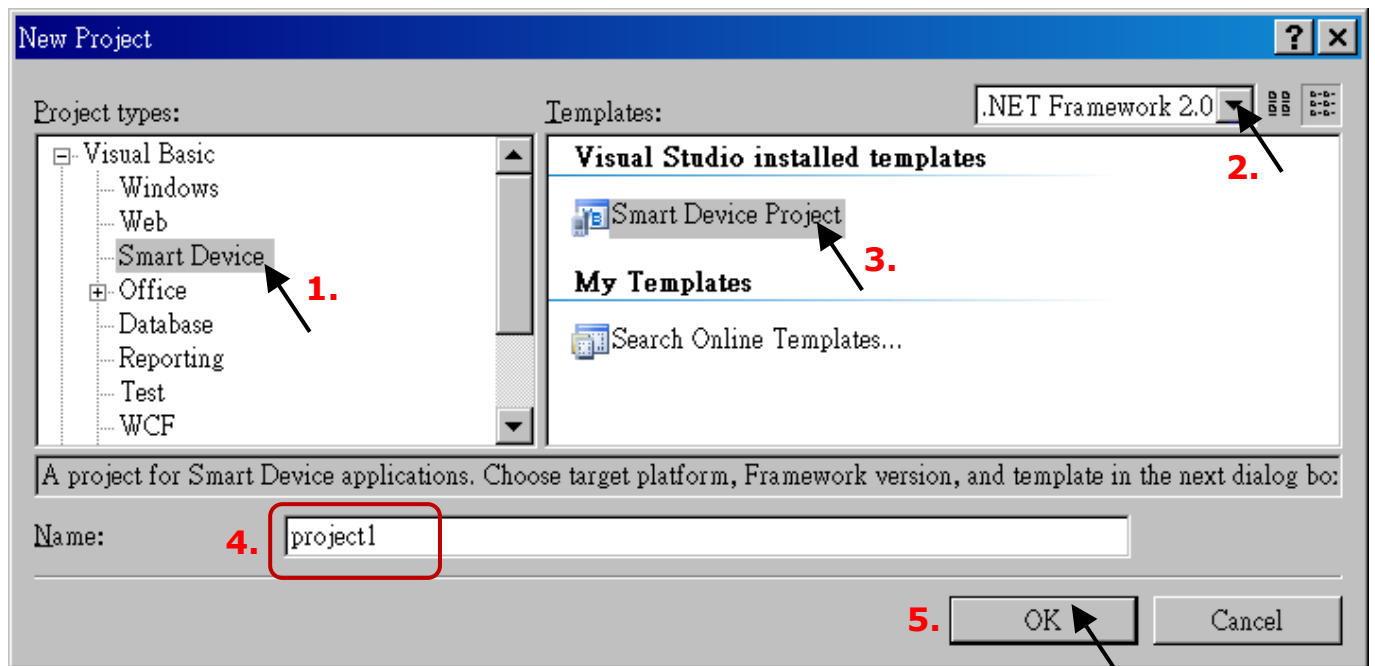
The name of ISaGRAF demo projects are "wp_vb01.pia", "wp_vb02.pia", and "wp_vb03.pia" in the same directory.

6.1 Create a New Project

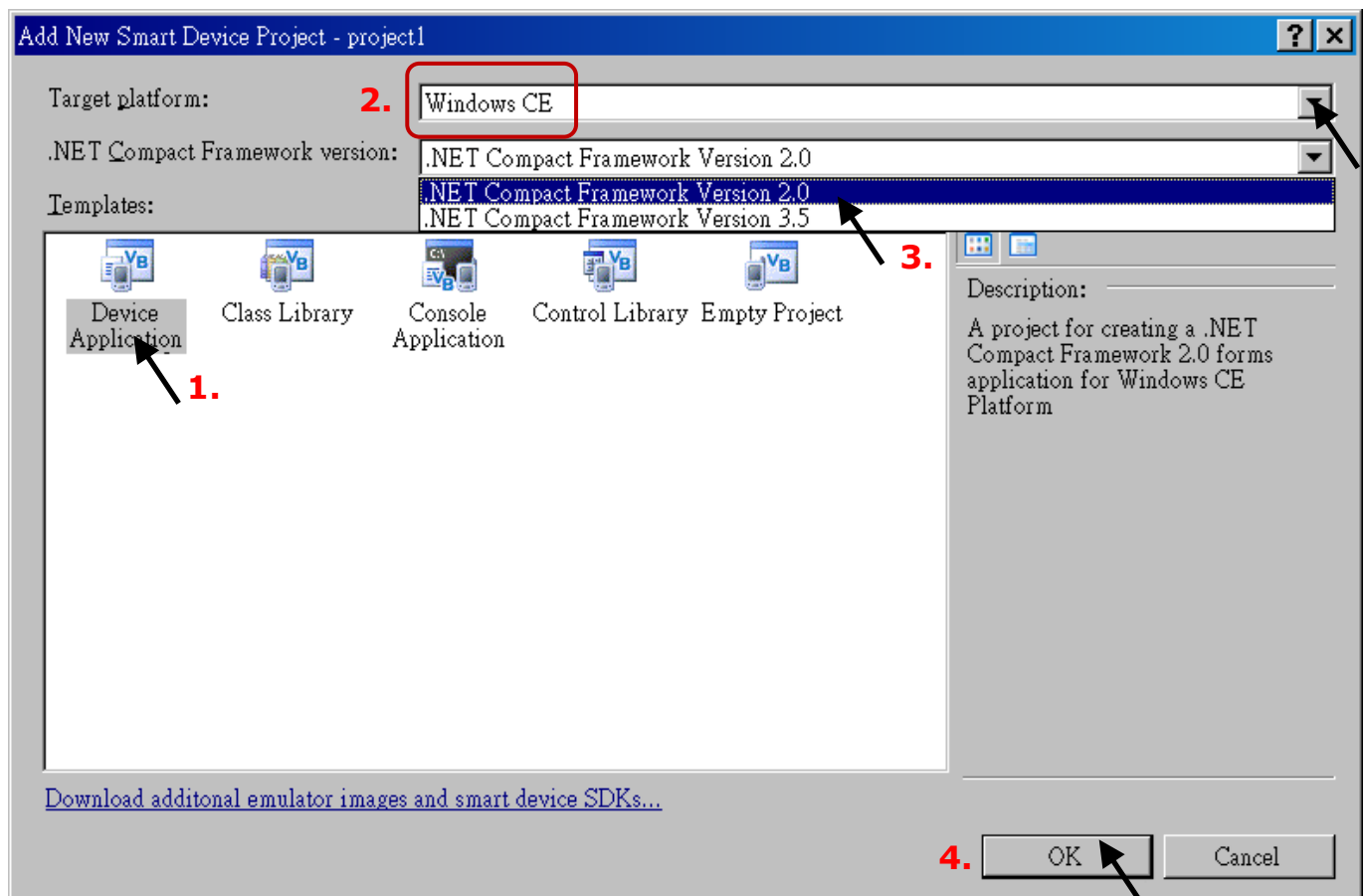
1. Open Microsoft Visual Studio .NET 2008 software and run the **"New Project"** from the **"File"** menu.



2. Check the "Smart Device" on the left, then selecting the ".NET frame work 2.0" and "Smart Device Project". Entering a proper project name and the last click on "OK".



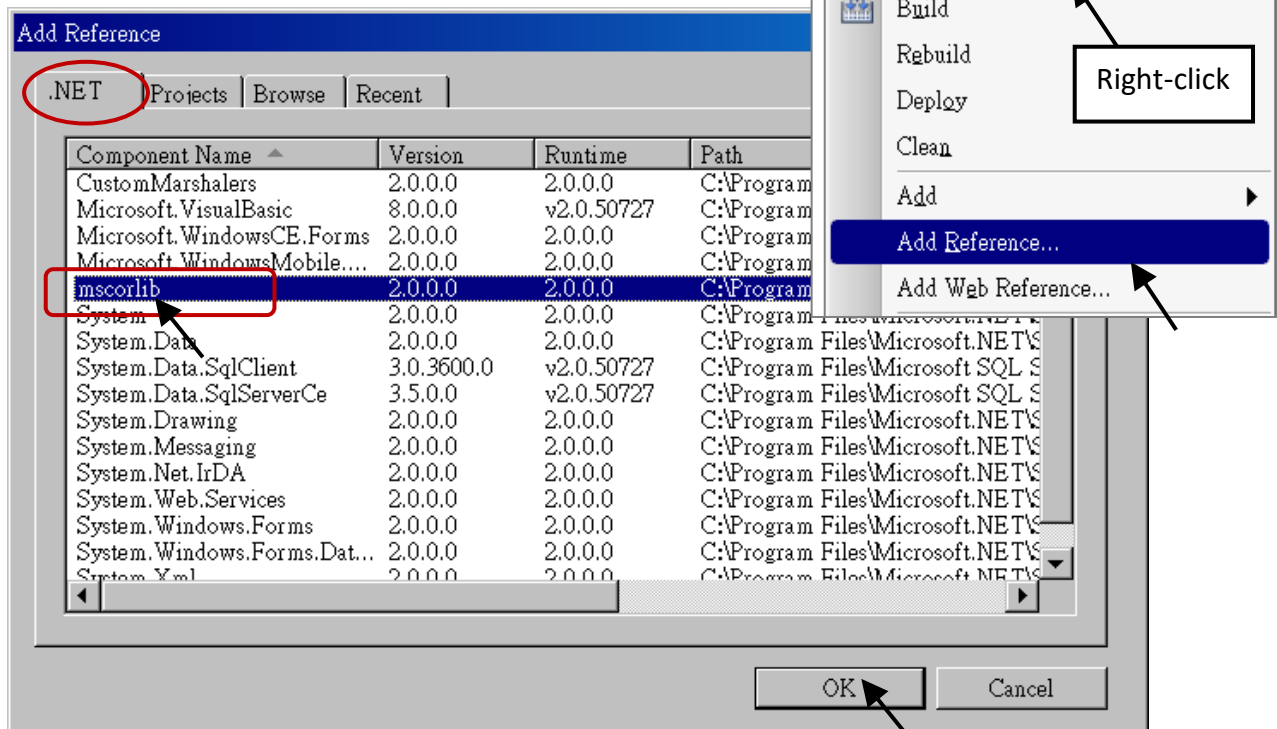
3. Select the "Device Application" and "Windows CE" and ".NET Compact Framework Version 2.0", then click on "OK".



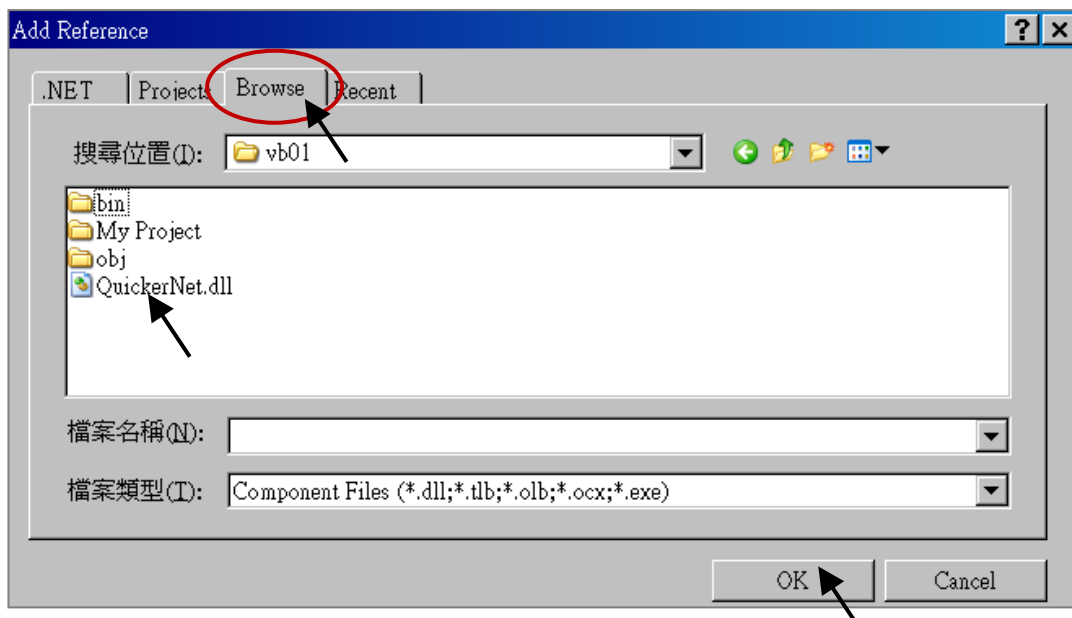
6.2 Add Project Reference for an Application

The “QuickerNet” library contains all modules’ functions. Before you use the “Quicker” keyword in the program, you must add the “QuickerNet.dll” into the reference list of your application.

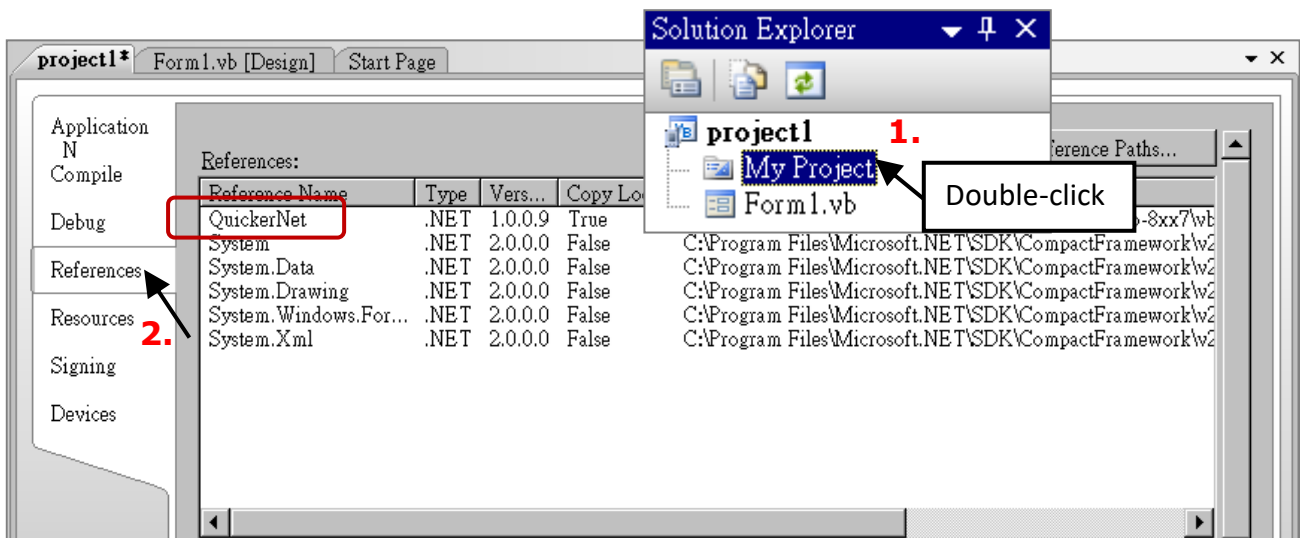
1. Right click on the Project name on the right hand side, then select “Add Reference ...”.
2. Select the “mscorlib” in the list box and click the button “OK” (the component “mscorlib” must appear in the Selected Components area)



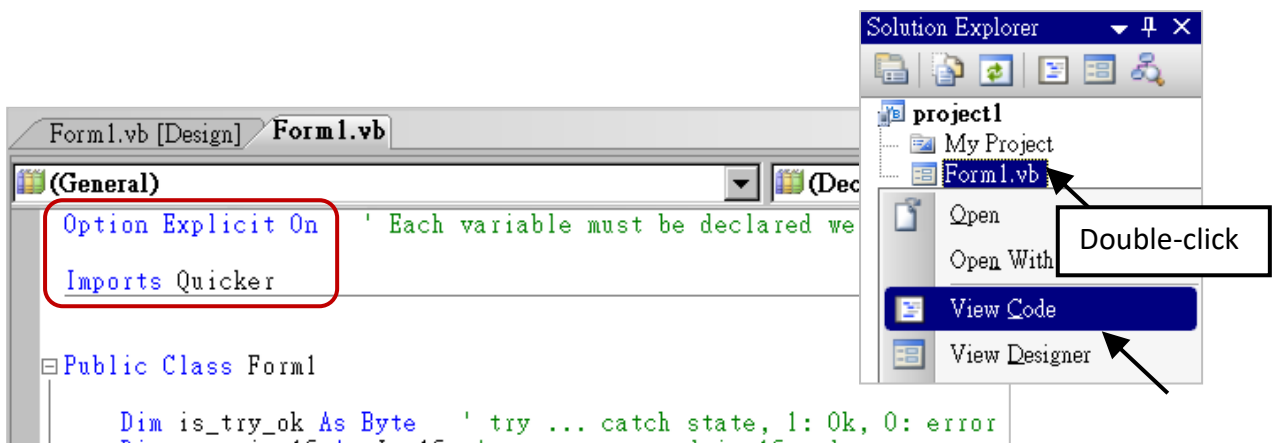
3. Click the “Browse” button. Select the “QuickerNet.dll” from **WP-8x47 demo** folder: ...\\isagraf_winpac_demo\\vb.net_2008_demo\\wp_vb01\\vb01\\ and click OK.



4. When both “mscorlib” and “QuickerNet.dll” are added, double-click on “My Project” and click “References” to check if the “QuickerNet.dll” is well added.



5. Right-click on the “Form1.vb” and select “View Code” from the pop-up. Move cursor to top and insert the “Option Explicit On” and “Imports Quicker” in the first two statements.

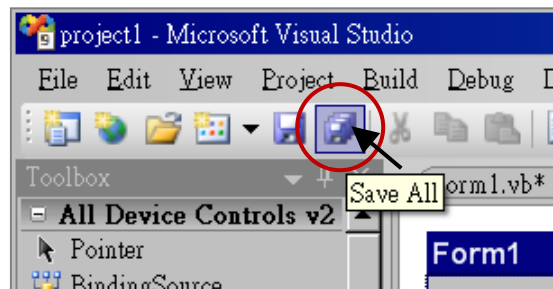


Then you can design all required objects and actions inside your VB Forms.

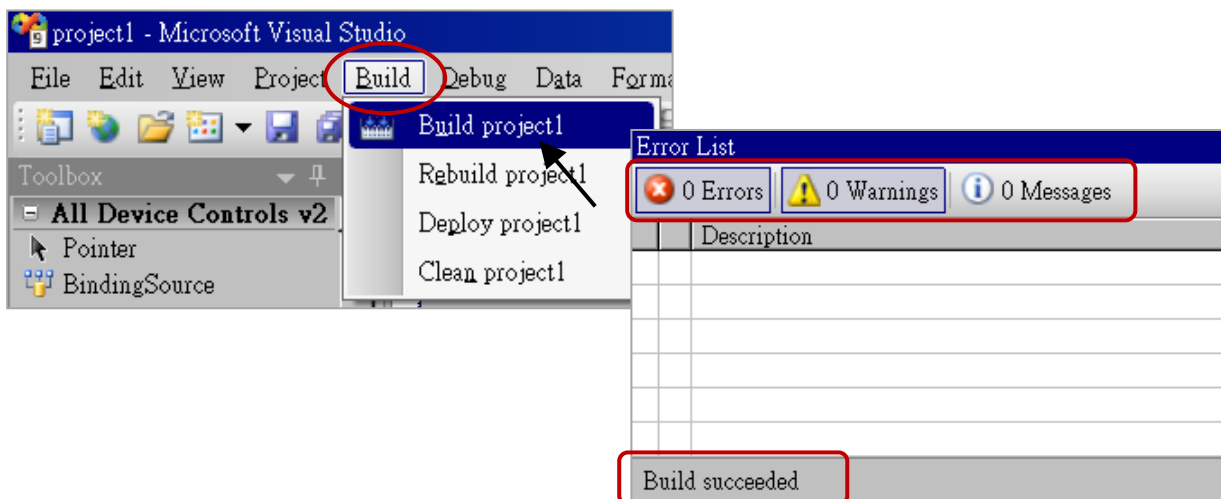
6.3 Compiling an Application Program

When you have finished writing a program, you can build an application by the following steps.

1. Remember to save at any time for safety.



2. Then compile (Build) the project. The result is listed in the "Error List" windows at the bottom.



3. You can find the execution file in
<Your VB.net Project folder> \bin\Release\ <project_name>.exe
Copy this execution file to the \System_Disk\ISaGRAF\ path in the WP-8x47 and run it.

Note:

User may copy the VB.net execution file to other path to run it but there should contain at least "QuickerNet.dll", "Quicker.dll", and "Mscorlib.dll" three DLL files with it or it cannot run correctly.

For example, the project1.exe can run in the \Micro_SD\ path if "QuickerNet.dll", "Quicker.dll" and "Mscorlib.dll" are in it. These DLL files can be copied from the path "\System_disk\ISaGRAF\" in the PAC.

6.4 QuickerNET.DLL

This section we will focus on the description of the application example of QuickerNET.DLL functions. There are some functions that can be used to R/W data from/to the ISaGRAF SoftLogic. The functions of QuickerNET.DLL can be clarified as two groups as depicted as below:

1. Digital R/W Functions
2. Analog R/W Functions

6.4.1 Digital R/W Functions

■ UserSetCoil

Description:

This function is to set the value to a Boolean variable by Modbus network address.

Syntax:

`UserShare.UserSetCoil (iUserAddress As System.UInt16, iStatus As byte)`

Parameter:

iUserAddress: Specify the Modbus Network Address of Variable (1 to 8191)

iStatus: Set the status. For instance, iStatus = 1 for True, iStatus = 0 for False

Return Value:

None

Example:

‘ Set the output variable of Modbus Network Address “1” to True.

```
UserShare.UserSetCoil(Convert.ToUInt16(1), 1)
```

Demo program:

WP-8x47 demo folder: ...\isagraf_winpac_demo\vb.net_2008_demowp_vb01

■ UserGetCoil

Description:

This function is to get the value from a boolean variable by Modbus network address.

Syntax:

UserShare.UserGetCoil (iUserAddress As System.UInt16, ByRef iStatus As byte)

Parameter:

iUserAddress: Specify the Modbus Network Address of Variable (1 to 8191)

iStatus: Get the variable status , iStatus = 1 for True, iStatus = 0 for False

Return Value:

None

Example:

‘ Get the variable status of Network Address “1”.

Dim iStatus As Byte

UserShare.UserGetCoil(Convert.ToUInt16(1), iStatus)

Demo program:

WP-8x47 demo folder: ...\\isagraf_winpac_demo\\vb.net_2008_demowp_vb01

6.4.2 Analog R/W Functions

■ **UserSetReg_short**

■ **UserSetReg_long**

■ **UserSetReg_float**

Description:

These functions are to set 16-bit short integer, 32-bit long integer & 32-bit float value to the specified Modbus network address.

Syntax:

```
UserShare.UserSetReg_Short (ByVal iUserAddress As System.UInt16, ByRef iStatus As Integer) As Byte
```

```
UserShare.UserSetReg_Long (ByVal iUserAddress As System.UInt16, ByRef iStatus As Integer) As Byte
```

```
UserShare.UserSetReg_Float (ByVal iUserAddress As System.UInt16, ByRef iStatus As Single) As Byte
```

Parameter:

iUserAddress: Specify the Network Address of Variable (1 to 8191)

iStatus: Set the short or long integer or float value.

Example:

'Set a long value "1234567" to the variable of Modbus Network Address "1".

```
UserShare.UserSetReg_long (Convert.ToUInt16(1), Convert.ToInt32(1234567))
```

'Set a short value "-1234" to the variable of Modbus Network Address "3".

```
UserShare.UserSetReg_short (Convert.ToUInt16(3), Convert.ToInt16(-1234))
```

'Set a float value "2.174" to the variable of Modbus Network Address "4".

```
UserShare.UserSetReg_float(Convert.ToUInt16(4), Convert.ToSingle(2.174))
```

Demo program:

WP-8x47 demo folder:

1. ...\\isagraf_winpac_demo\\vb.net_2008_demowp_vb02 for R/W analog I/O
2. ...\\isagraf_winpac_demo\\vb.net_2008_demowp_vb03 for R/W internal long integer, Timer and Real (floating-point) values.

Note:

In the ISaGRAF project, long integer, timer, or real variable must use 2 network address numbers.

Refer to section 4.2 of "ISaGRAF User Manual:

<http://www.icpdas.com/en/download/show.php?num=333>

Description:

These functions are to get 16-bit short integer, 32-bit long integer & 32-bit float value from the specified Modbus network address.

Syntax:

```
UserShare. UserGetReg_Short (ByVal iUserAddress As System.UInt16, ByRef iStatus As Integer) As Byte
```

```
UserShare. UserGetReg_Long (ByVal iUserAddress As System.UInt16, ByRef iStatus As Integer) As Byte
```

```
UserShare. UserGetReg_Float (ByVal iUserAddress As System.UInt16, ByRef iStatus As Single) As Byte
```

Parameter:

iUserAddress: Specify the Network Address of Variable (1 to 8191)

iStatus: Get the short or long integer or float value.

Example:

```
Dim float_val As Single
```

```
Dim short_val As Int16
```

```
Dim long_val As Int32
```

'Get float value of the variable of Modbus Network Address "7".

```
UserShare.UserGetReg_float(Convert.ToUInt16(7), float_val)
```

'Get long value of the variable of Modbus Network Address "9".

```
UserShare.UserGetReg_long(Convert.ToUInt16(9), long_val)
```

'Get short value of the variable of Modbus Network Address "11".

```
UserShare.UserGetReg_short(Convert.ToUInt16(11), short_val)
```

Demo program:

WP-8x47 demo folder:

1. ...\\isagraf_winpac_demo\\vb.net_2008_demowp_vb02 for R/W analog I/O
2. ...\\isagraf_winpac_demo\\vb.net_2008_demowp_vb03 for R/W internal long integer, Timer and Real (floating-point) values.

Note:

In the ISaGRAF project, long integer, timer, or real variable must use 2 network address numbers.

Refer to section 4.2 of "ISaGRAF User Manual:

<http://www.icpdas.com/en/download/show.php?num=333>

Chapter 7 Using EVC++ Program to Access ISaGRAF Variables

Important Notice:

Please store your application programs and data files in the \Micro_SD. Don't store them in the \System_disk. That is because the \System_Disk is using NOR Flash memory. Its size is small and the major purpose is for storing OS, ISaGRAF driver, some basic utilities and DLL.

The NOR Flash memory is not good for frequently updating files. If update files frequently in the \System_Disk (e.g., update a file every 1 to 5 seconds, then it will be about ten thousand more updates in one day), the data or files in the \System_disk may crush or lost for some days or months later.

The user can write his EVC++ 4.0 application to access to the ISaGRAF variables running at the same WP-8x47 by using the below functions for Read/Write boolean, word, long and float value.

The “Head file” and “library” at design time are “WinConAgent.h” and “Quicker.lib” that can be found in the WP-8x47 demo folder (...\\isagraf_winpac_demo\\evc++_lib\\) on PC.

The DLL at run time is the “Quicker.dll” which is in WP-8x47 's \System_Disk\\isagraf\\.
(Please copy the execution file after successfully compilation to the WinPAC 's \System_Disk\\isagraf\\ and then run it.)

Set Boolean value:

```
unsigned char UserSetCoil(unsigned short iUserAddress, unsigned char iStatus);
```

iUserAddress: 1 to 8191 (Variable's network address in ISaGRAF project)

iStatus: 0: set boolean to False, 1: set boolean to True

for example: UserSetCoil(100 , 1) // set boolean at network addr 100 as True

Set word or float or long value:

```
unsigned char UserSetReg(unsigned short iUserAddress, long *iStatus, unsigned char iDType);
```

iUserAddress: 1 to 8191 (Variable's network address in ISaGRAF project)

iStatus: A pointer to a long type, which stores the data to set

iDType 0: type is word

1: data type is float

2: data type is long (use long for Timer value in ISaGRAF, unit: ms)

for example:

```
float float_val;
```

```
long word_val, long_val;
```

```
long *temp_val;
```

```
//set word_val (-32768 to +32767) to ISaGRAF variable with network address 1
```

```
word_val = -20000 ;
```

```
temp_val = (long *)(&word_val);
```

```
UserSetReg(1 , temp_val, 0);
```

```
// set float_val to ISaGRAF variable with network address 2
```

```
float_val = 1.2345 ;
```

```
temp_val = (long *)(&float_val);
```

```
UserSetReg(2 , temp_val, 1);
```

```
// set long_val to ISaGRAF variable with network address 4
```

```
long_val = 12345678 ;
```

```
temp_val = (long *)(&long_val);
```

```
UserSetReg(4 , temp_val, 2);
```


Get Boolean value:

```
unsigned char UserGetCoil(unsigned short iUserAddress, unsigned char *iStatus);
```

iUserAddress: 1 to 8191 (Variable's network address in ISaGRAF project)

iStatus: 0: boolean is False, 1: boolean is True

for example:

```
unsigned char bVal;  
UserGetCoil(5 , &bVal) // get boolean value at network addr 5
```

Get word or float or long value:

```
unsigned char UserGetReg(unsigned short iUserAddress, long *iStatus, unsigned char iDType);
```

iUserAddress: 1 to 8191 (Variable's network address in ISaGRAF project)

iStatus: A pointer to a long type, which stores the data returned

iDType 0: type is word

1: data type is float

2: data type is long (use long for Timer value in ISaGRAF, unit: ms)

for example:

```
float float_val;  
long word_val, long_val;  
long ret_val;  
  
//get word_val (-32768 to +32767) of ISaGRAF variable with network address 10  
UserGetReg(10, &ret_val, 0);  
if ( ret_val>=0 && ret_val<=32767 ) word_val = ret_val;  
else word_val = ret_val | 0xFFFF0000;  
  
// get float of ISaGRAF variable with network address 11  
UserGetReg(11, &ret_val, 1) ;  
float_val = *(float *) (&ret_val) ;  
  
// get long of ISaGRAF variable with network address 13  
UserGetReg(13, &ret_val, 2) ;  
long_val = ret_val ;
```

Note:

In the ISaGRAF project, long integer, timer, or real variable must use 2 network address numbers.

Refer to section 4.2 of "ISaGRAF User Manual:

<http://www.icpdas.com/en/download/show.php?num=333>

Chapter 8 Using InduSoft Project to Access ISaGRAF Variables

Note:

If the HMI program behavior is not so smooth or slow, refer to Appendix F.

The WinPAC-8xx7/WP-8x47 is the abbreviation of the WinPAC-8147/8447/8847/8137/8437/8837.

The WinPAC-8xx6/WP-8xx6 is the abbreviation of the WinPAC-8146/8446/8846/8136/8436/8836.

Important Notice:

1. Only set a **fixed IP** address to the WP-8x47/8xx6. (No DHCP)
2. Recommend to use NS-205/208 or RS-405/408(Ring Switch) Industrial Ethernet Switch for WinPAC.
3. For more information, refer to the ISaGRAF User Manual on the website:
<http://www.icpdas.com/en/download/show.php?num=333>
4. WinPAC-8xx6 supports InduSoft and ISaGRAF logic running in the same PAC.

A simple example to run InduSoft & ISaGRAF logic in the same PAC:

Step 1: Create a new ISaGRAF project as below.

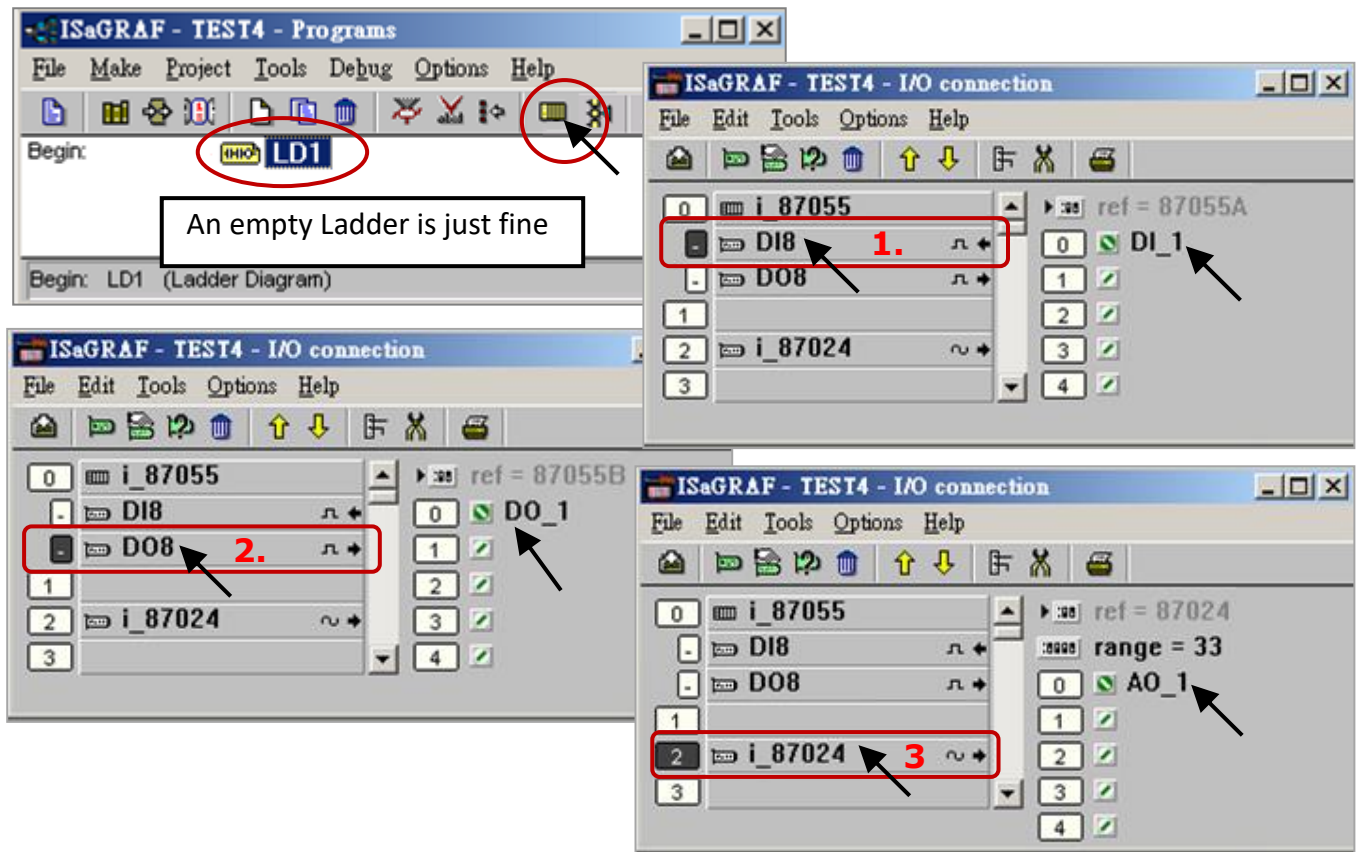
This demo uses a DI/O module I-87055W in slot 0 of WinPAC-8xx6, and an AO module I-87024W in slot 2 and one internal variable defined as follow.

ISaGRAF Variable Definition:

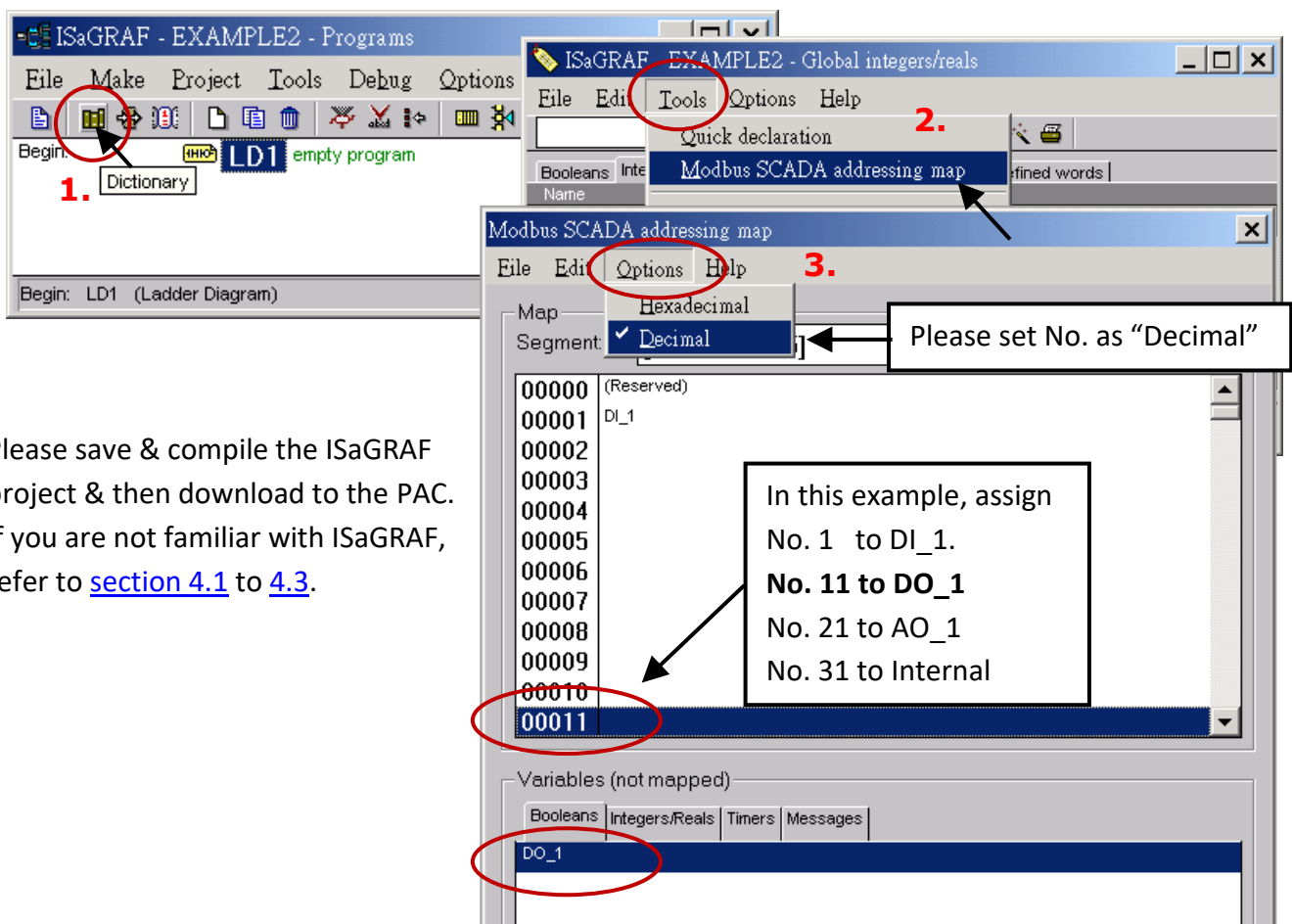
Variable Type	Name	Network Address	Comment	Attributes
Boolean	DI_1	1	87055W DI channel 1	Input
Boolean	DO_1	11	87055W DO channel 1	Output
Integers	AO_1	21	87024W AO channel 1	Output
Integers	Internal	31	Internal variable	Internal

If you are not familiar with ISaGRAF, refer to [section 4.1](#) to [4.3](#).

I/O Connection Setting:



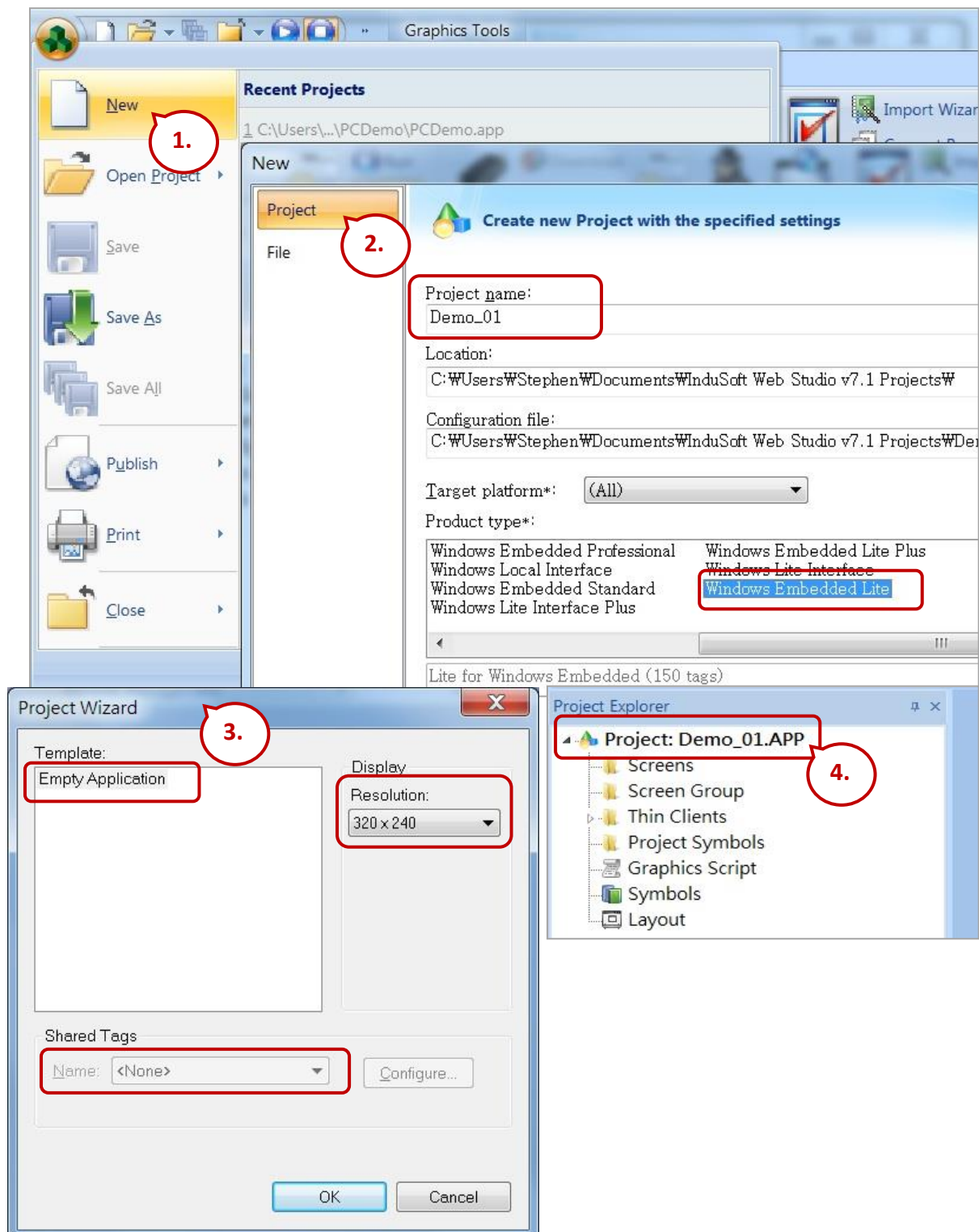
The ISaGRAF variables to be exchanged with InduSoft must be declared with a Modbus “Network Address” as below.



Please save & compile the ISaGRAF project & then download to the PAC. If you are not familiar with ISaGRAF, refer to [section 4.1](#) to [4.3](#).

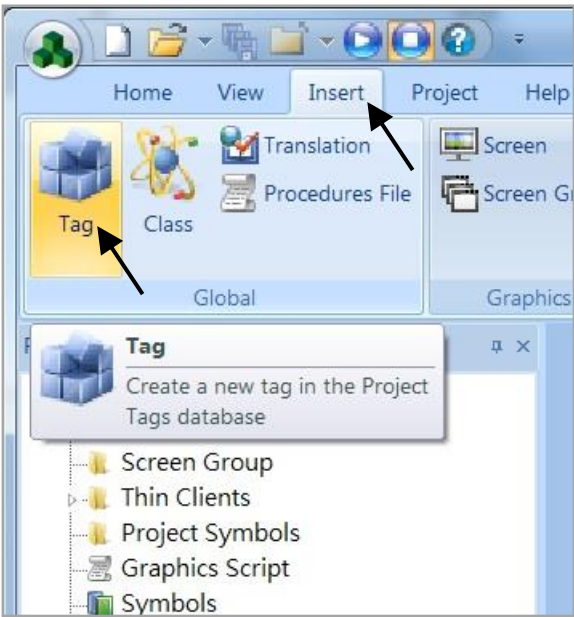
Step 2: Create an InduSoft project.

1. Select [File] > [New] from the “InduSoft Web Studio” main menu.
2. Click on “Project” tab in the “New” window. Then type in the name for the new user’s project in the “Project name” and select “Windows Embedded Lite” in the “Product type”. Press “OK”.
3. The “Project Wizard” window will appear. Select “Empty Application” on the “Template”, “320 x 240” on the “Resolution” and “None” on the “Shared Tags”.
4. Then, the new project will show on the “Project Explorer” window as the figure.



Define application tags

Select [Insert] > [Tag] on the main menu bar.



The “New Tag” window will show as below.

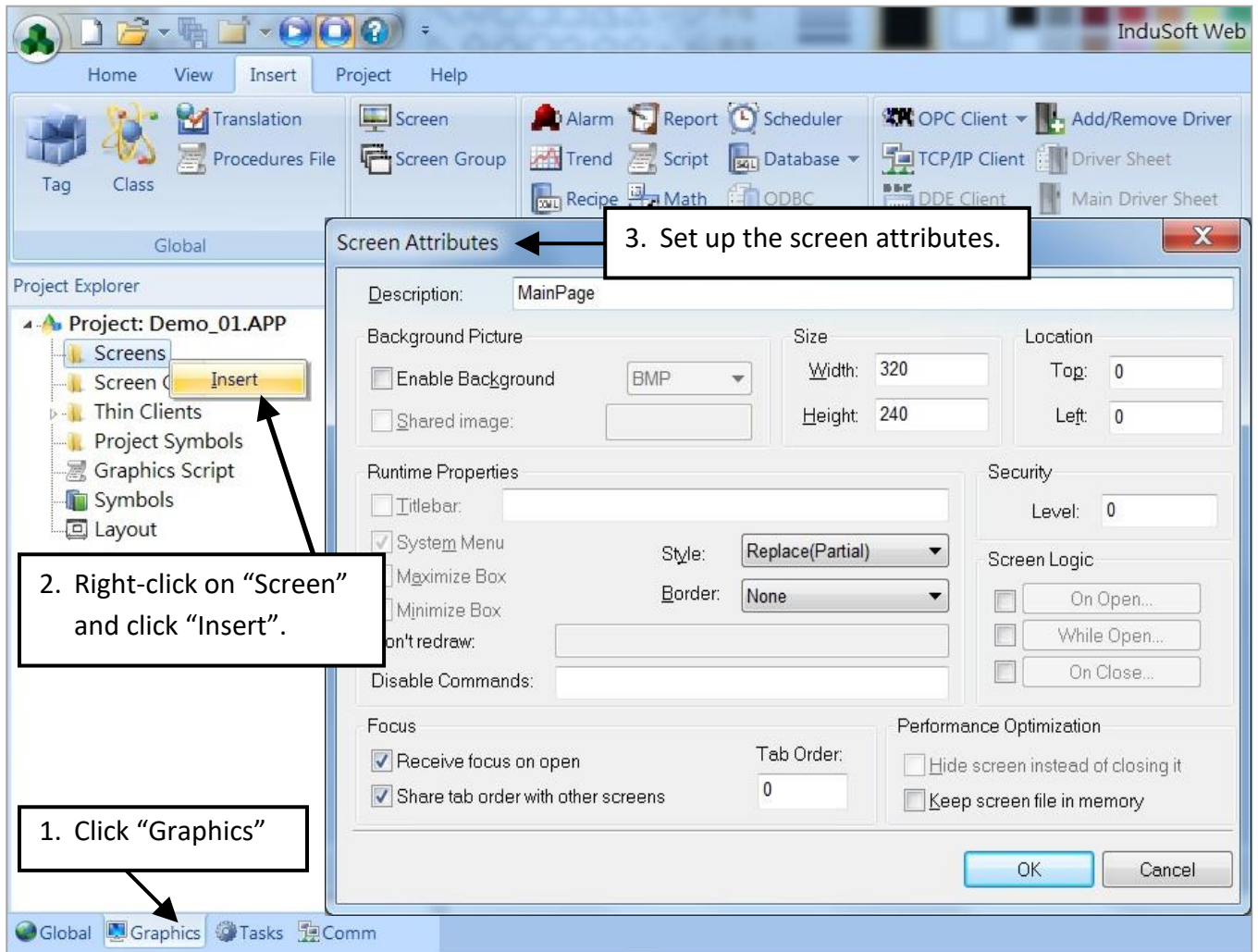


This demo uses a DI/DO module I-87055W, an AO module I-87024W and one internal variable defined as follow. Please create these tags one by one.

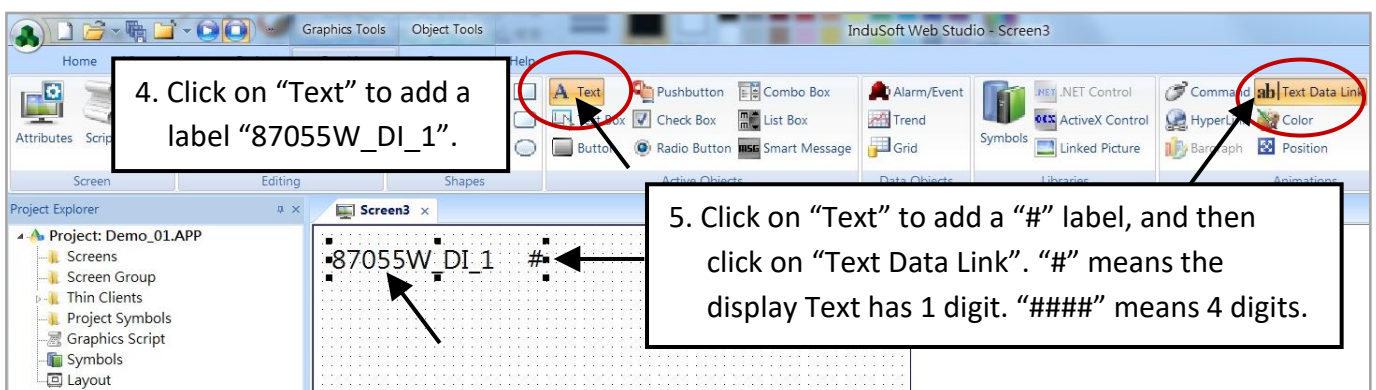
Project Tags x					
	Name	Array	Type	Description	Scope
1	DI	0	Boolean	87055W DI Channel 1	Server
2	DO	0	Boolean	87055W DO Channel 1	Server
3	AO	0	Integer	87024W AO Channel 1	Server
4	Internal	0	Integer	Internal Tag	Server
*			Integer		Server
*			Integer		Server

Create main screen

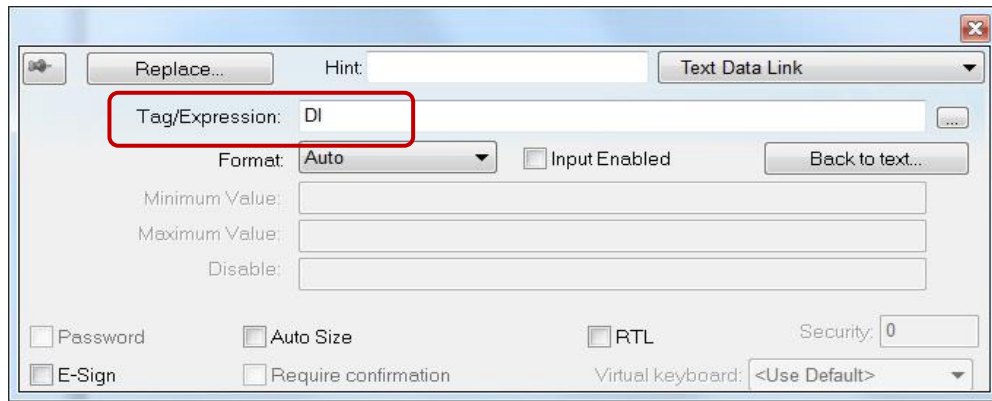
1. Select the “Graphics” tab in the “Project Explorer” window.
2. Click mouse right button in the file folder of “Screen” then the “Screen Attributes” window appears.
3. Set up the screen attributes such as “Size”, “Location”, “Runtime Properties” and “Background Picture” then press “OK” to edit screen.



4. Select “Text” icon, then click on the main screen where want to establish a text and type “87055W_DI_1”.
5. Select “Text” icon again following the previous text and type “#” then select “Text Data Link”. (# means 1 digit, ##### means 4 digits, ##### means 6 digits.)

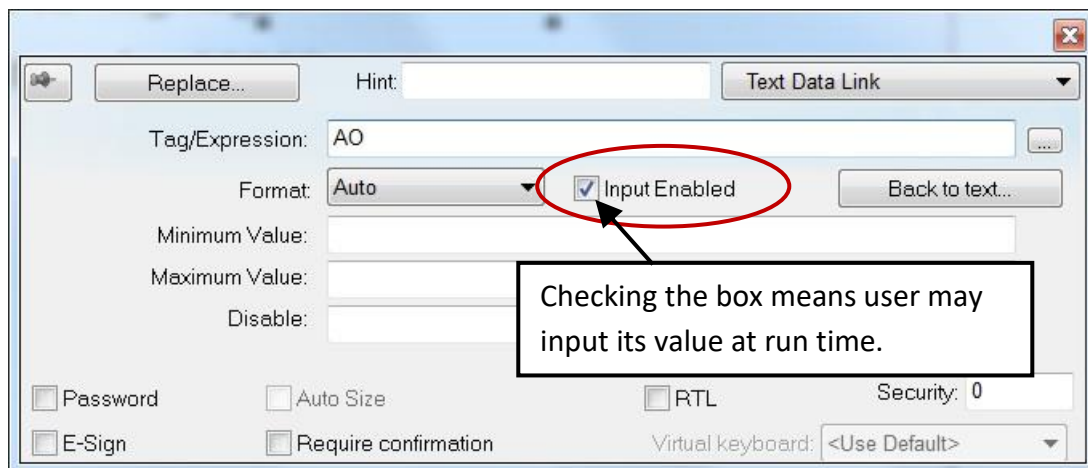


6. Double click the “#” object and then type DI in the “Tag/Expression”.

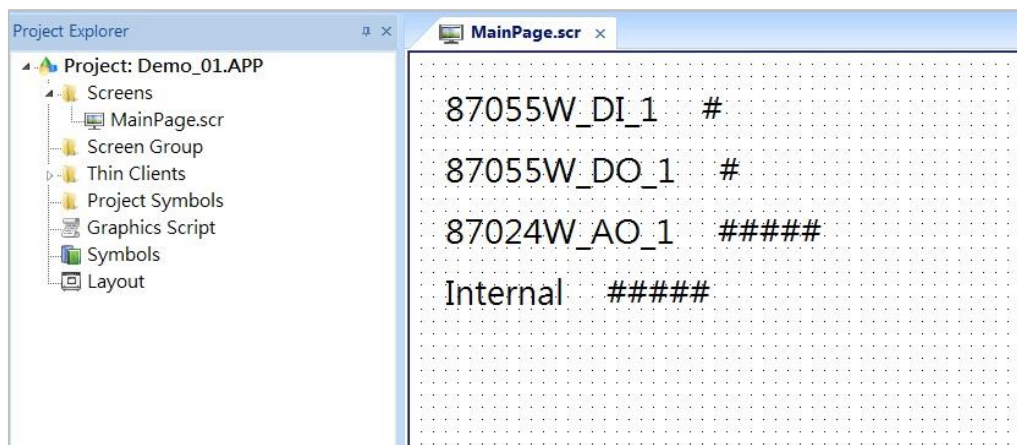


Repeat former method to create other objects and click “Save” icon on the main menu to save this main screen page as “MainPage.scr”. (Select [File] > [Save As HTML] to create this screen that can be visualized in a remote station using a regular web browser.)

Note: For the Output object, as 87024W_AO_1 and 87055W_DO_1, the “Input Enabled” of the “Text Data Link” should be checked as below.

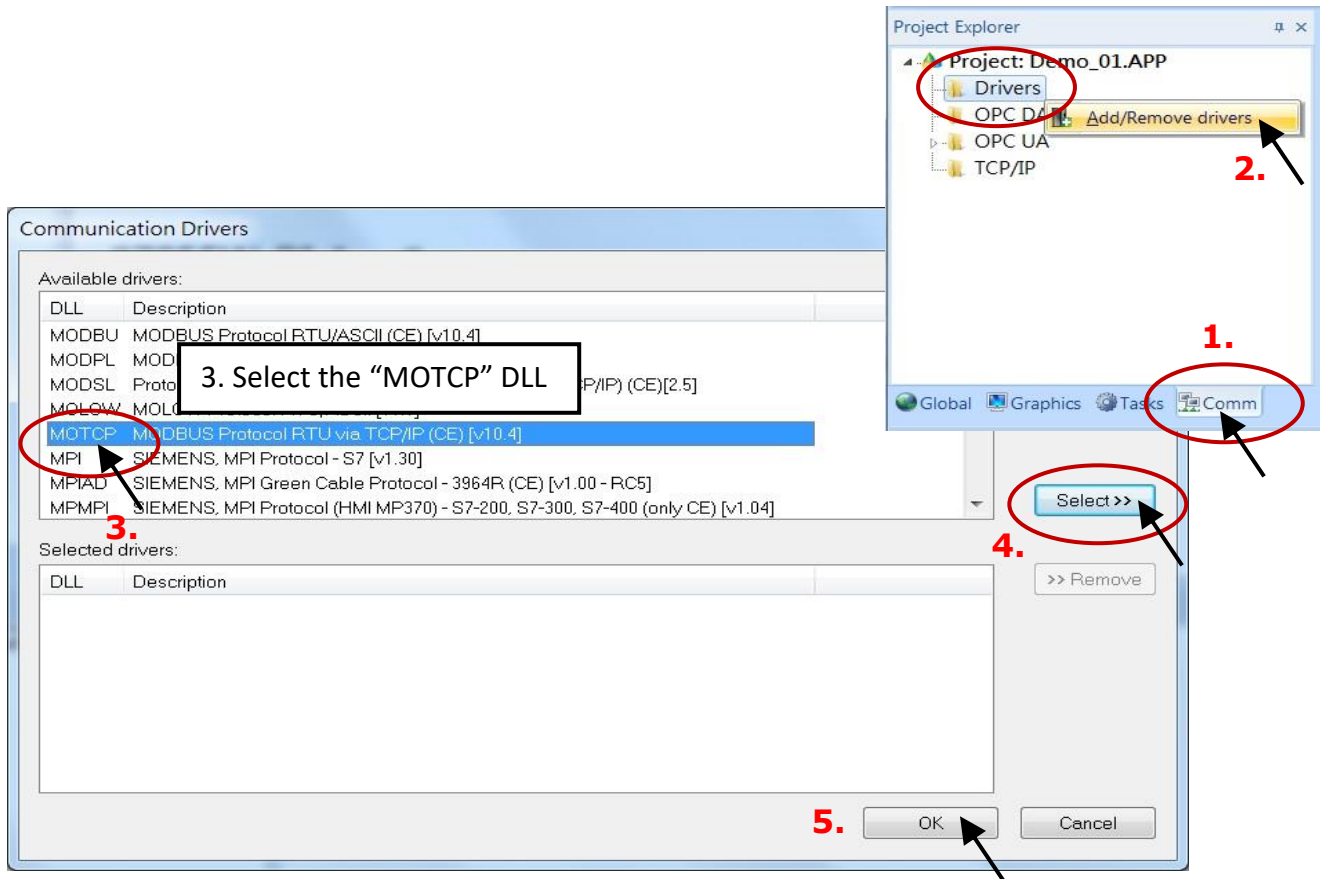


The main screen is created as below.

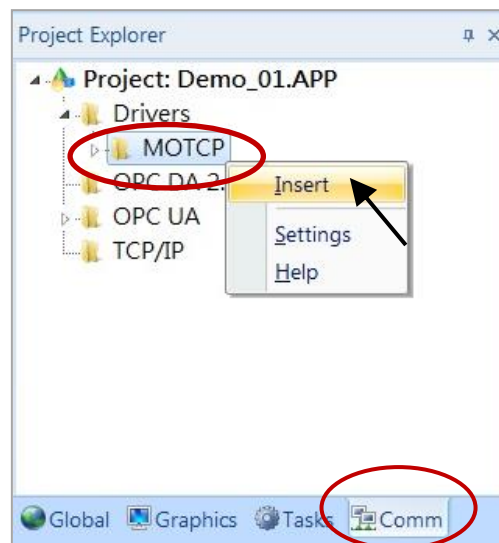


Create Modbus TCP workspace

1. Click “Comm” tab in the “Project Explorer”.
2. Click right mouse button on the folder “Drivers”, and select “Add/Remove drivers”.
3. In the “Communication Drivers” window, click “MOTCP” driver then click “Select” and click “OK” to close this window.



Expanding file folder of “Drivers” and it will show a file folder named “MOTCP”. Right-click on “MOTCP” and select “Insert” to add a workspace of Modbus TCP.



When a **Modbus TCP** workspace “MOTCP001.DRV” appears, fill in following data as corresponding field.

Description: DI ☐ Increase priority

Read Trigger: Enable Read when Idle 1

Write Trigger: Enable Write on Tag Cl

Station: **127.0.0.1:502:1** Header: **1X:0** Min: Max:

	Tag Name	Address	Div	Add
1	DI	1		

What does “127.0.0.1:502:1” mean?
 “127.0.0.1” is the local host IP address which means data is sent to the same PAC. “502” is the Modbus TCP/IP port No., the last “1” is the Net-ID of the PAC.

1X: 0 is for reading “Boolean” data
 0X: 0 is for writing “Boolean” data
 3X: 0 is for reading short “integer” data (16-bit integer, Word: -32768 to +32767)
 4X: 0 is for writing short “integer” data (16-bit integer, Word: -32768 to +32767)
 DW: 0 is for reading & writing long “integer” (32-bit integer, Double Word)
 FP: 0 is for reading & writing floating point data (32-bit REAL)

Data Type	Sample Syntax	Comments
0X	0X:1	Coil Status: Read and write events using Modbus instructions 01, 05, and 15
1X	1X:5	Input Status: Read events using Modbus instructions 02
3X	3X:4	Input Register: Read events using Modbus instruction 04
4X	4X:5	Holding Register: Read and write events using Modbus instructions 03, 06, 16
FP	FP:1	Floating-point value (Holding Register): Read and write float-point values using two consecutive Holding Registers.
DW	DW:2	32-bit Integer value (Holding Register): Read and write 32-bit integer values using two consecutive Holding Registers.
Valid Range of Initial Address per Worksheet: Varies according to the equipment		

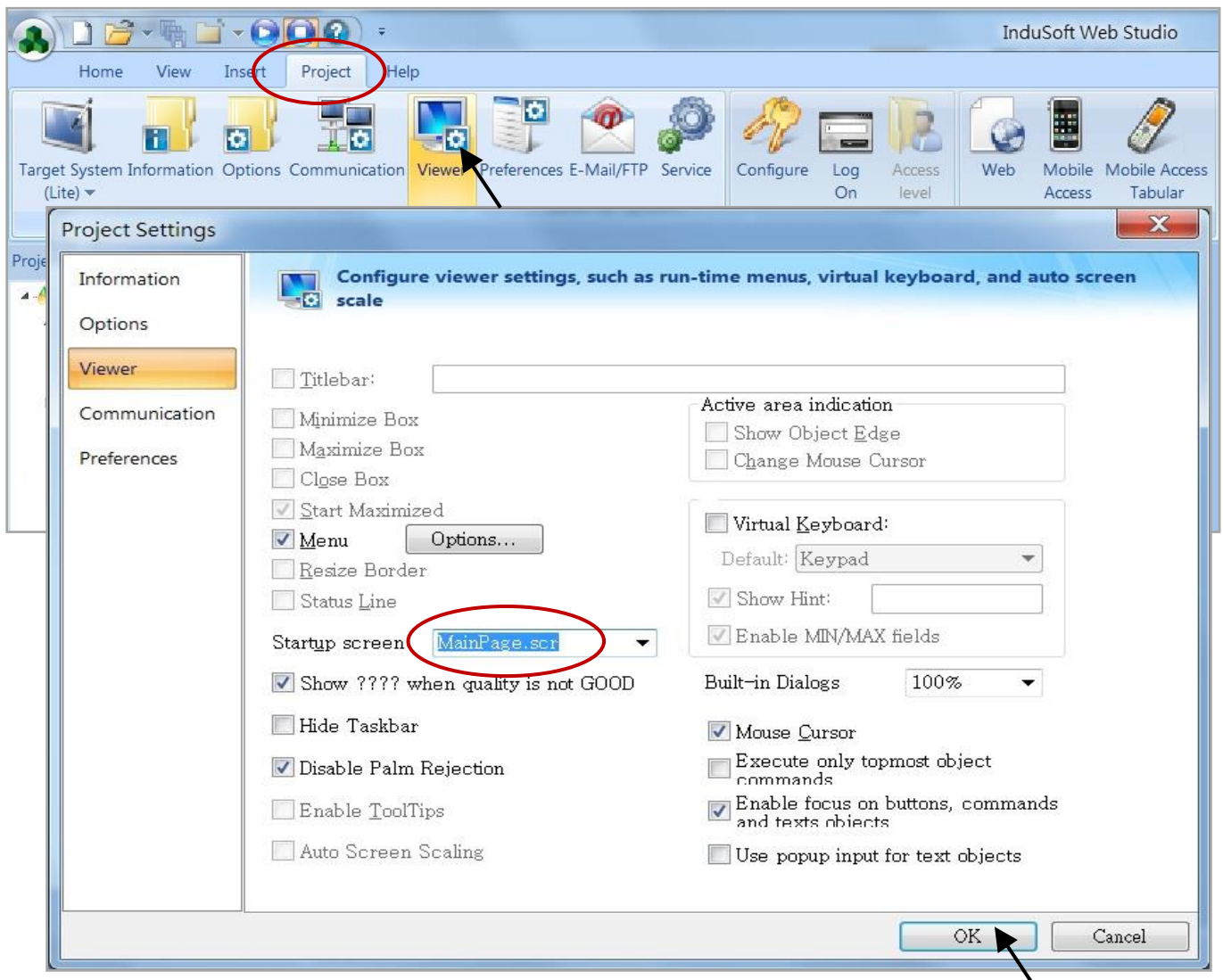
Please add the following 4 Modbus TCP workspace:

DRV Name	MOTCP001.DRV	MOTCP002.DRV	MOTCP003.DRV	MOTCP004.DRV
Description	DI	DO	AO	Internal
Station	127.0.0.1:502:1			
Header	1X:0	0X:0	4X:0	3X:0
Tag Name	DI	DO	AO	Interior
Enable Read when Idle	1			1
Enable Write on Tag Change		1	1	
Address	1	11	21	31

When finished all setting, press “Ctrl + F4” to close all inside windows and save all files.

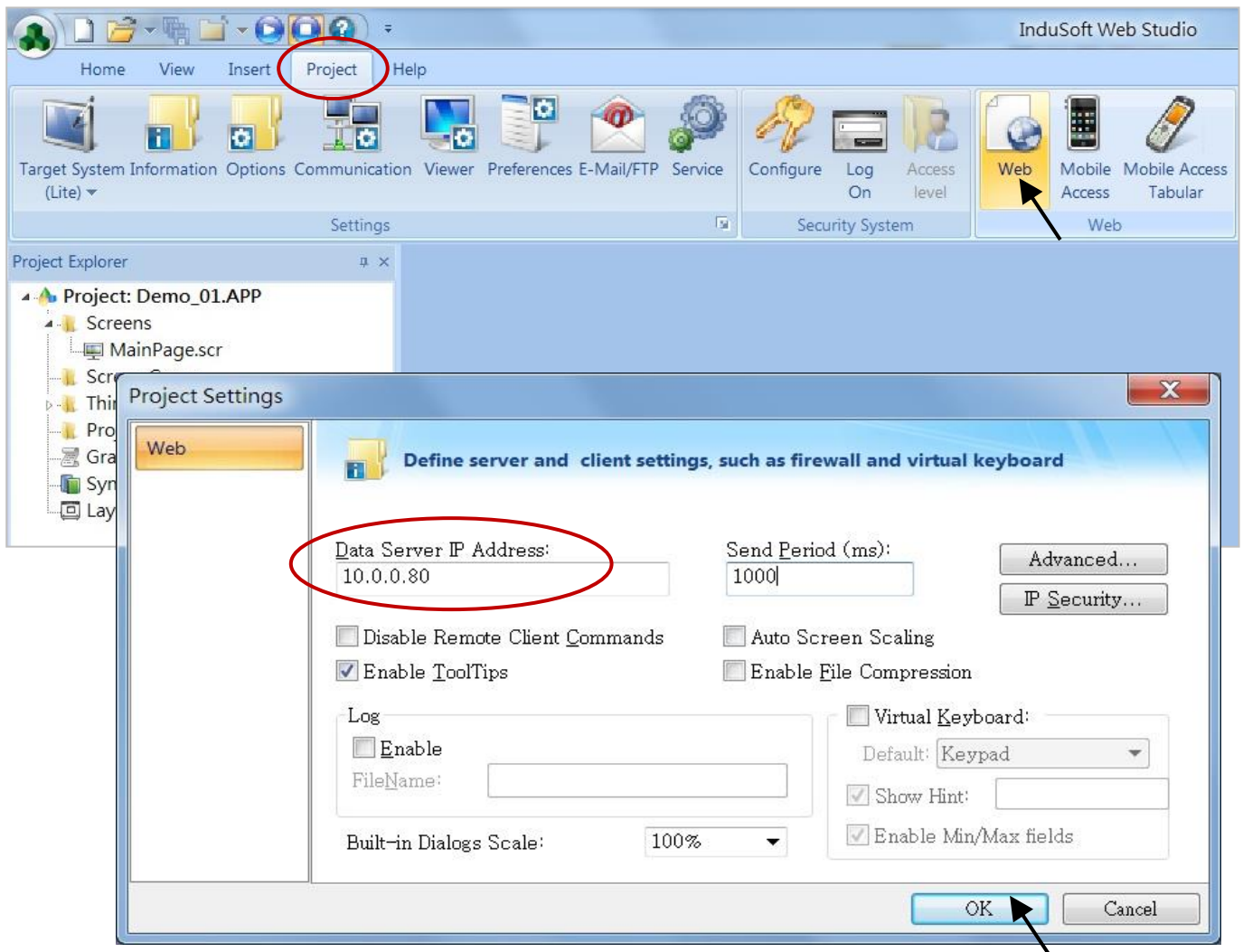
Project Setting

Select “Project -> Settings” to open “Project Settings” window. In the “Startup screen” edit box, fill in “MainPage.scr” then click “OK” to close this window.



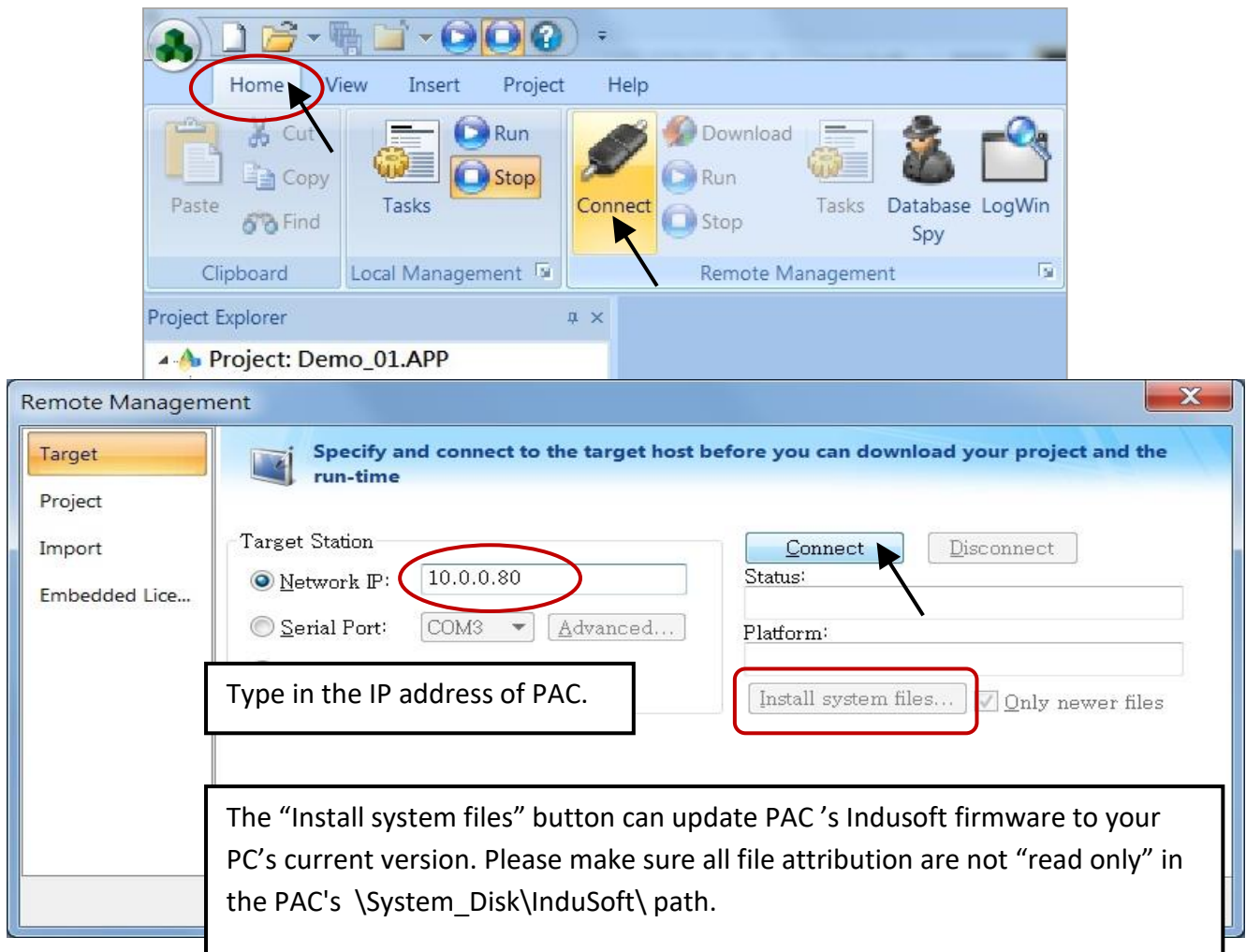
Web Thin Clients

Select “Project -> Settings” to open “Project Settings” window. In the “Data Server IP Address”, type in the correct IP address of your PAC and click “OK”.

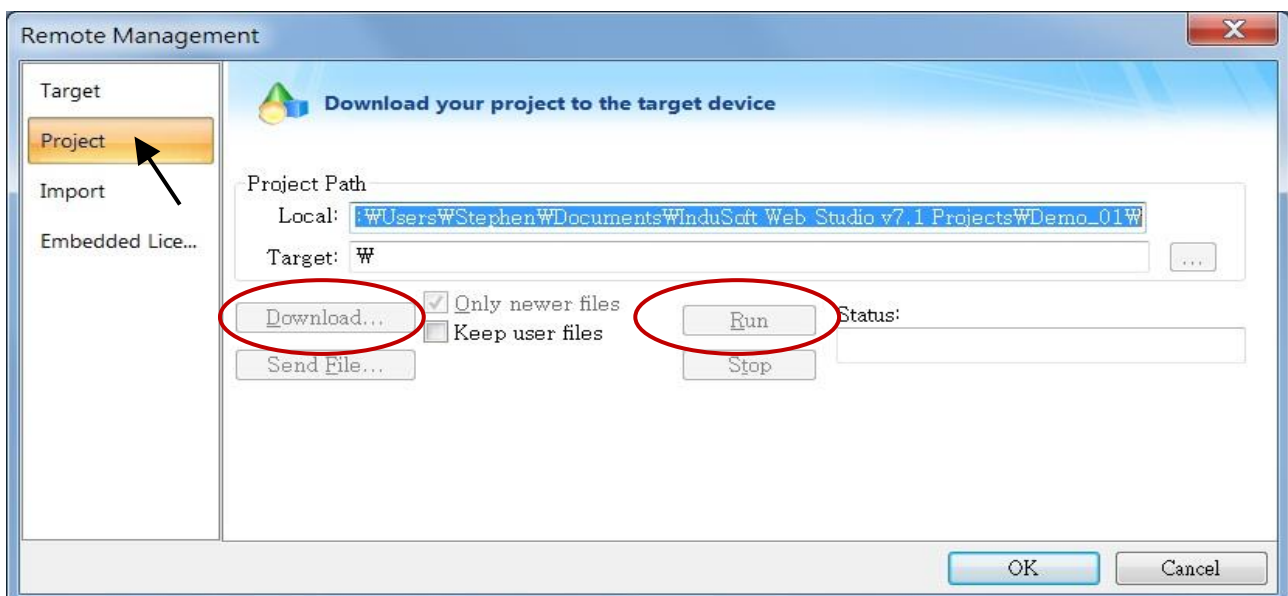


Download and run the project

Select [Home] > [Connect] to open “Remote Management” window. In the “Network IP” of “Target Station”, type in the correct IP address of your PAC and click “Connect”.



If connection is fine, click on the tab of “Project” then click “Download”. When download finished, click “RUN” to start the project.



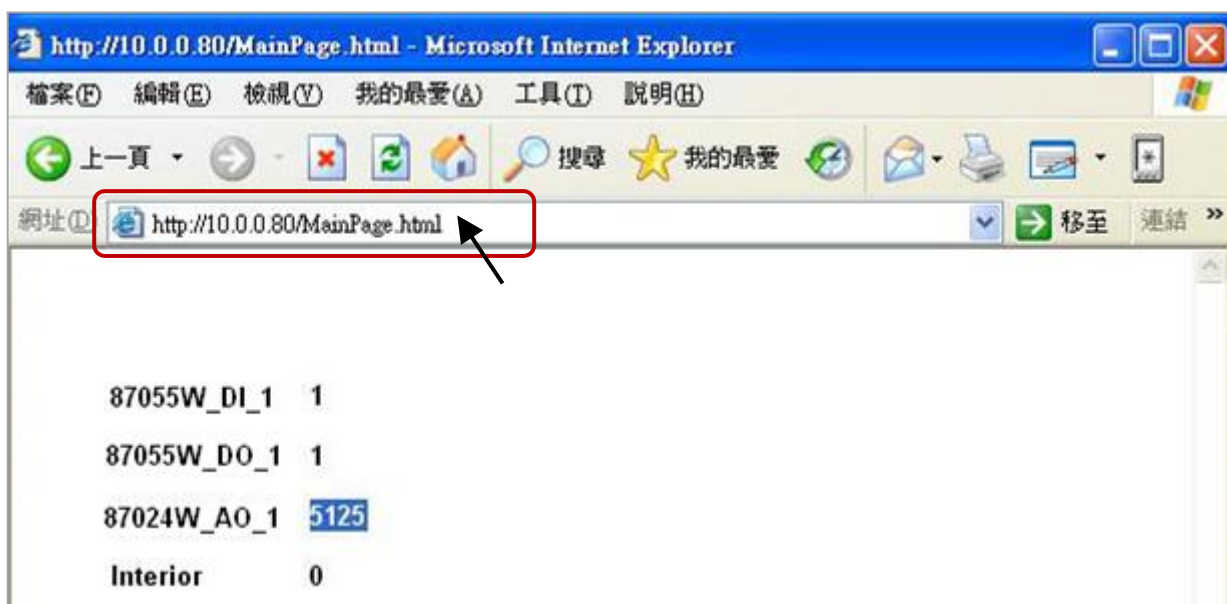
Configuration Web directory of WinPAC

Run WinPAC Utility and change Web directory to “\System_Disk\InduSoft\Demo_01\Web”. Click “Change” and “Save and Reboot” to finish this configuration.



Visualize your project in a remote station

Run Internet Explorer and type the IP address of the WinPAC, e.g., “<http://10.0.0.80/MainPage.html>”.



Chapter 9 Demo Program & FAQ

The WinPAC-8xx7/WP-8x47 is the abbreviation of the WP-8147/8447/8847.

For more information, refer to the ISaGRAF User Manual on the website:

<http://www.icpdas.com/en/download/show.php?num=333>

Demo Programs: (isagraf_winpac_demo.zip)

<http://www.icpdas.com/en/download/show.php?num=1005>

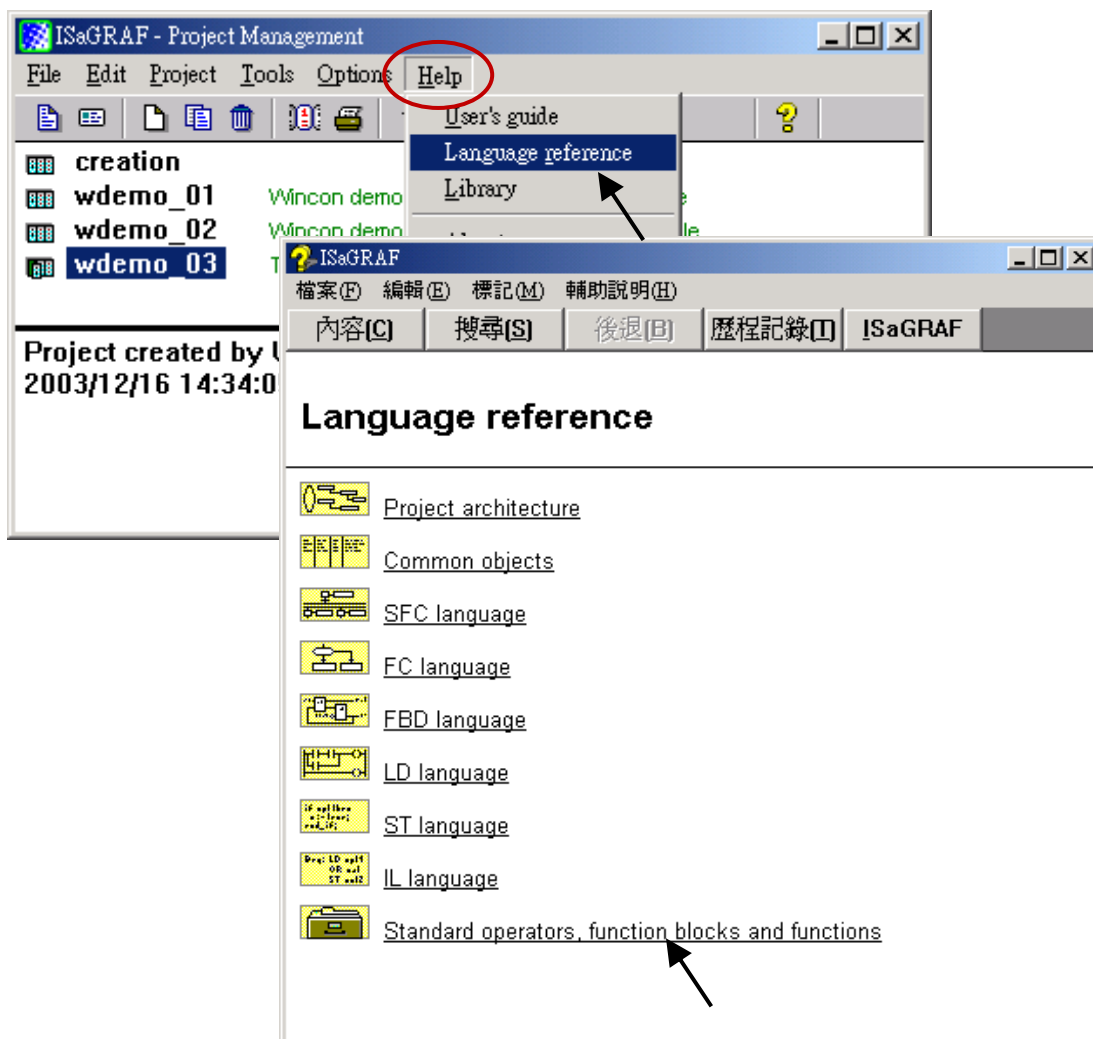
FAQ:

<https://www.icpdas.com/en/faq/index.php?kind=280#751>

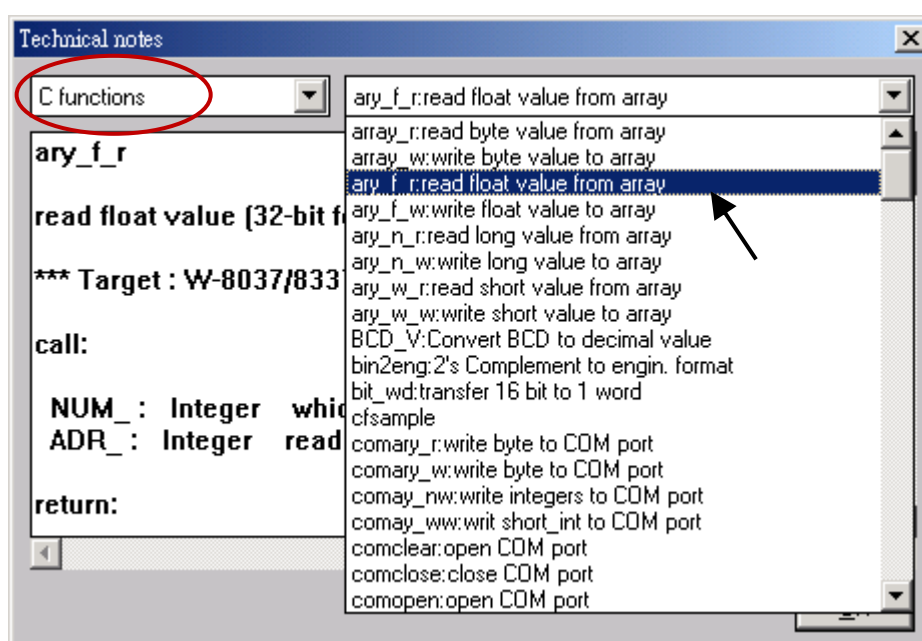
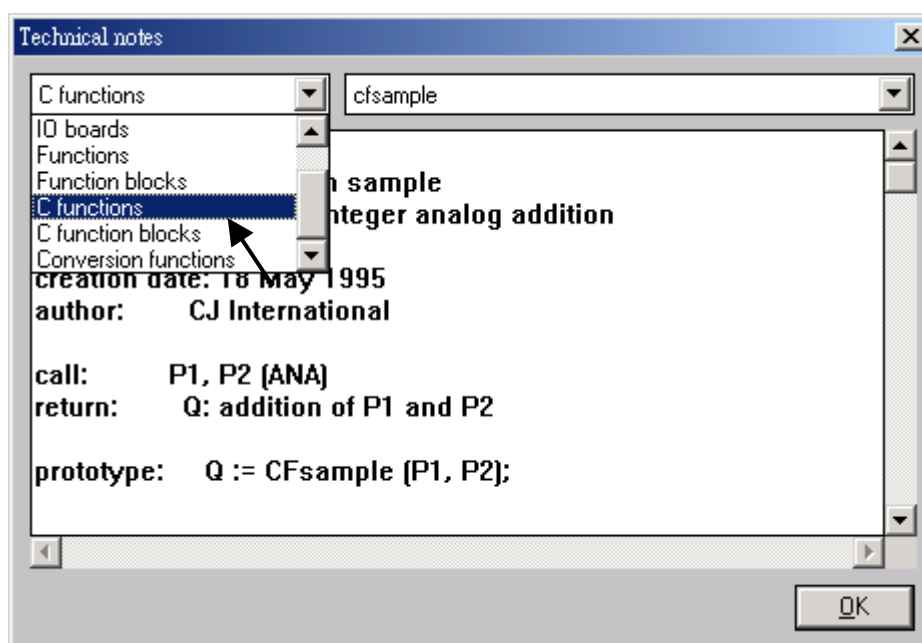
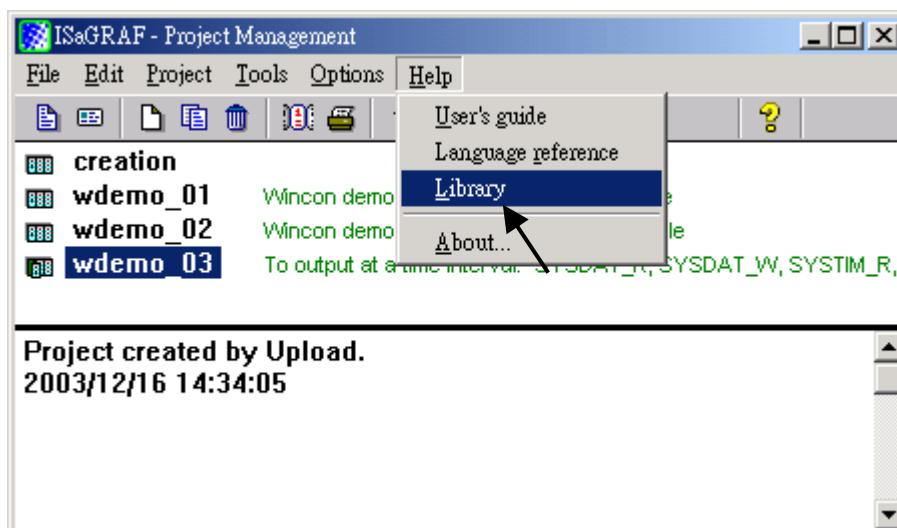
9.1 Get On-Line Help

If you have question, you may email to service@icpdas.com.

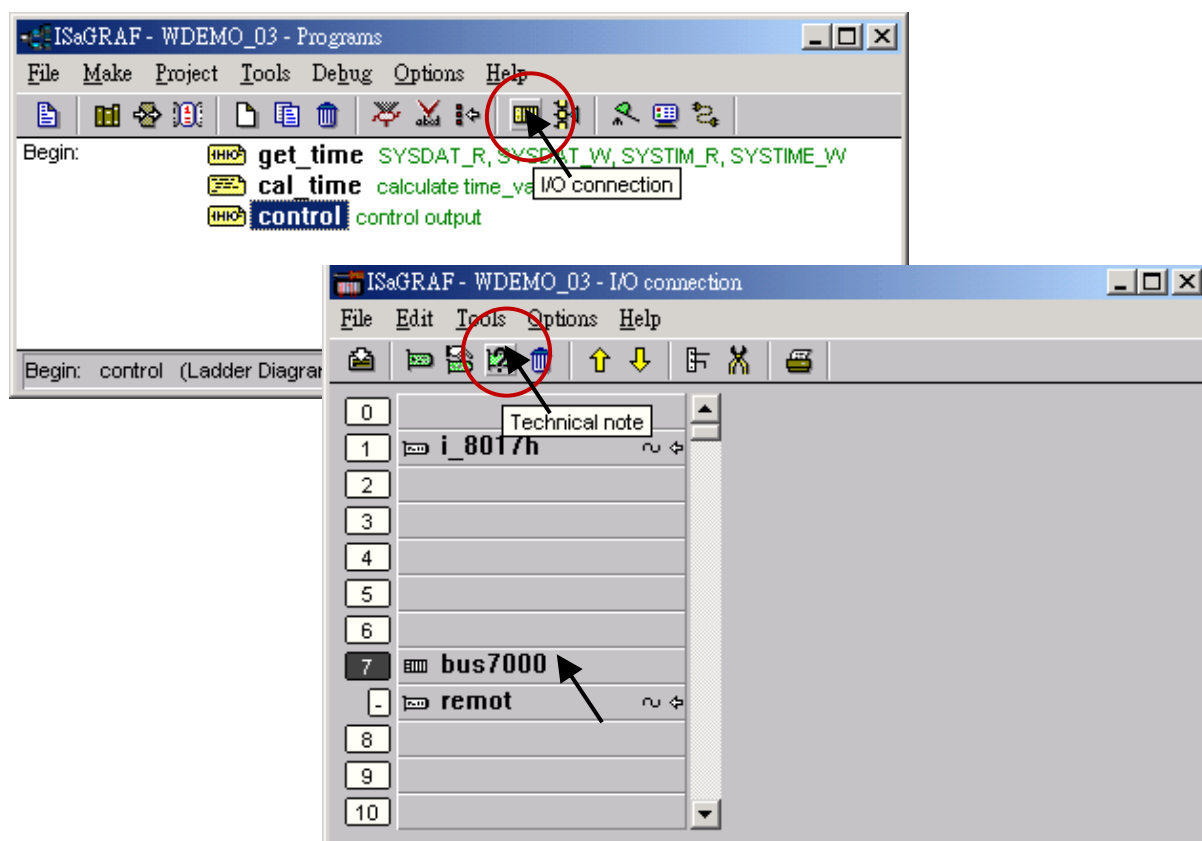
On-line help of ISaGRAF standard functions & function blocks:



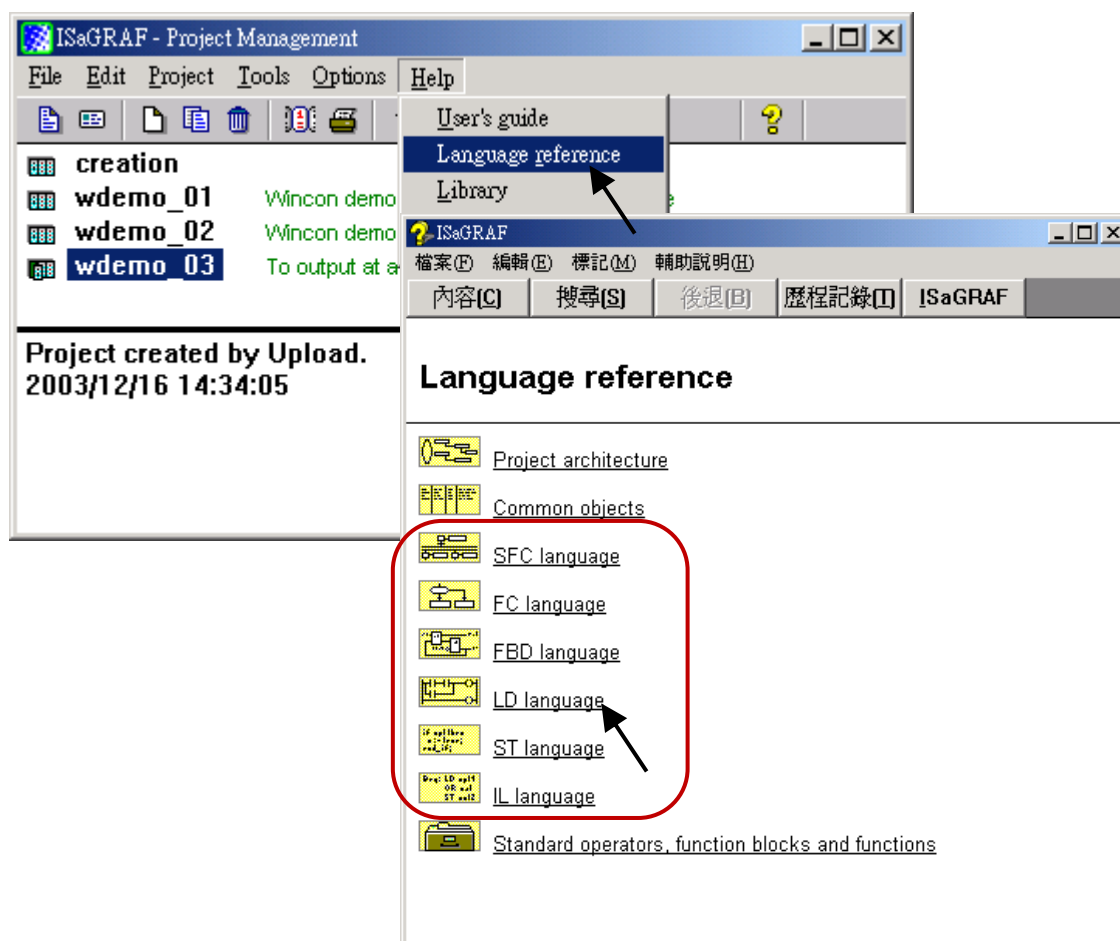
On-line help of ICP DAS add-on functions & function blocks:



On-line help of ICP DAS add-on I/O boards & I/O complex equipment:



On-line help of ISaGRAF languages:



9.2 Installing the ISaGRAF Programming Examples

Visit the website to download the following files:

ISaGRAF User Manual:

<http://www.icpdas.com/en/download/show.php?num=333>

Demo Programs: (isagraf_winpac_demo.zip)

<http://www.icpdas.com/en/download/show.php?num=1005>

FAQ:

<https://www.icpdas.com/en/faq/index.php?kind=280#751>

Example lists:

Project Name	Description	I/O Boards (Notes)
example1	A simple Web HMI example	slot 0: I-87055W
wp_vb01	VB.net 2008 demo 01 for WP-8x47: DI/DO demo, refer to Chapter 6.	
wp_vb02	VB.net 2008 demo 02 for WP-8x47: AI/AO demo, refer to Chapter 6.	
		slot 1: I-87024W slot 2: I-8017HW
wp_vb03	VB.net 2008 demo 03 for WP-8x47: Read/Write long integer, float, and Timer, refer to Chapter 6.	
wpdmo_01	WinPAC demo_01: Read/Write float value from file in the PAC.	FAQ-060
wpdmo_02	WinPAC demo_02: Read/Write long integer from file in the PAC.	
wpdmo_03	To output at a time interval: SYSDAT_R, SYSDAT_W, SYSTIM_R, SYSTIM_W (ST+QLD)	
wpdmo_04	WinPAC demo_04: User defined Modbus protocol (No using "Mbus")	
wpdmo_05	To do something at some sec later when an event happens. (FAQ-017)	slot 0: I-87055W
wpdmo_06	Using Message Array - MsgAry_r and MsgAry_w	
wpdmo_07	Convert float value to string, using real_str and rea_str2	
wpdmo_08	PID control, refer to the document .	
wpdmo_09	Store (or backup) Boolean / long integer value to (from) files	
wpdmo_10	Store (or backup) Boolean / long integer value to (from) EEPROM	
wpdmo_11	Store three values to three files in the \Micro_SD folder per 10 seconds, and change the file name per month.	
wpdmo_14	Retain variable by Retain_b, Retain_N, Retain_f, and Retain_t. (FAQ-074)	

Project Name	Description	I/O Boards (Notes)
wpdmo_16	Store three values to three files in the \Micro_SD folder per minute, and change the file name per day.	
wpdmo19	Send UDP String to PC when alarm happens by using variable array, Time_Gap is 1 second.	slot0: I-87055W (Section 19.2 of ISaGRAF Manual)
wpdmo19a	Send UDP String to PC 3 seconds later, Time_Gap is 250ms.	
wpdmo19b	Send UDP String to PC 3 seconds later, Time_Gap is 250ms. (wpdmo19a is better)	
wpdmo_20	Receive String coming from remote PC or PAC via UDP/IP	
wpdmo_21	Using "com_MRTU" to disable/enable Modbus RTU Slave port.	
wpdmo_22	PWM I/O demo. (Pulse Width Modulation, minimum scale is 2ms for WinPAC)	slot 0: I-8055W
wpdmo_23	Send Time String to COM3: RS-232 every second by using COMOPEN and COMSTR_W. (FAQ-059)	
wpdmo_24	Send string to COM3 when alarm 1 to 8 happens.	slot 0: I-87055W
wpdmo_26	To move some pulse at x-axis of I-8091W of slot 1 in WP-8x47 (Chapter 18 of the "ISaGRAF User's Manual")	slot 1: I-8091W
wpdmo_27	Motion x	slot 1: I-8091W slot 2: I-8090W (Chapter 18 of ISaGRAF Manual)
wpdmo_28	Motion x-y	
wpdmo_29	Moving to the Abs. position when CMD is given	
wpdmo_30	WP-8x47 (10.0.0.102) connect two i8KE8 + I/O, one is 10.0.0.108, one is 10.0.0.109.	FAQ-042
wpdmo_31	WP-8x47 (10.0.0.102) connect one i8Ke8 + I/O (10.0.0.109)	
wpdmo_32	Set WP-8x47 as TCP/IP Client and connect to other TCP/IP Server (1 connection)	slot 0: I-87055W (Section 19.3 of ISaGRAF Manual)
wpdmo_33	Same as Wpdmo_32 but send message only when event last for larger than 3 seconds.	
wpdmo_36	Read Real Val from Modbus RTU device.	FAQ-047, 075
wpdmo_37	Write Real Val to Modbus RTU device.	
wpdmo_38	Using Modbus function code 6 to write 16 bits.	FAQ-046, 075
wpdmo_39	WP-8x47 + I-8172W connecting FRnet I/O modules.	FAQ-082
wpdmo_41	COM3 connecting 1:M7053D + 2:M7045D (MBRTU format, baud=9600) (Chapter 21 of ISaGRAF Manual)	
wpdmo_42	COM3 connecting 1:M-7053D to get D/I counter value (MBRTU format, baud=9600)	

Project Name	Description	I/O Boards (Notes)
wpdmo_43	COM3 connecting 1:M7017R + 2:M7024 (MBRTU format, baud=9600)	
wpdmo_44	COM3 connecting 1:M7017RC , Current input, +/- 20mA, 4-20mA (Modbus format)	
wpdmo_45	COM3 connecting 1:M-7019R (set as T/C K-type input) (MBRTU format, baud=9600)	
wpdmo_46	COM3 connecting 1:M7080 (MBRTU format, baud=9600)	
wpdmo_48	VB.net 2005 demo - "MBTCP_demo" (FAQ-051)	
wpdmo_50	Non-linear conversion. like give P to find V (P, V relation listed in a file)	
wpdmo_51	Read 10 REAL value from a file,10 rows, each row has 1 REAL value, use str_real	
wpdmo_52	Msg_F.	
wpdmo_53	Msg_N.	
wpdmo_54	Using msg_f to read 20 REAL values from a file, total 4 rows, each row has 5 REAL values. (FAQ-060)	
wpdmo_55	Using msg_n to read 20 Integers from a file, total 2 rows, each row has 10 Integers.	
wpdmo56	Retain 17 REAL values to a file, total 2 rows, each row has 10 REAL values.	
wpdmo56a	Retain 2 Boolean + 17 REAL to a file, 2 rows, each row has 10 REAL values.	
wpdmo56b	Retain 25 Integer to a file, 2 rows, each row has 10 integer values.	
wpdmo56c	Retain 2 Boo + 25 Integer to a file, 2 rows, each row has 10 integer values. (FAQ-060)	
wpdmo56d	Retain 17 Real + 2 Boo + 10 Integer to 2 files, each row has 10 values.	
wpdmo56e	Retain more than 255 Real, 255 Boo, and 255 Integer to 2 files, up to 1024 values.	
wpdmo_61	Report data automatically to PC via UDP. PAC=10.0.0.103, PC=10.0.0.91	
wpdmo_62	Send email via Ethernet port. (To one receiver without attached file)	FAQ-067 , 071 , 072 , and 077
wpdmo_63	Send email to one receiver with one attached file.	
wpdmo64a	Time synchronization of many PACs via Ethernet.	
wpdmo64b	64a: station 1001 ; 64b: station 1002	
wpdmo65a	Record temperature to a file per minute, then send the record file by Email per day.	slot 2: I-87018z FAQ-067 , 071 , 072 , and 077
wpdmo65b	Same as wdmo_65a, also add time synchronization and state report to PC.	
wpdmo_66	Record channel 1 to 4 i8017HW's voltage per 20ms, then send the record file by Email	slot 2: I-8024W slot 3: I-8017HW

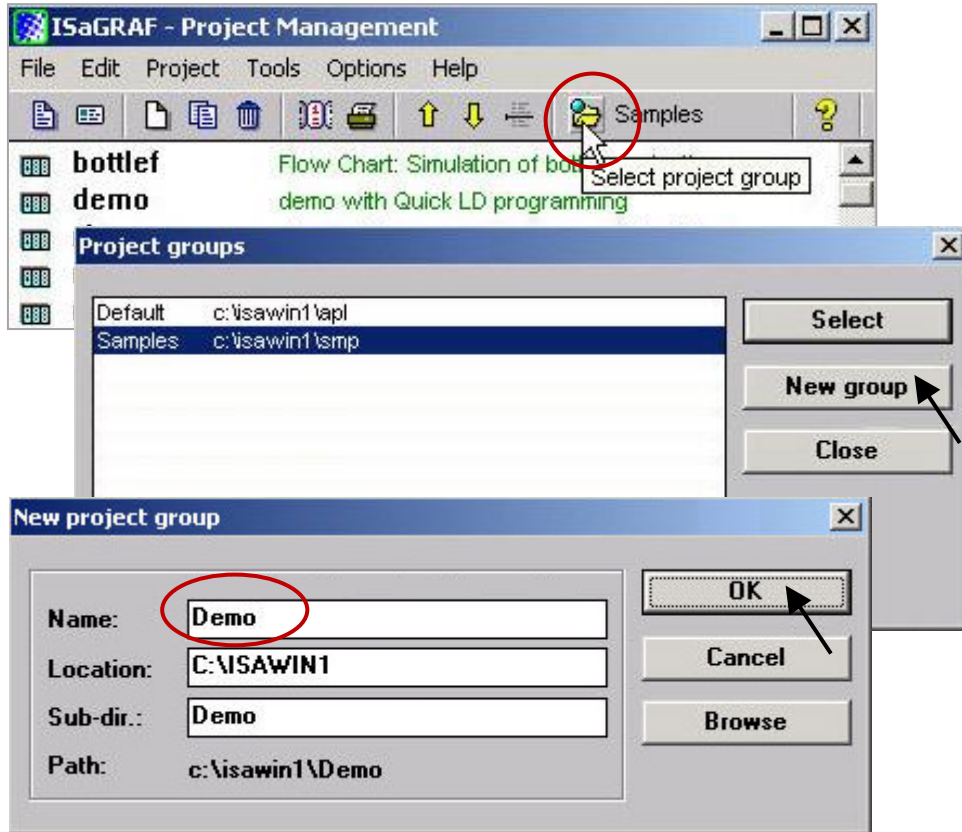
Project Name	Description	I/O Boards (Notes)
wpdmo_70	FRnet application: Port0, FR-2057 (addr.=4), FR-2053 (addr.=8)	slot 1: I-8172W FR-2057 FR-2053
wpdmo71a	Using COM4 to connect a I-7530 and a CANopen device (ID=1, 8DI, 8DO, 4AO, 8AI). (FAQ-086)	
wpdmo71b	Similar to wdmo_71A, but connecting two I-7530. One is at COM5, one is at COM6	
wpdmo71c	Using COM4 to connect a I-7530 and a CAN device to get string (or float and integer data)	
wpdmo71d	Similar to wdmo_71c, but connecting two I-7530. One is at COM5, one is at COM6	
wpdmo71e	Using COM5 to connect a I-7530 and a CANopen device; Using COM6 to connect a I-7530 and a CAN device.	
wpdmo72a	New WP-8x47 redundant system with RU-87P4 + I-87K I/O (Without Touch HMI).	
wpdmo72b	Same as wpdmo72a, but setup COM1 as Modbus RTU Slave port to connect one RS-232 Touch HMI.	
wpdmo72c	New WP-8x47 redundant system with I-8KE8-MTCP I/O (without Touch HMI)	
wpdmo74a	To get average value of one REAL value.	FAQ-099
wpdmo74b	To get average value of one Integer value.	
wpdmo75	Using the I-8088W (8-ch, PWM output) in slot0	slot 0: I-8088W
wpdmo75b	Connect the I-87088W (I-7088) (addr.=1, baud=115200) via WP-8x47's COM2: RS485	I-87088W (I-7088)
wpdmo_76	SMS : use COM4 to connect a GTM-201-RS232	GTM-201-RS232
wpdmo77a	Sending/Receiving UDP bytes by using eth_udp, eth_send(), and eth_recv()	
wpdmo77b	Sending/Receiving TCP bytes by using eth_tcp, eth_send(), and eth_recv()	
wpdmo78	WP-8x47 (COM2: Modbus Master) connect a M-7011 (ID=1, baud=9600) to get AI, DI	M-7011
wpdmo79a	Application1: Modbus RTU Master (Central station)	FAQ-119
wpdmo79b	Application1: Modbus RTU Slave (local PAC1), set ID to 1	
wpdmo79c	Application1: Modbus RTU Slave (local PAC2), set ID to 2	
wpdmo80a	Application2: Modbus TCP Master (Central station)	
wpdmo80b	Application2: Modbus TCP Slave (local PAC1), set ID to 1, LAN1=192.168.1.178 ; LAN2=192.168.1.179	
wpdmo80c	Application2: Modbus TCP Slave (local PAC2), set ID to 1, LAN1=192.168.1.180 ; LAN2=192.168.1.181	

Project Name	Description	I/O Boards (Notes)
wpdmo81	Using Aver_N and Aver_F to get Moving Average (FAQ-120)	slot 1: I-8017HW
wphmi_01	WinPAC Web HMI example 01: Display PAC's date & time (No I/O board)	
wphmi_02	WinPAC Web HMI example 02: DI & DO demo	slot 0: I-87055W
wphmi_03	WinPAC Web HMI example 03: Read/Write Long, float, and Timer value.	
wphmi_04	WinPAC Web HMI example 04: Read/Write PAC's String.	
wphmi_05	WinPAC Web HMI example 05: Multi-Page demo	slot 0: I-87055W
wphmi05a	05: Menu is on the Left ; 05a: Menu is on the Top	
wphmi_06	WinPAC Web HMI example 06: AIO demo	slot 2: I-87024W
wphmi_07	06: scaling is in ISaGRAF ; 07: scaling is in PC	slot 3: I-8017HW
wphmi_08	WinPAC Web HMI example 08: Download PAC's file to PC.	slot 0: I-87055W
wphmi_09	WinPAC Web HMI example 09: Display an alarm window on PC.	
wphmi_11	Trend curve demo	slot 2: I-87024W slot 3: I-8017HW
wphmi_12	Record channel 1 to 8 of I-8017HW 's voltage every 50ms and draw trend curve by M.S. Excel.	I-8017HW
wphmi_13	Record channel 1 to 4 of I-8017HW 's voltage every 10ms and draw trend curve by M.S. Excel.	

Restore the ISaGRAF demo programs

Before restoring the ISaGRAF demo programs, it is recommended creating an "ISaGRAF Project Group" to restore these files.

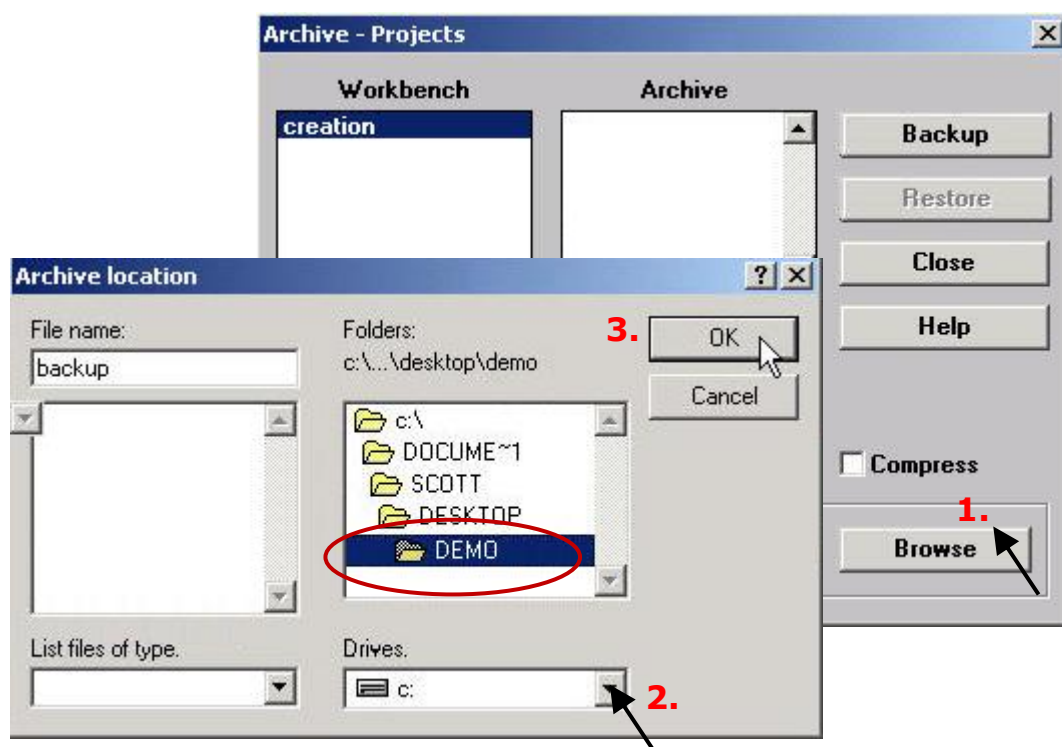
Click the **Select project group** button and click the **New group** button, then enter a name.



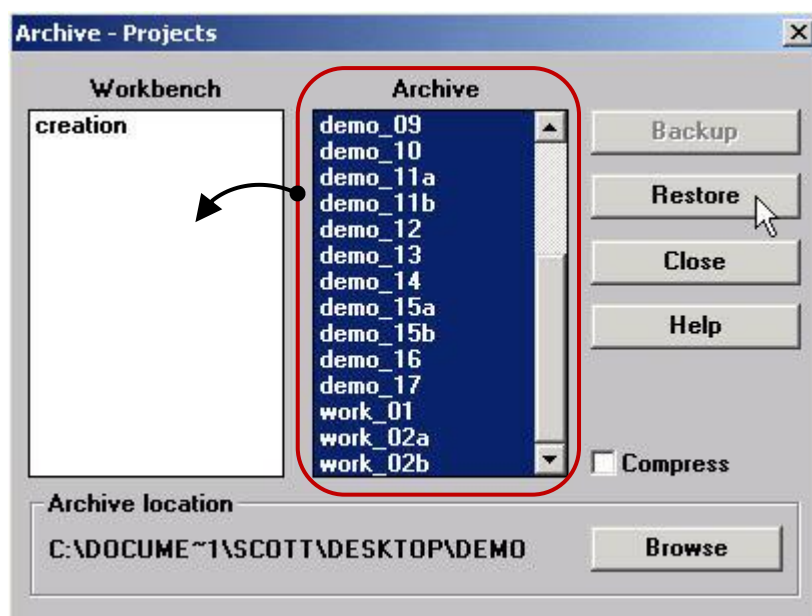
To restore the demo programs to the project group, open the "ISaGRAF Project Management" window and click "Archive" and "Projects" from the "Tools" menu.



In the "Archive Projects" window, click on the "Browse" button to select the location of demo files and click OK. (WP-8x47's demo folder: \isagraf_winpac_demo).



Select all files displayed in the "Archive" field and click the "Restore" button to restore all demo programs to ISaGRAF Workbench.



9.3 Frequently Asked Questions

FAQ: <https://www.icpdas.com/en/faq/index.php?kind=280#751>

FAQ Table:

No.	English ISaGRAF Ver.3 FAQ
001	How to get counter value built in I-7000 & I-87K remote I/O modules?
002	How to search I/O boards and declare variables automatically for I-8xx7?
003	How to build an HMI screen by using ISaGRAF?
004	Can I create my own functions inside ISaGRAF?
006	Can I use an ISaGRAF PAC (I-8417/8817/8437/8837, I-7188EG/XG) as a Modbus Master PAC to gather data from other Modbus devices?
007	Can I write my own protocol or third-party protocol to apply to ISaGRAF PACs?
008	What is the limitation of the program size of I-8417/8817/8437/8837, I-7188EG & I-7188XG?
009	Cannot find I/O boards in the ISaGRAF I/O connection window?
010	I Want to email my ISaGRAF program to someone. How can I archive one ISaGRAF project to a single file?
011	How can I implement motion control in I-8417/8817/8437/8837?
012	My HMI software wants to access to float values and long word values inside the I-8417/8817/8437/8837, 7188EG & 7188XG. How?
013	PWM: Can I generate D/O square pulse up to 1KHz with I-8417/8817/8437/8837, 7188EG & 7188XG? How?
014	Can I use 8K parallel D/I board to get counter input up to 1KHz? How?
015	How to output something at a time interval? For example, turn ON at 09:00 ~ 18:00 from Monday to Saturday, while 13:00 ~ 20:00 on Sunday.
016	How to determine a D/I if it has a bouncing problem?
017	How to trigger something at some seconds later when one event happens?
018	Does the ISaGRAF-256 software have I/O Tags limitation? Why not using the "ISaGRAF-L" Large version?
019	Why my I-8417/8817/8437/8837 or I-7188EG/XG stop running?
020	How to search a variable name in an ISaGRAF project?
021	When closing my ISaGRAF window, it holds for a long time. Why?
023	How to reduce ISaGRAF code size? How to directly Read/Write ISaGRAF variables by using Network address?
024	How to scale analog input and output of 4 to 20 mA (or 0 to 10 V) to my engineering format?
025	The fault detection for the PAC
026	New ISaGRAF retained variable is better than the old one.
027	How to link to the Modbus ASCII Slave device?
028	How to use multi-port Modbus Master on ISaGRAF PAC?

No.	English ISaGRAF Ver.3 FAQ
029	How to send/receive a message from ISaGRAF PAC to remote PCs or PACs via Ethernet UDP communication?
030	Setting special "range" parameter of temperature input board to get clear "Degree Celsius" or "Degree Fahrenheit" input value. For example, "1535" means 15.35 degrees.
031	Setting a special "ADR_" parameter of the remote I-7000 & I-87K temperature input module to get clear "Degree Celsius" or "Degree Fahrenheit" input value. For example, "8754" means 87.54 degrees.
034	How to access to ISaGRAF variables as an array? (A demo program of sending a string to COM2 or COM3 when alarm 1 to 8 happens)
037	Compiling error result in different ISaGRAF version?
038	I-7188EG/XG support remotely downloads via Modem Link
039	Setting I-7188EG/XG 's COM3 as Modbus RTU Slave port
040	Using Variable Array
041	Setting I-8437/I-8837/I-8437-80/I-8837-80 's COM3 as Modbus RTU Slave port
046	How to connect PC / HMI to a Redundancy system with a single IP address?
047	How to Write 16-bits to Modbus RTU devices by Modbus function call No. 6?
049	How to Read or Write Floating-Point Value to Modbus RTU Slave device?
050	Setting a special "CODE_" parameter of "MBUS_R" & "MBUS_R1" to get a clear "Degree Celsius" or "Degree Fahrenheit" input value of M-7000 temperature module. For example, "3012" means 30.12 degrees.
051	How to connect an ISaGRAF PAC to M-7000 remote I/O?
052	VB.net 2005 Demo program using Modbus TCP/IP protocol to control ISaGRAF PACs
055	VB 6.0 Demo program using Modbus TCP/IP protocol to control ISaGRAF PACs
056	How to connect I-7018z to get 6 channels of 4 to 20 mA input and 4 channels of Thermo-couple temperature input? And also display the value on PC by VB 6.0 program?
057	How to do a periodic operation on ISaGRAF PACs?
058	How to record I-8017H's Ch.1 to Ch.4 voltage input in a user allocated RAM memory in ISaGRAF PAC? The sampling time is one record every 0.01 second. The record period is 1 to 10 minutes. Then PC can download this record and display it as a trend curve diagram by M.S. Excel.
059	How to record I-8017H's Ch.1 to Ch.4 voltage input in S-256/512 on I-8437-80 or I-8837-80? The sampling time is one record every 0.05 second. The record period is 1 to 10 minutes. Then PC can download this record and display it as a trend curve diagram.
060	Some skill to operate RS-232/422/485 serial COM Port by COM functions
061	How to read/write file data on WinPAC and XPAC?
062	Linking RS-485 I-7000 & I-87K I/O Modules
063	How to setup a redundant system with Ethernet I/O?
065	Why my RS-485 remote I-7000 and I-87K Output module's host watchdog function doesn't work to reset its output channels to safe output value while the RS-485 communication cable is broken?

No.	English ISaGRAF Ver.3 FAQ
066	ICP DAS Release Stable and Cost-effective Data Acquisition Auto-Report System. (VC++ 6.0 and VB 6.0 and ISaGRAF demo program are available)
067	How to process the Integer or Real value coming from the RS-232/RS-485 device? Like the device of Bar-Code reader or RS-232 weight meter.
068	How to send an email with one attached file by iP-8447/8847 or uPAC-7186EG?
070	Why the I-8xx7 or I-7188EG/XG or uPAC-7186EG or iP-8xx7 always reset? How to fix it?
071	How to do Time Synchronization and record state of many ISaGRAF PAC?
072	Application: Record 10-Ch. temperature value into a file on ISaGRAF PAC every minute. When 24-hour recording is finished, send this record file by email every day.
073	Application: Record Voltage/Current input by ISaGRAF PAC every 20 ms for 1 to 10 minutes. Then send this record file by email.
074	Why the I 7017 or I 87017 s Current Input reading value become double or incorrect?
075	How to use ISaGRAF New Retain Variable? What is its advantage?
077	Why my ISaGRAF project cannot connect Modbus Slave device correctly?
080	Application sample: Record Voltage/Current input by μPAC-7186EG every second for 1 to 10 minutes. Then send this record file by email.
081	Application: Record 10-Ch. temperature value into a file in μPAC-7186EG every minute. When 24-hour recording is finished, send this record file by email every day.
082	How to measure +/-150 VDC in ISaGRAF PACs plus the I-87017W-A5 I/O card?
083	How to use FRNET fast I/O?
084	Why are my I-8x37, I-8x37-80, I-7188EG and uPAC-7186EG 's TCP connections disconnected and then recovered about every 20/40 hours?
086	Cost Effective Redundancy System by uPAC-7186EG or I-8437-80
087	The uPAC-7186EG and iP-8447/8847 connecting one or several I-7530 to link many CAN or CANopen devices and sensors.
088	What does it mean and how to fix it when the 7-segment LED shows error messages of Err00, Err02, Err03, Err90 or E.0001 after booting the PAC?
089	Function Modifications: The μPAC-7186EG, I-8x37-80, I-8xx7 and I-7188EG/XG with S256/512 and X607/608 no longer support old retain method, change to use the better new retain method to retain variables
090	Why my μPAC-7186EG unable to renew the driver and ISaGRAF application?
092	How to use I-7017Z module in ISaGRAF PAC?
096	Setting μPAC-7186EG's and I-7188EG/XG 's COM3 or COM2 as Modbus RTU Slave port
097	Release Two C-Function-Blocks to Read Max. 24 Words or 384 Bits from Modbus RTU/ASCII Devices
098	How to modify the PAC's IP, NET-ID and Modbus RTU Slave port setting of the XP-8xx7-CE6 by a USB pen drive (without Mouse and VGA)?
099	Application: Link Serial COM Port to the Modbus RTU device by COM functions
100	How to get an average value of a Real or Integer variable which is sampled every fixed interval (or sampled in every PLC scan)?

No.	English ISaGRAF Ver.3 FAQ
101	How to use I-8084W (4/8 – Ch. Counter or 8-Ch. frequency)?
104	How to read a max of 120 Words (or 60 Long-Integers or 60 REAL value) from Modbus RTU/ASCII devices by using 'MBUS_XR' or 'MBUS_XR1' function block? (For ISaGRAF WinCE PAC only)
105	Why my PC running ISaGRAF cannot connect the ISaGRAF PAC correctly?
107	Program 8-Channel PWM Output Board: I-8088W or I-87088W or I-7088 In The ISaGRAF PAC.
109	How to do auto-time-synchronization and measure the local Longitude and Latitude by using the GPS-721 or I-87211W GPS I/O module in ISaGRAF PAC?
111	How to adjust the system time of some ISaGRAF PACs via Ebus by using ISaGRAF PAC and I-87211W?
112	SMS: Short Message Service
113	Program the I-8093W (3-axis high-speed Encoder input module) by ISaGRAF.
114	Linking ISaGRAF PAC to Modbus TCP/IP Slave Devices by Modbus TCP Master Protocol
115	How to avoid garbled content when printing ISaGRAF PDF documents?
117	How do I use ISaGRAF SoftLogic and the eLogger HMI with an ISaGRAF WinCE-based PAC?
119	How to install the ISaGRAF Ver. 3 on Windows Vista or Windows 7?
120	How to implement the communication redundancy between the central control station and the local stations?
121	How to calculate the moving average value of a variable by c-functions "Aver_N" or "Aver_F"?
123	How to install or remove the ISaGRAF development platform properly?
124	How to move the InduSoft picture faster in the XP-8xx6-CE6?
125	A Web HMI Example for ISaGRAF Professional XPAC XP-8xx7-CE6-PRO – by FrontPage
126	The XP-8xx7-CE6 Redundant System (iDCS-8000 I/O)
128	How to use the WP-8847 to connect ET-7018Z and ET-7044D and develop the HMI program by InduSoft, VS2008 C#, and VB.NET?
129	How to use the ISaGRAF PAC plus I-87113DW - the Master card of the Carlson Strain Gauge Inputs?
130	How to Connect the ICP DAS Power Meter – PM-2133 and PM-2134 by the ISaGRAF PAC?
132	How to automatically synchronize the time of XP-8xx7-CE6 over a network?
133	Motion Control - Using I-8094F/8092F/8094
134	How to send and receive UDP/TCP data?
135	How to reset the ISaGRAF driver or reset the PAC by software?
136	How to program ISaGRAF PAC to support SQL Client to write data to (or read data from) Microsoft SQL server?
138	HART Solution : ISaGRAF PAC plus I-87H17W
139	How to program an XP-8xx7-CE6 redundant system (with I-87K8 expansion base or Modbus I/O or other I/O)?
140	How to install/use ISaGRAF 3.55 Demo Version and its limitations

No.	English ISaGRAF Ver.3 FAQ
141	How to communicate between InduSoft local HMI and ISaGRAF PACs via Modbus TCP protocol?
142	iP-8xx7/μPAC-7186EG/I-8xx7/I-8xx7-80 provide the Flash memory write-protect feature
143	How to protect your ISaGRAF program from used by the unauthorized people?
144	How to Make ISaGRAF WinCE PAC to Connect to the Internet and Send Data by GPRS or 3G wireless Dial-up? How to get the location by using GPS?
145	A new function block Mbus12w to write max. 12 words to Modbus slave devices.
147	How to use ISaGRAF via I-8123W to control the CANopen Slave devices?
148	How to use the VPD-130 to read the μPAC-7186EG's system date and time via RS-485?
149	User Guide for I-87017DW, I-87017ZW and I-87019ZW Cards
151	How to make the ISaGRAF WinCE PAC play a sound?
152	How to use FTP Client to upload log files to remote FTP Server on PC?
153	How to control the IR module, IR-210/IR-712, with the ISaGRAF PACs?
154	How to use the ISaGRAF PAC to communicate with a faraway Modbus TCP server or an FTP server by the 3G or 2G wireless GPRS?
156	How to use the FRnet AI/AO module with the ISaGRAF PAC?
157	ISaGRAF PAC connects a DL-100TM485 to measure humidity and temperature values.
159	How to link to the Temperature and Humidity module, DL-100T485, with the ISaGRAF PAC?
160	How to use the tGW-700 Series, Modbus TCP to RTU/ASCII gateway, with the ISaGRAF PAC?
161	Using many Modbus function blocks Mbus_AR and Mbus_AW in a For-loop in the ISaGRAF PAC
162	How to deliver event data by ISaGRAF PAC?
163	Why is the Power LED or the L1 LED indicator on the PAC blinking?
165	How to use the ISaGRAF PAC to control the tM-series and LC-series Modbus I/O Modules?
166	ISaGRAF WinCE PAC - Schedule Control.
167	Develop your own c-function and c-function blocks in the ISaGRAF WinCE PAC.
168	How to write an ISaGRAF program to copy/delete all files in one directory?
169	How to use the I-87028UW/CW, I-87024UW/CW modules on ISaGRAF PAC?
171	How do I use the "Mbus_RW" function block in the ISaGRAF PAC to easily monitor the Modbus device?
172	How to use ISaGRAF functions to read multiple strings from a file?
173	Why can't I connect to the ET-7000 web page using a web browser?
174	How to use the VMware Workstation/Player to create an ISaGRAF (Ver. 3.55) development environment?
175	How to test an Ethernet/Internet connection by using the ISaGRAF PAC?

Chapter 10 Using C# .net 2008 Program to Access ISaGRAF Variables

Important Notice:

Please store your application programs and data files in the \Micro_SD. Don't store them in the \System_disk. That is because the \System_Disk is using NOR Flash memory. Its size is small and the major purpose is for storing OS, ISaGRAF driver, some basic utilities and DLL.

The NOR Flash memory is not good for frequently updating files. If update files frequently in the \System_Disk (e.g., update a file every 1 to 5 seconds, then it will be about ten thousand more updates in one day), the data or files in the \System_disk may crush or lost for some days or months later.

This chapter lists the steps for creating the first demo program by using Visual Studio .NET 2008 development tool. There are some sample programs in the WP-8x47 demo folder.

WP-8x47 demo folder: ...\\isagraf_winpac_demo\\CSharp.net_2008_demo\\

wp_CSharp01: Digital I/O demo with one I-87055W in slot 0 of the WP-8x47.

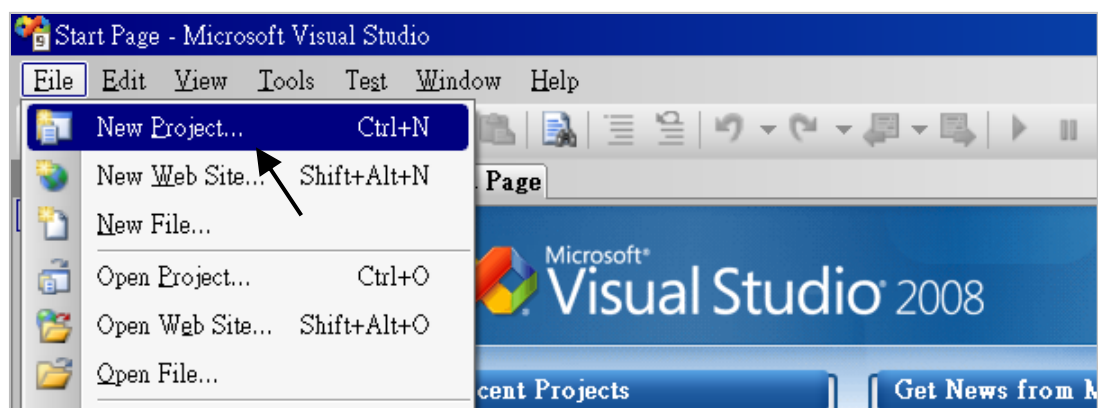
wp_CSharp02: Analog I/O demo with one I-87024W in slot 1 and one I-8017HW in slot 2.

wp_CSharp03: Read / Write ISaGRAF internal integers, timers and real variables. (No I/O)

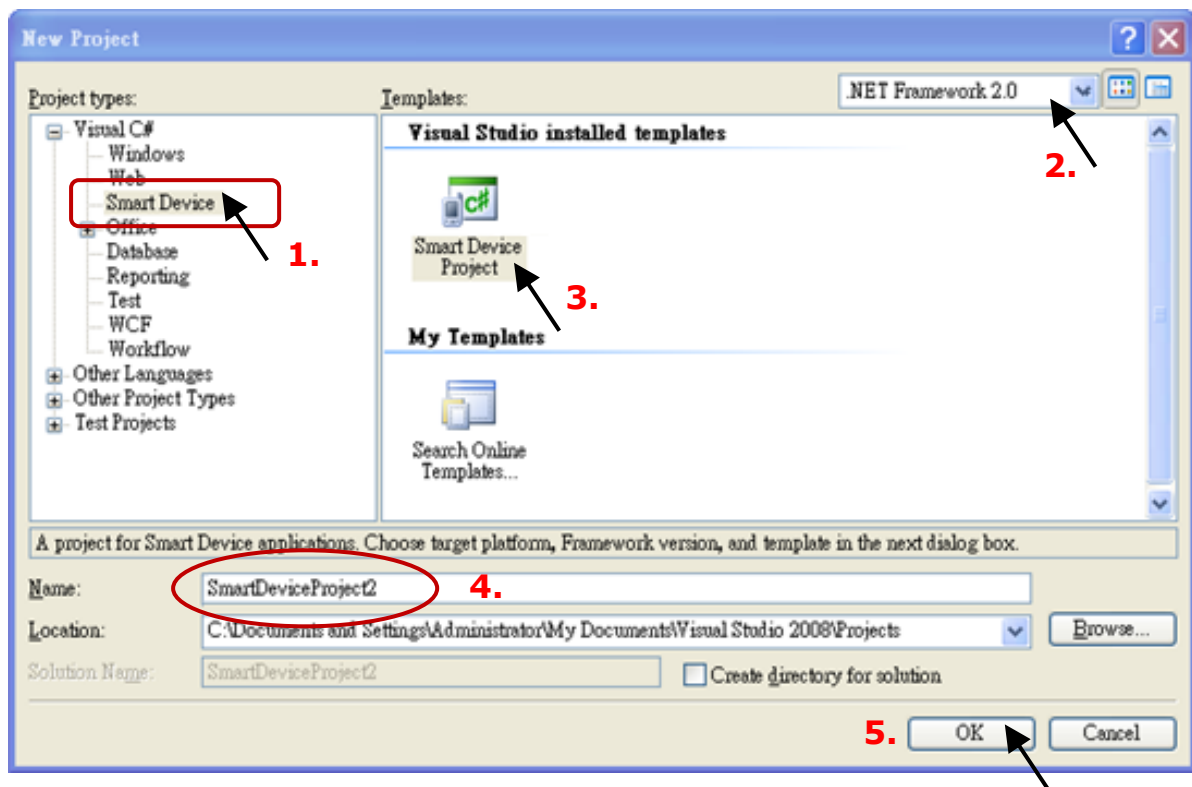
The name of ISaGRAF demo projects are "wp_vb01.pia", "wp_vb02.pia" and "wp_vb03.pia" in the same directory.

10.1 Create a New Project

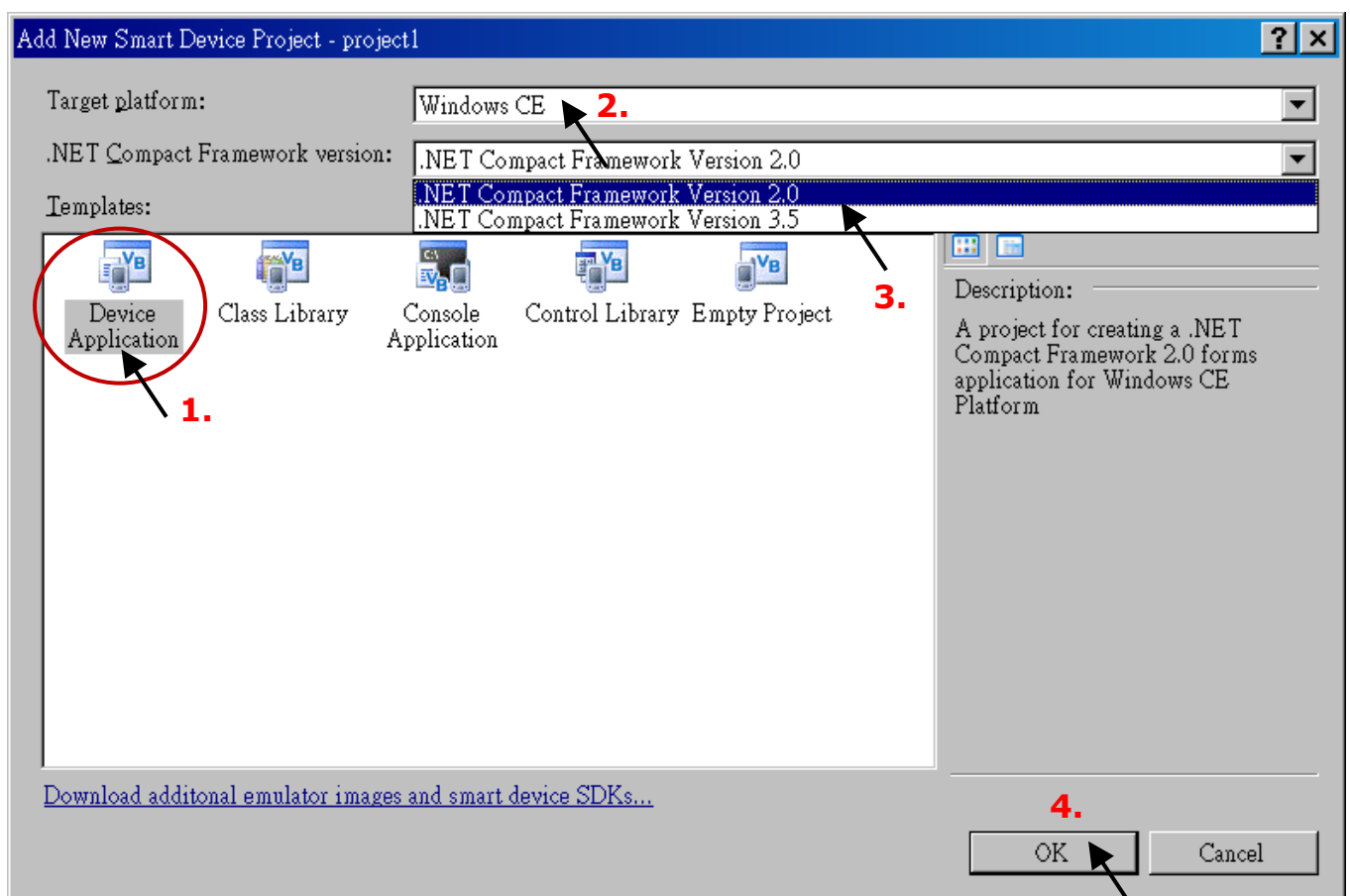
1. Start Microsoft Visual Studio .NET 2008 and click **File > New Project** on the menu bar.



2. Check the "Smart Device" on the left, then select the ".NET frame work 2.0" and "Smart Device Project". Then entering a proper project name (e.g., project1) and the last click on "OK".



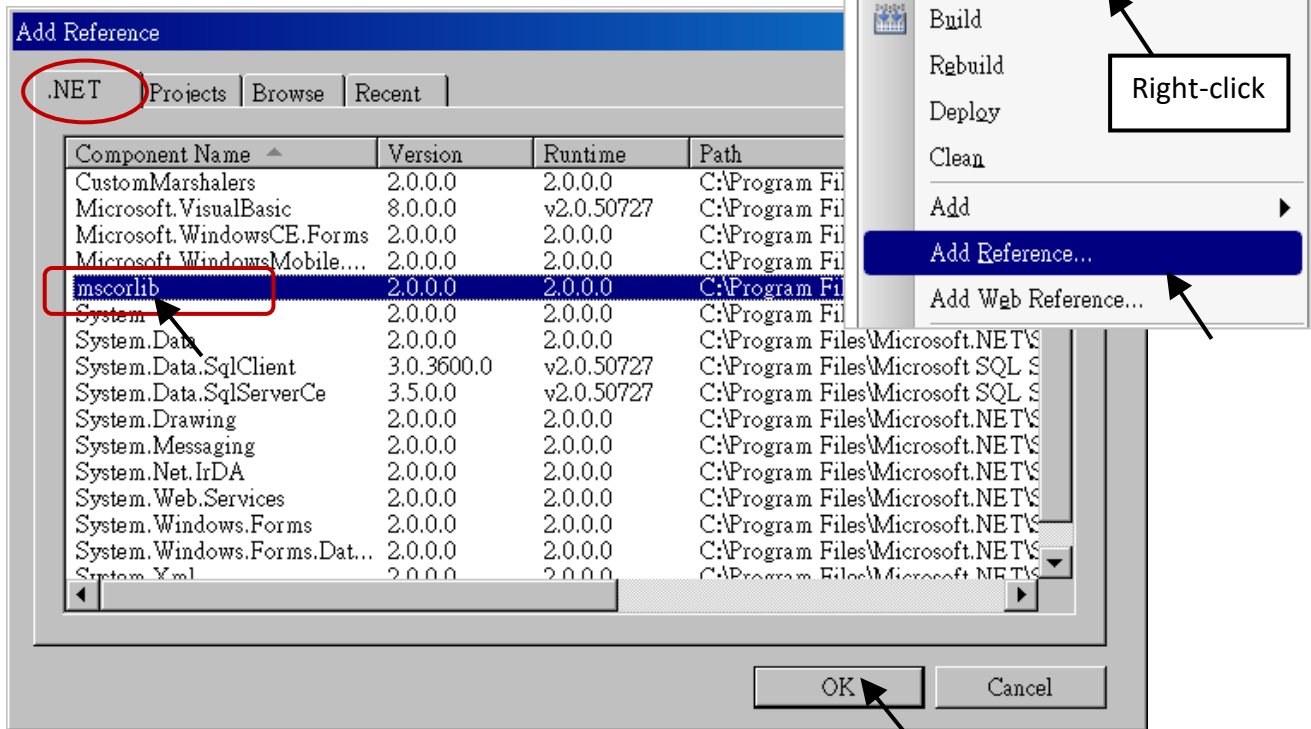
3. Select the "Device Application" and "Windows CE" and ".NET Compact Framework Version 2.0", then click on "OK".



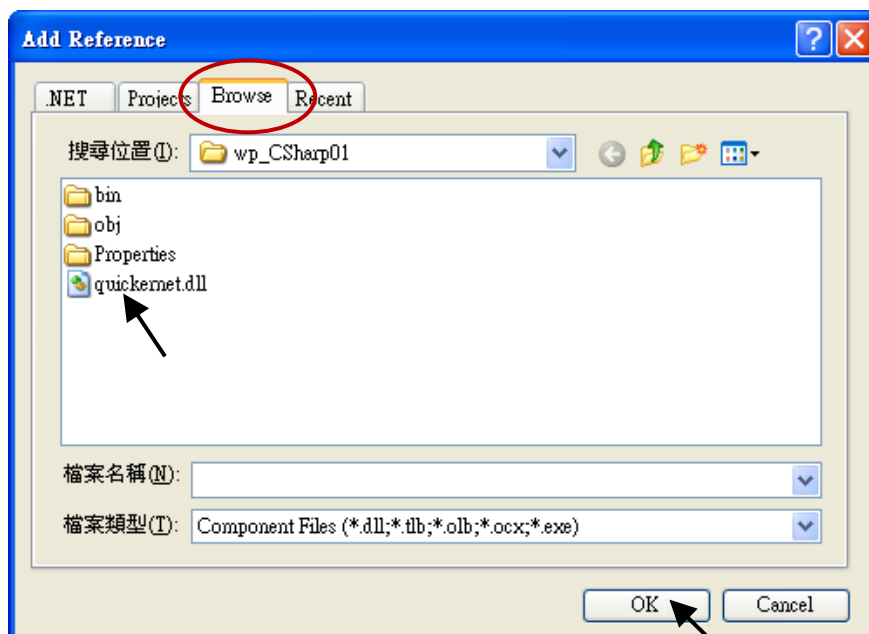
10.2 Add Project Reference for an Application

The “QuickerNet” library contains all modules’ functions. Before you use the “Quicker” keyword in the program, you must add the “QuickerNet.dll” into the reference list of your application.

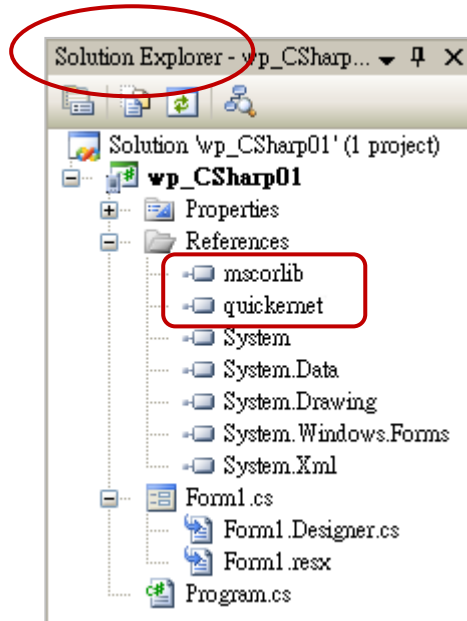
1. Right click on the Project name on the right hand side ,
then select “Add Reference ...”.
2. Select the “**mscorlib**” in the list box and click the button
“OK” (“mscorlib” is listed in the Component Name field on
the .NET page.)



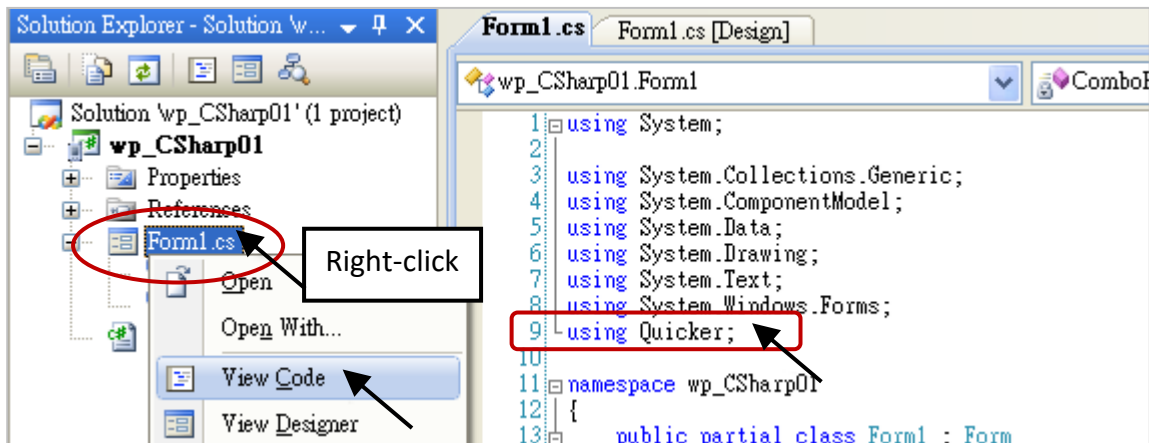
3. Click the “Browse” button and select the “quickernet.dll” from WP-8x47 demo folder:
\\isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp01, then click OK.



4. When both “mscorlib” and “QuickerNet.dll” are added that will be displayed in the **Solution Explorer** window.



5. Right-click on the “Form1.cs” and select “View Code” from the pop-up. Move cursor to top and insert the “using Quicker;” in the first statements.

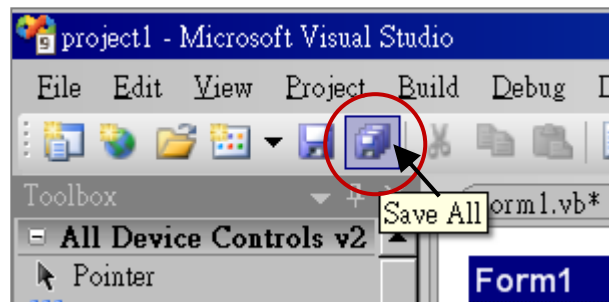


Then you can design all required objects and actions inside your C# Forms.

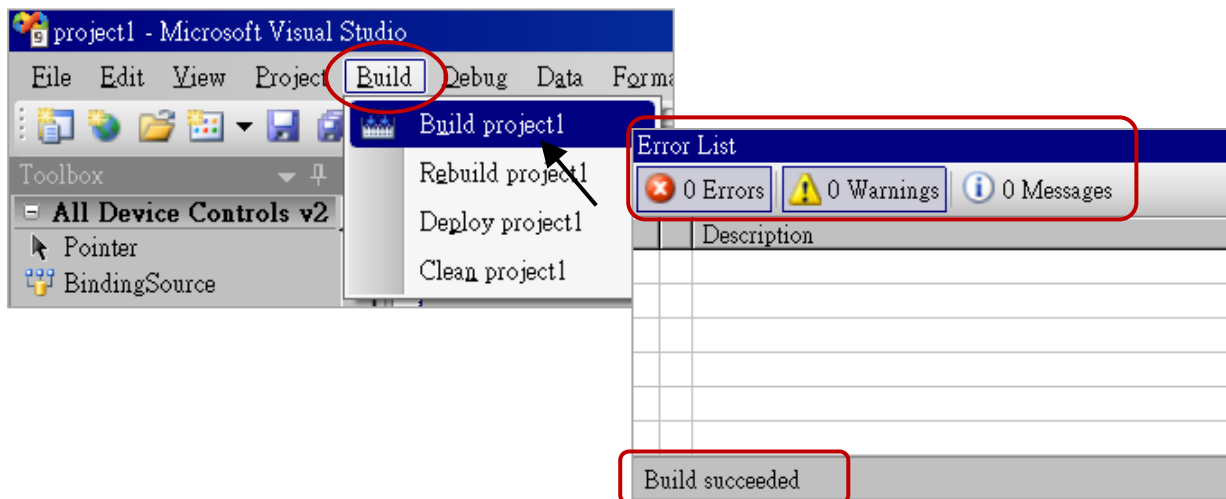
10.3 Compiling an Application Program

When you have finished writing a program, you can build an application by the following steps.

1. Remember to save at any time for safety.



2. Compile (Build) the project, and the result is listed in the “Error List” windows.



3. You can find the execution file in

<Your C# .net Project folder> \bin\Release\ <project_name>.exe

Copy this execution file to the \System_Disk\ISaGRAF\ path in the WP-8x47 and run it.

Note:

User may copy the C#.net execution file to other path to run it but there should contain at least “QuickerNet.dll”, “Quicker.dll”, and “Mscorlib.dll” three DLL files with it or it cannot run correctly.

For example, the project1.exe can run in the \Micro_SD\ path if “QuickerNet.dll”, “Quicker.dll” and “Mscorlib.dll” are in it. These DLL files can be copied from the path “\System_disk\ISaGRAF\” in the PAC.

10.4 QuickerNET.DLL

This section we will focus on the description of the application example of QuickerNET.DLL functions. There are some functions that can be used to Read/Write data from/to the ISaGRAF SoftLogic. The functions of QuickerNET.DLL can be clarified as two groups as depicted as below:

1. Digital R/W Functions
2. Analog R/W Functions

10.4.1 Digital R/W Functions

■ UserSetCoil

Description:

This function is to set the value to a Boolean variable by Modbus network address.

Syntax:

`UserShare.UserSetCoil(ushort iUserAddress, byte iStatus)`

Parameter:

iUserAddress: Specify the Modbus Network Address of Variable (1 to 8191)

iStatus: Set the status. For instance, iStatus = 1 for True, iStatus = 0 for False

Return Value:

None

Example:

// Set the output variable of Modbus Network Address "1" to True.

```
UserShare.UserSetCoil(Convert.ToUInt16(1), 1);
```

Demo program:

WP-8x47 demo folder: \isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp01

■ UserGetCoil

Description:

This function is to get the value from a Boolean variable by Modbus network address.

Syntax:

UserShare.UserGetCoil(ushort iUserAddress, out byte iStatus)

Parameter:

iUserAddress: Specify the Modbus Network Address of Variable (1 to 8191)

iStatus: Get the variable status, iStatus = 1 for True, iStatus = 0 for False

Return Value:

None

Example:

```
// Get the variable status of Network Address "1".
```

```
byte iStatus;
```

```
UserShare.UserGetCoil (Convert.ToUInt16(1), out iStatus);
```

Demo program:

WP-8x47 demo folder: \isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp01

10.4.2 Analog R/W Functions

UserSetReg_short

■ **UserSetReg_long**

■ **UserSetReg_float**

Description:

These functions are to set 16-bit short integer, 32-bit long integer & 32-bit float value to the specified Modbus network address.

Syntax:

```
UserShare.UserSetReg_Short(ushort iUserAddress, out int iStatus)
UserShare.UserSetReg_Long(ushort iUserAddress, out int iStatus)
UserShare.UserSetReg_Float(ushort iUserAddress, out float iStatus)
```

Parameter:

iUserAddress: Specify the Network Address of Variable (1 to 8191)

iStatus: Set the short or long integer or float value.

Example:

// Set a long value "1234567" to the variable of Modbus Network Address "1".

```
int temp1=1234567;
```

```
UserShare.UserSetReg_long(Convert.ToUInt16(1), out temp );
```

// Set a short value "-1234" to the variable of Modbus Network Address "3".

```
int temp2= -1234;
```

```
UserShare.UserSetReg_short(Convert.ToUInt16(3), out temp2 );
```

// Set a float value "2.174" to the variable of Modbus Network Address "4".

```
float temp3=2.174;
```

```
UserShare.UserSetReg_float(Convert.ToUInt16(4), out temp3 );
```

Demo program:

WP-8x47 demo folder:

1. \isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp02 for R/W analog I/O.
2. \isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp03 for R/W internal Boolean, long integer, Timer and Real (floating-point) values.

Note:

In the ISaGRAF project, long integer, timer, or real variable must use 2 network address numbers.

Refer to section 4.2 of ISaGRAF User Manual:

<http://www.icpdas.com/en/download/show.php?num=333>

Description:

These functions are to get 16-bit short integer, 32-bit long integer & 32-bit float value from the specified Modbus network address.

Syntax:

```
UserShare.UserGetReg_Short (ushort iUserAddress, out int iStatus)
```

```
UserShare.UserGetReg_Long (ushort iUserAddress, out int iStatus)
```

```
UserShare.UserGetReg_Float (ushort iUserAddress, out float iStatus)
```

Parameter:

iUserAddress: Specify the Network Address of Variable (1 to 8191)

iStatus: Get the short or long integer or float value.

Example:

```
float float_val
```

```
short short_val
```

```
int long_val
```

```
// Get float value of the variable of Modbus Network Address "7".
```

```
UserShare.UserGetReg_float (Convert.ToUInt16(7), out float_val);
```

```
// Get long value of the variable of Modbus Network Address "9".
```

```
UserShare.UserGetReg_long (Convert.ToUInt16(9), out long_val);
```

```
// Get short value of the variable of Modbus Network Address "11".
```

```
UserShare.UserGetReg_short (Convert.ToUInt16(11), out short_val);
```

Demo program:

WP-8x47 demo folder:

1. \isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp02 for R/W analog I/O.
2. \isagraf_winpac_demo\CSharp.net_2008_demo\wp_CSharp03 for R/W internal Boolean, long integer, Timer and Real (floating-point) values.

Note:

In the ISaGRAF project, long integer, timer, or real variable must use 2 network address numbers.

Refer to section 4.2 of "ISaGRAF User Manual:

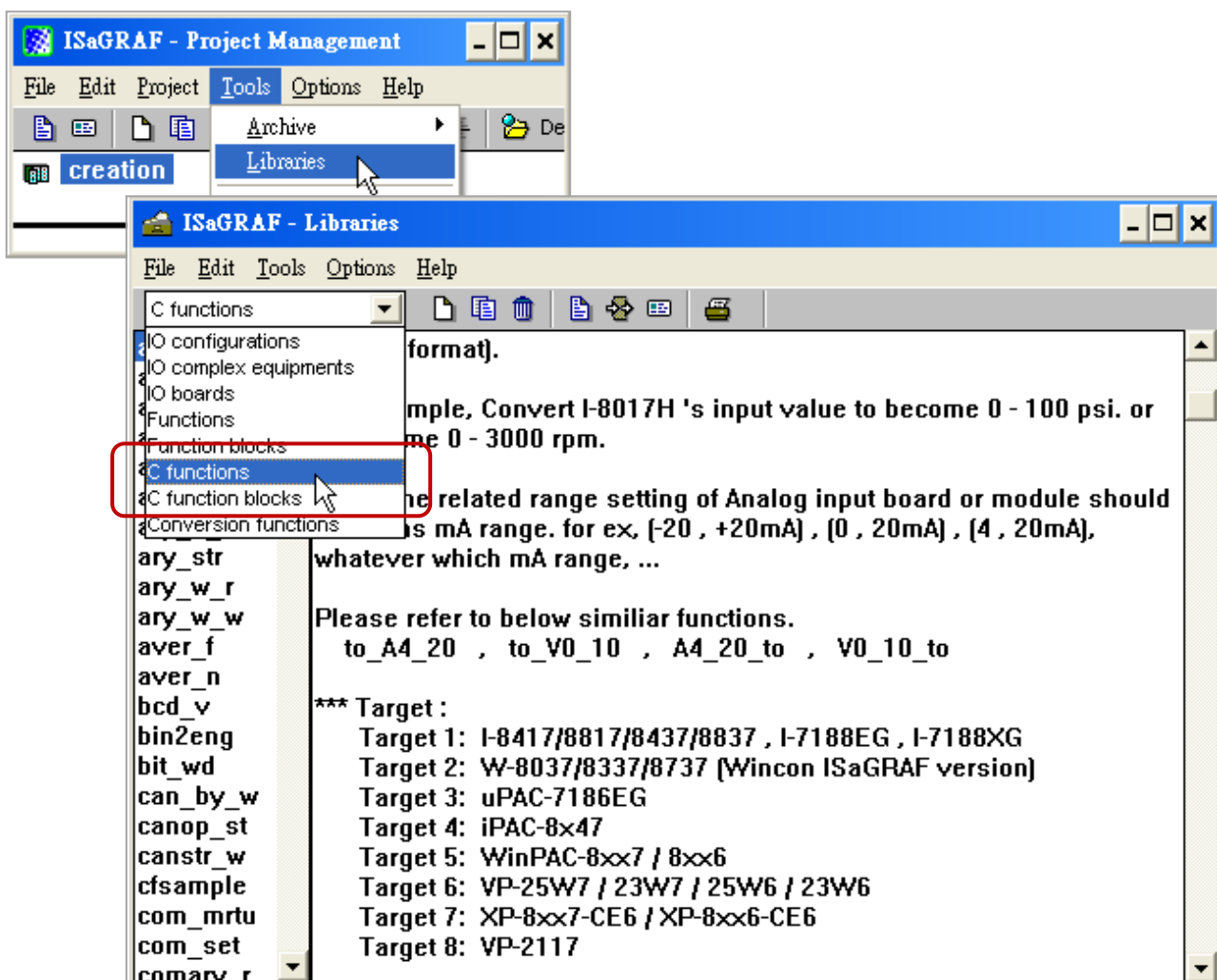
<http://www.icpdas.com/en/download/show.php?num=333>

Chapter 11 More Useful Features

This chapter will introduce gradually added and some useful features in ISaGRAF WinCE-based PAC. Users can visit the ISaGRAF FAQ to understand these usages.

11.1 FAQ-167: Develop your Own C-function and C-function Blocks in the ISaGRAF WinCE PAC

The FAQ-167 provides demo programs to guide users to develop their own C-function and C-function Block. More at: <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-167



11.2 FAQ-166: ISaGRAF WinCE PAC - Schedule Control

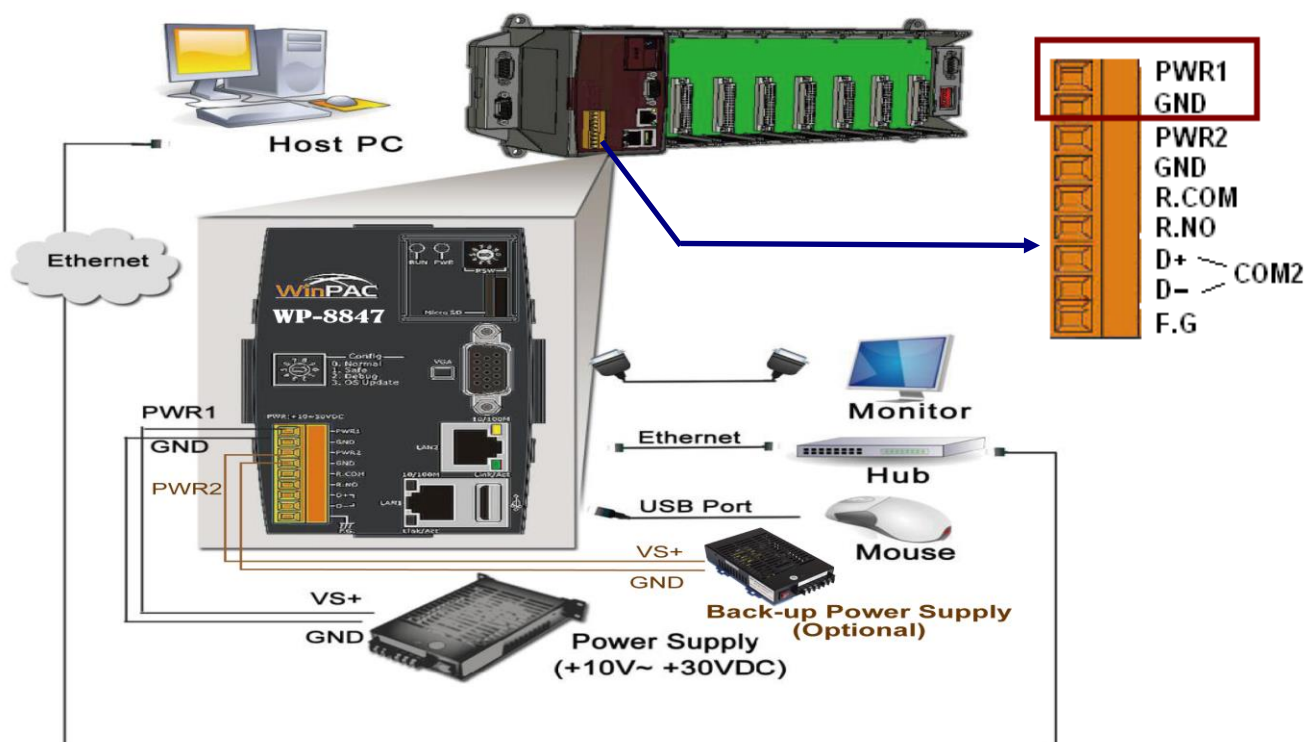
- The ISaGRAF WinCE-based PACs support Schedule Control. Users just need a few simple steps to configure the date events, such as normal days, weekend, special holidays, make-up workdays and four seasons to meet the complex scheduling control needs.
- One ISaGRAF PAC can control many Schedules for maximum 10 control devices (Target). Each control device (Target) can control one Boolean, one Integer and one Real variable (total 3 variables).
- More at: <https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-166



Appendix A Hardware System & Setting

A.1 Applying Correct Power Supply

Please apply a regular power supply between +10V to +30V (> 25W or higher is better)



Selection Guide:

Power supply:

http://www.icpdas.com/en/product/guide+Accessories+Power__Supplies+Power__Supply

DP-660: 24V/2.5A, 5V/0.5A power supply (DIN-Rail mounting)

DP-1200: 24V/5A power supply

Industrial Ethernet switch:

http://www.icpdas.com/root/product/solutions/industrial_ethernet_switch/switch_selection.html

NS-205: 10/100M, 5 ports

NS-208: 10/100M, 8 ports

http://www.icpdas.com/en/product/guide+Industrial__Communication+Ethernet__Communication+Ethernet__Switch#787

RS-405: 10/100M, 5 ports (Ring Switch)

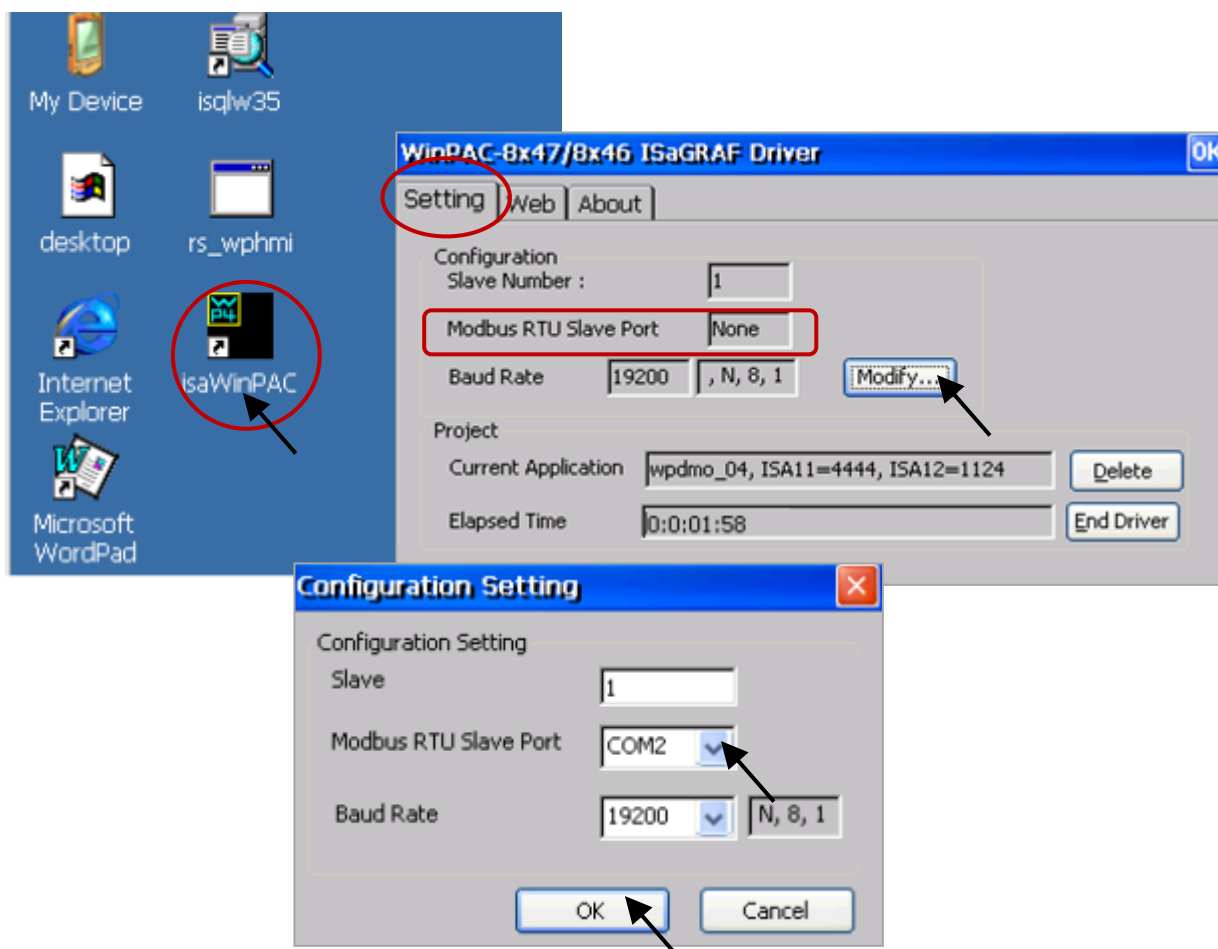
RS-408: 10/100M, 8 ports (Ring Switch)

A.2 Modify the NET-ID & Modbus RTU Port Setting

Users may set the Net-ID (Slave Number) for WP-8x47 in a range of 1 to 255.

By default, Modbus RTU Slave port is “None” when shipped out. Users may set it to others depends on its application (also refer to Appendix G & E for more Modbus RTU ports).

Then reboot the WP-8x47 once after the modification to make the new setting work.



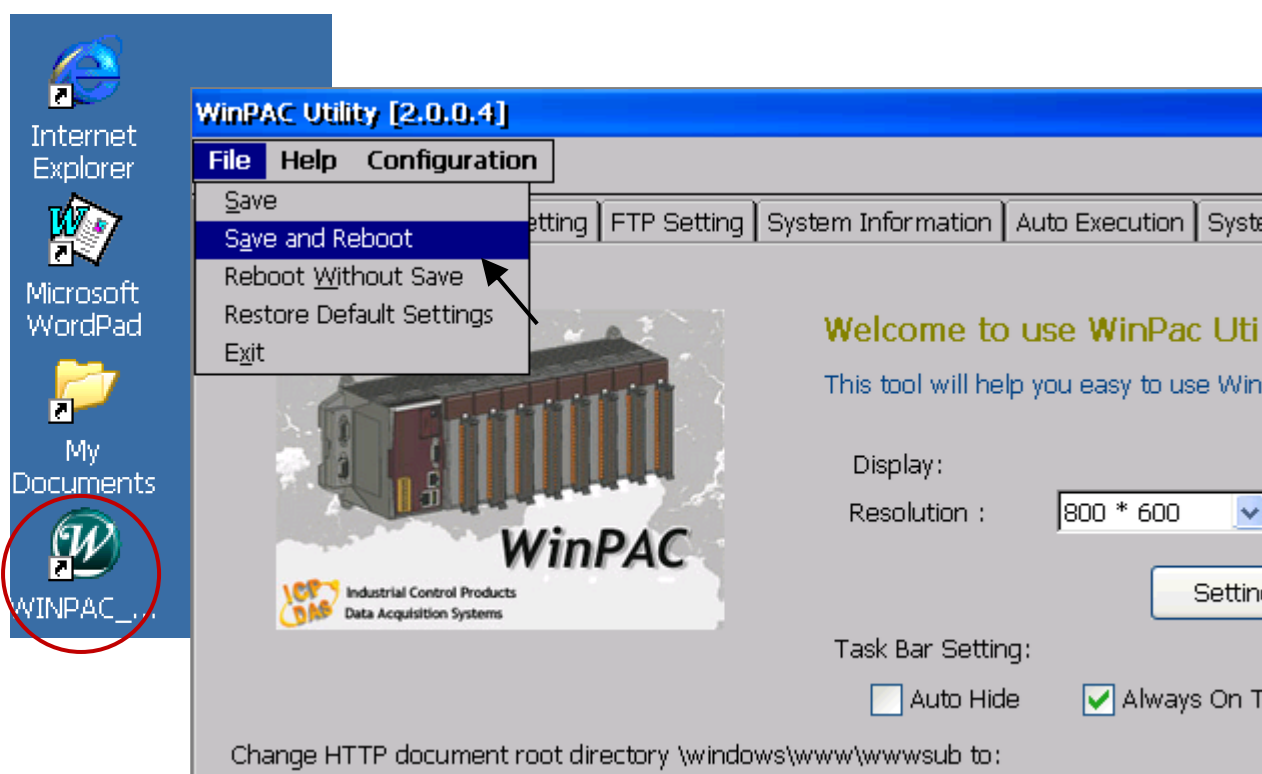
A.3 Setting the IP Address for the WP-8x47

Run [Start] > [Setting] > [Control Panel] on the WinPAC, then double-click on “Network and Dial-up Connections”. Then click on “LAN1” or “LAN2” to set the IP address and Subnet Mask for WinPAC.

(Only set as fixed IP for ISaGRAF application, No DHCP.)



Next, run [Start] > [Programs] > [WinPAC Utility], click on “Save and Reboot” to store the setting.



A.4 Connecting the PC to the WP-8x47 Ethernet Port

Before downloading an ISaGRAF application to the PAC using the Ethernet port, you must first setup the Ethernet port to properly communicate with the PC.

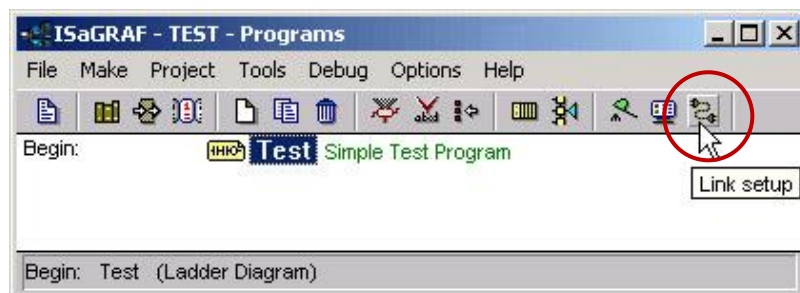
On the WP-8x47:

Set IP, Mask and Gateway addresses.

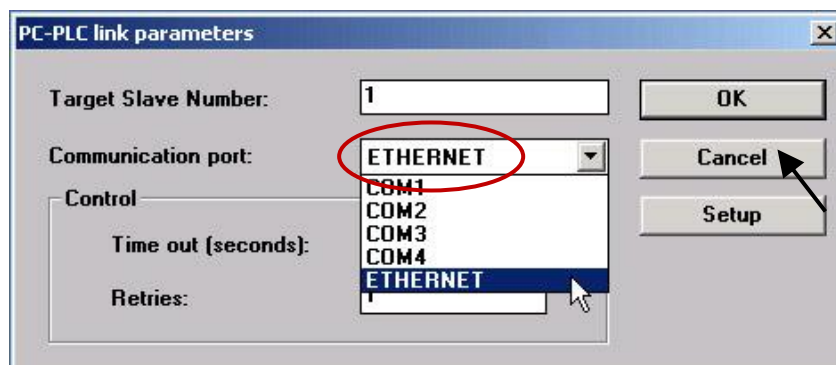
Refer to former section – “A.3: Setting The IP Address for The WP-8x47”

On your PC:

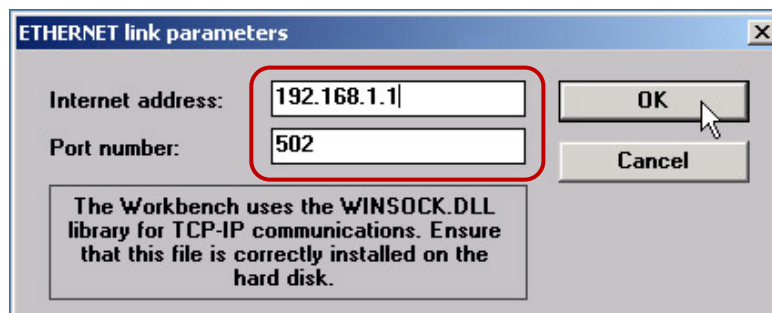
Open an ISaGRAF project (e.g., Test) that you want to download to the WP-8x47, then select the "Link Setup" button.



In the "PC-PLC Link Parameters" window, set the "Ethernet" as the communication port and click the "Setup" button.



In the "Ethernet Link Parameters" window, enter the IP address of **WP-8x47** and set the "Port Number" to "502".

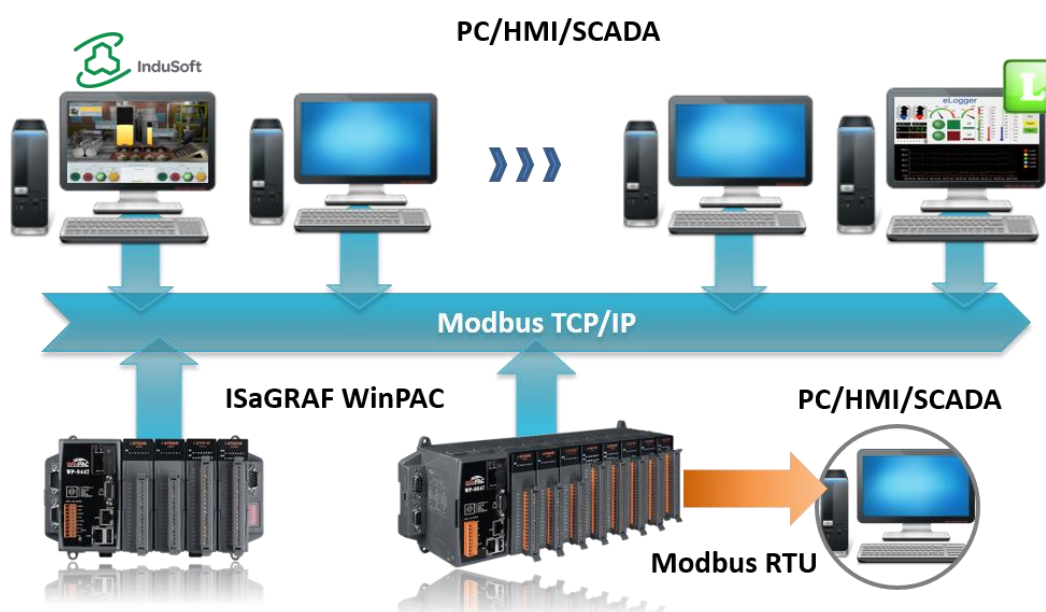


Once you have completed the setting, click the "OK" button. Now, the PC can communicate with the WP-8x47 through the Ethernet port.

A.5 Multi-Clients Connections and Pin Assignment of COM1, COM2, COM3 and COM4

Two Ethernet ports of WP-8x47 support Modbus TCP/IP Slave protocol to connect to ISaGRAF or PC/HMI. Both LAN1 and LAN2 support a maximum of 32 connections. The TCP port number is fixed 502.

When using one Ethernet port to connect all PC/HMI, up to 32 PC/HMI can be connected. When using two Ethernet port to connect all PC/HMI, up to 16 PC/HMI can be connected. Also, using PAC's COM1 (RS-232) or one of COM2 (RS-485)/COM3 (RS-232/485) or COM4 (RS-232) to connect other PC/HMI. (Refer to Appendix G & E - Modbus RTU Slave)



Industrial Ethernet switch:

http://www.icpdas.com/root/product/solutions/industrial_ethernet_switch/switch_selection.html

NS-205: 10/100M, 5 ports

NS-208: 10/100M, 8 ports

http://www.icpdas.com/en/product/guide+Industrial__Communication+Ethernet__Communication+Ethernet__Switch#787

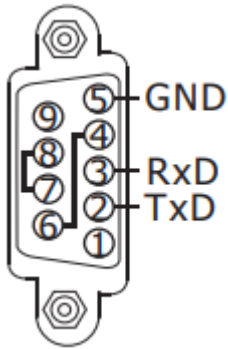
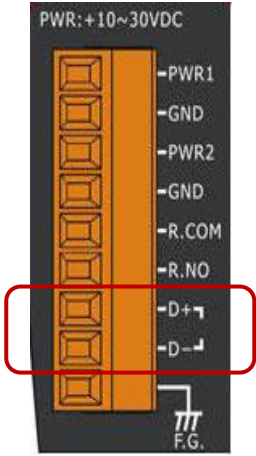
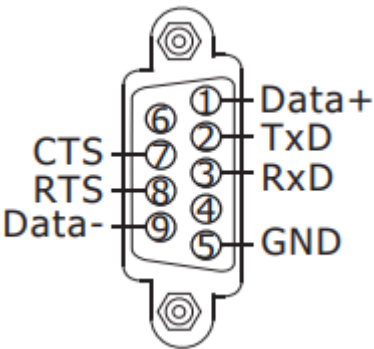
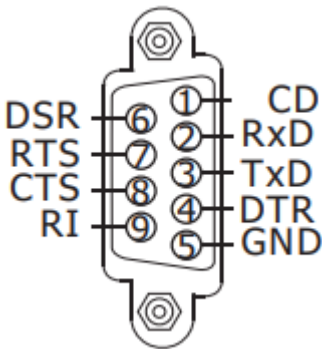
RS-405: 10/100M, 5 ports (Ring Switch)

RS-408: 10/100M, 8 ports (Ring Switch)

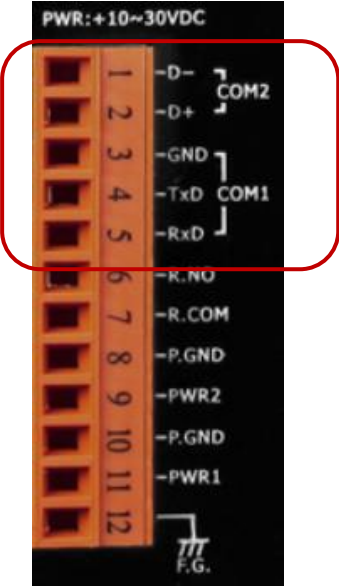
Pin Assignment:

COM1, COM2, COM3 and COM4:

WP-8447/8847

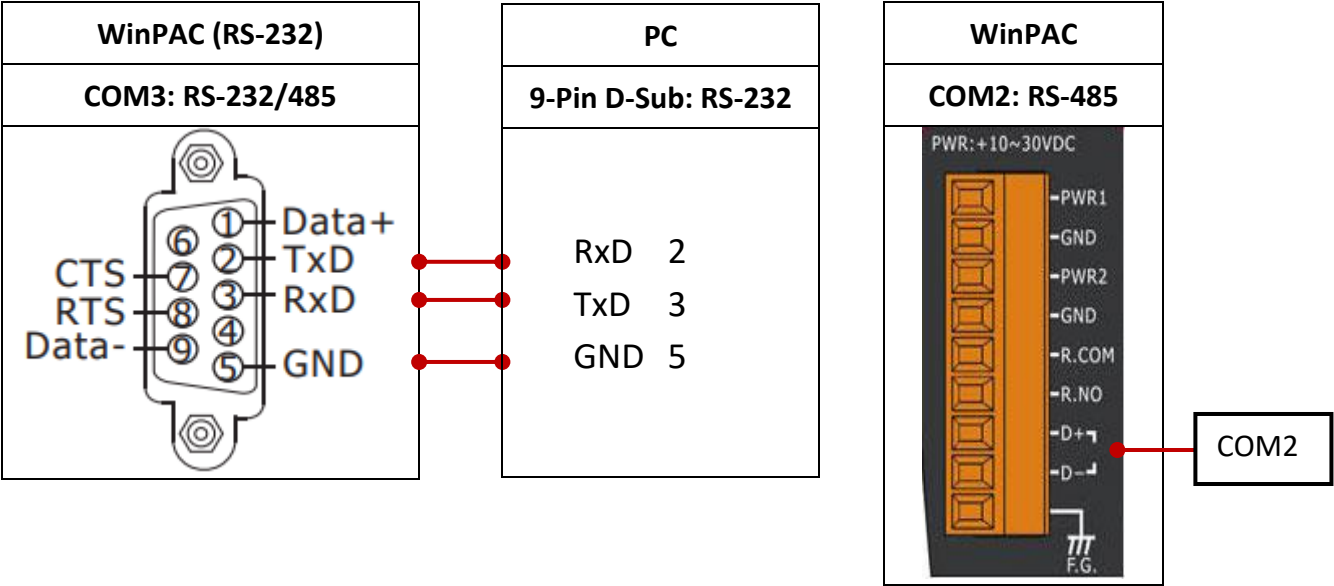
COM1: RS-232	COM2: RS-485	COM3: RS-232/485	COM4: RS-232
			

WP-8147

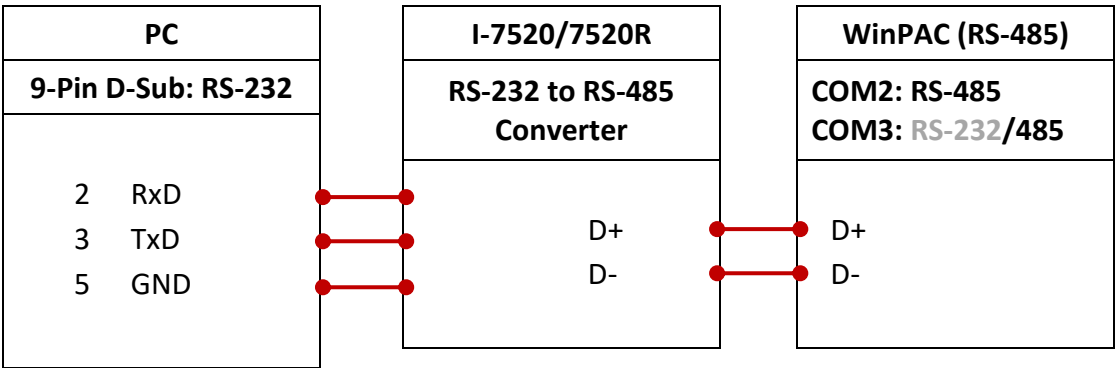
COM1: RS-232	COM2: RS-485
	

A.6 Connecting PC to the COM Port of the WP-8x47

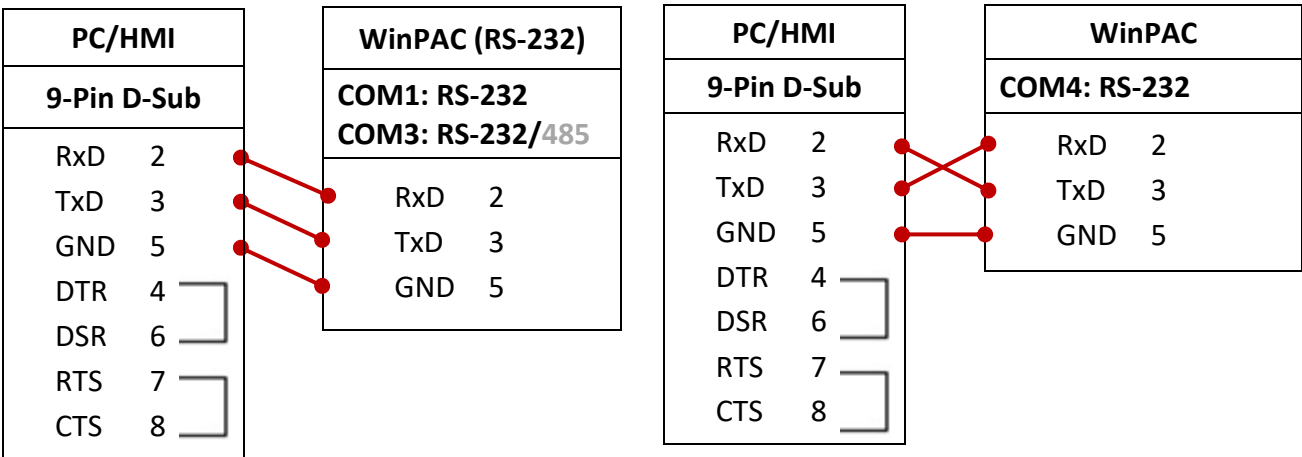
The default setting of Modbus RTU Slave port is “None”. User may change it to “COM2: RS-485” or “COM3: RS-232/485” or “None”. Refer to “A.2: Modify the NET-ID & Modbus RTU port setting” and Appendix G, E for more details about Modbus RTU ports. By default, the communication parameter is “19200,8,N,1”



When connecting PC to WinPAC COM2 or COM3 's RS-485, a I-7520 (RS-232/485 converter) is necessary.



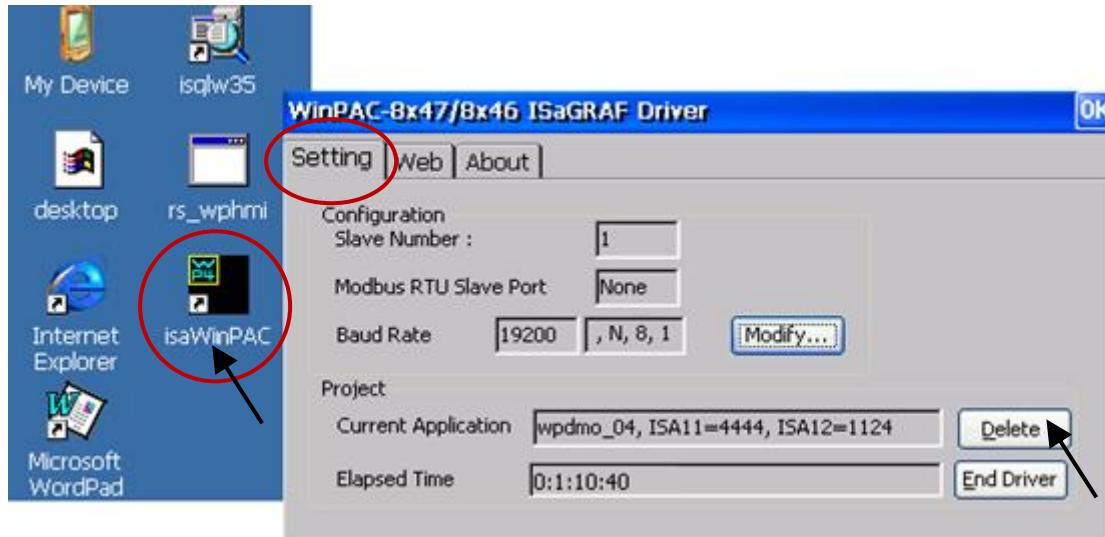
For the ISaGRAF Workbench RS-232 communications to operate properly, only the RXD, TXD, and the GND signals are used. If your PC is running a hardware device or software program that uses the CTS and DSR signals, you will need to wire the RTS-CTS and DTR-DSR signals together.



A.7 Deleting the ISaGRAF Project from the WP-8x47

For some reasons, user may delete the ISaGRAF program in the WP-8x47 PAC.

Click on “Setting” tab and click the “Delete” button to delete the ISaGRAF project.



If some software damage happens causing the WinCE software hanging, using this way to delete WP-8x47's ISaGRAF program.

1. Turn the rotary switch to the position 1 (Safe mode) on the front panel of the PAC and reboot.
2. The PAC will be powered on in safe mode. There will be a pop-up window says "... reboot right now ...", answer "No".
3. Double-click the "My Device" icon on the WinCE desktop. Go to the "\\System_Disk\\isagraf\\" directory and delete the "ISA11". "ISA11" is the ISaGRAF current running application. If there is no "ISA11" in the \\System_Disk\\ isagraf\\ directory, go to Explorer > View > Options to modify the setting.
4. Turn the rotary switch to the position 0 (Normal mode) and reboot again.

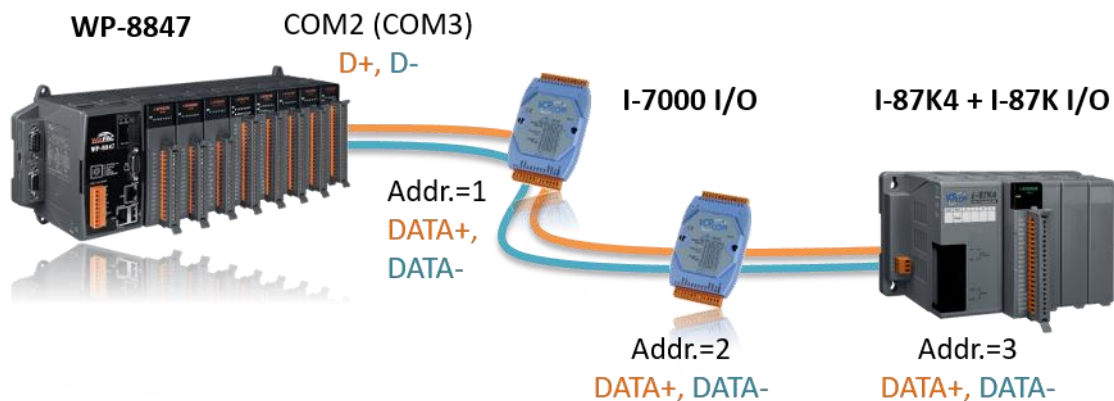
When the connection between ISaGRAF and PAC is established, the ISaGRAF window will display "No Application". Refer to Section 4.3 for more details.

A.8 Linking I-7000 and I-87K Modules for Remote I/O

The WP-8x47 PAC system can use one of its COM2 or COM3 's RS-485 signal to link to ICP DAS's "I-7000" and "I-87K" remote I/O modules. This configuration can be very useful in applications that require distributed remote I/O throughout the system.

You can link up to **255** I-7000 or I-87K series remote I/O modules to one WP-8x47 PAC system (It is better no more than 40 pcs. of I-7000 or I-87K). Each of I-7000 and I-87K module must be set a unique address, and be set to the same baud rate as the WP-8x47.

Refer to Chapter 6 of ISaGRAF User Manual - "Linking to I-7000 and I-87K Modules" for more details on setting up and programming an I-7000 / I-87K remote module.



A.9 Linking to an HMI Interface Device

One of the COM2 (RS-485) or COM3 (RS-232 or RS-485) (or max. four of the COM1, 4 and 5 to 8, refer to Appendix G & E) ports of the WP-8x47 can be used to interface with additional Human Machine Interface (HMI) devices such as touch displays.

Refer to section A.2 to choose Modbus RTU Slave por. ICP DAS provides a full line of touch screen displays, such as the "Touch" series screens. The models in the product line include the Touch 506, and Touch 510 HMI or other Touch 8000 series products.

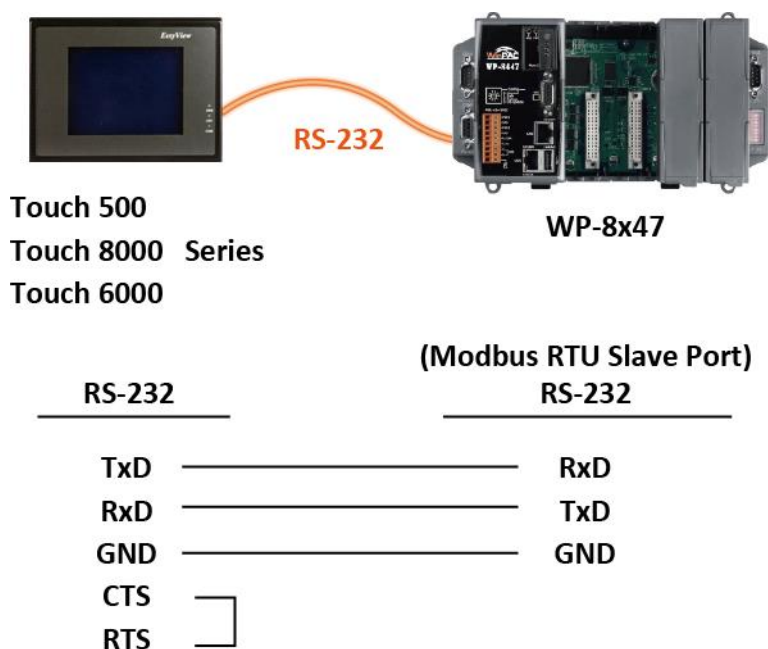
For more information, refer to:

1. ISaGRAF User's Manual. It is listed in Section 4.4

<http://www.icpdas.com/en/download/show.php?num=333>

2. Touch Panel Monitor User Manual

<http://www.icpdas.com/en/download/show.php?num=432>



Note:

Touch 500 series products have been phased out, visit the website for new information about products.

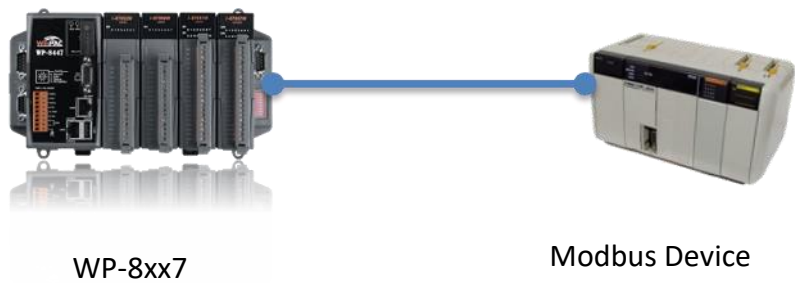
Touch Monitor:

http://www.icpdas.com/en/product/guide+Panel__Products+Display+Touch__Monitor

A.10 Linking to Other Modbus Devices

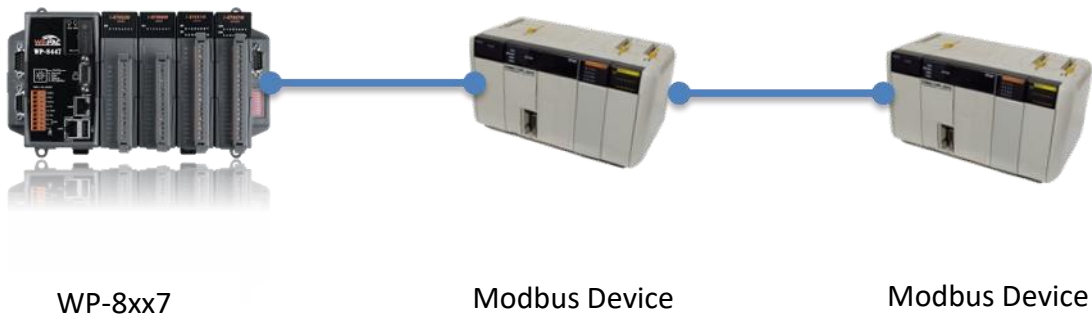
The COM2 (RS-485) or COM3 (RS-232/485) (or COM1, 4 and COM5 to 14, refer to Appendix E) supports Modbus Master protocol. Refer to Chapter 8 of ISaGRAF User Manual for more information.

RS-232:



COM1, 3		RS-232
TXD 2	_____	RXD
RXD 3	_____	TXD
GND 5	_____	GND
		CTS <input type="checkbox"/>
		RTS <input type="checkbox"/>

RS-485:

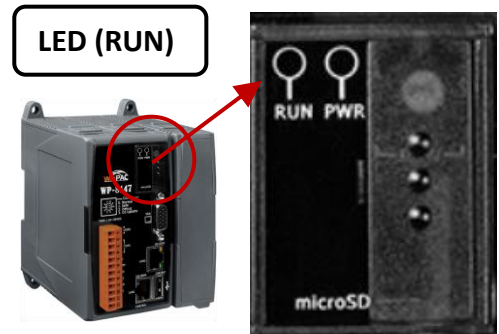
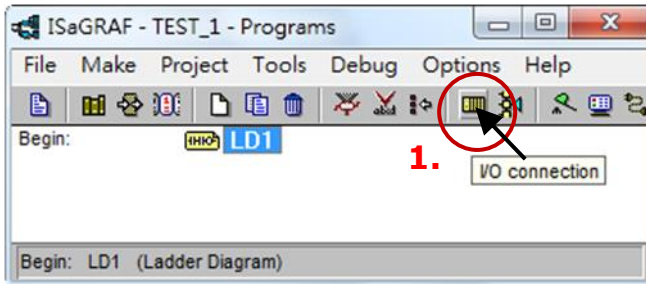


COM2 or COM3		RS-485		RS-485
D +	_____	485 +	_____	485 +
D -	_____	485 -	_____	485 -

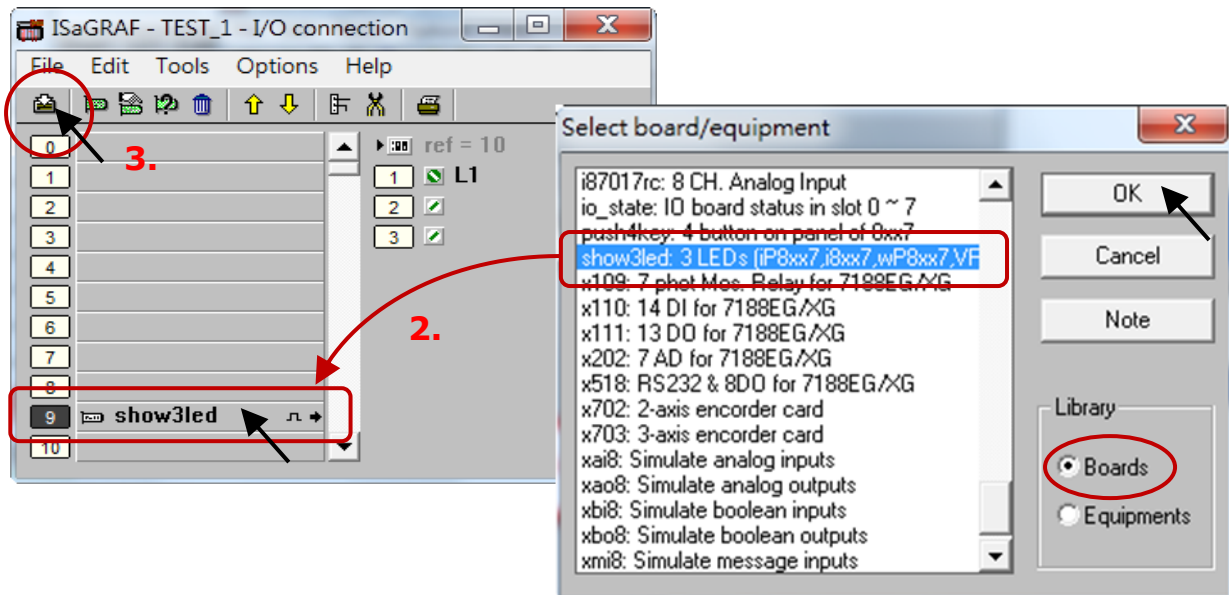
A.11 Control the LED Indicator

WP-8x47 has one programmable LED indicator (RUN) on the panel. In the ISaGRAF, you can use “show3led” function in the “I/O Connection” window to control the LED indicator.

1. Click “I/O Connection” to open the window.



2. In the “I/O Connection” window, double-click on a slot number larger than (or equals) “9” and select “show3led” then click “Save”.

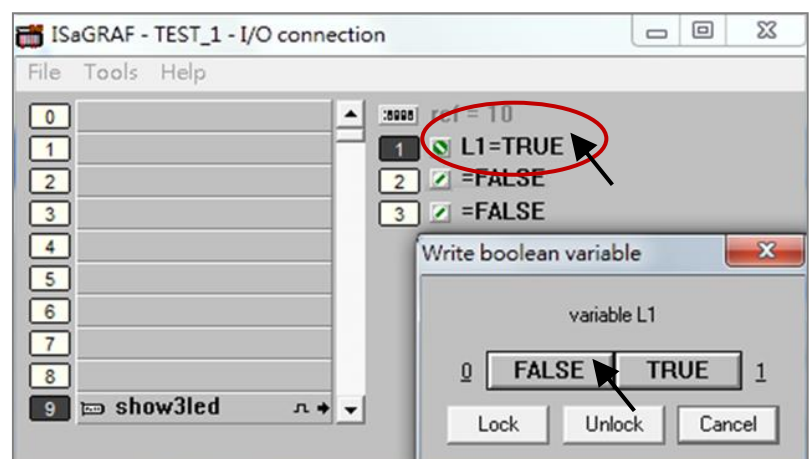


Important Notice:

Slot 1 to 8 are reserved for I/O expansion boards. User can only use the slot 9 or after to set others I/O board.

3. Refer to [Section 4.2](#), [4.3](#) to compile the program and then download to the PAC.
4. After downloading, open the “I/O Connection” window.

Change the status of I/O (FALSE/ TRUE) then view the change of the LED indicator on the front panel of the PAC.



Appendix B Upgrade ISaGRAF WinPAC Driver

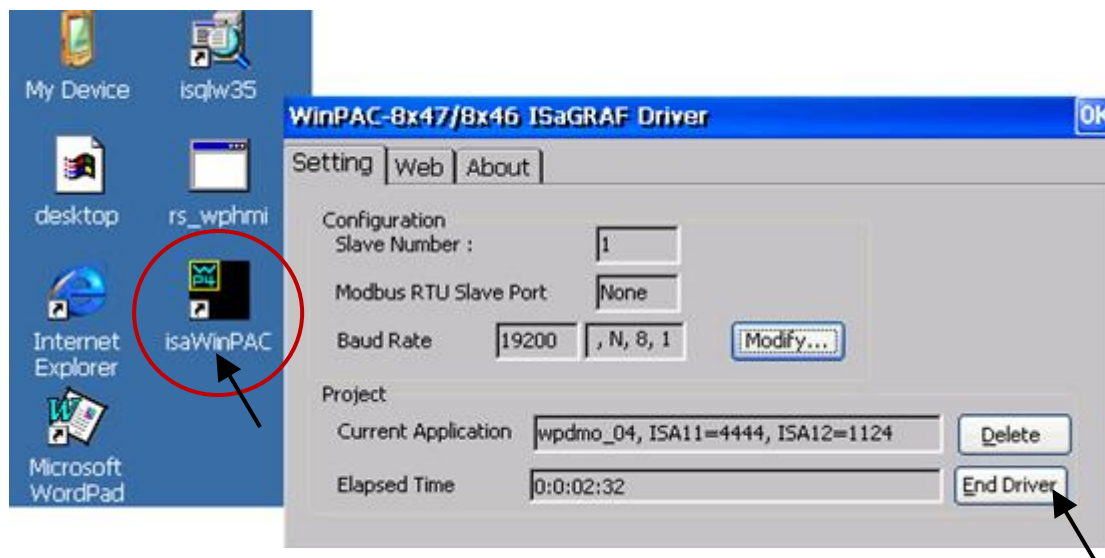
Note:

If you have purchased WP-8x47, the ISaGRAF driver is already installed with license when shipping out. It's necessary to install the driver. However, if a newer version is needed, you may follow the steps to upgrade the driver.

Visit the website to download the latest version of ISaGRAF driver.

<https://www.icpdas.com/en/download/show.php?num=368>

1. Open the ISaGRAF Driver window and click the “End Driver” button to stop running.



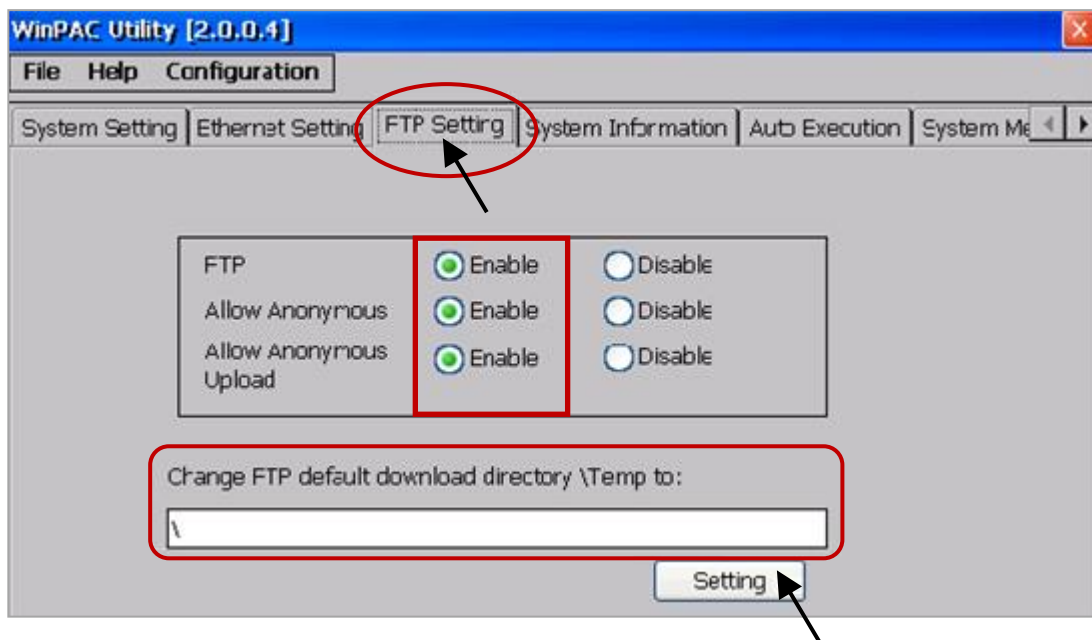
2. Set up WinPAC's IP address, Mask address, FTP directory, and the Auto-execute function.

- A. Create a folder named “isagraf” in the “\System_Disk” folder on the WinPAC. That is \System_Disk\isagraf\.
- B. Run “Start” – “Setting” – “Control Panel” on the WinPAC and double-click on “Network and Dial-up Connections”. Then click on “LAN1” or “LAN2” to set both the IP address and subnet mask address.

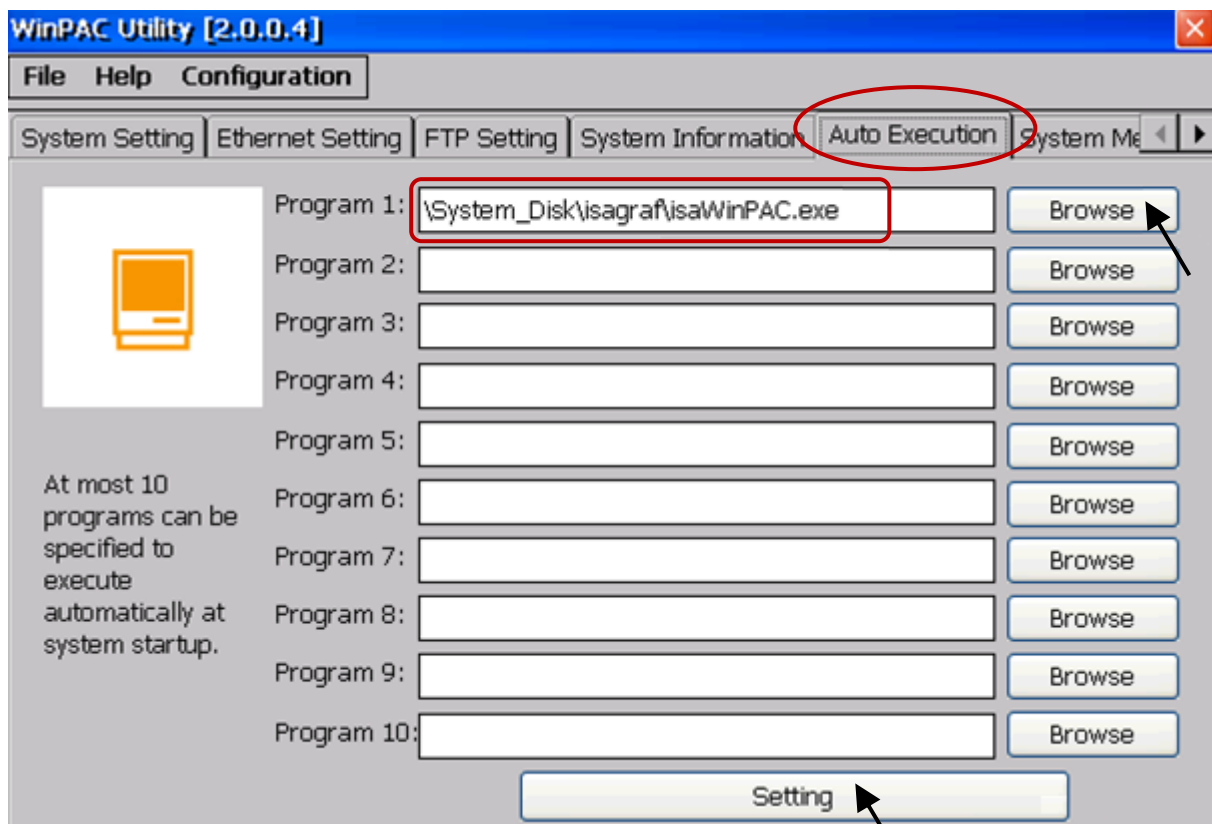
(Only using the fixed IP for ISaGRAF application, No DHCP)



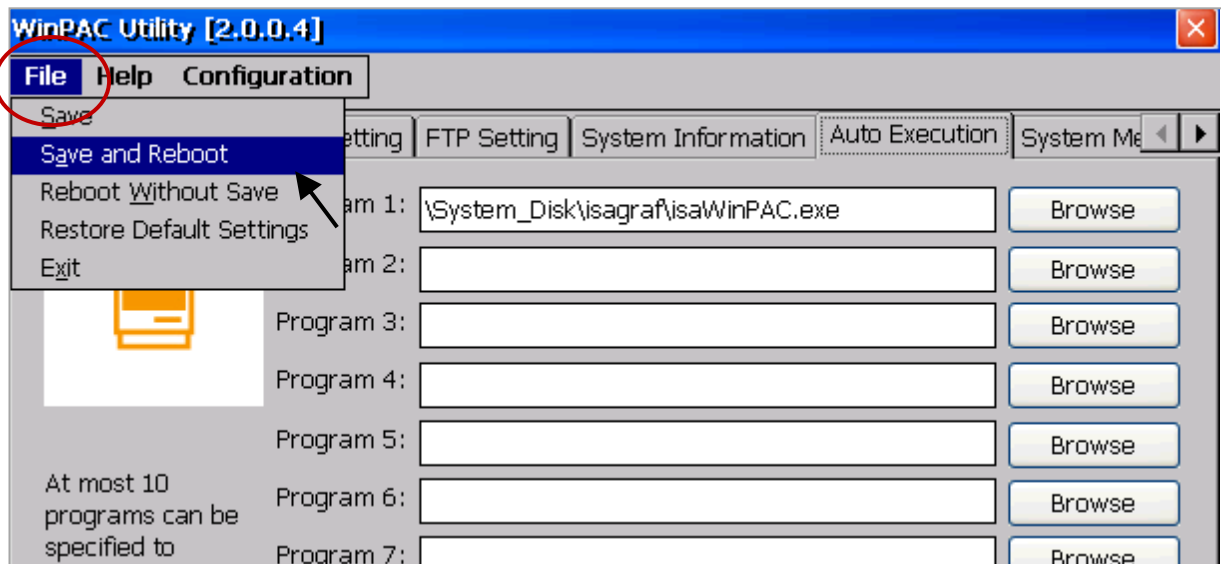
- C. Run WinPAC Utility on PAC desktop. On the FTP Setting page, set all three FTP options as “Enable”, set the FTP Directory to “\” (root), and click the “Setting” button.



- D. On the Auto Execution page, click the “Browse” button to select the file path or type “\\System_Disk\isagraf\isaWinPAC.exe” and click the “Setting” button.

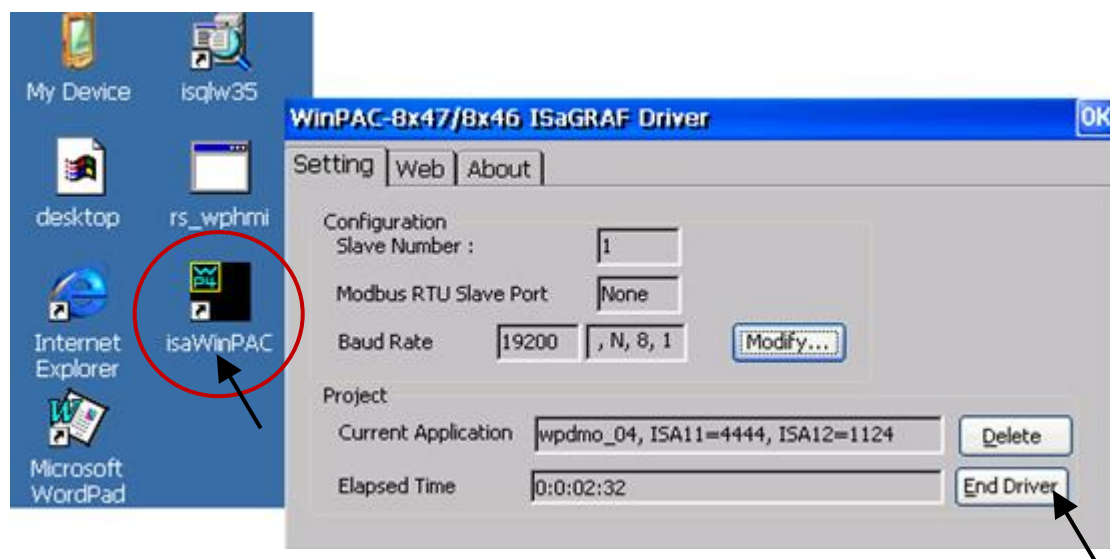


E. After completing the setting, it must to reboot the PAC by clicking File and Save and Reboot.



3. After the WinPAC is powered on, stop running the ISaGRAF driver again.

Note: If the ISaGRAF driver is running, it cannot be updated even the user has done the procedure.



4. Next, it needs to download the WP-8x47 driver from PC to WinPAC directory (i.e., “\System_Disk\isagraf\”). The following files are included in the driver version 1.16 and files may be different in different version.

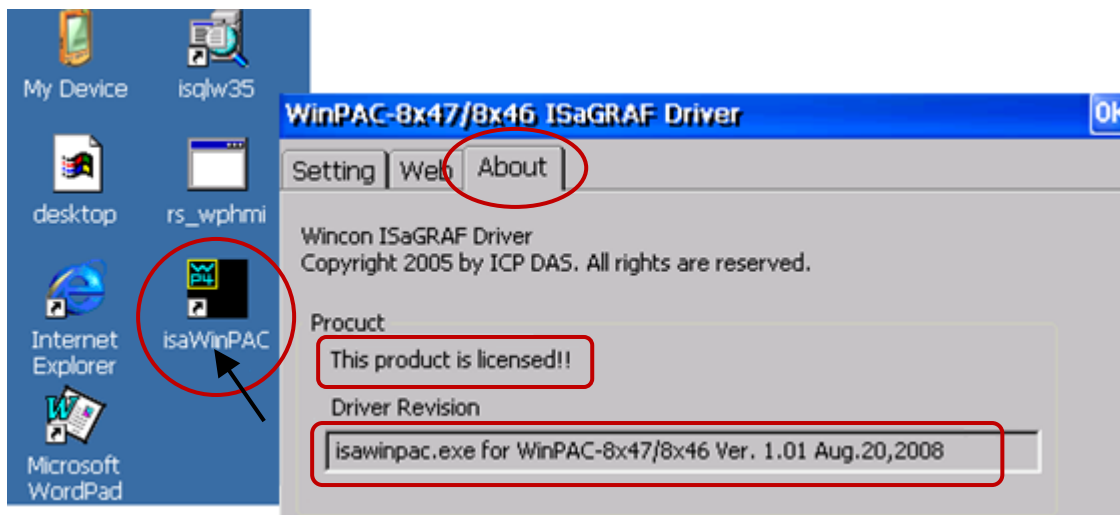
isaWinPAC.exe, rs_wphmi.exe
mscorlib.dll, QuickerNet.dll, Quicker.dll, login.dll, main.dll, whmi_filter.dll
isaWinPAC.lnk, isa_el.dll and sharedmemory.dll

When using **WP-8xx1/8xx9**, the WinPAC without installing ISaGRAF), the user needs to download the “**license.bin**” file.

These files can be downloaded by using FTP:

Open the Internet browser and then type in <ftp://<IP address>>, for example, <ftp://192.168.1.178>, and copy-and-paste the WP-8x47 driver to the \System_Disk\isagraf\. Then, reboot the WinPAC.

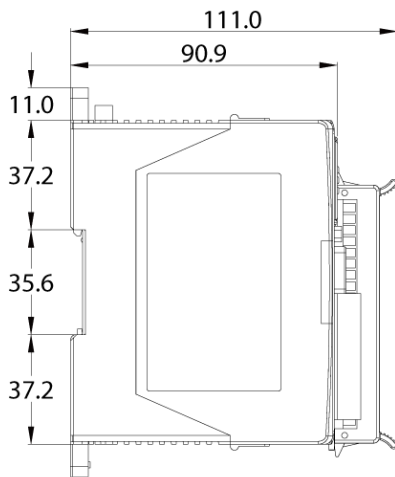
After the PAC is powered on, the new ISaGRAF driver is running automatically. Open the ISaGRAF Driver window to see if the version is correct.



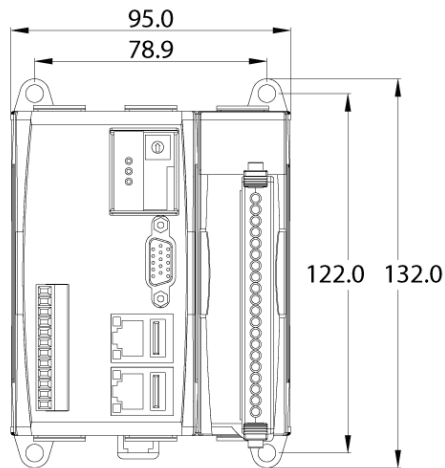
Appendix C Dimension

Unit: mm

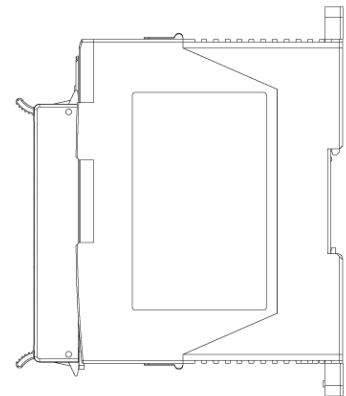
WP-8147



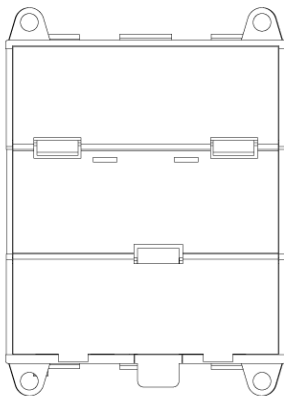
Left Side View



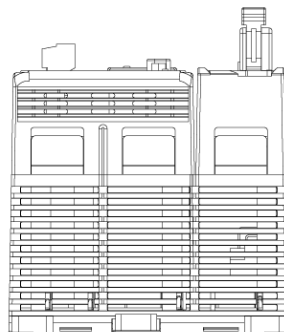
Front View



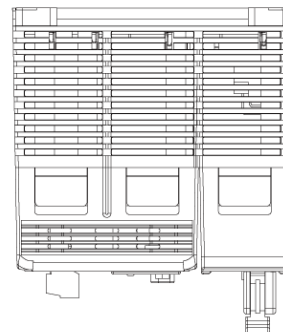
Right Side View



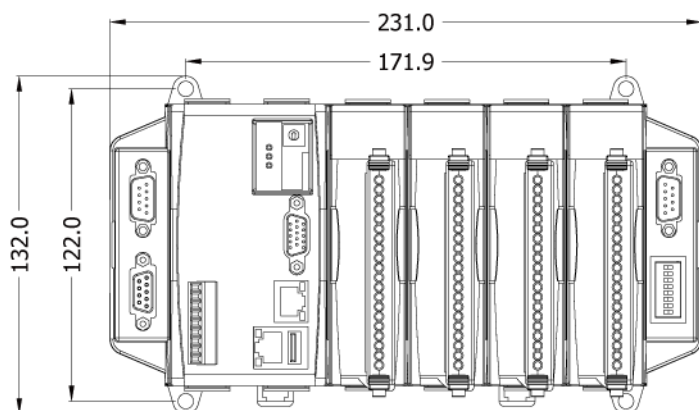
Back View



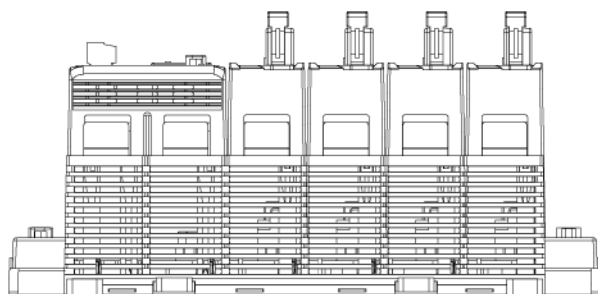
Bottom View



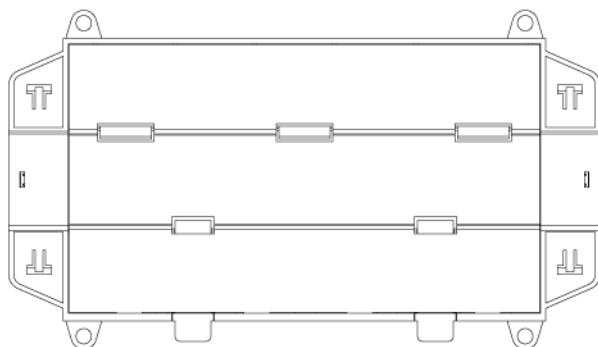
Top View



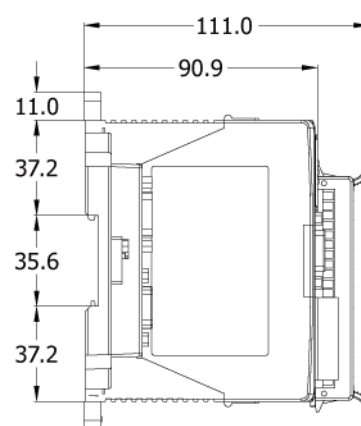
Front View



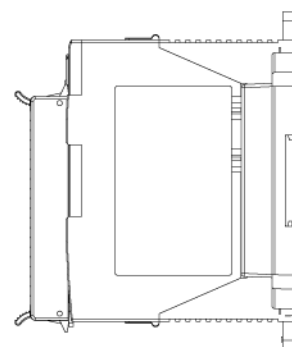
Bottom View



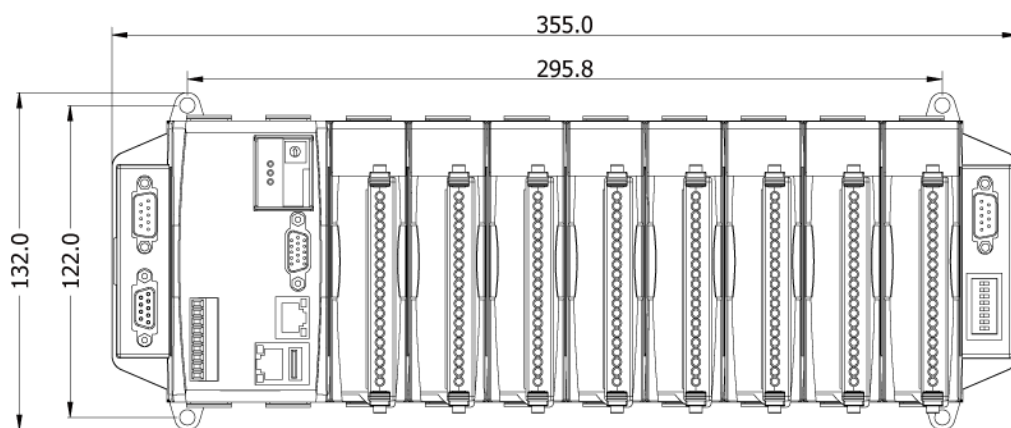
Back View



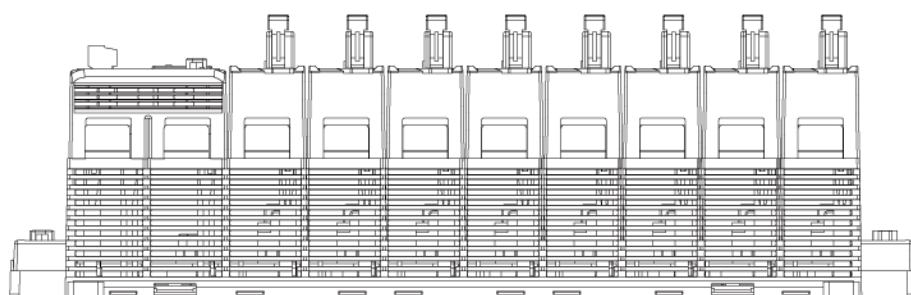
Left Side View



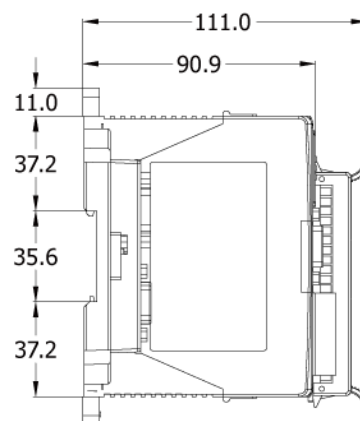
Right Side View



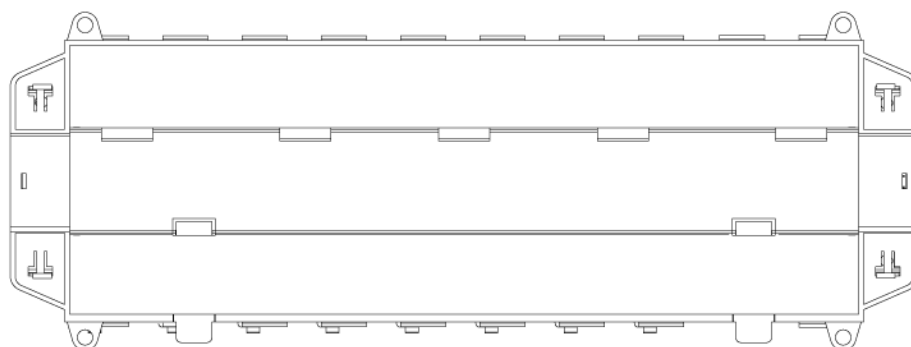
Front View



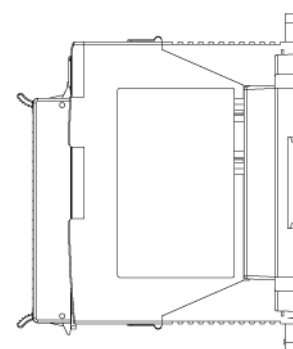
Bottom View



Left Side View



Back View



Right Side View

Appendix D How to Enable/Disable WP-8x47's LAN2

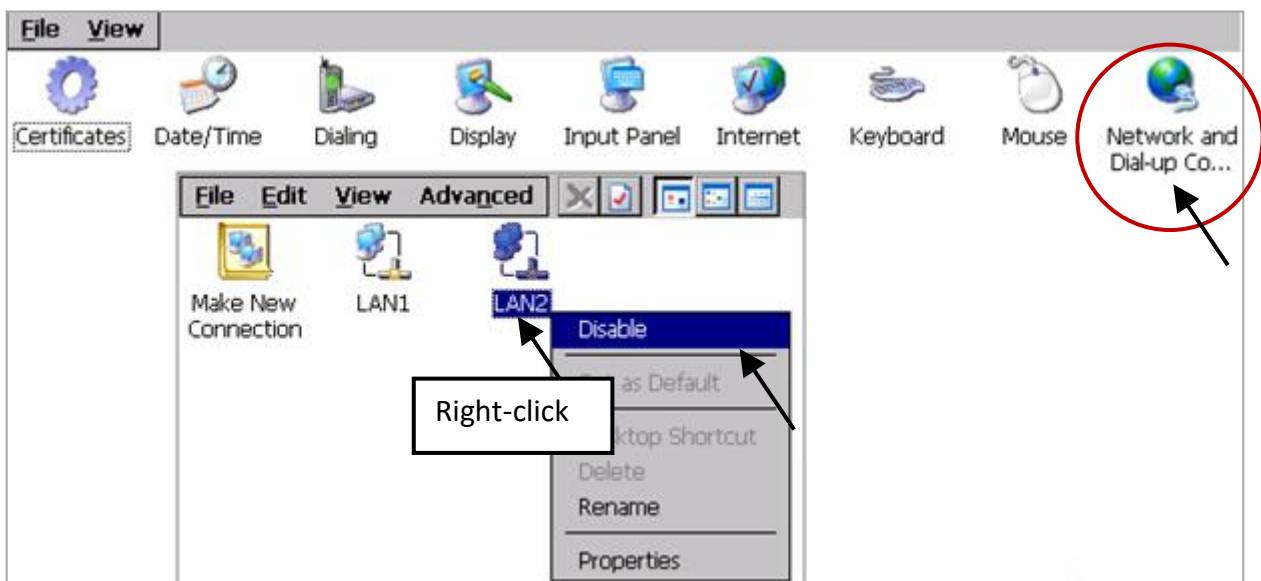
Important Notice:

1. Recommend to use Industrial Ethernet Switch, e.g., NS-205/208 or RS-405/408 (Ring Switch).
2. For ISaGRAF applications, set a fixed IP to LAN1 or LAN2 when it is enabled.

By default, the LAN2 port of WP-8x47 is disabled. Enable the LAN2 port before using it.

Click [Start] > [Setting] > [Control Panel] on the PAC and double-click the “Network and Dial-up Connections” icon, then right-click on LAN2 and set it as Enable (or Disable).

Run [Start] > [Programs] > [WinPAC Utility], click “Save and Reboot” to save the setting.



For ISaGRAF applications such as Ebus or redundant system, the LAN2 port of WP-8x47 must be used. Also, the LAN2 can be used for sending message via UDP or TCP protocol.

Refer to the ISaGRAF User Manual for more information.

Section 7.5: Programming the Ebus

Section 19.2: Delivering Message via UDP

Section 19.3: To Send/ Receive/ Auto-Report data via TCP/IP

Section 20.2: WP-8xx7 Redundant System

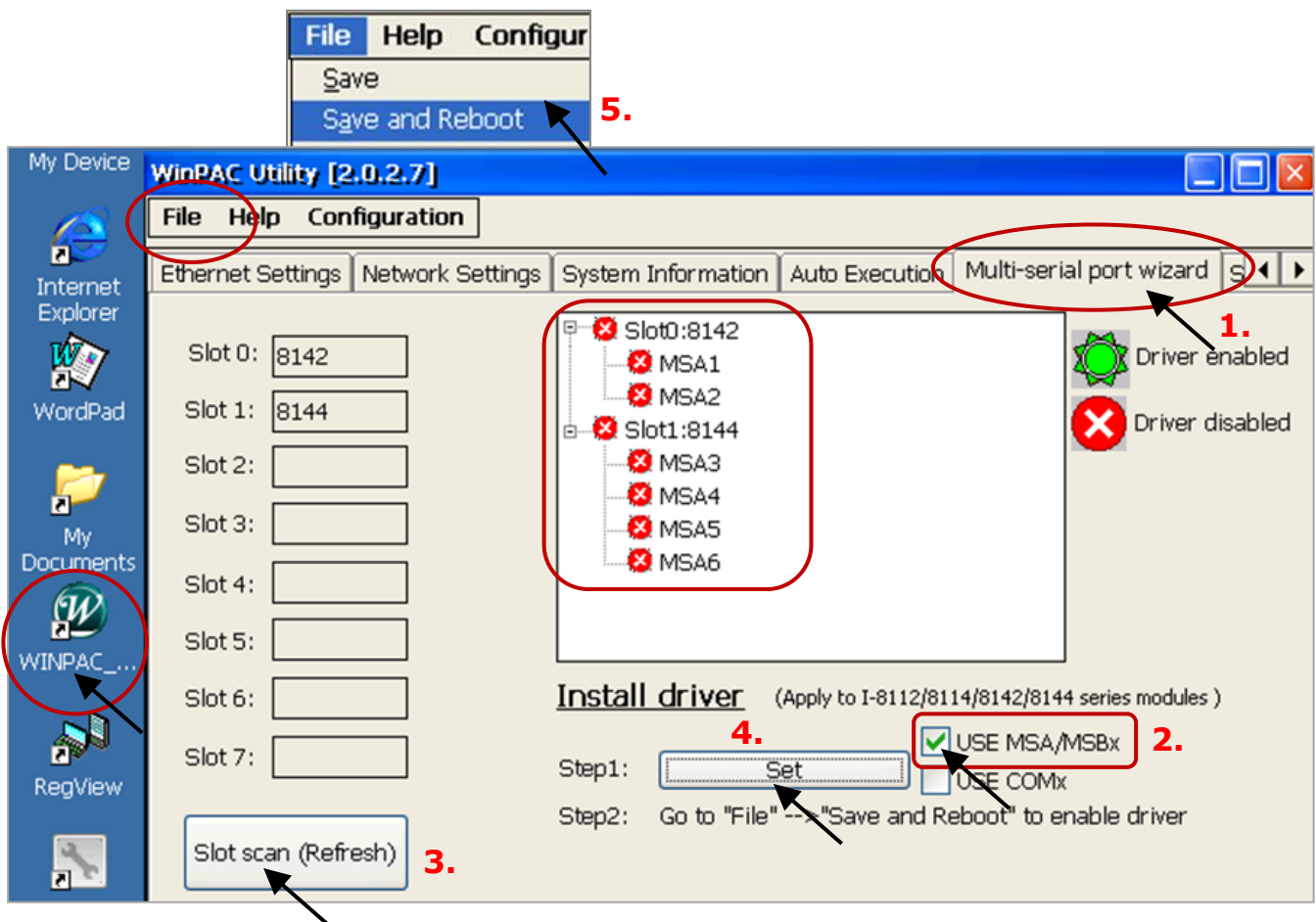
Appendix E Using RS-232/485/422 Expansion Modules

The WinPAC can expand 16 more COM ports in its slot 0 to 7 by using following modules.

- I-8112iW: 2-channel isolated RS-232
- I-8114iW: 4-channel isolated RS-232
- I-8114W: 4-channel non-isolated RS-232
- I-8142iW: 2-channel isolated RS-422/RS-485
- I-8144iW: 4-channel isolated RS-422/RS-485

Using “WinPAC Utility” (since version 2.0.0.6) to configure these modules before using them. Plug modules into slot 0 to 7 on the WinPAC. (It is better to be in slot 0 to 3)

1. Run [WinPAC Utility] and click the [Multi-serial port wizard] tab.
2. For ISaGRAF application, make sure that “Use MSA/MSBx” is selected.
3. Click on “Slot scan”. The current found multi-serial port modules will be displayed on the left. The original COM port setting is displayed on the right.
4. Click “Set” to display the current found modules on the right.
5. Click [File] > [Save and Reboot] to save the setting and reboot the WinPAC.

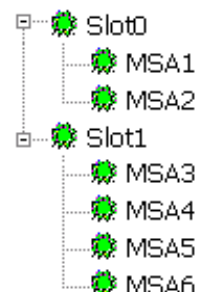


After the configuration succeeds, the COM port No. for the expansion board is COM5 to COM20 in the ISaGRAF definition.

The relation between WinPAC's COM setting and the ISaGRAF definition is as the following.

WinPAC	ISaGRAF	WinPAC	ISaGRAF
MSA1	COM5	MSB1	COM13
MSA2	COM6	MSB2	COM14
MSA3	COM7	MSB3	COM15
MSA4	COM8	MSB4	COM16
MSA5	COM9	MSB5	COM17
MSA6	COM10	MSB6	COM18
MSA7	COM11	MSB7	COM19
MSA8	COM12	MSB8	COM20

For example, Slot 0: I-8142iW
Slot 1: I-8144iW

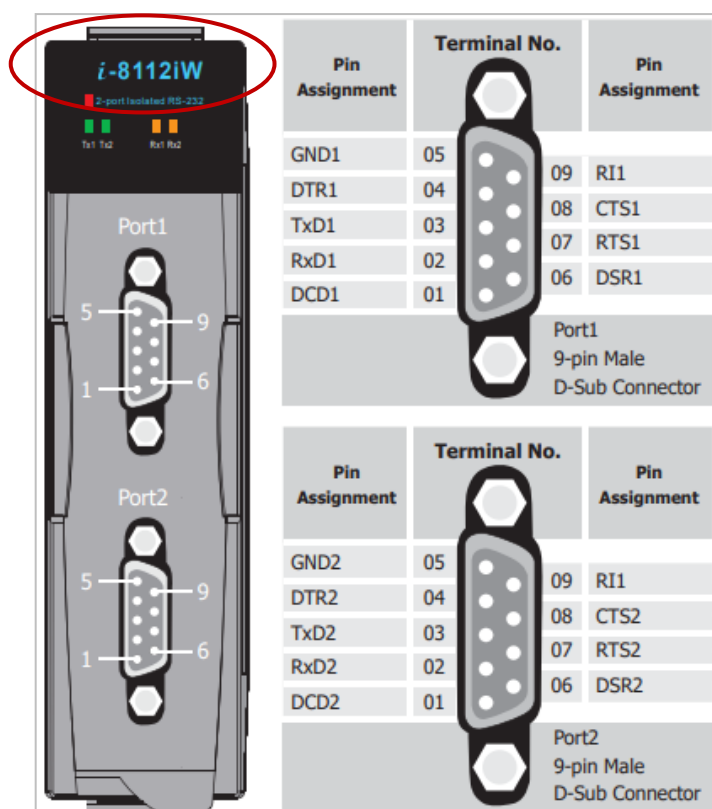


Note:

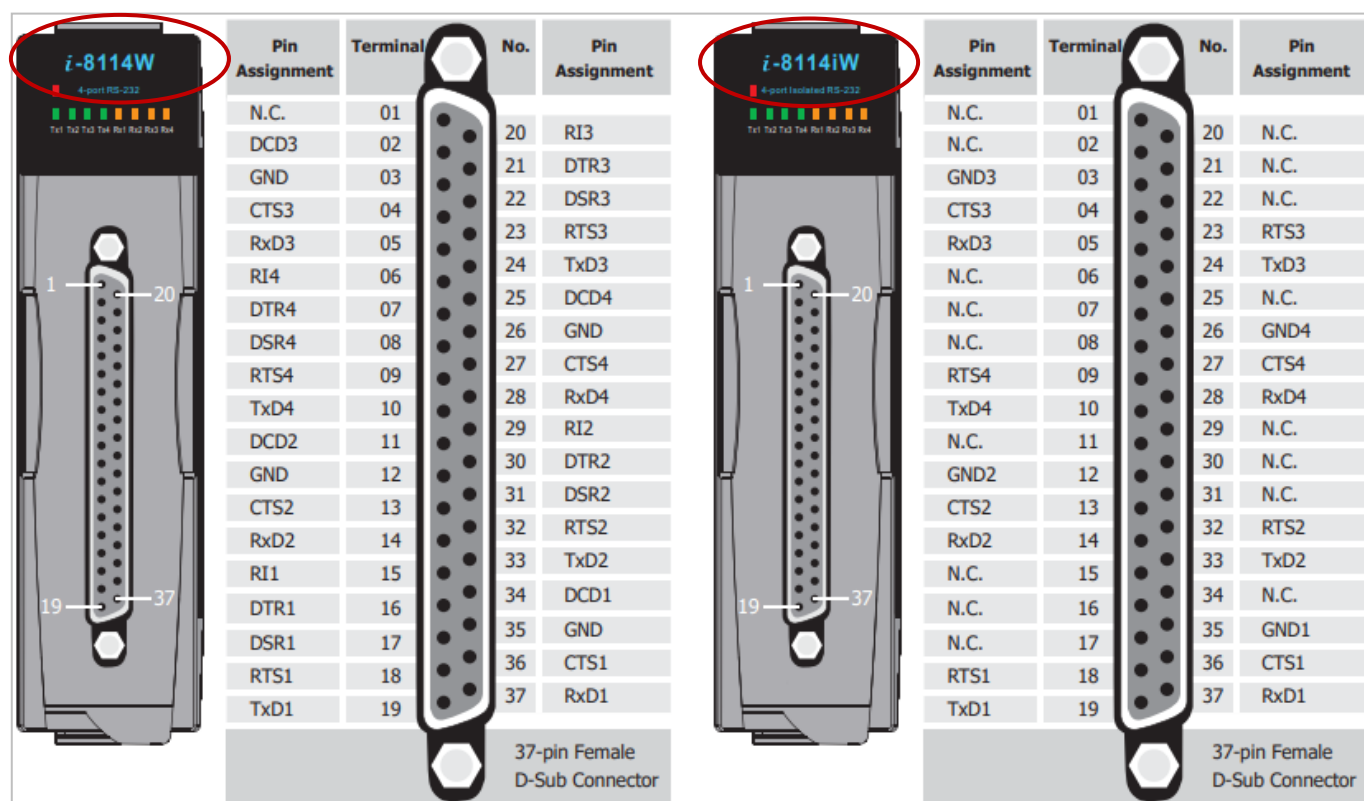
1. Refer to Section 8.4 of the ISaGRAF user manual for more about multi-ports Modbus Master. WP-8x47 support Modbus RTU/ASCII Master ports in ten of the COM1 to COM14.
2. Refer to Appendix A.4 of the ISaGRAF user manual for more details on using COM_OPEN, COM_READ, ... functions to read/write COM ports.
3. Refer to Appendix G of this manual for more details on setting up Modbus RTU Slave ports.

Pin assignment:

I-8112iW:

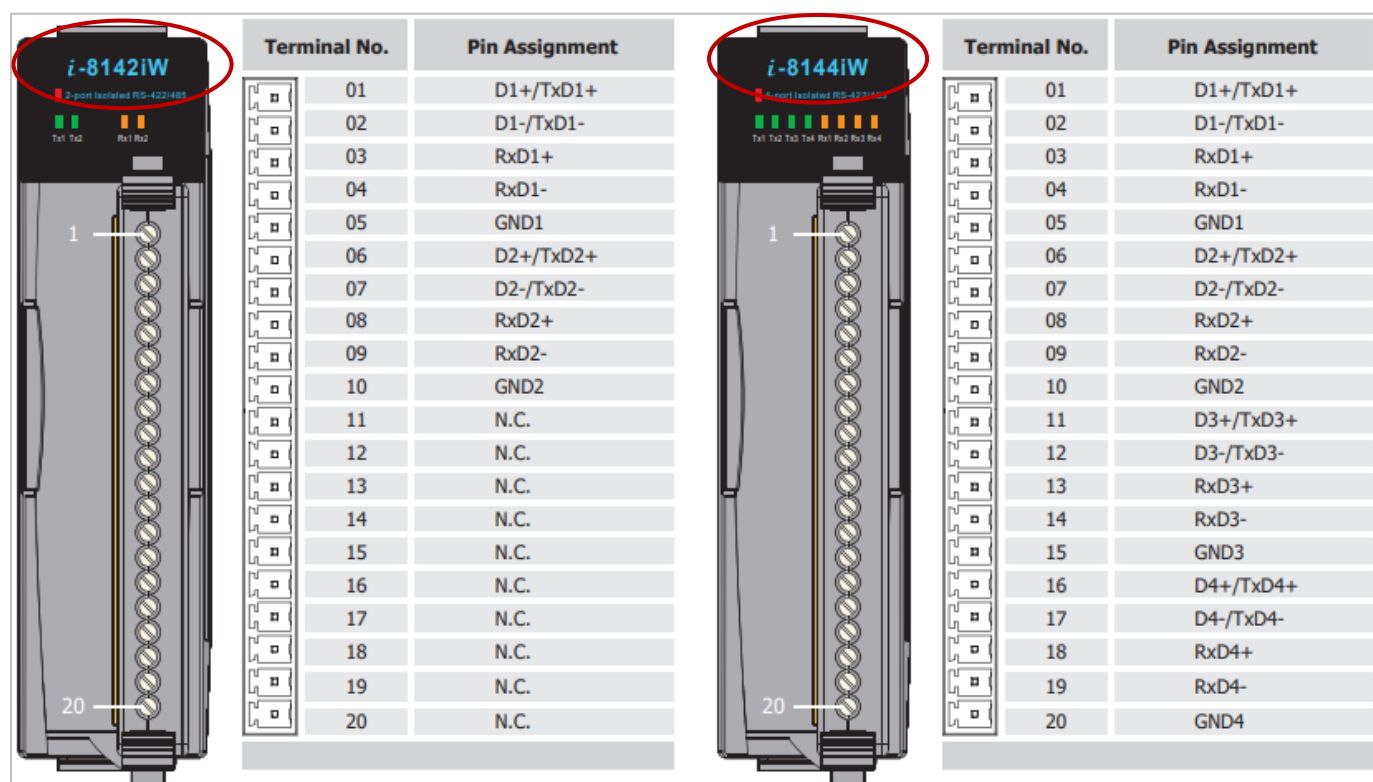


I-8114W / I-8114iW:



I-8142iW / I-8144iW:

RS-485: (D+, D-) ; RS-422: (TxD+, TxD-, RxD+, RxD-)



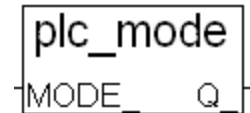
Appendix F Slow Down ISaGRAF Driver's Speed

The reason to slow down the speed of ISaGRAF driver is when you running some other HMI program (For example, InduSoft, or VB.net program) with ISaGRAF at the same time. There is only one CPU, all programs running in WinPAC must share execution time of the same CPU. If you feel the HMI program behavior is not so smooth, or slow, you may use ISaGRAF "PLC_Mode()" function to slow down the speed of the ISaGRAF driver.

PLC_Mode

Description:

Function Change the ISaGRAF driver speed.



Argument:

MODE_ integer Can be 0, 1, 2, or 3

0: Fast Mode, Default setting, the minimum PLC scan time is about 2 to 3ms

1: Slow Mode, the minimum PLC scan time is about 6 to 7ms

2: Slower Mode, the minimum PLC scan time is about 9 to 11ms

3 or other value: Slowest Mode, the minimum PLC scan time is about 19 to 21ms

Return:

Q_ boolean always return True.

Note:

1. The system default setting is "Fast Mode".
2. User may call "PLC_mode()" function at the first PLC scan to change the PLC speed.
3. The reason to slow down the PLC speed is to improve system performance while running both HMI program and ISaGRAF driver at the same time. For example, both InduSoft and ISaGRAF are running in the same WinPAC.

Example:

```
(* TMP is declared as Boolean internal variable *)
(* INIT is declared as Boolean internal variable and init at TRUE *)
if INIT then
  INIT := False ; (* Only do it once in the 1st PLC scan *)
  TMP := PLC_mode(2) ; (* Set PLC speed to 2:slower mode *)
end_if ;
```

Appendix G Setup More Modbus RTU Slave Ports

WP-8x47 support up to **five** Modbus RTU Slave ports, i.e., one of the COM2 or COM3 and in four of the COM1 to COM8. Refer to [Appendix E](#) for more details on using multi-port modules in slot 0 to 3 to add COM5 to COM8.

Note:

There is no COM3 and COM4 on WP-8147. (WP-8447/8847 have COM3 and COM4)

1. The first Modbus RTU Slave port can be one of the COM2 or COM3 which can be set on the PAC desktop by using mouse (refer to the [Appendix A.2](#)).
2. The user may enable 2nd, 3rd, 4th or 5th Modbus RTU Slave port in COM1 to COM8. (No support other COM port number)
3. Before using this function, make sure that the above ports do exist and well configured. Refer to the [Appendix E](#) for more information.
4. The user can use ISaGRAF to debug or set values via the 2nd, 3rd, 4th or 5th enabled Modbus RTU Slave port on the PAC, but **cannot** stop, download, or update the ISaGRAF program.

However, the user can debug, set value, stop, download, or update the ISaGRAF program via an Ethernet port or the first enabled Modbus RTU Slave port on the PAC.

How to setup?

Set the "Rtu_slav" function in the ISaGRAF IO connection window. Re-compile the project and download it to the WinPAC via Ethernet (or the first enabled Modbus RTU port).

1. I/O connection

2. Rtu_slav

3. Rtu_slav: 2nd ~ 5th Modbus RTU slave port

4. remot

RTU_Slave_Port2 to 5: Specify which COM port is enabled (1 to 8), 0 means not enable it. Baud rate setting can be 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

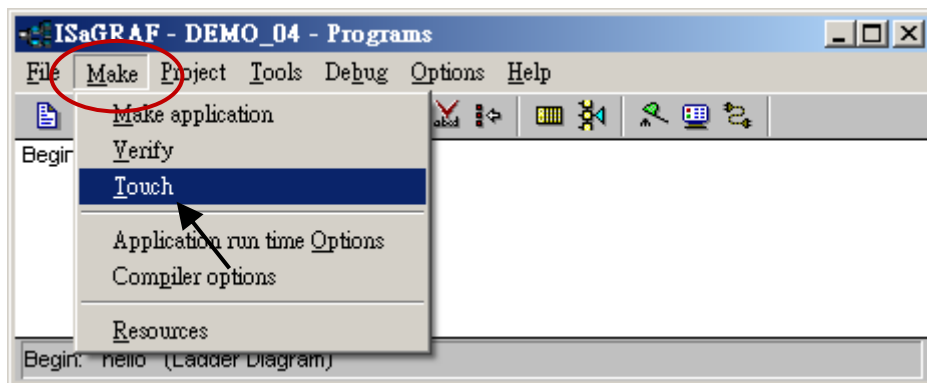
4-ch Boolean inputs: Display whether the specific port is enabled or not. True: Enabled. False: disabled.

Appendix H Compiling Error Result in Different ISaGRAF Version

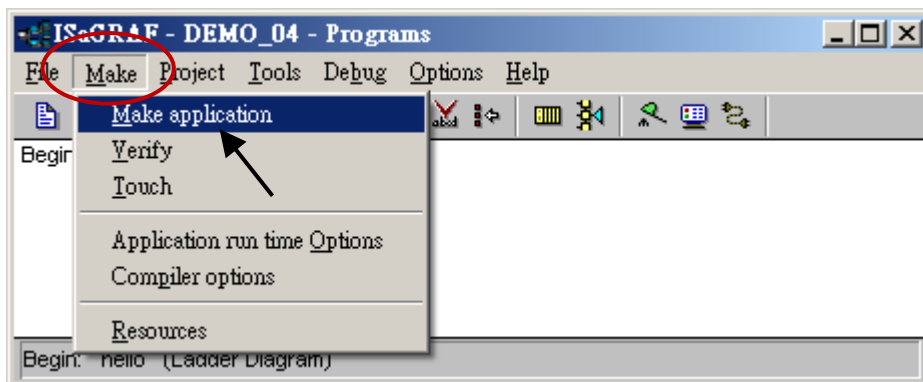
Since 2003, all the ISaGRAF example programs provided on the website are written in ISaGRAF workbench version of 3.46. If your ISaGRAF workbench is version of 3.51 or newer version, it may display error message when you re-compile these example programs.

To erase this kind of error in different ISaGRAF workbench version, run “Make” – “Touch” once and re-compile this example project.

The “Make” – “Touch” command will reset all files that have been successfully compiled to become “Not compiled yet”.



Then the “Make” – “Make application” command will re-compile all of them.



Appendix I Using RS-232 Serial/USB Touch Monitor

There are three types of RS-232 Serial or USB Touch monitor supported by the WP-8000 series.

“penmount_serial_touch”, “penmount_usb_touch”, or penmount-compatible Touch monitor.

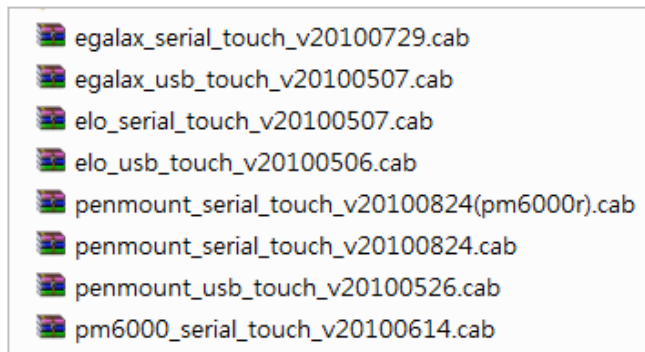
“elo_serial_touch”, “elo_usb_touch”, or elo-compatible Touch monitor.

“egalax_serial_touch”, “egalax_usb_touch”, or egalax-compatible Touch monitor.

I.1 Touch Monitor Drivers and Notice for installing

Touch monitor drivers for the WP-8000 series are placed in the PAC folder at “\System_Disk\external_device_driver\”. This folder includes the following drivers, and you must select the correct one to execute!

The file name with the word “_vyyyymmdd” stands for the version number and the updated date.



Notice:

1. To avoid hardware conflicts, do not install both USB and RS-232 drivers.
2. If the wrong driver has been installed, perform the uninstall command and reinstall it. Refer to [Appendix I.4](#) to uninstall the driver.
3. After the touch monitor driver installed, if the screen does not display properly (e.g., too large, too small, or moire, etc.). Refer to [Appendix I.5](#) to adjust the WinPAC display frequency.

The content in Appendix I, taking the "TPM-4100" touch monitor as an example:

10.4" 800 x 600 Aluminum Resistive Touch Panel with RS-232 or USB, and Power Supply.

http://www.icpdas.com/root/product/solutions/hmi_touch_monitor/touch_monitor/tpm-4100.html

Also, visit the **TPM-4100** download center to download the driver (.cab)

(<http://www.icpdas.com/en/download/index.php?model=TPM-4100>) and copy the file to the PAC folder at “\System_Disk\external_device_driver\” by FTP.

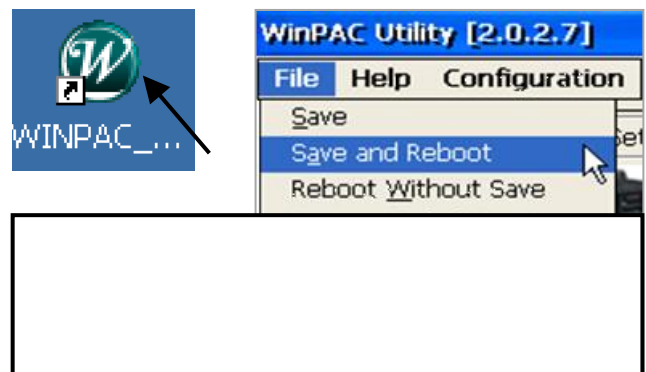
I.2 Using the USB Touch Monitor

4. **Connect each other with the USB port of the Touch monitor and PAC, and then start the PAC.** The WP-8x47 only has 1 USB that can be used alternately when setting up a driver for the touch monitor. Or, set up remotely with [VCEP](#).

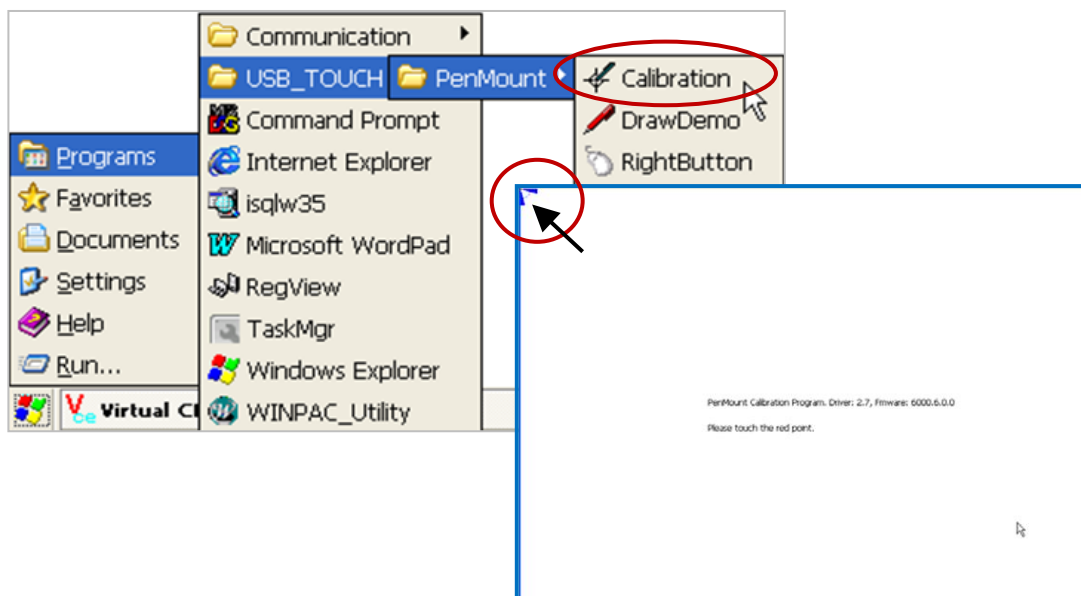


5. **Install the USB Touch Driver:**

Double-click the correct USB touch driver in the PAC folder “\System_Disk\ external_device_driver\”. In this example, the TPM-4100 driver is “PenMount_USB_TOUCH_V20100526”.



6. **Screen Calibration:** Click [Start] > [Programs] > [USB_TOUCH] > [PenMount] > [Calibration] to perform calibration by tapping the pointers that appear on the screen in sequence. Next, as in Step 2, perform “Save and Reboot” in the WinPAC Utility.



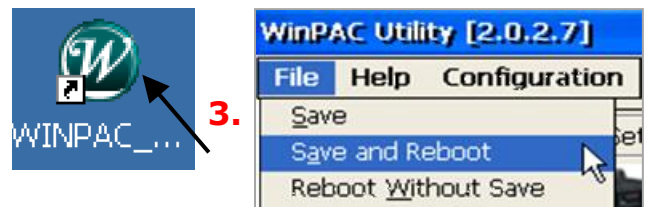
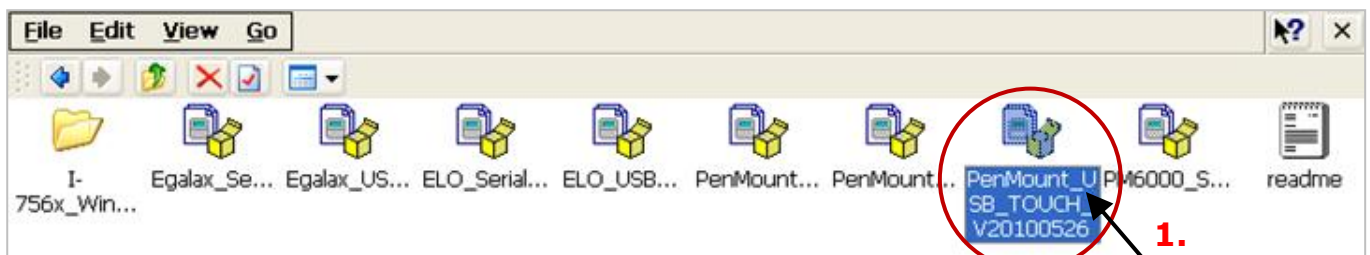
I.3 Using the RS-232 Serial Touch Monitor

1. Using a RS-232 cable to connect the touch monitor with COM4 of WP-8x47 (refer to [Appendix A.5](#) for the COM4 pin assignment) and install a USB mouse on the WP-8x47 for configuring the touch monitor driver. Then, start the PAC.



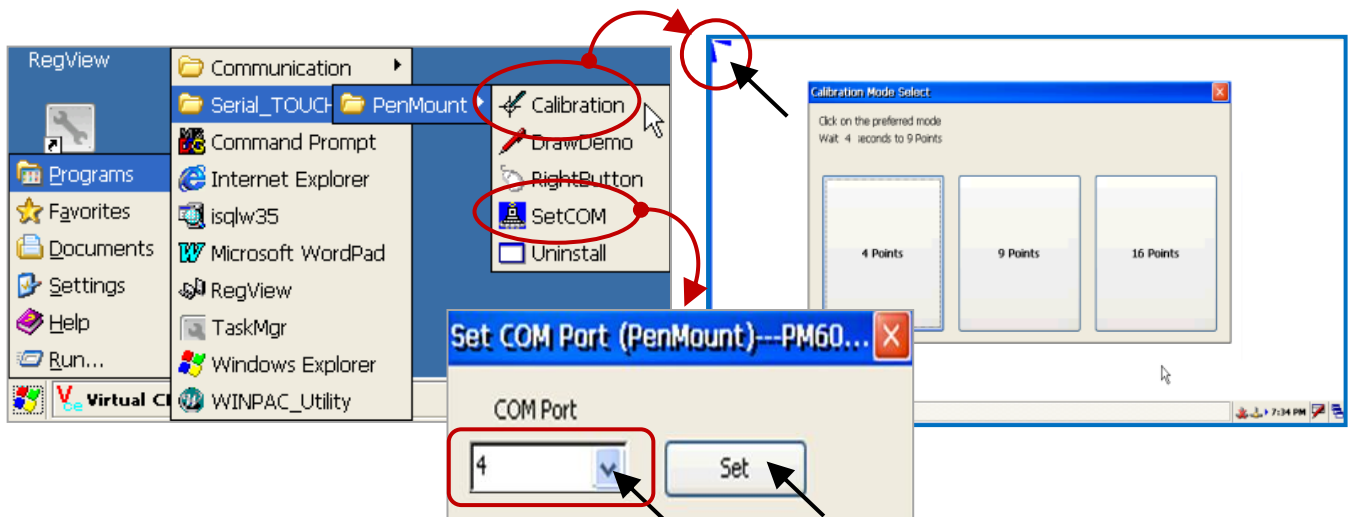
2. Install the Serial Touch Driver:

Double-click the correct serial touch driver in the PAC folder at \System_Disk\external_device_driver\. In this example, the TPM-4100 driver is “PenMount_Serial_TOUCH_Vyyyymmdd(PM6000R).CAB”.



Double-click “WinPAC Utility” on the PAC desktop, and click “File” > “Save and Reboot” to save settings and reboot the PAC.

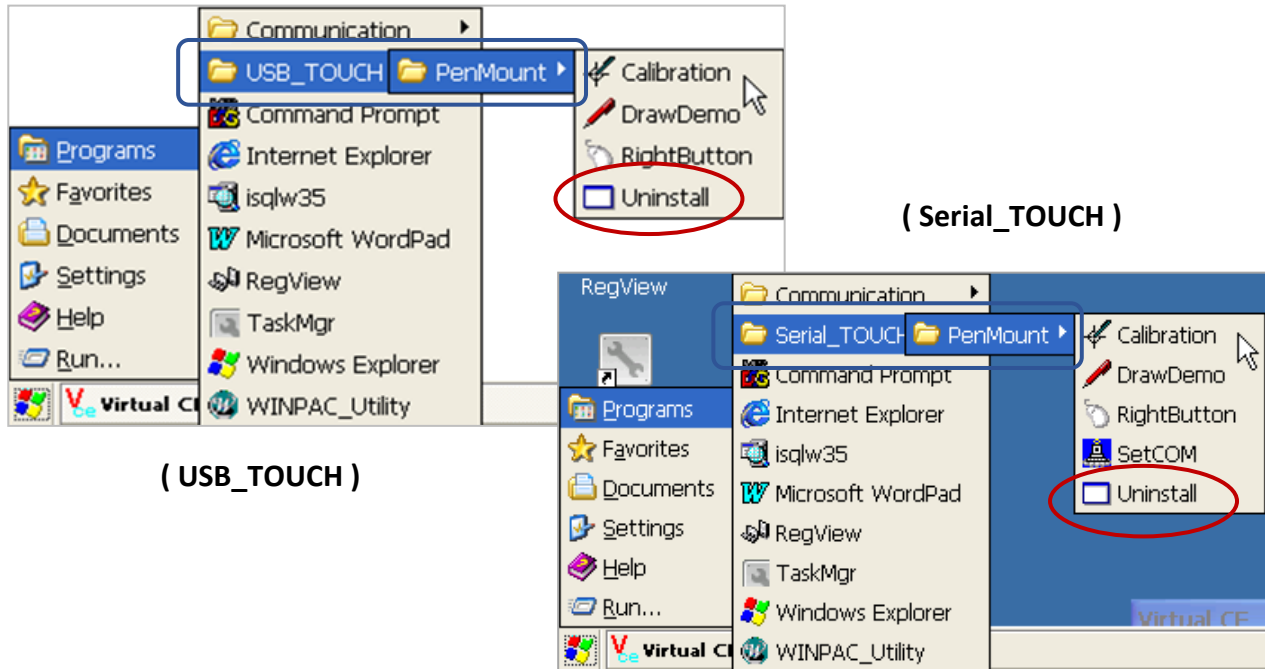
3. **Screen Calibration:** Click [Start] > [Programs] > [Serial_TOUCH] > [PenMount] > [Calibration] and tap the pointers that appear on the screen in sequence. Next, as in Step 2, perform “Save and Reboot” in the WinPAC Utility.
4. **Set COM Port:** Click [Start] > [Programs] > [Serial_TOUCH] > [PenMount] > [SetCOM] and set COM Port as 4 in this example. Then perform “Save and Reboot” in the WinPAC Utility.



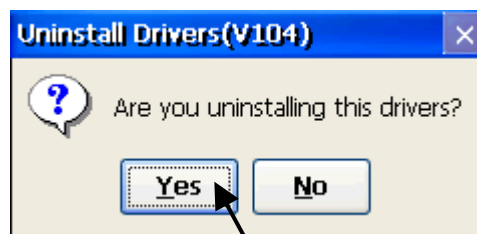
I.4 Uninstalling the Touch Monitor Driver

Users may install the wrong touch monitor driver or need to replace a new monitor, uninstall the driver before installing a new touch monitor driver.

1. **Start Menu:** [Start] > [Programs] > [USB_TOUCH or Serial_TOUCH] > [PenMount] > [Uninstall].

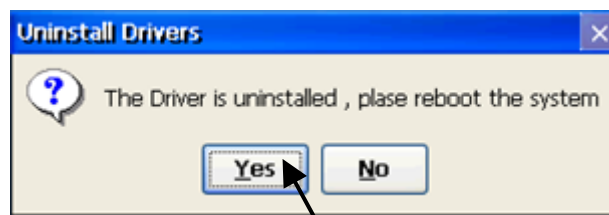


2. **Uninstall:** Click "Yes" in the pop-up message box to uninstall the touch monitor driver.



3. **Reboot the WinPAC:**

After completing the uninstall process, click "Yes" in the pop-up message box to reboot the PAC.



I.5 Adjust the WinPAC Display Frequency

The default display settings of the WinPAC may not support all kinds of the monitor. Refer to this Appendix to adjust the display to solve the following problems:

1. Moire.
2. No display.
3. The screen cannot be displayed properly. (bigger or smaller)

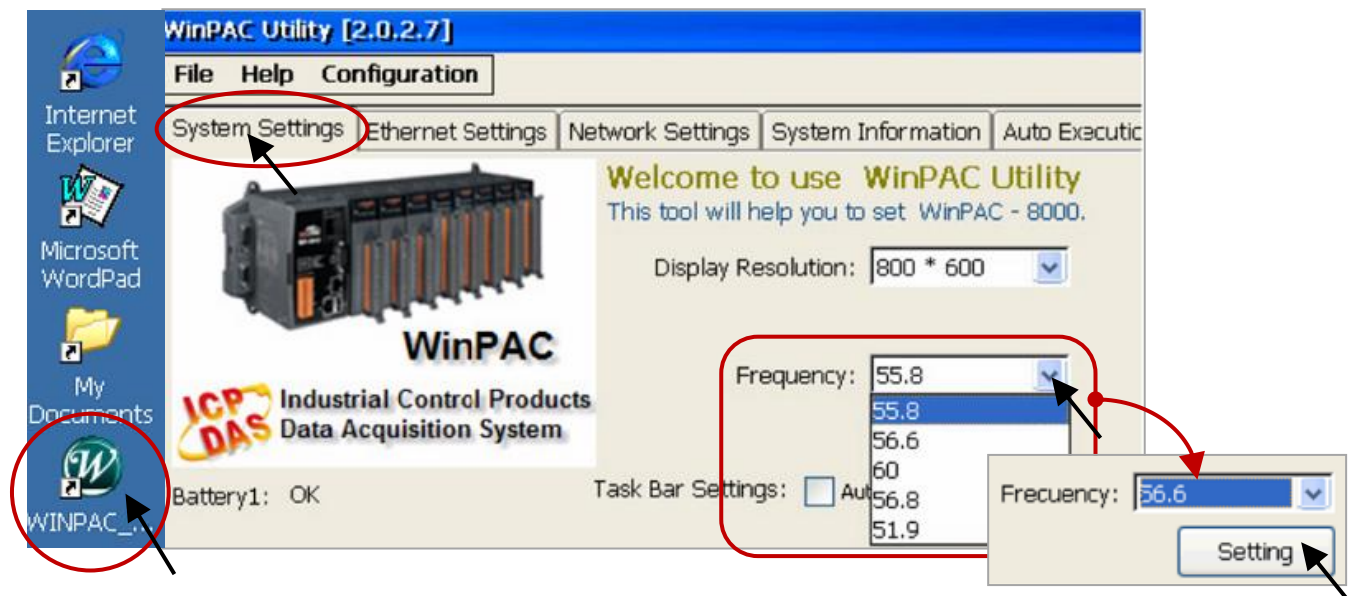
The WinPAC supports the function to adjust the display frequency since the following versions:

PAC Platform	OS Version	WinPAC Utility Version
WP-8x47	V1.6.1.1 and later	V2.0.2.7 and later

Note: Some of the frequency may cause the monitor fails to display. Before adjusting the frequency, adding the VCEP path on the “Auto Execution” page in the WinPAC-Utility so that the user can remotely control the WinPAC by using a PC. (Refer to [WinCE5.0 PAC FAQ - w2-001](#))

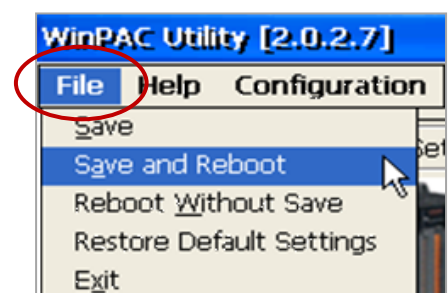
The user can push the auto adjust button on the monitor. If the auto adjust cannot solve the problems, you can change the display frequency on the WinPAC.

1. Execute the WinPAC_utility on the PAC desktop and click the “System Settings” tab.
2. Choose the frequency in the Frequency field and click the Setting button.



3. Click [File] > [Save and reboot] to save and reboot the WinPAC.

If the new frequency cannot solve the problem, repeat steps 1 to 3 to set the correct frequency.



Appendix J Why my PC Running ISaGRAF cannot Connect the ISaGRAF PAC Correctly?

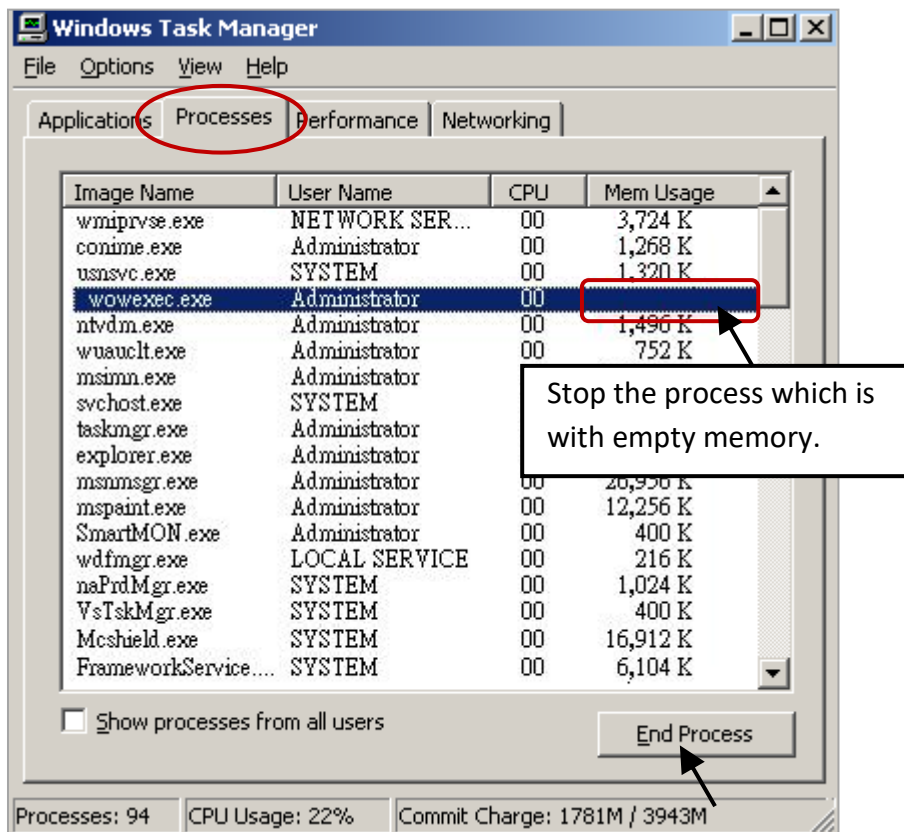
The document also can be downloaded on ISaGRAF FAQ page:

<https://www.icpdas.com/en/faq/index.php?kind=280#751> > FAQ-104.

When using the ISaGRAF Debug function on PC to connect to the ISaGRAF PAC, sometimes it displays a pop-up message box says “Can not link ...” or “Can not download” or “Can not find BMP ...” or ...

To solve this problem, follow these steps:

1. Close all ISaGRAF windows and press the Delete key while holding the Control and Alt keys to open the Task Manager.
2. On the Processes page, stop the process which is with empty memory. Then run PC/ISaGRAF again to connect to the PAC.



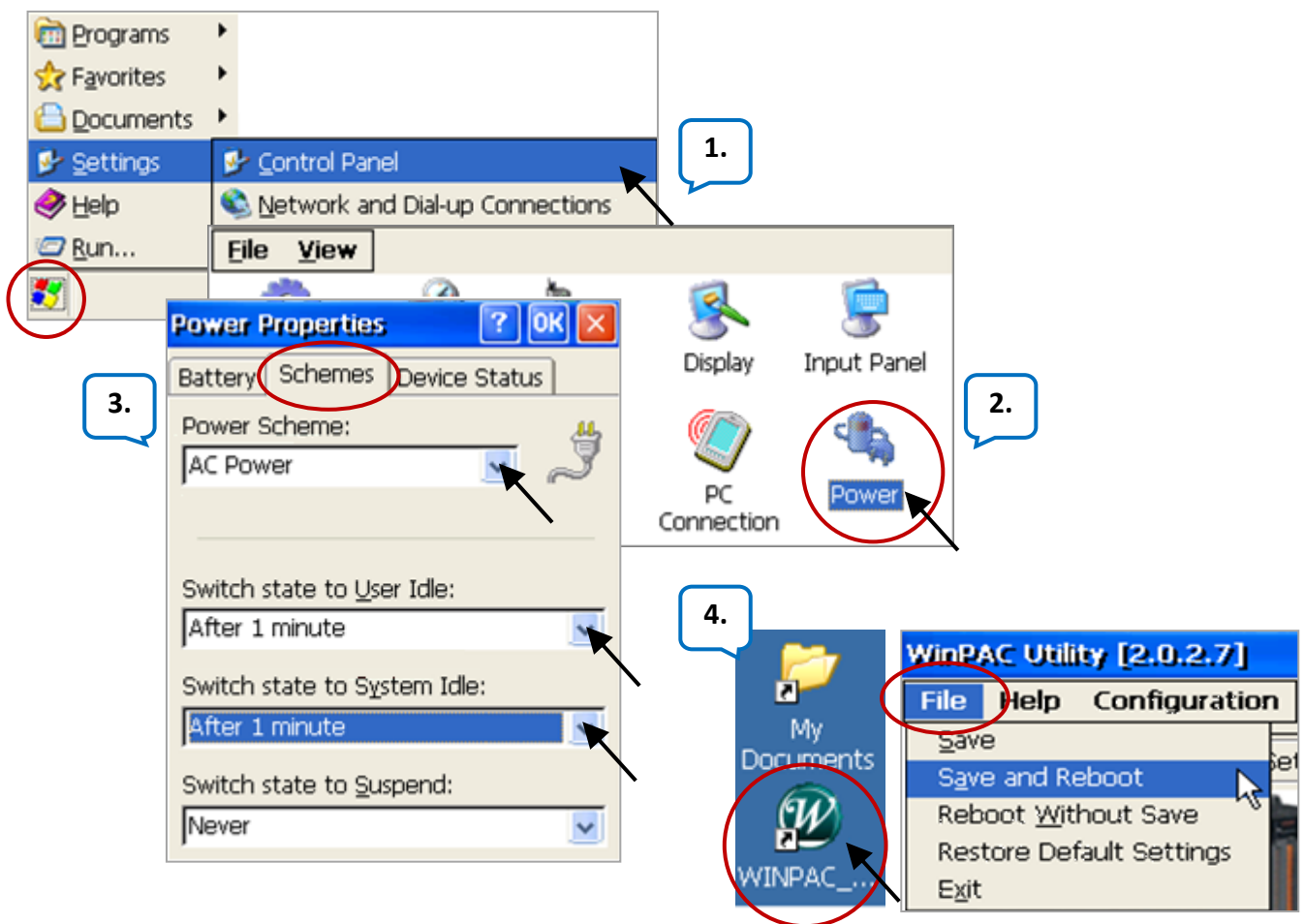
3. If the problem is still there and you are using **Ethernet** to connect the PAC, check if your PC and PAC are set in the same IP domain. For example, PC with (IP/Mask) = (192.168.1.2/255.255.255.0) cannot connect to PAC = (192.168.3.5, 255.255.255.0). However, it can connect the PAC = (192.168.1.5, 255.255.255.0) well.
4. If the problem is still there and you are using **RS-232** to connect the PAC, check if your RS-232 cable is correct and check if you are setting the correct PC RS-232 port number to connect the PAC.
5. The last way is re-start your PC and try again.

Appendix K Enable the Screen Saver of WinPAC

To enable the screen saver of WP-8x47, follow these steps.

1. Click [Start] > [Settings] > [Control Panel] and then double-click the Power icon.
2. On the Schemes page, set “Power Scheme” as AC power and set both “...User Idle” and “...System Idle” as the same value (or set the “System Idle” value larger than the “User Idle” value).
3. Run WinPAC Utility, click [File] > [Save and Reboot] to save the settings and restart the PAC.

After the WP-8x47 is inactive for the specified amount of time, the backlight will be turned off and the screen saver becomes activated. The backlight will be turned on when the screen or the push-button is touched.



To disable the screen saver, set both “User Idle” and “System Idle” to “Never” and then remember to run WinPAC Utility > File > Save and Reboot.

Appendix L How to Detect the Status of Dual Battery and the Ethernet Port

Notice: Power off the PAC before replacing the battery; it may cause permanent damage if the battery accidentally touches other metal electronic parts.

The WP-8x47 equips a 512 KB SRAM with dual battery design to retain the data even in the case of total power loss. This dual battery design allows for the replacement of one of the batteries without losing power and thus not losing the data stored in the memory. **Warning:** Do not take out two batteries at the same time or the data will be lost during this period of non-power.

Name	Type	Attrib.	ADR	Description
battery1	Integer	Internal	9992	Detect the status of battery 1.
battery2	Integer	Internal	9993	Detect the status of battery 2.
lan1	Binary	Internal	9987	Detect the status of LAN1.
lan1	Binary	Internal	9986	Detect the status of LAN2.

- To read the status of battery, using the “**R_MB_ADR**” function and set “**ADR**” as “**9992**” or “**9993**”. ADR number “9992” or “9993” indicates the status of battery number 1 or 2.
- To read the status of the Ethernet port, using “**R_MB_ADR**” and set “**ADR**” as “**9987**” or “**9986**”. ADR number “9987” or “9986” indicates the status of LAN1 or LAN2.

