WinPAC-5xx7 User Manual

The WinPAC-5xx7/WP-5xx7 is the abbreviation of the WP-5147/WP-5147-OD.
The WinPAC-5xx6/WP-5xx6 is the abbreviation of the WP-5146/WP-5146-OD.

Important Notice

1. 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 major purpose is for storing OS, 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.
2. Please always set a fixed IP address to the WinPAC-5xx7. (No DHCP)
3. Please always set WP-5xx7's LAN2 as disabled if not using it (refer to Appendix D).
4. Recommend to use the Industrial Ethernet Switch (NS-205/NS-208) or Real-time Redundant Ring Switch (RS-405/RS-408) for WP-5xx7/5xx6.
5. For supporting retain variables, you must purchase an XW-608 and plug it into the WP-5xx7/5xx6.

Legal Liability

ICP DAS CO., LTD. assumes no liability for any and all damages that may be incurred by the user as a consequence of this product. ICP DAS CO., LTD. reserves the right to change this manual at any time without notice.

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Trademark & Copyright Notice

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Development Software

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

Reference Guide

- ISaGRAF User's Manual (English Manual):
WP-5xx7 CD: \napdos\isagraf\wp-5xx7\english_manu\ "user_manual_i_8xx7.pdf" & "user_manual_i_8xx7_appendix.pdf"

- ISaGRAF 進階使用手冊 (Chinese Manual):

WP-5xx7 CD: \napdos\isagraf\wp-5xx7\chinese_manu\ "chinese_user_manual_i_8xx7.pdf" & "chinese_user_manual_i_8xx7_appendix.pdf"

- More from the Internet:

www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Manual

Technical Service

Please contact local agent or email problem-report to service@icpdas.com .
FAQ : www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC

Written by Chun Tsai; Edited by Janice Hong.

Table of Contents

Reference Guide

ISaGRAF User's Manual (English Manual):
WinPAC-5xx7 CD: \napdos\isagraf\wp-5xx7\english_manu\ "user_manual_i_8xx7.pdf" & "user_manual_i_8xx7_Appendix.pdf"

ISaGRAF 進階使用手冊 (Chinese Manual):
WinPAC-5xx7 CD: \napdos\isagraf\wp-5xx7\chinese_manu\ "chinese_user_manual_i_8xx7.pdf" & "chinese_user_manual_i_8xx7_Appendix.pdf"

Web: www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Manual

Industrial Ethernet Switch: NS-205/NS-208, RS-405/RS-408
www.icpdas.com > Product > Solutions > Industrial Ethernet Switch & Fber Switch > Unmanaged Ethernet Switches


NS-205


NS-208


RS-405


RS-408

Power Supply:
www.icpdas.com > Product > Solutions > Accessories > Power Supply

DP-660 : 24 V / 2.5 A , 5 V / 0.5 A power supply (DIN-Rail mounting)
DP-665 : 24 V / 2.5 A , 5 V / 0.5 A power supply
DP-1200 : 24 V / 5 A power supply


DP-1200

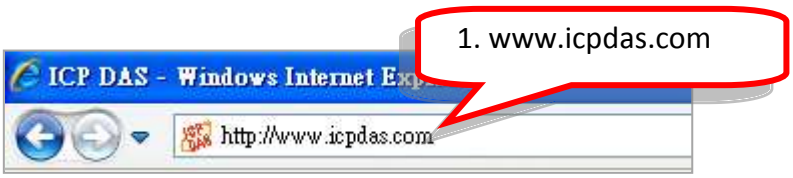

DP-660

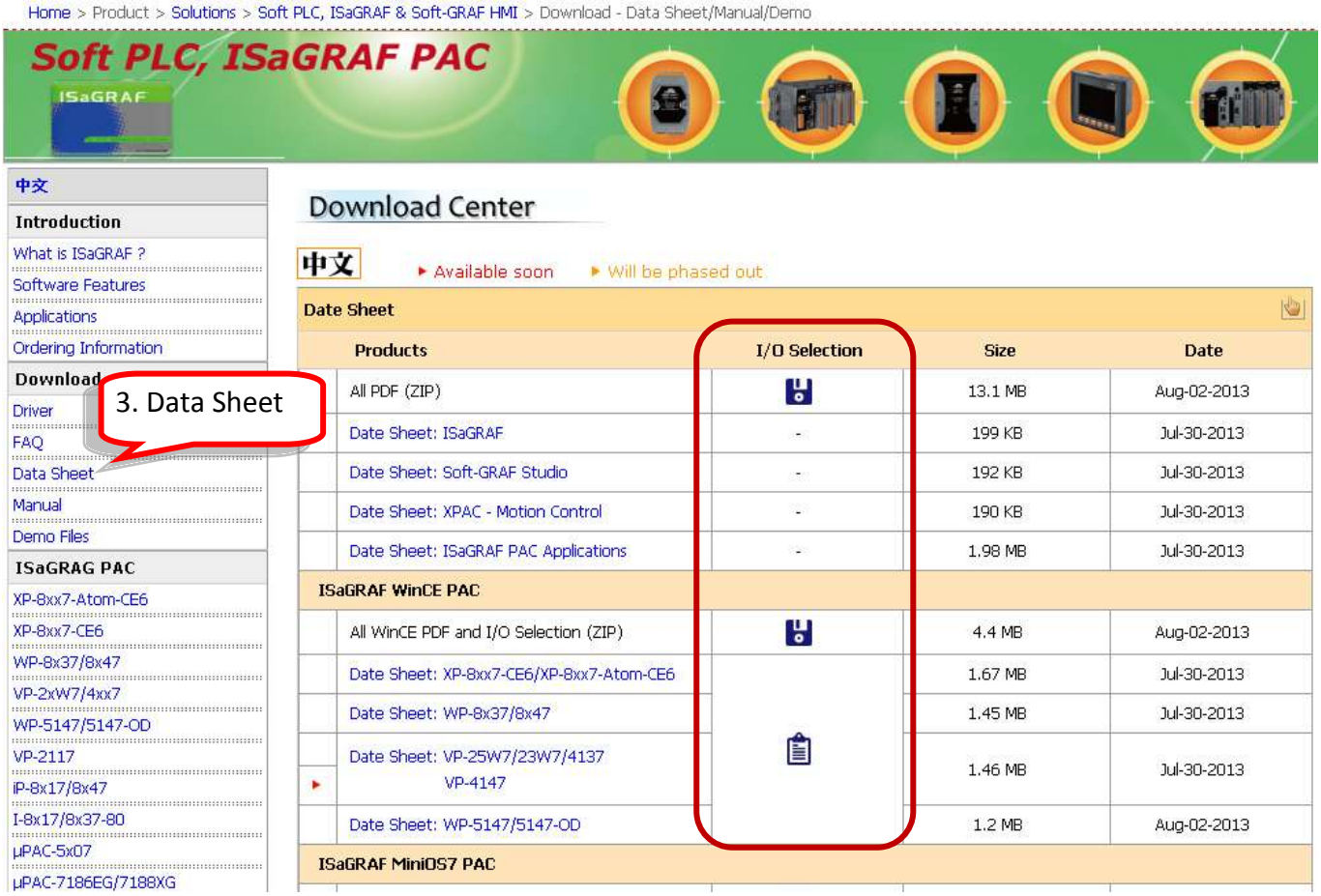

DP-665

Frequently Asked Question:
www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC or
ISaGRAF Web > Download – FAQ

I/O Modules Selection Guide for WP-5xx7 Series

WP-5xx7 supports one optional XW-board (open the cover to plug it into the PAC) and RS-485 remote I/O modules. Please refer to the list in the next page or follow the below steps to get the new list.





XW-board : Add-on Expansion Boards

More at : www.icpdas.com > Product > Solutions > PAC > WP-5000 > I/O Expansion Boards (XW-board)

DI, DO Expansion	
XW107	8-channel Non-Isolated Digital Input and 8-channel Non-Isolated Digital Output
XW107i	8-channel Isolated Digital Input and 8-channel Isolated Digital Output
XW110	16-channel Non-Isolation Digital Input
XW110i	16-channel Isolated Digital Input
AI, AO Expansion	
XW304	6-channel A/D (+/- 5 V or 0 ~ 5 V), 1-channel D/A (+/- 5 V), 4-channel D/O, 4-channel D/I
XW310	4-channel A/D (+/- 10 V), 2-channel D/A (+/- 10 V), 3-channel D/O, 3-channel D/I
XW310C	4-channel Differential/8-channel Single-Ended A/D (0 ~ 20 mA), 1-channel D/A (0 ~ 20 mA), 4-channel D/O, 4-channel D/I
SRAM Expansion	
XW608	512 KB (Battery Backup SRAM for Retain Variables)

RS-485 Remote I/O Modules: Serial Interface; I-87K High Profile Modules

More at: www.icpdas.com > Product > Solutions > Remote I/O Modules/Units > I-8K & 87K

Note:

For using I-87K (High Profile) modules, the WP-5xx7 must connect to an I/O expansion unit (I-87K4/5/8/9 or RU-87P1/2/4/8) by using RS-485 wiring.

I-87K Analog I/O Modules	
I-87005W	8-ch. Thermistor input and 8-ch. digital output module
I-87013W	4-ch., 16-bit, 10 Hz (Total), 2/3/4 Wire RTD Input Module with Open Wire Detection
I-87015W	7-ch., 16-bit, 12 Hz (Total), RTD Input Module with Open Wire Detection (for short sensor distance)
I-87015PW	7-ch. RTD Input Module with 3-wire RTD lead resistance elimination and with Open Wire Detection (for long sensor distance)
I-87017RW	8-ch. Differential , 16/12-bit, 10/60 Hz (Total) Analog Input Module with 240 V_{rms} Over Voltage Protection, Range of -20 ~ +20 mA Requires Optional External 125 Ω Resistor
I-87017RCW	8-ch. Differential , 16/12-bit, 10/60 Hz(Total) Current Input Module
I-87017W	8-ch. Analog Input Module
I-87017W-A5	8-ch. High Voltage Input Module
I-87017DW	8-ch. Analog Input Module (Gray Cover) (RoHS)
I-87017ZW	10/20-ch. Analog Input Module with High Voltage Protection (RoHS)
I-87018PW	8-ch. Thermocouple Input Module (Gray Cover) (RoHS)
I-87018RW	8-ch. Thermocouple Input Module. Recommend to use the better I-87018Z.
I-87018W	8-ch. Thermocouple Input Module. Recommend to use the better I-87018Z.

I-87018ZW	10-ch. Differential , 16-bit, 10 Hz (Total), Thermocouple Input Module with 240 V_{rms} Over Voltage Protection, Open Wire Detection, Range of +/-20 mA, 0~20 mA, 4~20 mA requires Optional External 125 Ω Resistor
I-87019PW	8-ch. Universal Analog Input Module (RoHS) (With a CN-1824 Daughter Board)
I-87019RW	8-ch. Diff. , 16-bit, 8 Hz (Total), Universal Analog Input Module with 240 V_{rms} Over Voltage Protection, Open Wire Detection (V, mA, Thermocouple; Range of -20 ~ +20 mA need to set Jumper on board)
I-87019ZW	10-ch. Universal Analog Input Module (Gray Cover) (RoHS), Includes the I-87019ZW Module and a DB-1820 Daughter Board
I-87024CW	4-ch. 12-bit channel to channel isolated current output module with open-wire detection
I-87024DW	4-ch. 14-bit analog output module
I-87024RW	4-ch. 14-bit analog output module
I-87024W	4-ch. 14-bit analog output module (0 ~ +5 V, +/-5 V, 0 ~ +10 V, +/-10 V, 0 ~ +20 mA, +4 ~ +20 mA)
I-87028CW	8-ch. 12-bit current output module
I-87K Multifunction I/O Modules	
I-87026PW	6-ch. Analog Input, 2-ch. Analog Output, 2-ch. Digital Input and 2-ch. Digital Output Module (RoHS)
I-87K Digital I/O Modules	
I-87037W	16-ch. source type Isolated Digital Output Module(RoHS)
I-87040W	32-ch. Isolated Digital Input Module
I-87040PW	32-ch. Isolated Digital Input Module with 16-bit Counters (RoHS)
I-87041W	32-ch. Sink Type Open Collector Isolated Digital Output Module
I-87046W	16-ch. Non-Isolated Digital Input Module for Long Distance Measurement
I-87051W	16-ch. Non-Isolated Digital Input Module
I-87052W	8-ch. Differential , Isolated Digital Input Module
I-87053PW	16-ch. Isolated Digital Input Module with 16-bit Counters
I-87053W	16-ch. Isolated Digital Input Module
I-87053W-A5	16-ch. 68 ~ 150 V_{DC} Isolated Digital Input Module
I-87053W-AC1	16-ch. AC Isolated Digital Input Module with 16-bit Counters
I-87053W-E5	16-channel 68-150 V_{DC} solated Digital Input Module with 16-bit Counters
I-87054W	Isolated 8-ch. DI and 8-ch. Open Collector DO Module
XW107	Non-Isolated 8-ch. DI and 8-ch. Open Collector DO Module
I-87057W	16-ch. Open Collector Isolated Digital Output Module
I-87057PW	16-ch. Open Collector Isolated Digital Output Module
I-87058W	8-ch. 80~250 V_{AC} Isolated Digital Input Module
I-87059W	8-ch. Differential 10-80 VAC Isolated Digital Input Module
I-87061W	16-ch. Relay Output Module (RoHS)
I-87063W	4-ch. Differential Isolated Digital Input and 4-ch. Relay Output Module 5 A (NO) / 3 A(NC) @ 5 ~ 24 V_{DC} ; 5 A(NO) / 3 A(NC) @ 0 ~ 250 V_{AC}
I-87064W	8-ch. Relay Output Module, 5 A (47~63 Hz) @ 0~ 250 V_{AC} ; 5 A @ 0~ 30 V_{DC}
I-87065W	8-ch. AC SSR Output Module, AC: 1.0 A_{rms} @ 24 ~ 265 V_{rms}

I-87066W	8-ch. DC SSR Output Module , DC: 1.0 A_{rms} @ 3 ~ 30 V_{DC}
I-87068W	4-ch. Form-A Relay Output and 4-ch. Form-C Relay Output Module ; Form-A: 8 A @ 250 V_{AC}; 8 A @ 28 $V_{DC;}$ Form-C: 5 A (NO) / 3 A (NC) @ 277 V_{AC} ; 5 A(NO) / 3 A(NC) @ 30 V_{AC}
I-87069W	8-ch. PhotoMOS Relay Output Module, Max. AC/DC: 0.13 A @ 350 V
I-87K Counter/Frequency Modules	
I-87082W	2-ch. Counter/Frequency Module, Isolated or Non-isolated Inputs
I-87K PWMS Modules	
I-87088W	8-ch. PWM outputs, software support 1 Hz~100 kHz, (non-continuous), duty: 0.1 ~ 99.9%
I-87K GPS Modules	
I-87211W	Time-Synchronization and GPS module for getting UTC/local time and local Longitude/Latitude

Remote I/O Modules/Units : RS-485 or Ethernet I/O Modules / Expansion Unit

More at: www.icpdas.com > Product > Solutions > Remote I/O Modules/Units

RS-485 Remote I/O Modules
● Selection Guide: I-7000 Modules (DCON Protocol) ● Selection Guide: M-7000 Modules (DCON, Modbus RTU Protocol) ● Selection Guide: tM series Modules (DCON, Modbus RTU, Modbus ASCII Protocol)
Remote I/O Expansion Unit (RS-485 Bus)
● Selection Guide: RU-87P1/2/4/8 (Hot-Swap, Auto Configuration) ● Selection Guide: I-87K4/5/8/9
Ethernet I/O
● Selection Guide: ET-7000 (Web based I/O Module) ● Selection Guide: PET-7000 (PoE Web based I/O Module) ● Selection Guide: tPET/tET Series (Modbus TCP I/O Modules)
Ethernet I/O (Expansion Unit)
● Selection Guide: I-8KE4/8-MTCP (Modbus/TCP based Ethernet I/O Unit)

Specifications: WP-5147/WP-5147-OD

Hardware Specification:

Models		WP-5147	WP-5147-OD
System Software			
OS		Windows CE 5.0 Core	
.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; Support Soft-GRAF HMI: XP-8xx7-CE6, XP-8xx7-Atom-CE6, WP-8xx7/5xx7 and VP-2xW7/4xx7 PAC	
	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)	
CPU Module			
CPU		PXA270, 520 MHz	
SDRAM		128 MB	
Flash		64 MB	
EEPROM		16 KB	
Expansion Flash Memory		microSD socket with one microSD card (support up to 32 GB)	
Battery Backup SRAM		Require one XW608, 512 KB (for retain variables)	
RTC (Real Time Clock)		Provide second, minute, hour, date, day of week, month, year	
64-bit Hardware Serial Number		Yes, for Software Copy Protection	
Dual Watchdog Timers		Yes	
LED Indicators		1 LED for Power and Running 2 LEDs for user programmable	
Rotary Switch		Yes (0 ~ 9)	
VGA & Communication Ports			
VGA		Yes; 640 × 480 / 800 × 600	
Ethernet		RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
USB 1.1 (client)		1	
USB 1.1 (host)		1	
Audio		-	Microphone-In and Earphone-Out
COM 1		RS-232 (RxD, TxD and GND); Non-isolated	
COM 2		RS-485 (Data+, Data -); 2500 V_{DC} isolated	
COM 3		RS-232 (RxD, TxD and GND); Non-isolated	

Models	WP-5147	WP-5147-OD
I/O Expansion		
I/O Expansion Bus	Yes; to mount one optional XW-Board. No supporting XW5xx board (i.e. XW506, XW507, XW508, XW509, XW511i, XW514)	
Mechanical		
Dimensions (W x L x H)	91 mm x 132 mm x 52 mm	
Installation	DIN-Rail Mounting	
Environmental		
Operating Temperature	-25 ~ +75°C	
Storage Temperature	-30 ~ +80°C	
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)	
Power		
Input Range	+10 ~ +30 V_{DC}	
Isolation	1 kV	
Consumption	4.8 W	

Software Specifications:

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 the Standard Modbus TCP/IP Slave protocol. Support one or more tGW-700 series gateway (Modbus TCP to Modbus RTU/ASCII) to expand many Modbus RTU / ASCII master ports to connect many Modbus RTU / ASCII slave devices.
Modbus RTU/ASCII Master	Support Multi-port. A max. of 10 ports.
Modbus RTU Slave	A max. of 5 ports.
Modbus TCP/IP Slave	Two Ethernet ports, LAN1 & LAN2, support total up to 32 connections. 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 ~ COM3 using Serial communication function blocks.
I-7000 & I-87K RS-485 Remote I/O	COM2 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 can support M-7000 I/O. Each port can connect 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)
Send Email	Provide functions to send email with a single attached file via the Ethernet port.
Ebus	LAN2 can be used to exchange data between ICP DAS ISaGRAF Ethernet PACs via the Ethernet port.

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.
Soft-GRAF HMI	Support the Soft-GRAF HMI. User can use the Soft-GRAF Studio on the PC to design the HMI screen and then download it to the PAC to display the HMI on the PAC. (FAQ-146)
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).
CAN/CANopen	COM1, COM3 can connect to one I-7530 (converter: RS-232 to CAN) to support CAN/CANopen devices and sensors. One WP-5xx7 supports a max. of 10 RS-232 ports to connect a max. of 10 I-7530. (FAQ-086)
FTP Client	Enable the FTP Client to upload files from the PAC to a remote FTP server on a PC. (FAQ-151) The Soft-GRAF g_Alarm and g_Logger1 HMI objects also support FTP Client. (FAQ-146)
*** ISaGRAF FAQ:** www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC * ICP DAS recommends using NS-205/NS-208 or RS-405/408 (Ring Switch) Industrial Ethernet Switches.	

Chapter 1 Typical Application

The website for the applications supporting list of all ISaGRAF PACs :
www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Applications

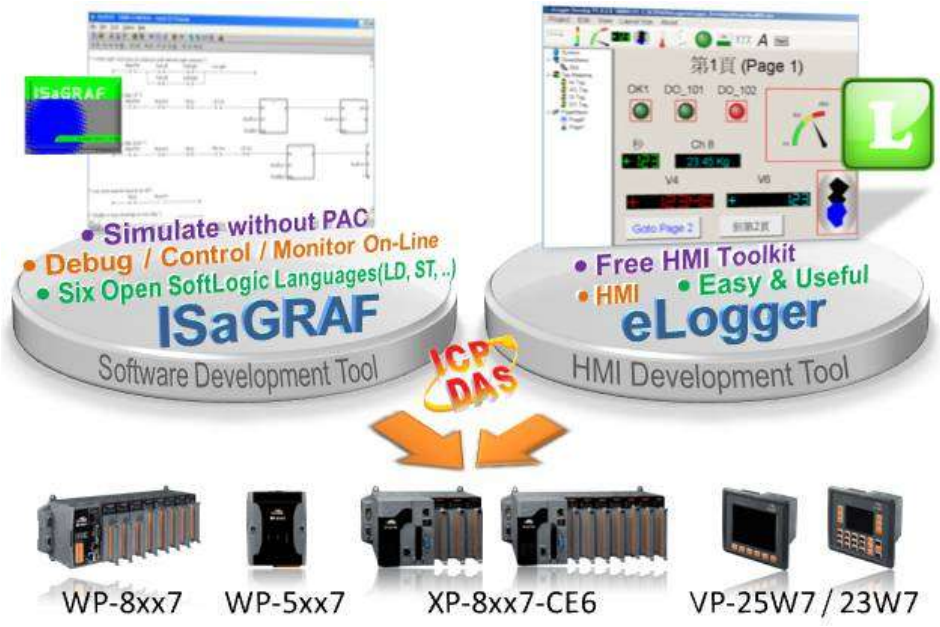
1.1 Soft-GRAF HMI Application: Colorful HMI

- Support Various and Colorful HMI Objects:
  - Pages (Max. 200, Support Password Security)
  - Label (Normal, Reverse Type, Under-line)
  - Boolean Value (Normal, Reverse Type, Blinking)
  - Numeric Value (Normal, Scaling, Limit - Blink/Color/Text)
  - Message Value (Dynamic Message, Multi-language)
  - Button (Value, Title, Picture, Security, Confi rm, Password)
  - Picture (Static, Dynamic, Boolean Picture)
  - Login/Logout
  - Bar Meter (Vertical, Horizontal, Scale, Unipolar, Bipolar)
  - Trace (1-axis, 2-axis)
  - Trend (Real-time, Historical)
  - Schedule-Control
  - Gauge Meter
  - Alarm Lists
  - Data Logger (Log data; support USB export or FTP upload)
  - Built-in Various Objects (Button, Gif, LED... will be More)
- Multi-language: English, Traditional Chinese, Simplify Chinese, Russian, etc.
- Support user designed graphics, e.g. JPG, PNG ...
- More at Ch. 3 and www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-146

Running HMI and Control Logic in the Same PAC

1.2 eLogger HMI Application

- ICP DAS eLogger is an easy and useful HMI development tool which helps users to create user-friendly pictures and control items.
- Recommend to use Soft-GRAF HMI, the performance is better (Refer to Chap. 3).
- More at www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-115

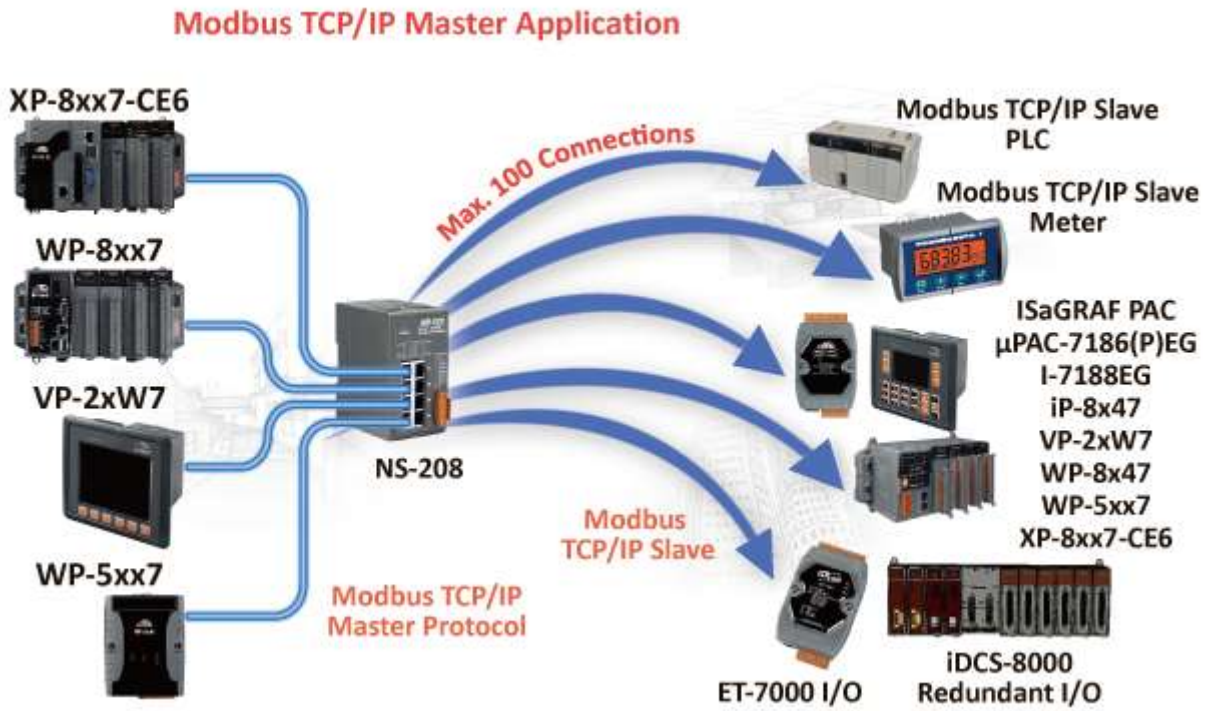


1.3 Modbus Slave: RTU/TCP

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

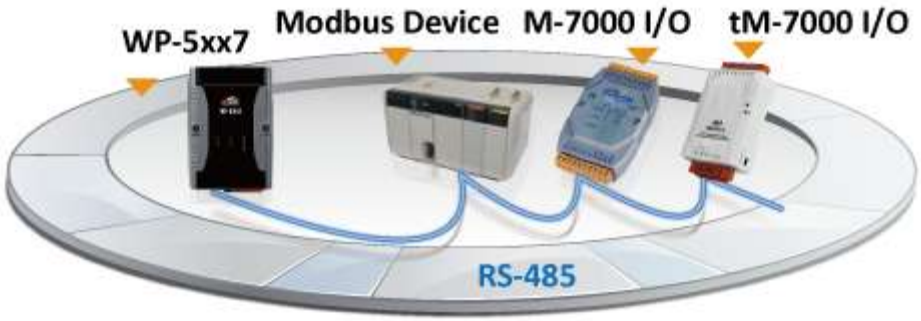
1.4 Modbus Master: TCP/IP

- Each WP-5xx7 supports to link to max. 100 Modbus TCP/IP slave devices.
- Support various Standard Modbus TCP/IP Slave devices.
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-113



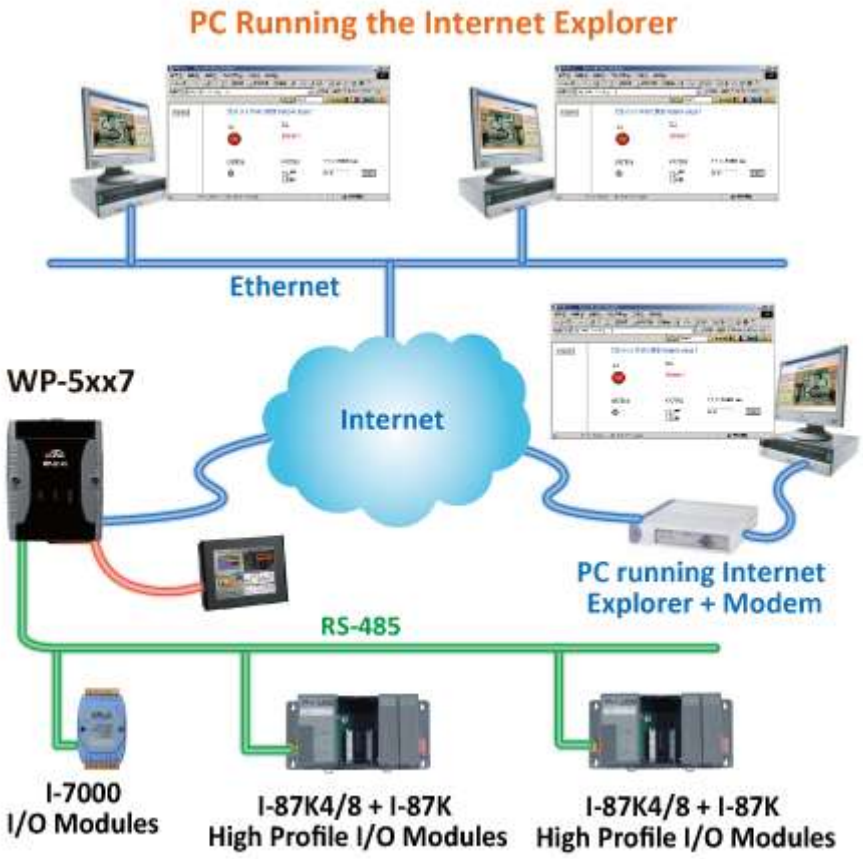
1.5 Modbus Master: RTU, ASCII, RS-232/485/422

- Support up to 10 ports
- Can link to Modbus PLC or M-7000 I/O or Modbus devices.
  (Power meter, temperature controller, inverter etc.)

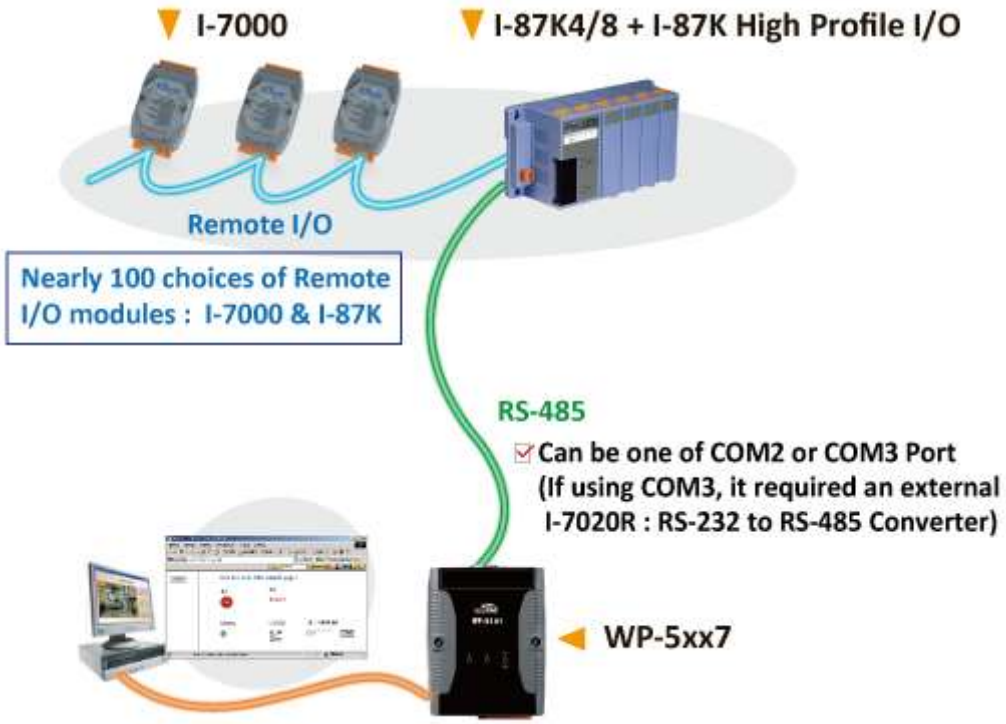


1.6 Communicate With Other TCP/IP Server or UDP Client/Server Devices

1.7 Multiple Web HMI – Monitor & Control Everywhere!

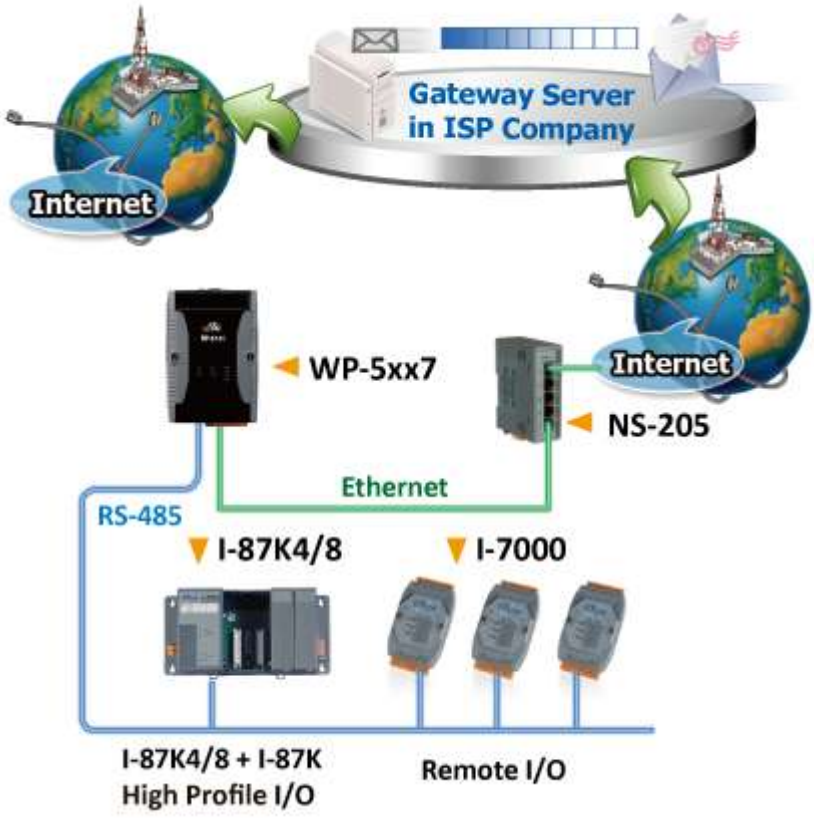


1.8 Remote I/O Application



1.9 Send Email with One Attached File

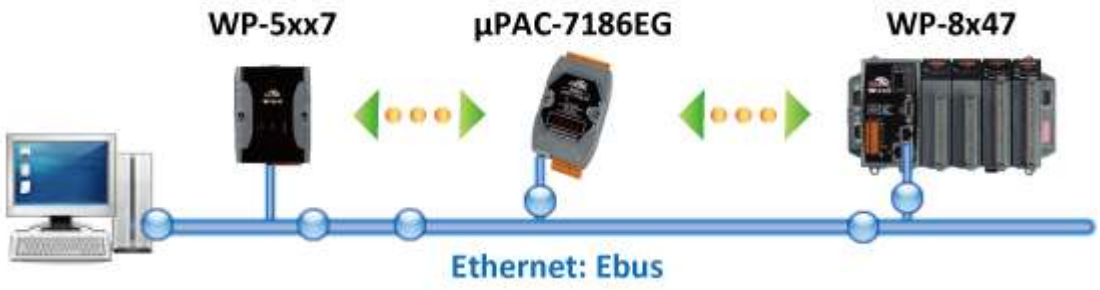
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-067



1.10 Data Exchange: Ebus

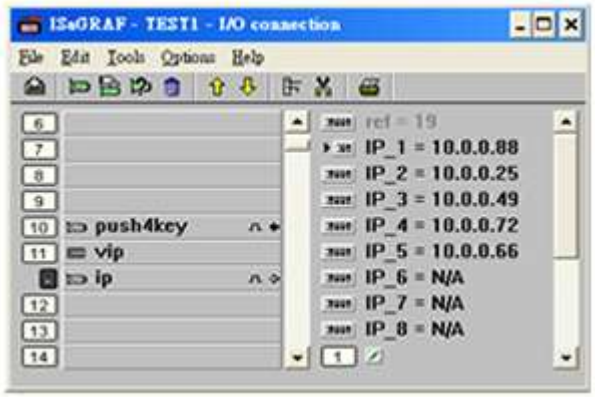
- Ebus (Ethernet Network)
  Each ISaGRAF PAC can use its Ethernet port to talk to each other via the Ebus communication mechanism. When a PC is talking with controllers via Ethernet, the controllers can also talk to each other via the same Ethernet; it makes the configuration more flexible and faster.

Note: The WP-5xx7, XP-8xx7-CE6, WP-8xx7 and VP-2xW7 don't support Fbus.

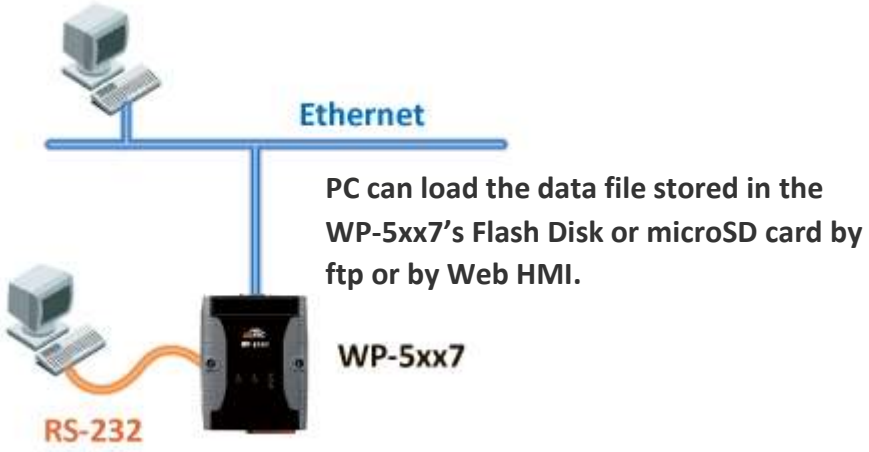


1.11 VIP Communication Security

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



1.12 Data-Recorder & Data-Logger

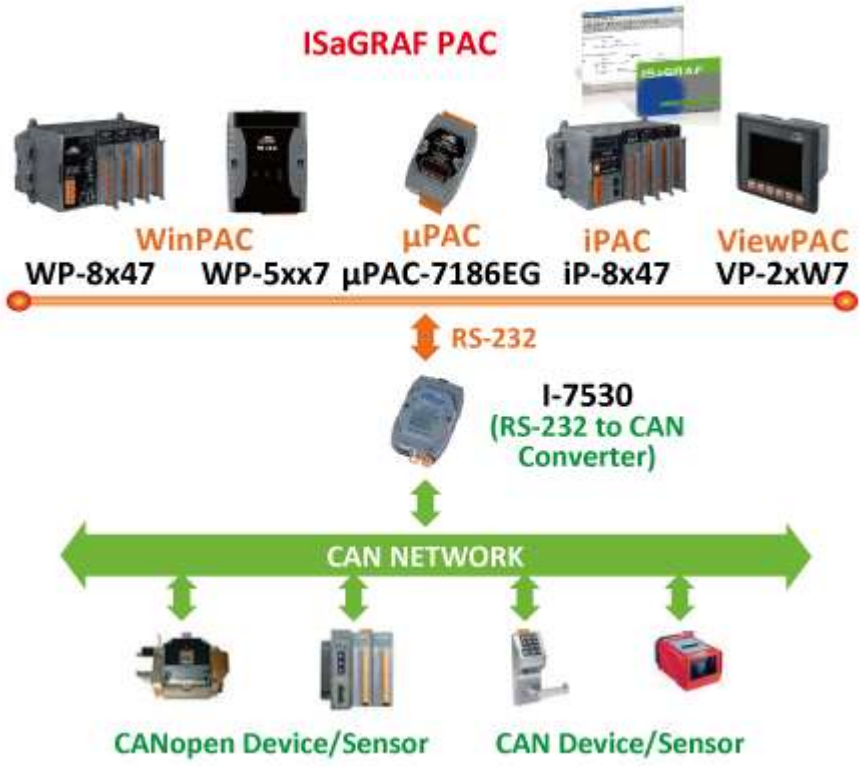


1.13 SMS: Short Message Service

- Short message can be sent in multiple language format (like Chinese, English... others)
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-111

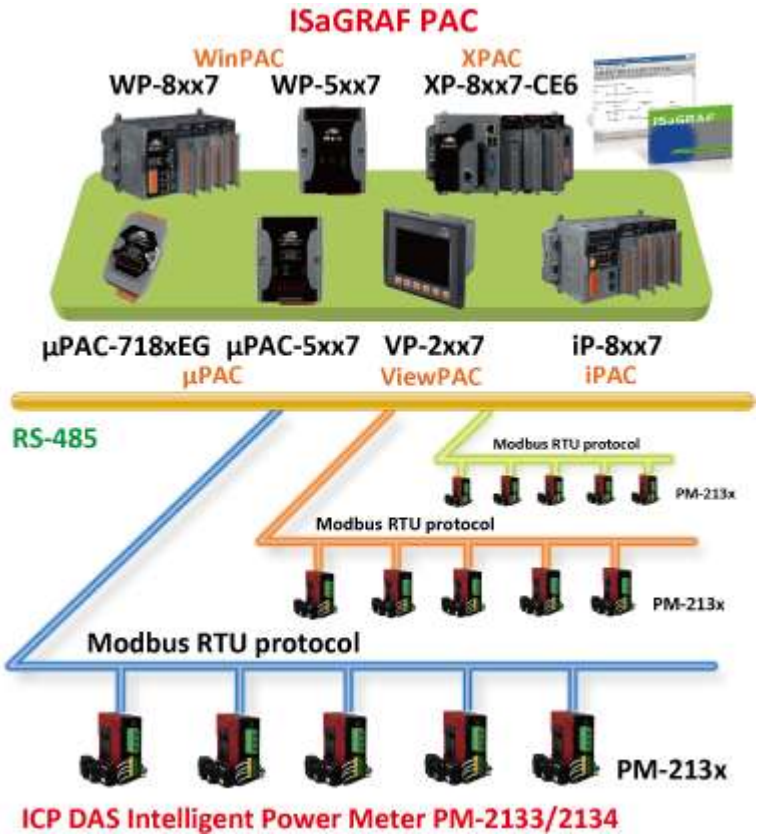
1.14 Integrate with CAN/CANopen Devices & Sensors

- WP-5xx7 supports max. **10** I-7530 (RS-232 to CAN Converter)
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-086



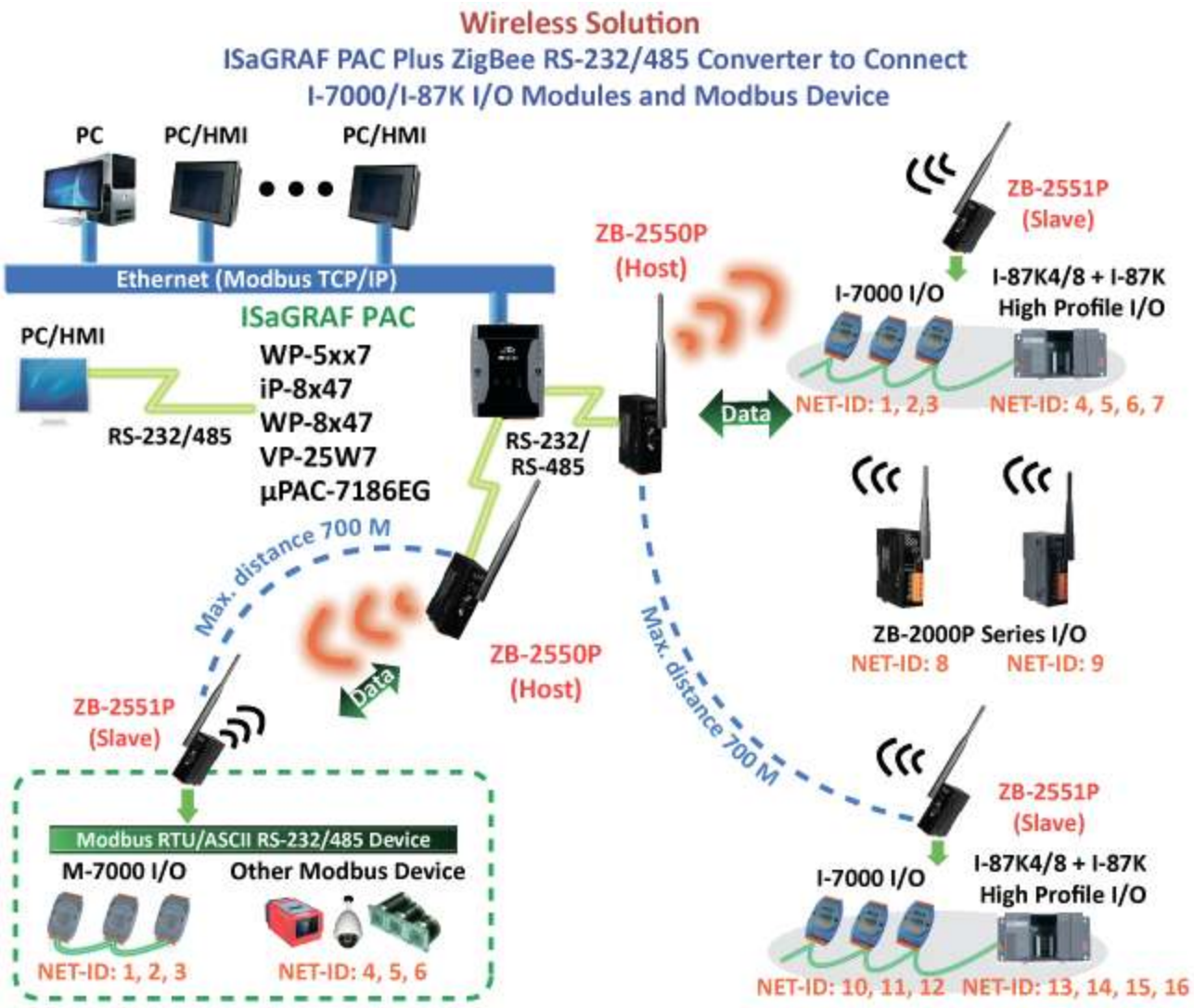
1.15 ISaGRAF PAC Connects the Smart Power Meter

- Support standard Modbus protocol; support multiple RS-485 ports to connect to multiple PM-2133/2134 Smart meters.
- PM-2133/2134 is a series of 3 Phase/4 Loops 1 Phase Compact Smart Meter with true RMS energy and power parameters measurement in a compact size. The ISaGRAF PACs combining with PM-213x can apply to various control/monitor systems about intelligent electric power measurement.
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-129



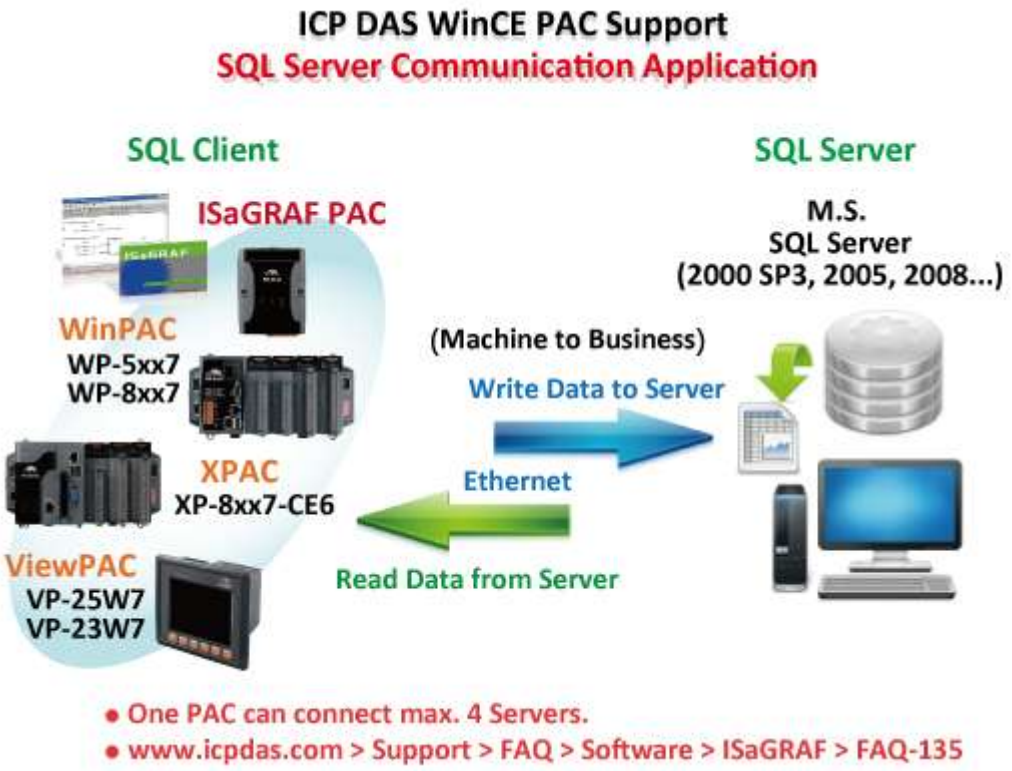
1.16 ZigBee Wireless Solution

- The WP-5xx7 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.
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-110



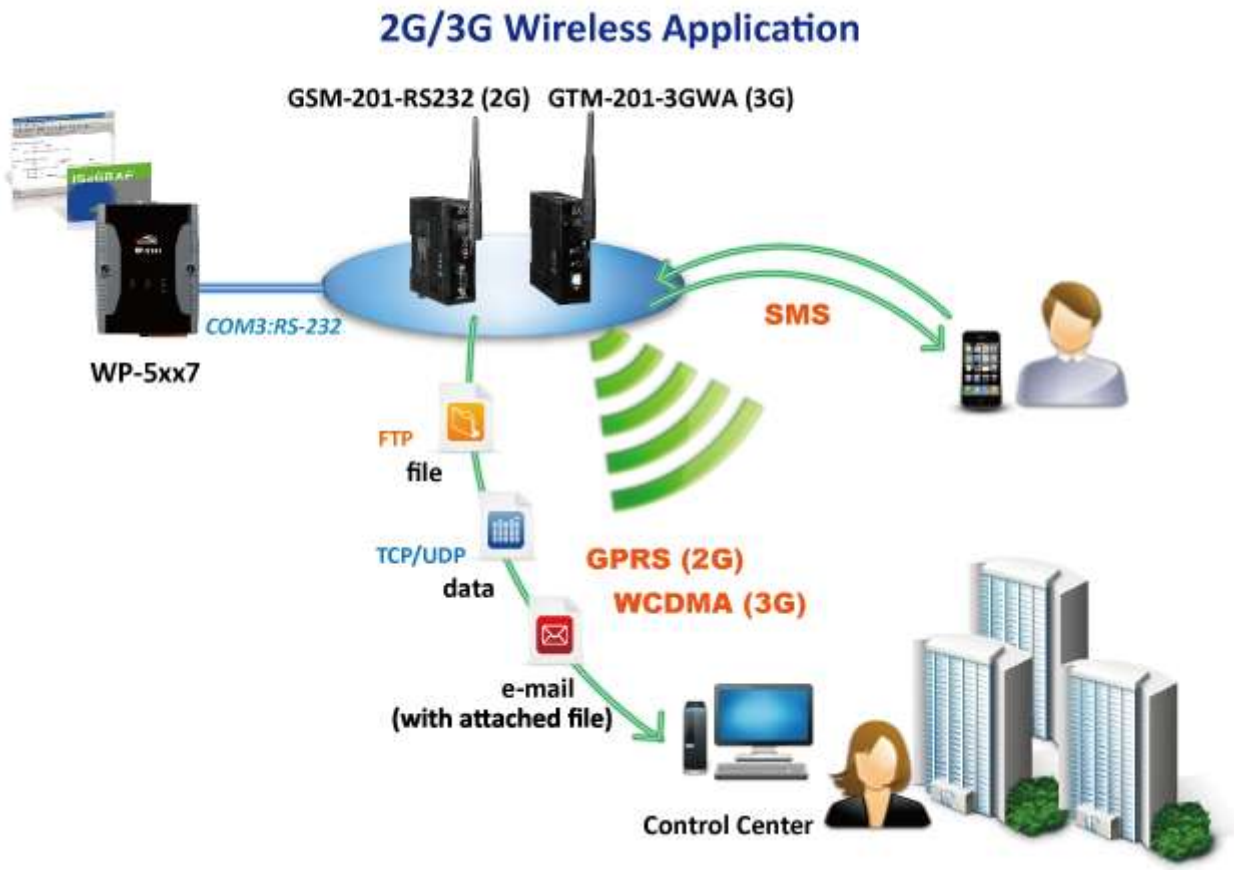
1.17 Database Application

- 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 (Taiwan), Simplified Chinese, English, French, German, Italian, Portuguese, Russian, Spanish and others.
- Integrating Machine-Business Automation Application.
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-135



1.18 2G/3G Wireless Application

- The WP-5xx7 can communicate with remote Server by 2G/3G wireless modem.
- More at [www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC](www.icpdas.com) > FAQ-143, 151, 153



Note: For more applications, please refer to www.icpdas.com > product > solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Applications.

Chapter 2 Software Installation

Please refer to Chapter 3 for the Soft-GRAF HMI applications.

The WinPAC-5xx7/WP-5xx7 is the abbreviation of the WP-5147/WP-5147-OD.
The WinPAC-5xx6/WP-5xx6 is the abbreviation of the WP-5146/WP-5146-OD.

Important Notice:

1. Please always set a **fixed IP** address to the WinPAC-5xx7. (No DHCP)
2. Please always set WP-5xx7's LAN2 as disabled if not using it (refer to Appendix D).
3. Recommend to use the Industrial Ethernet Switch (NS-205/NS-208) or Real-time Redundant Ring Switch (RS-405/RS-408) for WP-5xx7/5xx6.
4. For supporting retain variables, you must purchase an XW-608 and plug it into the WP-5xx7/5xx6.

Please refer to below location for detailed ISaGRAF English User's Manual.
WinPAC-5xx7 CD: \napdos\isagraf\wp-5xx7\english_manu\
"user_manual_i_8xx7.pdf" & "user_manual_i_8xx7_appendix.pdf"

Note:

- The WinPAC-5xx7/5xx6 supports ISaGRAF programming method & provides Web HMI solution by default.
- If user would like to program the WinPAC-5xx7 by using both ISaGRAF and (EVC++ 4.0 or VS.net 2008), it is also possible. Please refer to Chapter 7, Chapter 8 or Chapter 11.

2.1 Step 1 - Installing the ISaGRAF Software

The user has to install the following items before he can program the ISaGRAF controller system. They are:

A. **ISaGRAF Workbench** &
B. **ICP DAS Utilities For ISaGRAF**

User has to purchase at least one pcs. of ISaGRAF (Ver. 3.4x or Ver. 3.5x ISaGRAF-256-E or ISaGRAF-256-C or ISaGRAF-32-E or ISaGRAF-32-C) to install on his PC to edit, download, monitor & debug the controller system. Item (B) is free and it is burned inside the CD-ROM which is delivered with the WinPAC-5xx7.

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.

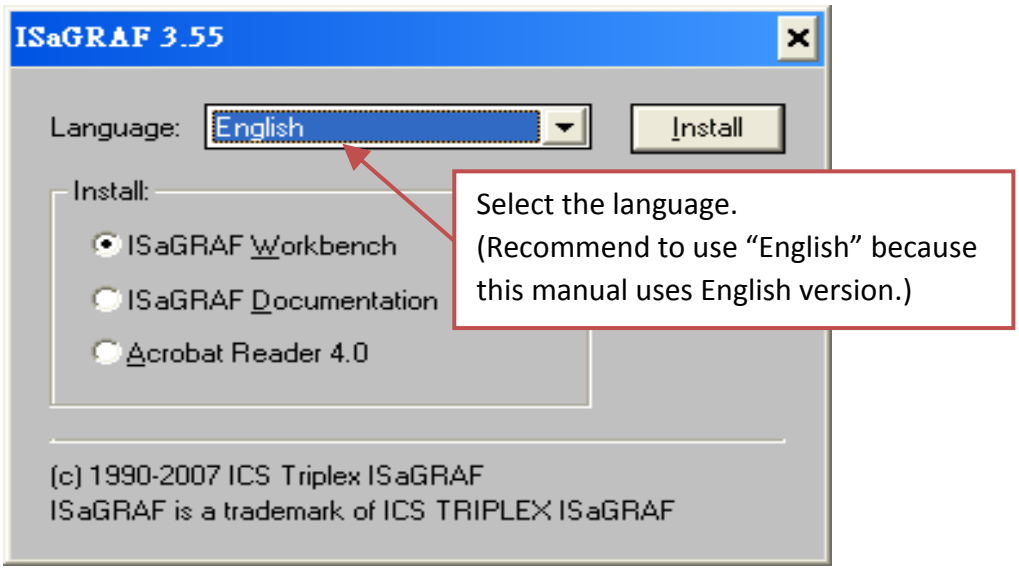
Windows 98, Windows 2000 or Windows XP
Windows NT Version 3.51 or Windows NT Version 4.0
Windows Vista or Windows 7 (refer to FAQ-117)

Steps to Installing the ISaGRAF Workbench:

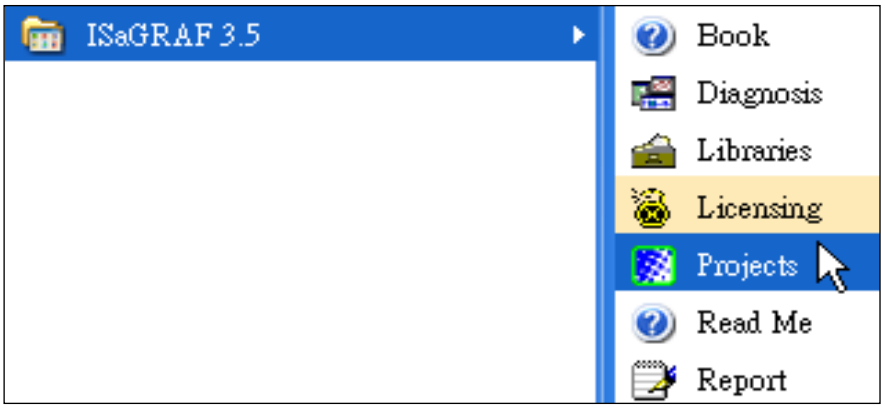
If your PC OS is Windows Vista or Windows 7 (32-bit), refer to Section 2.1.4.
If your PC OS is Windows 7 (64-bit), please refer to Section 2.1.5.

1. Insert the ISaGRAF Workbench CD into your CD-ROM drive and the "install.bat" will auto-run. (If your computer does not have the auto-start feature active, use the Windows Explorer and go to the CD-ROM drive where the Workbench CD is installed, then double-click on the "install.bat" file listed on the ISaGRAF CD. If the "install.bat" file is not found on your ISaGRAF CD, then double-click on the "ISaGRAF.exe" file to start the installation process.)

2. When running the "install.bat", it will show the screen as below. Please select the language version. (Recommend to use the “English” version as we use in this manual)

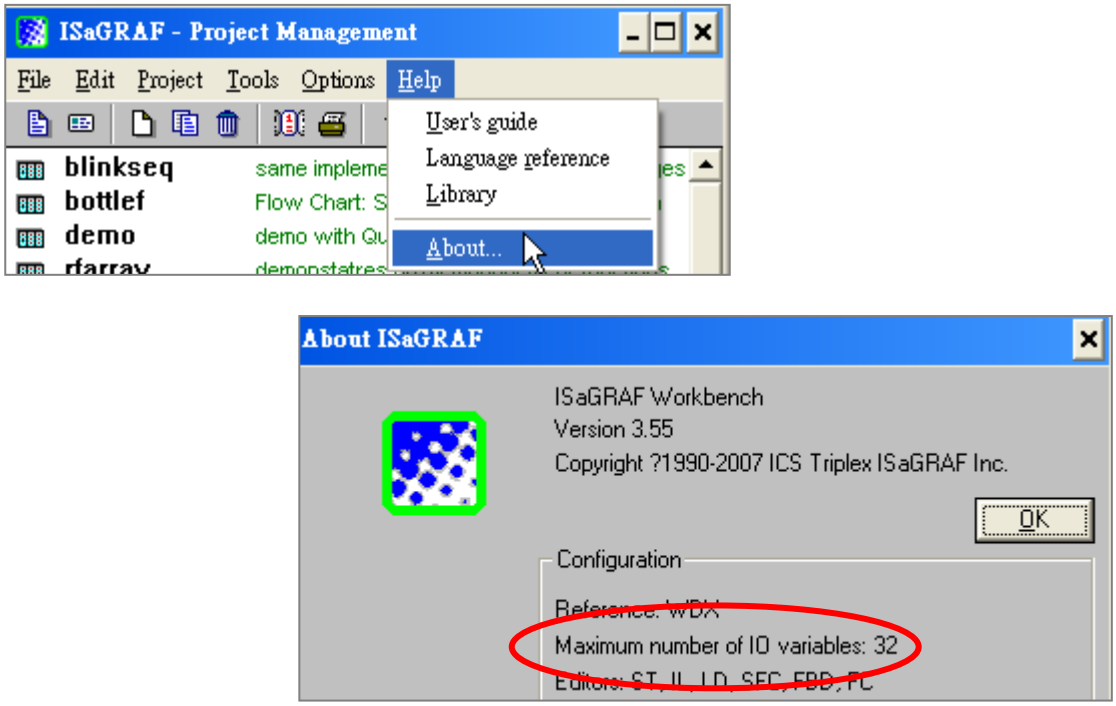


3. After installing, please click on the Windows "Start" button > “All Programs" > "ISaGRAF 3.x" > "Projects” to start the ISaGRAF software.



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. (ISaGRAF-32-E & ISaGRAF-32-C DO NOT need dongle or USB Key-Pro.)



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:

Please execute the ISaGRAF CD_ROM and then reset the PC again.

- ISaGRAF-80: \Sentinel5382\setup.exe
- Other ISaGRAF version: \Sentinel\setup.exe

USB Key-Pro Protection:

1. To make your PC recognize the ISaGRAF USB protection-key, please **un-plug** the USB protection-key from your USB port first, then run "**\Sentinel\SSD5411-32bit.exe**" in the ISaGRAF 3.55 CD-ROM (or later version) after you have installed the ISaGRAF. Then please reset your PC.

2. To run ISaGRAF Ver. 3.5x, please always plug the USB protection-key into the PC's **USB port.**

2.1.2 Important Notice for Windows 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

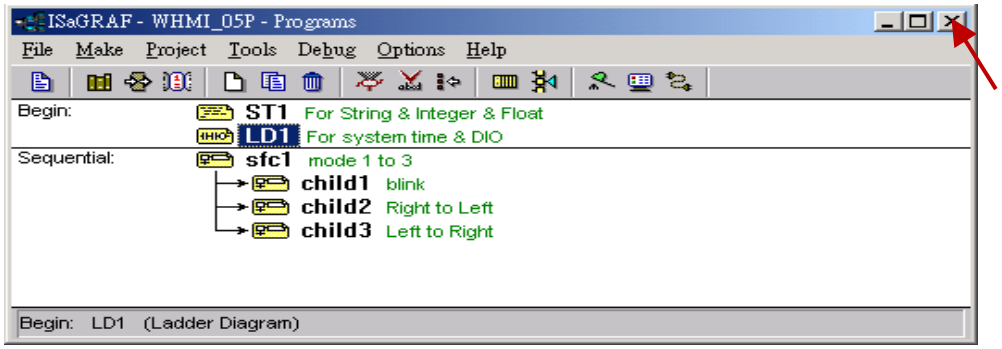
You can use any ASCII based text editor (such as Notepad or UltraEdit32) to open the "isa.ini" file. Locate the [WS001] header in the "isa.ini" initialization file (it should be at the top of the file). Anywhere within the [WS001] header portion of the "isa.ini" initialization file, add the entry shown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

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

2.1.3 Important Notice for Windows 2000 Users

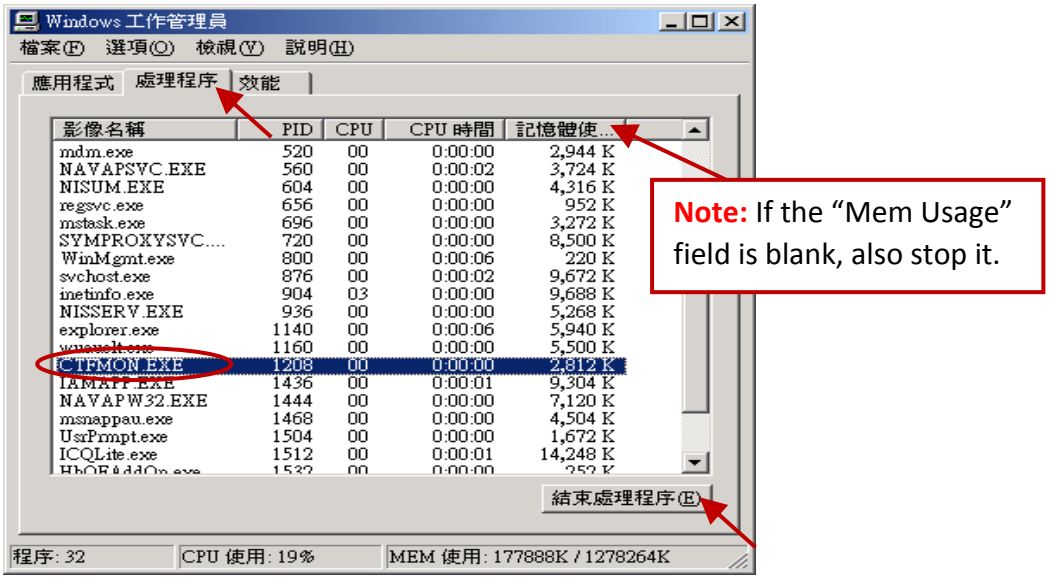
When closing my ISaGRAF window on Windows 2000, it holds. Why ?

This problem usually happens on the Windows 2000. When you close some ISaGRAF windows by clicking on the “X” , it holds about 20 to 40 seconds (No response).



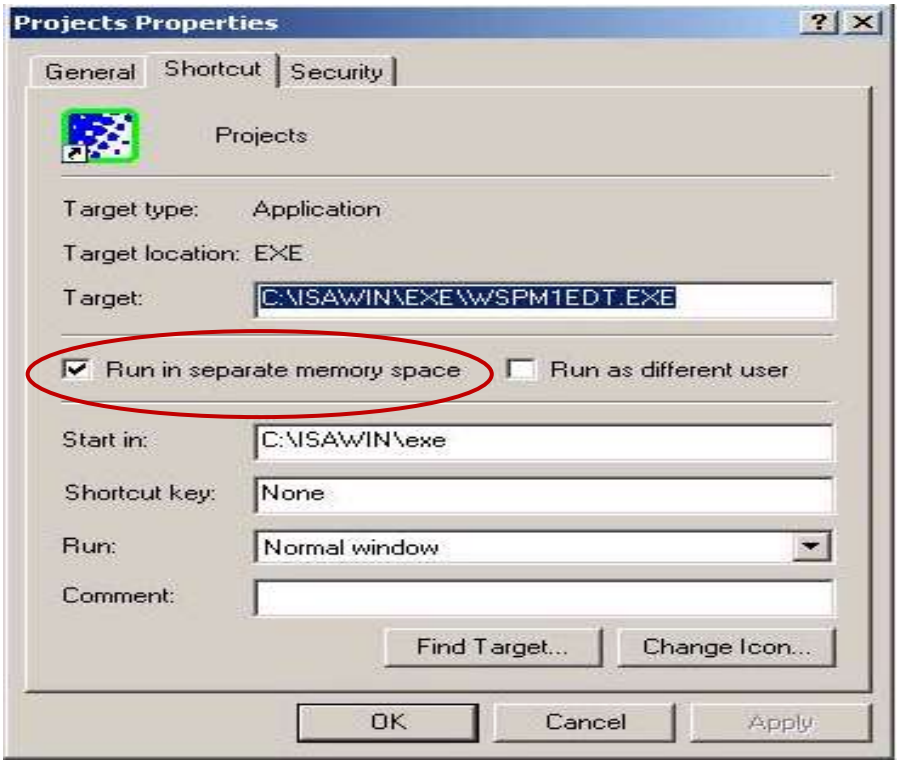
This “hold” behavior is caused by the “CTFMON.EXE” process. We still don’t know the reason yet. You may stop this process by click on the “Ctrl” & “Alt” & “Del” at the same time to open the window Task Manager, and then stop it as next page.

However you will find the “CTFMON.EXE” still load to run when you reboot your PC or run Microsoft Office. So you need to stop it every time when your Windows 2000 is rebooted. If you want to know more about the “CTFMON.EXE”, please visit www.microsoft.com & search “CTFMON.EXE”.



One Quick Way to Avoid the “hold” Problem on Windows 2000:

You may create a shortcut for the “ISaGRAF project manager. And then check on "run in separate memory space" option in the shortcut property.



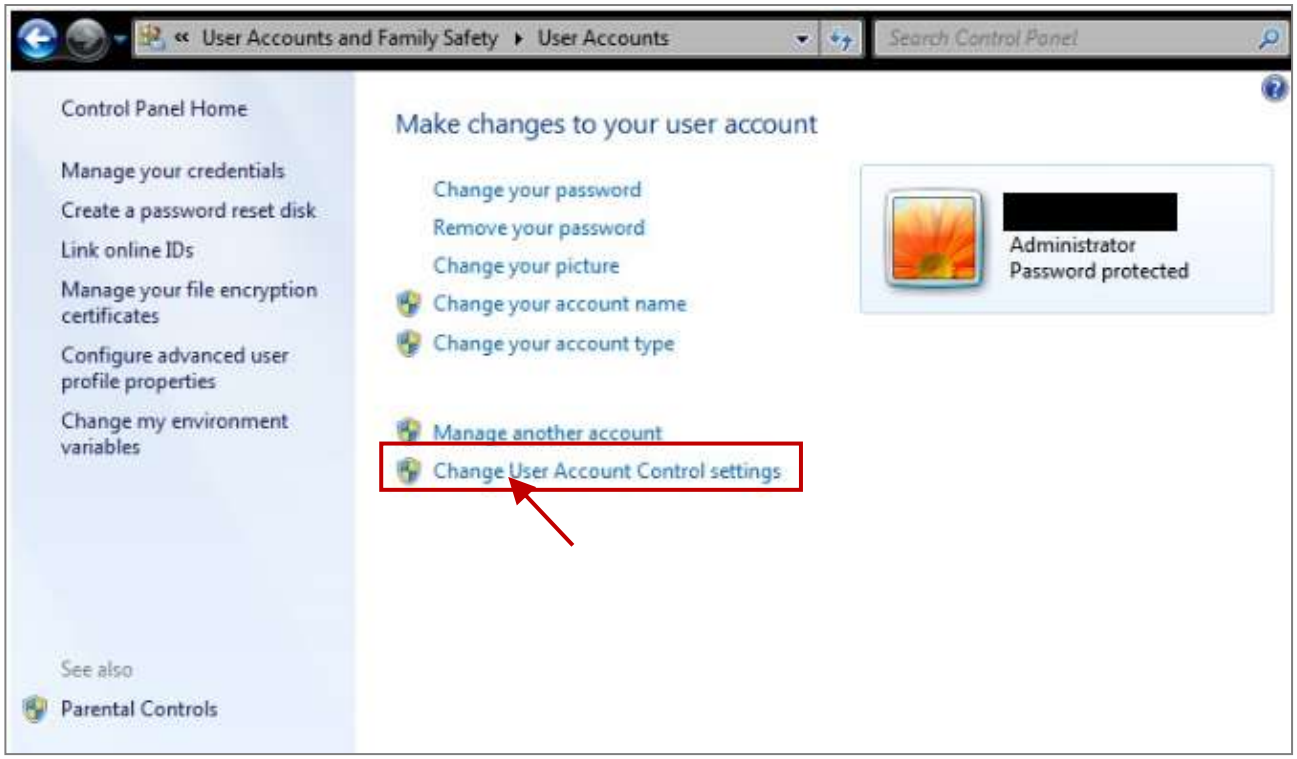
2.1.4 Important Notice for Windows Vista or Windows 7 (32-bit) Users

Before installing the ISaGRAF, if your operating system is Windows Vista or Windows 7 (32-bit), please 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.

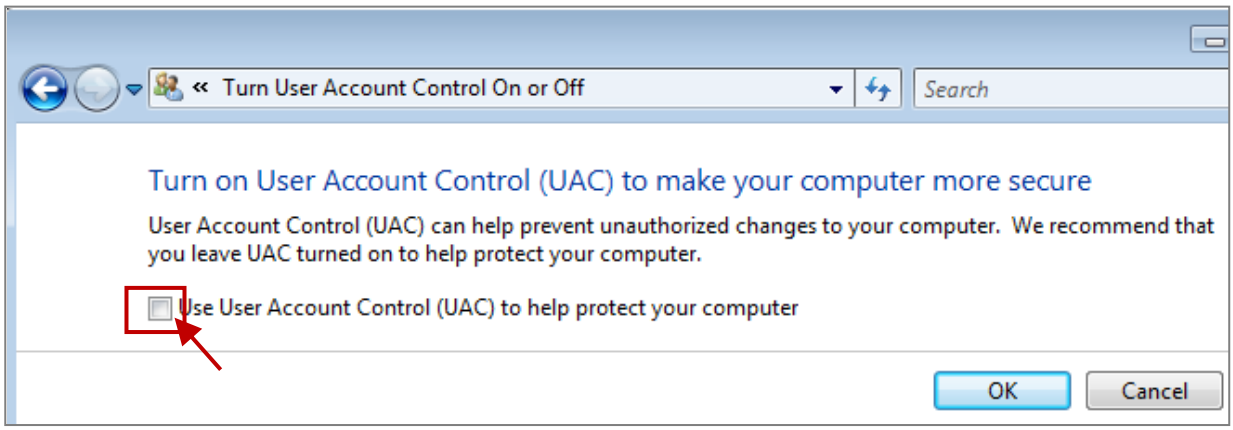
1. From the "Start" menu, choose "Control Panel > User Accounts and Family Safety > User Accounts", then click "Change User Account Control settings" or "Turn User Account Control on or off".



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

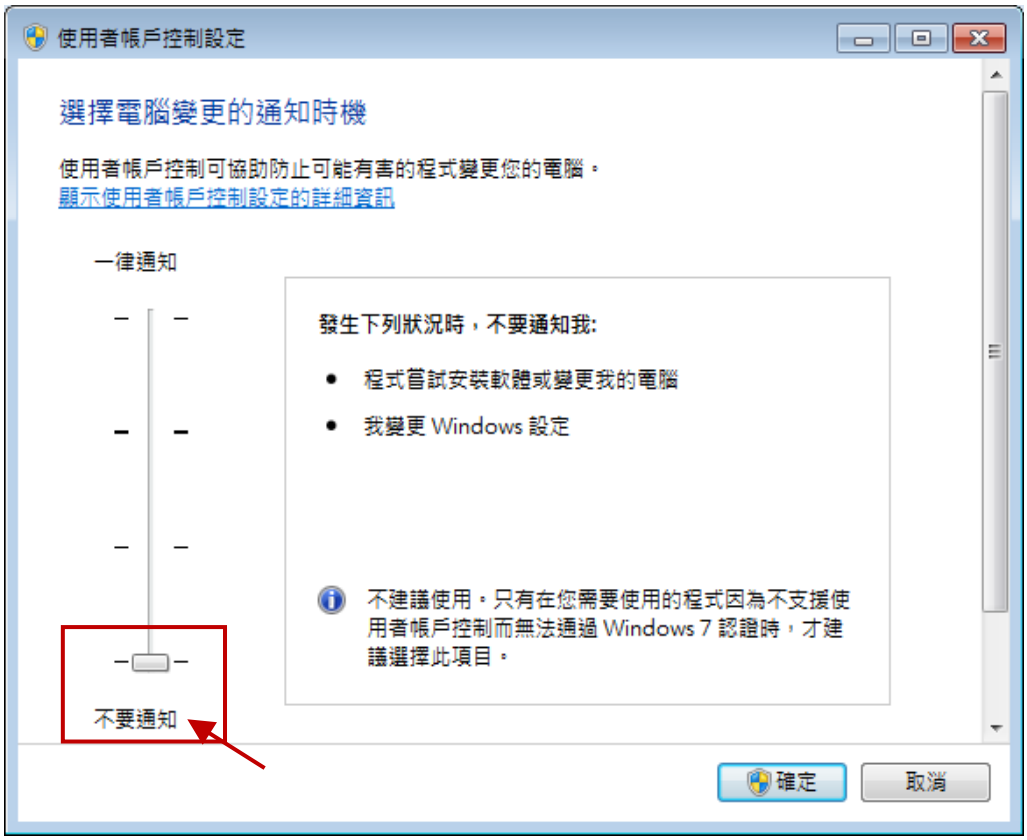
Windows Vista:

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, please refer to section 2.1 Installing the ISaGRAF Software.

2.1.5 Important Notice for Windows 7 (64-bit) Users

If your operating system is Windows 7 (64-bit) Professional, Enterprise, or Ultimate, the ISaGRAF must be installed under the XP Mode. Please do the following steps to install Virtual PC and XP Mode.

Installing the 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. Record the password that is provided during the Setup because it is required to log on to your virtual machine.
7. Now, go back to Section 2.1 to install the ISaGRAF.

2.1.6 Important Setting for Using Variable Arrays

The important setting for using variable arrays:

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

[DEBUG]
Arrays=1

2.2 Step 2 - Installing the ICP DAS Utilities for ISaGRAF

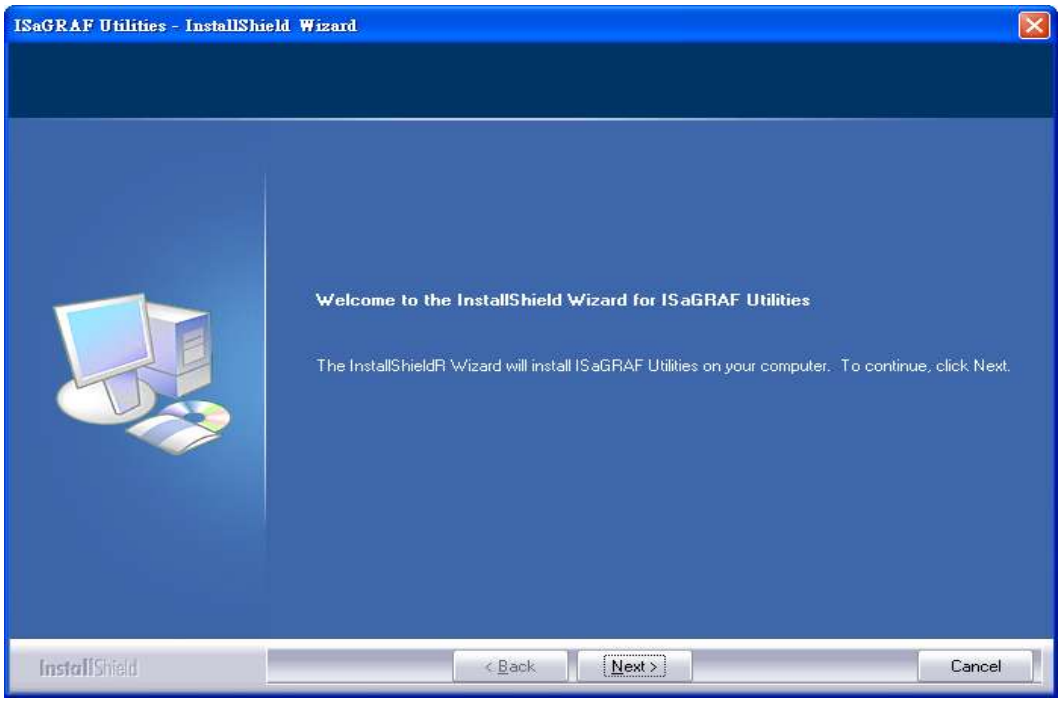
The “ICP DAS Utilities For ISaGRAF” consists of 3 major items.

- I/O libraries (for all ICP DAS ISaGRAF controllers)
- Modem_Link utility
- Auto-scan I/O utility

Note:

The ISaGRAF Workbench software program must be installed before attempting to install the “ICP DAS Utilities for ISaGRAF”. If you have not already installed the ISaGRAF Workbench program, please refer to Section 2.1 Step 1 before continuing.

There is a CD-ROM supplied with each of the WinPAC-5xx7 controllers with the “ICP DAS Utilities for ISaGRAF”. Please insert the CD-ROM into your CD-ROM drive. Then run **CD-ROM: \napdos\isagraf\setup.exe** . Follow the steps to install it.



Note:

If “ICP DAS Utilities for ISaGRAF” is not in your CD-ROM, please download “ICP DAS Utilities For ISaGRAF (io_lib.zip)” from www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Driver.

Chapter 3 Create a Colorful HMI in the ISaGRAF WinCE PAC

Soft-GRAF is an HMI (Human Machine Interface) software developed by ICP DAS which allows user to create his colorful HMI application running with the control logic in the same ISaGRAF WinCE series PAC. Using the PAC with the Soft-GRAF support, user can easily edit its HMI screen by Soft-GRAF Studio and design the control logic by ISaGRAF software.

There are three types of HMI Objects in the Soft-GRAF Studio:
"Value", "Button", "Graph"

User can create the HMI object directly by mouse dragging and dropping the Object into the editing screen and set the properties by mouse/keyboard to display the different effect.

Running HMI and Control Logic in the Same PAC

Information and links:

- For more information, refer to FAQ-146:
  www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-146
  Soft-GRAF Studio V.x.xx Software & manual: Create a Colorful HMI in the ISaGRAF WinCE PAC

Chapter 4 Setting Up a Web HMI Demo

The WinPAC-5xx7 (or WP-5xx7) is the abbreviation of the WP-5147/WP-5147-OD.
The WinPAC-5xx6 (or WP-5xx6) is the abbreviation of the WP-5146/WP-5146-OD.

Important Notice:

1. Please always set a **fixed IP** address to the WinPAC-5xx7. (No DHCP)
2. Recommend to use the Industrial Ethernet Switch (NS-205/NS-208) or Real-time Redundant Ring Switch (RS-405/RS-408) for WP-5xx7/5xx6.
3. The only I/O slot for XW-board in the WP-5xx7 is slot 0.

4.1 Web Demo List

The Web page location:
WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\wp_webhmi_demo\

The respective ISaGRAF project location:
WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\demo\

Demo list:

Name	Description	"IO Connection"
sample	A Web HMI sample	No I/O board
example1	A simple example listed in Chapter 4	Slot 0: XW107
wphmi_01	Display controller's date & time	No I/O board
wphmi_02	DI & DO demo	Slot 0: XW107
wphmi_03	Read / Write Long, float & Timer value	No I/O board
wphmi_04	Read / Write controller's String	No I/O board
wphmi_05	Multi-Pages demo Page menu is on the Left	Slot 0: XW107
wphmi_05a	Multi-Pages demo Page menu is on the Top	Slot 0: XW107
wphmi_06	AIO demo, scaling is in ISaGRAF	Slot 2: (Virtual) I-87024W Slot 3: (Virtual) I-8017HW
wphmi_07	AIO demo, scaling is in the PC	Slot 2: (Virtual) I-87024W Slot 3: (Virtual) I-8017HW
wphmi_08	Download controller's file to PC	Slot 0: XW107
wphmi_09	Pop up an alarm window on PC	Slot 0: XW107
wphmi_11	Trend curve.	Slot 2: (Virtual) I-87024W Slot 3: (Virtual) I-8017HW

wphmi_12	Record 1 to 8 channel i8017HW 's volt every 50ms and draw the trend curve by M. S. Excel	Slot 3: (Virtual) I-8017HW Slot 2: (Virtual) I-8024W
wphmi_13	Record 1 to 4-Ch. i8017HW's voltage every 10ms and draw the trend curve by M. S. Excel	Slot 3: (Virtual) I-8017HW Slot 2: (Virtual) I-8024W

4.2 Steps to Set Up a Web HMI Demo

4.2.1 Step 1 - Setup the Hardware

A. Please have one WP-5147 and then plug one XW107 board in its slot 0.

If you don't have the XW107 (8 IN & 8 OUT board), please follow the same steps as below however your Web HMI demo may be replaced to "wphmi_01" not "wphmi_05"

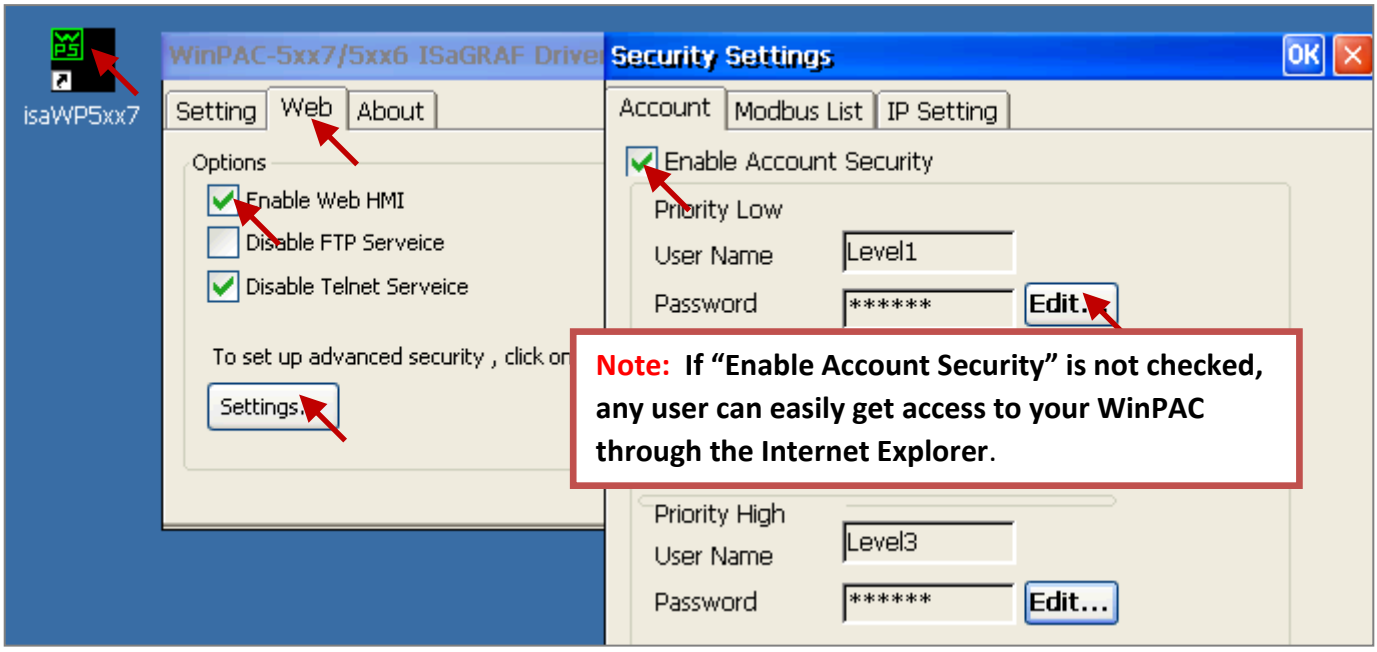
B. Prepare one VGA monitor, one USB mouse and one Ethernet cable and then connect them to the WinPAC-5xx7. (The keyboard is using the software keyboard on the bottom-right of the VGA screen)

C. Power the WinPAC-5xx7 up.

4.2.2 Step 2 - Setting the Web Options

A. Please refer to the Appendix A.3 to set a **fixed IP** address to the WinPAC. (No DHCP)

B. Check on "Enable Web HMI" and then click on "Setting", Please check the "Enable Account Security" and then click on "Edit" to set (username , password). **Then remember to click on "OK"**



4.2.3 Step 3 - Download ISaGRAF Project

Please download ISaGRAF project “wphmi_05” to the WinPAC-5xx7. This project is in the WP-5xx7 CD-ROM:\napdos\isagraf\wp-5xx7\demo\ “wphmi_05.pia”

wphmi_05 demo need one XW107.If you don’t have the XW107 (8 DI & 8 DO board), you may download “wphmi_01” (CD-ROM:\napdos\isagraf\wp-5xx7\demo\ “wphmi_01.pia”)

If you know how to restore “wphmi_05.pia” to your ISaGRAF Workbench and download it to the controller, please go ahead to the Section 4.2.4.

However if you don’t know it, please refer to the below steps. Please make sure the ISaGRAF Workbench is already installed to your PC. (Refer to the Section 2.1 & 2.2)

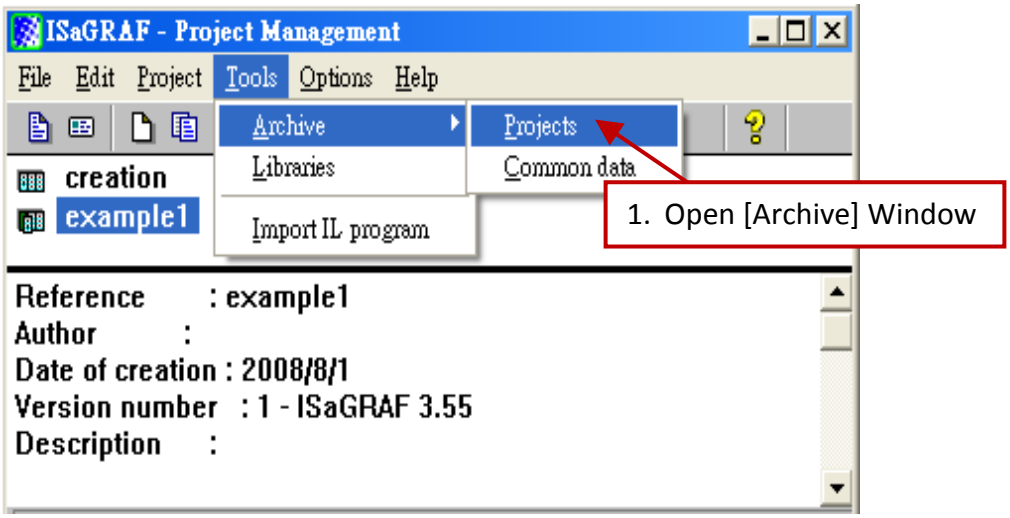
Steps to Backing Up & Restoring an ISaGRAF Project:

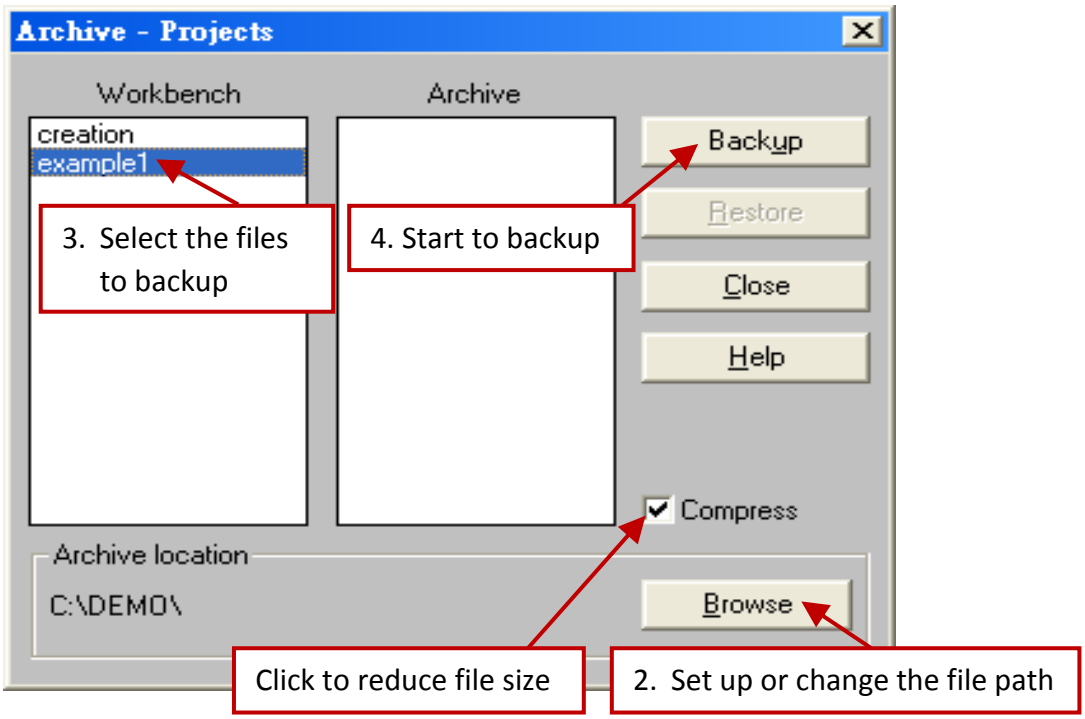
For archiving purposes you can "Back Up" and "Restore" an ISaGRAF project. For example, you may want someone to test your program or email to service@icpdas.com for ICP DAS’s ISaGRAF technical service.

Backing Up an ISaGRAF Project

Open the "ISaGRAF Project Management",

1. Select "Tools" > "Archive" > "Projects" from the menu bar to open "Archive - Projects" window.
2. Click on “Browse” to set up the file path (e.g. C:\demo), and you can also click "Compress" to reduce the file size.
3. Select the project name you want to backup from the “Workbench” field.
4. Click on "Backup" to start the process.

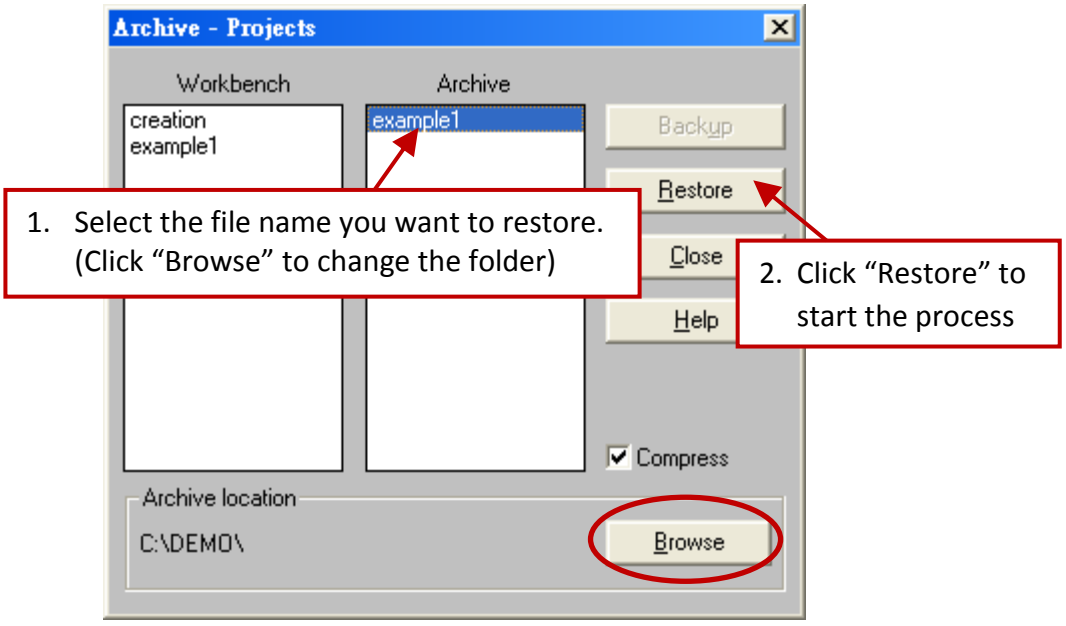




Restoring an ISaGRAF Project

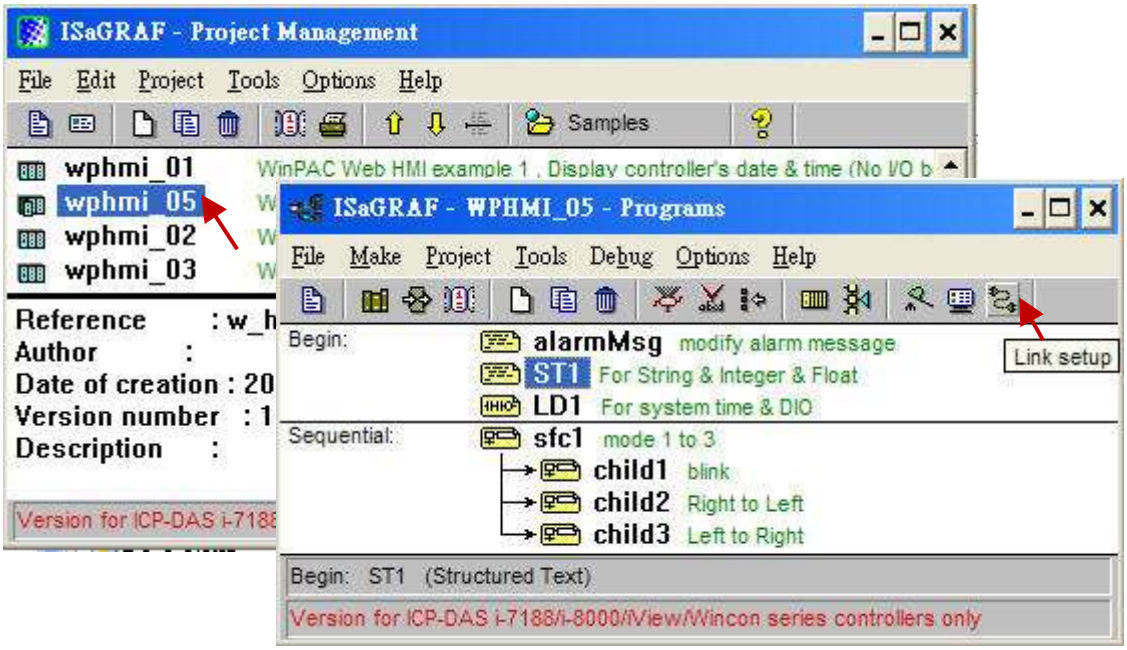
To restore an ISaGRAF project from a backed up file (*.pia), use the same method as above to access the "Archive - Projects" window.

1. Select the project name (backed up file) you want to restore from the "Archive" field.
2. Click on the "Restore" button. The ISaGRAF project will now be restored to the sub-directory you designated.

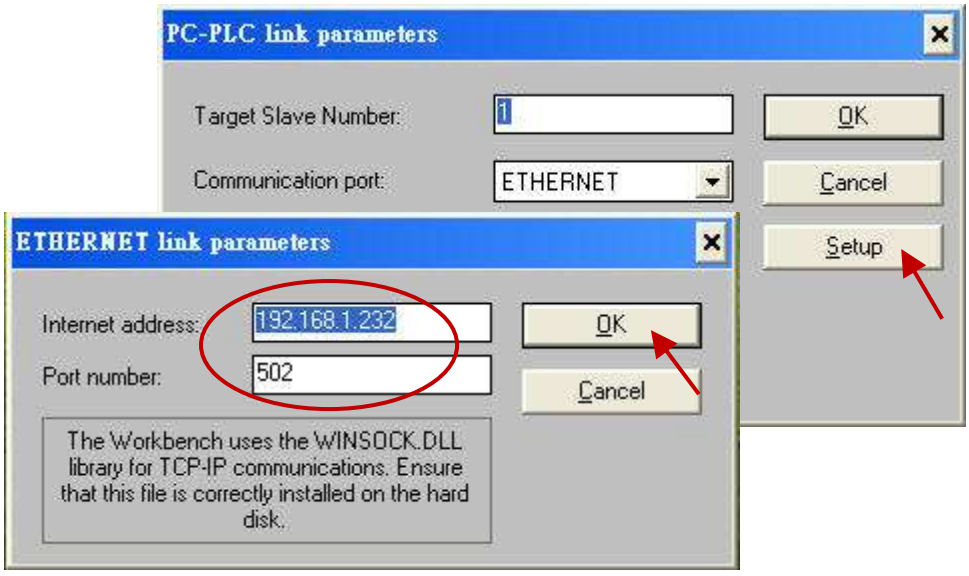


4.2.3.1 Steps to Download an ISaGRAF Project to the Controller:

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

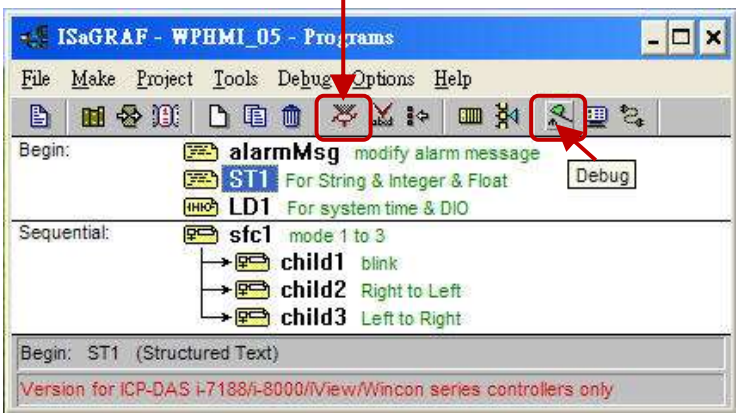


Click on “Setup” first and then entering the IP address of your controller. The port number should be 502.

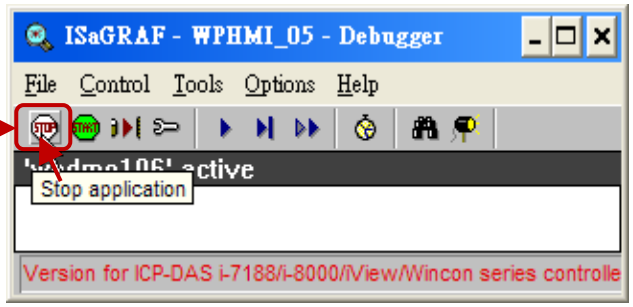


As figure below, to download “wphmi_05” project to the WinPAC-5xx7, click on “Debug”. If communication has been established, click on “stop” to stop the old project running in the WP-5xx7. Then click on “Download” to download it to the controller.

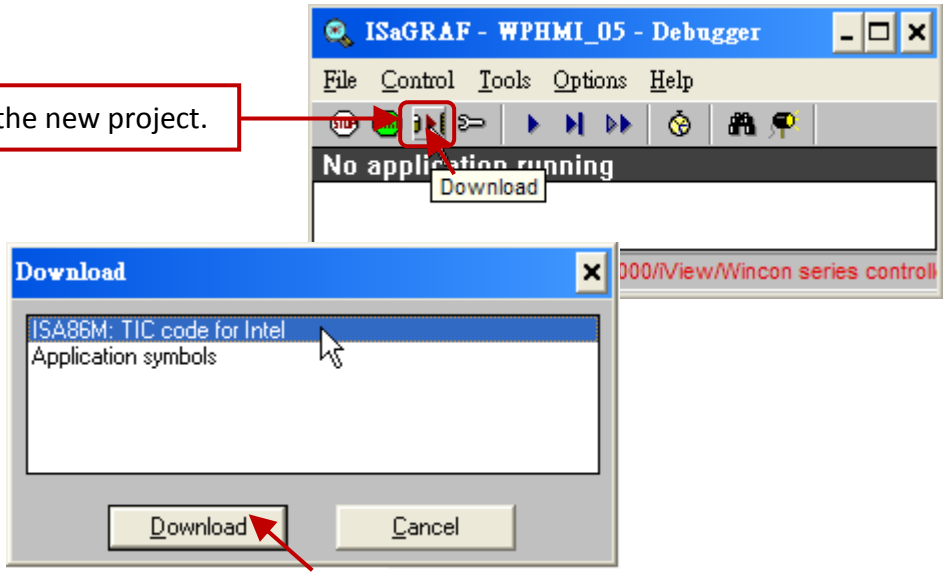
If the project is not compiled, click on “Make application code” button first, then, click on the “Debug”.



Stop the running project.



Download the new project.



4.2.4 Step 4 - Download Web Pages to the WinPAC

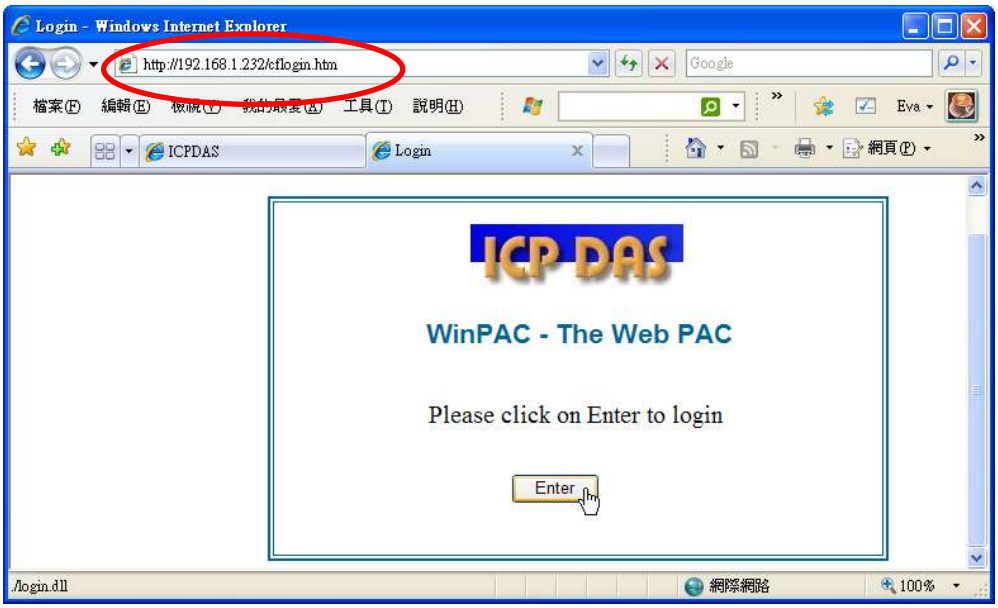
A. Please copy all files in the CD-ROM:
WinPAC-5xx7 CD: \napdos\isagraf\wp-5xx7\wp_webhmi_demo\wphmi_05\ *.*
to the WinPAC-5xx7's \Miscro_SD\Temp\HTTP\WebHMI\

wphmi_05 demo need one XW107 in its slot 0. If you don't have the XW107 (8 IN & 8 OUT board), you may download "wphmi_01"

B. Since the Web Pages are modified or new copied, please run "rs_wphmi.exe" to reset the Web server.
The "rs_wphmi.exe" must be run every time when user has modified any file in the WP-5xx7's \Micro_SD\Temp\HTTP\WebHMI

4.2.5 Step 5 - Show Time

Please run Internet Explorer (Rev. 6.0 or higher), key in the IP address of your WinPAC-5xx7.
For example: 192.168.1.232 or http://192.168.1.232



Chapter 5 Programming a Web HMI Example

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

The WinPAC-5xx7 (or WP-5xx7) is the abbreviation of the WP-5147/WP-5147-OD.
The WinPAC-5xx6 (or WP-5xx6) is the abbreviation of the WP-5146/WP-5146-OD.

Important Notice:

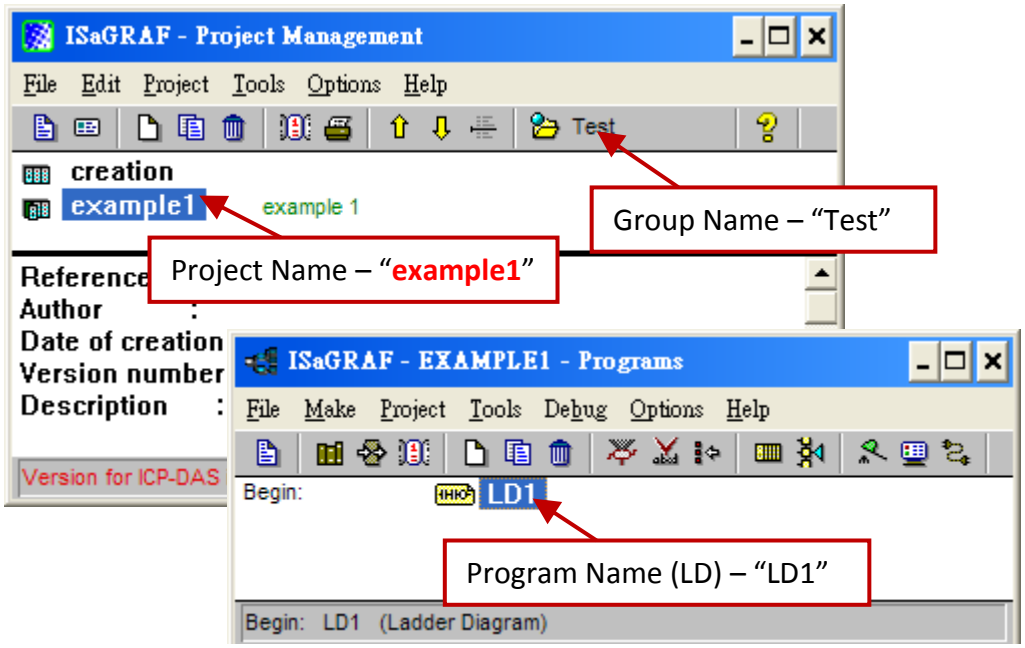
1. Please always set a **fixed IP** address to the WinPAC-5xx7. (No DHCP)
2. Recommend to use the Industrial Ethernet Switch (NS-205/NS-208) or Real-time Redundant Ring Switch (RS-405/RS-408) for WP-5xx7/5xx6.

If user would like to program WinPAC-5xx7 by using both ISaGRAF & (EVC++ or VS.net), it is also possible. Please refer to Chapter 7, Chapter 8 and Chapter 11.

5.1 Writing a Simple ISaGRAF Program

We are going to use ISaGRAF Workbench to write a simple ISaGRAF example program, then download it to the WinPAC-5xx7 controller (with one **XW107** I/O board in its slot 0) to make it work. If you haven't installed "ISaGRAF" & "ICP DAS Utilities for ISaGRAF", please go back to read Chapter 2.

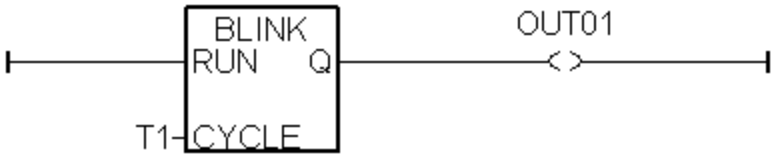
This example contains one Ladder program. (This demo program resides at the WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\demo\ "example1.pia")



Variables declaration:

Name	Type	Attribute	Description
OUT01	Boolean	**Output**	Output 1 in the XW107, Modbus network addr = 1
OUT02	Boolean	**Output**	Output 2 in the XW107, Modbus network addr = 2
K1	Boolean	**Input**	Input 1 in the XW107, Modbus network addr = 11
K2	Boolean	**Input**	Input 2 in the XW107, Modbus network addr = 12
T1	Timer	**Internal**	Time Period of blinking, initial value set as T#8s Modbus network addr = 21

Ladder Logic Program Outline (LD1):

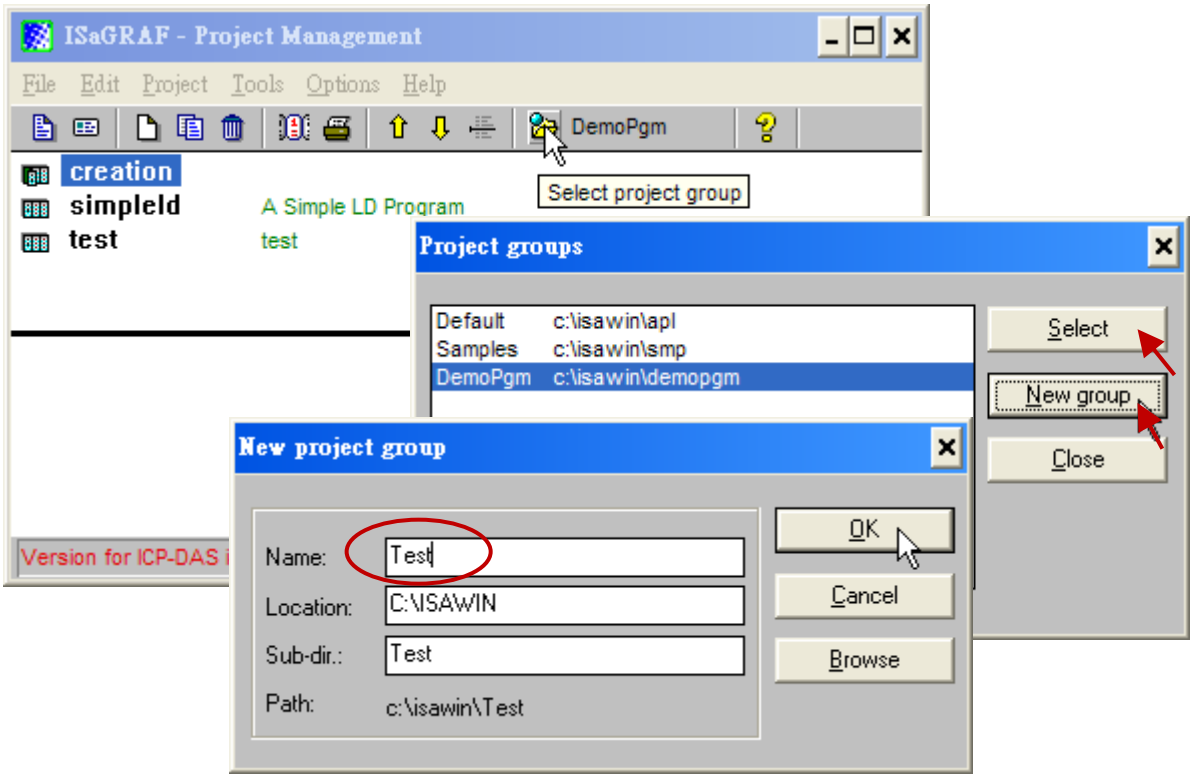


5.1.1 Open ISaGRAF-Project Management

Click on the Windows "Start" button, then click on "Programs" > "ISaGRAF 3.4", (or ISaGRAF 3.5) and then click on "Projects" as shown below.

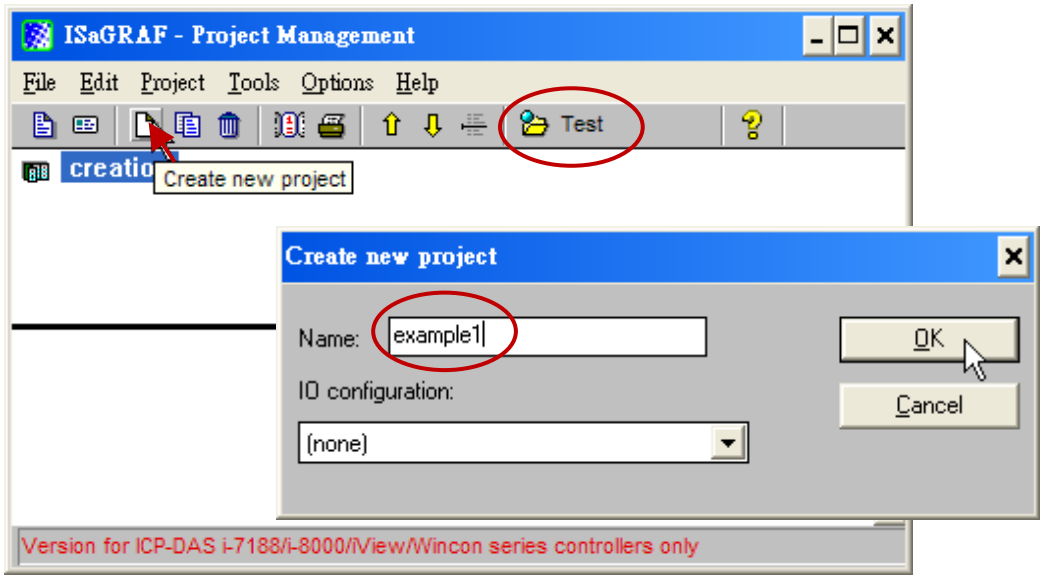
5.1.2 Creating an ISaGRAF User's Group

Click on the "Select Project Group", and then click on "New Group", then type in the name for the new user's group you wish to create, and last click on "OK".

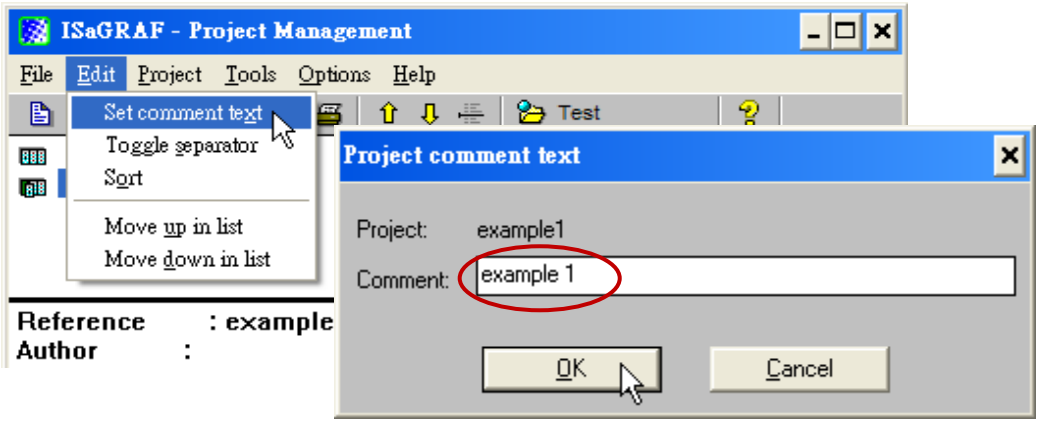


5.1.3 Creating a New ISaGRAF Project

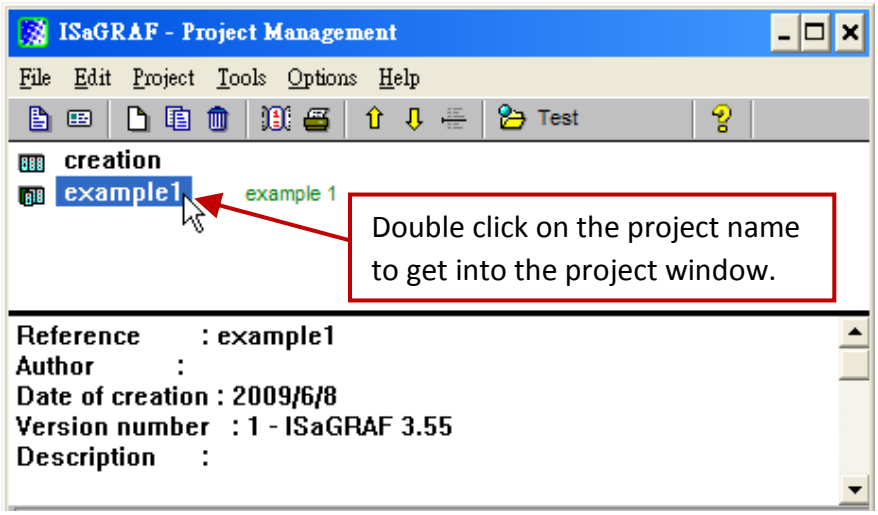
To start a new ISaGRAF project, click on the "Create New Project" icon and then enter in the name for the new project.



You can then enter additional information for your project by clicking on the "Edit" and then "Set Comment Text" menu as illustrated below.



You will now see the name of the new project in the "Project Management" window. Double click on the name of the new project to open the new project.

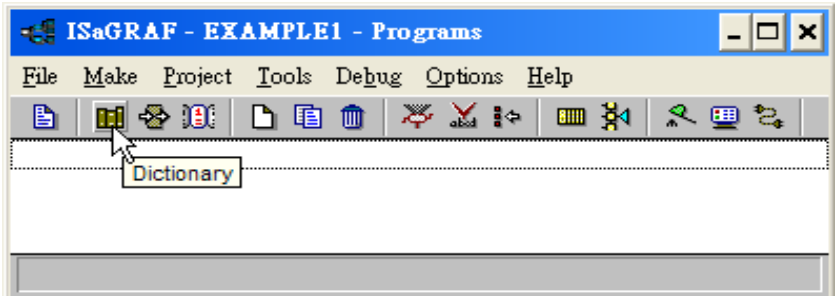


5.1.4 Declaring the ISaGRAF Project Variables

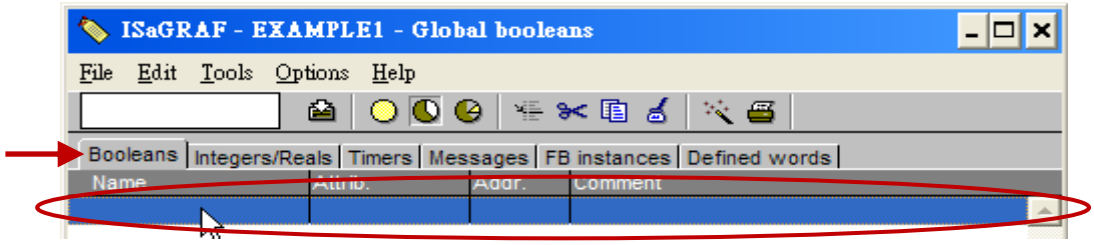
Before you can start creating an ISaGRAF program, you must first declare the variables that will be used in the ISaGRAF program.

Declare the Boolean Variables

1. Click on the "Dictionary" icon.



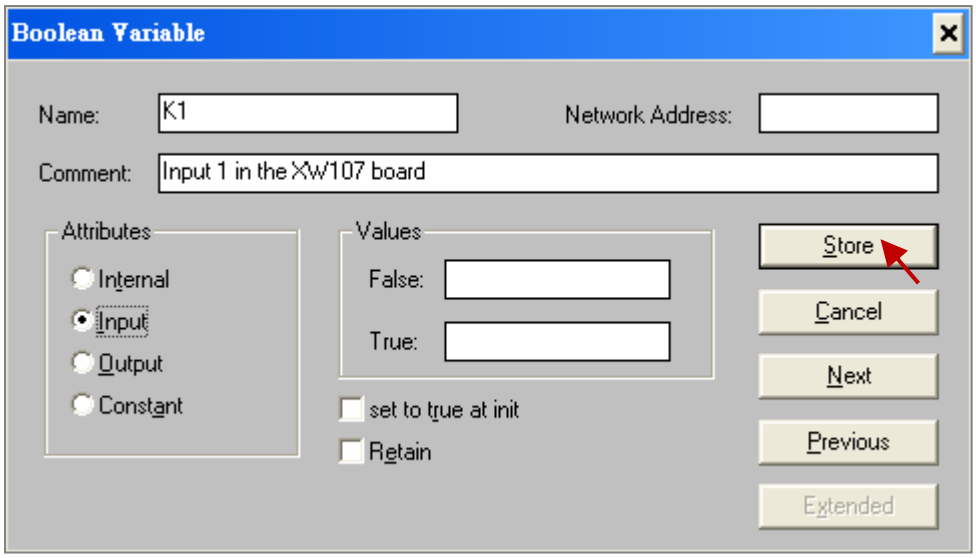
2. Click on the "Boolean" tab to declare the Boolean variables that will be used in our example program.
3. Double click on the colored area below the "Boolean" tab, and a "Boolean Variable" window will open.



(For this example program)

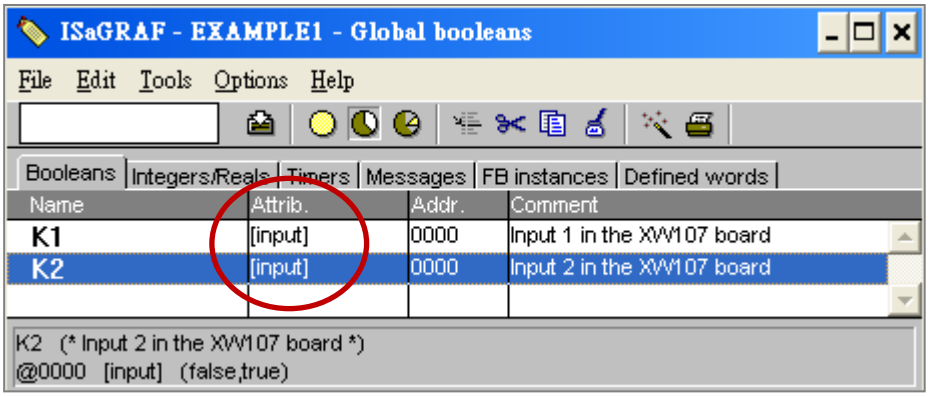
4. Enter in the name of the variable to be used in the project. (e.g. "K1")
5. Add the description for the variable in “Comment” field. (e.g. "Input 1 in the XW107 board")
6. Select the properties of the variable in “Attributes” field. (e.g. "Input")
7. Click “Store” to save it.

Now, the variable has been declared.



Note:

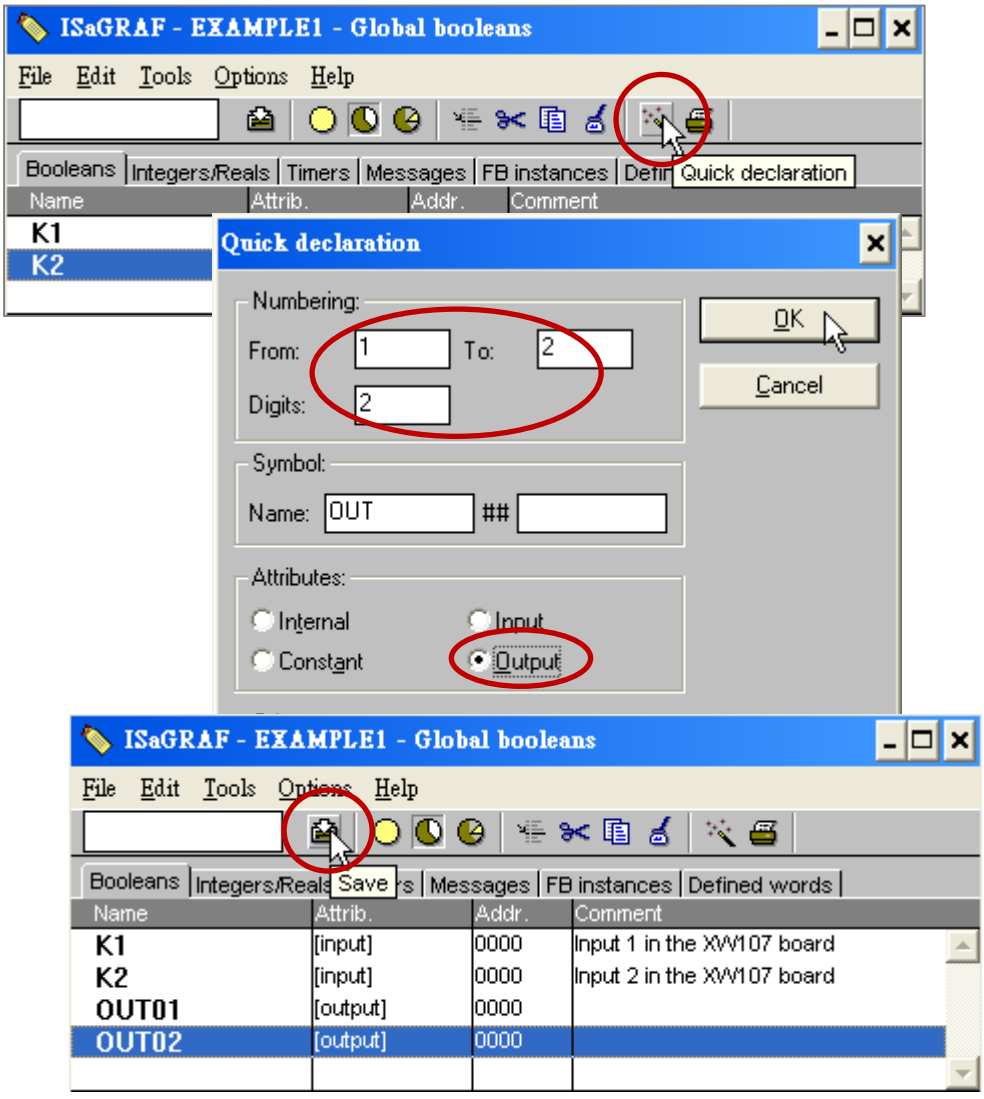
You MUST make sure that the variable you have declared has the desired **Attribute** assigned. If you decide that you want to change a project variable’s attribute, just double click on the variable name and you can reassign the attribute for the variable. Please follow the above same step to declare one another Boolean variable – “K2”. Then you will have as below.



Quick Way to Declare

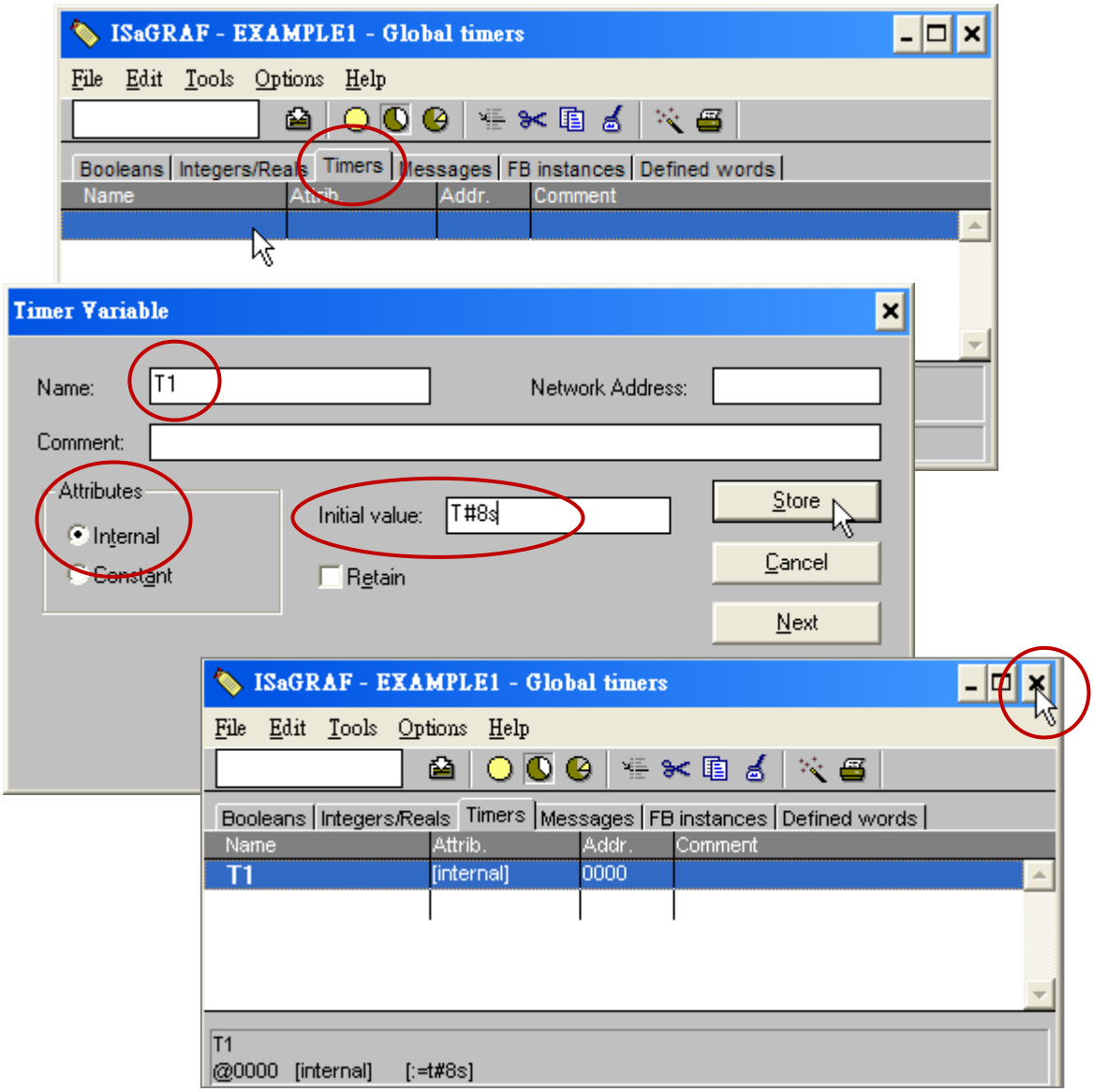
There are two outputs used in this example program named "OUT01 and OUT02". ISaGRAF provides a **quick and easy way to declare** like variables that are sequentially ordered. To begin this process,

1. Click on the "Quick Declaration" icon.
2. In “Numbering” item:
   “From” and "To" - Enter a continuous sequence of variables to the start and end of the digital.
   (In this case, from 1 to 2).
   “Digits” - Enter the number of digit.
   (In this case, 2; if the number is less than 2-digit, it will add 0 such as “01”.
3. Enter the "Symbol" name for the output variables being declared.
4. Set the attribute to "Output and then click “OK” to complete the setup.
5. Now, all two outputs will be immediately added to the "Global Boolean" window. Click on “Save” to store them.



Declare the Timer Variables

To declare the timer (T1) variable used in this example program, click on the "Timers" tab in the setup screen. Double click on the colored area and enter the Name as "T1", set the "Attributes" to "Internal", the "Initial Value" to "T#8s", then click on the "Store" button. Then please click on “X” to close the “dictionary” window.



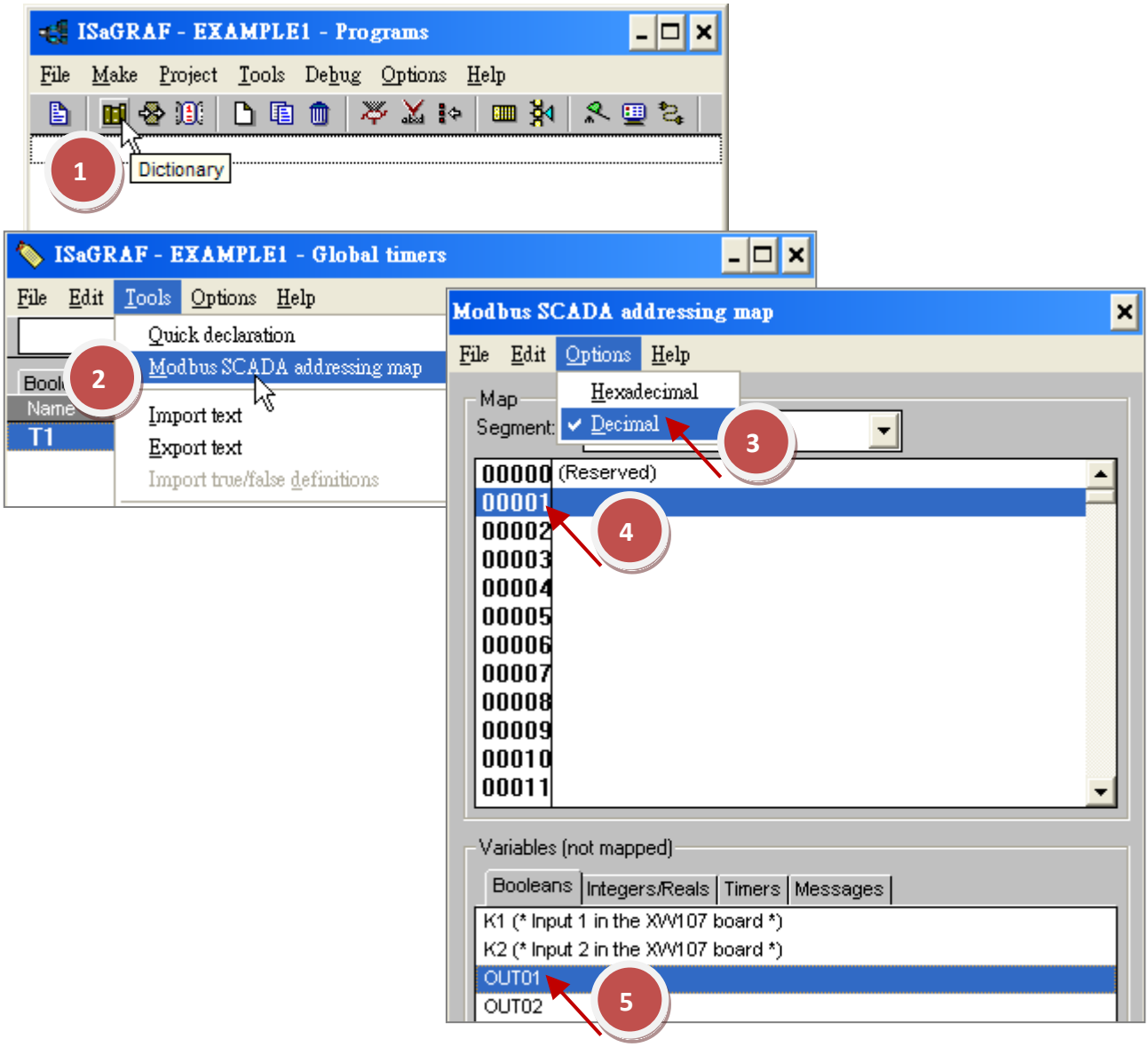
5.1.5 Assign Modbus Network Address No to Variables

The Web HMI will exchange the variable value with the ISaGRAF project if they have assigned the proper "Modbus network address". The Web HMI only recognizes Modbus No. from 1 to 1024. However other SCADA software may R/W the Modbus No. from 1 to 8191 in the WinPAC-5xx7.

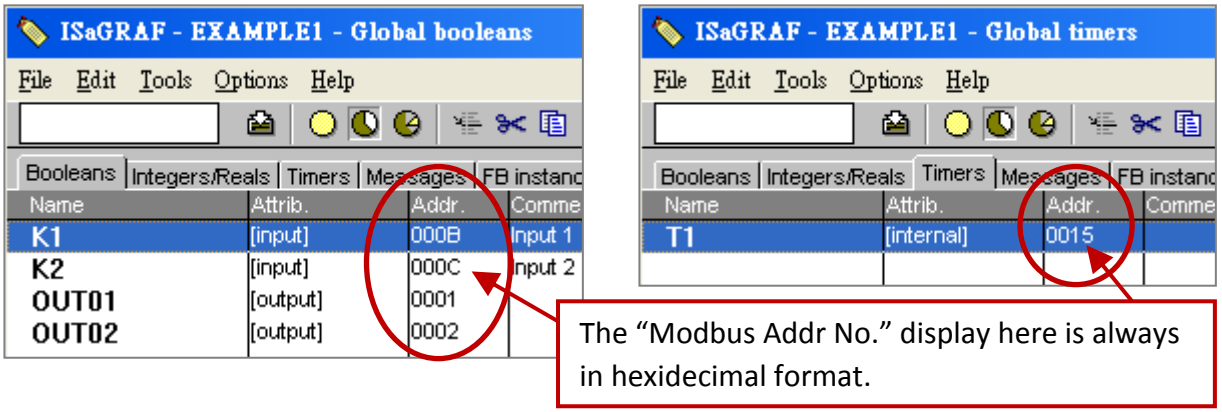
Variables without assigning Modbus No. will not be available by Web HMI and other SCADA software or HMI devices.

Please refer to WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\ "user_manual_i_8xx7.pdf" for section 4.1 & 4.2 for detailed information about assigning Modbus network address.

1. Click on "dictionary" icon.
2. Click [Tools] > [Modbus SCADA addressing map].
3. Select [Options] > [Decimal], or it will use Hexadecimal format as default.
4. Click on "00001" on the top window
5. Double click on "OUT01" to attach it to the Modbus No. 1.



Please follow the same way to assign OUT01 to No.2, K1 to No.11, K2 to No.12 and then Timer variable T1 to No.21. Then we have below window.

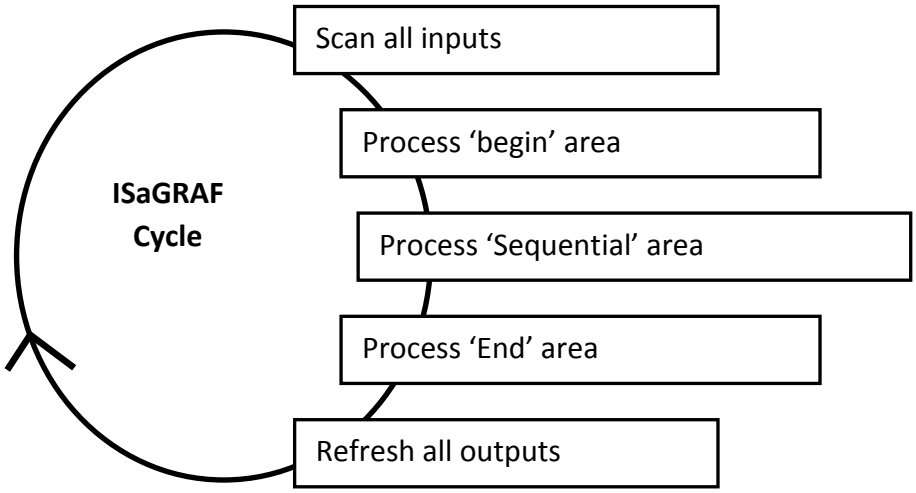


Very Important:

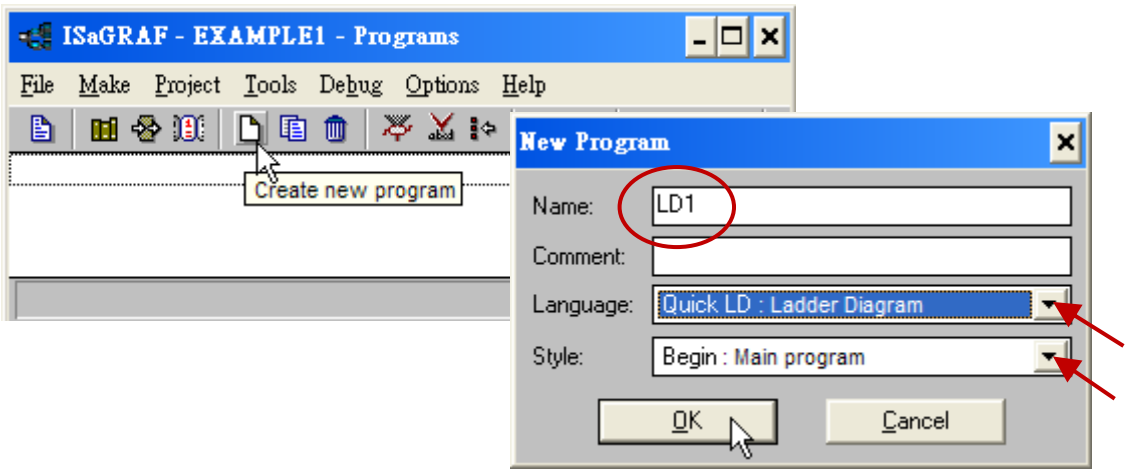
If assign Modbus No. to Long integer or Float or Timer variables, they should occupy two Modbus No.
Please refer to WinPAC-5xx7 CD-ROM:
\napdos\isagraf\wp-5xx7\english_manu\ "user_manual_i_8xx7.pdf” - section 4.2 for detailed information.

5.1.6 Create the LD - "LD1" Program

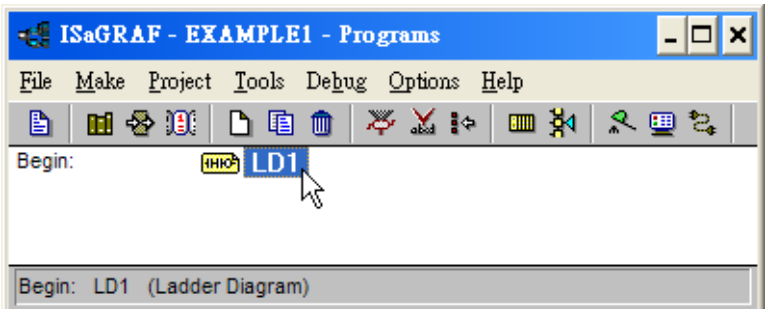
ISaGRAF will run every program one time in each PLC scan cycle. Programs in the “begin” area will run first, then the “Sequential” area, and last the “End” area. An ISaGRAF cycle runs in the way as the below scheme.



Click on the "Create New Program" icon and the "New Program" window will appear. Enter the "Name" as "LD1", next, click on the "Language" scroll button and select "Quick LD: Ladder Diagram", and make sure the "Style" is set to "Begin: Main Program". You can add any desired text to the "Comment" section for the LD program, but it isn't required.

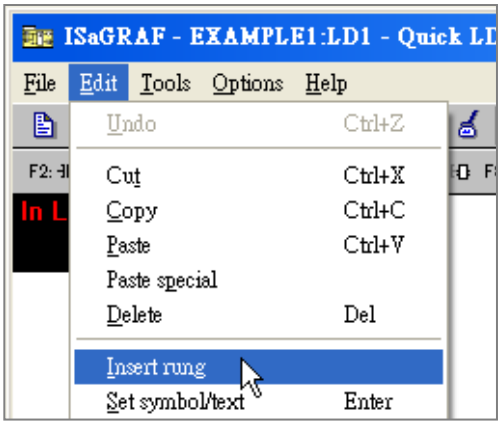


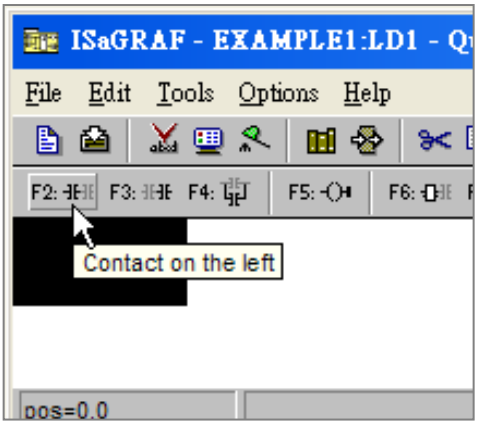
Now we have one program inside this project. Please double click on the "LD1" to get into it.

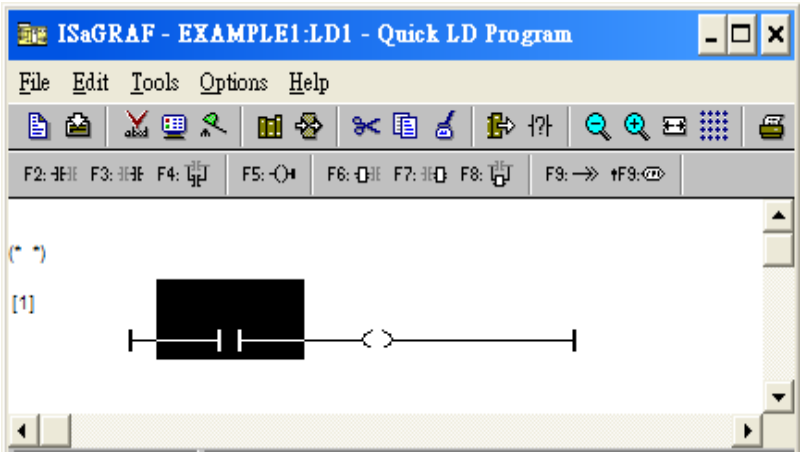


5.1.7 Edit the "LD1" Program

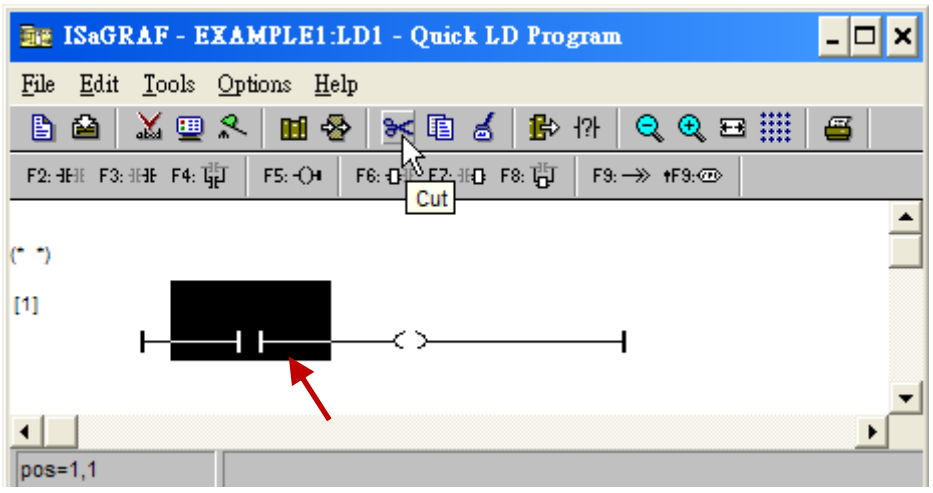
When you double click on the "LD1" name the "Quick LD Program" window will appear. To start programming our LD program, click on "Edit" from the main menu bar, and then click on "Insert Rung". "Insert Rung" means to insert a basic LD rung just above the current position. **Or, you may just simply click on the "F2 (Contact on the left)"** icon, and the following will appear within the Quick LD Program window.



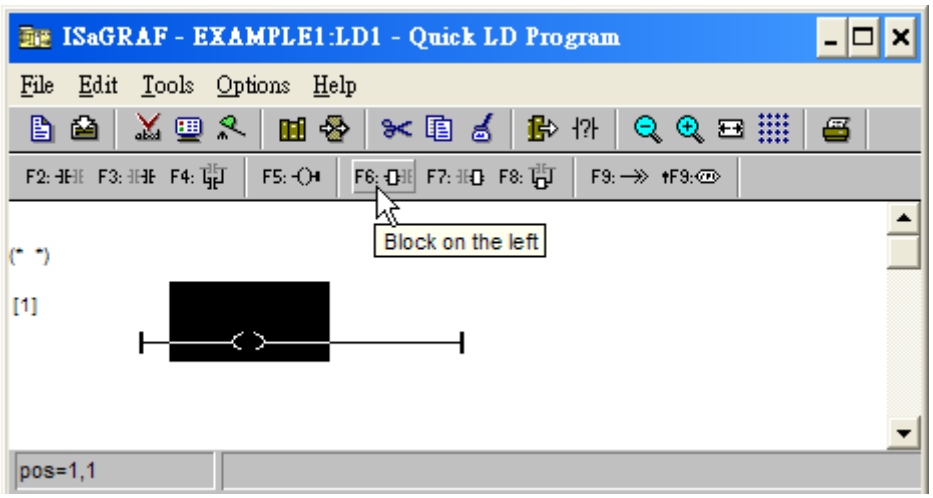




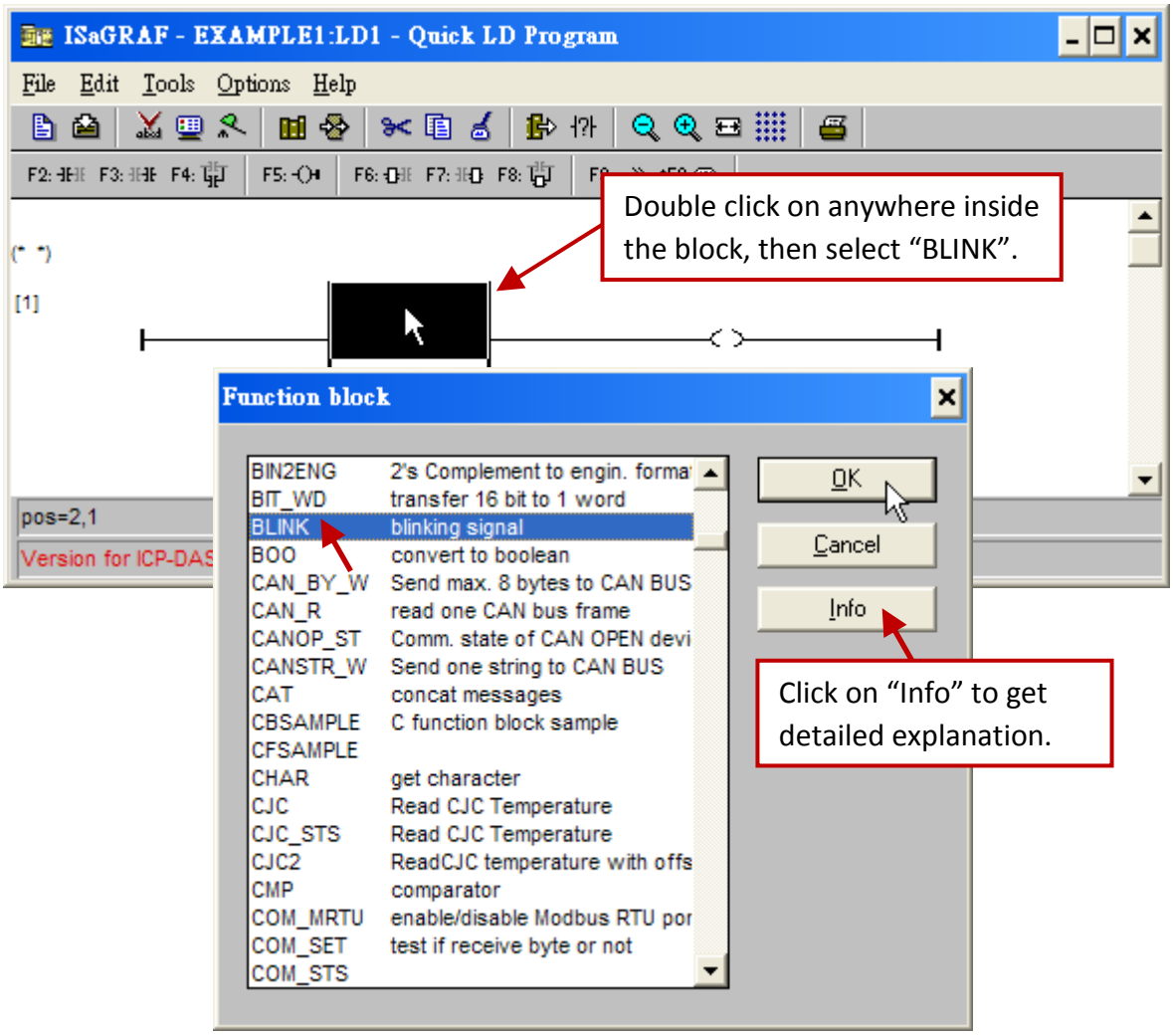
We are going to write the first line of the LD1 program. Move the cursor to the first “contact” and then click on “cut” to delete it.



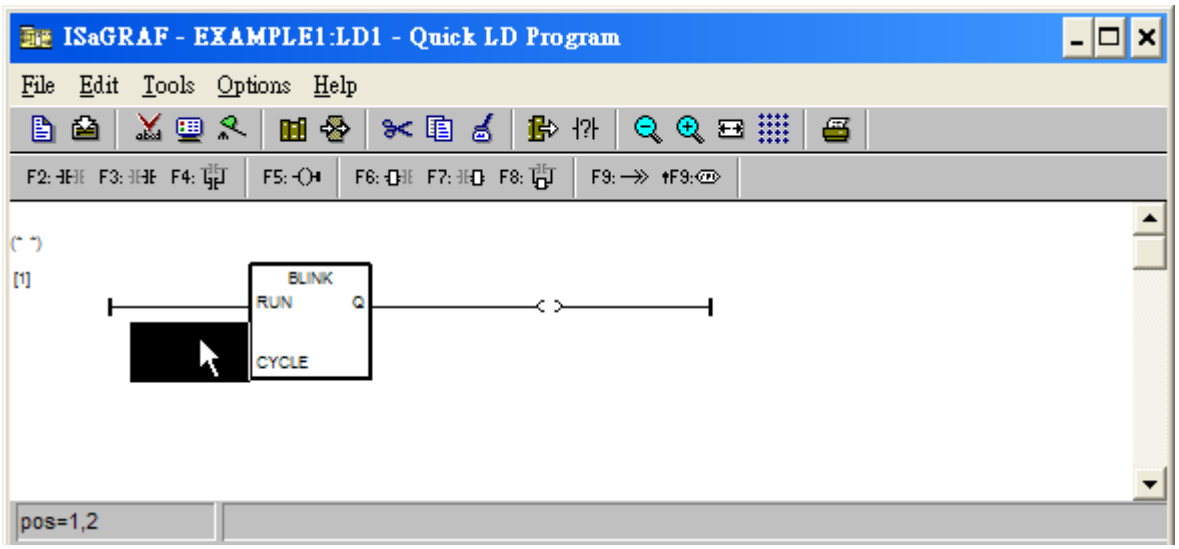
Click on the "F6 (Block on the left)" icon and you will create a block on the left of the “coil”.



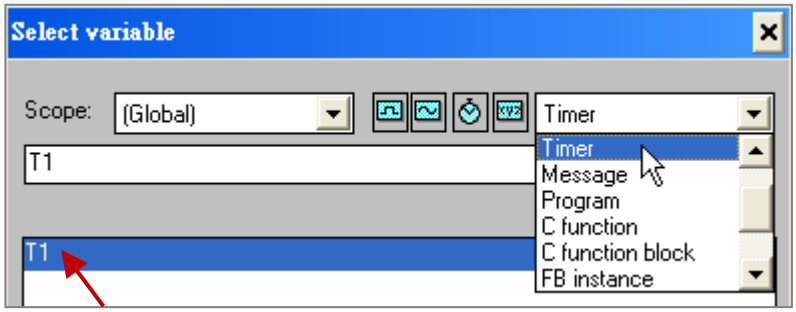
Now we are going to assign the associated variable & constant to each item. Double click anywhere inside of the block and the "Function Block" assignment window appears. Select the "BLINK" type function block. To learn how the "BLINK" function operates you can click on the "Info" button for a detailed explanation of its functionality



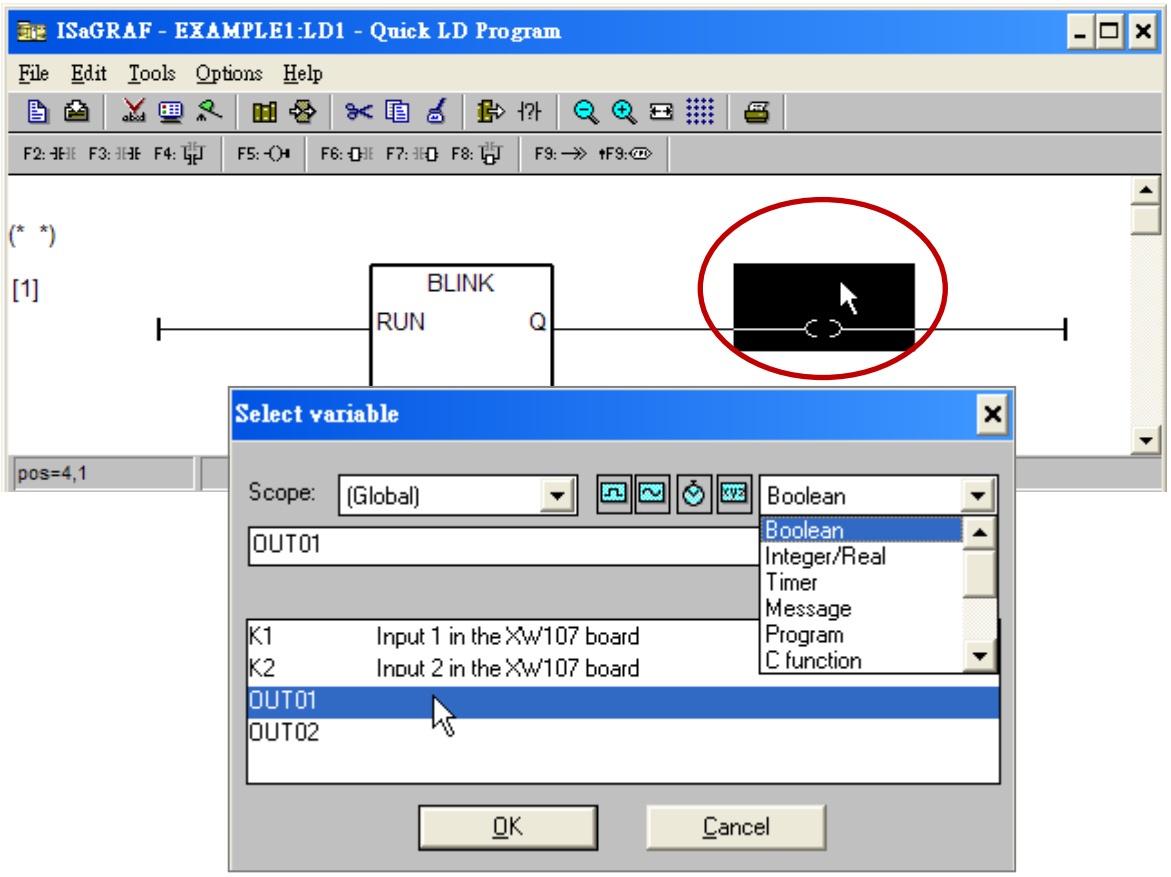
Now move your cursor to the left of the parameter “CYCLE” of the “BLINK” block.



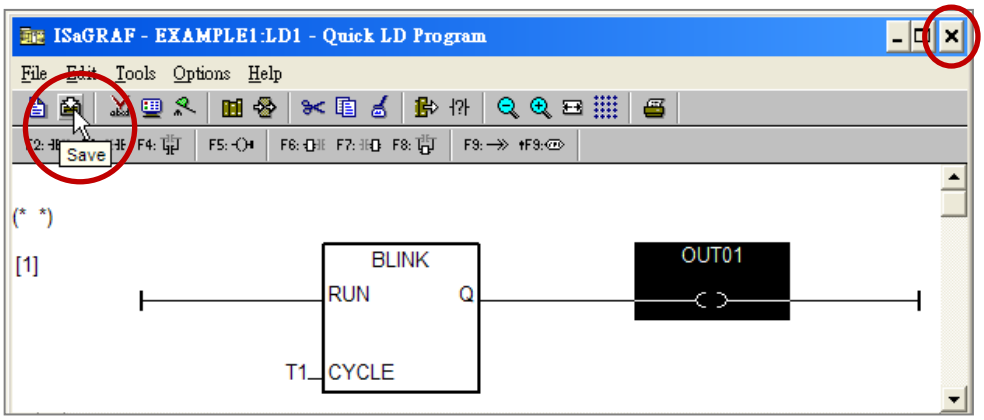
Double click on it, select “Timer” and then double click on variable name - “T1”.



Move your cursor to the “coil”. Double click on it, select “Boolean” and then double click on variable name – “OUT01”.

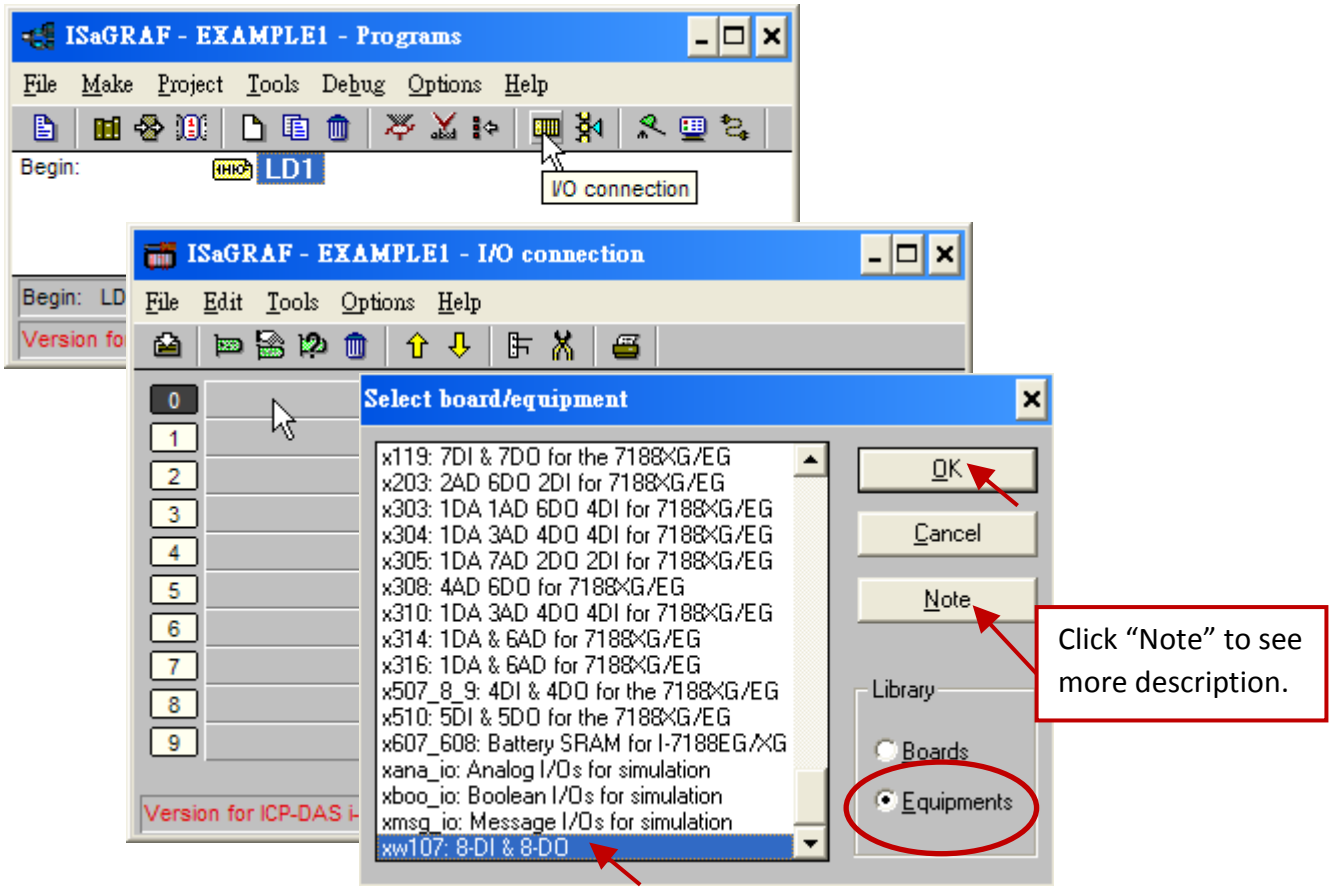


Now we have finished our Ladder code, click on “Save” and then click on “X” to exit.

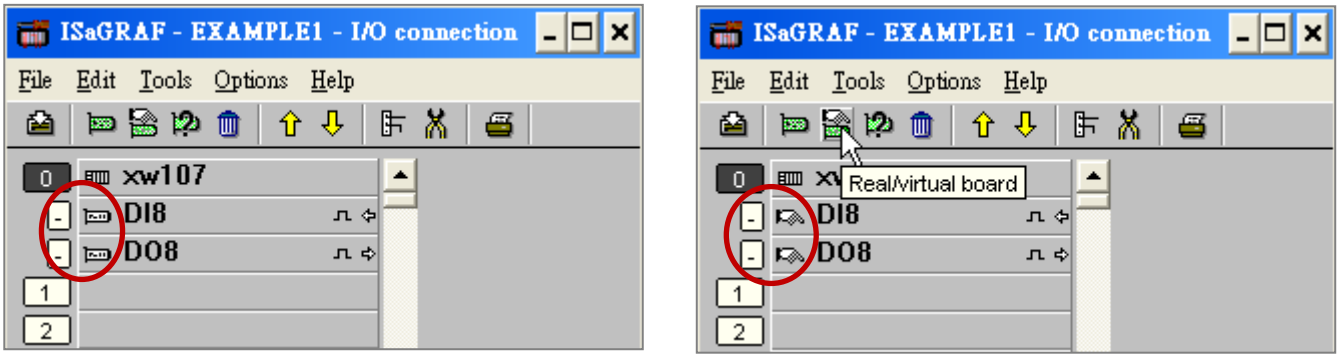


5.1.8 Connecting the I/O

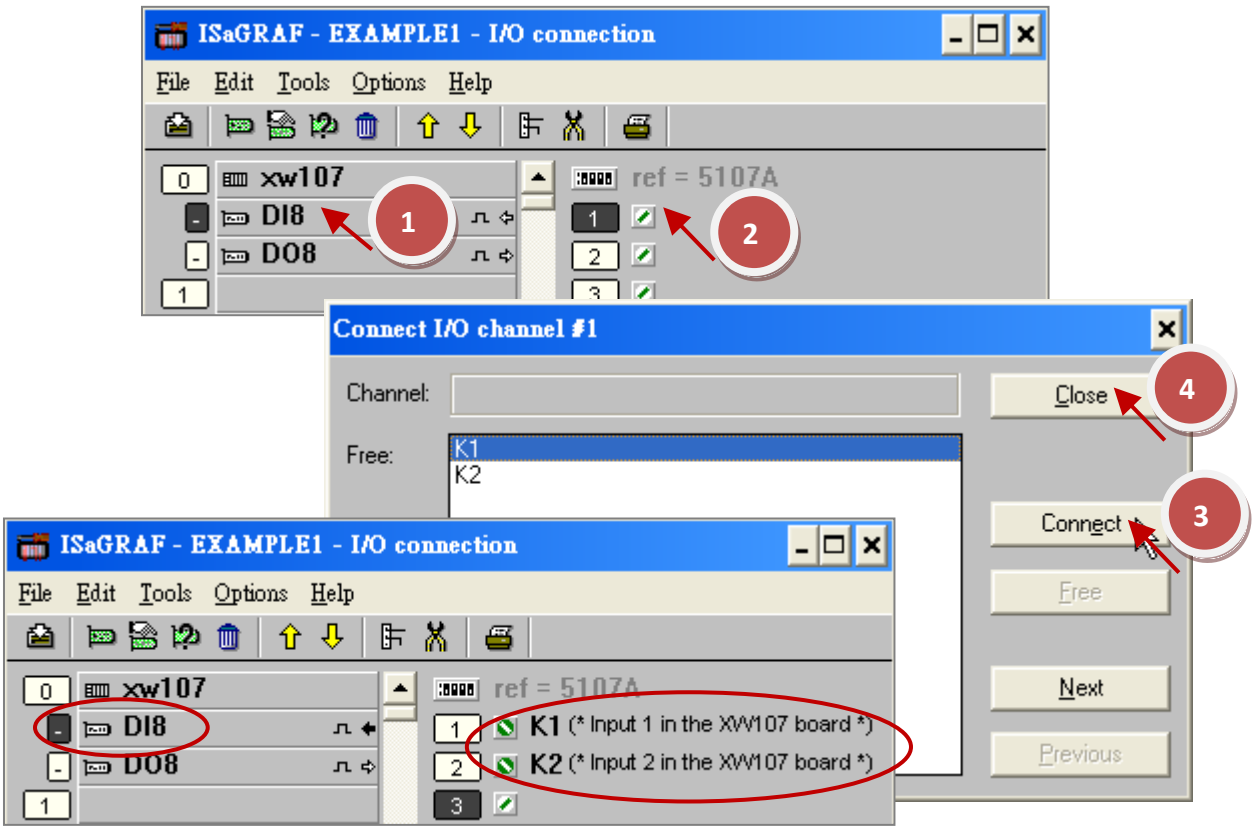
We have defined variables name of “OUT01” , “OUT02” as “output” attribution, while “K1” & “K2” as “input” attribution in Section 5.1.4. These “input” & “output” variables should be map to physical I/O in the controller before they can work. To do that, click on “I/O connection” to get into the I/O connection window. Double click on the slot 0 (Please make sure your XW107 I/O board is plug in slot 0 of the WP-5xx7) & then check on the “Equipments” & double click on the “XW107: 8 DI & 8 DO”.



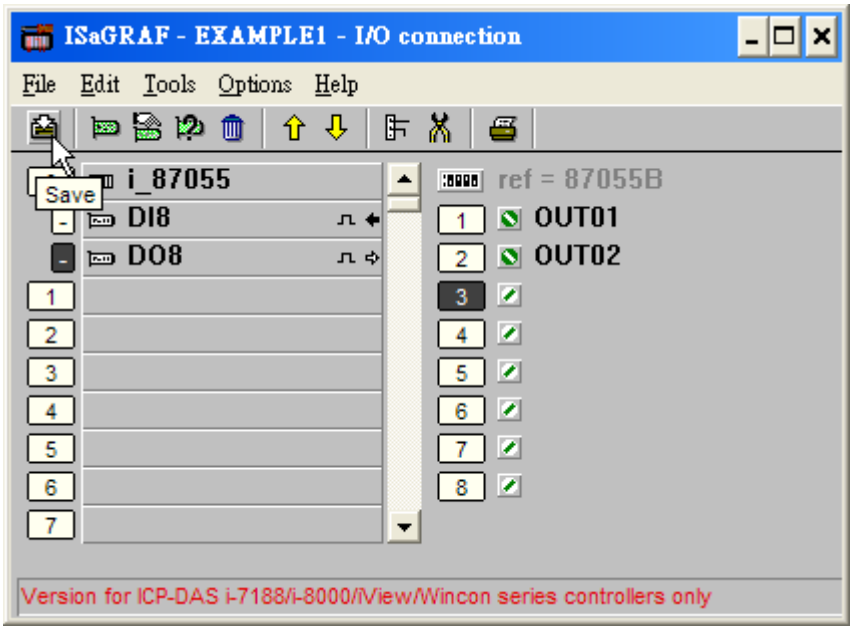
Then we have. (If you don't have the XW107, you may click the “Real / Virtual board” to make it become virtual board.)



To map input variables “K1” & “K2” to the input channel No. 1 & 2 of the “XW107”, please click on “DI8” (①) and then double-click on the channel 1 in the right window (②), then click on “Connect” twice to connect “K1” & “K2”. Finally, click on “Close” to complete the setting.



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



Important Notice:

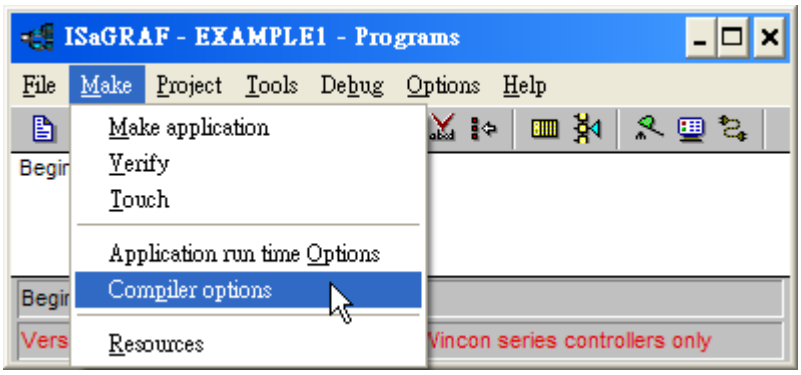
1. I/O Slots 0 is reserved for XW-board that will be used in the WP-5xx7. You can use slot No. 1 and above for additional functionality.

2. All of the variables with “Input” and “Output” attribute MUST be connected through the I/O connection as described above for any program to be successfully compiled. Only the Input and Output attribute variables will appear in the "I/O Connections" window. In this example we have only 2 boolean output variables - OUT01, OUT02 and 2 boolean input variables – K1 & K2.

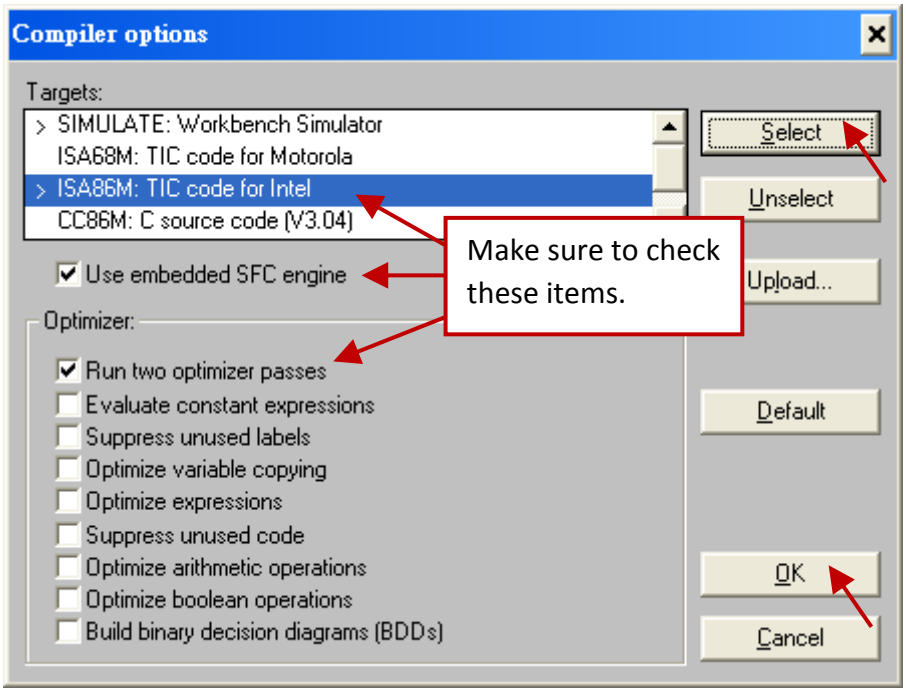
5.2 Compiling & Simulating the Example Project

For ANY AND EVERY ISaGRAF program to work properly with any of the ISaGRAF PACs (ISaGRAF µPAC, iPAC, WinPAC, ViewPAC...) controller systems, it is the responsibility of the programmer to properly select the correct "Compiler Options". You MUST select the "ISA86M: TIC Code for Intel" option as described below.

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.



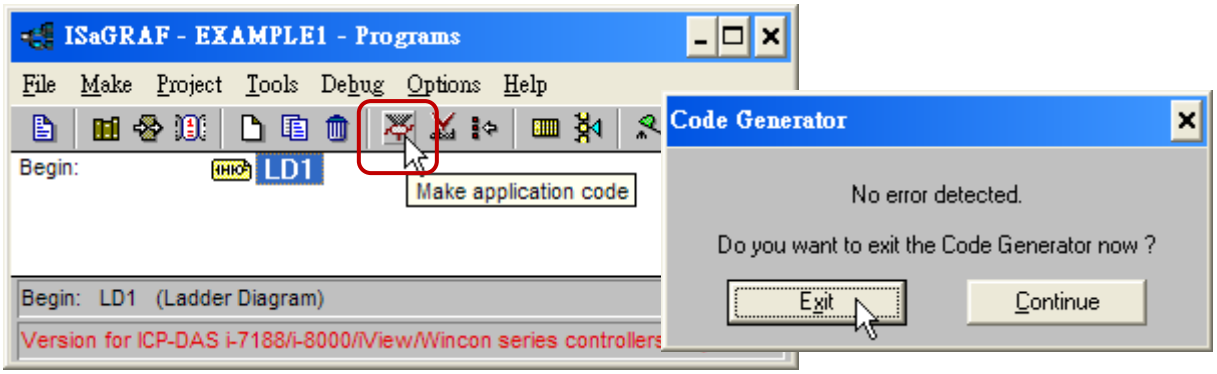
The "Compiler Options" window will now appear. Make sure to select the options as shown below then press the "OK" button to complete the compiler option selections.



Compiling error result in different ISaGRAF Version, please refer to Appendix H of this manual.

Time to Compile the Project!

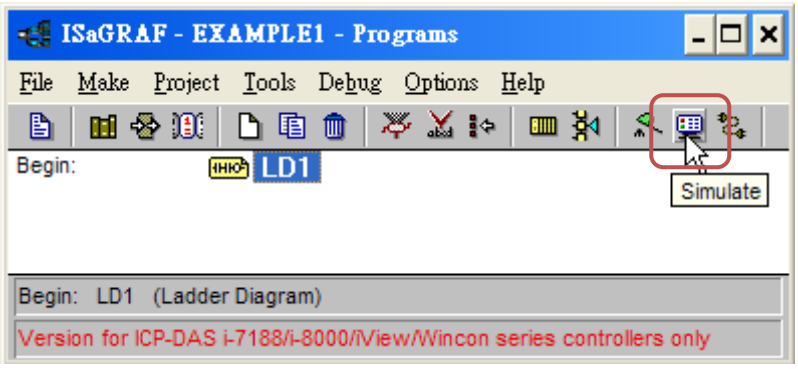
Now that you have selected the proper compiler options, click on the "Make Application Code" icon to compile the example project. If there are no compiler errors detected during the compilation process, CONGRATULATIONS, you have successfully created our example program.



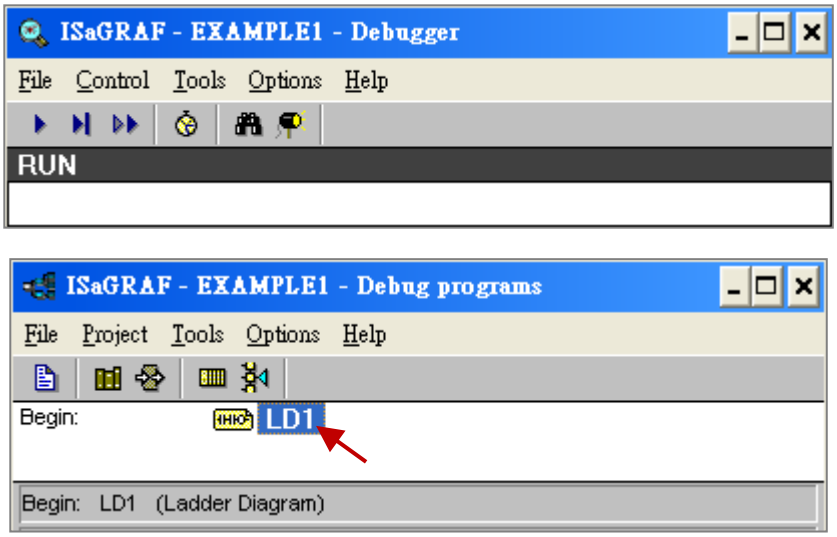
If errors are detected during the compilation process, just click on the "CONTINUE" button to review the error messages. Return to the Project Editor and correct the errors as outlined in the error message window.

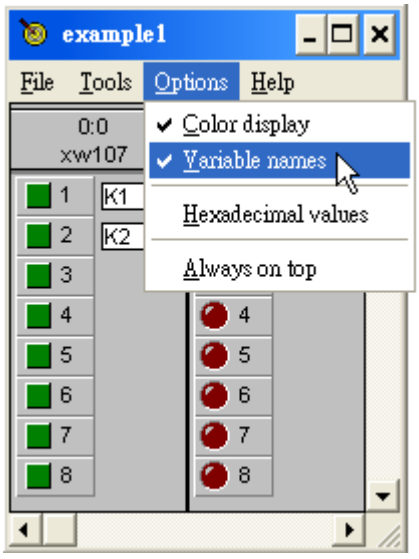
Time to Simulate the Project!

If the compilation is Ok, you may click on the “Simulate” icon to simulate the project



When you click on the "Simulate" icon three windows will appear. The windows are the "ISaGRAF Debugger", the "ISaGRAF Debug Programs", and the "I/O Simulator" windows. If the I/O variable names you have created DO NOT appear in the I/O simulator window, just click on the "Options" > "Variable Names" to show the name (as shown below).

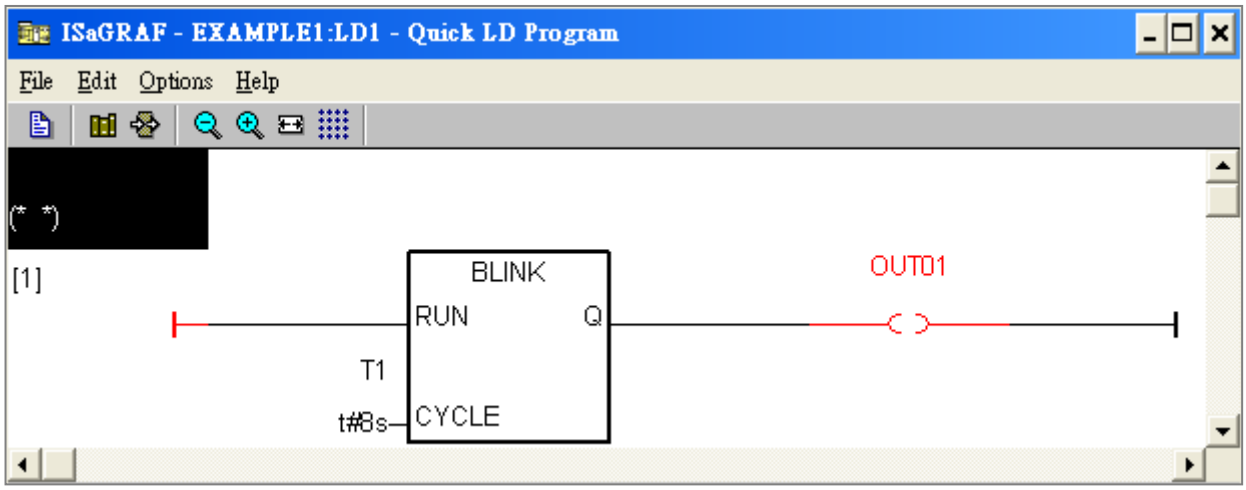




In the "ISaGRAF Debug Program" window, double click on the "LD1". This will open up the ISaGRAF Quick LD Program window and you can see the LD program you have created.

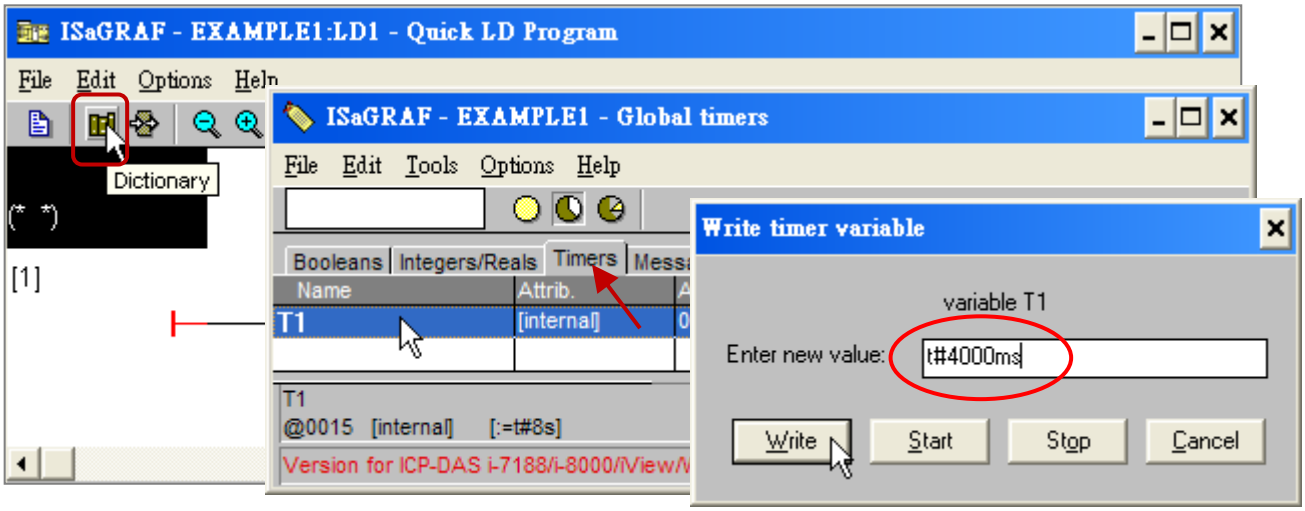
Running the Simulation Program

When you double click on "LD1" in the "ISaGRAF Debug Programs" window, the follow window should appear. You can see outputs “OUT01” will blink in the period of 8 seconds.

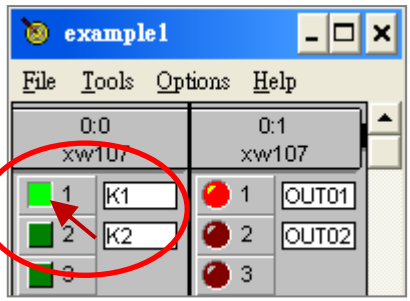


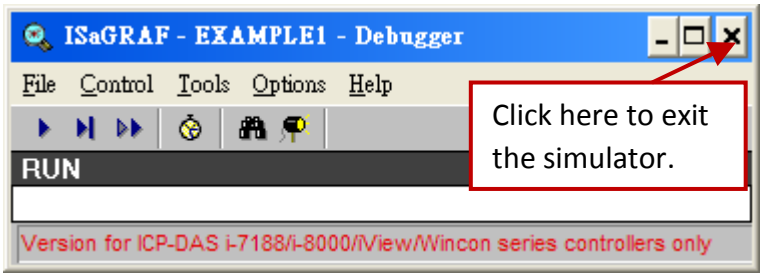
You can adjust the "T1" variable while the program is running. To accomplish this,

1. Click on the "Dictionary" icon which will open the "ISaGRAF Global Variables" window.
2. Click on “Timer” tab and then double click on “T1” to change the timer value to “T#4000ms”.
3. Then click on “Write” and to see the change of blinking rate.



Now, we are going to simulate the “K1” & “K2” input, just click on “K1” and “K2” with the left mouse button to test it. Finally, close the “Debugger” window to exit the simulator.





5.3 Download & Debug the Example Project

We have two ways to download the project to the WinPAC-5xx7. One is using Ethernet cable; the other one is using RS-232 cable. Here will show you the RS-232 way. (**Please refer to Section 4.2.3 if you would like to download the project via Ethernet**)

Wiring the Hardware

To begin this process, please install the hardware as below. The RS-232 cable wiring should be as below figure. (**Please make sure the "Modbus RTU Slave Port" is set as COM3, or it can only be download via Ethernet, refer to Appendix A.2**)

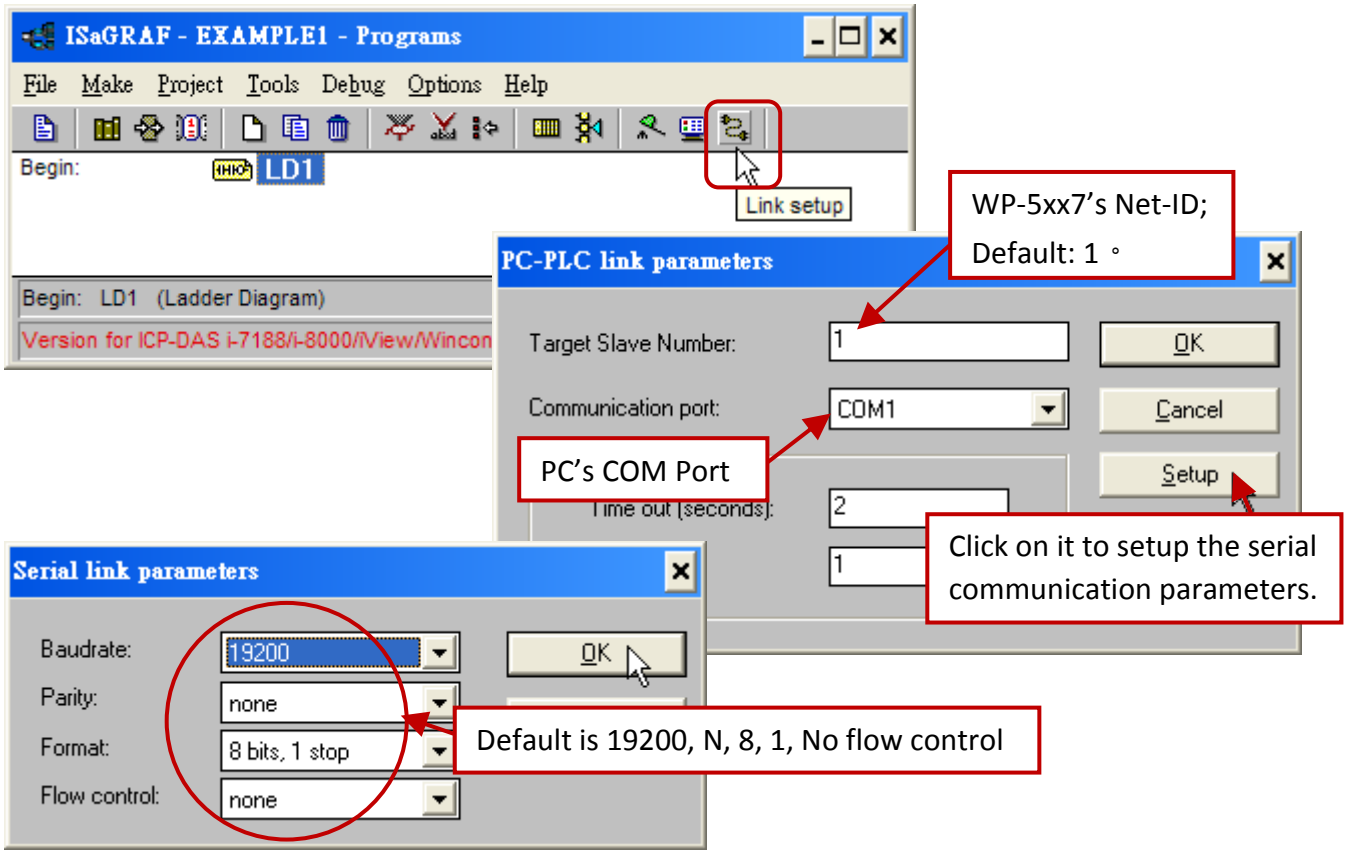
PC (9-Pin D-sub) **WP-5xx7 (COM3: RS-232)**

2 RxD	———	**TxD**
3 TxD	———	**RxD**
5 GND	———	**GND**

This section lists how to download the ISaGRAF program via RS-232 cable. However user may also use Ethernet cable to download program to the WinPAC-5xx7 (please refer to Section 4.2.3.1)

Setup Link Parameters

Click on the "Link Setup" icon in the "ISaGRAF Programs" window, please set the proper value like the following window.



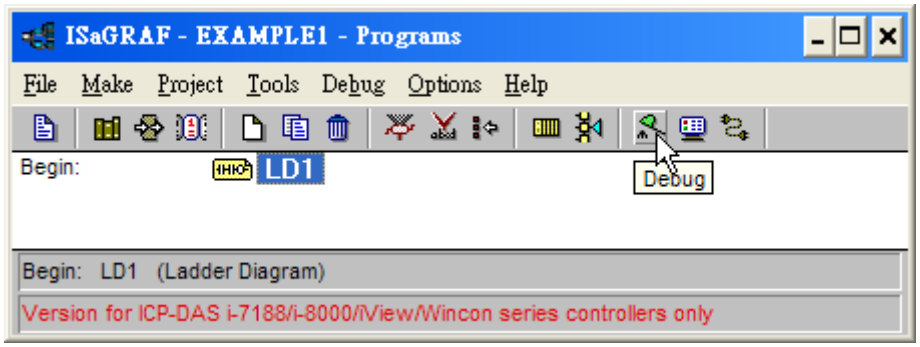
The RS-232 communication parameters for the target WP-5xx7 controller **MUST** be set to the same serial communication parameters for the development PC. For WP-5xx7 controllers (serial port communications), the default parameters for COM3 (RS-232) port are:

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

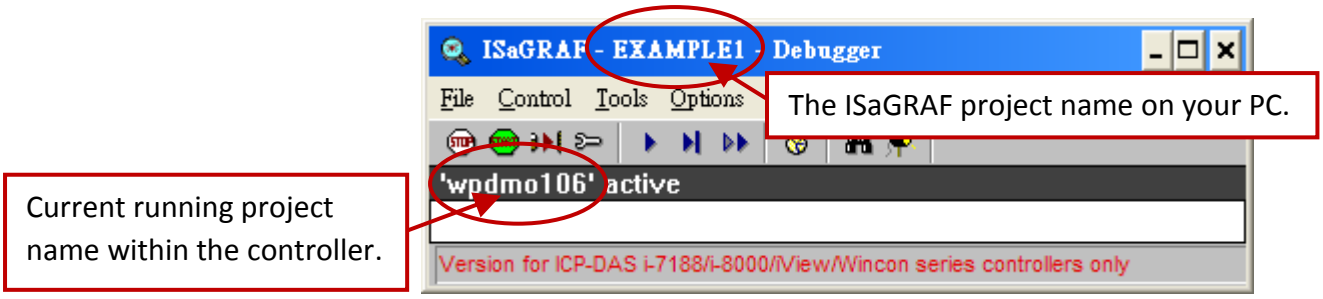
(Please refer to Appendix A.2 to setup COM3 as Modbus RTU slave port)

Downloading the Example Project

Before you can download the project to the controller, you must first verify that your PC and the controller system are communicating with each other. To verify proper communication, click on the "Debug" icon in the "ISaGRAF Programs" window as shown below.



If the development PC and the WinPAC-5xx7 controller system are communicating properly with each other, the following window displayed below will appear (or if a program is already loaded in the controller system, the name of the project will be displayed with the word "active" following it.

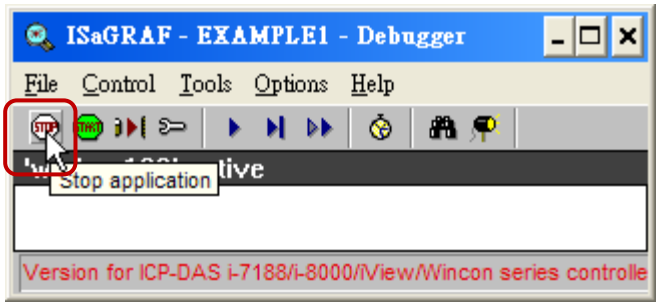


If the message in the "ISaGRAF Debugger" says "Disconnected", it means that the development PC and the controller system have not established communications with each other.

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 WP-5xx7 controller system.

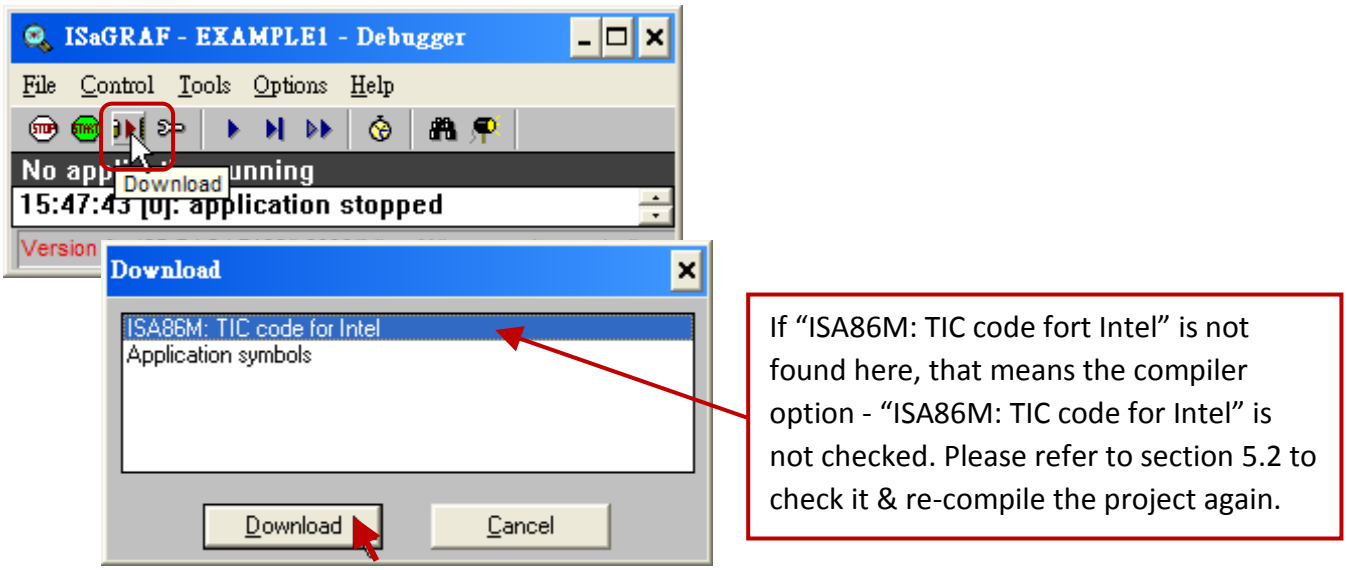
You may have to either change the serial port communication settings for the development PC (which may require changing a BIOS setting) or change the "Serial Link Parameters" in the ISaGRAF program.

If there is a project already loaded in the controller system you will need to stop that project before you can download the example project. Click on the "STOP" icon as illustrated above to halt any applications that may be running.

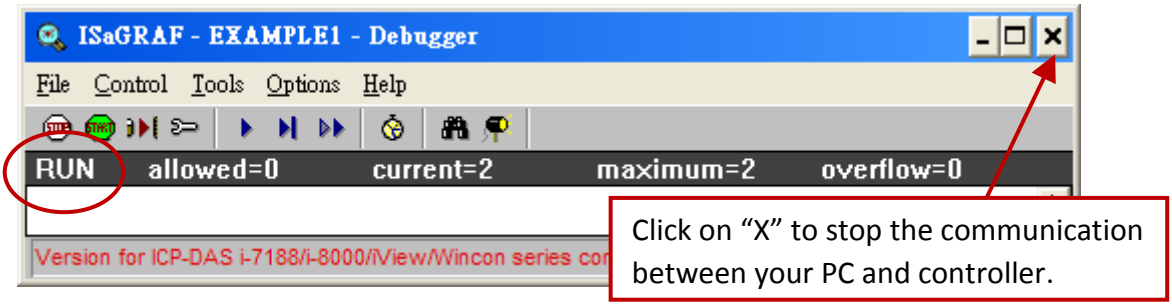


Starting the Downloading Process

Click on the "Download" icon from the "ISaGRAF Debugger" window. Then select "ISA86M: TIC Code for Intel" and then click on "Download" button as shown below.



The example project will now start downloading to the WP-5xx7 controller system. A progress bar will appear in the "ISaGRAF Debugger" window showing the project downloading progress.

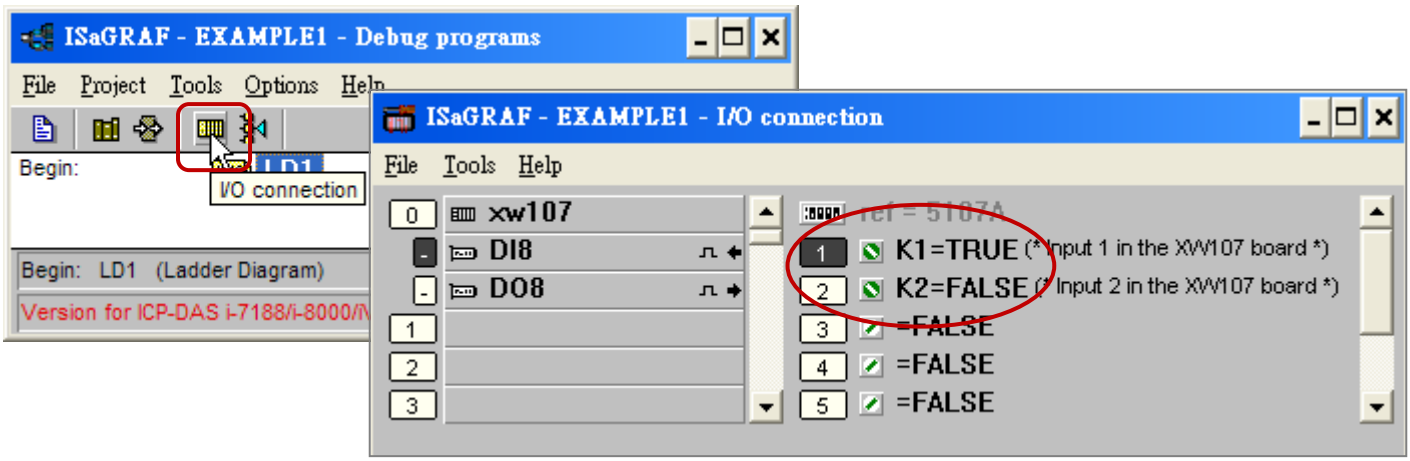


When the example project has successfully completed the downloading process to the W-8xx7 controller system the following two windows will appear.

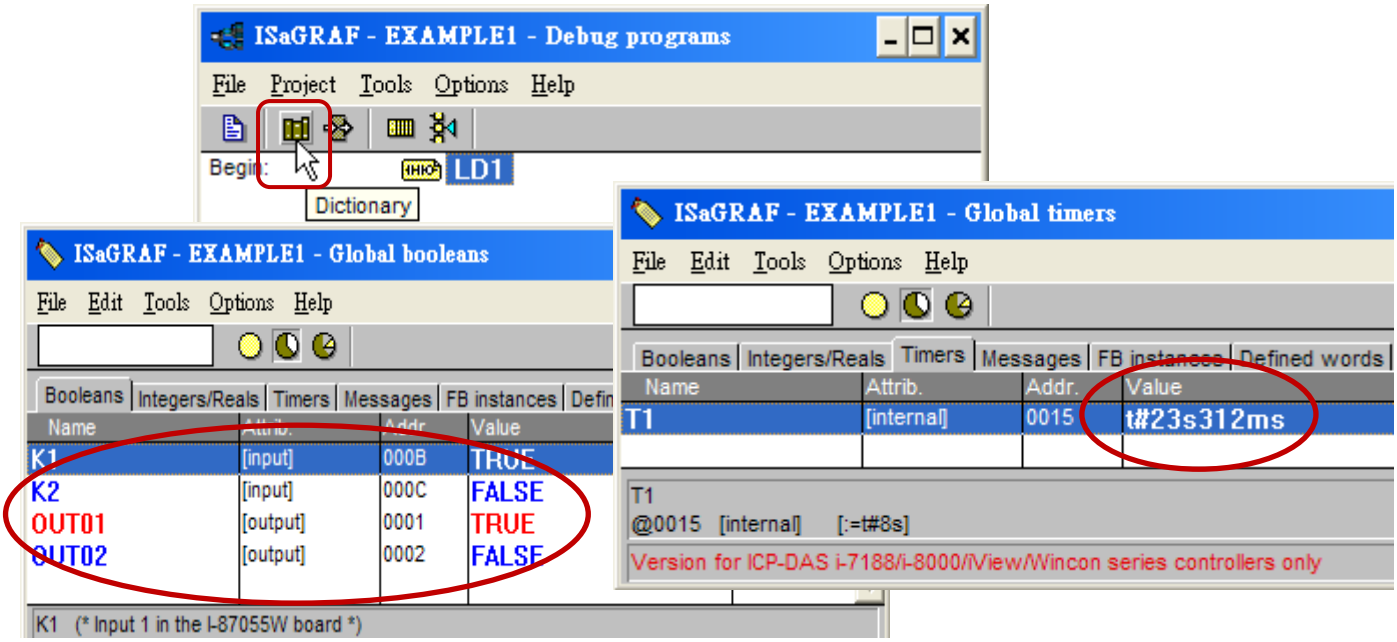
Running the Example LD Program

You can observe the real time I/O status from several ISaGRAF windows while you are running the example project. One of the windows is the "I/O Connections" window, which shows each of the inputs and outputs as assigned. Click on the "I/O Connections" icon in the ISaGRAF Debugger window to open

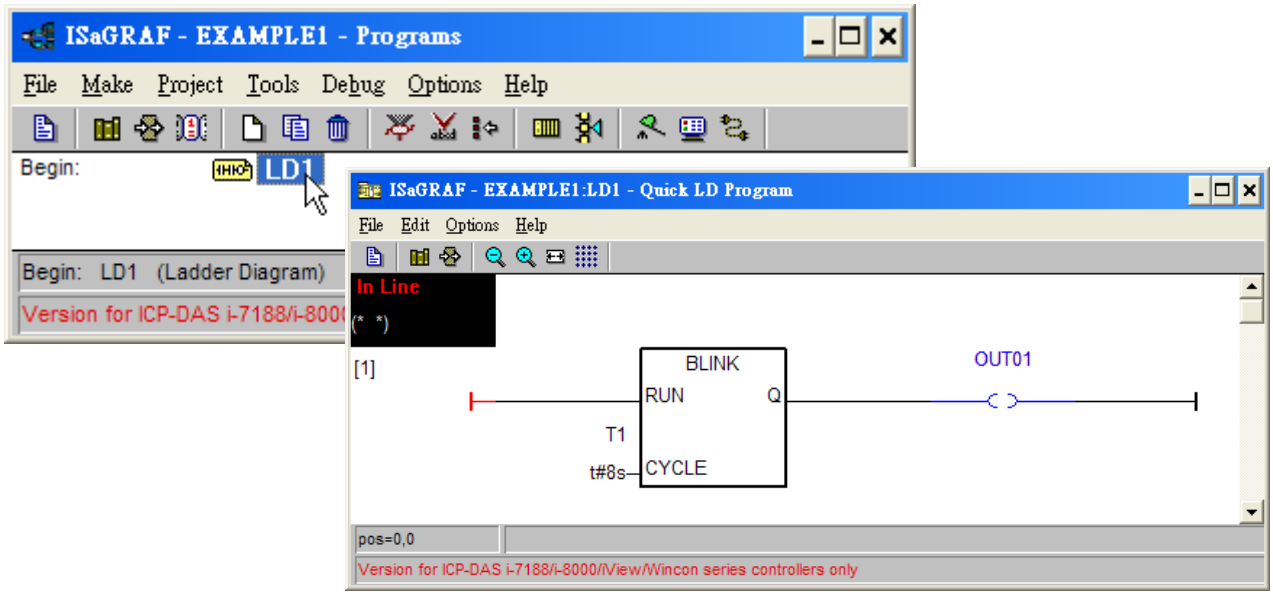
the "I/O Connections" screen. You can switch the “DI” status (ON/OFF) on the XW107 I/O board to see what happen about “K1” & “K2”.



You may also click on “Dictionary” to see the real time variable state.



Another VERY helpful window you can open is the "Quick LD Program" window. From this window you can observe the LD program being executed in real time.



5.4 Design the Web Page

After finishing the ISaGRAF project & download it to the WinPAC-5xx7, 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 4, 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 your prefer web page editor to do the same thing.

You may refer to the finished web pages of this example in the WP-5xx7 CD-ROM at design time. However it is better to do it one time by yourself to get more understanding.

WinPAC-5xx7 CD: \napdos\isagraf\wp-5xx7\wp_webhmi_demo\example1\

5.4.1 Step 1 – Copy the Sample Web HMI pages

This is a sample Web HMI pages in the WinPAC-5xx7 CD-ROM:
\napdos\isagraf\wp-5xx7\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.

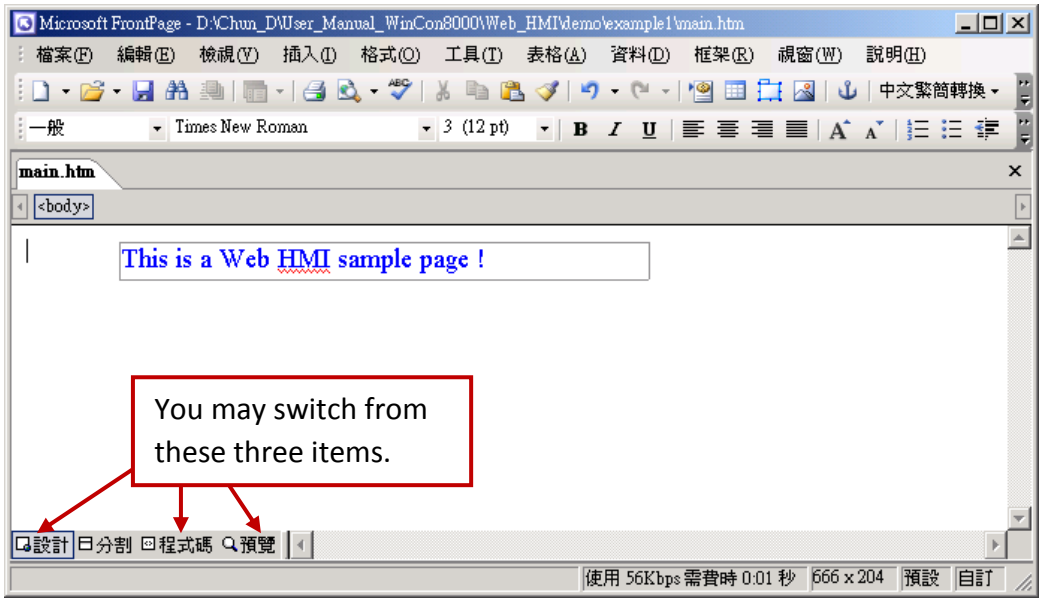
./img/	(default image files - *.jpg , *.bmp , *.gif)
./msg/	(default message files – wincon.js & xxerror.htm)
whmi_filter.dll	(three DLL files)
login.dll	
main.dll	
index.htm	(first default page)
login.htm	(the Web HMI welcome page)
menu.htm	(the page-menu page, normally on the left on the Internet Explorer)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

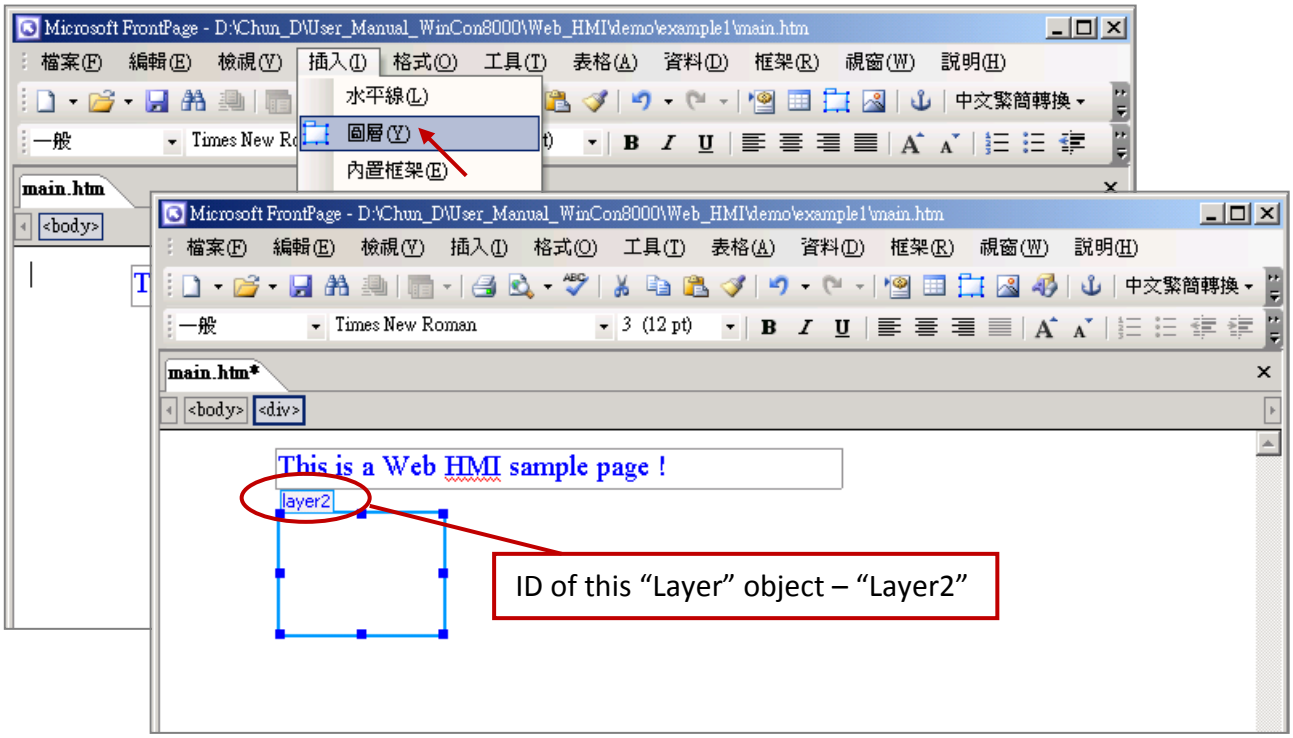
The "index.htm" file is the default entry page of the web server. User should not modify it. The "index.htm" re-directs to the "login.htm" file in 1 to 2 second when someone visits the WinPAC-5xx7 via the Internet Explorer. User may modify the "login.htm", "menu.htm" & "main.htm" to fit his own need. We will only modify the "main.htm" in this example.

5.4.2 Step 2 – Building the Main.htm

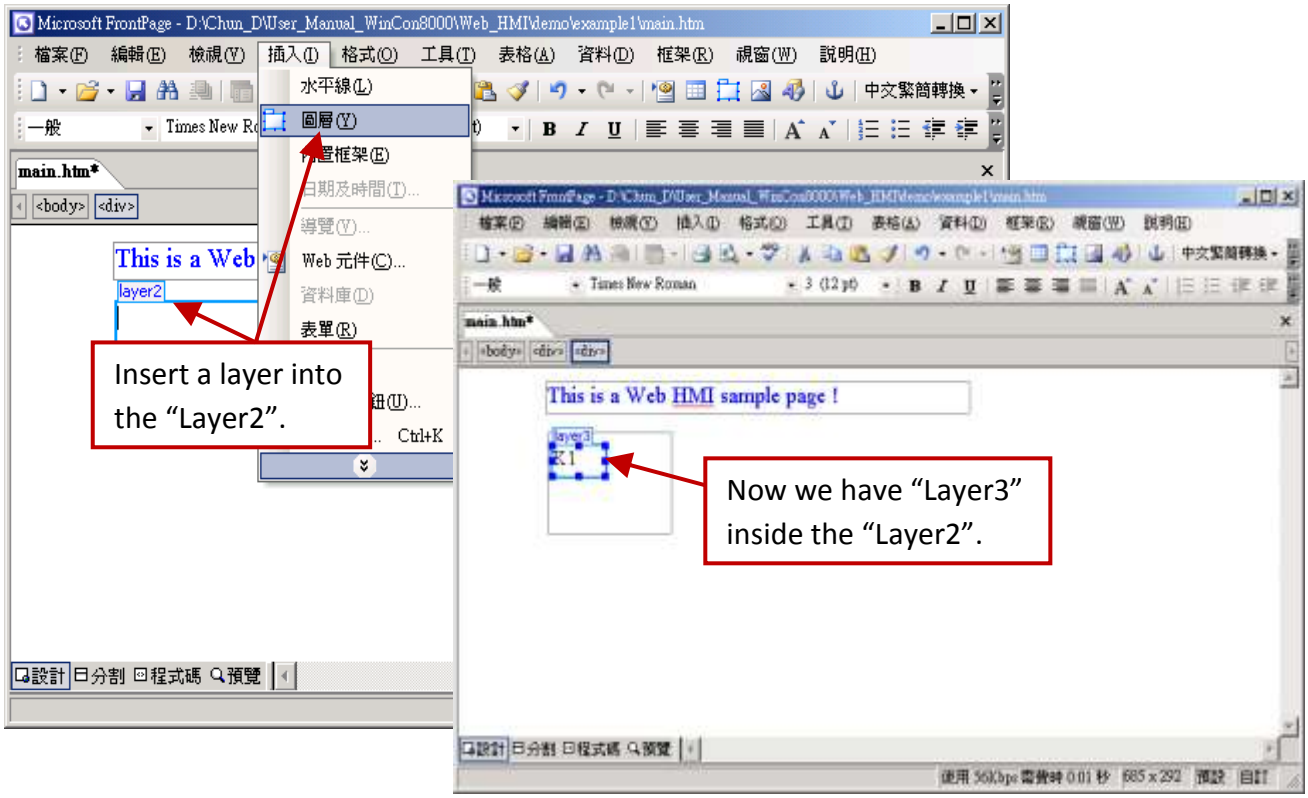
Please run the Microsoft Office FrontPage 2003 (or advanced version) and open the “main.htm”.



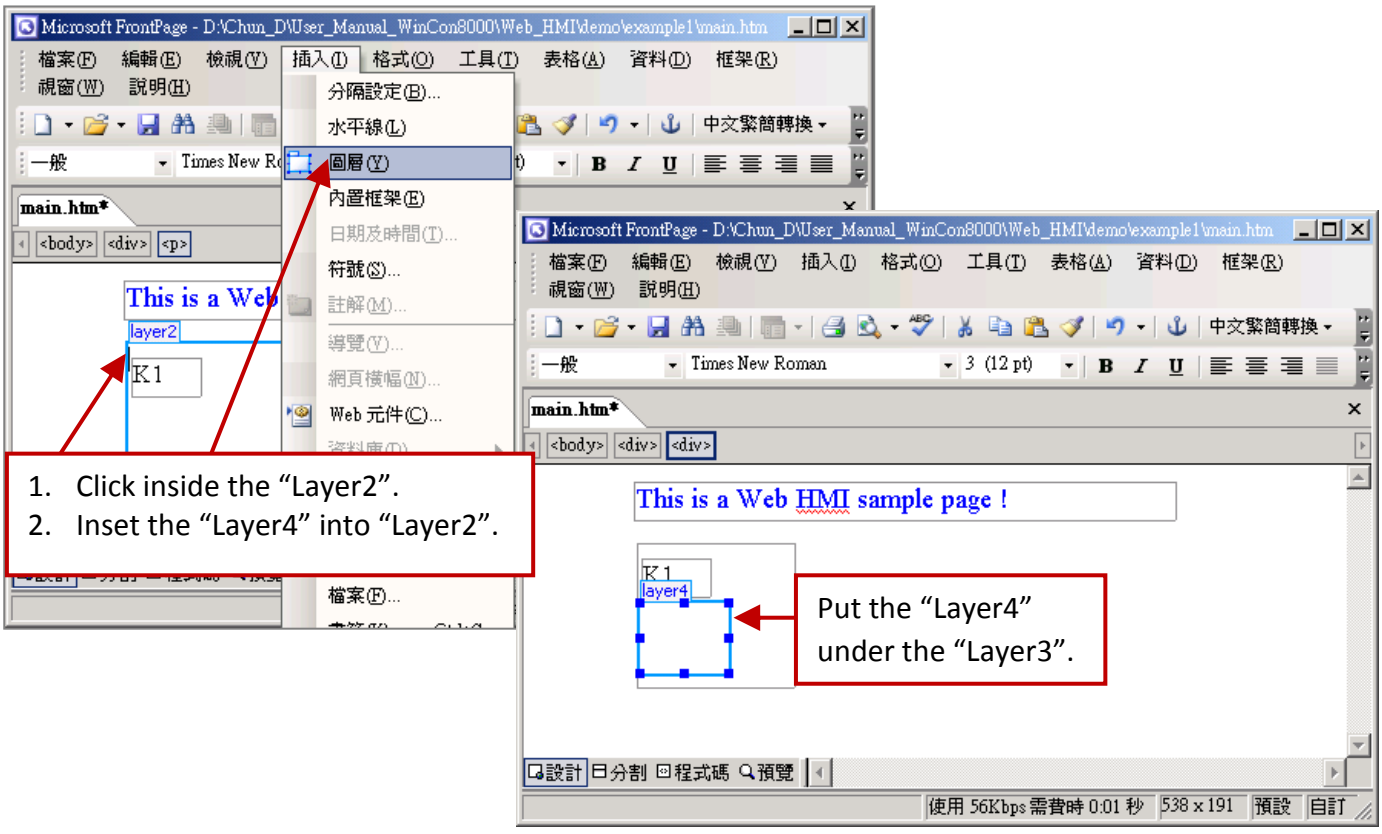
Please switch the window to design the page.
Please insert a layout object – “Layer” as below.



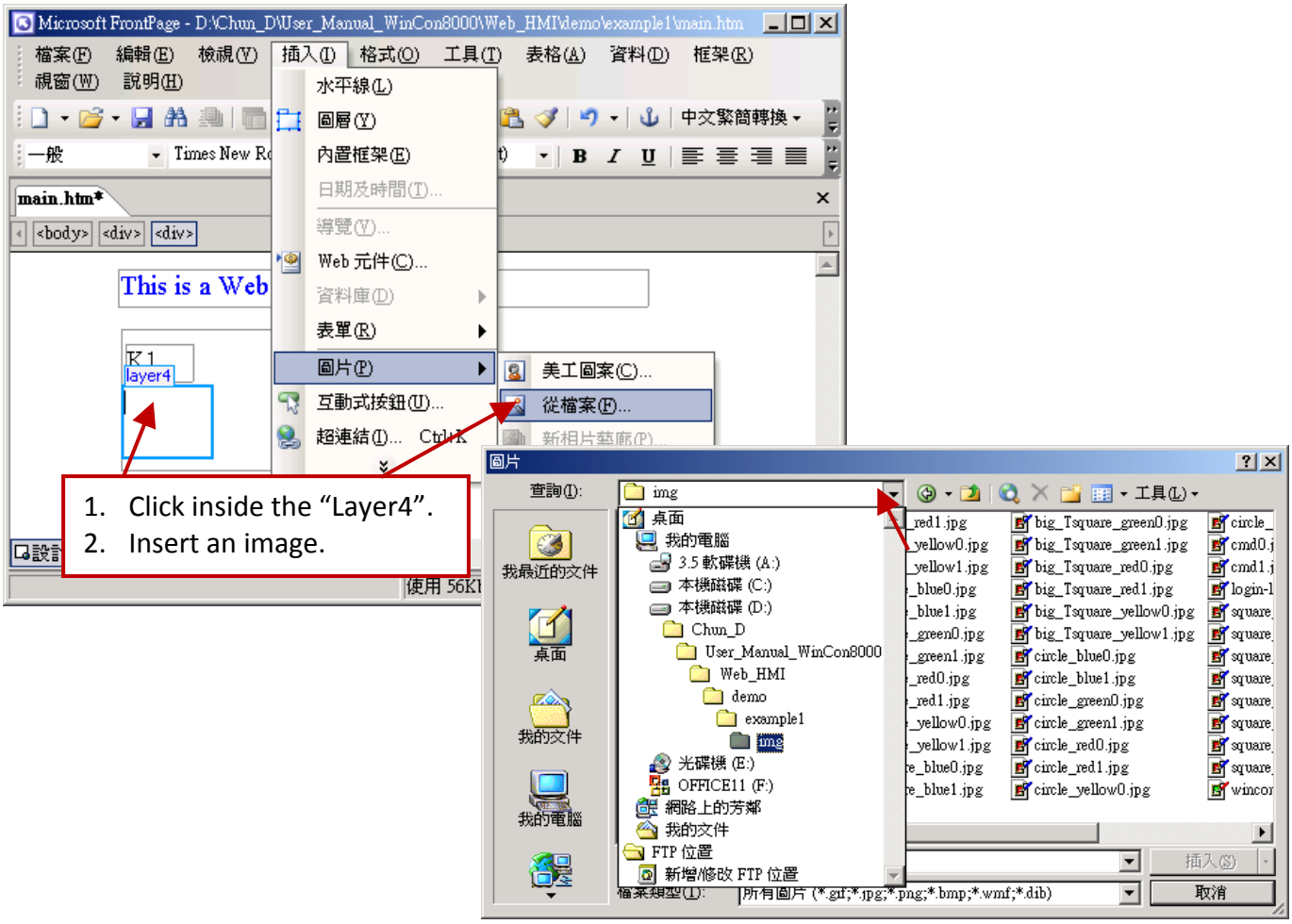
Click inside this “Layer” and then insert one another layer inside it as below. Please enter “K1” into the new created “Layer”.



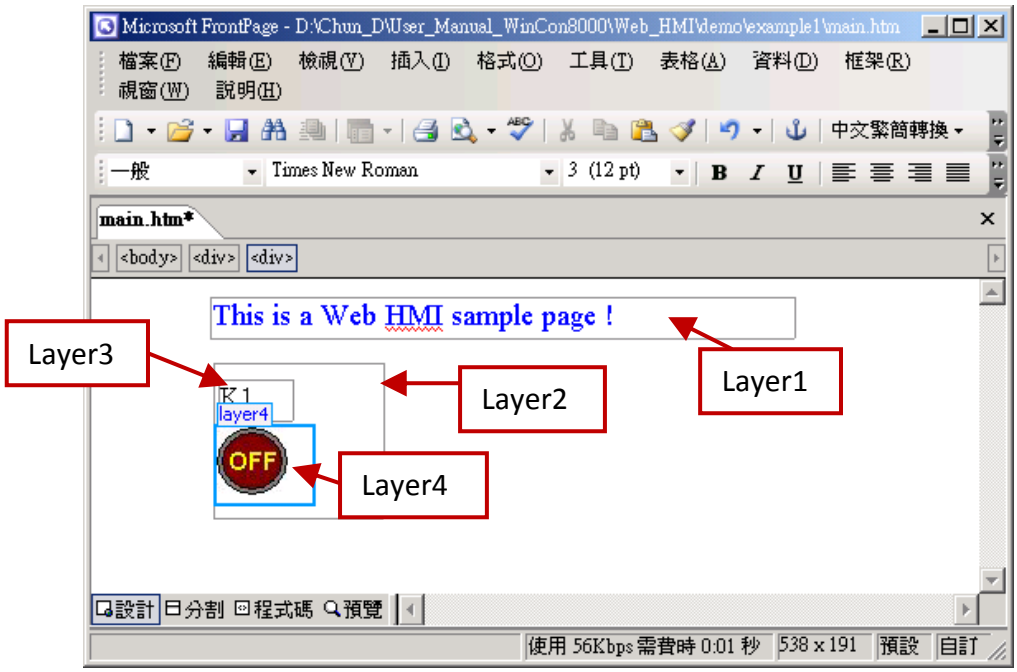
Follow the same former steps to insert one another “Layer” to be in just below the “Layer3” as below.



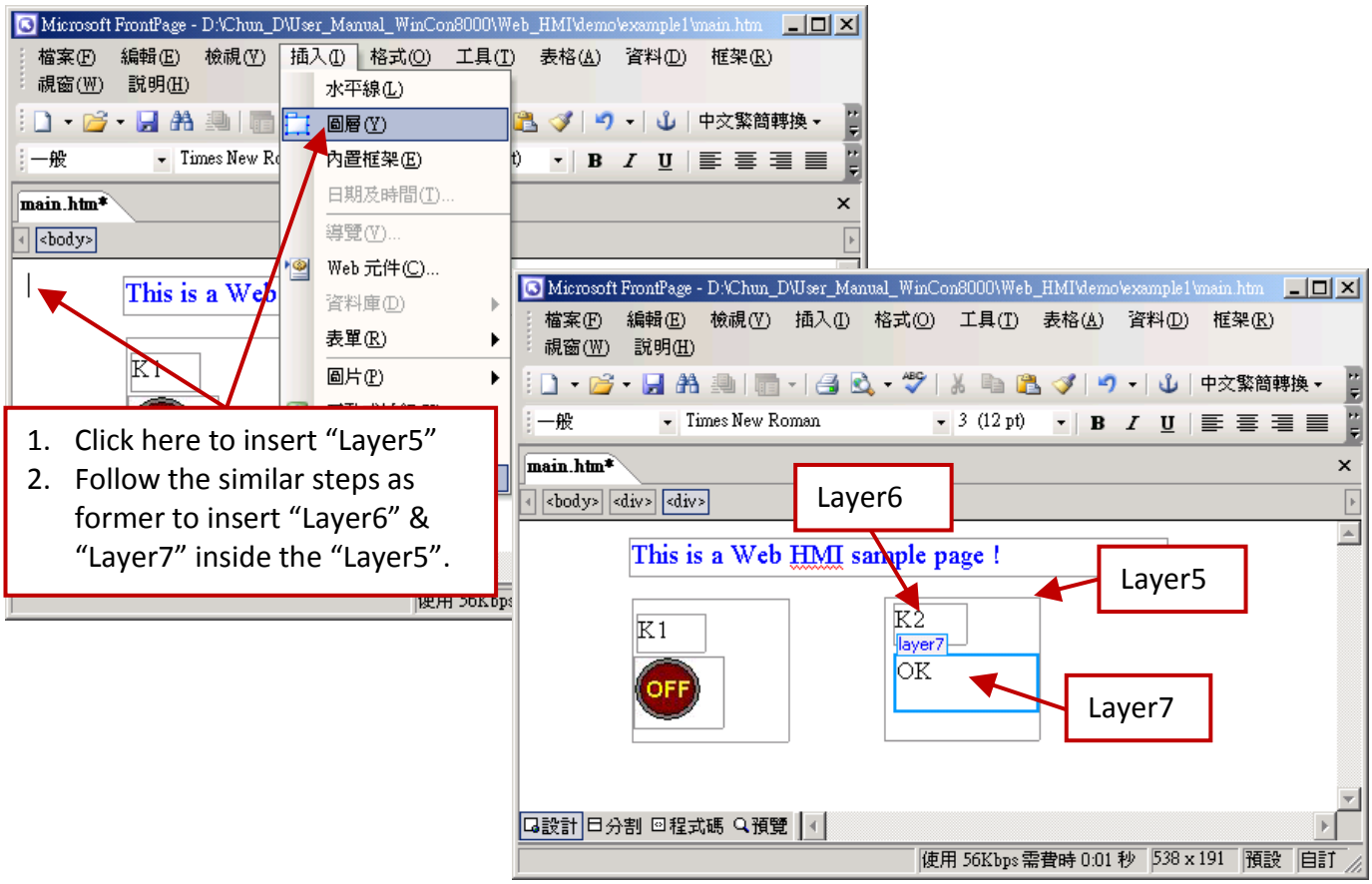
Inside the “Layer4”, we are going to insert one image file to it as below. The image file name is “./img/big_Tcircle_red0.jpg”. Please browse to the correct folder in your hard driver. Here we use “example1/img/” in this example.



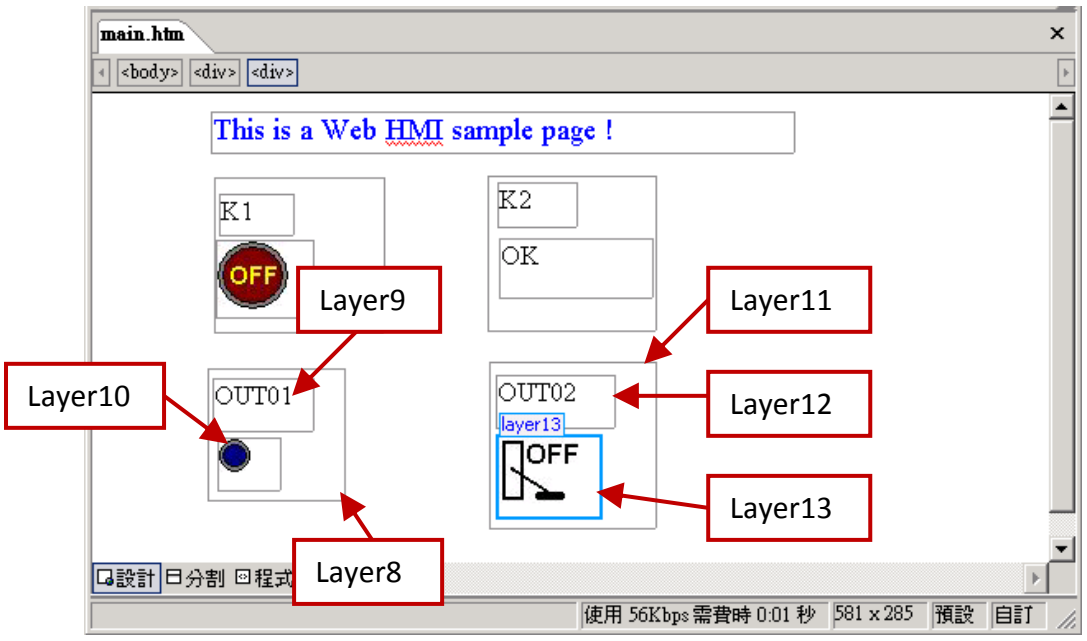
You will see a window as below.



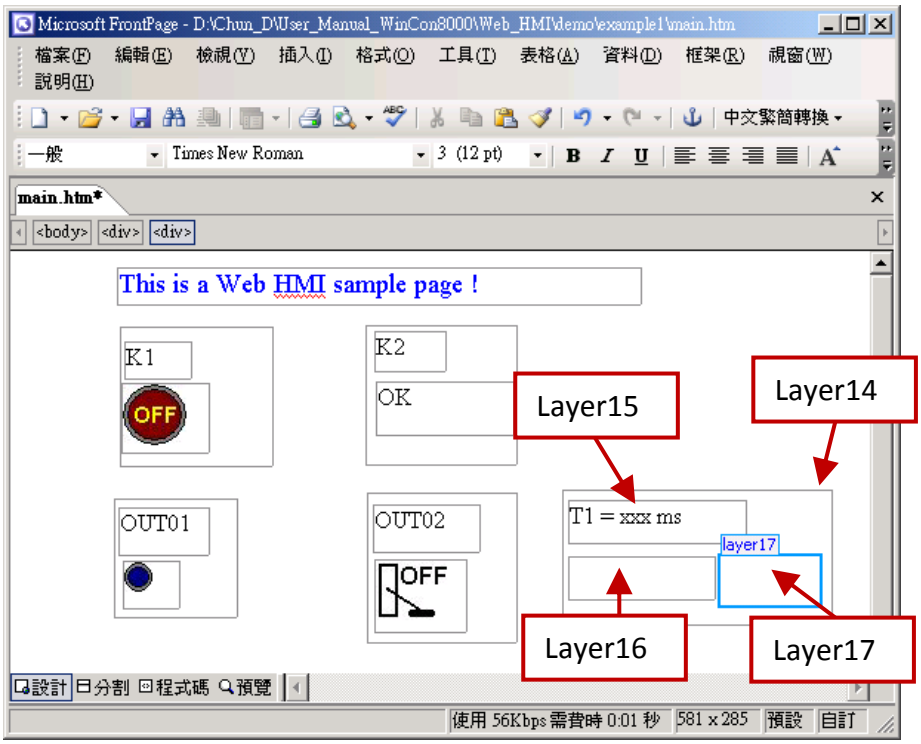
Please follow the similar steps to insert one another “Layer5” and one “Layer6” with a “K2” symbol inside it, and also a “Layer7” with an “OK” symbol inside it as below. We will use “K1” to display the state of the first input of the XW107 board, and “K2” for its second input.



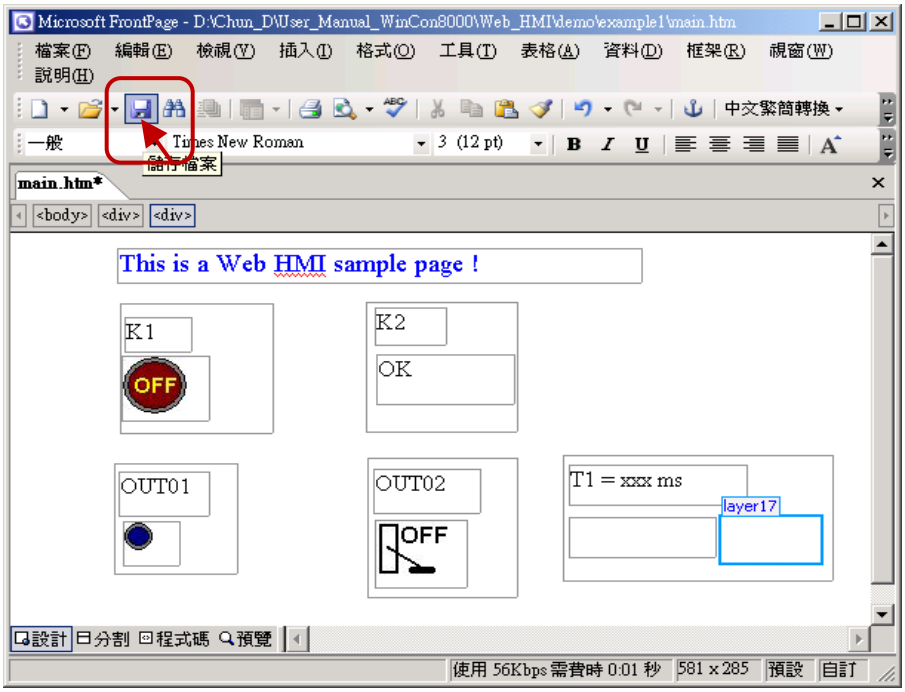
Please follow the similar steps to insert “OUT01” & “OUT02” as below. The OUT01 uses “./img/circle_blue0.jpg” as its image source, while OUT02 using “./img/cmd0.jpg”. We will use OUT01 to display the state of the first output of the XW107 board, while “OUT02” is for controlling and displaying the second output of the XW107.



Now please insert one another “Layer14”. Inside the “Layer14” please 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.

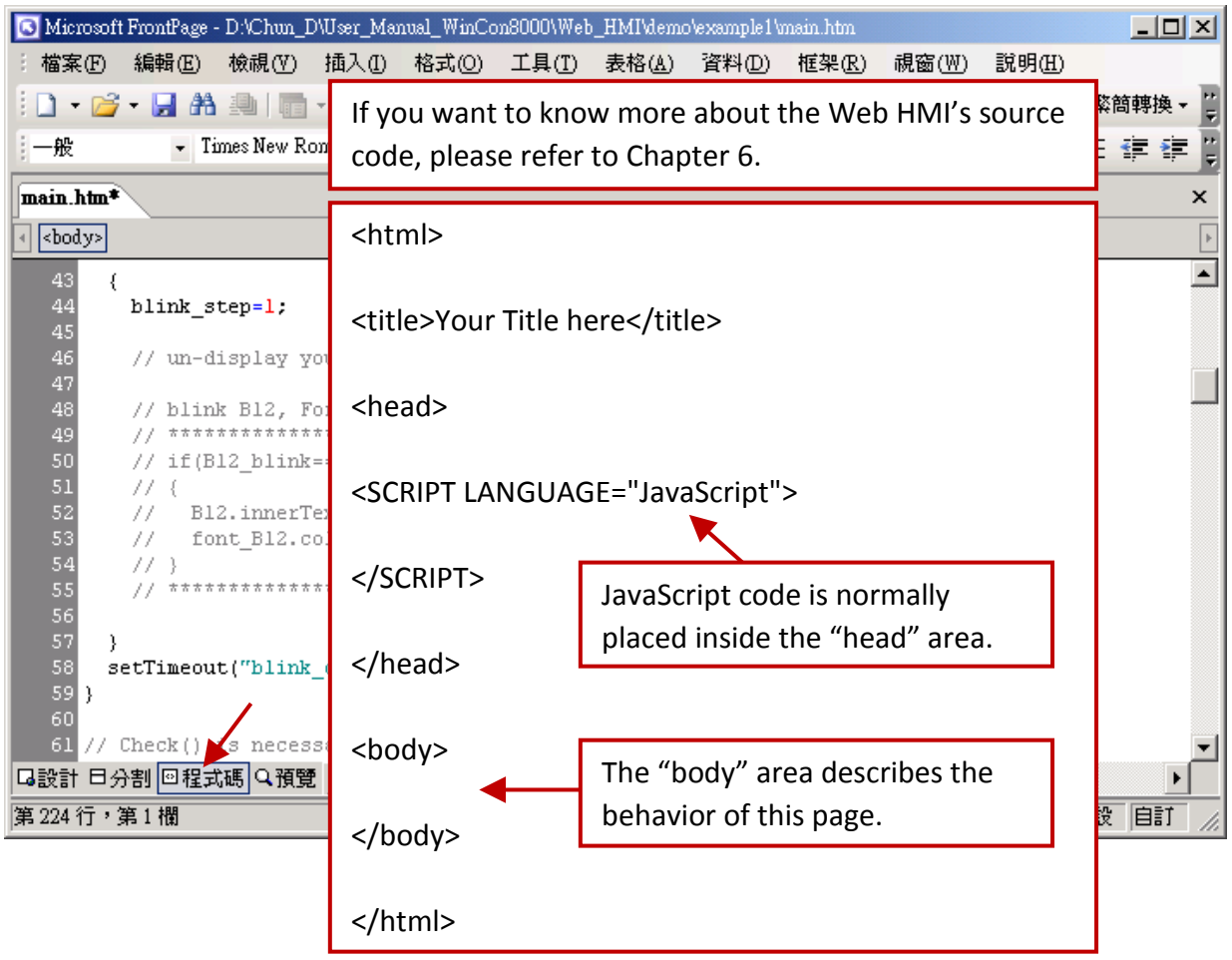


Click on “Save” to save this page.



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

Please switch the window to the source code. A valid HTML document will contain the basic objects as below.



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

Caption Area: Layer1.
A Layer is starting with “<div ” and ending with “ ” tag

```
<!-- Caption -->
<font color="blue" size="4">
<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>
</font>
```

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">
<img  name= “B11”  border="0" src="img/big_Tcircle_red0.jpg" width="43" height="41"></div>
<p> </div>
```

Please 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> </div>
```

Please modify “OK ” 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">
<img  name="B1"  border="0" src="img/circle_blue0.jpg" width="19" height="20"></div>
<p> </div>
```

Please insert name="B11" just after the "<img "

OUT02 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">
<img  style="cursor:hand" name="B2"  onclick="ON_OFF(form_B2,  form_B2.B2,  boolean_val[2])"
border="0" src="img/cmd0.jpg" width="50" height="40"></div>
```

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

Please insert below code after the "<img":
Style="cursor:hand" name="B2" onclick="ON_OFF(form_B2, form_B2.B2, boolean_val[2])"

Please insert:

```
<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

**T1 = xxx ms **

Please modify “T1 = xxx ms ” as
T1 = xxx ms

```
<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>
```


Please insert below code inside “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( )">
```


<p>

Inside the “Layser17”, please insert:
<input type="button" value="Enter" onclick="Check_L21( )">

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

Now please go to the “head” area.
In the “head” area, please modify the sample code to be as below.

```
    // 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.

We need a function “Check_L21 to check the entered T1 value and post it to the Wincon. Please un-mask the sample code to be as below.

// 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
}
```

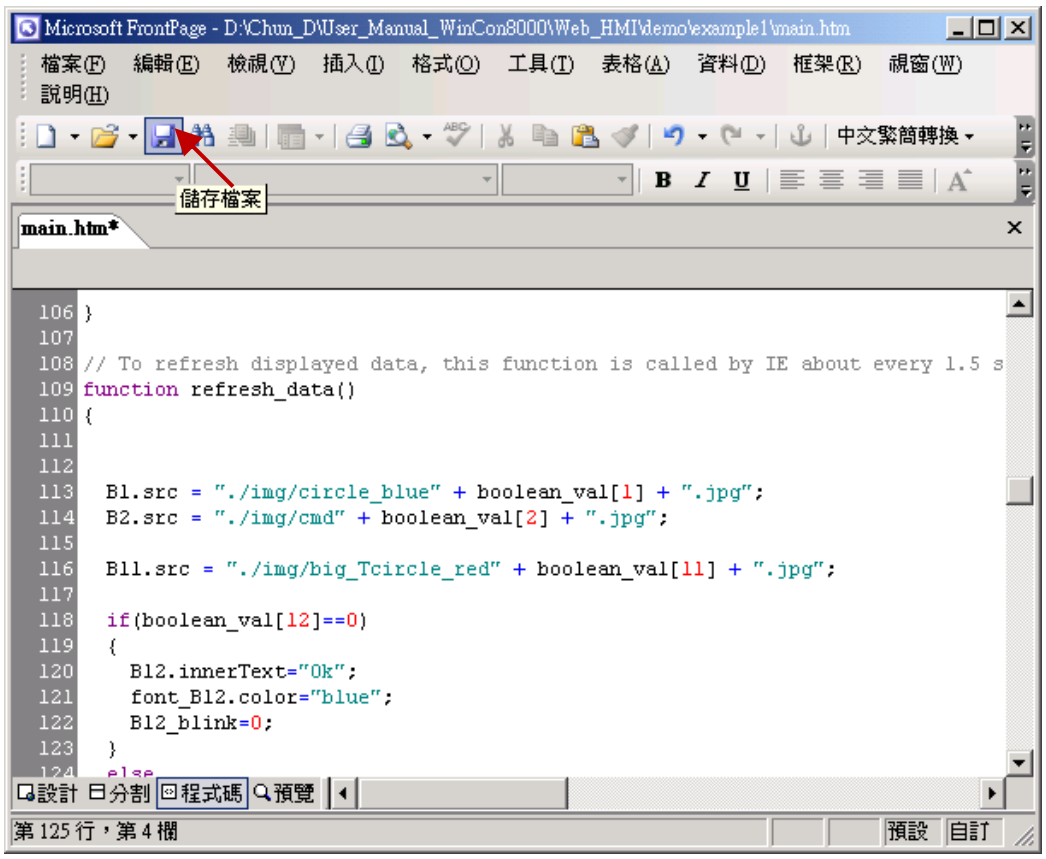
// **

And also inside the “refresh_data() “ function, please insert below code.

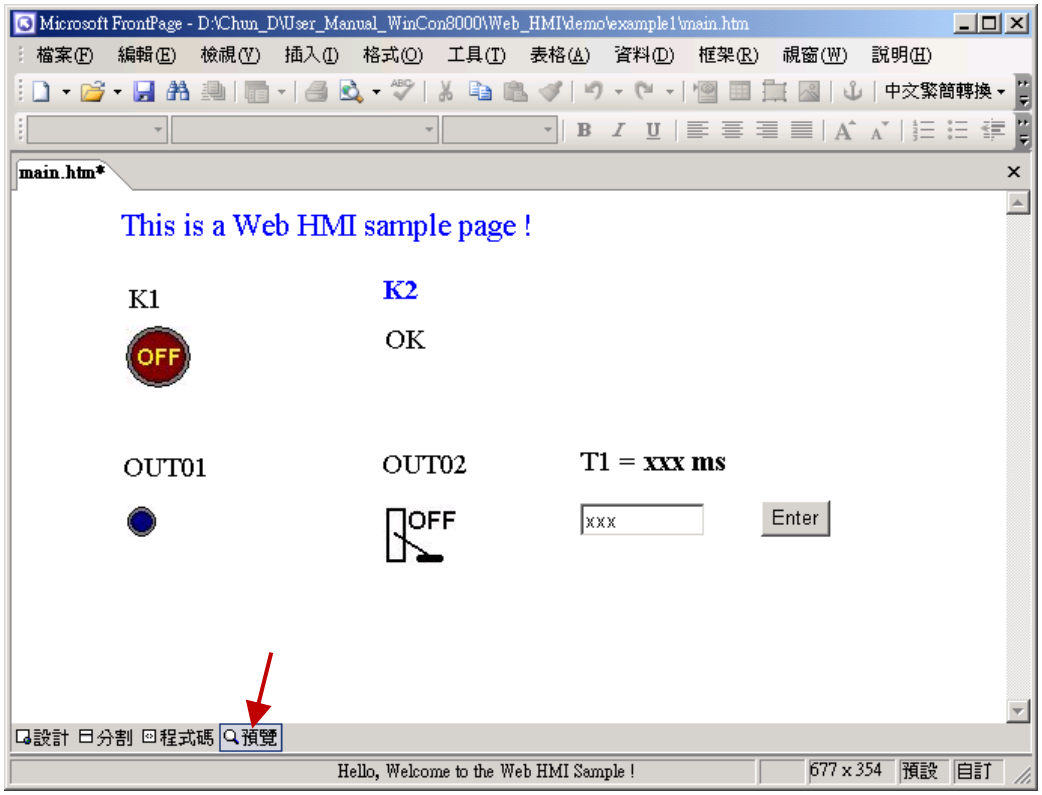
// To refresh displayed data ， this function is called by IE about every 1.5 sec later

```
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.



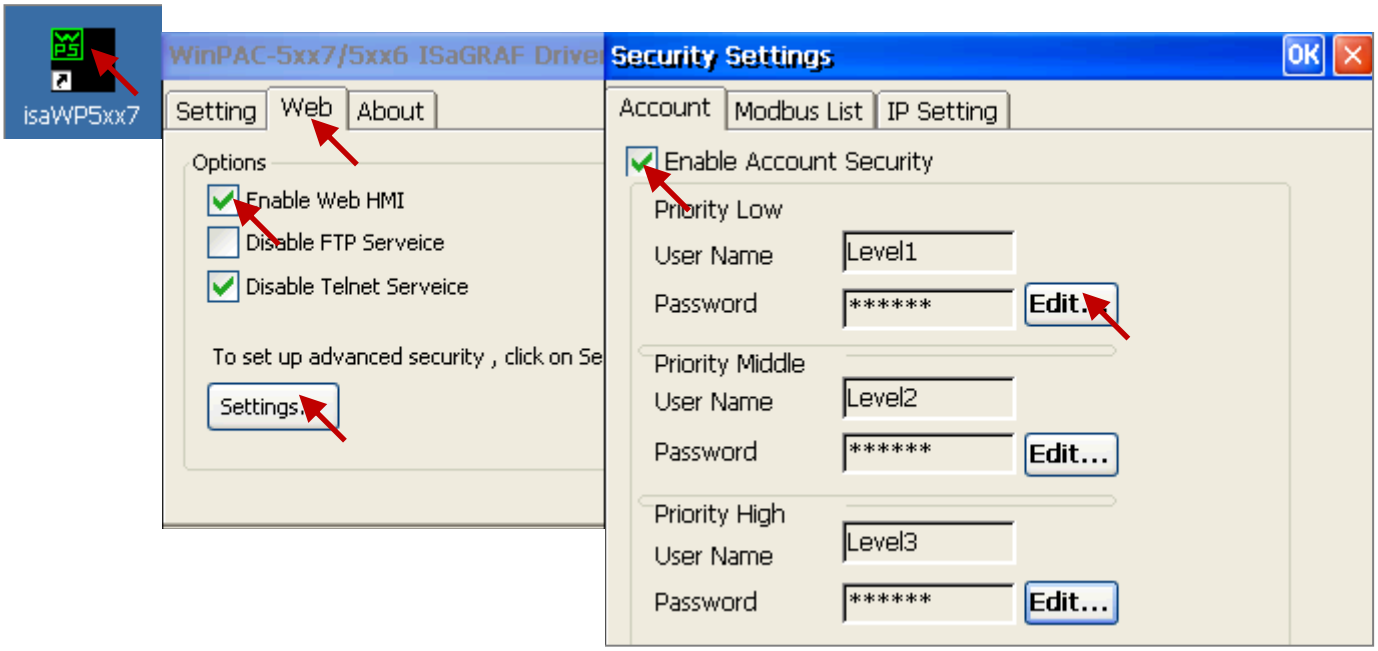
5.4.4 Step 4 – Download Web HMI Pages to the Controller

The steps are similar as listed in Section 4.2.3. If you haven't practiced "Setting Up A Web HMI Demo" listed in the Chapter 4, it's better to do it once to get familiar with it.

Set the web options

First, run the "isaWinPAC"and check on "Enable Web HMI" in the "Web" tab and then click on "Settings", Please check on "Enable Account Security" and then click on "Edit" to set (username , password). **Then remember to click on "OK"**

Note: **If "Enable Account Security" is not checked, any user can easily get access to your WinPAC-5xx7 through the Internet Explorer**.



And then, please copy all files in this example1 to the controller

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

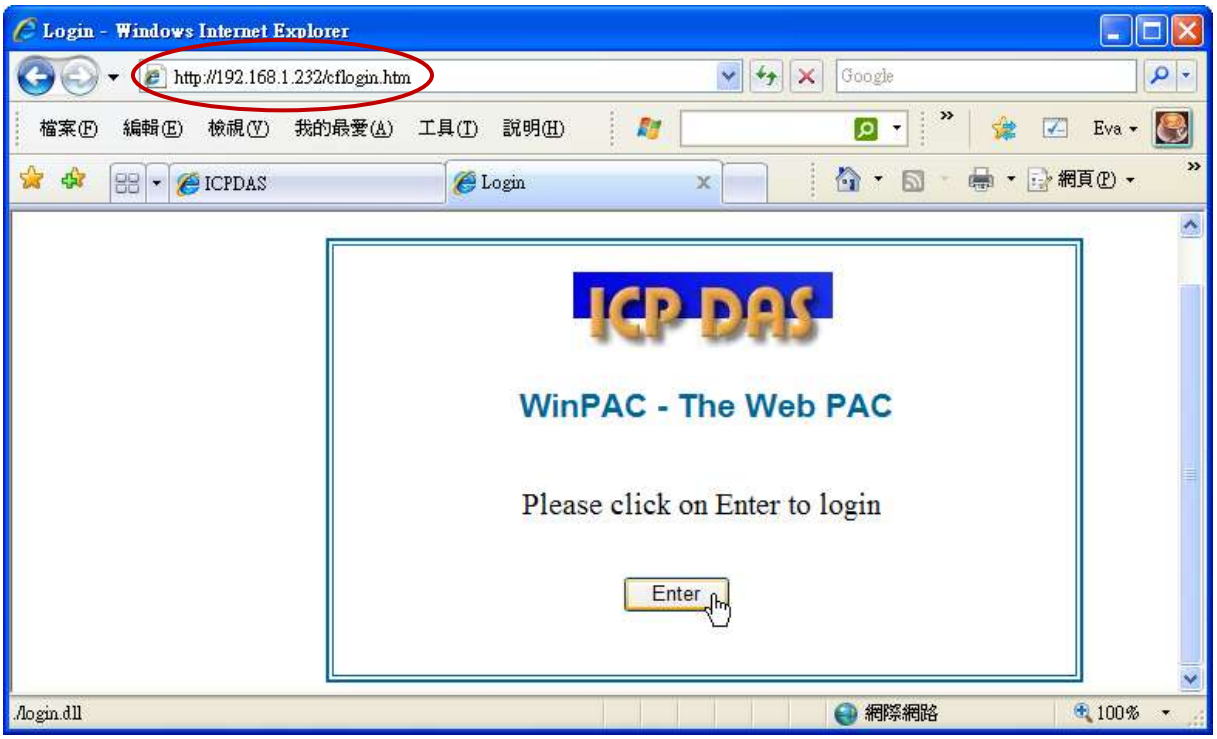
to the WinPAC-5xx7's

Micro_SD\Temp\HTTP\WebHMI\

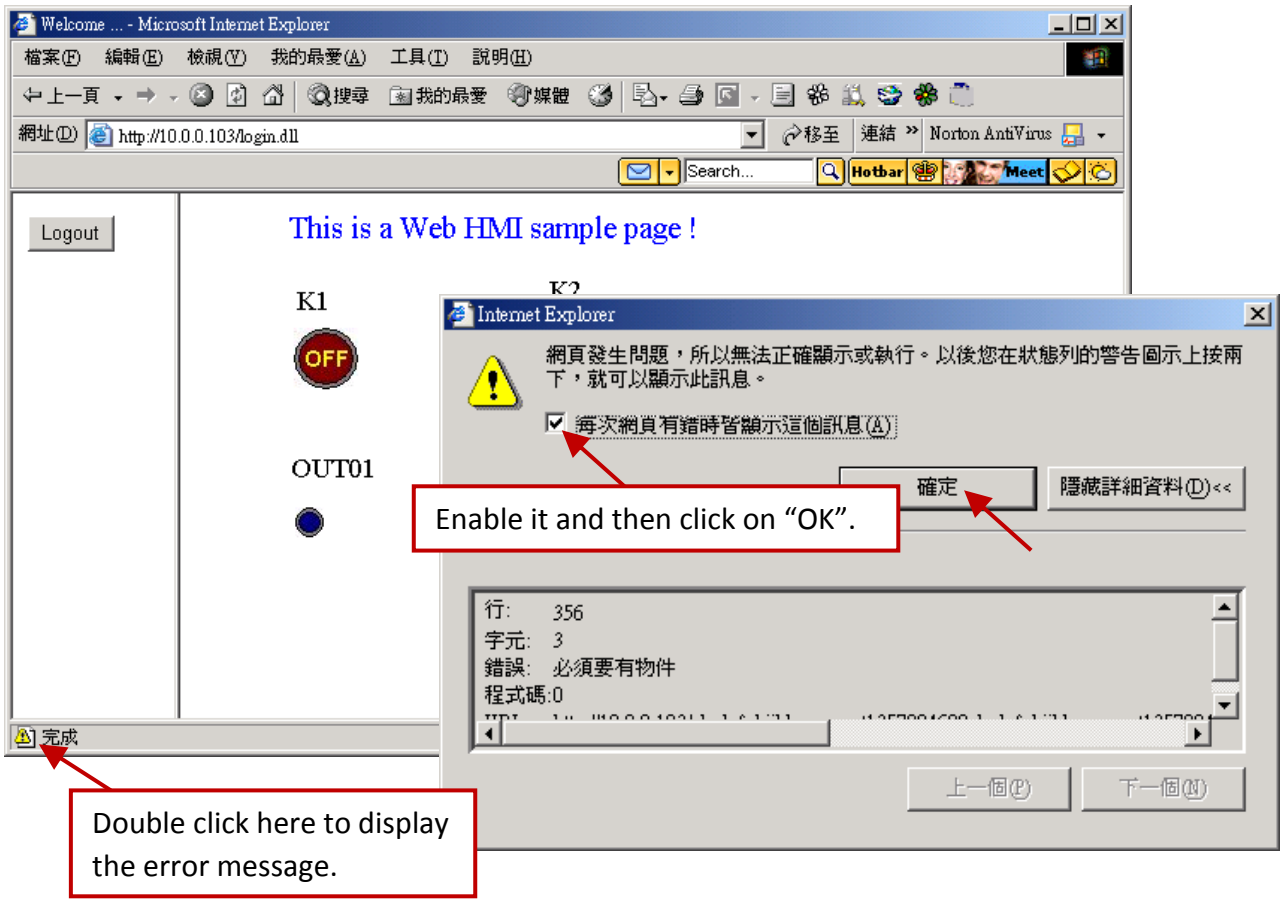
Since the Web Pages are modified or new copied, please run “rs_wphmi.exe” to reset the Web server. **The “rs_wphmi.exe” must be run every time when user has modified any file in the WP-5xx7’s \Micro_SD\Temp\HTTP\WebHMI**

Show Time:

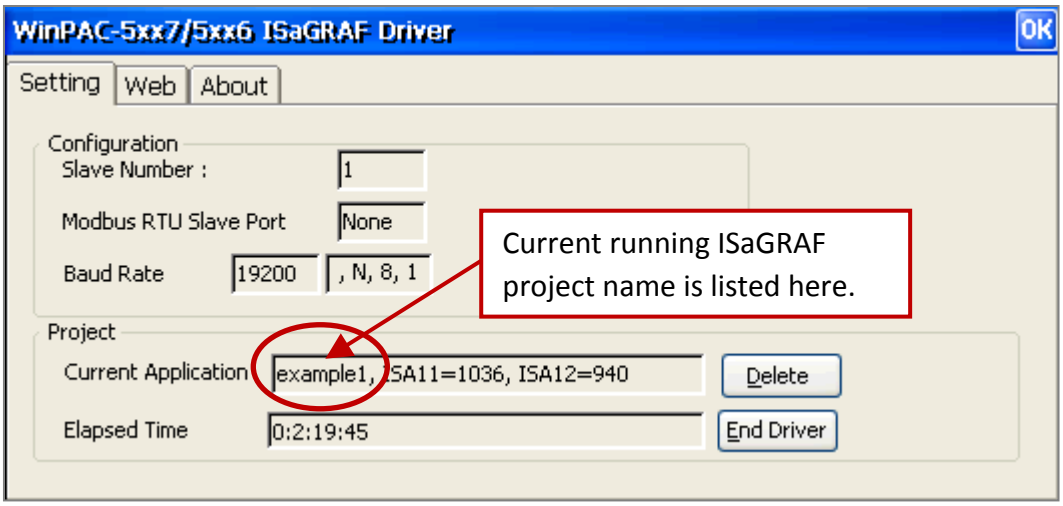
Please run Internet Explorer (Rev. 6.0 or higher), key in the IP address of your WP-5xx7.
For example: 61.218.42.10 or http://61.218.42.10



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 controller (Refer to Section 5.3 or Section 4.2.3). And do you assign the correct Modbus Network address to the respective ISaGRAF variables? (Refer to Section 5.1.5).



Chapter 6 Web HMI Basics

The WinPAC-5xx7 (or WP-5xx7) is the abbreviation of the WinPAC-5147/WP-5147-OD.
The WinPAC-5xx6 (or WP-5xx6) is the abbreviation of the WinPAC-5146/WP-5146-OD.

Important Notice:

1. **WP-5xx7/ 5xx6 support only XW-board in its slot 0**.
2. Please always set a fixed IP address to the WinPAC-5xx7. (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. Note: 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 WinPAC-5xx7's CD-ROM. Please refer to Section 4.1.

6.1 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 Wincon 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 WinPAC-5xx7 via the Internet Explorer.

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

6.2 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>

</div>

</body>
```

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.

```
<!-- 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.

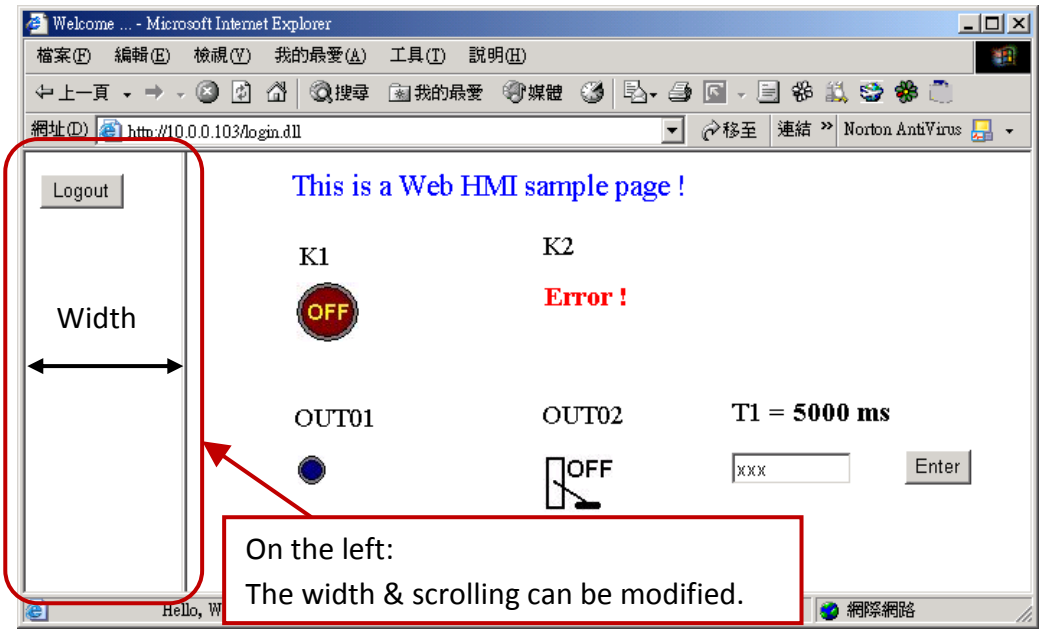
That's all the login.htm need. You can insert more images or text to it. Only remember to keep its basic code.

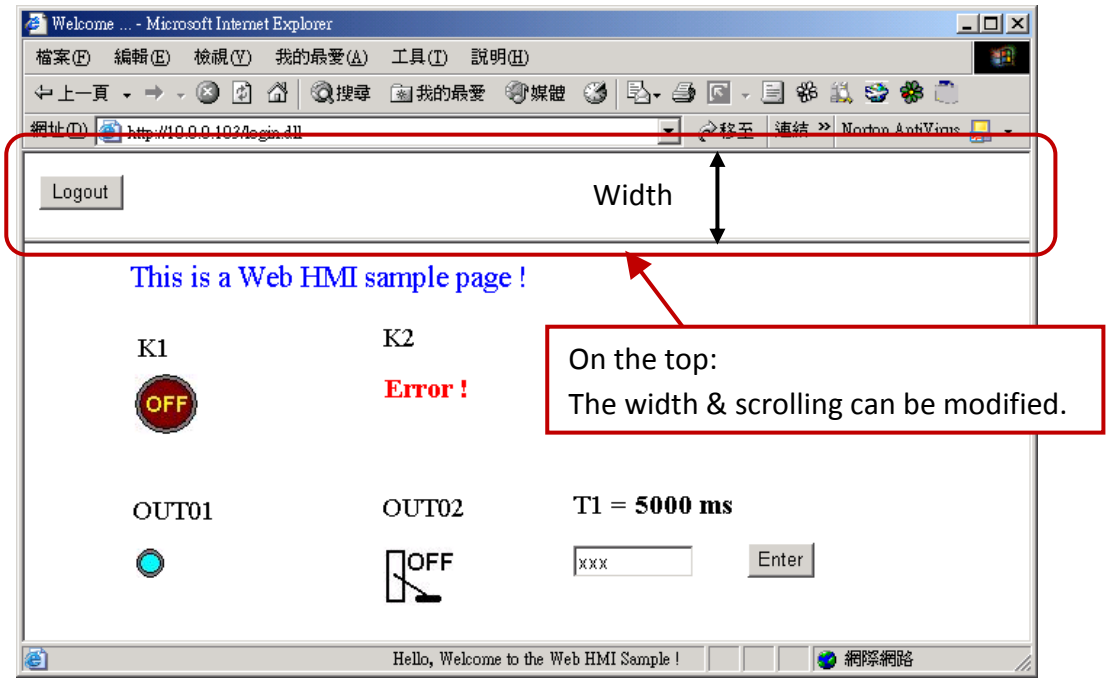
6.3 Menu.htm

Note:

If you want to know more about the multi-page application, there are two demos in the WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\wp_webhmi_demo\wphmi_05 & 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>

<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>
</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>

</body>
</html>
```

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

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

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

form_logout is for the logout button.

Note:

If you want to know more about the multi-page application, there are two demos in the WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\wp_webhmi_demo\wphmi_05 & wphmi_05a. The “wphmi_05” place its page-menu on the left, while “wphmi_05a” on the top.

6.4 Main.htm

6.4.1 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 display a “Hello !” message when successfully login, nothing else.

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

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

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

function refresh_data()
{
}

</SCRIPT>
</head>

<body onLoad="init()">

<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>

</body>
</html>
```

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

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

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.

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 communication quality.

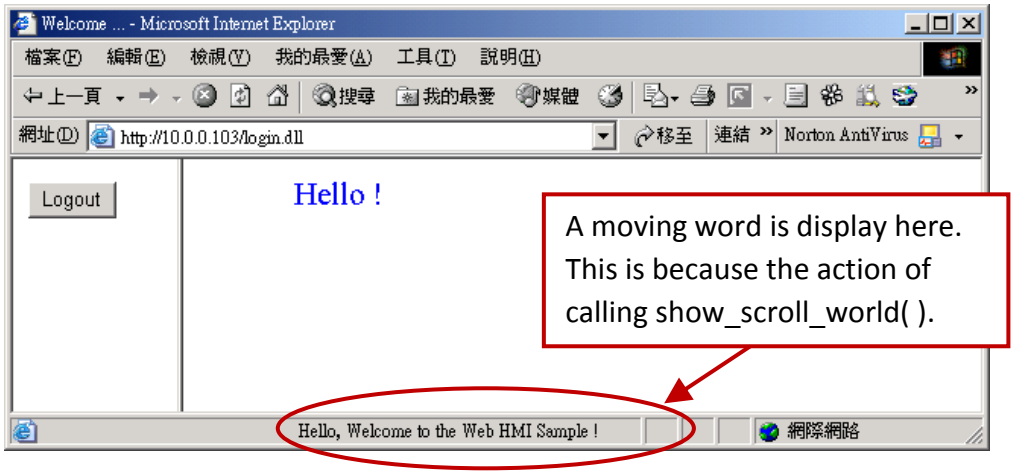
init( ) is the entry pint of the main.htm & other multi-pages.

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

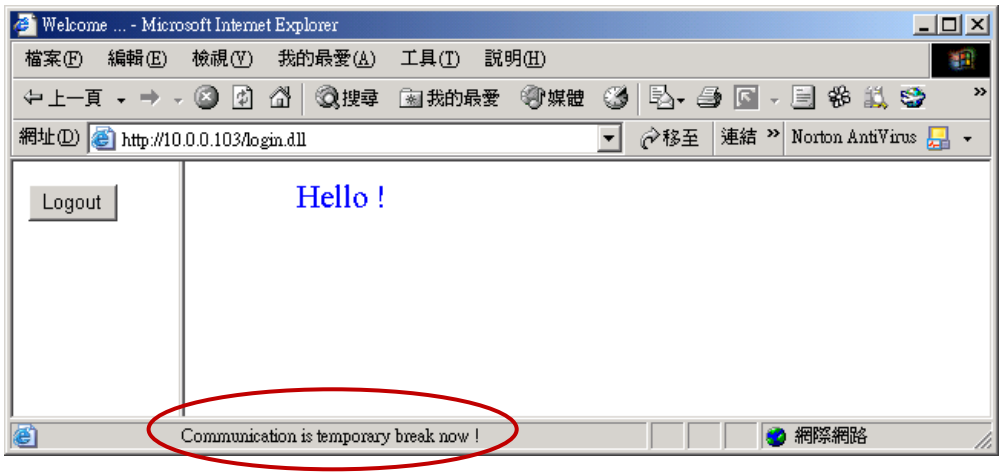
You may replace the main.htm in the WinPAC-5xx7 CD-ROM:

\napdos\isagraf\wp-5xx7\wp_webhmi_demo\sample

to the above main.htm & download it to the controller (refer to Section 5.4.4). You will see the below window when you login successfully.



User may try to plug out the Ethernet cable of the WinPAC 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.

6.4.2 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 controller. 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 5.1.5). The Web HMI only accepts Network Address No in the range of 1 to 1024. The data without a Network Address No (No. = 0) or not in the range of (1 to 1024) is not accessible by the Internet Explorer.

The main.htm and other multi-pages can use the below variable array to access to the ISaGRAF's 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) please 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 "User's Manual of ISaGRAF Embedded Controllers" or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\ " User_Manual_I_8xx7.pdf").

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 assigned to any other variable in the ISaGRAF project. However you may assign No.=13 to one another variable.

6.4.2.1 Displaying Dynamic Boolean Data

Demo example: whmi_02 and whmi_05 (Section 4.1)

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

<body onLoad="init()">
…

<div style="position: absolute; width: 214px; height: 53px; z-index: 2; left: 102px; top: 79px">
<img name="B1" src="img/circle_blue0.jpg"></div>

…
</body>
```

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"

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

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

6.4.2.2 Displaying Dynamic Float & Word & Timer Data

Demo example: wphmi_01 , wphmi_03 and wphmi_05 (section 4.1)
If user want to display the dynamic float value, the below code can be used.

```
…
function refresh_data()
{
  F21.innerText = float_val[21] ;
}
…
<body onLoad="init()">
…

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

…
</body>
```

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 ex, F21.innerText = timer_val[21] + " ms";

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

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

6.4.2.3 Displaying Dynamic Long Integer Data

Demo example: wphmi_03 and wphmi_05 (Section 4.1)
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 " " tags.

The declaration of Text object "L11" is defined here by the "<b" tag and id="L21" and "" tag , the initial value of this L11 is "xxx".

6.4.2.4 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 " " tags.

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

6.4.2.5 Trigger A Boolean Object To Blink

Demo example: wphmi_02 and wphmi_05 (Section 4.1)

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.

```
…
  var blink_period=500;

  setTimeout("blink_obj()", blink_period);

  var B12_blink=0;   // init as 0: not blink
  var blink_step=0;

  function blink_obj()
  {
   if(blink_step==1)
   {
    blink_step=0;

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

   }
   else
   {
    blink_step=1;

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

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

  …function refresh_data()
  {
```

The blinking period, unit is ms.

Setup a timer to handle the blinking action.

1: to blink , 0: no blink

Blink step 1:
To display “Error !” in red color.

Blink step 2:
To display “” (nothing) in red color.

```
if(boolean_val[12]==0)
{
  B12.innerText="Ok";
  font_B12.color="blue";
  B12_blink=0;
}
else
{
  B12_blink=1;
 }
}
…
<body onLoad="init()">
…
<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>
</font>
</div>
…
</body>
```

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

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

The ““ & “” tags can be used for controlling the font’s color and font’s size.

The declaration of Text object “B12” is defined here by the “<b” tag and id=”B12” and “” tag, the initial value of this B2 is “OK”.

6.4.2.6 Displaying Float Value with Fixed Digit Number Behind The “.” Symbol

Demo example: wphmi_06 and wphmi_07 (Section 4.1)

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 ex, float_str1(1.234567, 3) return “1.234” ,
float_str1(1.234567, 2) return “1.23”

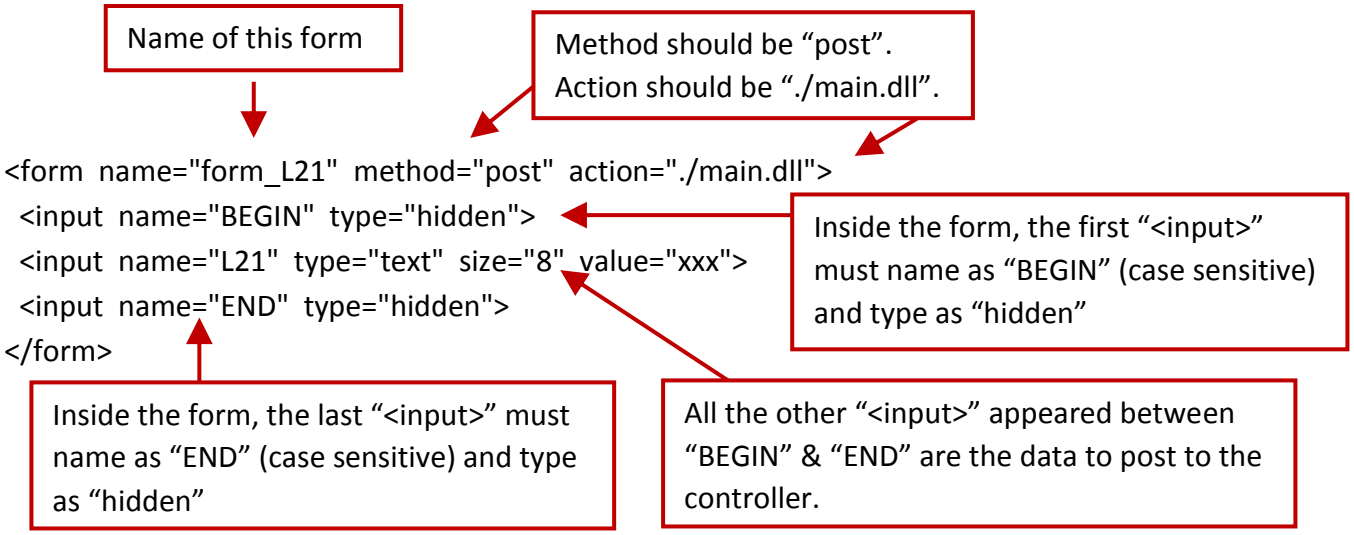
```
…
function refresh_data()
{
 F21.innerText = float_str1( float_val[21] , 3) ;
}
```

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

6.4.3 Post Data to the Controller

The former section 6.4.2 listing how to get and display data from the controller. This section focuses on posting data to the controller, 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 “User’s Manual of ISaGRAF Embedded Controllers” or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\ “User_Manual_I_8xx7.pdf”)

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 assigned to any other variable in the ISaGRAF project. However you may assign No.=13 to one another variable.

6.4.3.1 Post Boolean Value to the Controller

A. To post by the image

```
…

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();
 }
}
function refresh_data()
{
 B2.src = “img/cmd” + boolean_val[2] + “.jpg” ;
}
…
<body onLoad="init()">
…
<div style="position: absolute; width:100px;height:100px; z-index: 5; left: 242px; top: 164px" >
<img style="cursor:hand" name="B2"  onclick="ON_OFF(form_B2, form_B2.B2, boolean_val[2])"
src="img/cmd0.jpg">
```

Demo example: wphmi_02 and wphmi_05

ON_OFF function is used for posting Boolean value to the controller by refer to the current Boolean value.

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

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

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

Name of the image object

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 for posting boolean value as “True” to the controller.

```
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 for posting boolean value as “Fasle” to the controller .

```
function refresh_data()
{
 B2.src = "img/big_Tcircle_red" + boolean_val[2] + ".jpg" ;
}
…
<body onLoad="init()">
…
<div style="position: absolute; width: 56px; height:40px; z-index: 5; left: 82px; top: 69px" >
<img name="B2" src="img/big_Tcircle_red0.jpg">
</div>
```

Display the current Boolean image. In this case,
0: “img/big_Tcircle_red0.jpg”,
1: “img/ big_Tcircle_red1.jpg”

The layout (or location) of the image object “B2” is defined here by the “<div” and “ ” 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”

6.4.3.2 Post Word, Long, Float, Timer and String Value to the Controller

```
…
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 for posting 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];
}
…

<body onLoad="init()">
…

<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>

<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>
…
</body>
```

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[ ]

The layout (or location) of the text object “L15” & “F17” are defined here by the “<div” “ ”

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

“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 controller.

6.5 Multi-Pages

The Web HMI in the WinPAC-5xx7 supports multi-pages application. You may refer to Chapter 4 to setup the multi-page demo – "wphmi_05" to see how it works.

6.5.1 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 users 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 6.4)

6.5.2 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”

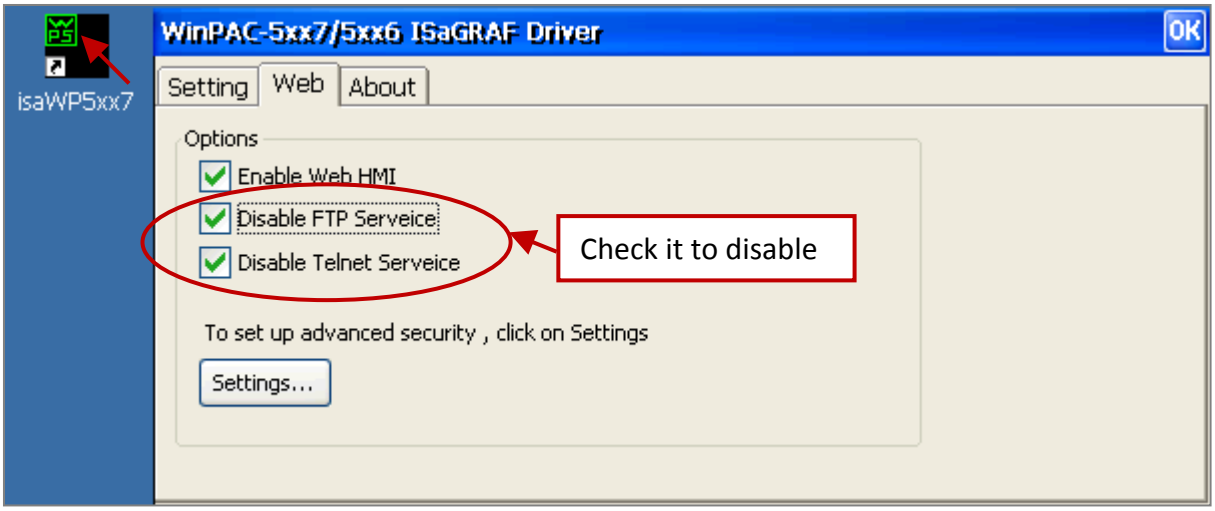
Switch page to “kitchen.htm”

6.6 Web Security

There are some ways user can get access to the WinPAC-5xx7 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)

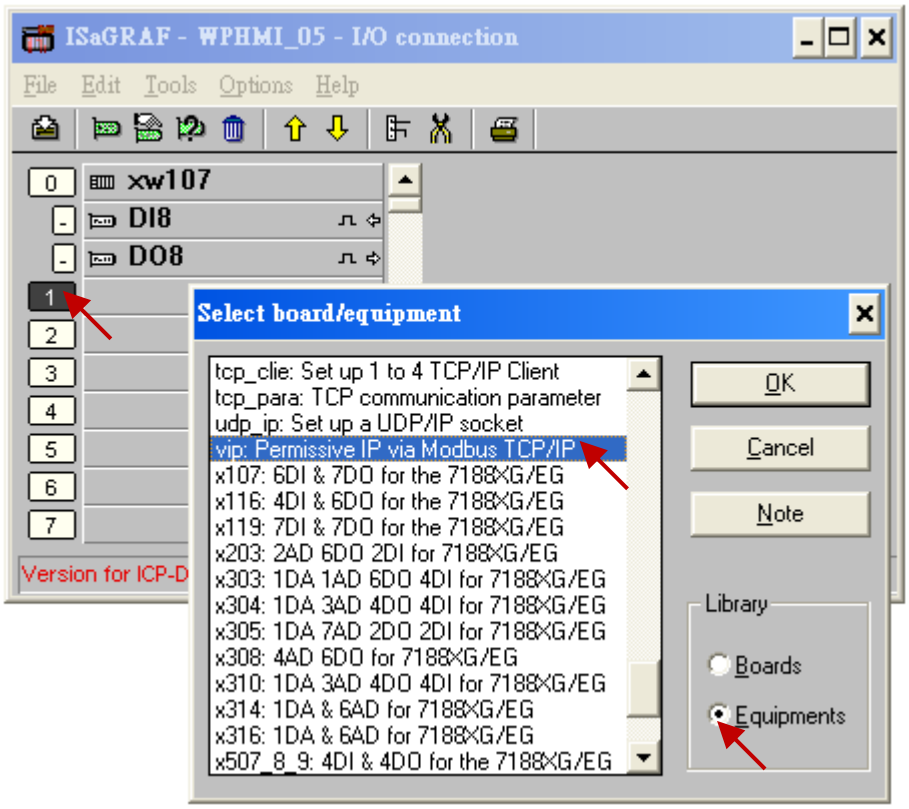
For safety, recommend to disable item 2 and 3 at run time.

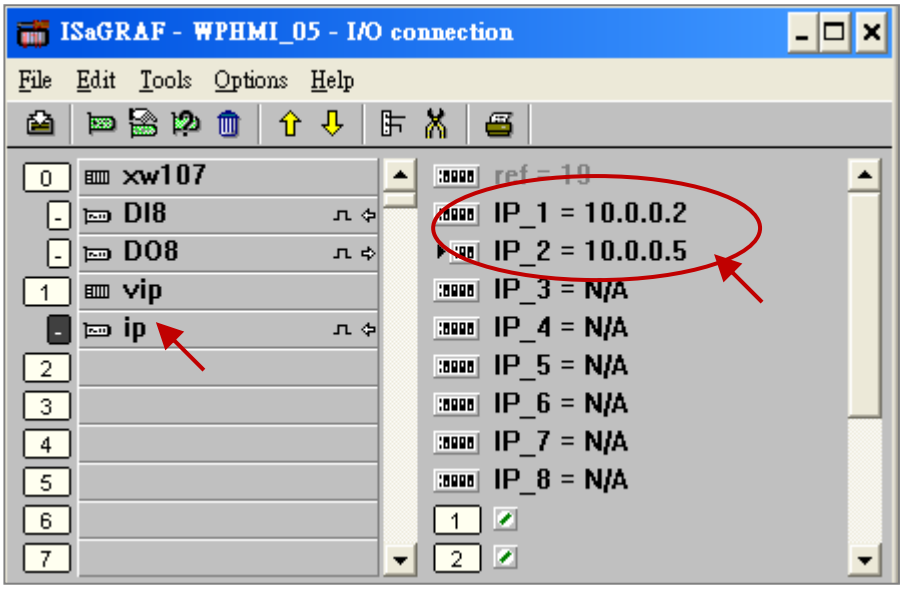


And about item 4, please set proper username & password for the Web HMI.

About item 1, user may set up to 8 IP address for ISaGRAF or other HMI to get access to the WP-5xx7 via the Modbus TCP/IP protocol as below.

On the IO connection window of ISaGRAF, please connect “vip” and entering the IP which can get access to the WP-5xx7 via Modbus TCP/IP protocol. If “vip” is not connected, any remote IP can get access to your WP-5xx7 via Modbus TCP/IP protocol. If “vip” is connected and No IP is entered (all assigned as “N/A”), No HMI and ISaGRAF can get access to it anymore.





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

Chapter 7 VB.net 2008 Program Running In WinPAC-5xx7 Access to 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 major purpose is for storing OS, 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.

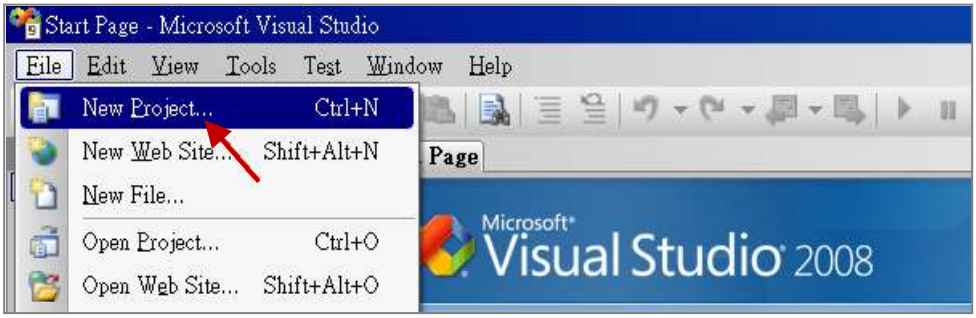
This chapter lists the procedure for creating the first demo program by Visual Studio .NET 2008 development tool. There is some sample programs in the WinPAC-5xx7 CD-ROM.

WinPAC-5xx7 CD-ROM : \napdos\isagraf\wp-5xx7\vb.net_2008_demo\
wp_vb01 : Digital I/O demo with one XW107 in slot 0 of the WinPAC-5xx7.
wp_vb02 : Analog I/O demo with virtual I/O board (I-87024W, I-8017HW).
wp_vb03 : Read/Write ISaGRAF internal integers, timers & real variables. (No I/O)

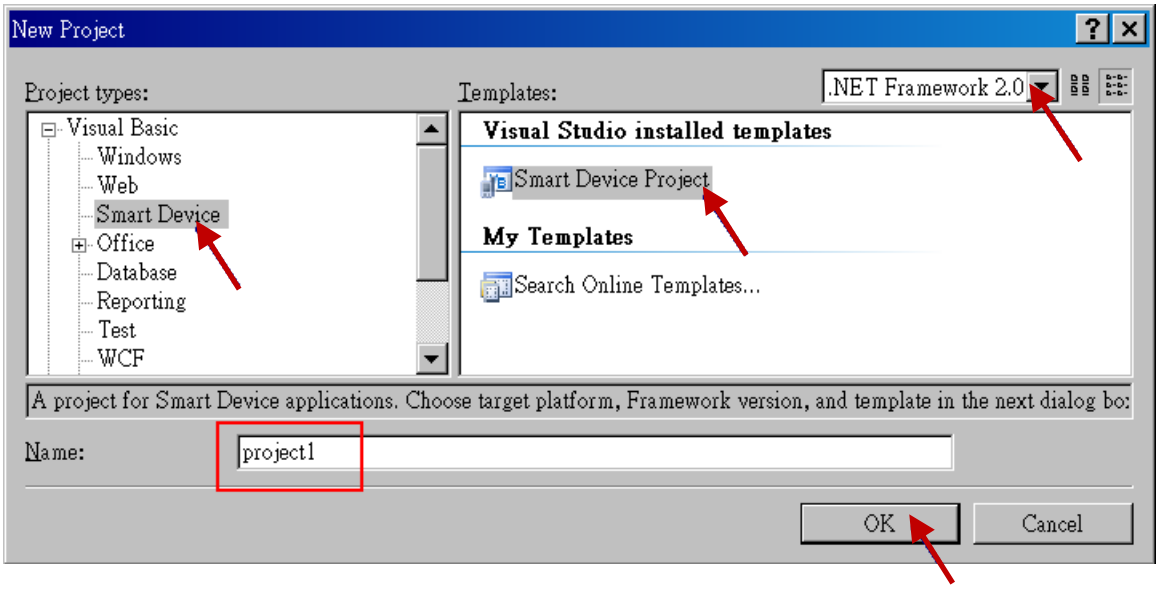
The related ISaGRAF demo project names are "wp_vb01.pia", "wp_vb02.pia and "wp_vb03.pia" in the same directory.

7.1 Create a New Project

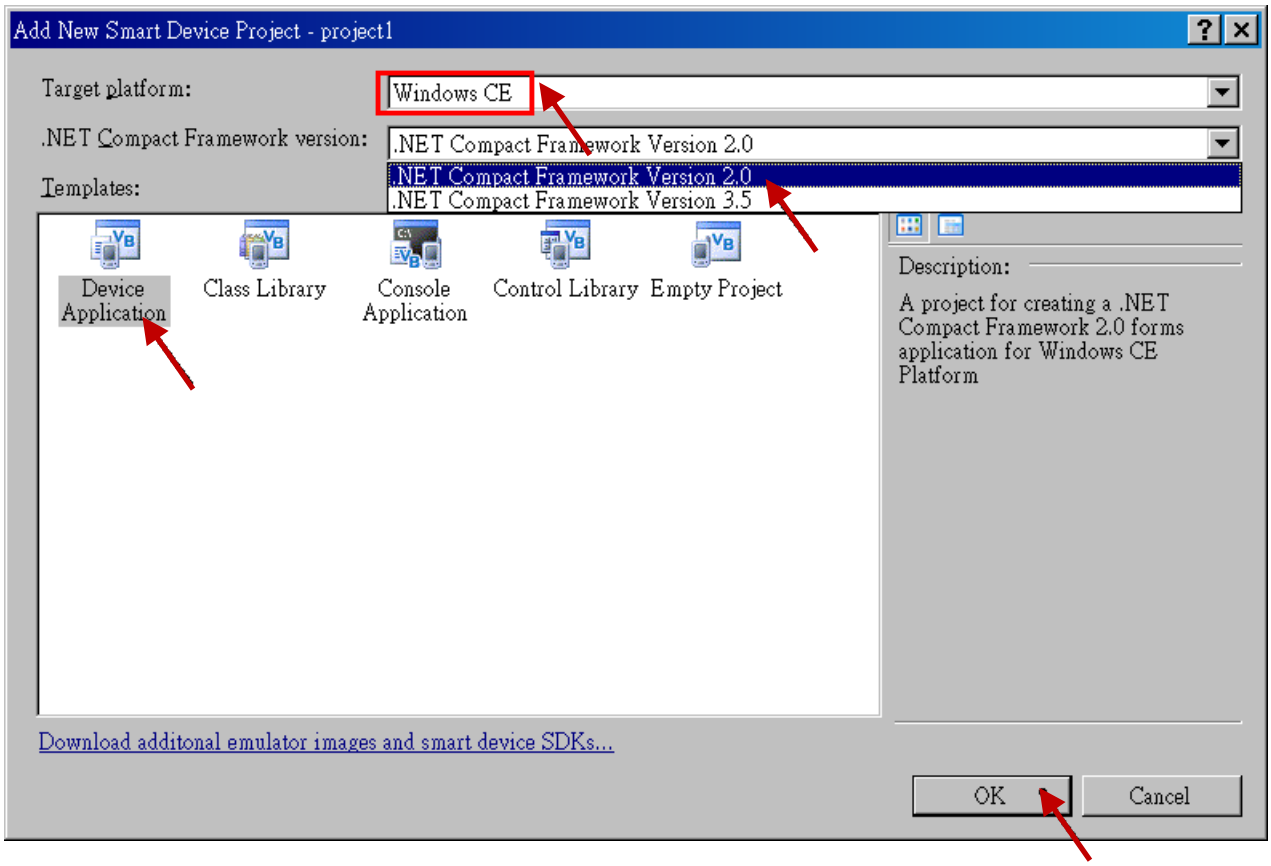
1. In the first, users need to open Microsoft Visual Studio .NET 2008 software. And then in the menu of "**File**", please run the "**New Project**".



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".



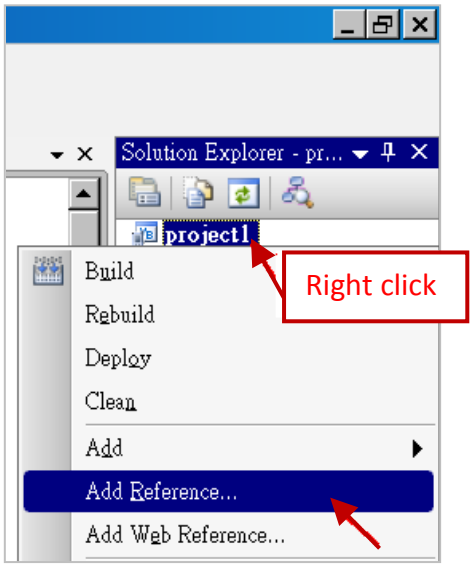
3. Select the "**Device Application**" and "**Windows CE**" and "**.NET Compact Framework Version 2.0**" , then click on "OK" .



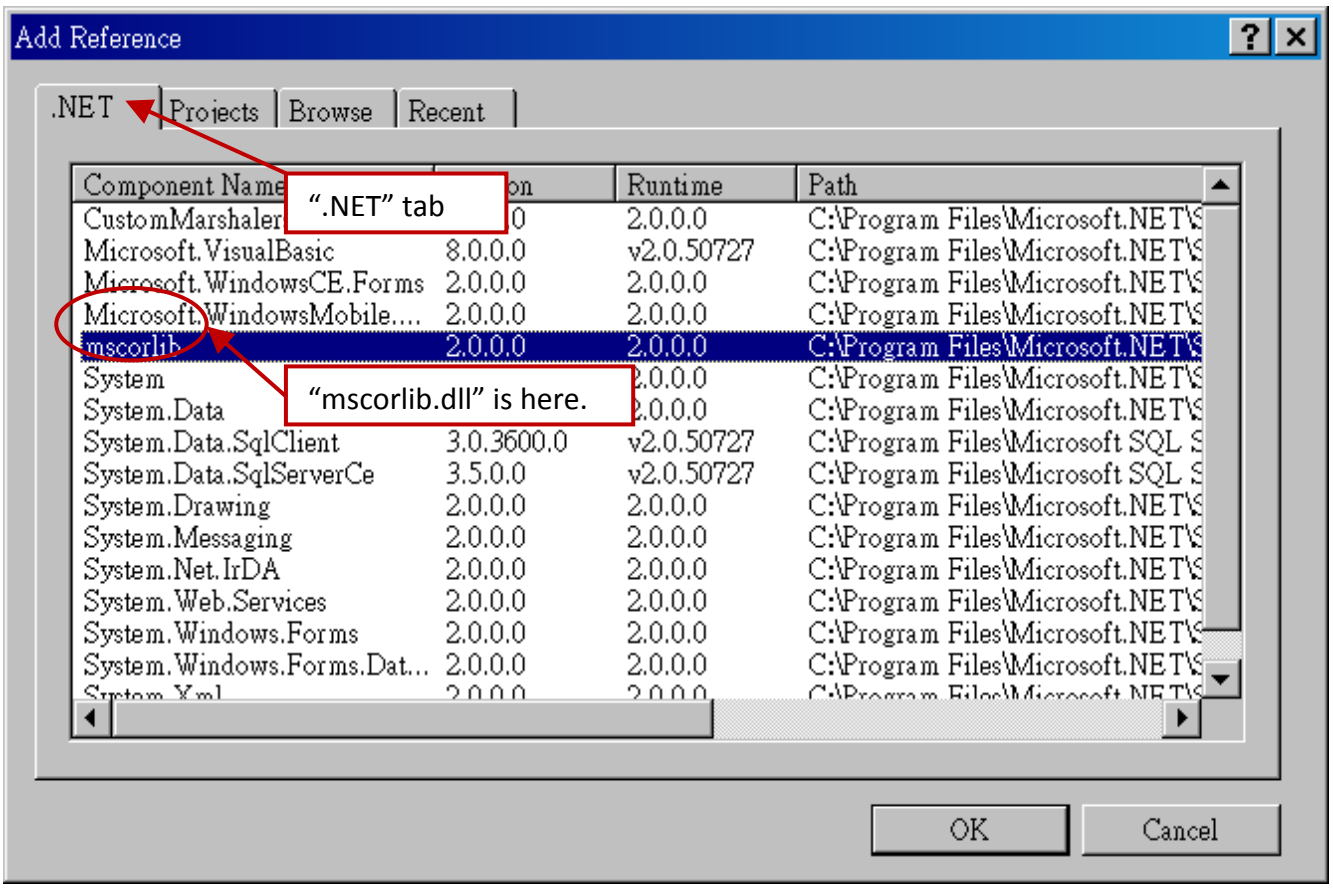
7.2 Add Project Reference for an Application

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.

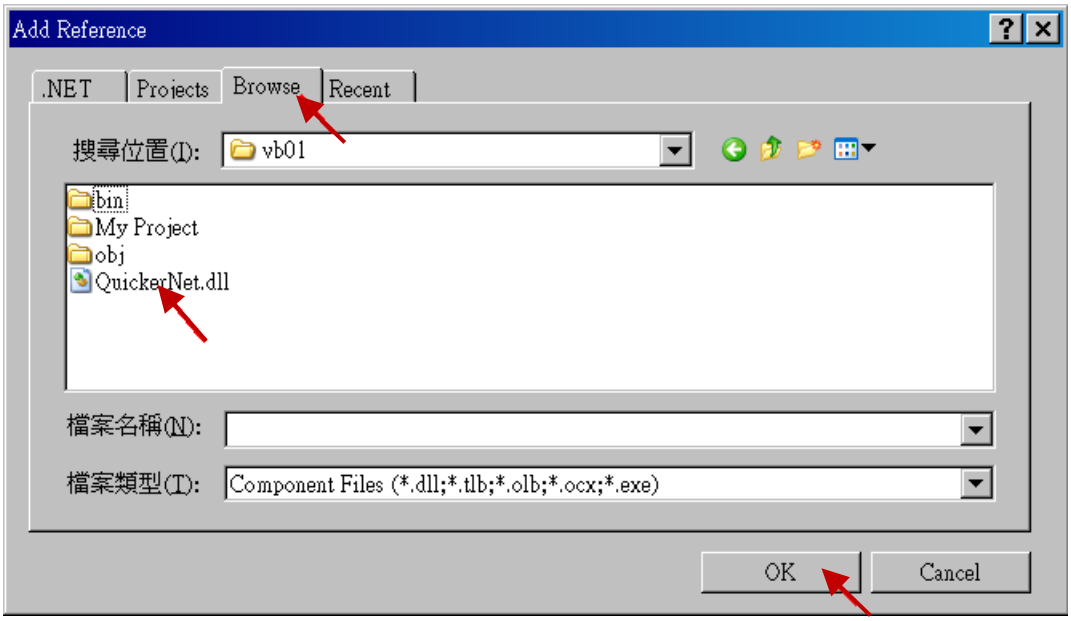
1. Right click on the Project name on the right hand side , then select “Add Reference …”



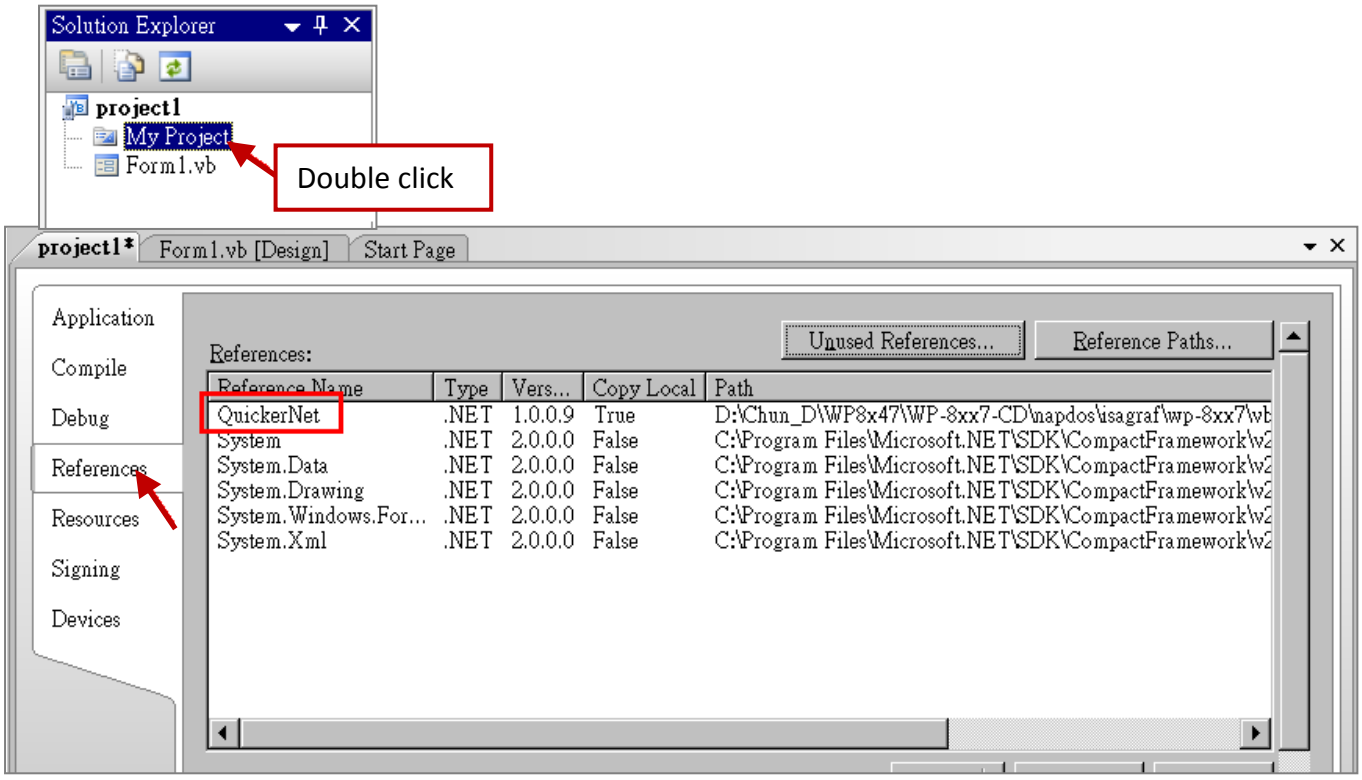
2. Select the “**mscorlib**” in the list box and click the button “**OK”** (the component “**mscorlib**” must appear in the Selected Components area)



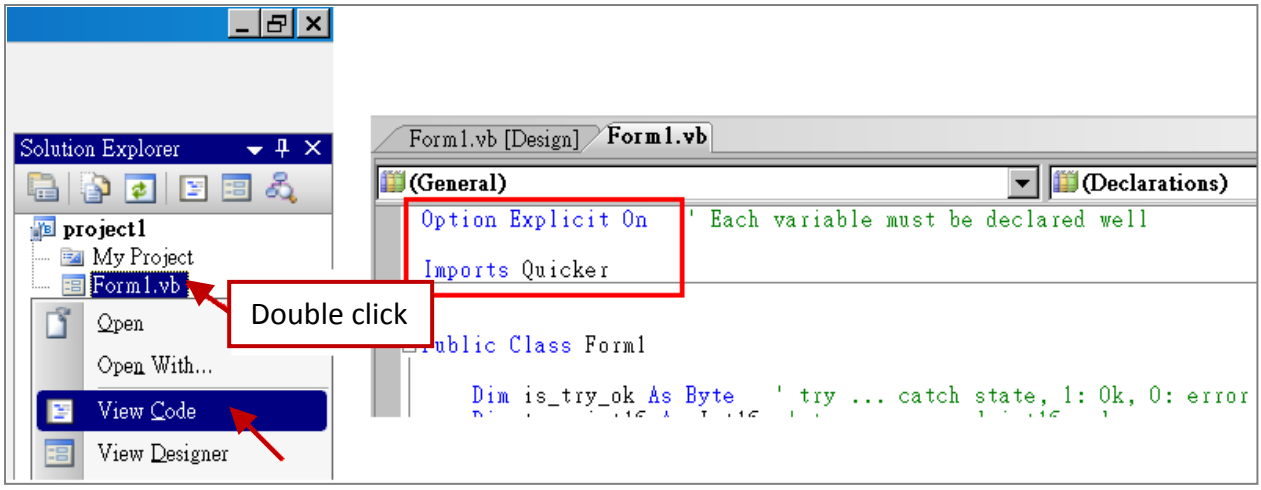
3. Click the "**Browse**" button. Select the "**QuickerNet.dll"** from **WinPAC-5xx7 CD-ROM : \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_vb01\vb01** subfolder or from your own location**.**



4. When both "**mscorlib**" and "**QuickerNet.dll**" are added, please double click on "My Project" 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.

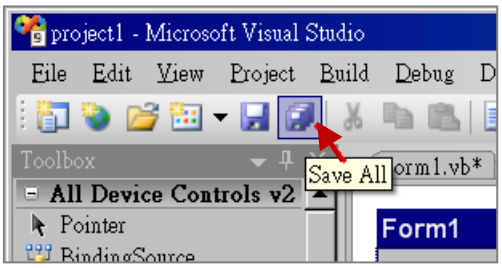


Then you can design all required objects and actions inside your VB Forms.

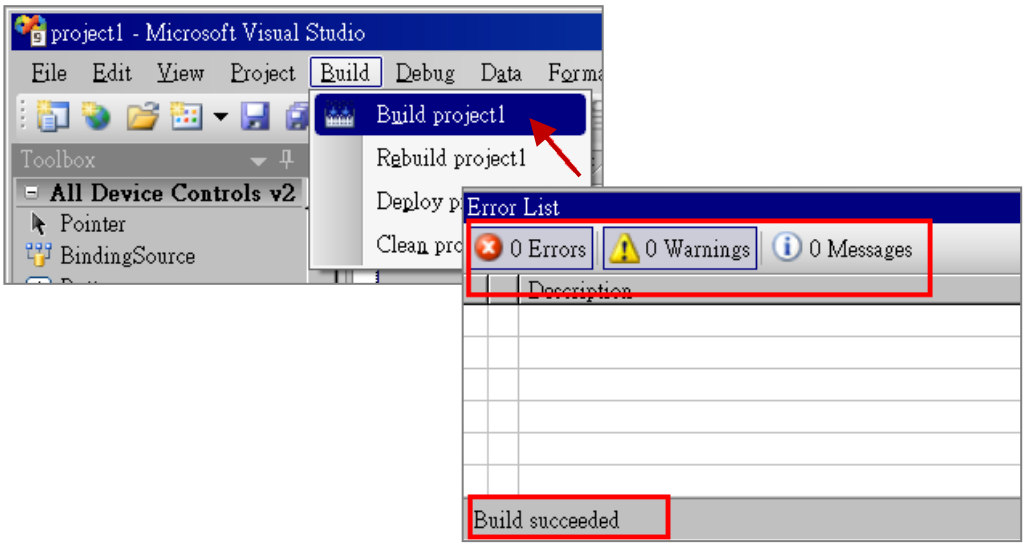
7.3 Compiling an Application Program

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

Please copy this execution file to the WinPAC-5xx7’s \Micro_SD\ISaGRAF\ path to run it.

Note:

User may copy the VB.net execution file to other path to run it but there should contain at least three DLL files with it or it cannot run correctly.

For instance, the project1.exe can run in the \Micro_SD\ path if there is three plus one file in it. The “project1.exe”, “QuickerNet.dll”, “Quicker.dll” and “Mscorlib.dll”.
(The three .dll files can be copied from the WinPAC-5xx7’s “\Micro_SD\ISaGRAF\” path)

7.4 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

7.4.1 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:

WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_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:

WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_vb01

7.4.2 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:

WinPAC-5xx7 CD-ROM:

1. \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_vb02 for R/W analog I/O
2. \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_vb03 for R/W internal long integer, Timer and Real (floating-point) values.

Note:

The long integer & timer & real variable's Network Address No. must occupy 2 No. in the ISaGRAF project. (Refer to section 4.2 of "User's Manual of ISaGRAF Embedded Controllers" or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\" User_Manual_I_8xx7.pdf")

■ **UserGetReg_short** ■ **UserGetReg_long** ■ **UserGetReg_float**

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:

WinPAC-5xx7 CD-ROM:

1. \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_vb02 for R/W analog I/O
2. \napdos\isagraf\wp-5xx7\vb.net_2008_demo\wp_vb03 for R/W internal long integer, Timer and Real (floating-point) values.

Note:

The long integer & timer & real variable's Network Address No. must occupy 2 No. in the ISaGRAF project. (Refer to section 4.2 of "User's Manual of ISaGRAF Embedded Controllers" or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\" User_Manual_I_8xx7.pdf")

Chapter 8 EVC++ Program Running in WinPAC Access to 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 major purpose is for storing OS, 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.

User can write his EVC++ 4.0 application to access to the ISaGRAF variables running at the same WinPAC-5xx7 by using the below functions for Read/Write boolean, word, long and float value.

The “include file” and “library” at design time are “WinConAgent.h” and “Quicker.lib”.
(WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\evc++_lib\ ).

The DLL at run time is the “Quicker.dll” which is in WinPAC-5xx7's \Micro_SD\ISaGRAF\ (Please copy the excution file after successfully compilation to the WinPAC's \Micro_SD\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:

The long integer & timer & real variable's Network Address No. must occupy 2 No. in the ISaGRAF project. (Refer to section 4.2 of "User's Manual of ISaGRAF Embedded Controllers" or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\ "User_Manual_I_8xx7.pdf")

Chapter 9 InduSoft Project Access to ISaGRAF Variables

Note:

If the HMI program behavior is not so smooth or slow, please refer to Appendix F.
The WinPAC-5xx7 (or WP-5xx7) is the abbreviation of the WinPAC-5147/WP-5147-OD.
The WinPAC-5xx6 (or WP-5xx6) is the abbreviation of the WinPAC-5146/WP-5146-OD.

Important Notice:

1. Please always set a **fixed IP** address to the WinPAC-5xx7/5xx6. (No DHCP)
2. Recommend to use the Industrial Ethernet Switch (NS-205/NS-208) or Real-time Redundant Ring Switch (RS-405/RS-408) for WP-5xx7/5xx6.
3. **WinPAC-5xx6** supports InduSoft and ISaGRAF logic running in the same controller.

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

Step 1: Create a new ISaGRAF project.

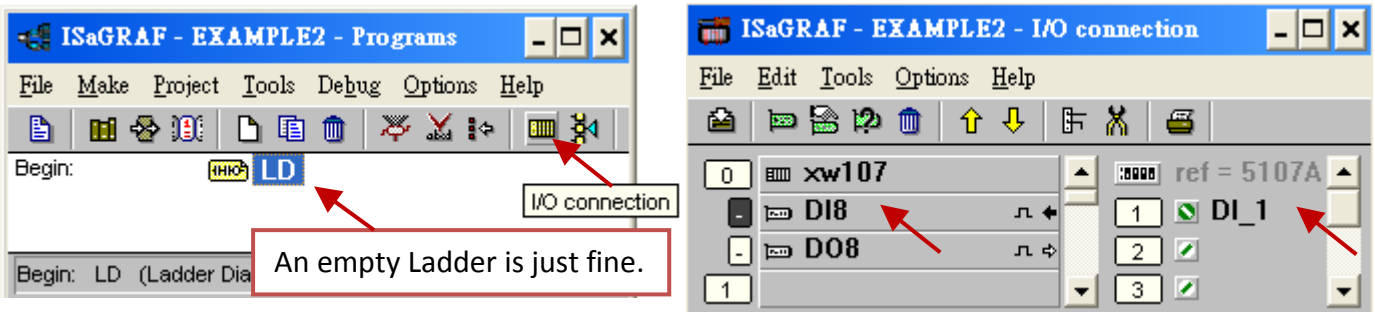
This demo uses a DI/DO module XW107 in slot 0 of WP-5xx6 PAC, and a virtual AO board I-87024W in slot 2 and one internal variable defined as follow.

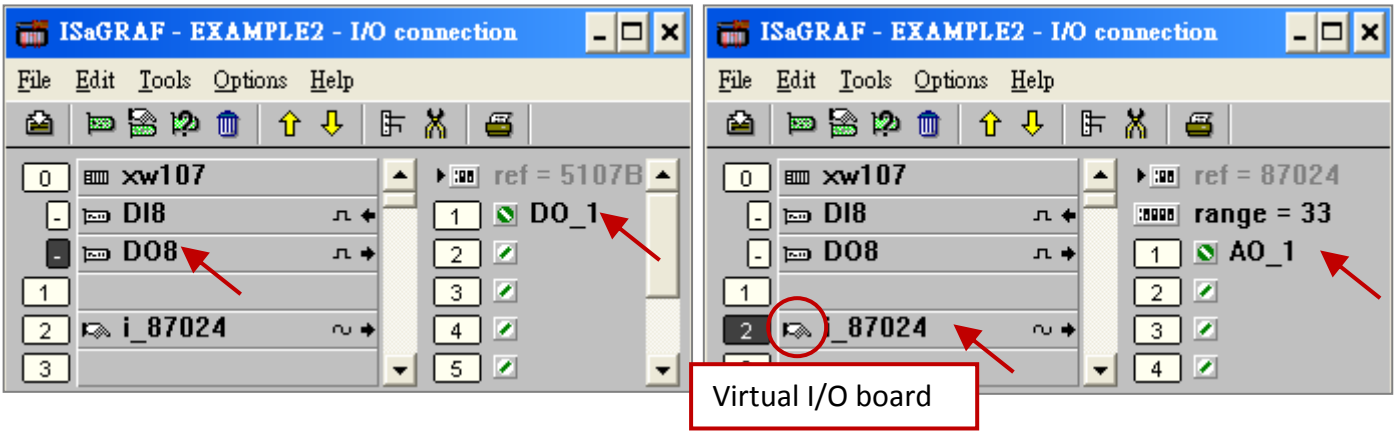
ISaGRAF Variable Definition:

Variable Type	Name	Network Address	Comment	Attributes
Boolean	DI_1	**1**	XW107 DI channel 1	**Input**
Boolean	DO_1	**11**	XW107 DO channel 1	**Output**
Integers	AO_1	**21**	Virtual 87024W AO channel 1	**Output**
Integers	internal	**31**	Internal variable	**Internal**

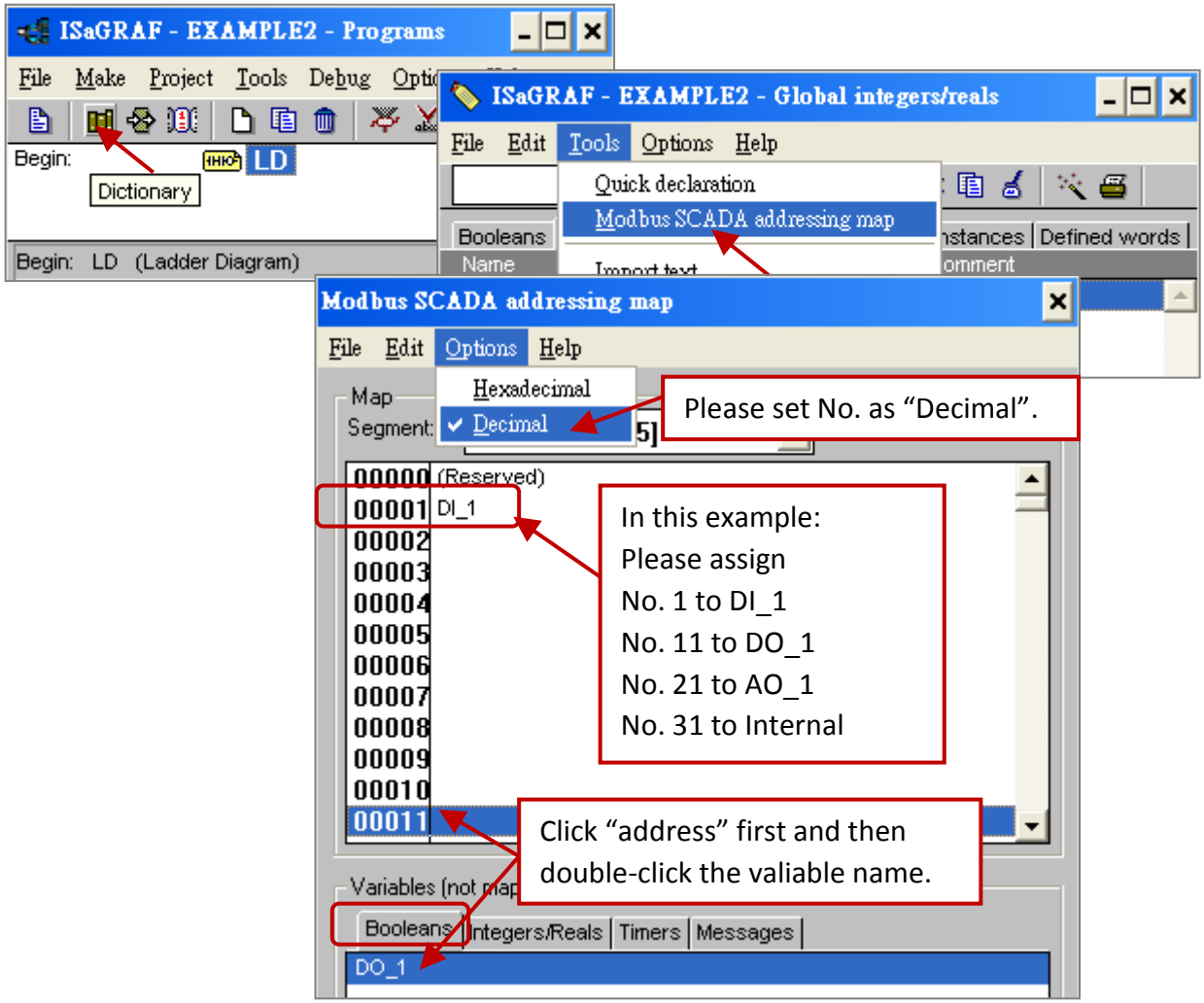
If you are not familiar with ISaGRAF, please refer to Section 5.1 to 5.3.
And setup the I/O connection as following.

I/O Connection Setting:





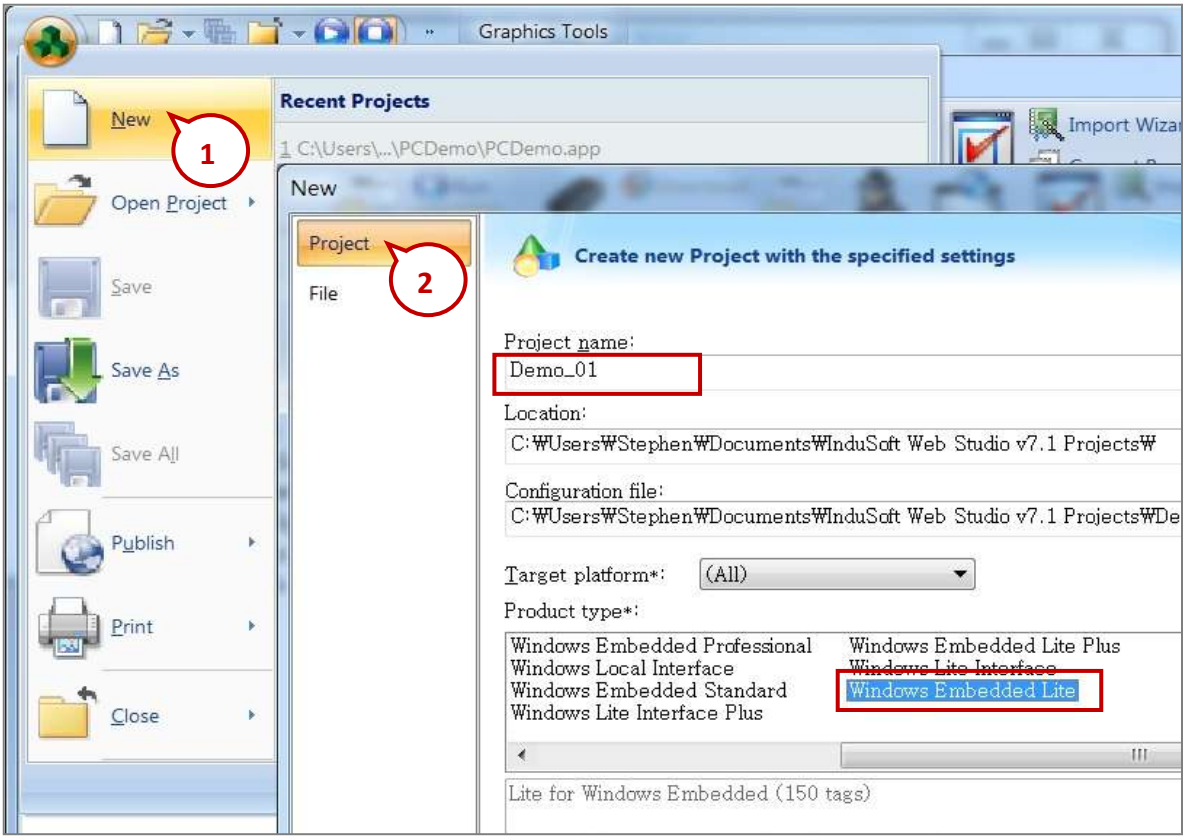
The ISaGRAF variables to be exchanged with InduSoft must be declared with a Modbus "Network Address" as below.



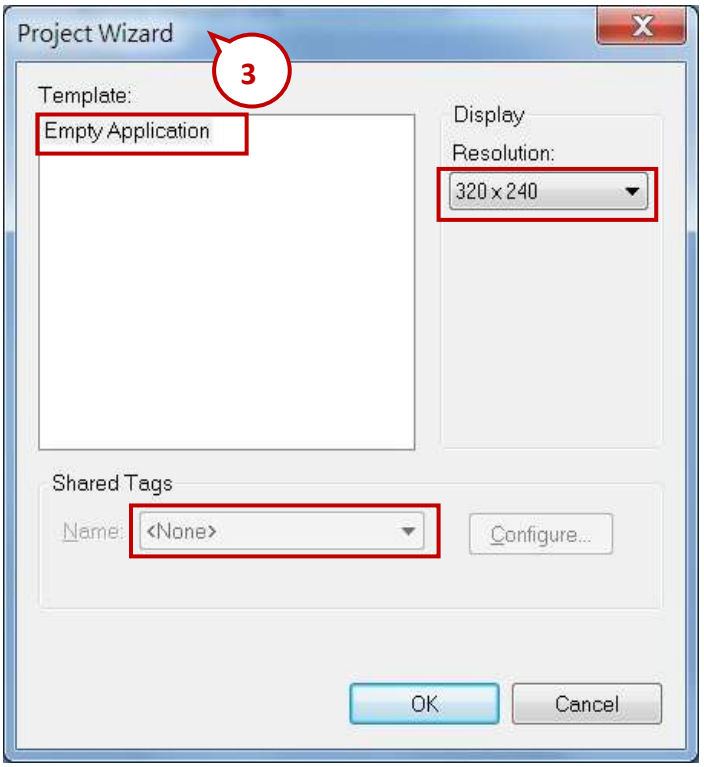
Please save & compile the ISaGRAF example project & then download to the PAC.
If you are not familiar with ISaGRAF, please refer to Section 5.1 to 5.3.

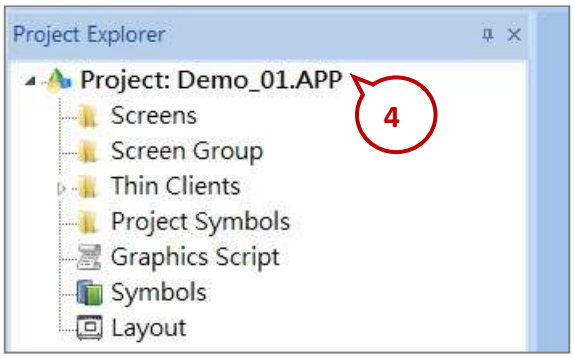
Step 2: Create an InduSoft project.

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 "Project type". Press "OK".



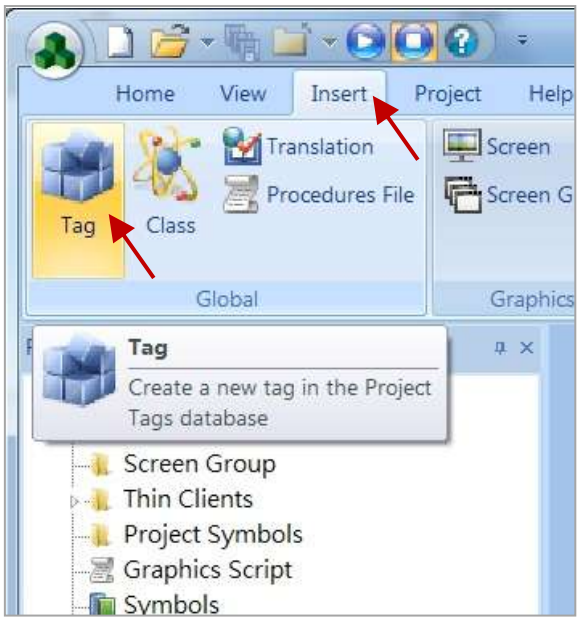
3. The "Project Wizard" window will appear. Select "Empty Application" on the "Template", "320 x 240" on the "Resolution" and "None" on the "Shared Tags".
4. Then, the new project will show on the "Project Explorer" window as the figure.



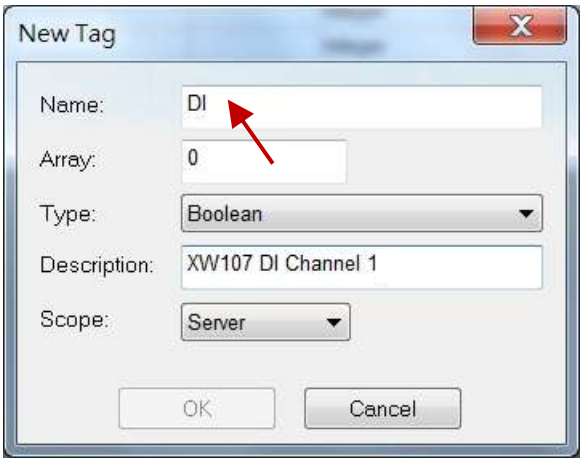


Define Application Tags

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



The “New Tag” window will show as below.



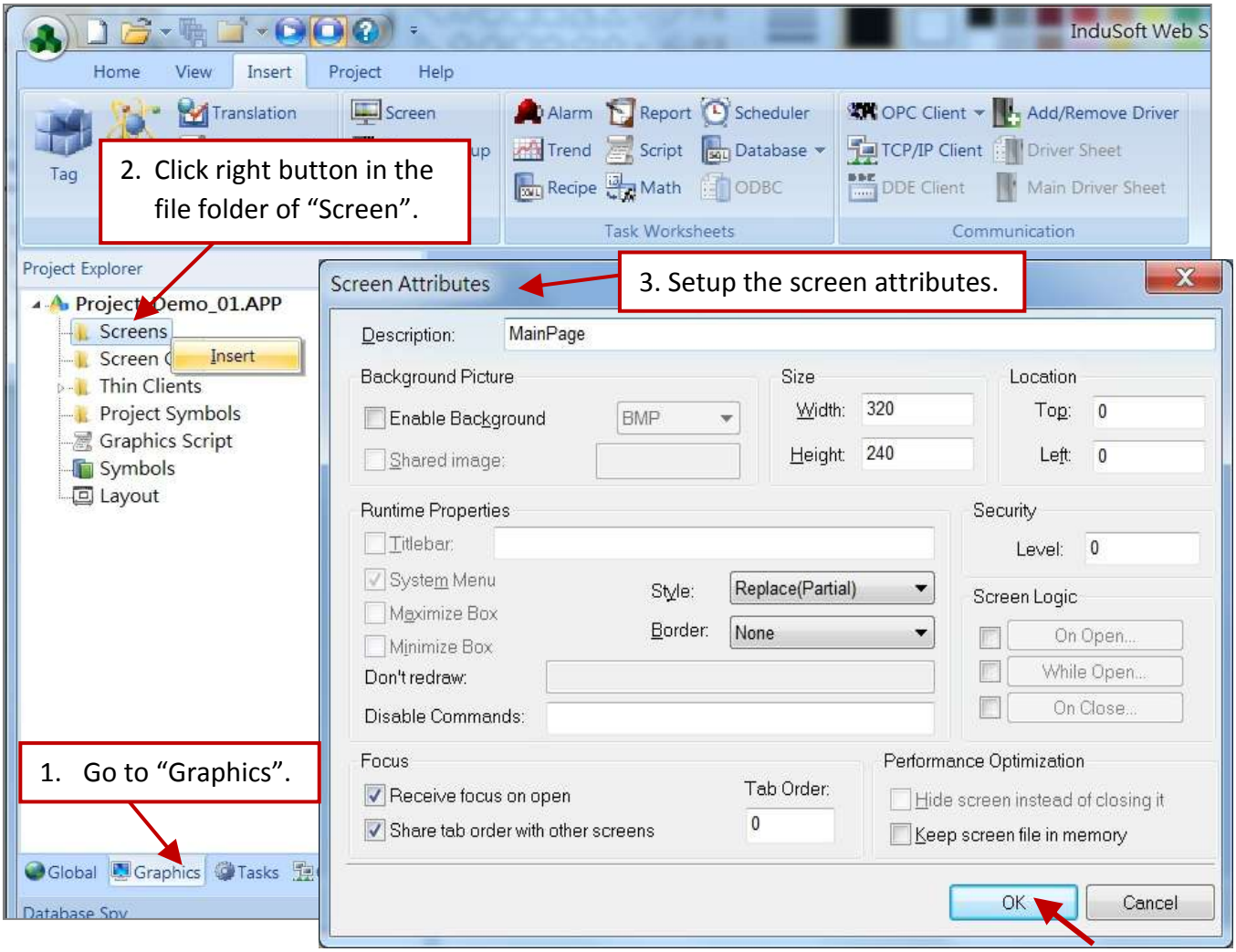
This demo uses a DI/DO module XW107, a virtual AO board (I-87024W) and one internal variable defined as follow. Please create these tags one by one.

Project Tags

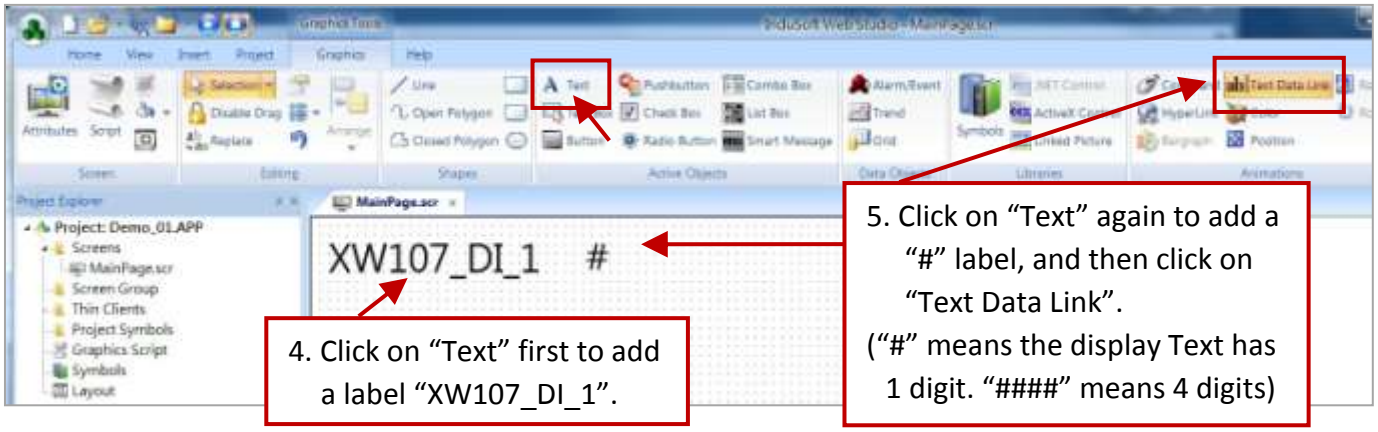
	Name	Array	Type	Description	Scope
1	DI	0	Boolean	XW107 DI Channel 1	Server
2	DO	0	Boolean	XW107 DO Channel 1	Server
3	AO	0	Integer	87024W AO Channel 1	Server
4	Internal	0	Integer	Internal Tag	Server
*			Integer		Server
*			Integer		Server

Create Main Screen

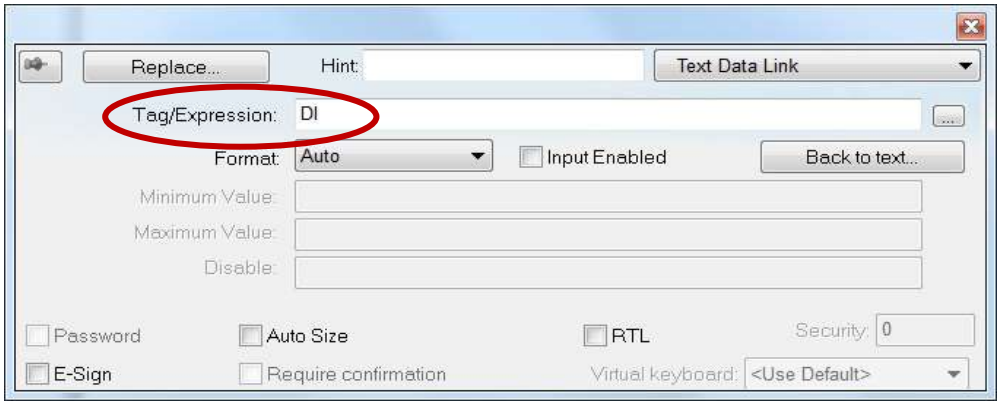
1. Select the “Graphics” tab in the “Workspace” window.
2. Click mouse right button in the file folder of “Screen”. The “Screen Attributes” window appears.
3. Set up the screen attributes such as “Size”, “Location”, “Runtime Properties” and “Background Picture” then press “OK” to edit screen.



4. Select “Text” icon, then clink on the main screen where want to establish a text and type “XW107_DI_1”.
5. Select “Text” again following the previous text and type “#” then select “Text Data Link”. (# means 1 digit, #### means 4 digits, ###### means 6 digits)

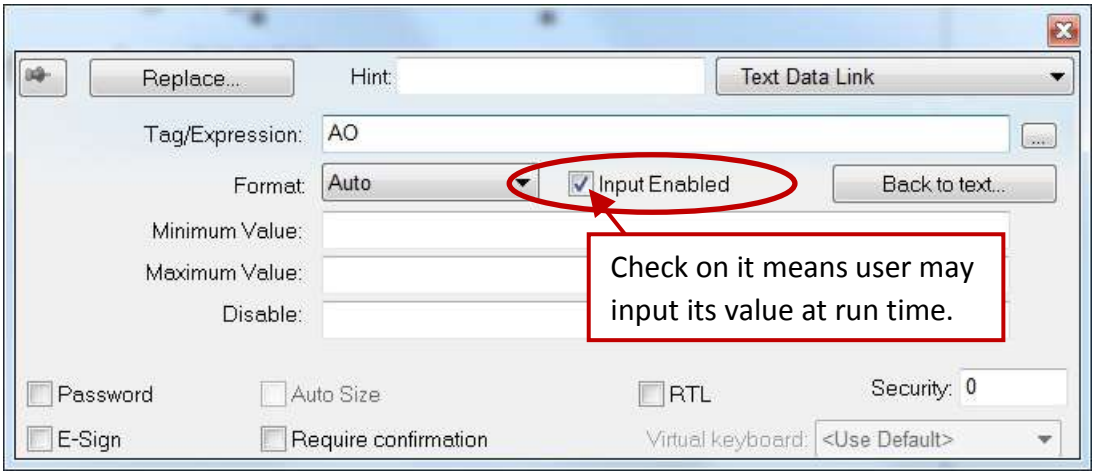


6. Double click the “#” object and then type DI in the “Tag/Expression”.

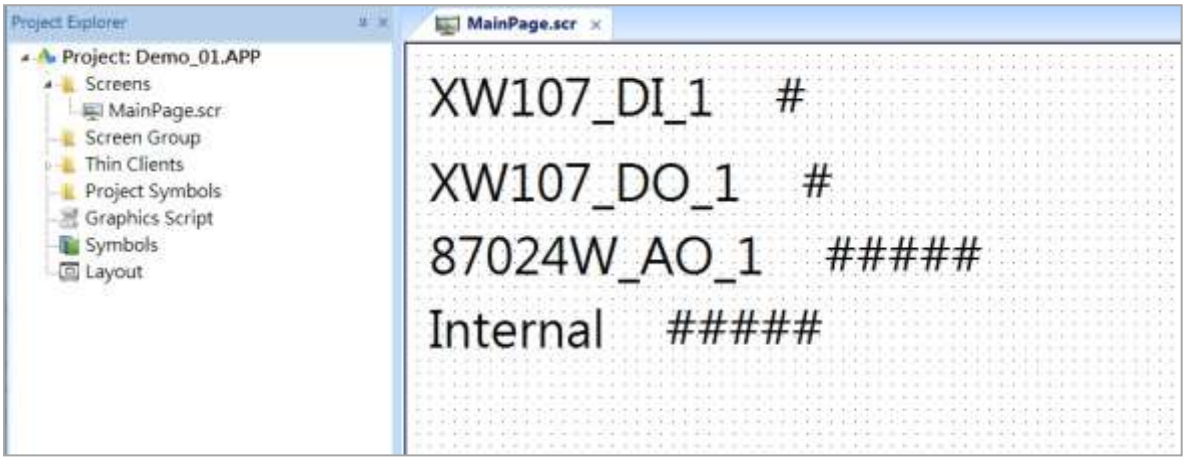


Repeat former method to create other objects and click “Save” icon on the main menu to save this main screen page as “MainPage.scr”. (**Select [File] > [Save As HTML] to create this screen that can be visualized in a remote station using a regular web browser.**)

Note: For the Output object, as 87024W_AO_1 and XW107_DO_1, the “Input Enabled” of the “Text Data Link” should be checked as below.

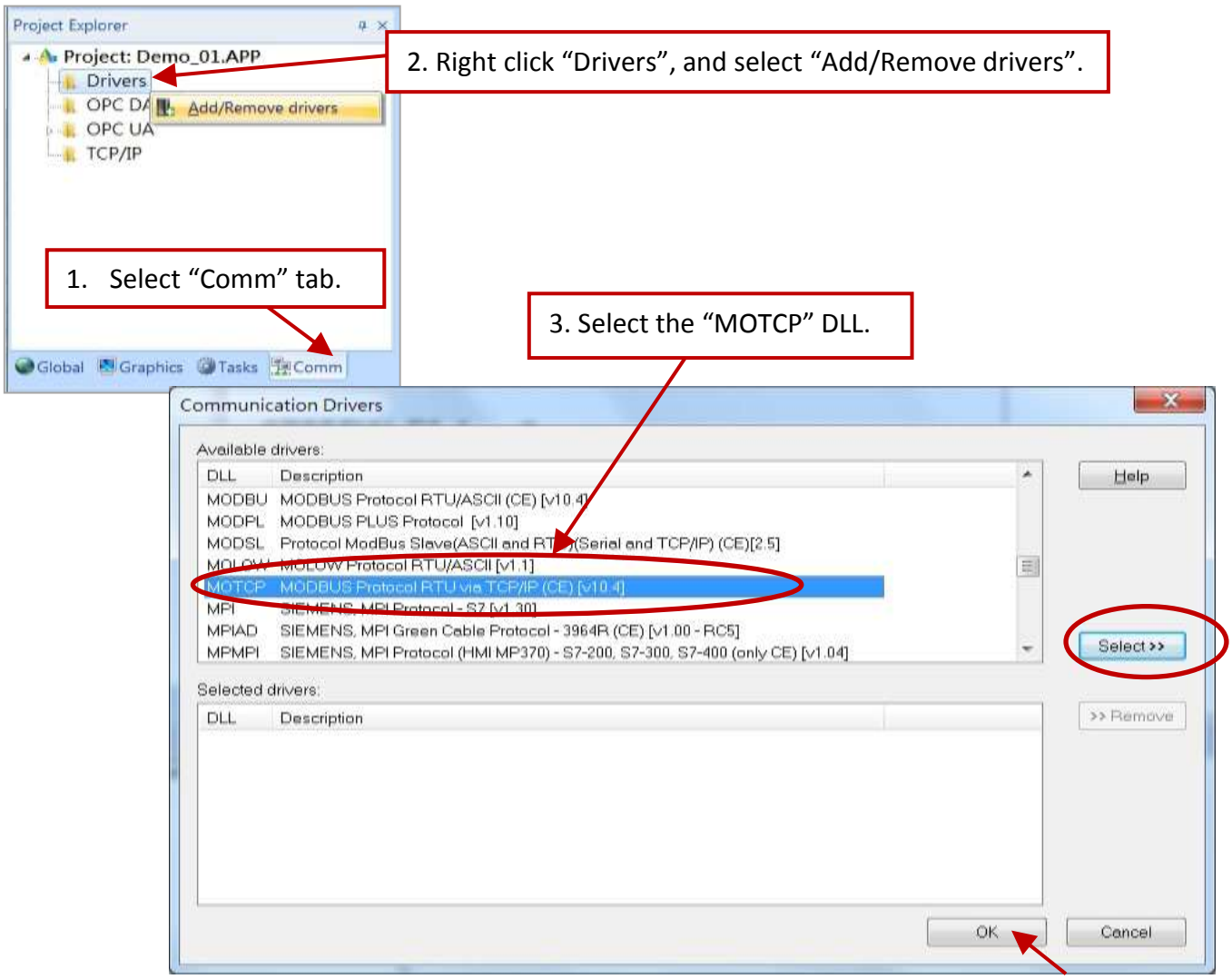


The main screen is created as below.

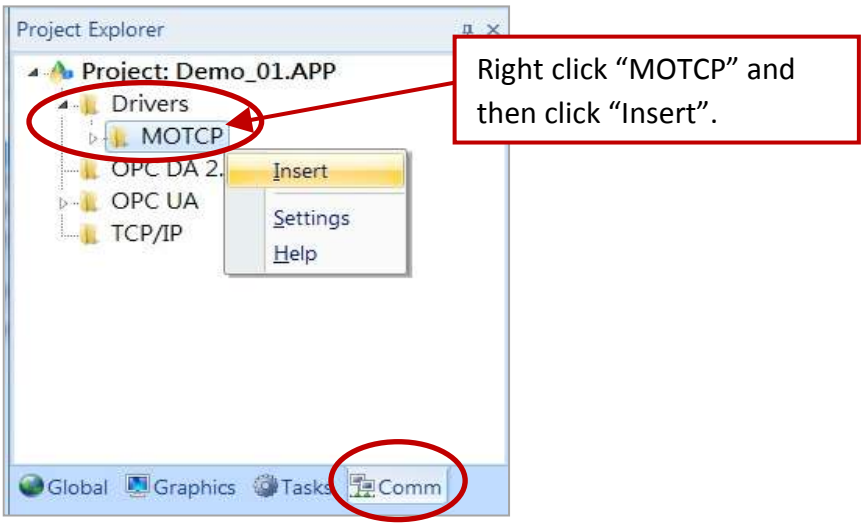


Create Modbus TCP workspace

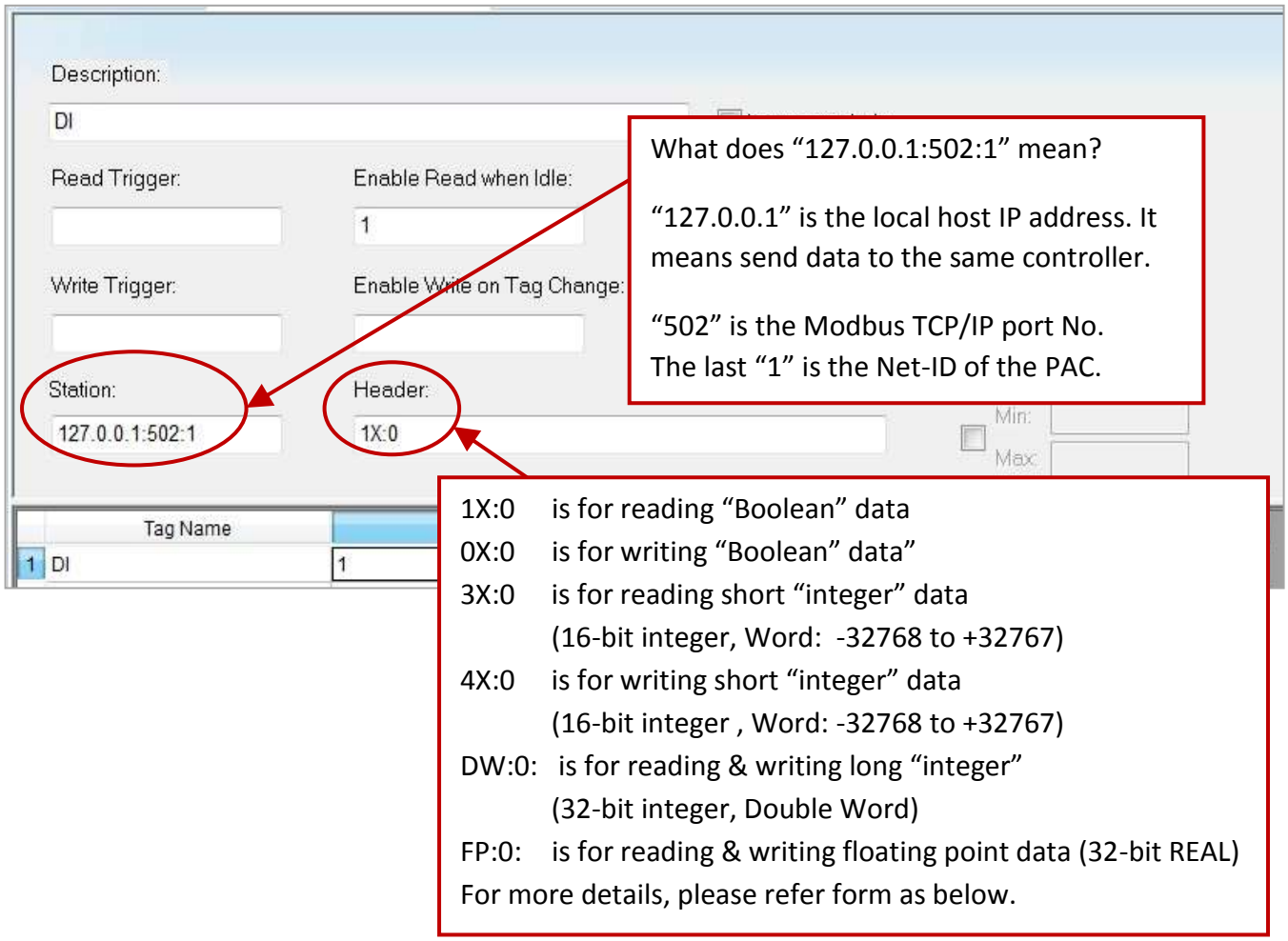
1. Click “Comm” tab in the “Project Explorer”.
2. Click the right mouse button on the folder “Drivers”, and select “Add/Remove drivers”.
3. In the “Communication Drivers” window, click “MOTCP” driver then click “Select” and click “OK” to close this window.



Expanding file folder of “Drivers” and it will show a file folder named “MOTCP”. Click the right mouse button 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.



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

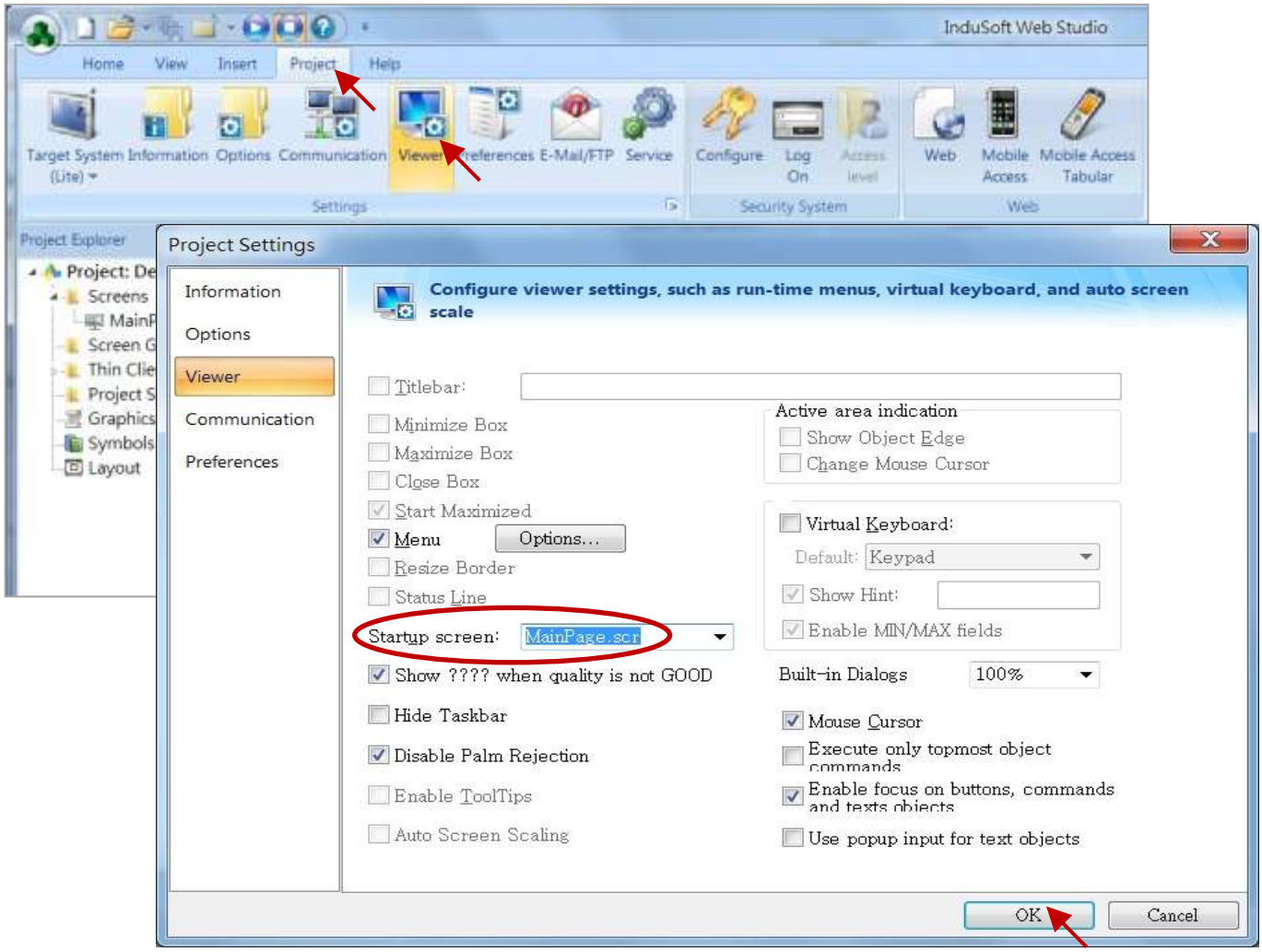
Please add the following 4 Modbus TCP workspace:

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	Internal
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.

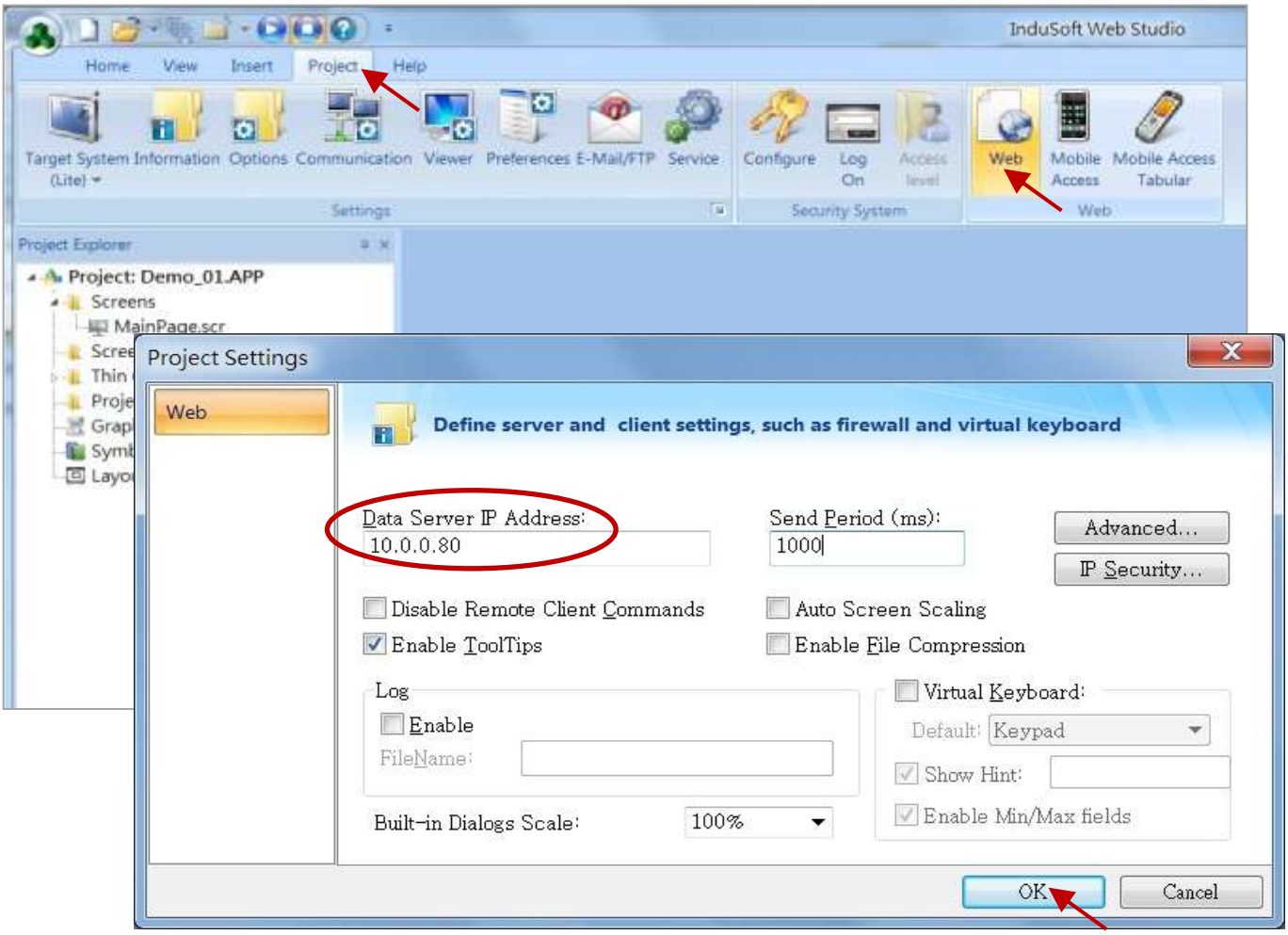
Project Setting

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.



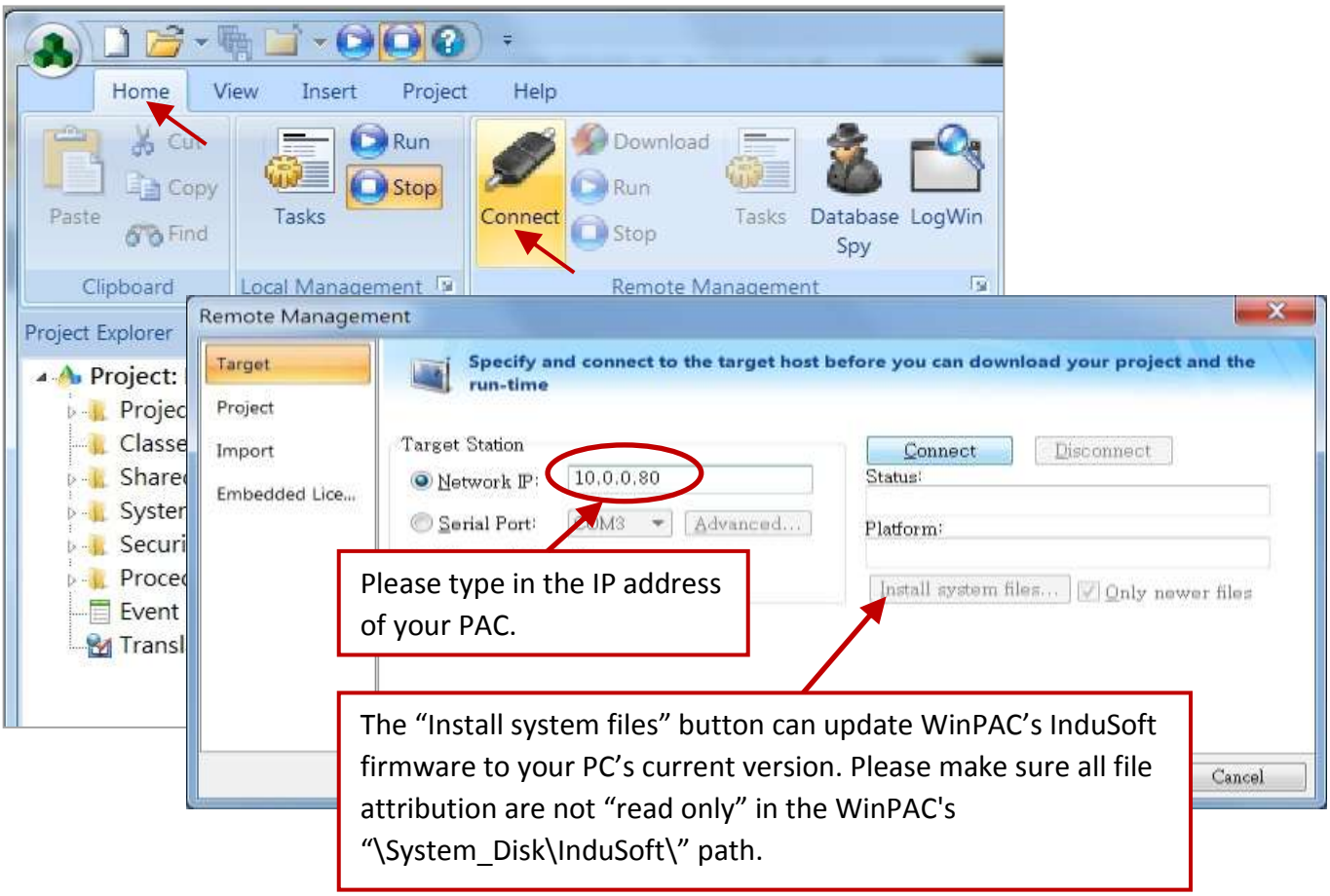
Web Thin Clients

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”.

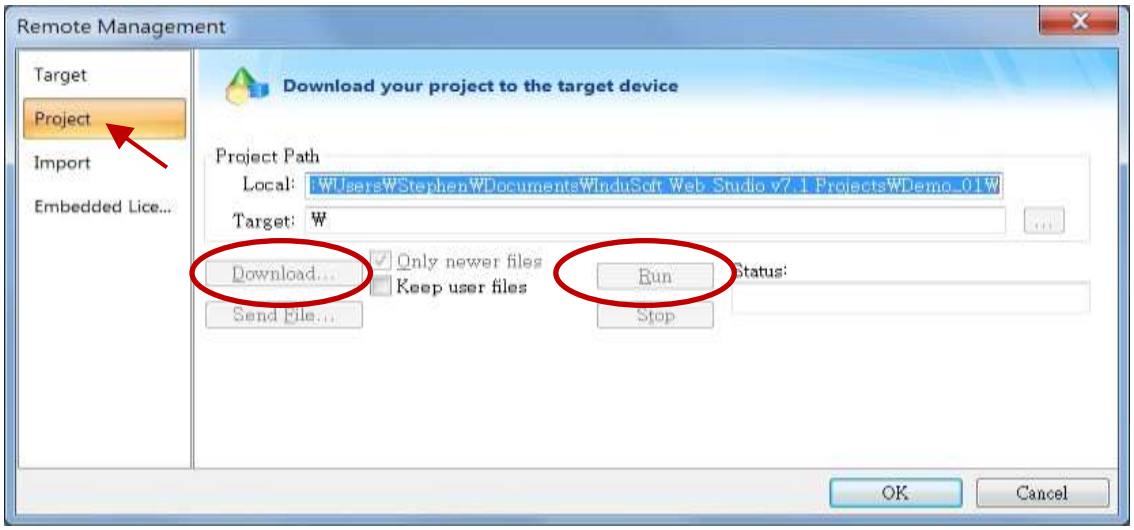


Download and Run the Project

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”.

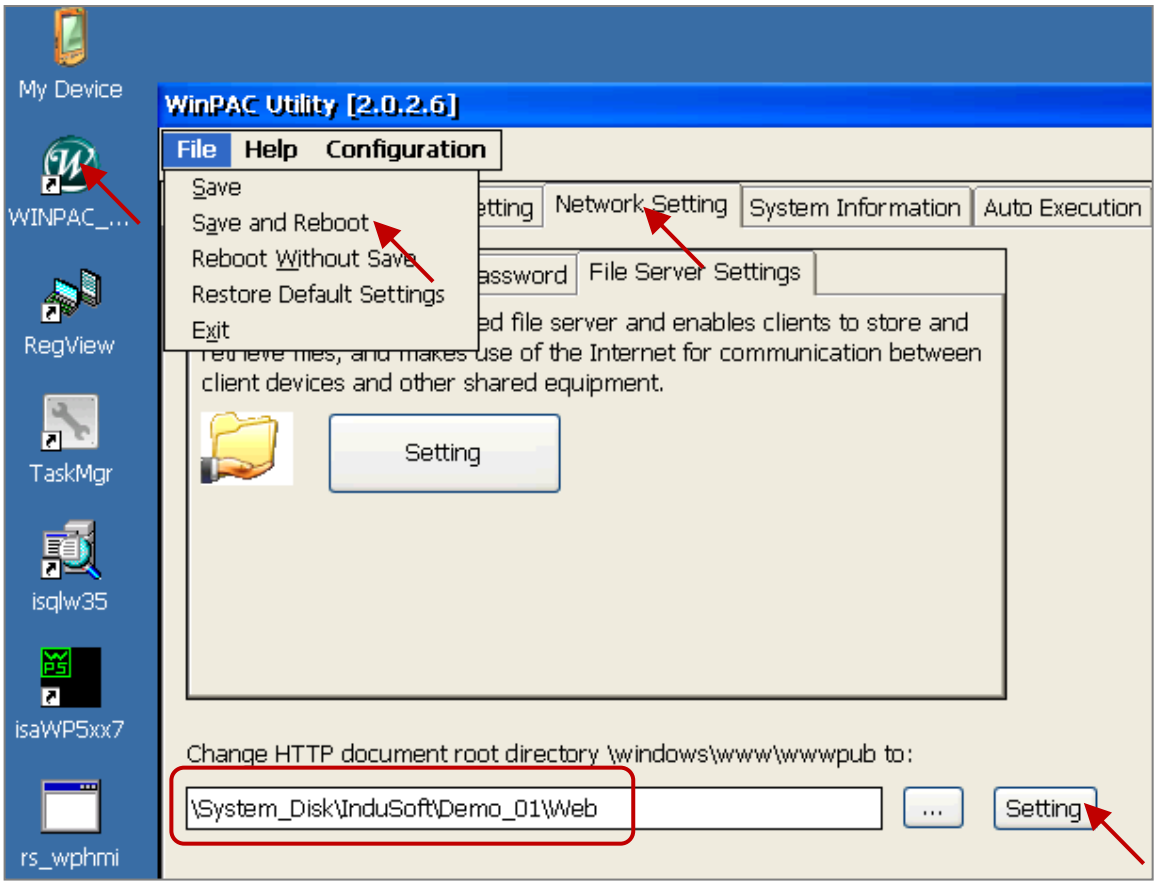


If connection is fine, click on the tab of “Project” then click “Download”. When download finished, click “RUN” to start the project.



Configuration Web directory of WinPAC

Run WinPAC Utility and switch to “Network Setting” tab then change Web directory to “\System_Disk\InduSoft\Demo_01\Web”. Click “Setting” and “File > Save and Reboot” to finish this configuration.



Visualize your project in a remote station

Run Internet Explorer and type for ex. “http://10.0.0.80/MainPage.html”. (Use WinPAC's IP)

Chapter 10 Example Program & FAQ

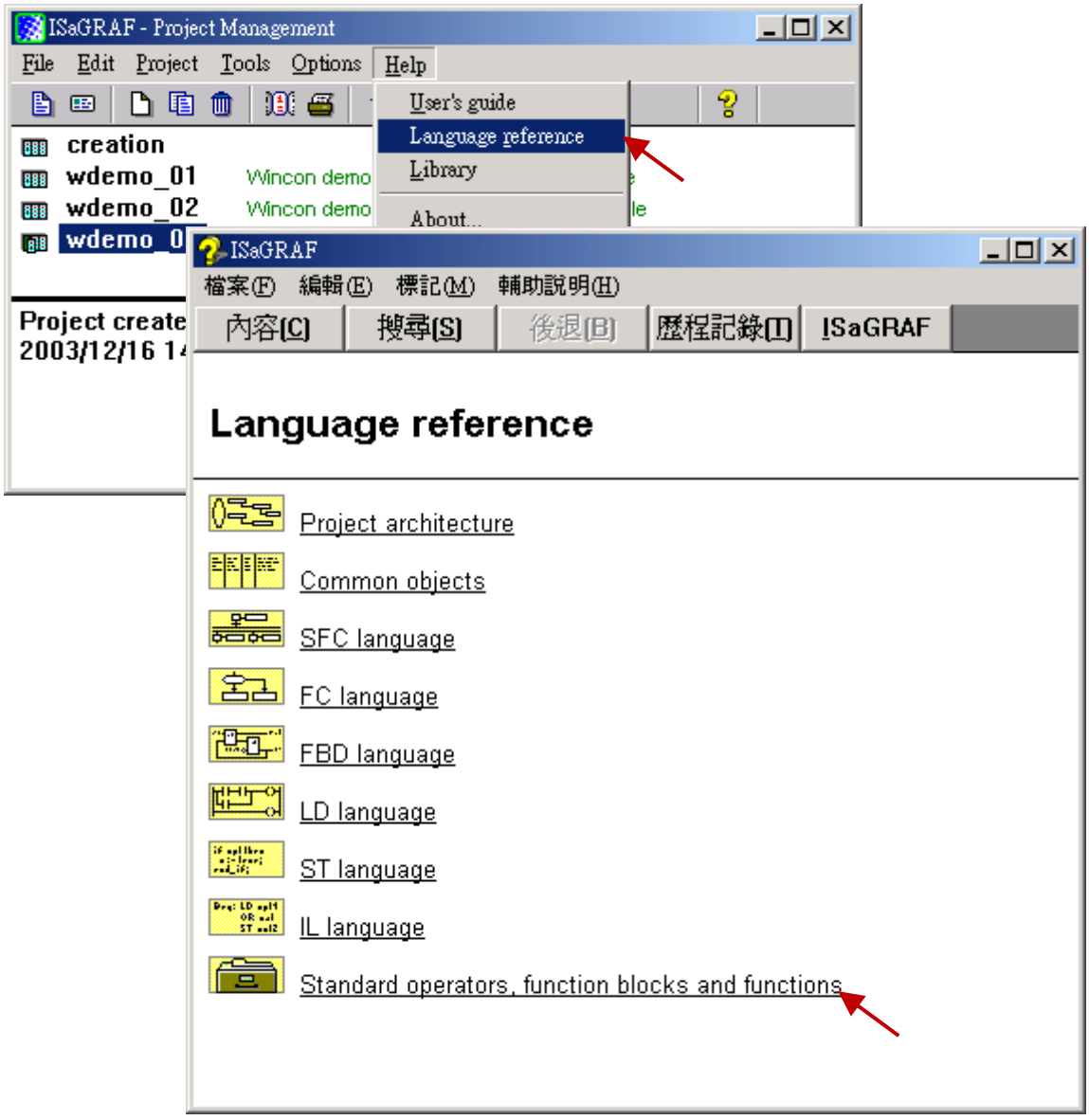
The WinPAC-5xx7/WP-5xx7 is the abbreviation of the WP-5147/WP-5147-OD.
The WinPAC-5xx6/WP-5xx6 is the abbreviation of the WP-5146/WP-5146-OD.

Please refer to WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\
"user_manual_i_8xx7.pdf" & "user_manual_i_8xx7_appendix.pdf"
for detailed ISaGRAF User's Manual.

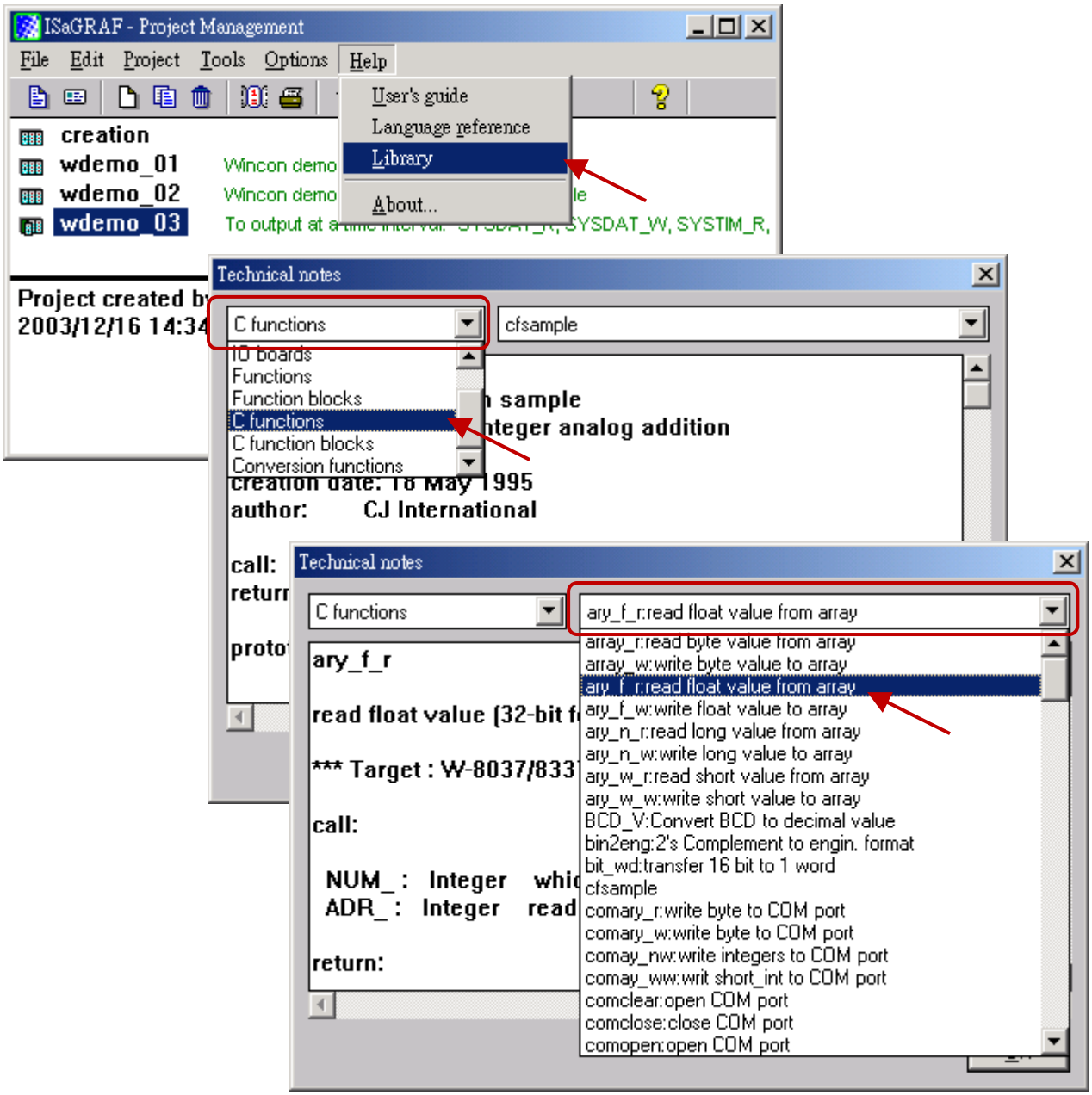
10.1 Get On-Line Help

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

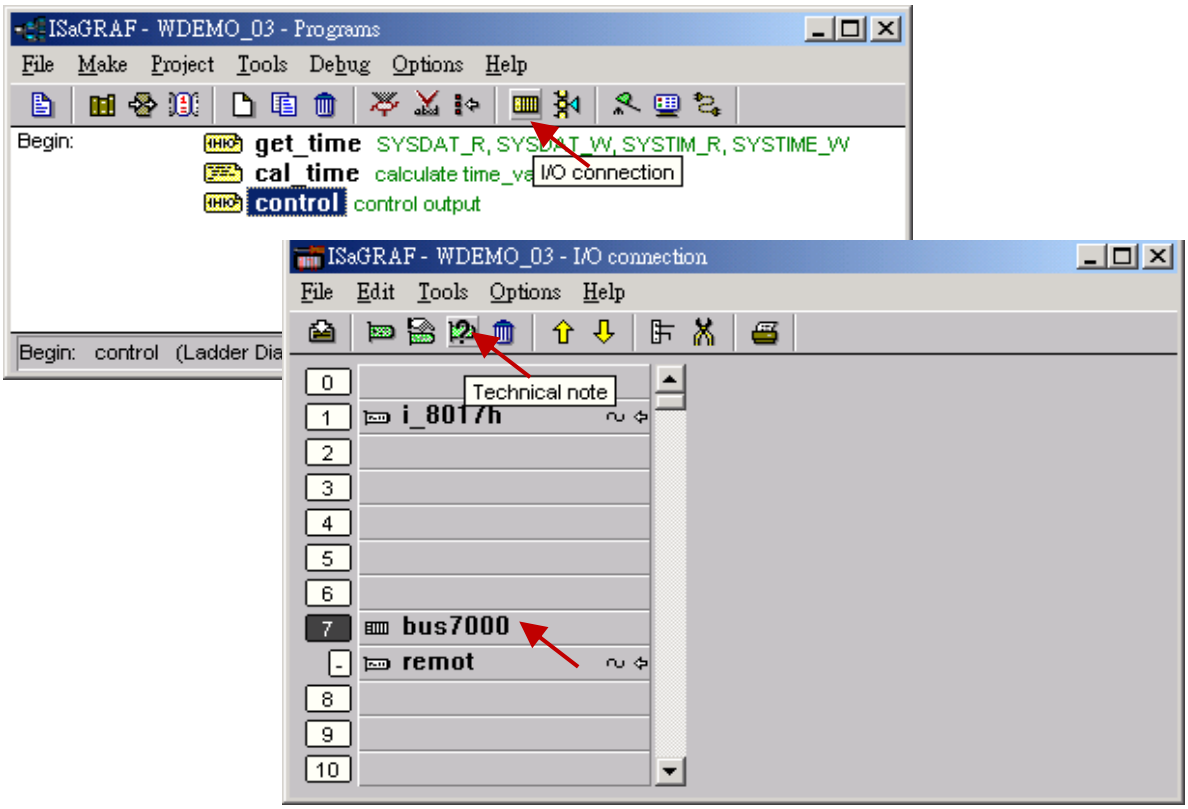
On-line Help of ISaGRAF Standard Functions & Function Blocks:



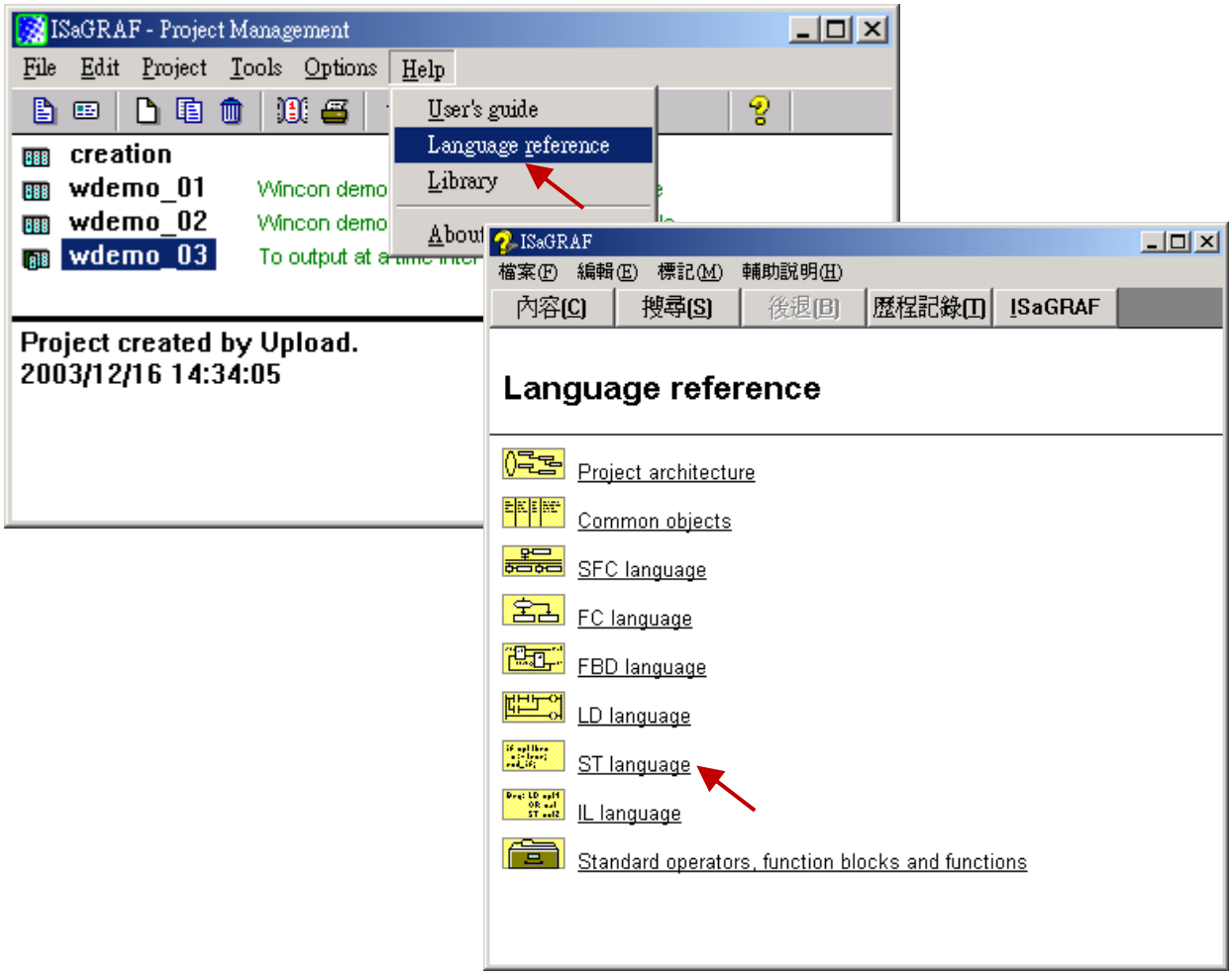
On-line Help of ICP DAS Add-on Functions & Function Bocks:



On-line Help of ICP DAS Add-on I/O Boards & I/O Complex Equipments:



On-line Help of ISaGRAF Languages:



10.2 Installing the ISaGRAF Programming Examples

The ISaGRAF Programming Examples:

www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Demo Files
WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\demo

ISaGRAF User's Manual:

ISaGRAF Web > Manual
English: \napdos\isagraf\wp-5xx7\english_manu\
"User_Manual_I_8xx7.pdf"
"User_Manual_I_8xx7_Appendix.pdf"

WP-5xx7 Demo Example Files:

Web: ISaGRAF Web > Demo Files
FTP: ftp://ftp.icpdas.com/pub/cd/winpac-8xx7/napdos/isagraf/WP-5xx7/demo/

ISaGRAF FAQ:
ISaGRAF Web > FAQ or
www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC

Example Lists:

Project Name	Description	I/O Connection
sofgr_01	A simple Soft-GRAF HMI demo. (sofgr_01 ~ sofgr_08: FAQ-131)	
sofgr_02	A Soft-GRAF demo which use 18 HMI objects.	
sofgr_03	A Soft-GRAF demo. Display 10 temperature values and 8 D/I values and control 8 D/O. Data amount less than 255.	
sofgr_04	A Soft-GRAF demo. Read process parameters from a file or store them. Data format is Float data, only handle one file. Data amount less than 255.	
sofgr_05	A Soft-GRAF demo. Read process parameters from a file or store them. Data format is Integer data, only handle one file. Data amount less than 255.	
sofgr_06	A Soft-GRAF demo. Read process parameters from a file or store them. Data format is Float data, handle several files. Data amount less than 255.	
sofgr_07	A Soft-GRAF demo. Read process parameters from a file or store them. Data format is Integer data, handle several files. Data amount: 1000 (can be more).	

Project Name	Description	I/O Connection
sofgr_08	A Soft-GRAF demo. Read process parameters from a file or store them. Data format is Float data, handle several files. Data amount: 1000 (can be more).	
example1	A simple Web HMI example	slot 0: XW107
wp_vb01	VB.net 2008 demo 01 for WP-5xx7 : DIO demo Please refer to Chapter 7	slot 0: XW107
wp_vb02	VB.net 2008 demo 02 for WP-5xx7. Analog I/O Please refer to Chapter 7	(Virtual I/O board) slot 1: I-87024W slot 2: I-8017HW
wp_vb03	VB.net 2008 demo 03 for WP-5xx7. Read / Write long integer, float & Timer Please refer to Chapter 7.	
wpdmo_01	WinPAC demo_01: R/W float value from file. (FAQ-060)	
wpdmo_02	WinPAC demo_02: R/W long integer from file (FAQ-060)	
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: XW107
wpdmo_06	Using Message Array - MsgAry_r , MsgAry_w	
wpdmo_07	Convert float value to string, using real_str & rea_str2	
wpdmo_08	PID control, refer to WinPAC-5xx7 CD: \napdos\isgraf\wp-5xx7\english_manu\"PID_AL...htm"	
wpdmo_09	Store & backup boolean & long integer value To/From files	
wpdmo_10	Store & backup boolean & long integer value To/From EEPROM	
wpdmo_11	Dir is \Micro_SD ,save 3 values to 3 files per 10 minutes ,change file name per month	
wpdmo_14	Retain variable by Retain_b, Retain_N, Retain_f and Retain_t . (FAQ-074)	
wpdmo_16	Dir is \Micro_SD ,save 3 values to 1 file every minute ,change file name every day	
wpdmo19	Send UDP String to PC when alarm happens (using variable array),Time_Gap is 1 sec (Chapter 19.2 of the “ISaGRAF User's Manual”)	slot0: XW107

Project Name	Description	I/O Connection
wpdmo19a	Send UDP String to PC 3 sec later, Time_Gap is 250ms (Chapter 19.2 of the “ISaGRAF User's Manual”)	slot0: XW107
wpdmo19b	Send UDP Str to PC 3 sec later (wpdmo19a is better), Time_Gap is 250 ms (Chapter 19.2 of the “ISaGRAF User's Manual”)	slot0: XW107
wpdmo_20	receive String coming from remote PC or controller 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: XW107
wpdmo_23	Send Time String to COM3: RS-232 every second by using COMOPEN, COMSTR_W. (FAQ-059)	
wpdmo_24	Send string to COM3 when alarm 1 to 8 happens	slot 0: XW107
wpdmo_30	WP-5xx7 (10.0.0.102) link two i8KE8 + I/O , one is 10.0.0.108, one is 10.0.0.109 . (FAQ-042)	
wpdmo_31	WP-5xx7 (10.0.0.2) link one i8Ke8 + I/O (10.0.0.109) (FAQ-042)	
wpdmo_32	Set up WP-5xx as TCP/IP Client & link to other TCP/IP server (1 connection) (Chapter 19.3 of the “ISaGRAF User's Manual”)	slot 0: XW107
wpdmo_33	Same as Wpdmo_32 but send message only when event last for larger than 3 seconds	slot 0: XW107
wpdmo_36	Read Real Val from Modbus RTU device (www.icpdass.com > FAQ > Software > ISaGRAF > 47 & 75)	
wpdmo_37	Write Real Val to Modbus RTU device. (FAQ-047 & 75)	
wpdmo_38	Using Modbus function code 6 to write 16 bits. (FAQ-046 & 75)	
wpdmo_41	COM2 connecting 1: M7053D + 2:M7045D (MBRTU format, baud=9600) (Chapter 21 of the “ISaGRAF User's Manual”)	
wpdmo_42	COM2 connecting 1: M-7053D to get D/I counter value (MBRTU format, baud=9600)	
wpdmo_43	COM2 connecting 1: M7017R + 2:M7024 (MBRTU format, baud=9600)	
wpdmo_44	COM2 connecting 1: M7017RC , Current input, +/- 20mA, 4-20mA (Modbus format)	
wpdmo_45	COM2 connecting 1: M-7019R (set as T/C K-type input) (MBRTU format, baud=9600)	

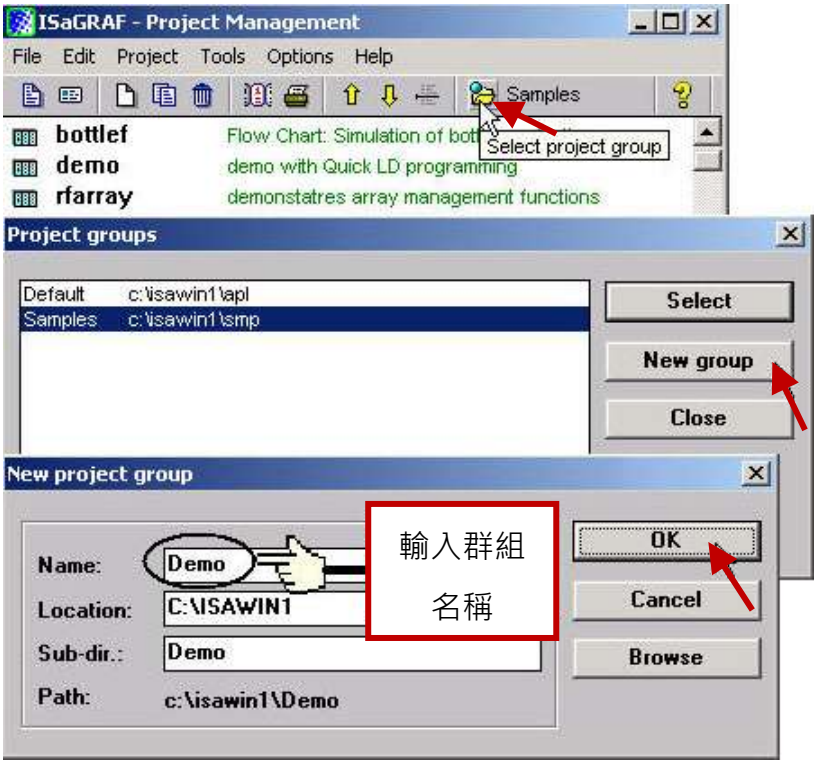
Project Name	Description	I/O Connection
wpdmo_46	COM2 connecting 1: M7080 (MBRTU format, baud=9600)	
wpdmo_48	VB.net 2005 demo - "MBTCP_demo" (FAQ-051)	
wpdmo_50	Non-linear conversion. like give P to find V (P , V relation listed in a file)	
wpdmo_51	Read 10 REAL value from a file,10 rows,each row has 1 REAL value, use str_real	
wpdmo_52	Msg_F. (I-8xx7 since 3.19, I-7188EG/XG since 2.17/2.15, WP-5xx7 since 1.0.1)	
wpdmo_53	Msg_N. (I-8xx7 since 3.19, I-7188EG/XG since 2.17/2.15, WP-5xx7 since 1.0.1)	
wpdmo_54	Read 20 REAL values from a file, 4 rows,each row has 5 REAL values,uses msg_f . (FAQ-060)	
wpdmo_55	Read 20 Integers from a file,2 rows, each row has 10 Integers, uses msg_n.	
wpdmo56	Retain 17 REAL value in a file, 2 rows, Each row has 10 REAL value.	
wpdmo56a	Retain 2 Boo + 17 REAL in a file, 2 rows, Each row has 10 REAL value.	
wpdmo56b	Retain 25 Integer in a file, 2 rows, Each row has 10 integer value.	
wpdmo56c	Retain 2 Boo + 25 Integer in a file, 2 rows, Each row has 10 integer value. (FAQ-060)	
wpdmo56d	Retain 17 Real + 2 Boo + 10 Integer in 2 file, Each row has 10 value	
wpdmo56e	Retain more than 255 Real, 255 Boo, 255 Integer in 2 file, up to 1024.	
wpdmo_61	i8xx7, WP8xx7: AutoReport data to PC via UDP.Controller=10.0.0.103, PC=10.0.0.91	
wpdmo_62	Send email via Ethernet port. (To one receiver without attached file) (FAQ-067, 71, 72, 76, 77)	
wpdmo_63	For WP-8xx7, XP-8xx7-CE6, VP-2xW7, WP-5xx7, iP-8xx7 only. Send email to one receiver with one attached file. (FAQ-067, 71, 72, 76, 77)	
wpdmo71a	WP-5xx7 COM3 connects I-7530 -- "CANopen" ID=1 device (8DI, 8DO, 4AO, 8AI) . (FAQ-086)	

Project Name	Description	I/O Connection
wpdmo71c	WP-5xx7 COM4 – 7530 -- CAN device to get string (with float or integer data inside)	
wpdmo72a	New WP-5xx7 redundant system with RU-87P4 + I-87K I/O (Without Touch HMI). (FAQ-093)	
wpdmo72b	Same as wpdmo72a but setup COM1 as Modbus RTU slave port to connect one RS-232 Touch HMI. (FAQ-093)	
wpdmo72c	New WP-5xx7 redundant system with I-8KE8-MTCP I/O (Without Touch HMI)	
wpdmo72d	New WP-5xx7 redundant system without I-7000 or I-87K I/O or I-8KE8-MTCP I/O (Without Touch HMI)	
wpdmo74a	get average value of one REAL value. (FAQ-099)	
wpdmo74b	get average value of one Integer value. (FAQ-099)	
wpdmo75b	Connect the I-87088W (I-7088) (addr=1,baud=115200) via WP-5xx7's COM2:RS485	I-87088W (I-7088)
wpdmo_76	SMS : WP-5xx7, COM3: GTM-201-RS232	GTM-201-RS232
wpdmo77a	sending / Receiving UDP bytes by using eth_udp and eth_send( ) and eth_recv( )	
wpdmo77b	sending / Receiving TCP bytes by using eth_tcp and eth_send( ) and eth_recv( )	
wpdmo78	WP-5xx7 COM2 Mbus Master---M-7011 (ID=1, baud=9600) to get AI,DI (FAQ-118)	M-7011
wphmi_01	WinPAC Web HMI example 1 , Display controller's date & time (No I/O board)	
wphmi_02	WinPAC Web HMI example 2 , DI & DO demo (slot 0: XW107)	slot 0: XW107
wphmi_03	WinPAC Web HMI example 3 , R/W Long, float & Timer value (No I/O board)	
wphmi_04	WinPAC Web HMI example 4 , R/W controller's String (No I/O board)	
wphmi_05	WinPAC Web HMI example 5, Multi-Page demo, slot 0: XW107, Menu is on the Left	slot 0: XW107
wphmi05a	WinPAC Web HMI example 5A, Multi-Page demo, slot0: XW107, Menu is on the Top	slot 0: XW107
wphmi_06	WinPAC Web HMI example 6, AIO demo, slot 2: I-87024W, 3: I-8017HW, scaling is in ISaGRAF	(Virtual I/O board) slot 2: I-87024W slot 3: I-8017HW
wphmi_07	WinPAC Web HMI example 7, AIO demo, slot 2: I-87024W, 3:I-8017HW, scaling is in PC	(Virtual I/O board) slot 2: I-87024W slot 3: I-8017HW,

Project Name	Description	I/O Connection
wphmi_08	WinPAC Web HMI example 8, download controller's file to PC (slot 0: XW107)	slot 0: XW107
wphmi_09	WinPAC Web HMI example 9, pop up an alarm window on PC (slot 0: XW107)	slot 0: XW107
wphmi_11	trend curve demo (slot 2: I-87024W , slot 3: I-8017HW)	(Virtual I/O board) slot 2: I-87024W slot 3: I-8017HW
wphmi_12	Record 1 to 8 Ch. I-8017HW 's volt every 50ms and draw trend curve by M.S. Excel	(Virtual I/O board) I-8017HW
wphmi_13	Record 1 to 4-Ch. I-8017H's voltage every 10ms and draw trend curve by M.S. Excel	(Virtual I/O board) I-8017HW

Install the ISaGRAF example programs

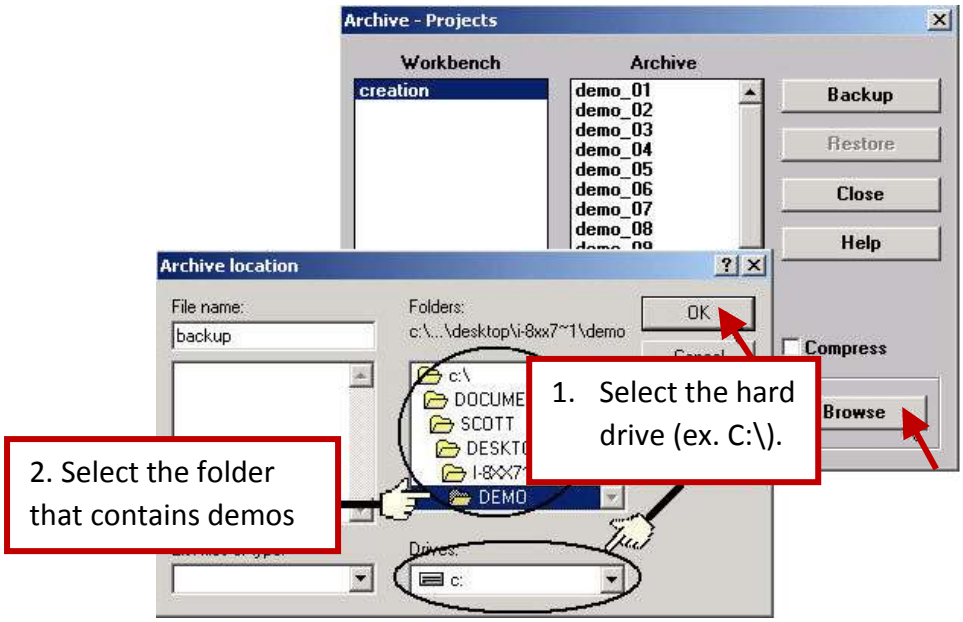
When you install the ISaGRAF programming example for the WinPAC controller it is recommended that you create an "ISaGRAF Project Group" to install the demo program files into.



To install the demo programs into the project group you have created, first, open the "ISaGRAF Project Management" window.

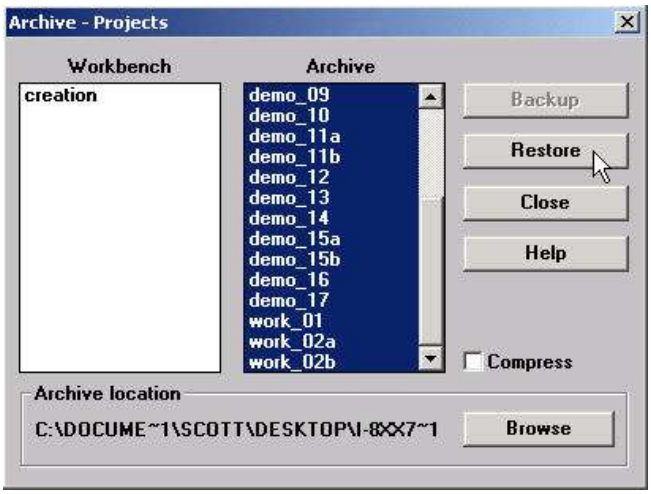
Then, select "Tools" from the menu bar, then select the "Archive" option and then click on "Projects".

When you click on the "Projects" selection the "Archive Projects" window will open. Click on the "Browse" button to select the drive and the sub-directory where the demo files are located (**\napdos\isagraf\wp-5xx7\demo\ in the WinPAC-5xx7 CD-ROM**) .



To install all of the Demo files, click on the "wdemo_01" file, then press and hold down the "Shift" key, continue to hold down the "Shift" key and use your mouse to scroll down to last file in the "Archive" window.

Click on the last file name from the demo file location and that will select the entire group of demo files. Lastly, click on the "Restore" button in the "Archive Projects" window and all of the demo files will be installed into the sub-directory you have created.



10.3 Frequently Asked Questions

FAQ (ISaGRAF Ver.3 FAQ: Questions/Descriptions/Demo programs)
www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC

FAQ Table:

No.	English ISaGRAF Ver.3 FAQ
1	Q: How to get counter value built in I-7000 & I-87xxx remote I/O modules?
2	Q: How to search I/O boards and declare variables automatically for I-8xx7 controllers?
3	Q: How to build a HMI screen by using ISaGRAF?
4	Q: Can I create my own functions inside ISaGRAF?
5	Q: Can I use more than 32 I/O in my ISaGRAF project if I don't have ISaGRAF-256 or ISaGRAF-L?
6	Q: Can I use ISaGRAF controller (I-8417/8817/8437/8837, I-7188EG/XG) as a Modbus Master controller to gather data from other Modbus devices?
7	Q: Can I write my own protocol or third-party protocol to apply on ISaGRAF controllers?
8	Q: What is the limitation of program size of I-8417/8817/8437/8837, I-7188EG & I-7188XG?
9	Q: Can not fine I/O boards in the ISaGRAF I/O connection window?
10	Q: I Want to email my ISaGRAF program to someone. How can I archive one ISaGRAF project to a single file?
11	Q: How can I implement motion control in I-8417/8817/8437/8837?
12	Q: My HMI software wants to access to float values and long word values inside the I-8417/8817/8437/8837, 7188EG & 7188XG. How?
13	Q: PWM: Can I generate D/O square pulse up to 500Hz with I-8417/8817/8437/8837, 7188EG & 7188XG controllers? How?
14	Q: Can I use 8K Parallel D/I board to get counter Input up to 500Hz? How ?
15	Q: How to output something at a time interval? For ex. Turn ON at 09:00~18:00 on Monday to Saturday , while 13:00~20:00 on Sunday.
16	Q: How to determine a D/I if it has bouncing problem?
17	Q: How to trigger something at some seconds later when one event happens?
18	Q: Does the ISaGRAF-256 software have I/O Tag limitation? Why not using "ISaGRAF-L" Large version?
19	Q: Why my I-8417/8817/8437/8837 or I-7188EG/XG stop running?
20	Q: How to search a variable name in an ISaGRAF project?
21	Q: When closing my ISaGRAF window, it holds for long time. Why?
22	Q: How to use Proface HMI (Touch panel) to link to I-7188EG/XG, I-8xx7 and WinCon-8x37?
23	Q: How to reduce ISaGRAF code size? How to directly Read / Write ISaGRAF variables by using Network address?
24	Q: How to scale Analog Input and Output of 4 to 20 mA to my engineering format? How

No.	English ISaGRAF Ver.3 FAQ
	to scale Analog Input and Output of 0 to 10 V to my engineering format?
25	Q: How to detect controller Fault?
26	Q: New ISaGRAF retained variable is better than old one.
27	Q: How to link to Modbus ASCII Slave device?
28	Q: How to use multi-port Modbus Master in the WinCon-8037/8337/8737 & WinCon-8036/8336/8736?
29	Q: How to send/receive message from ISaGRAF PAC to remote PCs or Controllers via Ethernet UDP communication?
30	Q: Setting special “range” parameter of temperature input board to get clear “Degree Celsius” or “Degree Fahrenheit” input value. For ex, “1535” means 15.35 degree.
31	Q: Setting a special “ADR_” parameter of remote I-7000 & I-87K temperature input module to get clear “Degree Celsius” or “Degree Fahrenheit” input value. For ex, “8754” means 87.54 degree.
32	Q: How to access to ISaGRAF variables as array? (A demo program of sending string to COM2 or COM3 when alarm 1 to 8 happens)
33	Q: Setting up more Modbus RTU Slave ports in WinCon ISaGRAF PACs.
34	Q: Compiling error result in different ISaGRAF version?
35	Q: Slow down ISaGRAF driver speed to work better with InduSoft software in W-8036/8336/8736 & W-8046/8346/8746?
36	Q: Redundancy Solution in WinCon-8xx7.
37	Q: I-7188EG/XG support remotely downloads via Modem Link.
38	Q: Setting I-7188EG/XG's COM3 as Modbus RTU Slave port.
39	Q: ISaGRAF version 3.4 & 3.5 now supporting "Variable Array" !!!
40	Q: Setting I-8437/I-8837/I-8437-80/I-8837-80's COM3 as Modbus RTU Slave port.
41	Q: How to connect PC / HMI to a Redundancy system with a single IP address?
42	Q: How to use WinCon connecting to Ethernet I/O? The I/O scan rate is about 30 to 40 msec for 3000 to 6000 I/O channels.
43	Q: How to setup WinCon-8xx7 as TCP/IP Client to communicate to PC or other TCP/IP Server device? Or WinCon automatically report data to PC via TCP/IP?
44	Q: WinCon-8xx7/8xx6 automatically report data to PC/InduSoft or PC/HMI?
45	Q: ISaGRAF controllers display message to EKAN Modview LED.
46	Q: How to Write 16-bits to Modbus RTU devices by Mobus function call No. 6?
47	Q: How to Read or Write Floating Point value to Modbus RTU Slave device?
48	Q: How to use WinCon-8xx7 / 8xx6 to control FRnet I/O?
49	Q: 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 ex, “3012” means 30.12 degree.
50	Q: How to connect an ISaGRAF controller to M-7000 Remote I/O?
51	Q: VB.net 2005 Demo program using Modbus TCP/IP protocol to control ISaGRAF PACs

No.	English ISaGRAF Ver.3 FAQ
52	Q: VB 6.0 Demo program using Modbus TCP/IP protocol to control ISaGRAF PACs.
53	Q: Performance Comparison Table of ISaGRAF PACs.
54	Q: iPAC-8xx7 and µPAC-7186EG support Data Logger function.
55	Q: How to connect I-7018z to get 6 channels of 4 to 20 mA Input and 4 channles of Thermo-couple temperature Input? And also display the value on PC by VB 6.0 program?
56	Q: How to do periodic operation in ISaGRAF PACs?
57	Q: How to record I-8017H's Ch.1 to Ch.4 voltage Input in a user allocated RAM memory in the WinCon-8xx7? 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.
58	Q: How to record I-8017H's Ch.1 to Ch.4 voltage input in S256 / 512 in 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 by M.S. Excel.
59	Q: Some skill to operate RS-232/422/485 serial COM Port by COM functions
60	Q: How to read / write file data in WinCon?
61	Q: How to connect RS-485 Remote I-7000 and I-87K I/O modules in I-8xx7, I-7188EG/XG and WinCon-8xx7 PAC? How to program RS-485 remote I-7017RC, I-87017RC and I-7018Z?
62	Q: How to setup a redundant system with Ethernet I/O?
63	Q: 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?
65	Q: ICP DAS release Stable and Cost-effective Data Acquisition Auto-Report System. (VC++ 6.0, VB 6.0 and ISaGRAF demo program are available)
66	Q: 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.
67	Q: How to send email with one attached file by WinCon-8xx7 or iPAC-8447 / 8847 or µPAC-7186EG?
68	Q: Why the W-8xx7 or I-8xx7 or I-7188EG/XG always reset? How to fix it?
69	Q: Why my PC can not run "ftp" to connect W-8347 or W-8747?
70	Q: How to do Time Synchronization and record state of many ISaGRAF PACs?
71	Q: Application: Record 10-Ch. temperature value into a file in W-8xx7 every minute. When 24 hour recording is finished, send this record file by email every day.
72	Q: Application sample: Record Voltage / Current input by W-8xx7 every 20 ms for 1 to 10 minutes. Then send this record file by email.
73	Q: Why does the I-7017 or I-87017's Current Input reading value become double or incorrect?
74	Q: How to use ISaGRAF new Retain Variable? What is its advantage?

No.	English ISaGRAF Ver.3 FAQ
75	Q: Why my ISaGRAF project can not connect Modbus Slave device correctly?
77	Q: Application sample: Record Voltage / Current input by µPAC-7186EG every second for 1 to 10 minutes. Then send this record file by email.
80	Q: 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.
81	Q: How to measure +/-150VDC in ISaGRAF controllers plus the I-87017W-A5 I/O card?
82	Q: An easy way to program the fast FRnet remote I/O modules.
83	Q: How to set I-8x37, I-8x37-80, I-7188EG and µPAC-7186EG's TCP recycling time?
84	Q: Application: A Cost Effective and Hot-Swap Redundancy System by µPAC-7186EG or I-8437-80 plus RU-87P4/8.
86	Q: The WinCon-8347 / 8747 , µPAC-7186EG and iP-8447 / 8847 connecting one or several I-7530 to link many CAN or CANopen devices and sensors.
87	Q: 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?
88	Q: Function Modifications: The W-8347/8747, µPAC-7186EG, I-8x37-80, I-8xx7 and I-7188EG/XG with S256/512 and X607/608 no longer support old retain method, please change to use the better new retain method to retain variables.
089	Q: Why my µPAC-7186EG unable to renew the driver and ISaGRAF application?
090	Q: How to use I-7017Z module in ISaGRAF PAC?
091	Q: How to use ISaGRAF PAC plus I-87089-the VW sensor Master card to measure the Vibration Wire frequency to calculate the stress of constructions?
092	Q: Setting µPAC-7186EG's and I-7188EG/XG's COM3 or COM2 as Modbus RTU Slave port.
093	Q: New Hot-Swap and Redundant solution for the WinCon-8347 / 8747.
094	Q: How to update the WinCon-8347/8747's OS?
095	Q: The WinCon-8xx7 supports Max. 32 Modbus TCP/IP connections since Its Driver version 4.03.
096	Q: Release two C-Function-Blocks to read max. 24 Words or 384 Bits from Modbus RTU / ASCII devices.
097	Q: How to modify the IP, NET-ID and Modbus RTU Slave port setting of the W-8347 / 8747 by an USB pen drive (without Mouse and VGA)?
098	Q: Application: Link Serial COM Port to the Modbus RTU device by COM functions .
099	Q: How to get an average value of a Real or Integer variable which is samlped every fixed interval (or sampled in every PLC scan) ?
100	Q: How to use I-8084W (4 / 8 – Ch. Counter or 8-Ch. frequency) ?
101	Q: How to read max. 120 Words or max. 60 Long-Integers or max. 60 Real value from Modbus RTU / ASCII devices by using MBUS_XR or MBUS_XR1 function block (for WP-5xx7 / 8xx6 and VP-25W7/23W7/25W6/23W6 and Wincon-8xx7 / 8xx6 only) ?
102	Q: Why PC can not connect the WP-5xx7 or VP-25W7/23W7 's FTP Server ?
103	Q: Using RS-232 Or USB Touch Monitor With WinPAC.
104	Q: Why my PC running ISaGRAF can not connect the ISaGRAF PAC correctly ?

No.	English ISaGRAF Ver.3 FAQ
105	Q: Program The 8-Channel PWM Output Board : I-8088W In WP-5xx7, VP-25W7/23W7 And iP-8xx7 PAC.
106	Q: How to display the frequency trend curve by running ISaGRAF and C# .net 2008 program in the WinPAC-8xx7 plus I-8084W?
107	Q: How to do auto-time-synchronization and measure the local Longitude and Latitude by using the i-87211W GPS I/O module in ISaGRAF PAC ?
108	Q: How to display the temperature trend curve by running ISaGRAF and C# .net 2008 program in the WinPAC-8xx7 plus i-87018z?
109	Q: How to adjust the system time of some ISaGRAF PACs via Ebus by using ISaGRAF PAC and I-87211w?
110	Q: ZigBee Wireless Application: How to control remote I/O and acquire data?
111	Q: How to use the GTM-201-RS232 to send a short message in user's local language ?
112	Q: Program the I-8093W (3-axis high speed Encoder input module) by ISaGRAF.
113	Q: Linking ISaGRAF PAC to Modbus TCP/IP Slave Devices By Modbus TCP Master Protocol.
114	Q: How to avoid garbled content when printing ISaGRAF PDF documents?
115	Q: Working eLogger HMI with ISaGRAF SoftLogic in the WP-5xx7, VP-2xW7 and XP-8xx7-CE6 PAC. (the document version is 1.03 released on Jul.15,2010)
116	Q: How to enable the second to fifth Modbus RTU slave port of the WP-5xx7 and VP-2xW7 without modifying the ISaGRAF project ?
117	Q: How to install the ISaGRAF Ver. 3 on Windows Vista or Windows 7?
118	Q: A M.S. VC++ 6.0 Demo Program To Connect One WP-5xx7 by Modbus TCP Protocol.
119	Q: How to implement the communication redundancy between the central control station and the local stations?
120	Q: How to calculate the moving average value of a variable by c-functions "Aver_N" or "Aver_F" ?
121	Q: How to install or remove the ISaGRAF development platform properly?
122	Q: How To Solve The USB-Freeze Problem Of The W-8x4x ? How To Update The W-8x4x 's OS Image ?
123	Q: How to move the InduSoft picture faster in the W-8xx6 / WP-5xx6 / VP-25W6 / XP-8xx6-CE6 ?
124	Q: A Web HMI Example for ISaGRAF Professional XPAC XP-8xx7-CE6-PRO – by FrontPage .
125	Q: XP-8xx7-CE6 And iDCS-8000 (Or ET-7000 Or Modbus TCP Slave device) Redundant System.
126	Q: 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 ?
128	Q: How to use The ISaGRAF PAC plus i-87113DW - the master card of the Carlson Strain Gauage Inputs ?
129	Q: How To Connect The ICP DAS Power Meter – PM-2133 and PM-2134 By The ISaGRAF PAC ?

No.	English ISaGRAF Ver.3 FAQ
130	Q: How to automatically synchronize the time of WP-8x47/VP-23W7 over a network ?
131	Q: Soft-GRAF : Create A Colorful HMI in The XP-8xx7-CE6 and WP-5xx7 and VP-2xW7 PAC (paper version: 1.3) .
132	Q: Motion Control - Using I-8094F/8092F/8094
133	Q: How to send and receive UDP / TCP data ?
134	Q: How to reset the ISaGRAF driver or reset the whole controller by software ?
135	Q: How to program ISaGRAF PAC to support SQL Client to write data to (or read data from) Microsoft SQL server ?
136	Q: HART Solution : ISaGRAF PAC plus I-87H17W
137	Q: How to connect to remote server and send network package via GPRS with uPAC-5000 series controller?
138	Q: How to program an XP-8xx7-CE6 redundant system (with I-87K8 expansion base or Modbus I/O or other I/O) ?
139	Q: How to install/use ISaGRAF 3.55 Demo Version and its limitations
140	Q: How to communicate between InduSoft local HMI and ISaGRAF PACs via Modbus TCP protocol?
141	Q: iP-8xx7/µPAC-7186EG/I-8xx7/I-8xx7-80 provide the Flash memory write protect feature
142	Q: How to protect your ISaGRAF program from used by the unauthorized people?
143	Q: How to Make “ISaGRAF WinCE PAC” to Connect to the Internet and Send Data by GPRS Dial-up?
144	Q: A new function block “Mbus12w” to write max. 12 words to Modbus salve devices.
146	Q: Soft-GRAF Studio : Create a Colorful HMI in the XP-8xx7-CE6 & WP-5xx7 & VP-2xW7 PAC
147	Q: How to use the VPD-130 to read the µPAC-7186EG’s system date and time via RS-485?
149	Q: How to make the ISaGRAF WinCE PAC play a sound?
150	Q: ISaGRAF Tutorial Video
151	Q: How to use FTP Client to upload log files to remote FTP Server on PC?
152	Q: How to control the IR module, IR-210/IR-712, with the ISaGRAF PACs?
153	Q: How to use the ISaGRAF PAC to communicate with a far away Modbus TCP Server or a FTP Server by the 3G or 2G wireless GPRS ?
154	Q: How to use the FRnet AI/AO module with the ISaGRAF PAC ?
155	Q: How to save the value of ISaGRAF variables to the Micro_SD memory in the WP-5xx7, WP-8xx7 and VP-25W7 PAC ?
156	Q: ISaGRAF PAC connects a DL-100TM485 to measure humidity and temperature values.
157	Q: How to link to the Temperature and Humidity module, DL-100T485, with the ISaGRAF PACs?
158	Q: Soft-GRAF Application – Data Logger

No.	English ISaGRAF Ver.3 FAQ
159	Q: How to use the tGW-700 Series, Modbus TCP to RTU/ASCII gateway, with the ISaGRAF PAC?
160	Q: Soft-GRAF Application - Alarm Lists
161	Q: Using many Modbus function blocks Mbus_AR and Mbus_AW in a “for” loop in the ISaGRAF PAC
162	Q: How to deliver event data by ISaGRAF PAC?
163	Q: The reason of blinking power LED or L1 LED on PAC while Ethernet connect fail.
165	Q: How to use the ISaGRAF PAC to control the tM-series and LC-series Modbus I/O Modules?
166	Q: ISaGRAF WinCE PAC - Schedule Control.
167	Q: Develop your own c-function and c-function blocks in the ISaGRAF WinCE PAC.

Chapter 11 C# .net 2008 Program Running in WP-5xx7 Access to 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 major purpose is for storing OS, 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.

This chapter lists the procedure for creating the first demo program by Visual Studio .NET 2008 development tool. There is some sample programs in the WinPAC-5xx7 CD-ROM.

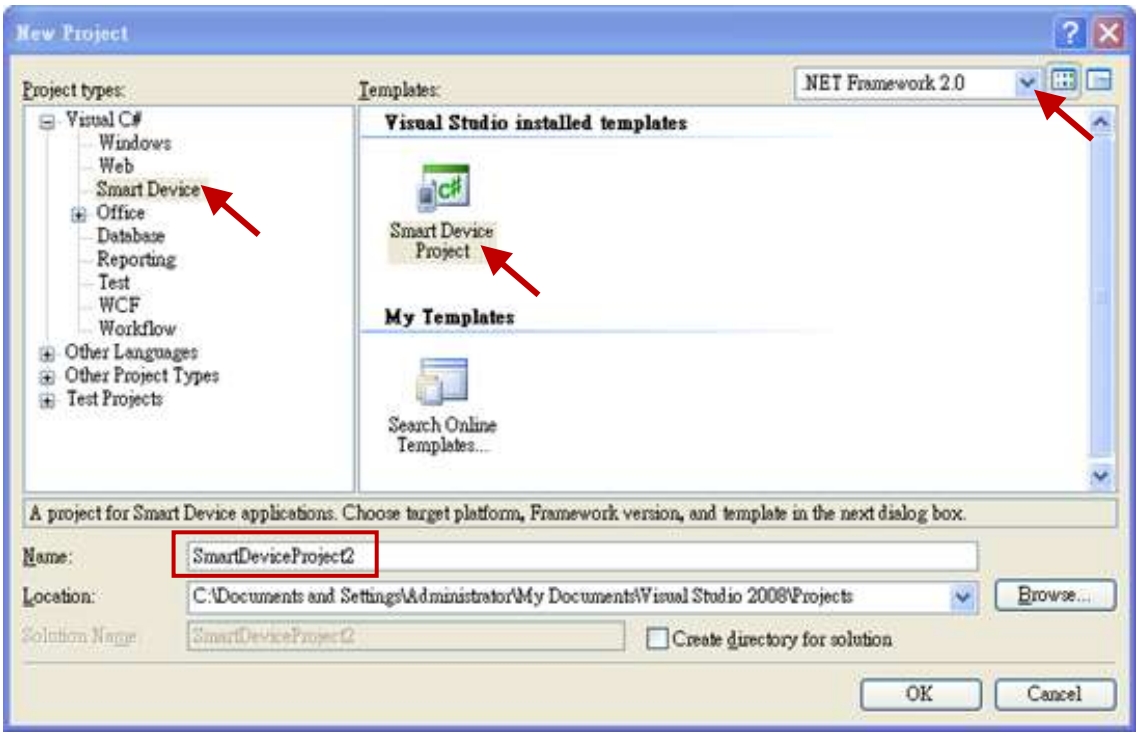
WinPAC-5xx7 CD-ROM : \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\
- wp_CSharp01 : Digital I/O demo with one XW107 in slot 0 of the WP-5xx7.
- wp_CSharp02 : Analog I/O demo with virtual I/O board (I-87024W and I-8017HW).
- wp_CSharp03 : Read / Write ISaGRAF internal integers, timers and real variables. (No I/O)

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

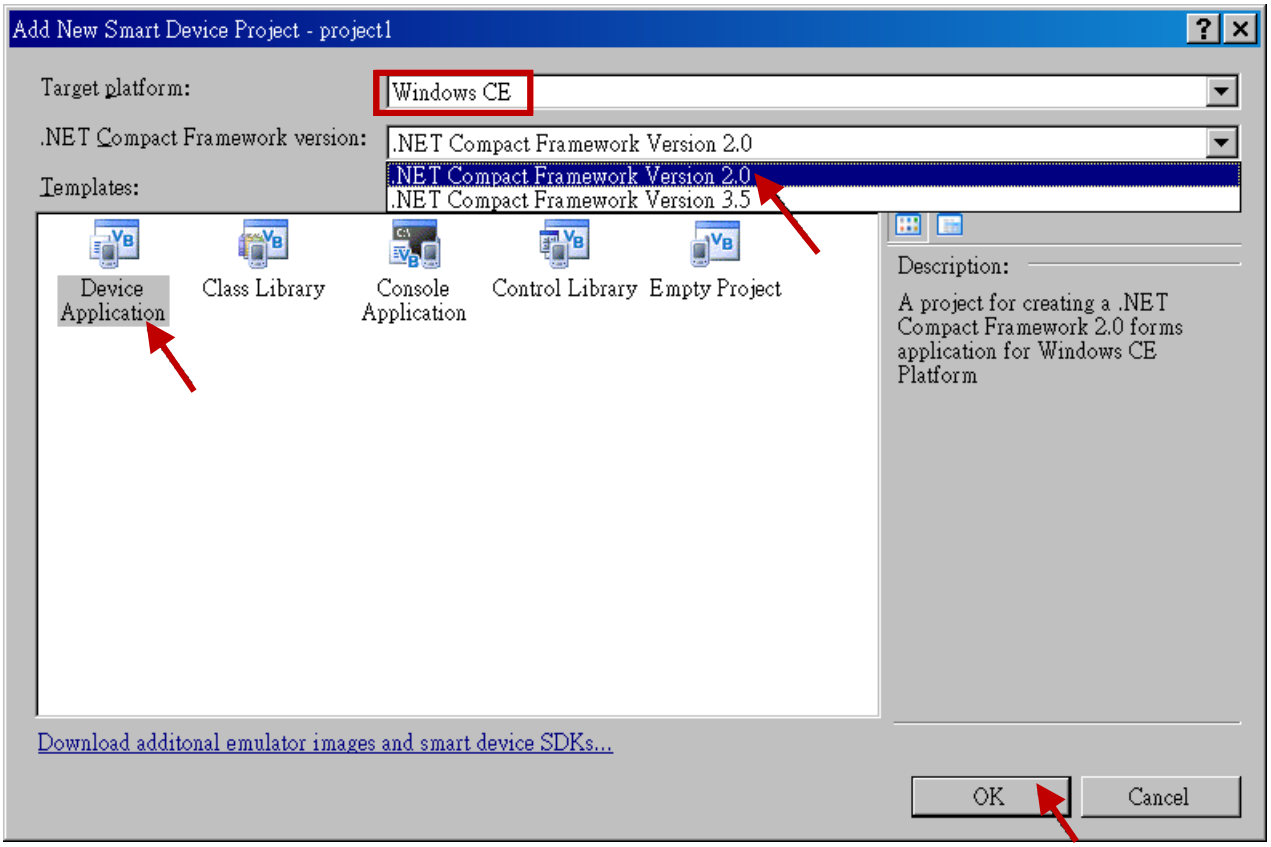
11.1 Create a New Project

1. In the first, users need to open Microsoft Visual Studio .NET 2008 software. And then in the menu of "File", please run the "New Project".

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



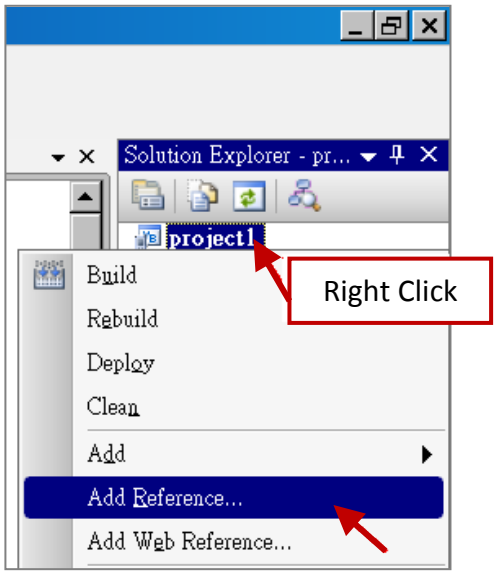
3. Select the "Device Application" and "Windows CE" and ".NET Compact Framework Version 2.0", then click on "OK".



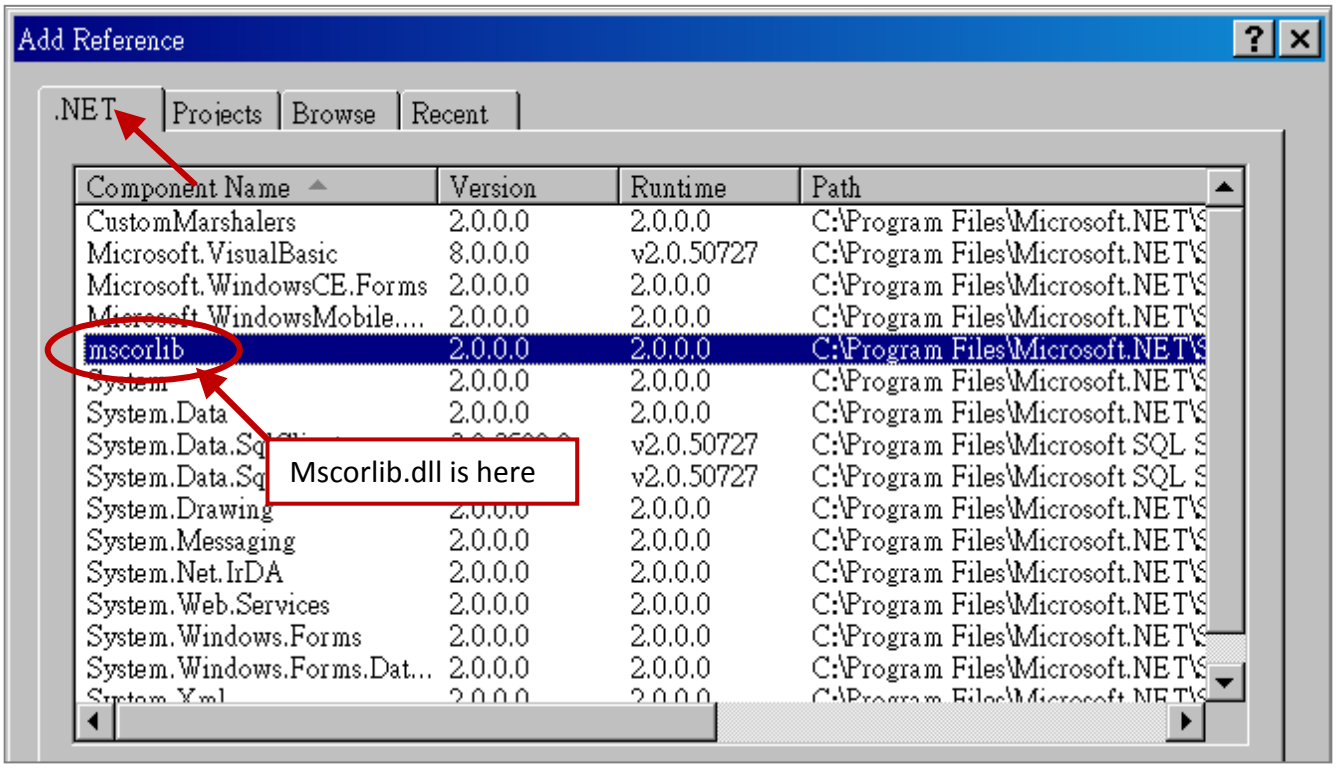
11.2 Add Project Reference for an Application

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.

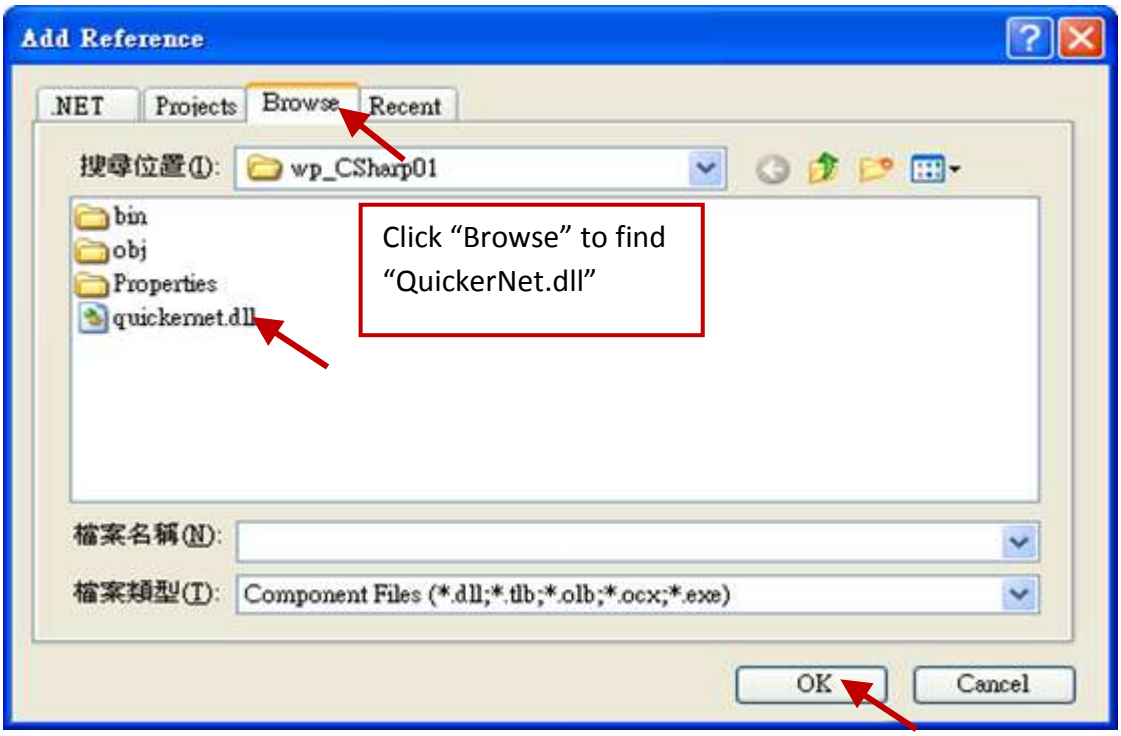
1. Right click on the Project name on the right hand side , then select “Add Reference …”



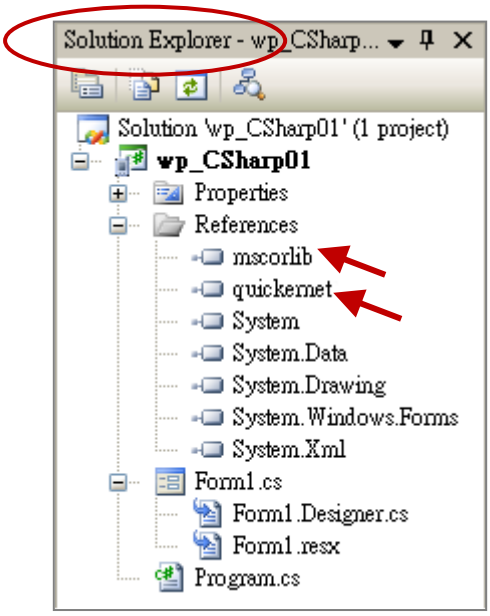
2. Select the “mscorlib” in the list box and click the button “OK” (the component “mscorlib” must appear in the Selected Components area)



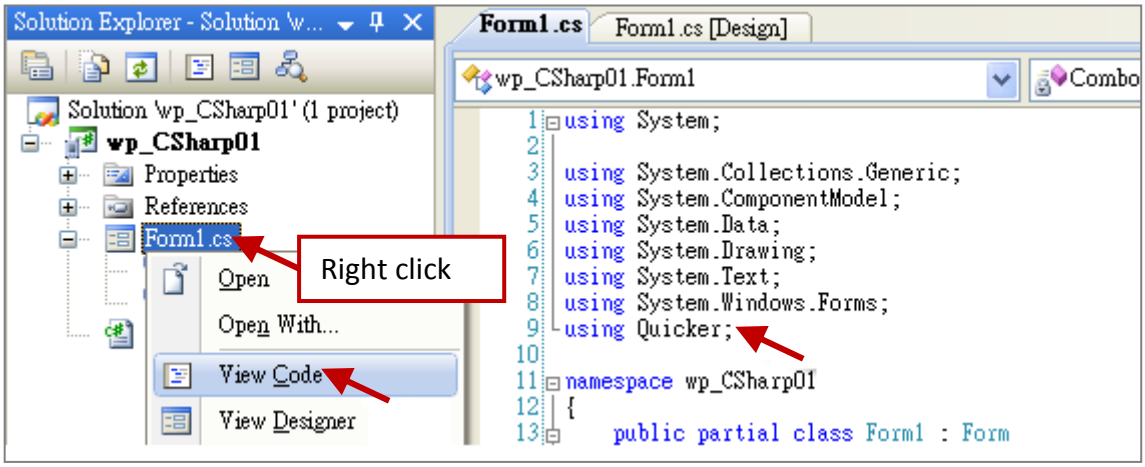
3. Click the “Browse” button. Select the “QuickerNet.dll” from WinPAC-5xx7 CD-ROM : \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\ wp_CSharp01 subfolder or from your own location.



4. When both “mscorlib” and “QuickerNet.dll” are added, you can see them in the solution explorer as below.



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.

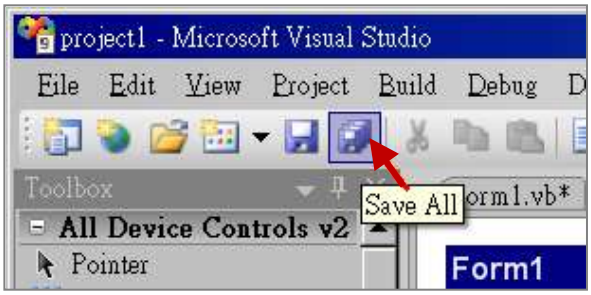


Then you can design all required objects and actions inside your C# Forms.

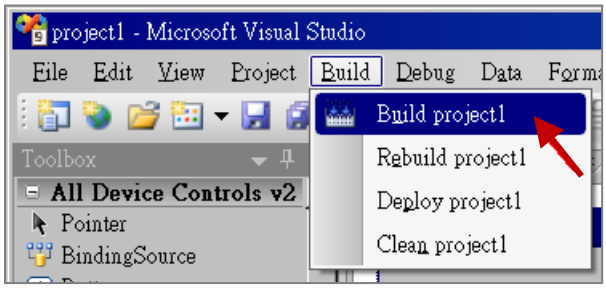
11.3 Compiling an Application Program

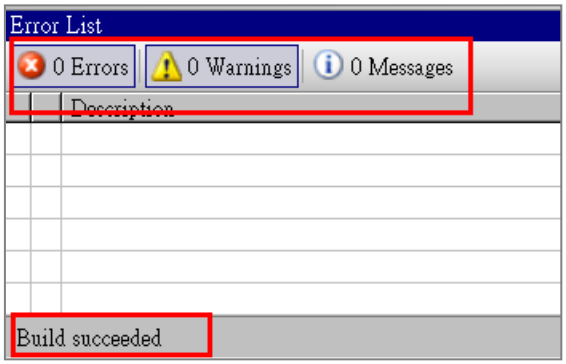
When you have finished writing a program, you can build an application by the following steps.

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

Please copy this execution file to the WinPAC-5xx7's \Micro_SD\ISaGRAF\ path to run it.

Note:

User may copy the C#.net execution file to other path to run it but there should contain at least three DLL files with it or it cannot run correctly.

For instance, the project1.exe can run in the \Micro_SD\ path if there is three plus one file in it. The "project1.exe", "QuickerNet.dll", "Quicker.dll" and "Mscorlib.dll".
(The three .dll files can be copied from the WinPAC-5xx7's "\Micro_SD\ISaGRAF\" path)

11.4 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

11.4.1 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:

WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\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:

WinPAC-5xx7 CD-ROM: \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\wp_CSharp01

11.4.2 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:

WinPAC-5xx7 CD-ROM:

1. \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\wp_CSharp02 for R/W analog I/O
2. \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\wp_CSharp03 for R/W internal Boolean, long integer, Timer and Real (floating-point) values.

Note:

The long integer & timer & real variable's Network Address No. must occupy 2 No. in the ISaGRAF project. (Refer to section 4.2 of "User's Manual of ISaGRAF Embedded Controllers" or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\" User_Manual_I_8xx7.pdf")

■ **UserGetReg_short** ■ **UserGetReg_long** ■ **UserGetReg_float**

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:

WinPAC-5xx7 CD-ROM:

1. \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\wp_CSharp02 for R/W analog I/O
2. \napdos\isagraf\wp-5xx7\CSharp.net_2008_demo\wp_CSharp03 for R/W internal Boolean, long integer, Timer and Real (floating-point) values.

Note:

The long integer & timer & real variable’s Network Address No. must occupy 2 No. in the ISaGRAF project. (Refer to section 4.2 of “User’s Manual of ISaGRAF Embedded Controllers” or in the CD-ROM: \napdos\isagraf\wp-5xx7\english_manu\” User_Manual_I_8xx7.pdf”)

Chapter 12 To Save the Value of ISaGRAF Variables to the Micro_SD Memory

User can download this paper and its example programs (wpdmo56.pia, wpdmo56a.pia, pdmo56b.pia, wpdmo56c.pia, wpdmo56d.pia, wpdmo56e.pia) from the following web.
www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-155

wpdmo56 :	Save 17 REAL variables in "\Micro_SD\data56.txt" (max. 255 REALs)
wpdmo56a :	Save 17 REAL and 2 BOOL variables in "\Micro_SD\data56.txt" (max. 255)
wpdmo56b :	Save 25 integer variables in "\Micro_SD\data56.txt" (max. 255 integers)
wpdmo56c :	Save 25 integer and 2 BOOL variables in "\Micro_SD\data56.txt" (max. 255)
wpdmo56d :	Save 17 REAL, 2 BOOL and 10 integer variables in "\\Micro_SD\data56F.txt" and "\Micro_SD\data56.txt" (max. 255 REALs and "integer+BOOL" <= 255)
wpdmo56e :	Save max. 1024 REAL and max. amount of "integer+BOOL" is 1024 .

This paper shows the way to save the ISaGRAF variables to the Micro_SD memory in the WP-5xx7, WP-8xx7 and VP-25W7 PAC. The PAC will restore the last value of variables when power up. And at any time when the value is modified, it will save the last value automatically. This paper is very useful for the WP-5xx7 PAC (like the WP-5147) because its default hardware has no battery backup memory (so it can not use the "new retain variables" if the XW-608 is not purchased and installed inside it).

Important Note:

1. 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 major purpose is for storing OS, 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.
2. To read / write file in the \System_Disk or \Micro_SD memory take lots of CPU time, please do not read / write it frequently. If user read / write file in every PLC scan cycle, the PLC scan time will become very large and the PAC will perform badly. If user need fast retain, refer to www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-074 for the "New retain variables".

The example programs - wpdmo56.pia, wpdmo56a.pia, wpdmo56b.pia, wpdmo56c.pia, wpdmo56d.pia and wpdmo56e.pia all use the "array variables". You need to setup your PC / ISaGRAF before you can use them. First close all of the ISaGRAF windows. Then open the "isa.ini" file in the directory where the ISaGRAF is installed (it is "C:\ISAWIN\EXE\" normally). Then add two rows on the top of the "isa.ini" file as the following and save this file.

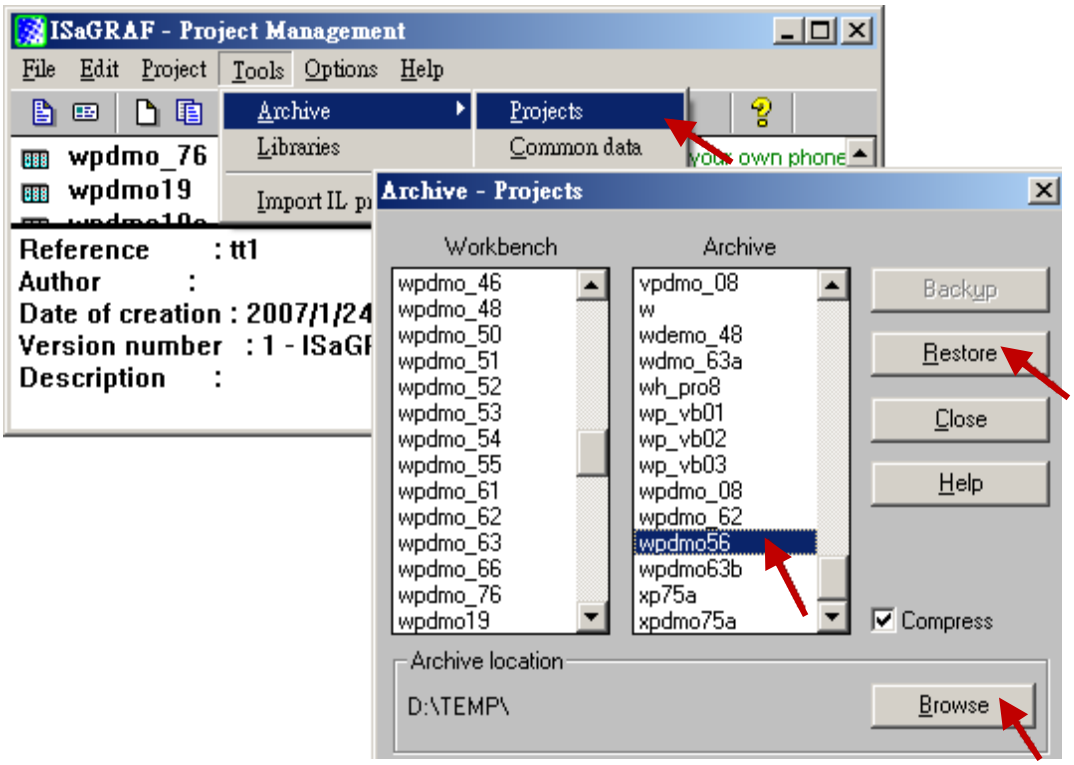
For more information about the "array variables", please refer to www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-039

```
[DEBUG]
arrays=1
```

If functions of Msg_F , Msg_N , ARY_F_R, AFY_F_W are not found in your PC / ISaGRAF, download the "ICP DAS utilities for ISaGRAF" at www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Driver. Then run "setup.exe" to restore them to your ISaGRAF workbench (The installation takes about 10 minutes).

This paper only describes about the "wpdmo56" program. The "wpdmo56" reads 1 to 255 REAL values from "\Micro_SD\data56.txt" to related ISaGRAF variables when the PAC is powered up. If this "data56.txt" doesn't exist, all these 1 to 255 variable value will be inited as "0.0". At run time, if any value of these variables is modified, all the 1 to 255 variables will be written automatically in the "data56.txt". If the file doesn't exist, this program will create it.

Restore the "wpdmo56" example project:



Project Architecture (wpdmo56.pia):

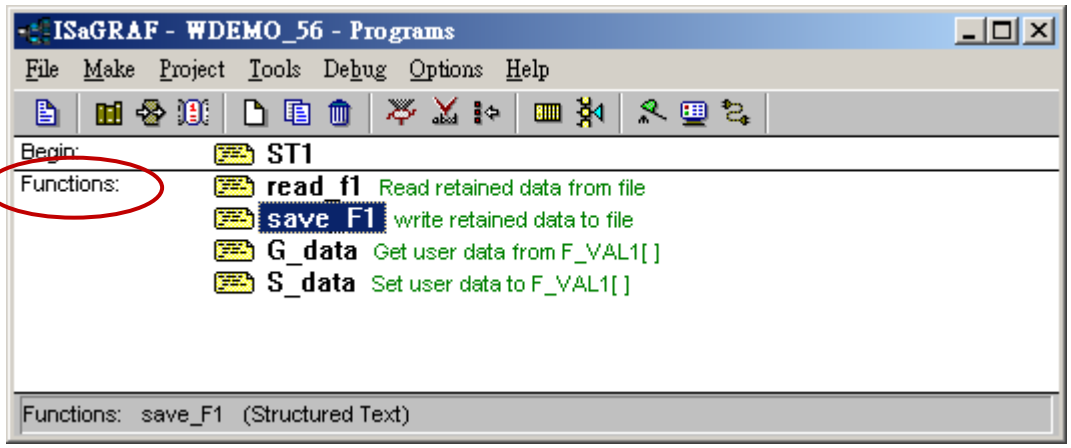
There are five ST programs in this "wpdmo56" project. Four of them are ISaGRAF user-defined functions – "reaf_f1", "save_f1", "G_data" and "S_data".

Important Note:

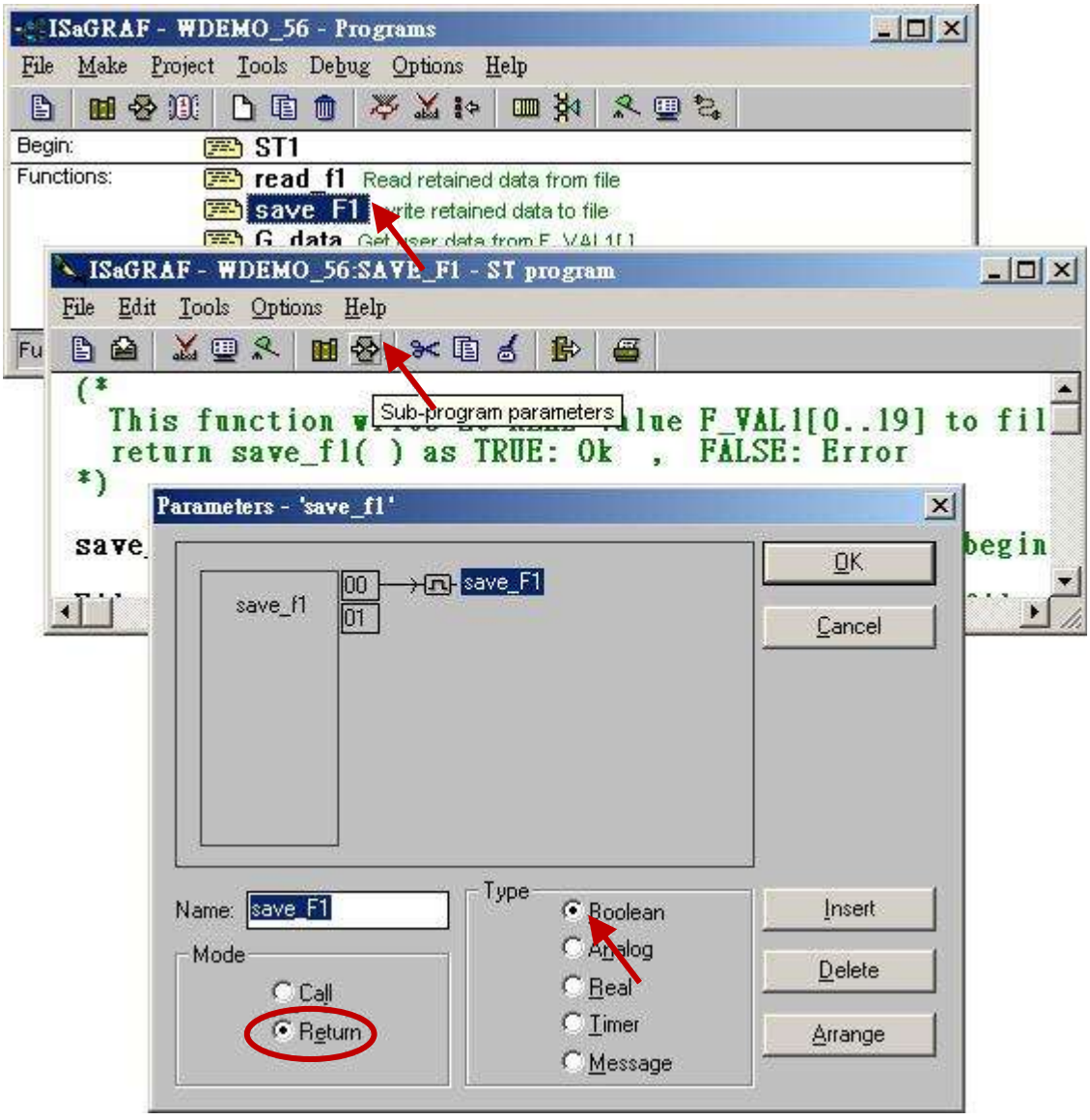
1. User may modify the constant value of "SIZE1" in the ISaGRAF "dictionary" window to a value between 1 and 255 according his own application.

2. Please also modify the "Dim" value of the "F_VAL1[ ]" and "Old_F_VAL1[ ]" variable array in the ISaGRAF "dictionary" window to the same value as the "SIZE1". And also modify the "G_data" and "S_data" program.

3. There is one advantage of retaining value in the Micro_SD memory. The data file can be edited in a PC in advance. Then using the “ftp” utility to download it to the PAC. The file path name of this example is “\Micro_SD\data56.txt”. Then set the value of boolean variable “RE_LOAD” to TRUE, all related variables will update to the new value.



The following ST programs are all declared as ISaGRAF functions. They are “read_f1” , “save_f1” , “G_data” and “S_data” . They all return a Boolean value. Please refer to below figure to declare function’s return-value type. (more description is in the Chapter 15 of the “ISaGRAF User's manual”)



The “read_f1” and “save_f1” program use “local variables” as below.

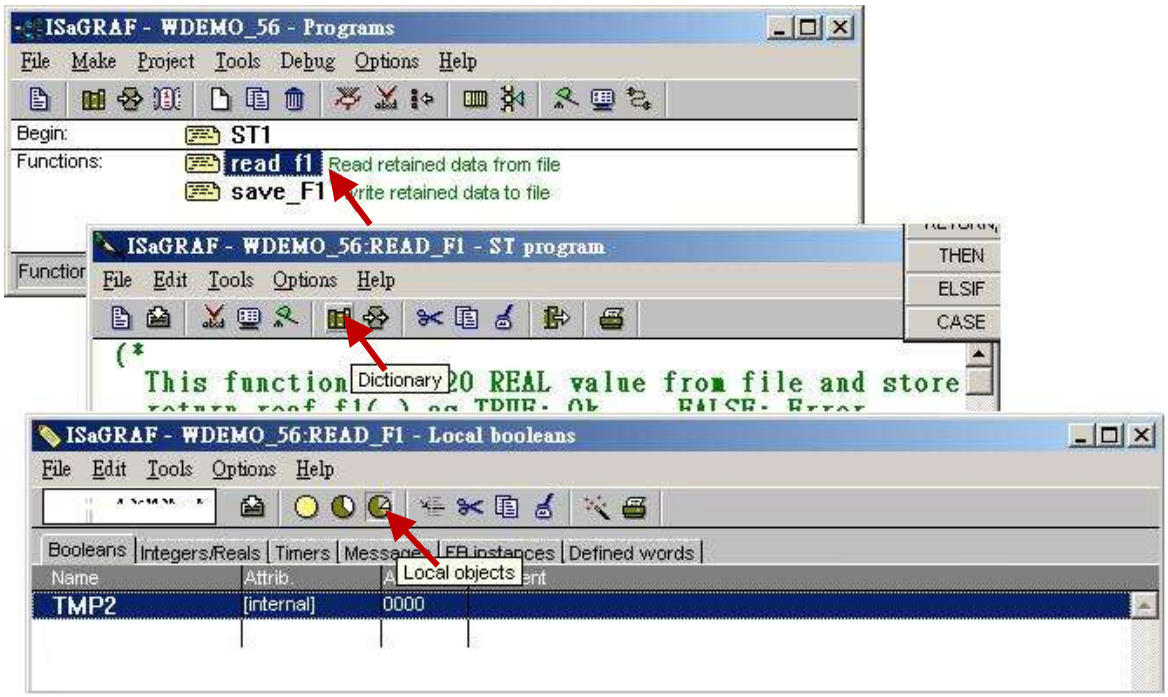
read_f1 :

Name	*Type*	*Attribute*	*Description*
TMP2	Bool	Internal	Internal use
ii2	Integer	Internal	Index of “for” loops
jj2	Integer	Internal	Index of “for” loops
num2	Integer	Internal	Internal use

save_f1 :

Name	*Type*	*Attribute*	*Description*
TMP2	Bool	Internal	Internal use
ii2	Integer	Internal	Index of “for” loops
jj2	Integer	Internal	Index of “for” loops
num2	Integer	Internal	Internal use

To declare “local variable”, please double click “read_f1” to get into this program. Then get into the “Dictionary” window. Then click on “Local objects” to declare them.



Global variables:

Name	*Type*	*Attribute*	*Description*
SIZE1	Integer	Constant	**Amount of retain variables. Can be 1 to 255. Pls modify the "Dim" value of the "F_VAL1[ ]" and Old_F_VAL1[ ]" to the same value as "SIZE1"**. Here we use "SIZE1" as 17.
num_row1	Integer	Internal	How many rows in the file ? This value is automatically calculated by "SIZE1". Each row should have 10 REAL values, except the last row.
Last_num1	Integer	Internal	How many data in the last row ? This value is automatically calculated by "SIZE1".
RE_LOAD	Bool	Internal	Set as True to read File once, init as TRUE.
TMP	Bool	Internal	Internal use.
Data_Ok1	Bool	Internal	TRUE means File Ok.
Flag_to_save	Bool	Internal	If program want to save data, it will set this value to TRUE.
File_name1	Message	Internal	Len is 64, init as \Micro_SD\data56.txt
Msg1	Message	Internal	Len is 128, File processing state.
str1	Message	Internal	Len is 255, Internal use.
F_VAL1[0..16]	REAL	Internal	**Variable array, "Dim" should be init as the same value as "SIZE1".**
Old_F_VAL1 [0..16]	REAL	Internal	Old value of "F_VAL1[ ]" **Variable array, "Dim" should be init as the same value as "SIZE1"**.
NUM1	Integer	Internal	Get return of Msg_F( ), -1 means format error.
File1	Integer	Internal	File ID.
ii	Integer	Internal	Index of "for" loops.
jj	Integer	Internal	Index of "for" loops.
Data1 ~ Data5 and Data06 ~ Data17	REAL	Internal	**The User Data variable. Here we have 17 variables in the demo program**. User can declare them to different variable name. If name is modified, the "G_data" and the "S_data" program should be modified also.

ST program - ST1:

```
if  RE_LOAD  then      (* if RE_LOAD is TRUE, get retained data from file *)

 RE_LOAD  :=  FALSE ;   (* Set RE_LOAD as FALSE *)

 (* caculate number of rows and data number of the last row *)
 num_row1  :=  SIZE1 / 10 ;
 last_num1  :=  SIZE1 -  10  *  num_row1 ;
 if  last_num1  <>  0  then
   num_row1  :=  num_row1 + 1 ;    (* if last_row has data, num_row1 must plus 1 *)
 else
   last_num1  :=  10 ;
 end_if ;

 (* Get retained value from file when controller is powered up *)
 TMP  :=  read_F1( ) ;

 if  TMP = FALSE  then   (* Read file error or file not exist *)

  for  ii  :=  0  to  SIZE1 - 1  do
    F_VAL1[ ii ]  :=  0.0 ;     (* set all F_VAL1[ ] 's value as 0.0 *)
  end_for ;

  Data_Ok1  :=  FALSE ;    (* set data is not Ok *)
  Msg1  :=  'File : '  +  File_name1  +  ' not exist or data error ! or File is open now' ;

 else   (* Read data Ok *)

  Data_Ok1  :=  TRUE ;    (* set data is Ok *)
  Msg1  :=  'Get Retained data from file Ok ' ;

 end_if ;

 (* Update Old_F_VAL1[ ] *)
 for  ii  :=  0  to  SIZE1 - 1  do
  Old_F_VAL1[ ii ]  :=  F_VAL1[ ii ] ;
 end_for ;

 (* Get user data from F_VAL1[ ] when controller is just powered up *)
 TMP  :=  G_DATA( ) ;

end_if ;

(* At run time, Set user data to F_VAL1[ ] *)
TMP  :=  S_DATA( ) ;
```

```
(* At run time, test any value of F_VAL1[ ] is modified *)
for   ii  :=  0  to  SIZE1 - 1  do

 if  Old_F_VAL1[ ii ]  <>  F_VAL1[ ii ]  then     (* if any value is modified *)
   Flag_to_save  :=  TRUE  ;     (* now save command is given *)
   Old_F_VAL1[ ii ]  :=  F_VAL1[ ii ]  ;    (* Update Old_F_VAL1[ ] if it is modified *)
 end_if  ;

end_for  ;

(* if save command is given, it means value is modified *)
if   Flag_to_save  then

 TMP  :=  save_f1( )  ;    (* save data to file *)

 (* if save file failed, keep this save command *)
 if   TMP  =  FALSE   then
   Msg1  :=  'Can not save data to file. May be file is open now by WinPAC 's screen ! '  ;

 (* Save Ok, cancel this save command *)
 else
  Flag_to_save  :=  FALSE  ;     (* Set as "No save" at the beginning *)

 end_if  ;

end_if  ;
```

ST functions – G_data:

```
(*  If any name of Data1 to Data17 is modified or value of “SIZE1” is modified,
    User must modify the below code *)
 Data1    :=  F_VAL1[0] ;     (* get variable value from F_VA1L[0..16] *)
 Data2    :=  F_VAL1[1] ;
 Data3    :=  F_VAL1[2] ;
 Data4    :=  F_VAL1[3] ;
 Data5    :=  F_VAL1[4] ;
 Data06   :=  F_VAL1[5] ;
 Data07   :=  F_VAL1[6] ;
 Data08   :=  F_VAL1[7] ;
 Data09   :=  F_VAL1[8] ;
 Data10   :=  F_VAL1[9] ;
 Data11   :=  F_VAL1[10] ;
 Data12   :=  F_VAL1[11] ;
 Data13   :=  F_VAL1[12] ;
 Data14   :=  F_VAL1[13] ;
 Data15   :=  F_VAL1[14] ;
 Data16   :=  F_VAL1[15] ;
 Data17   :=  F_VAL1[16] ;
 G_data  :=  TRUE  ;       (* function  returns TRUE *)
```

ST functions – S_data:

```
(*  If any name of Data1 to Data17 is modified or value of “SIZE1” is modified,
    User must modify the below code *)
 F_VAL1[0]  :=  Data1 ;    (* store variable value to F_VAL1[0..16] *)
 F_VAL1[1]  :=  Data2 ;
 F_VAL1[2]  :=  Data3 ;
 F_VAL1[3]  :=  Data4 ;
 F_VAL1[4]  :=  Data5 ;
 F_VAL1[5]  :=  Data06 ;
 F_VAL1[6]  :=  Data07 ;
 F_VAL1[7]  :=  Data08 ;
 F_VAL1[8]  :=  Data09 ;
 F_VAL1[9]  :=  Data10 ;
 F_VAL1[10]  :=  Data11 ;
 F_VAL1[11]  :=  Data12 ;
 F_VAL1[12]  :=  Data13 ;
 F_VAL1[13]  :=  Data14 ;
 F_VAL1[14]  :=  Data15 ;
 F_VAL1[15]  :=  Data16 ;
 F_VAL1[16]  :=  Data17 ;
 S_data  :=  TRUE ;          (* function returns TRUE *)
```

ST functions - read_f1:

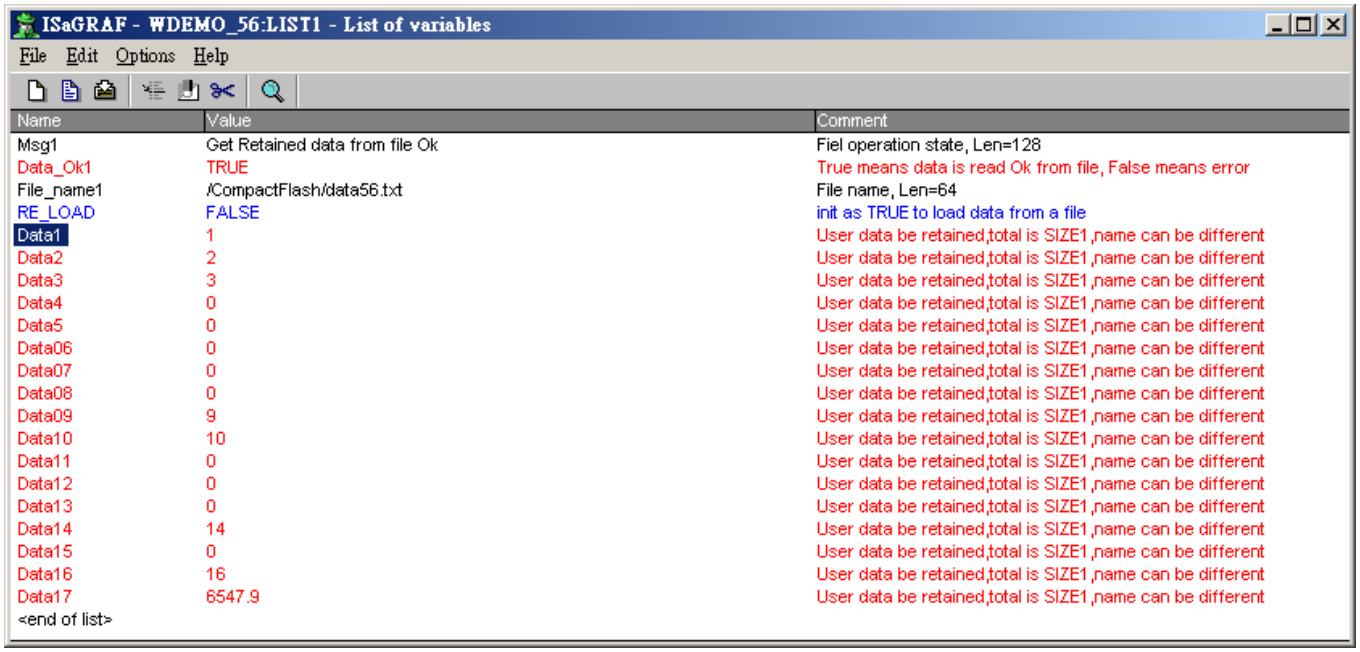
```
(*  This function read "SIZE1" number of REAL value from file and store them to F_VAL1[ ]
    return reaf_f1( ) as TRUE: Ok , FALSE: Error  *)
 read_f1 := FALSE ;                  (* set as FALSE: Error at the beginning *)
 File1 := f_wopen( File_name1 ) ;  (* Try to open file in Read & Write mode *)

 if  File1 = 0  then     (* File doesn't exists *)
    return ;   (* exit this function *)
 end_if ;

(* max  "num_row1"  rows to read these "SIZE1" number of REAL values, Each row in the file contains
    10 REAL values *)
 for  ii2  :=  0  to  num_row1 - 1  do
   if  f_eof( File1 ) = TRUE  then  (* test if End_Of_File reached *)
     exit ;      (* Reach End Of File,  exit “for” loop *)
   end_if ;
   str1 := fm_read( File1 ) ;  (* Read one row as String (message) *)
   (* Convert this string to some REAL values and store them into No.1 Float array *)
   NUM1 := Msg_F( str1 , 1 ) ;

   (* if data number of last row is not correct *)
   if  ( ( ii2 = num_row1 – 1 )  and  ( NUM1  <>  last_num1 ) )  or
      (* non-last row must have 10 REAL values *)
      ( ( ii2  <>  num_row1 – 1 )  and  ( NUM1  <>  10 ) )    then
     (* error, it means the format is not correct REAL values or data number is not enough *)
     exit ;      (* exit for loop *)
   end_if;

   (* conversion Ok, store these REAL values to F_VAL1[ ] *)
   if  ii2  =  num_row1 - 1  then     (* last row *)
      num2  :=  last_num1 ;       (* last row has only "last_num1" number of data *)
   else
      num2 := 10 ;   (* non-last row has 10 data *)
   end_if ;
   (* Get these converted REAL values from No.1 Float array's addr. 1 to 10  (or 1 to last_num1 for
      last row) *)
   for   jj2  :=  0  to  num2 - 1  do
      F_VAL1[ 10*ii2  +  jj2 ]  :=  ARY_F_R( 1 ,  jj2  +  1 ) ;
   end_for ;
 end_for ;

 (* Any file been open should be closed by f_close( ) *)
 TMP2  :=  f_close( File1 ) ;
 (* All rows are read Ok *)
 if  ii2  =  num_row1   then
    read_F1  :=  TRUE ;     (* return value as TRUE:Ok *)
 end_if ;
```

ST functions - save_f1 :

```
(*  This function write 20 REAL value F_VAL1[0..19] to file
    return save_f1( ) as TRUE: Ok  ,  FALSE: Error  *)

 save_f1  :=  FALSE  ;   (* set as FALSE: Error at the beginning *)
 File1  :=  f_creat( File_name1 )  ;   (* Creat a new file to write *)

 if   File1 = 0 then
  return ;  (*creat failed , exit this function *)
 end_if  ;

 (* max "num_row1" rows to save these REAL values, each row in the file contains 10 REAL values *)
 for  ii2  :=  0  to  num_row1 - 1  do

  str1  :=  ''  ;   (* set initial value of str1 *)

  if   ii2  =  num_row1 – 1   then        (* last row *)
   num2   :=   last_num1 ;      (* last row has only "last_num1" number of data *)
  else      (* non-last row *)
   num2  := 10 ;    (* non-last row has 10 data *)
  end_if  ;

  for    jj2  :=  0  to  num2 - 2    do
   str1  :=  str1  +  REAL_STR(  F_VAL1[ 10 * ii2  +  jj2 ]  )  +  ' , '  ;
  end_for ;

  (* the last data in each row should end with <CR> <LF> character *)
  str1  :=  str1  +  REAL_STR(  F_VAL1[ 10 * ii2  +  num2 - 1]  )  +  '$0D$0A'  ;
  TMP2  :=  f_writ_s( File1  , str1 )  ;     (* write one row to file *)

 end_for ;

 (* Any file been open should be closed by f_close( ) *)
 TMP2  :=  f_close( File1 ) ;

 save_f1  :=  TRUE  ;   (* return value as TRUE: Ok *)
```

How to test this "wpdmo56" project ?

1. Please download "wpdmo56" to the PAC, then the "Spy list" window will pop-up as below.



Name	Value	Comment
Msg1	Get Retained data from file Ok	Fiel operation state, Len=128
Data_Ok1	TRUE	True means data is read Ok from file, False means error
File_name1	/CompactFlash/data56.txt	File name, Len=64
RE_LOAD	FALSE	init as TRUE to load data from a file
Data1	1	User data be retained,total is SIZE1,name can be different
Data2	2	User data be retained,total is SIZE1,name can be different
Data3	3	User data be retained,total is SIZE1,name can be different
Data4	0	User data be retained,total is SIZE1,name can be different
Data5	0	User data be retained,total is SIZE1,name can be different
Data06	0	User data be retained,total is SIZE1,name can be different
Data07	0	User data be retained,total is SIZE1,name can be different
Data08	0	User data be retained,total is SIZE1,name can be different
Data09	9	User data be retained,total is SIZE1,name can be different
Data10	10	User data be retained,total is SIZE1,name can be different
Data11	0	User data be retained,total is SIZE1,name can be different
Data12	0	User data be retained,total is SIZE1,name can be different
Data13	0	User data be retained,total is SIZE1,name can be different
Data14	14	User data be retained,total is SIZE1,name can be different
Data15	0	User data be retained,total is SIZE1,name can be different
Data16	16	User data be retained,total is SIZE1,name can be different
Data17	6547.9	User data be retained,total is SIZE1,name can be different
<end of list>		

You may modify any value of user data - Data1 to Data17. Then the new value will be saved into the file "\Micro_SD\data56.txt". Then you can open this file on the PAC's monitor screen by double click on the file name. You will see the related value is modified. (Please do not always keep this file open. Close it later, or the new modified data will not be saved. That is because the file is open, write operation is not allowed)

2. Recycle the power of the PAC. You will see the value keep at its last-modified value when the PAC is boot up well.

3. Edit a "data56.txt" file on a PC as below by the "NotePad" utility. (total 17 data)

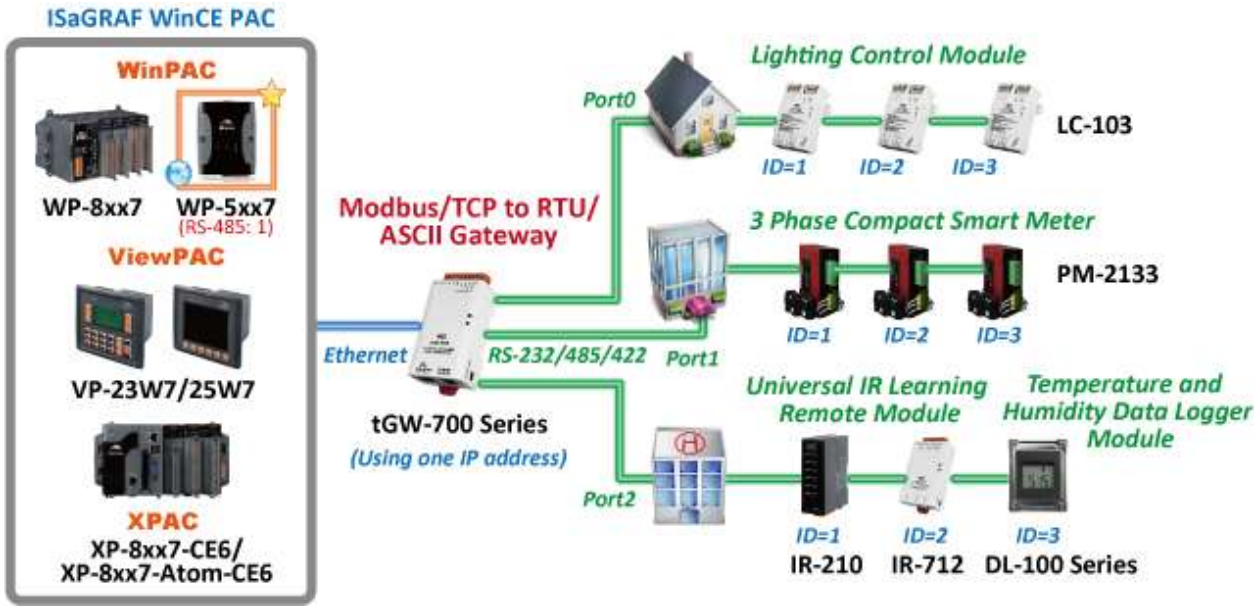
   1.1 , 2.2 , 3.3 , 4.4 , 5.5 , 6.66 , 7.77 , 8.88 , 9.99 , 10.01
   0.01 , 0.02 , 0.03 , 0.04 , 0.05 , 0.06 , 0.07

Then download this "data56.txt" file to PAC's \Micro_SD\ path by the "ftp" utility. Then set "RE_LOAD" to become TRUE on ISaGRAF "Spy list" window. You will see the related variable value is updated.

Chapter 13 Using the tGW-700 Series, Modbus TCP to RTU/ASCII gateway, with the ISaGRAF PAC

13.1 Application Introduction

Users sometimes have to choose lower speed transmission (lower baud rate) for long distance communication via Modbus RTU/ASCII over RS-485/RS-422. This often leads into a new problem of inefficient communication. The tGW-700 series gateway of ICP DAS can solve this problem. Using the tGW-700 series gateways can change the RS-485 to the high speed Ethernet and eliminate the cable length limitation of the RS-485 network to solve the problem about poor communication efficiency. This section introduces the way to use the tGW-700 with the ISaGRAF PAC.



The following versions of the ISaGRAF PACs support to send Modbus TCP commands of different NET-ID to the same Modbus TCP Slave device (i.e. to the tGW-700 series).

ISaGRAF WinCE PAC	ISaGRAF Driver Version
WP-5xx7	1.02 or later version
WP-8xx7	1.52 or later version
VP-25W7/23W7	1.44 or later version
XP-8xx7-CE6	1.32 or later version
XP-8xx7-Atom-CE6	1.01 or later version

Download the Document and the Demo Programs:
www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-159 .
Download the ISaGRAF Drivers:
www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Driver
Download the ISaGRAF Product Data Sheet:
www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Data Sheet

13.2 tGW-700 Series Modules

13.2.1 Introduction of tGW-700

The tGW-700 is a Modbus TCP to Modbus/RTU or Modbus/ASCII gateway that enables a Modbus/TCP host (i.e. the WP-5147) to communicate with serial Modbus RTU/ASCII devices through an Ethernet network, and eliminates the cable length limitation of legacy serial communication devices.

13.2.2 Installation & Configuration

Connecting the power and Host PC

1. Make sure **Init/Run** switch is on **Run** position.

2. Connect both the tGW-700 and PC to the same sub-network or the same Ethernet Switch and power on the tGW-700.

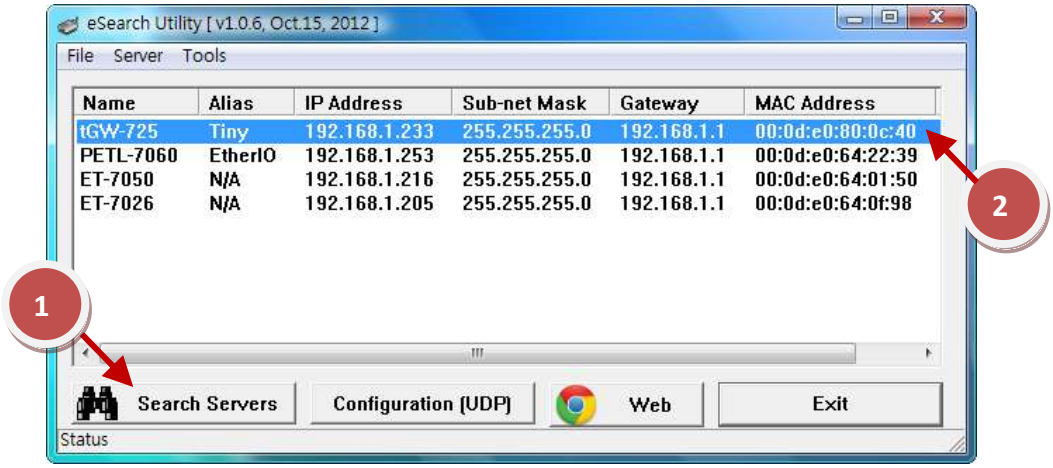
Installing the "eSearch.exe" to your PC

1. Download the eSearch Utility "eseach.exe" at:
   http://ftp.icpdas.com/pub/cd/tinymodules/napdos/software/esearch/

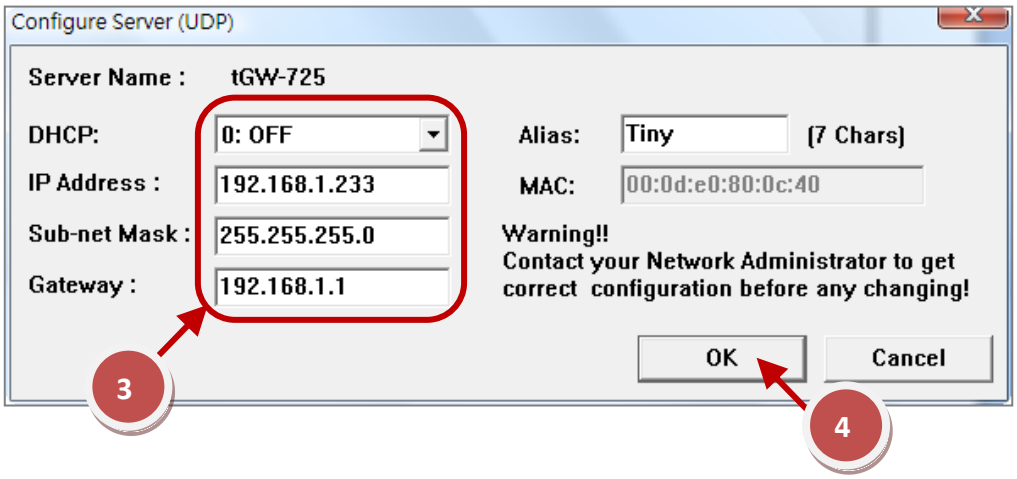
2. Run esearch.exe

Setting the network

1. Click the “Search Servers” button to search for your tGW-700.
2. Double click the name of your tGW-700 to open the configuration window.



3. Contact your Network Administrator to obtain the correct network configuration information (i.e. IP/ Mask/ Gateway) for your tGW-700.
4. Enter the network settings and then click “OK”, the tGW-700 will use the new settings after reboot.



Testing the tGW-700

1. Wiring to the Modbus RTU device (i.e. LC-103, DL-100TM485, PM-2133, IR-210…) with your tGW-700. As below:

2. Use the Modbus Utility to test the tGW-700. If the return data is correct, then the installation has succeeded.

13.2.3 More Related Information

- tGW-700 Series Product website:
  www.icpdas.com > Product > Solutions > Industrial Communication > Serial to Ethernet Device Server (DS) > DS Series > tGW-700

- LC-103 Product website:
  www.icpdas.com > Product > Solutions > Remote I/O Modules/Unit > LC Series Modules > LC-103

- DL-100 Product website:
  www.icpdas.com > Product > Solutions > Remote I/O Modules/Unit > DL Series > DL-100

- IR-210 Product website:
  http://m2m.icpdas.com/IR-210.html

- PM-213x Series Product website:
  www.icpdas.com > Product > Solutions > Intelligence Power Meter > PM-213x Series

13.3 How to test the Demo Example (faq159_1)?

13.3.1 Hardware Preparation

The Hardware for this demo

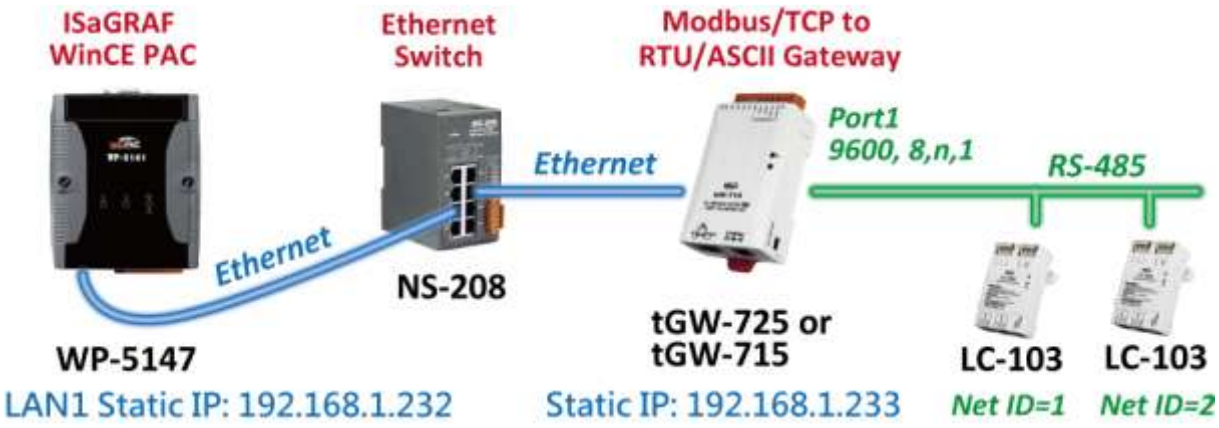
1. ISaGRAF PAC (CE based) x 1 (i.e. WP-5147)
2. 2. tGW-715 or tGW-725 x 1
3. 3. LC-103 x 2

Note: The driver version of the ISaGRAF PAC must support to send Modbus TCP commands of different NET-ID to the same Modbus TCP Slave device. (Refer to section 13.1) If not, please download the latest driver version.

Pre-setting for the Hardware

1. The ISaGRAF PAC: Set IP as “192.168.1.232”.
2. The tGW-725 : Set IP as “192.168.1.233”, port as “Port1” and Baud rate as “9600”.
   For configuring the tGW-700, please refer to 13.2 tGW-700 Series Modules.
3. One LC-103 : Set Rotary Switch as “1”, Modus device NET-ID as “1”;
4. The other LC-103 : Set Rotary Switch as “2”, Modus device NET-ID as “2”.
5. Cable Wiring : Wire the Port1 of tGW-725 to the RS-485 of two LC-103 modules

Hardware Wiring Picture



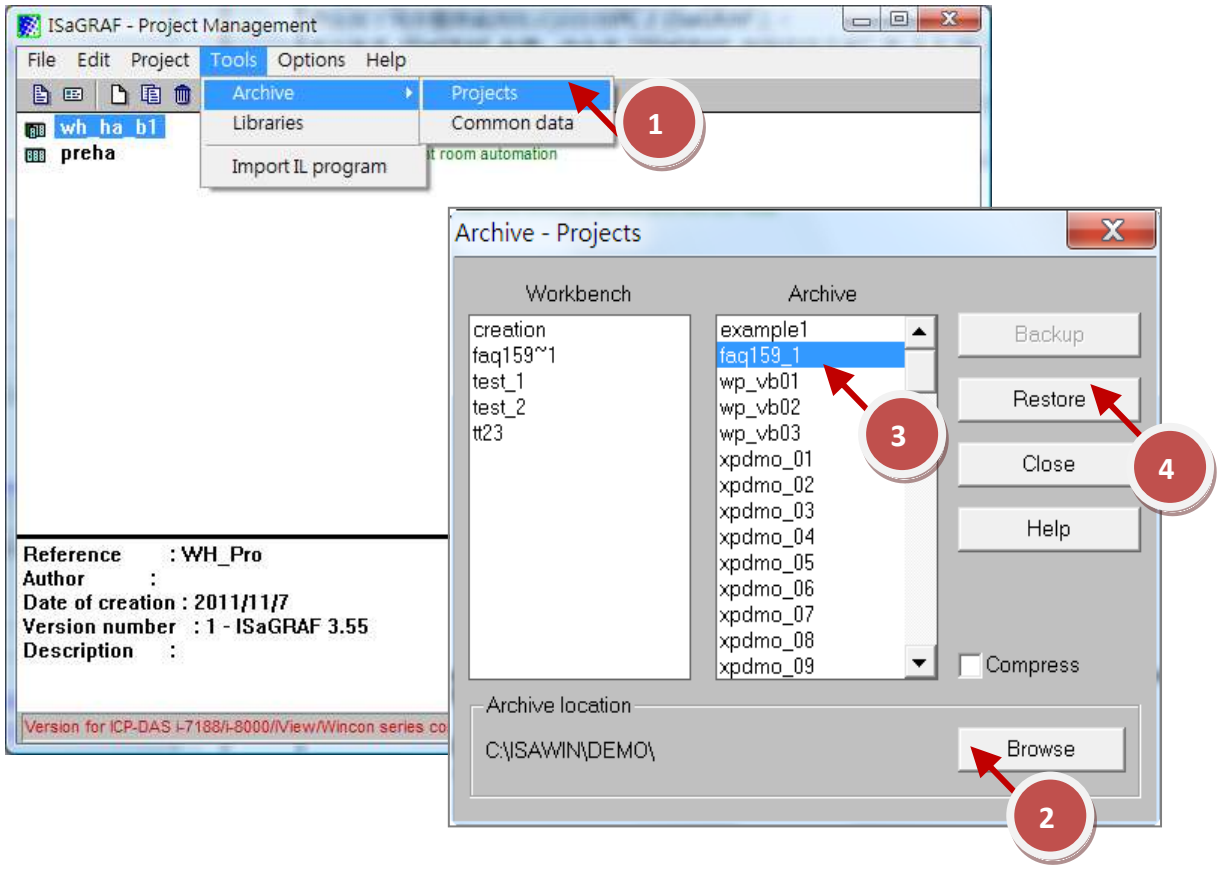
13.3.2 Operating the Demo (faq159_1)

Download faq159_1.pia

Please download the "faq159_demo.zip" that includes this PDF paper and the demo program "faq159_1.pia" from www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > 159

Restore faq159_1.pia to PC/ISaGRAF

Follow the steps in the below picture to restore the demo program into your PC/ISaGRAF.



Compile

Click the menu bar [Make > Make application] to re-compile this ISaGRAF demo project.

Note:

If user is not familiar with the ISaGRAF, recommend to study the Section 1.1 and 1.2 and Section 2.1 of the ISaGRAF User's manual. The PDF file names of the manual are “user_manual_i_8xx7.pdf” and “user_manual_i_8xx7_appendix.pdf”. You may find them in the CD-ROM of the PAC product box, or the web site www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Manual.

Download Project to the PAC

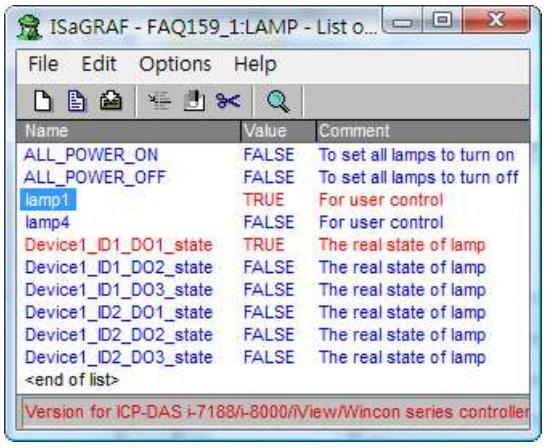
After compiling, download the ISaGRAF project into the ISaGRAF PAC.

Test the Demo

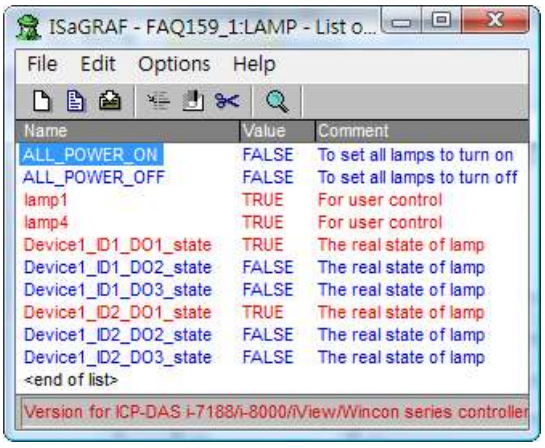
When the PC/ISaGRAF connects the ISaGRAF PAC which is running the “faq159_1” project, the below Spy Lists window will pop up.

Test the demo in the Spy Lists window:

1. If set “ALL_POWER_ON” to “true”, the DO1 of all LC-103 will turn on.
2. If set “ALL_POWER_OFF” to “true”, the DO1 of all LC-103 will turn off.
3. If set “lamp1” to “true”, the DO1 of LC-103 ID 1 will turn on.
4. If set “lamp1” to “false”, the DO1 of LC-103 ID 1 will turn off.



If set “lamp1” to “true”



If set “ALL_POWER_ON” to “true”

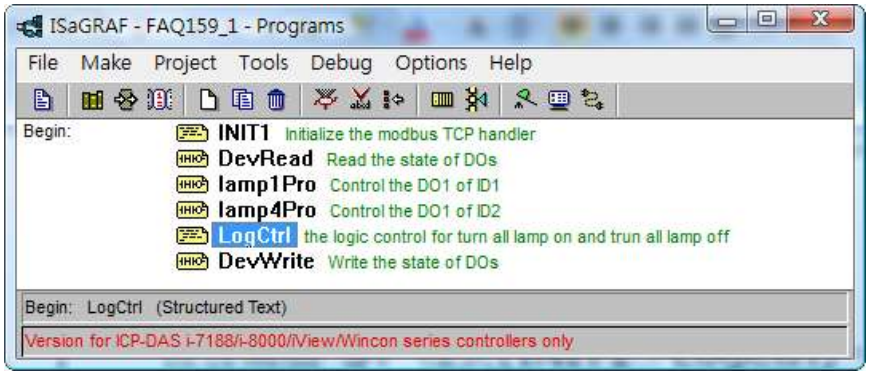
Note:

If user is not familiar with the ISaGRAF, recommend to study the Section 1.1 and 1.2 and Section 2.1 of the ISaGRAF User's manual. The PDF file names of the manual are “user_manual_i_8xx7.pdf” and “user_manual_i_8xx7_appendix.pdf”. You may find them in the CD-ROM of the PAC product box, or the web site www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Manual.

13.3.3 Description of the Demo (faq159_1)

ISaGRAF Project Architecture

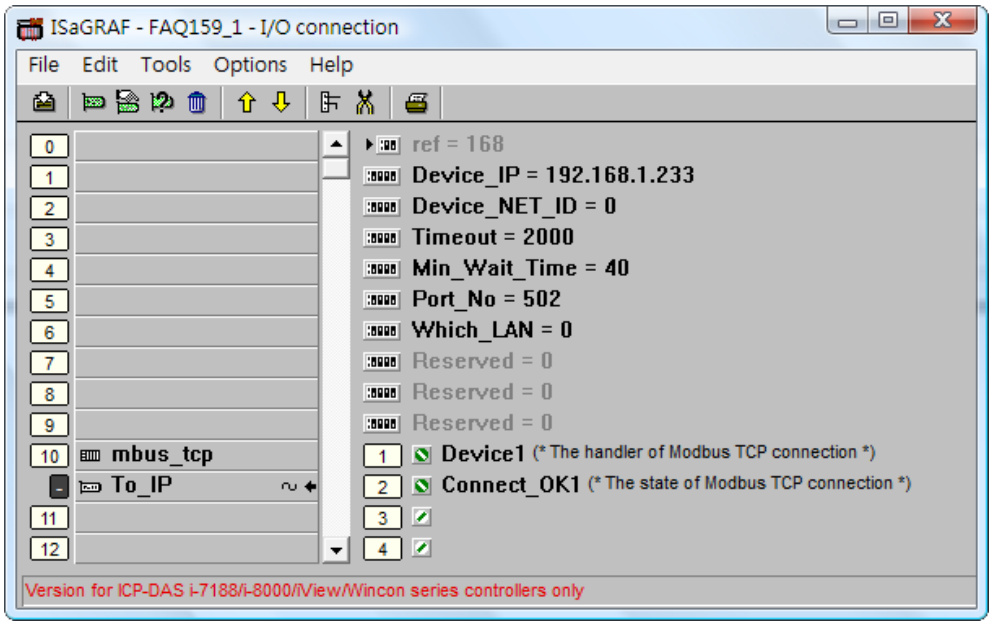
There are two ST programs (INIT1, LogCtrl) and four LD programs (DevRead, Lamp1Pro, Lamp4Pro, DevWrite).



ISaGRAF Variables

Name	Type	Attribute	Description
initialized	Boolean	Internal	Used to run the first scan cycle. Set initial value to “False”.
Dev1_ID1_s	Boolean	Internal	The connection state of the Modbus device ID 1
Dev1_ID2_s	Boolean	Internal	The connection state of the Modbus device ID 2
SetDev1ID1_DO1	Boolean	Internal	If true, set the DO1 state of the LC-103 ID1
SetDev1ID2_DO1	Boolean	Internal	If true, set the DO1 state of the LC-103 ID2
Dev1_ID1_DO1	Boolean	Internal	For Internal used to store the lamp state
Dev1_ID2_DO1	Boolean	Internal	For Internal used to store the lamp state
Dev1_ID1_DO1_s	Boolean	Internal	The DO1 real state of the LC-103 ID1
Dev1_ID1_DO2_s	Boolean	Internal	The DO2 real state of the LC-103 ID1
Dev1_ID1_DO3_s	Boolean	Internal	The DO3 real state of the LC-103 ID1
Dev1_ID2_DO1_s	Boolean	Internal	The DO1 real state of the LC-103 ID2
Dev1_ID2_DO2_s	Boolean	Internal	The DO2 real state of the LC-103 ID2
Dev1_ID2_DO3_s	Boolean	Internal	The DO3 real state of the LC-103 ID2
lamp1	Boolean	Internal	If true, enable the DO1 of the LC-103 ID1
lamp4	Boolean	Internal	If true, enable the DO1 of the LC-103 ID2
ALL_POWER_ON	Boolean	Internal	If true, set lamp1, lamp4 to turn on
ALL_POWER_OFF	Boolean	Internal	If true, set lamp1, lamp4 to turn off
Device1	Integer	Input	Get the Modbus TCP handler of the device
Connect_OK1	Integer	Input	The state of Modbus TCP connection. 1: connection OK
Device1_ID1	Integer	Internal	The Modbus TCP handler of device ID1
Device1_ID2	Integer	Internal	The Modbus TCP handler of device ID2
temp_state1	Integer	Internal	Temporarily store the DO state of device ID1
temp_state2	Integer	Internal	Temporarily store the DO state of device ID2

I/O Connection



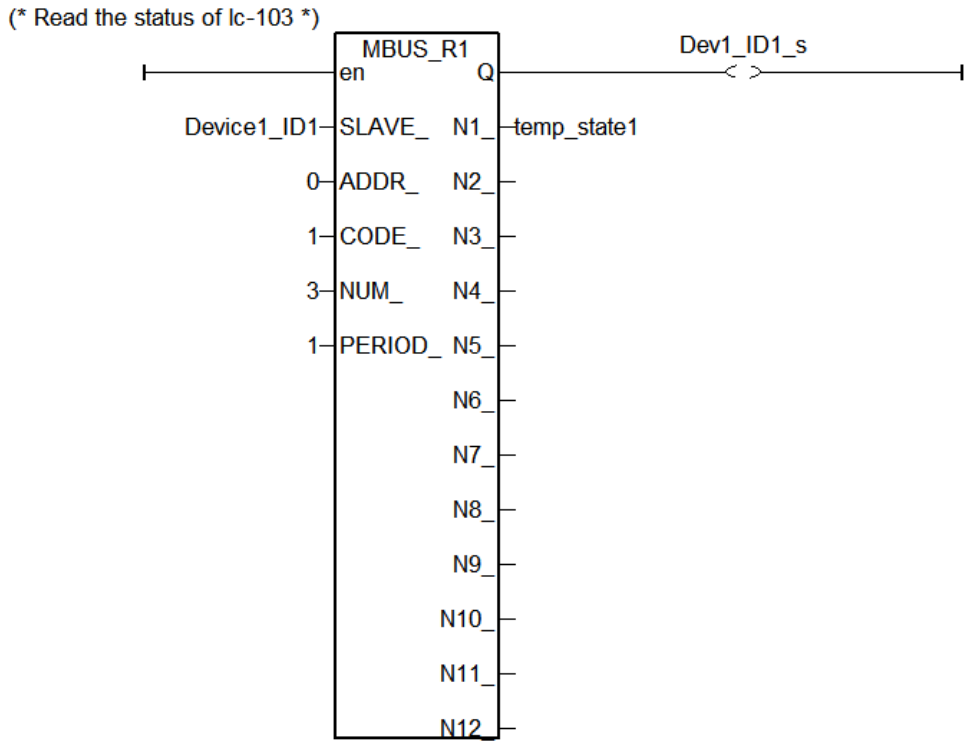
Mbus_tcp Parameter Description	
Device_IP	Enter the tGW-725 IP address. Ex: 192.168.1.233
Device_NET_ID	Assign “0”, if want to send Modbus TCP commands of different NET-ID to the same Modbus TCP Slave device.
Timeout	Unit: ms (0.001 second), range: 500 ~ 15,000
Min_Wait_Time	Unit: ms (0.001 second), the waiting time before send the next Modbus TCP commend. Range: 10 ~ 60,000
Port_No	Enter “502“ if use Port1 of the tGW-725; Enter “503“ if use Port2.
Which_LAN	1 or 2: the LAN number used 0: auto switch the LAN
Device1	Get the Modbus TCP handler
Connect_OK1	Get the connection state with the device 1: connection is ok. 2: not connected.

"INIT1" ST Program

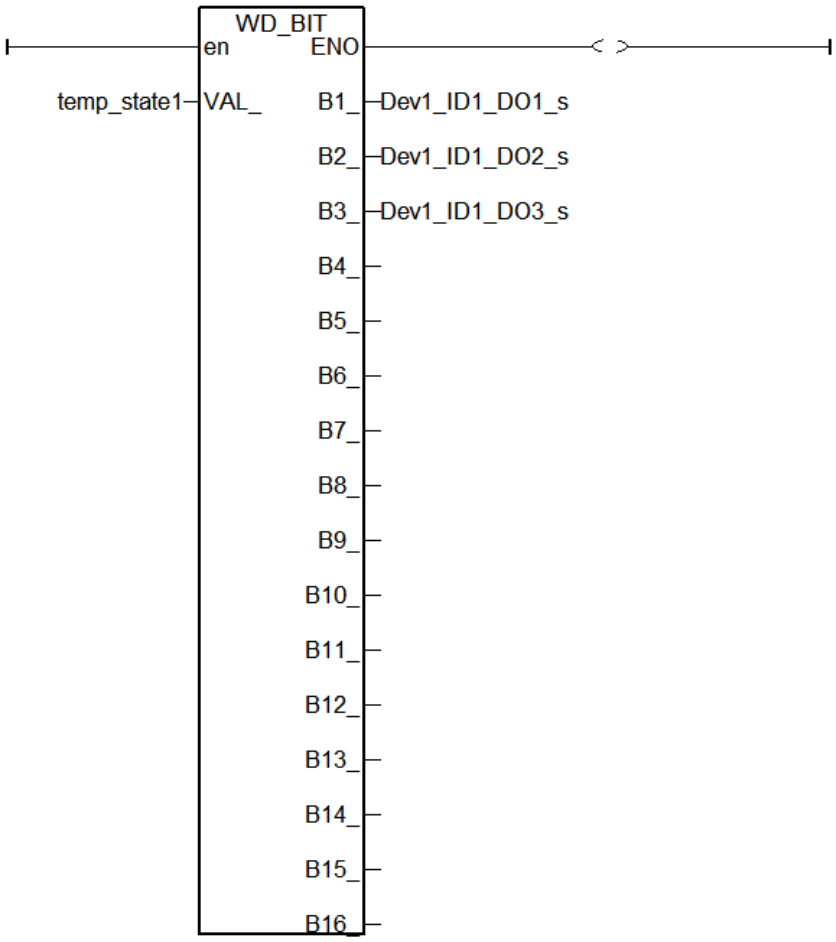
```
(* For operating correction, this ST program must run first, then can execute Mbus**** block *)
(* This ST only run once in the 1st scan cycle *)
(* Set all NET-ID that Device1 will use in the demo. Set ID 1 and ID 2 devices for this demo *)

if Not (initialized) then

        initialized := true;

(* Light controllers, Two LC-103 *)
 (* Get the device handler from the mbus_tcp handler plus the device's Slave ID *)
        Device1_ID1 := Device1 + 1 ;
        Device1_ID2 := Device1 + 2 ;

end_if;
```

"DevRead" LD Program

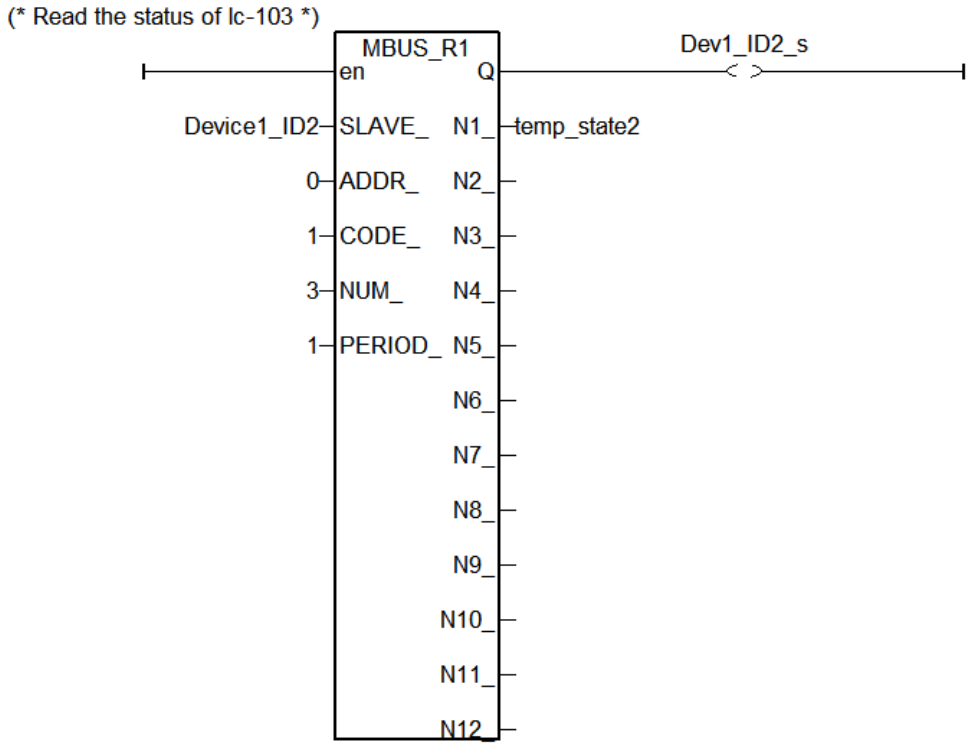
(* Use C function-Block **"Mbus_R1"** to read the DO state of Slave device ID 1 per second *)



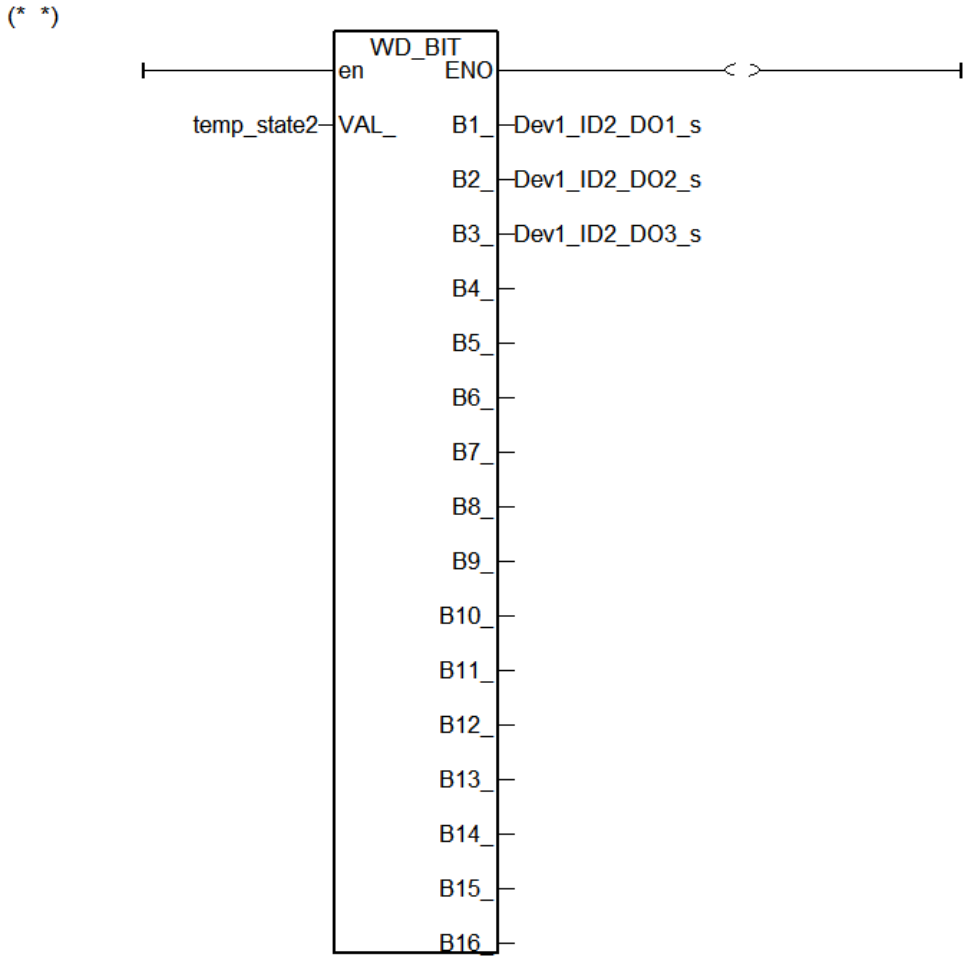
(* Use C function-block **“WD_Bit”** to divide the return state into each DO state *)



(* Use C function-Block **“Mbus_R1”** to read the DO state of Slave device ID 2 per second *)

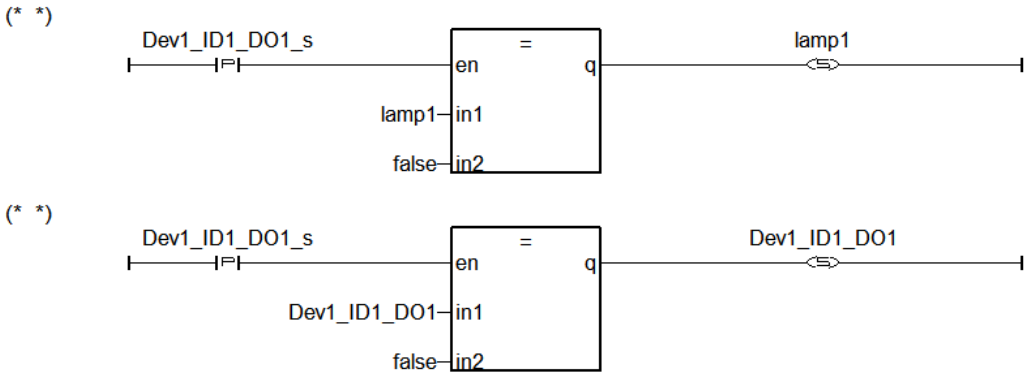


(* Use C function-block **“WD_Bit”** to divide the return state into each DO state *)

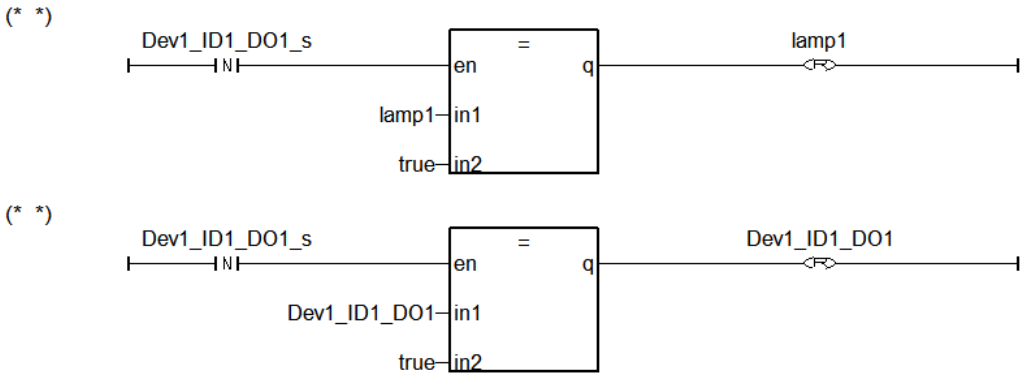


lamp1Pro" LD Program

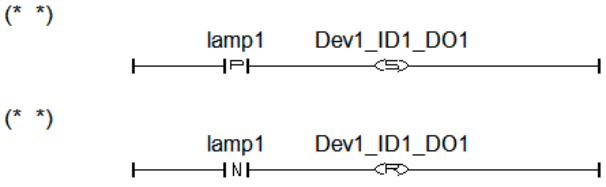
(* If DO at rising eage, set external variable "lamp1" and internal variable "Dev1_ID1_DO1" to true *)



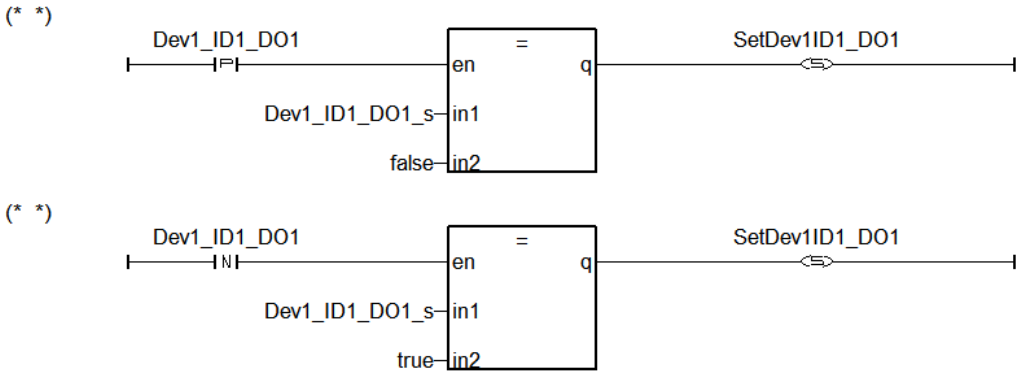
(* If DO at falling eage, set external variable "lamp1" and internal variable "Dev1_ID1_DO1" to false *)



(* If the state of external variable lamp1 changed, change the state of internal variable Dev1_ID1_DO1 *)

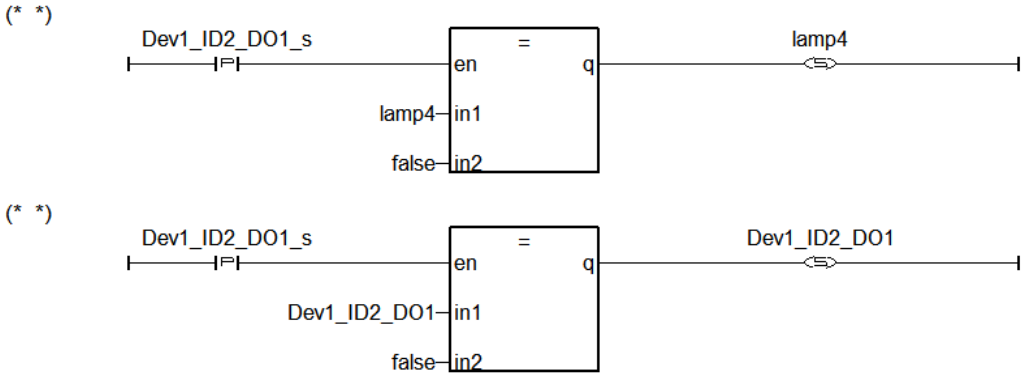


(* If the state of internal variable Dev1_ID1_DO1 changed, judge DO state to send commend or not *)

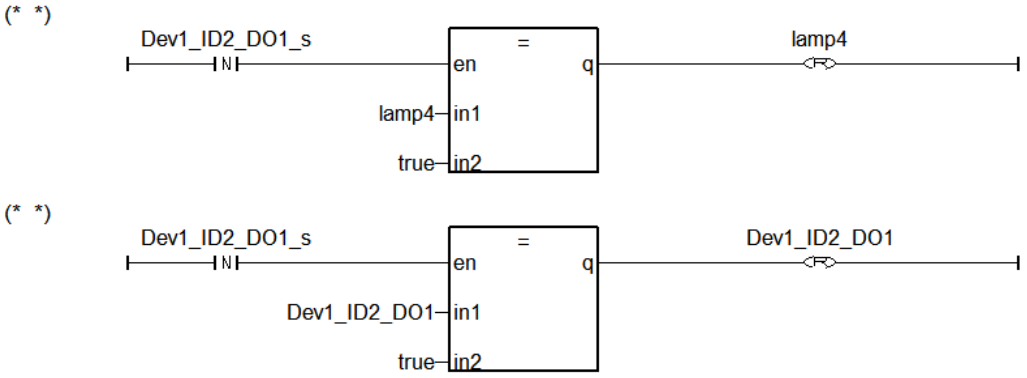


“lamp4Pro” LD Program

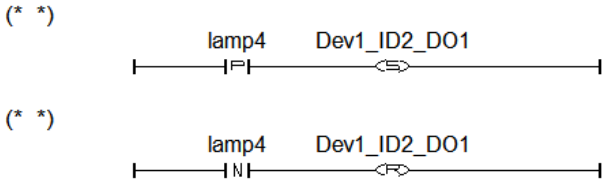
(* If DO at rising eage, set external variable “lamp4” and internal variable “Dev1_ID2_DO1” to true *)



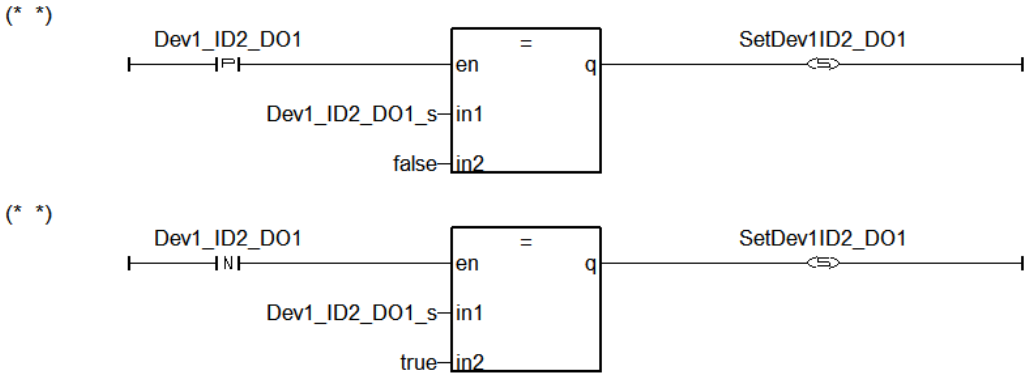
(* If DO at falling eage, set external variable “lamp4” and internal variable “Dev1_ID2_DO1” to false *)



(* If the state of external variable lamp4 changed, change the state of internal variable Dev1_ID2_DO1 *)



(* If the state of internal variable Dev1_ID2_DO1 changed, judge DO state to send commend or not *)

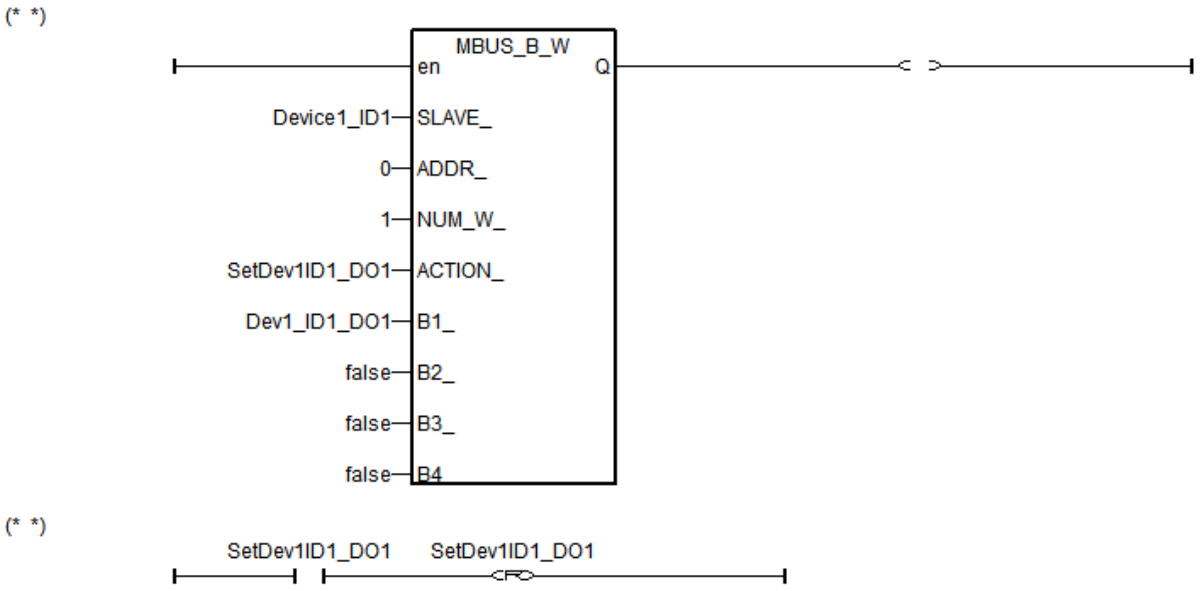


“LogCtrl” ST Program

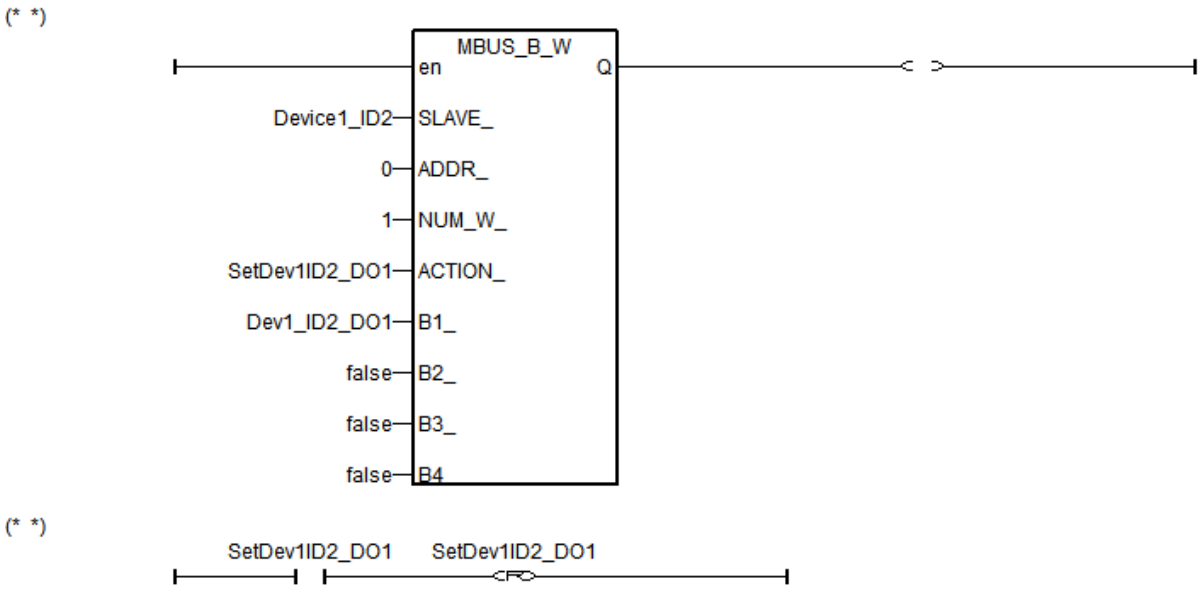
```
(* Turn on all lamps *)
if ALL_POWER_ON then

ALL_POWER_ON := false;

lamp1 := true;
lamp4 := true;

end_if;

(*Turn off all lamps *)
if ALL_POWER_OFF then

ALL_POWER_OFF := false;

lamp1 := false;
lamp4 := false;
```

“DevWrite” LD Program

(* If SetDev1ID1_DO1 is true, write the state of Dev1_ID1_DO1 *)



(* If SetDev1ID2_DO1 is true, write the state of Dev1_ID2_DO1 to DO *)

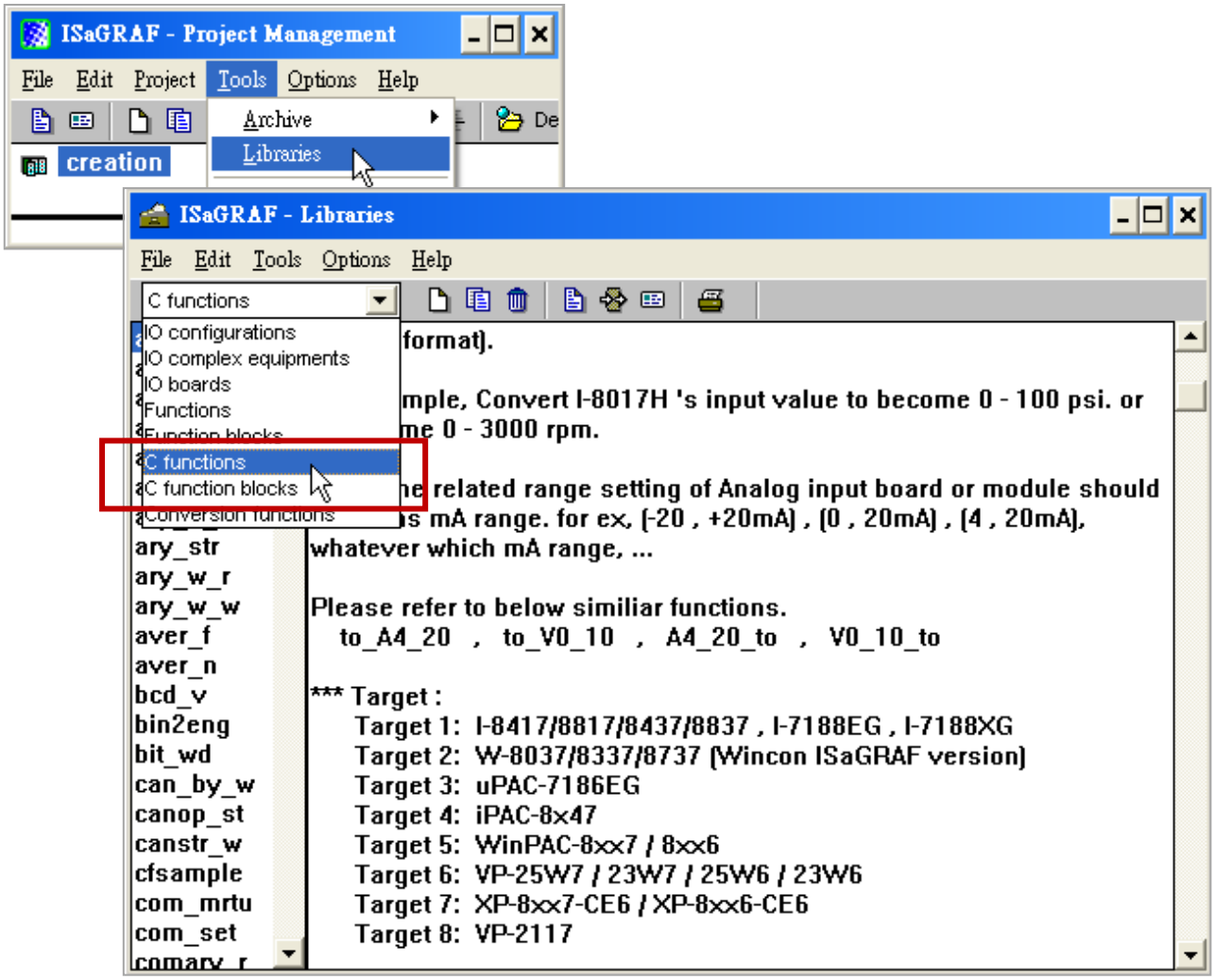


Chapter 14 More Useful Features

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.

14.1 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: www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-167



14.2 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: www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-166

14.3 FAQ-160: Soft-GRAF Application - Alarm Lists

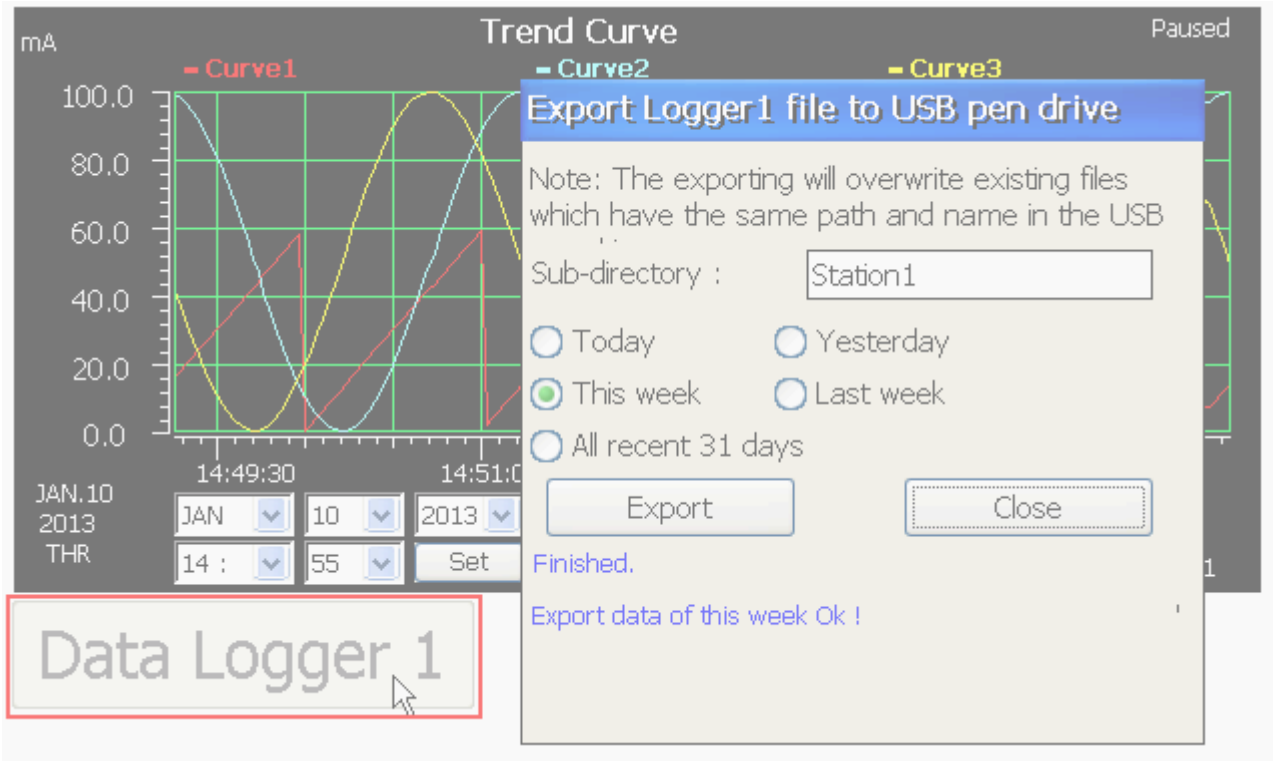
Users can use the Soft-GRAF HMI software to build an alarm-list application in the ISaGRAF WinCE-based PAC.

- The Soft-GRAF HMI object - "g_Alarm" can send the max. of 3000 messages a day.
- The FAQ-160 provides demo programs that can send a short message to some operator's mobile phone when some emergency occurs.
- The system can create a new file to save the alarm messages in each day. Users can also export thease alarm files to a USB pen drive. (File format: .csv or .txt)
- Users can enable the function of FTP Client to send the alarm file to the control center (FTP Server1, FTP Server2) automatically at a fixed time each day. Or, users can also get the PAC files through the FTP Server.
- More at: www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-160

14.4 FAQ-158: Soft-GRAF Application - Data Logger

Users can use the Soft-GRAF HMI software to build a data logger application in the ISaGRAF WinCE-based PAC.

- The Soft-GRAF HMI object - " g_Logger1" can record the max. of 50 tags.
  (Data format: Boolean, 16-bit signed integer, 32-bit signed integer and 32-bit Float)
- The system can create a new file to save the alarm messages in each day. Users can also export thease alarm files to a USB pen drive. (File format: .csv or .txt)
- Users can enable the function of FTP Client to send the alarm file to the control center (FTP Server1, FTP Server2) automatically at a fixed time each day. Or, users can also get the PAC files through the FTP Server.
- More at: www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-158



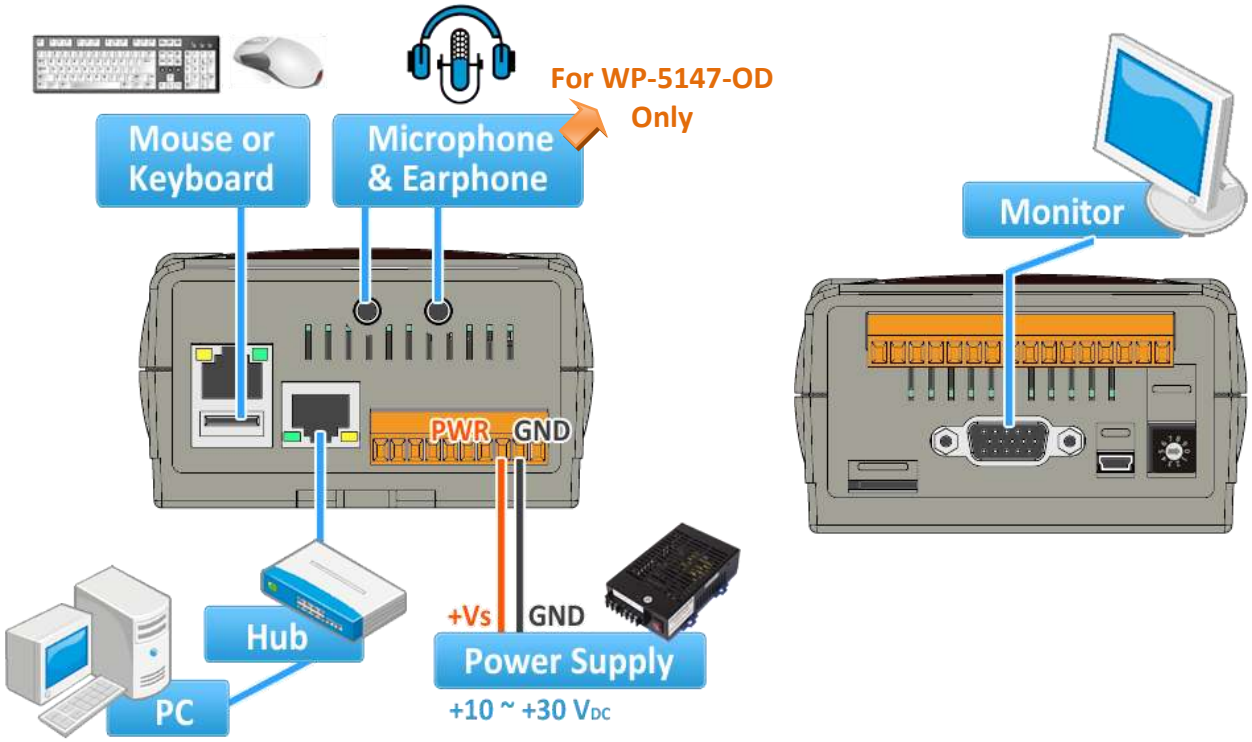
Appendix A Hardware System & Setting

The WinPAC-5xx7/WP-5xx7 is the abbreviation of the WP-5147/WP-5147-OD.

The WinPAC-5xx6/WP-5xx6 is the abbreviation of the WP-5146/WP-5146-OD.

A.1 Applying Correct Power Supply

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



Options:

Power Supply:

www.icpdas.com > Product > Solutions > Accessories > Power Supply

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

DP-665 : 24V/2.5A , 5V/0.5A power supply

DP-1200 : 24V/5A power supply

Industrial Ethernet switch:

www.icpdas.com > Product > Solutions > Industrial Ethernet Switch & Fber Switch > Unmanaged Ethernet Switches

NS-205: 10/100M, 5 ports

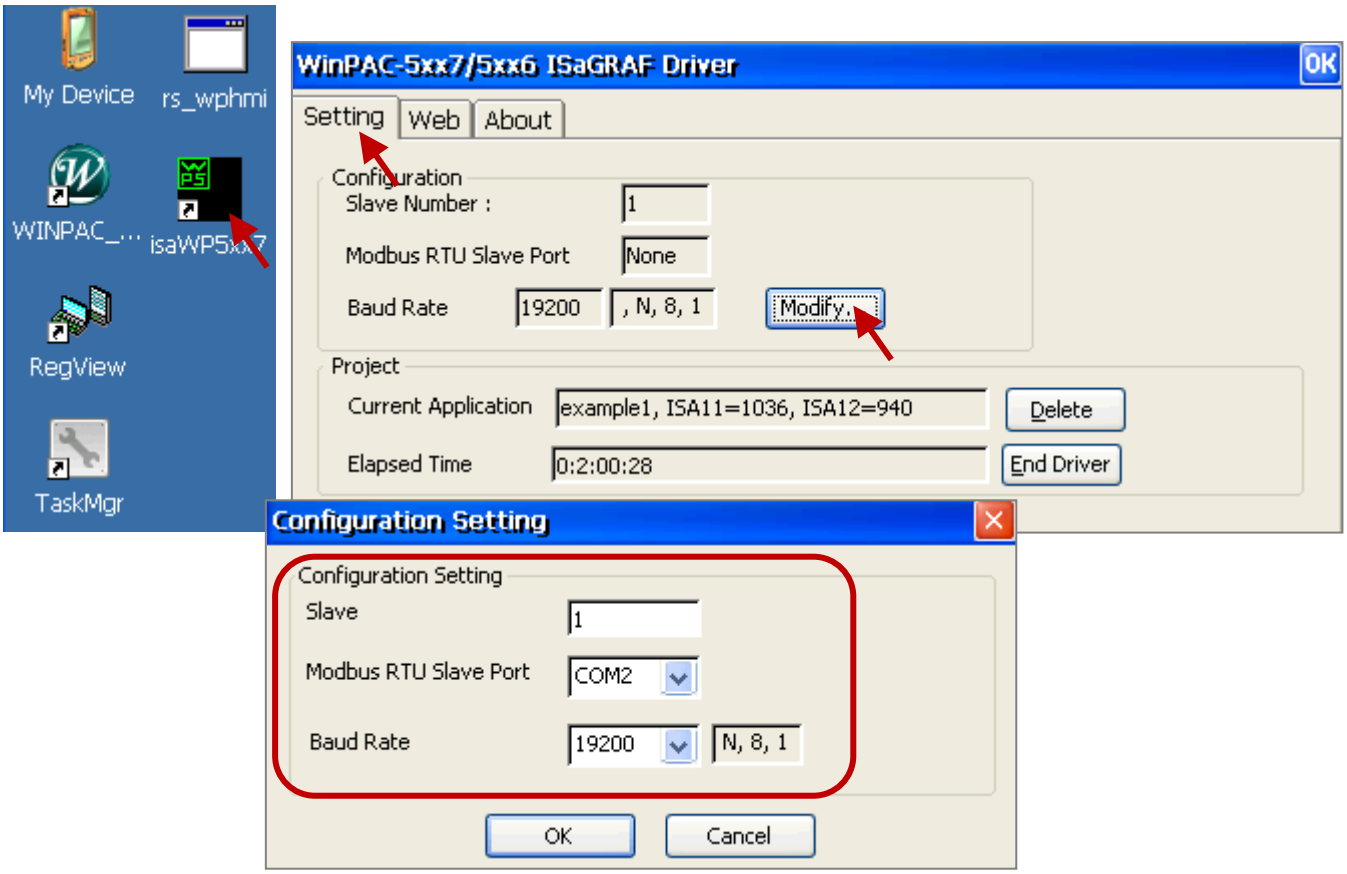
NS-208: 10/100M, 8 ports

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

User may set WP-5xx7's Net-ID (Slave Number) to a No. from 1 to 255.

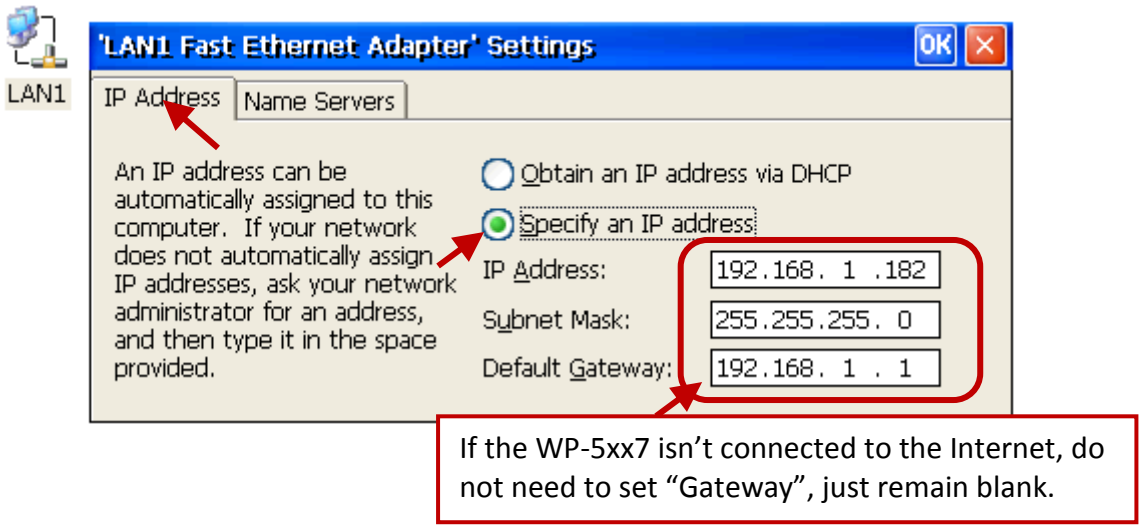
The default Modbus RTU slave port is "None" when shipped out. User may set it to others depends on its application (please also refer to Appendix G & Appendix E for more Modbus RTU ports).

Then please reset the WinPAC-5xx7 once after the modification to make the new setting work.

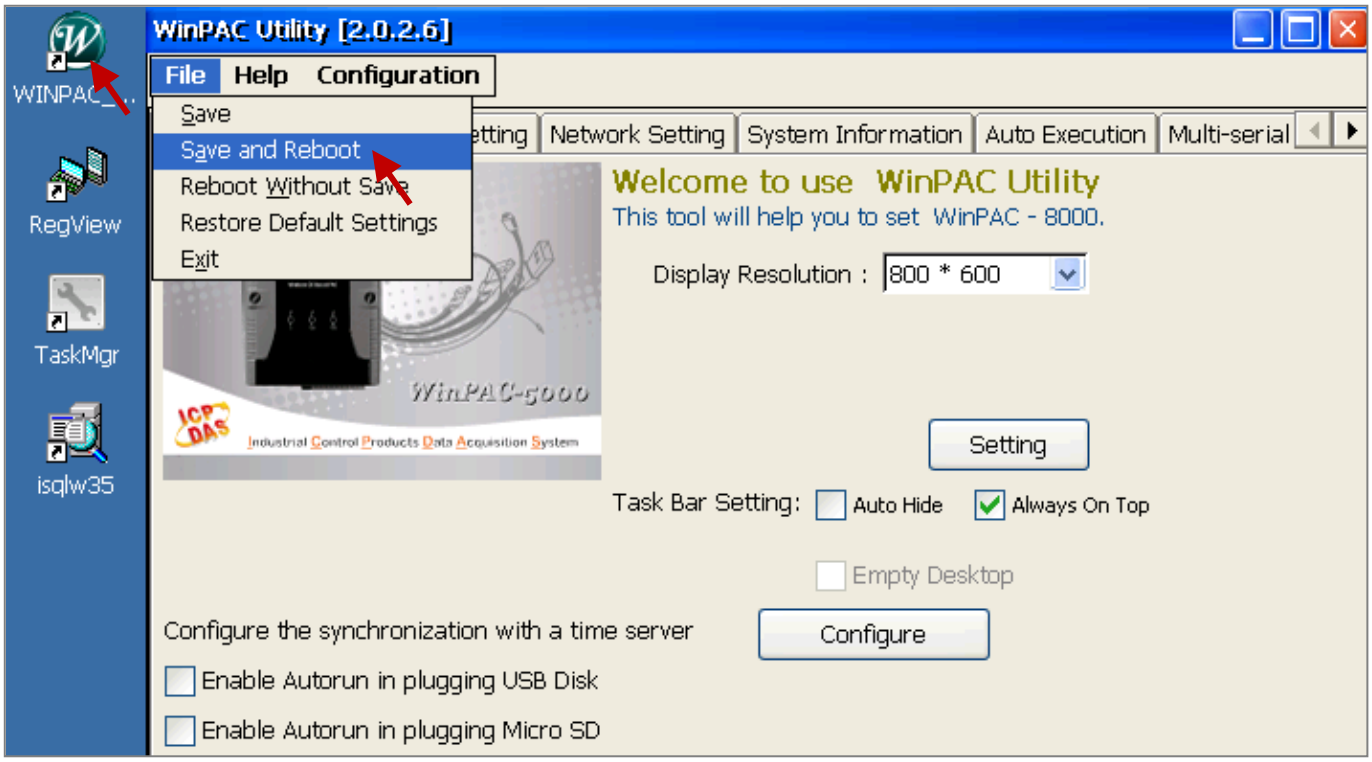


A.3 Setting the IP Address for the WP-5xx7

Please run [Start] > [Settings] > [Network and Dial-up Connections] on the WinPAC. Then click on “LAN1” and “LAN2”. Set your WinPAC’s IP address & its Subnet Mask. (Please always set as Fixed IP for ISaGRAF application, No DHCP)



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



A.4 Connecting Your PC to the WP-5xx7 Ethernet Port

Before you can download an ISaGRAF application to the WP-5xx7 controller using the Ethernet port, you must first setup the Ethernet port to properly communicate with the PC.

On the WP-5xx7:

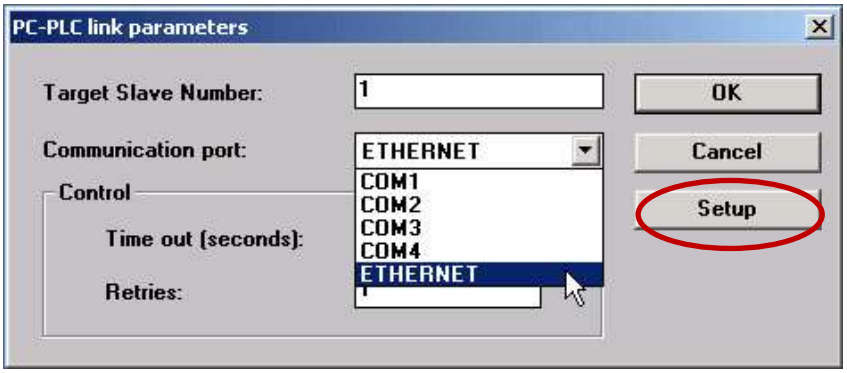
Set IP, Mask and Gateway address.

Please refer to former section – "A.3: Setting the IP Address for the WP-5xx7"

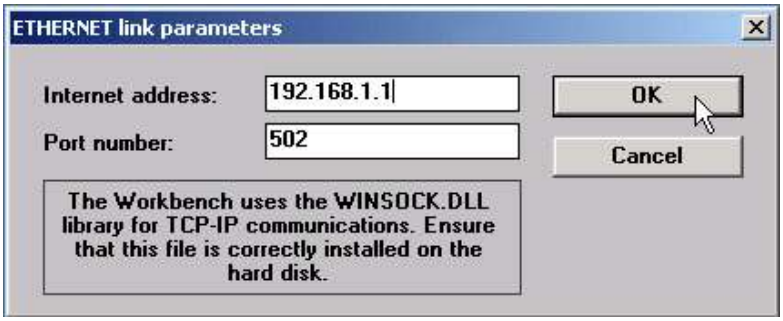
On your PC:

First open an ISaGRAF project and select a program you wish to communicate between your PC and the WP-5xx7 controller system. Next, select the "Link Setup" button on the project screen as shown below.

A "PC-PLC Link Parameters" dialog box will appear as shown below. From here select the "Ethernet" communications option and click on the "Setup" button.



Once you have clicked on the "Setup" button, an "Ethernet Link Parameters" dialog box will appear. Set the "Port Number" to "**502**" and enter in the **Internet address (IP) of the WP-5xx7** controller.



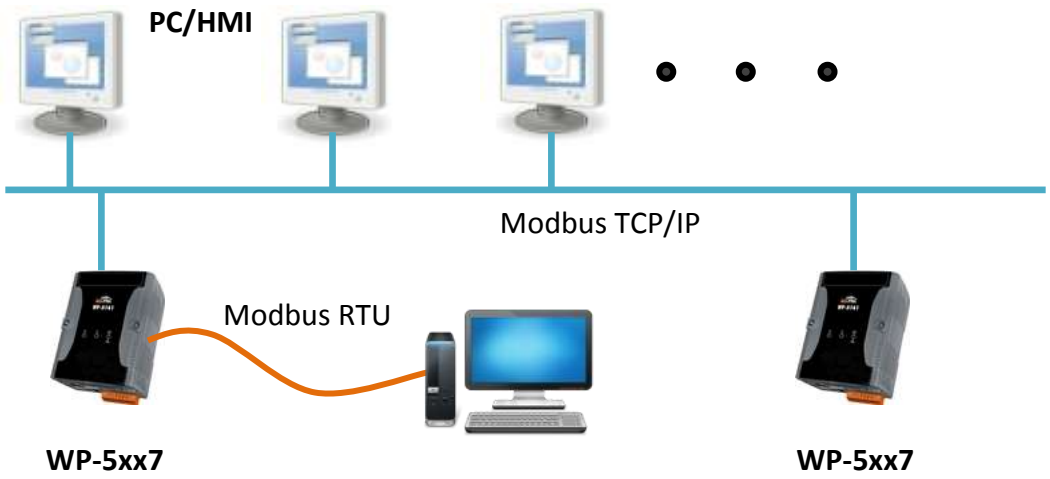
Once you have entered the appropriate information, click on the "OK" button.

Now you have configured your PC to communicate with the WP-5xx7 through the Ethernet port.

A.5 Pin Assignment of COM1, COM2, COM3 and Multi-Clients Connection to the WP-5xx7

Each WP-5xx7 has an IP address and with a fixed Ethernet port No. **502.** Up to 32 PCs can link to one WP-5xx7 throughout Ethernet (Modbus TCP/IP protocol, one TCP/IP connection for each PC).

Other PC or HMI can link to COM2: RS-485 port or COM3: RS-232 (or COM1, 5, 6... Appendix G & E) (Modbus RTU slave)

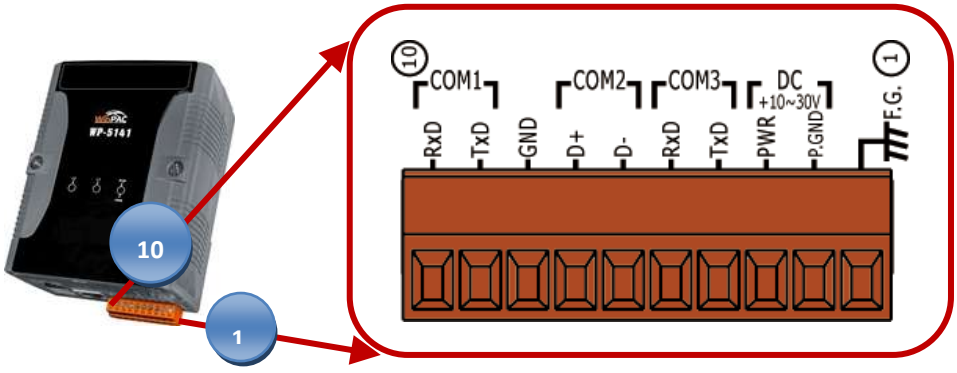


Options: Industrial Ethernet Switch:

www.icpdas.com > Product > Solutions > Industrial Ethernet Switch & Fber Switch > Unmanaged Ethernet Switches

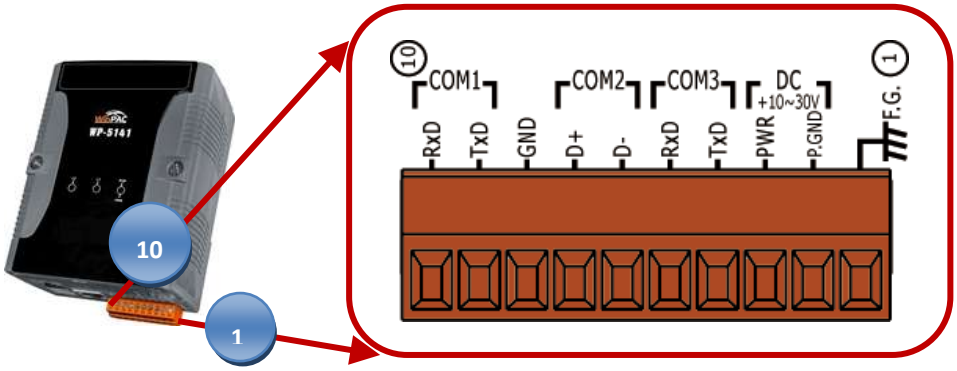
NS-205: 10/100M , 5 ports
NS-208: 10/100M , 8 ports

Pin Assignment:
COM1, COM2 and COM3:

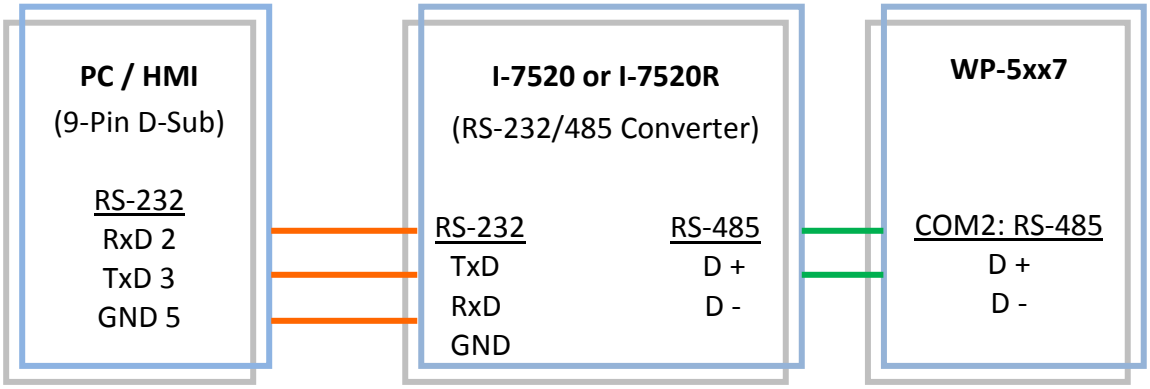


A.6 Connecting PC to WP-5xx7 COM Ports

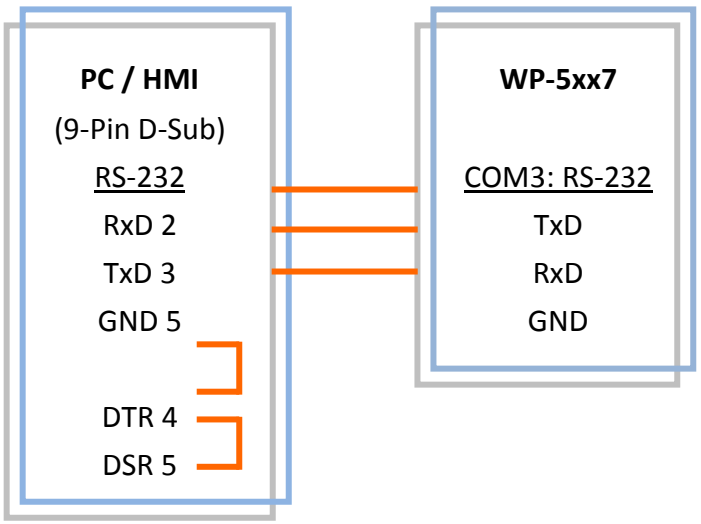
The default Modbus RTU slave port is “None”. User may change it to “COM2: RS-485” or “COM3: RS-232” or “None”. (Please refer to “A.2: Modify the NET-ID & Modbus RTU Port Setting” and Appendix G & E for more Modbus RTU ports. Default communication parameter is “19200, 8, N, 1”



If connecting PC to WinPAC COM2: RS-485, an I-7520 (RS-232/485 converter) is necessary as below.



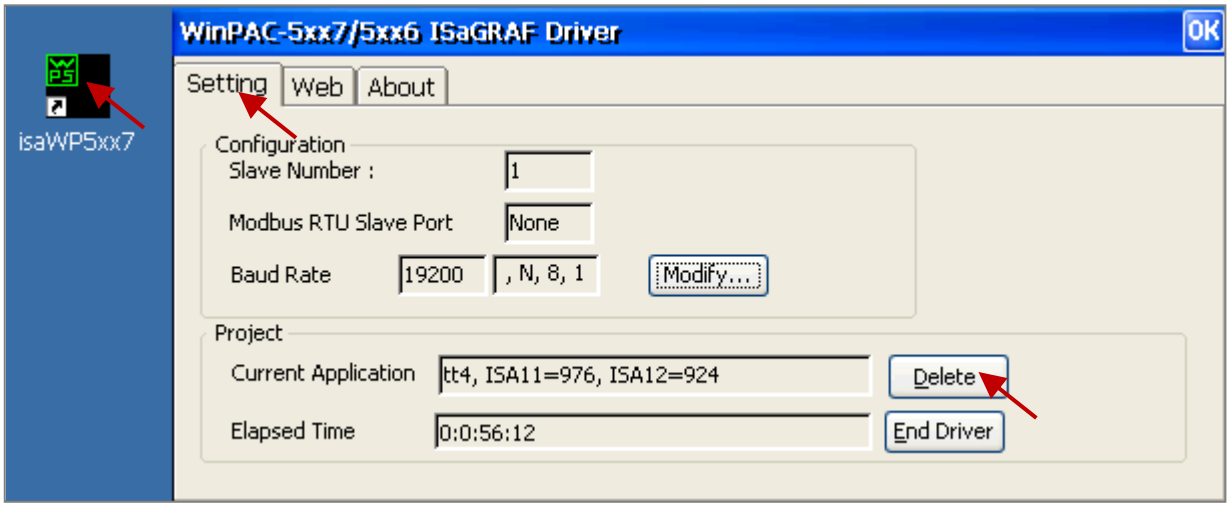
For the ISaGRAF Workbench RS-232 communications to operate properly, only the RXD, TXD, and the GND signals are used. If your PC is running a hardware device or software program that uses the CTS and DSR signals, you will need to wire the RTS-CTS and DTR-DSR signals together as shown below.



A.7 Deleting the ISaGRAF Project from the WP-5xx7

For some reasons, user may delete the ISaGRAF program in the WinPAC-5xx7 controller.

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



Delete WinPAC-5xx7's ISaGRAF program if some software damage happens causing the WinCE software hanging.

4. Please turn the rotary switch to postion 1 (Safe mode) on the front panel of the WinPAC-5xx7. Then reset the WinPAC-5xx7 once.

5. Then the WinPAC-5xx7 will boot up as safe mode. There will be one pop-up window asking “... reboot right now ...” , please answer “No”. Then get into the “My Device” on the WinCE desktop. Please goto the “\Micro_SD\ISaGRAF\” directory. Then delete the “ISA11”. The “ISA11” is the ISaGRAF current running application. (If you find no “ISA11” in the \Micro_SD\ISaGRAF\ directory, please goto Explorer > View > Options to modify the setting)

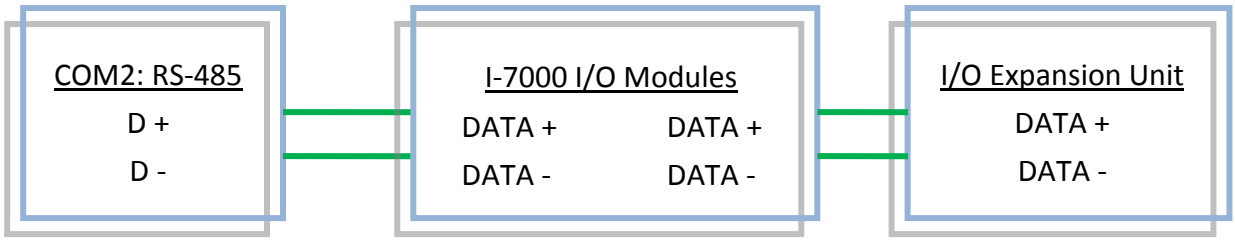
6. Turn the rotary switch to position 0 (normal), and then reboot WinPAC-5xx7. Then when ISaGRAF is connected, it will display “No Application”.

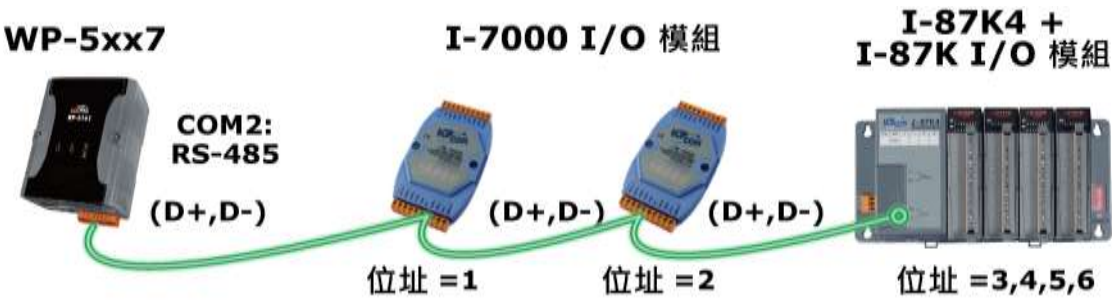
A.8 Linking I-7000 and I-87K Modules for Remote I/O

The WP-5xx7 controller system can use one of its COM2 (RS-485) to link to ICP DAS's "I-7000" and “I-87K” series of 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 modules to one WP-5xx7 controller system (It is better not to link up to 40 pcs. of I-7000 or I-87K). You must remember to set each I-7000 and I-87K remote module must have a unique address, and be set to the same baud rate as the WP-5xx7 controller system.

For more information regarding setting up and programming an I-7000 / I-87K remote module, please refer to chapter 6 - "Linking To I-7000 and I-87K Modules" of the “User’s Manual Of ISaGRAF PAC”.





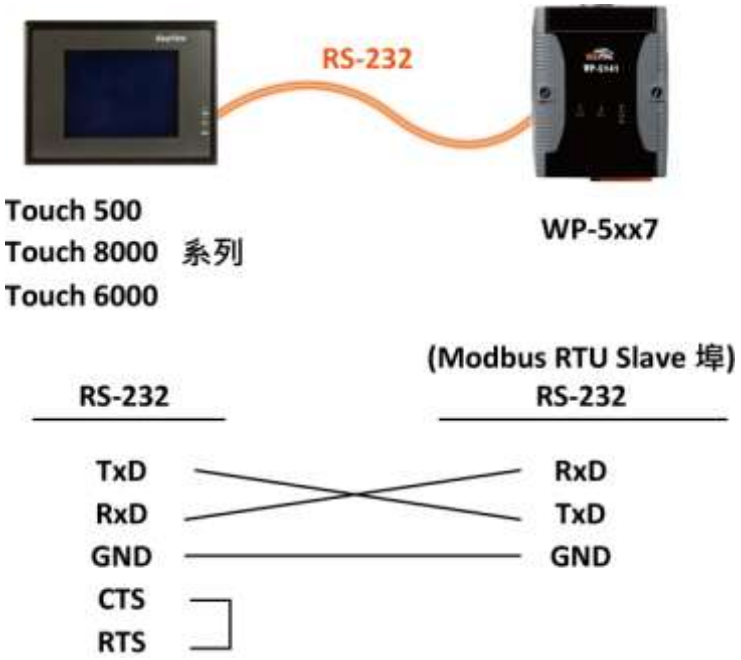
Without using COM2, you can also use COM3 (RS-232) to connect, and it requires a RS-232 to RS-485 Converter (e.g. I-7520R) and then link to I-7000 I/O modules.

A.9 Linking to an HMI Interface Device

One of the COM2 or COM3 (or max. four of the COM1, 5, 6, 7, 8, please refer to Appendix G & E) ports of the WP-5xx7/5xx6 controller system can be used to interface with additional Human Machine Interface (HMI) devices such as touch displays.

Please refer to Section A.2 first for setting Modbus RTU port at one of COM2 or COM3. 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 regarding interfacing the Touch series of MMI devices to the WP-5xx7/5xx6 controller system, please refer to chapter 4 - "Linking the I-8xx7 to HMI Devices" of the "User's Manual of the ISaGRAF Embedded Controller".



A.10 Linking to Other Modbus Devices

The COM2 (RS-485) or COM3 (RS-232) (or COM1, COM5 to 12, refer to Appendix E) supports Modbus Master Protocol. Please refer to chapter 8 of the "User's Manual of the ISaGRAF Embedded Controllers" for more information.

RS-232:

WP-5xx7 Modbus Device

COM1, 3		RS-232
TXD	———	RXD
RXD	———	TXD
GND	———	GND
		CTS
		RTS

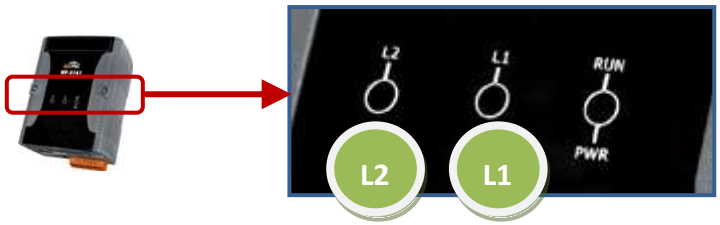
RS-485:

WP-5xx7 Modbus Device Modbus Device

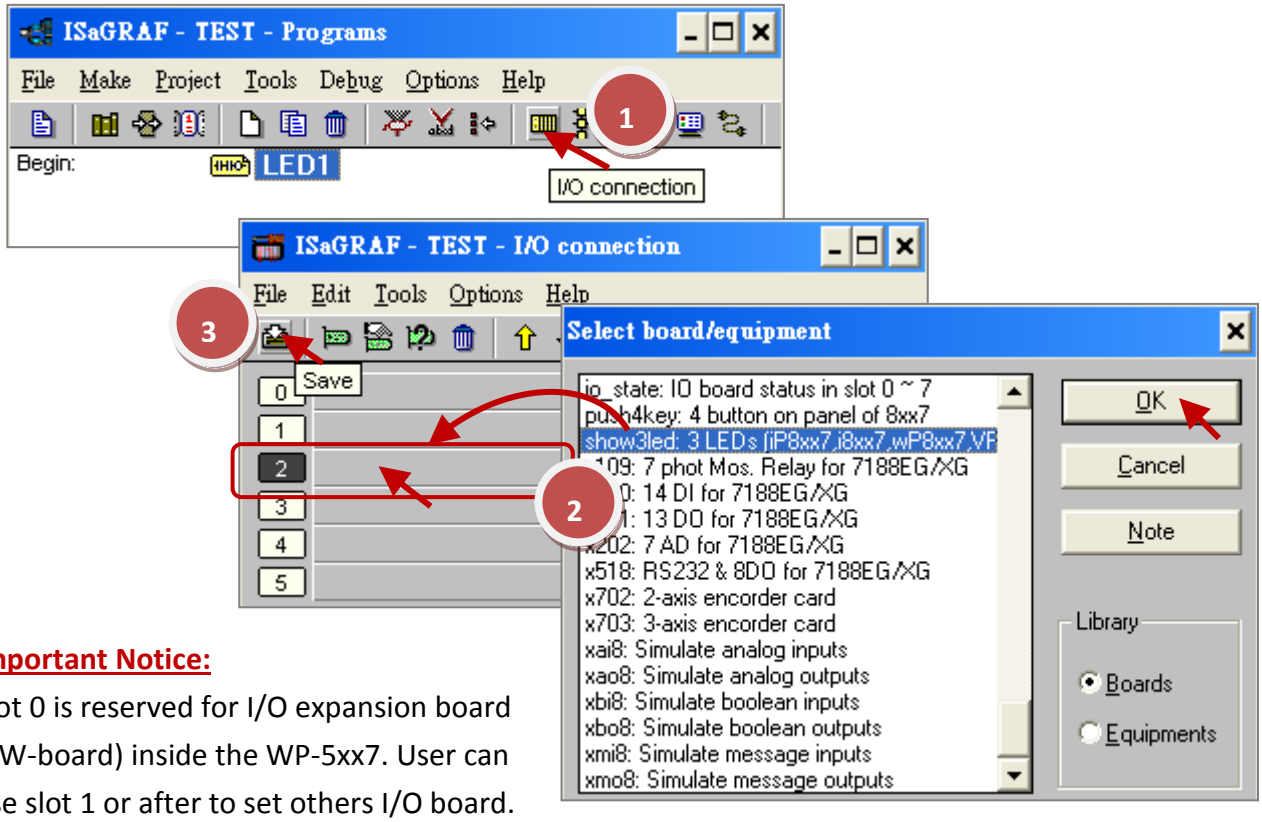
COM2		RS-485		RS-485
D +	———	485 +	———	485 +
D -	———	485 -	———	485 -

A.11 Control the L1 and L2 LED

In the ISaGRAF, you can use “show3led” function in the “I/O Connection” window to achieve this procedure.



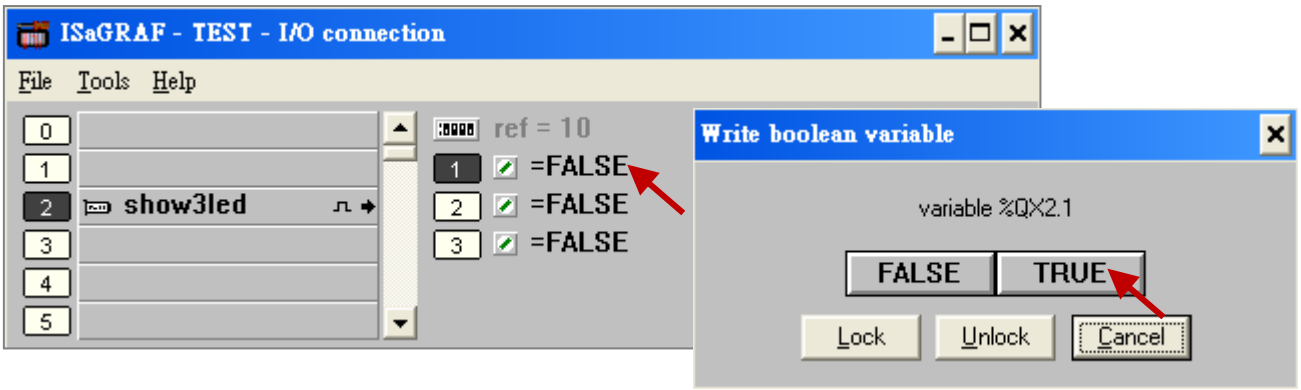
1. Mouse click “I/O Connection” to open the window.
2. In the “ I/O Connection” window, double-click on a slot number large than “0” and select “show3led” then click “Save” ◦



Important Notice:

Slot 0 is reserved for I/O expansion board (XW-board) inside the WP-5xx7. User can use slot 1 or after to set others I/O board.

3. Please refer to Section 5.2, 5.3 to compile the program and then download to the WP-5xx7.
4. After downloading, open the “I/O Connection” window and change the status of I/O (False > True) then view the change of LED light on the front pannel of the WP-5xx7.



Appendix B Upgrade WinPAC's ISaGRAF Driver to Newer Version

Note:

If you have purchased WP-5xx7, the ISaGRAF Driver is already installed with license when shipping out. You don't need to install it. However if you want to upgrade to newer version, you may upgrade it by yourself.

The WinPAC ISaGRAF driver can be obtained in the WinPAC-5xx7 CD-ROM:

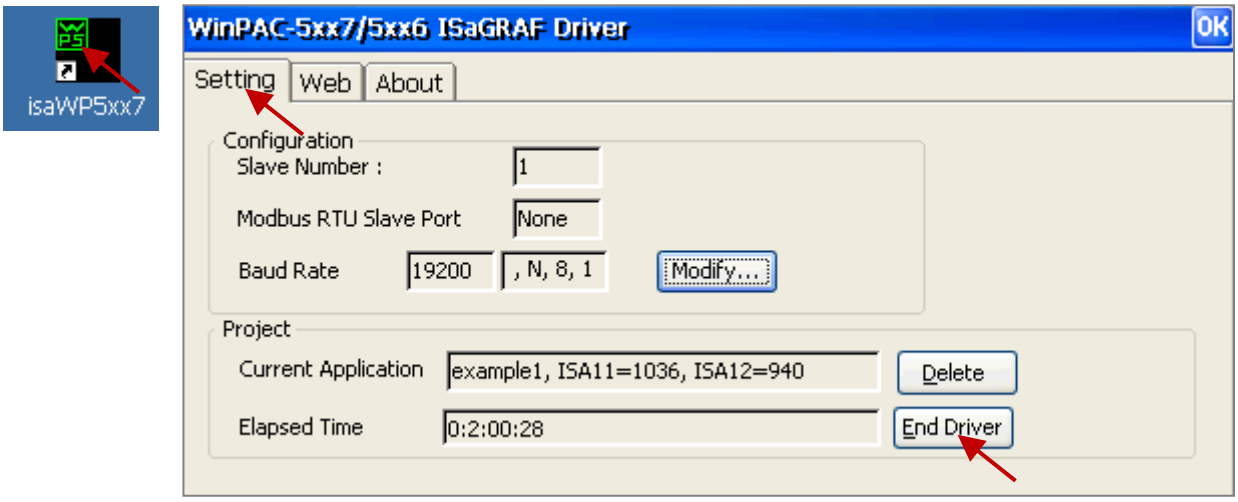
\napdos\isagraf\wp-5xx7\driver\<version Number>\

EX: version 1.01 is located at \napdos\isagraf\wp-5xx7\driver\1.01\

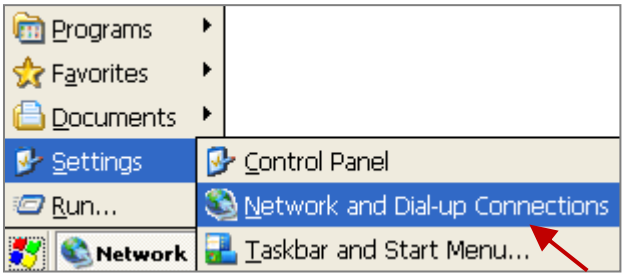
Or download it from

www.icpdas.com > Product > Solutions > Soft PLC, ISaGRAF & Soft-GRAF HMI > ISaGRAF > Driver

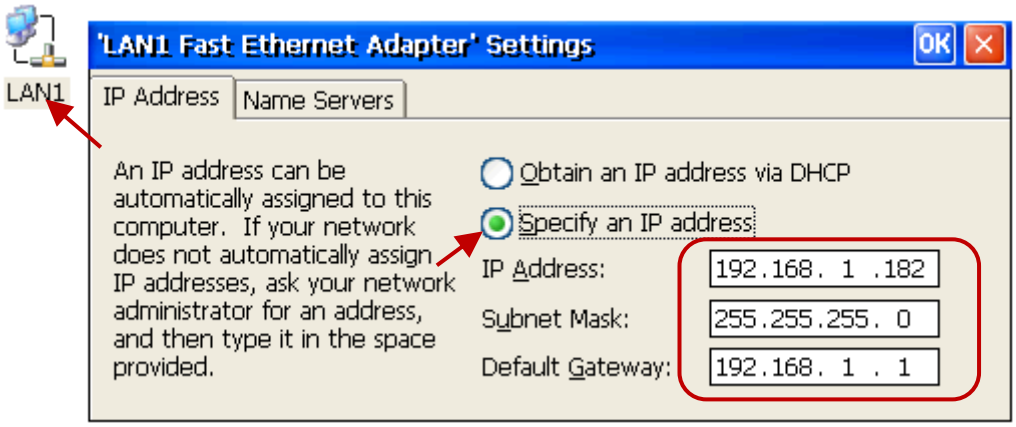
1. If your WinPAC is WP-5xx7/WP-5xx6, please stop "WinPAC ISaGRAF Driver" first. (Click on "End Driver" button to stop it.) However, if it is WP-5xx1/5xx9 (WinPAC without ISaGRAF license), please goto step 2.



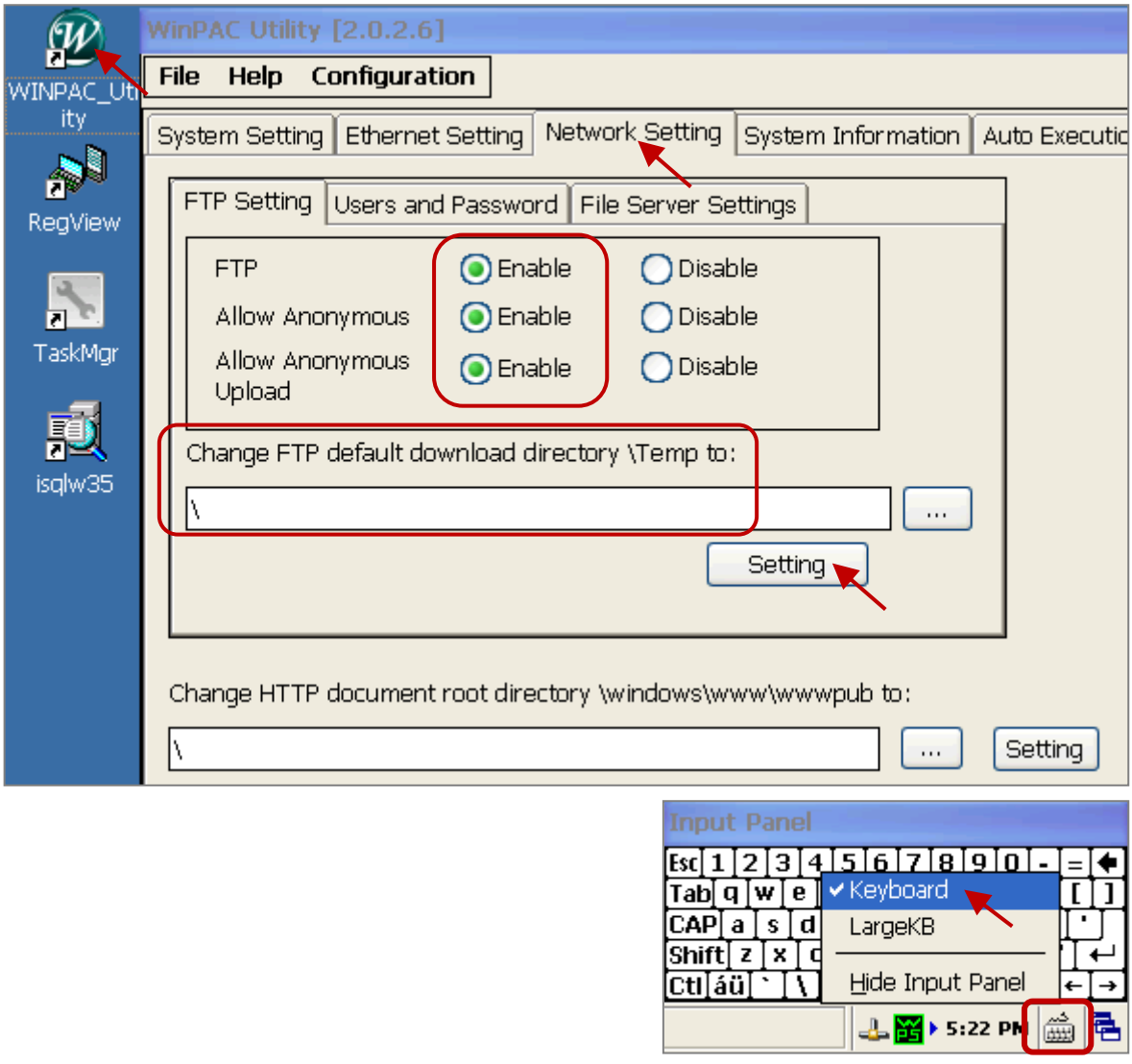
2. Set up WinPAC's IP, Mask, FTP directory & Auto-execute.
   A. Please create a folder "ISaGRAF" inside "\Micro_SD\" folder in your WinPAC controller. Then it will be \Micro_SD\ISaGRAF\
   B. Please run "Start" – "Setting" – "Network and Dial-up Connections" on the WinPAC.



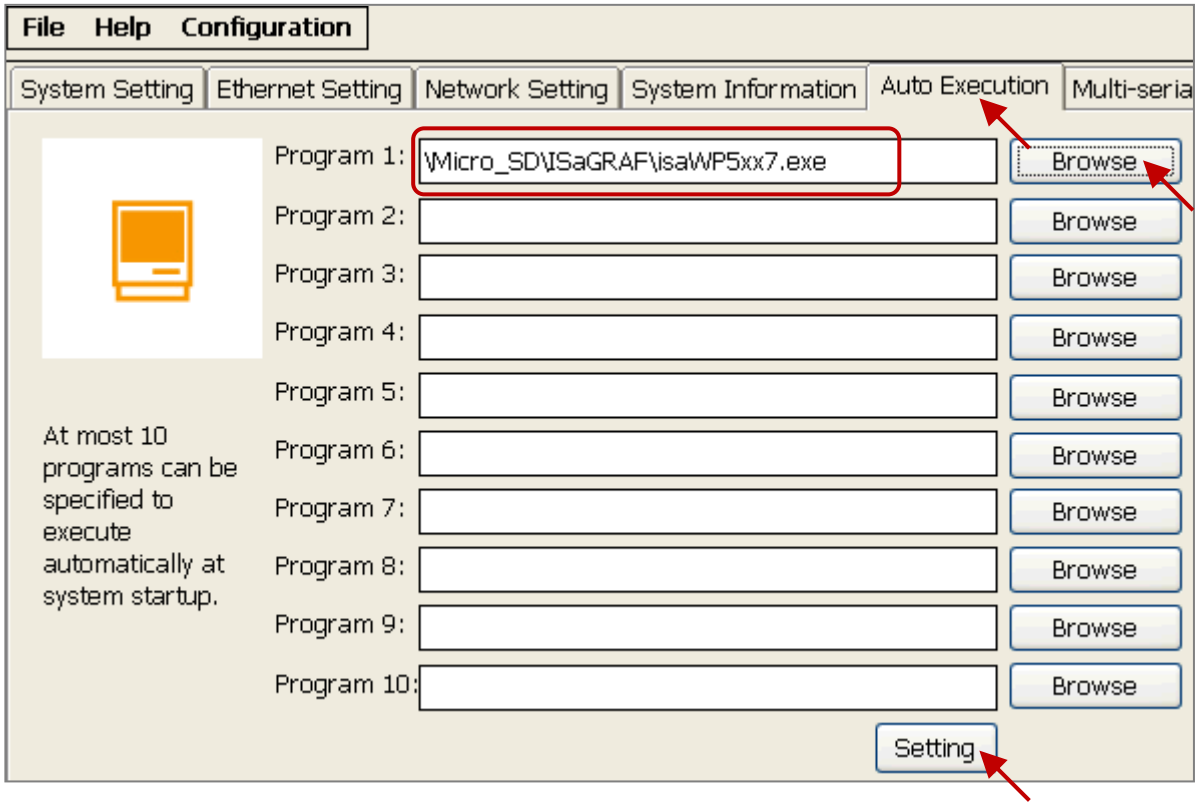
Then click on “LAN1” and “LAN2”. Set your WinPAC’s IP address & its Subnet Mask. (Please always set as Fixed IP for ISaGRAF application, No DHCP)



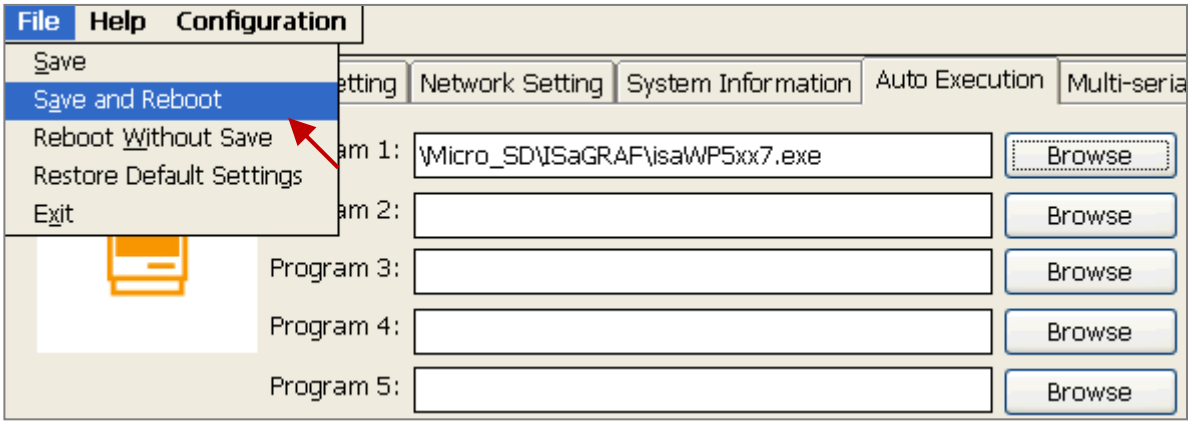
C. Please run “Start” – “Programs” – “WinPAC Utility”. Set FTP directory to the root dircetory “\”. Then check all three ftp options as “Enable”. Remember to click on “Setting”. Then click on “Auto Execution” to do the next step.



D. Please click on “Auto Execution” tab and then click on “Browse” to select or type “\Micro_SD\ISaGRAF\isaWP5xx7.exe”, then click on “Setting”.



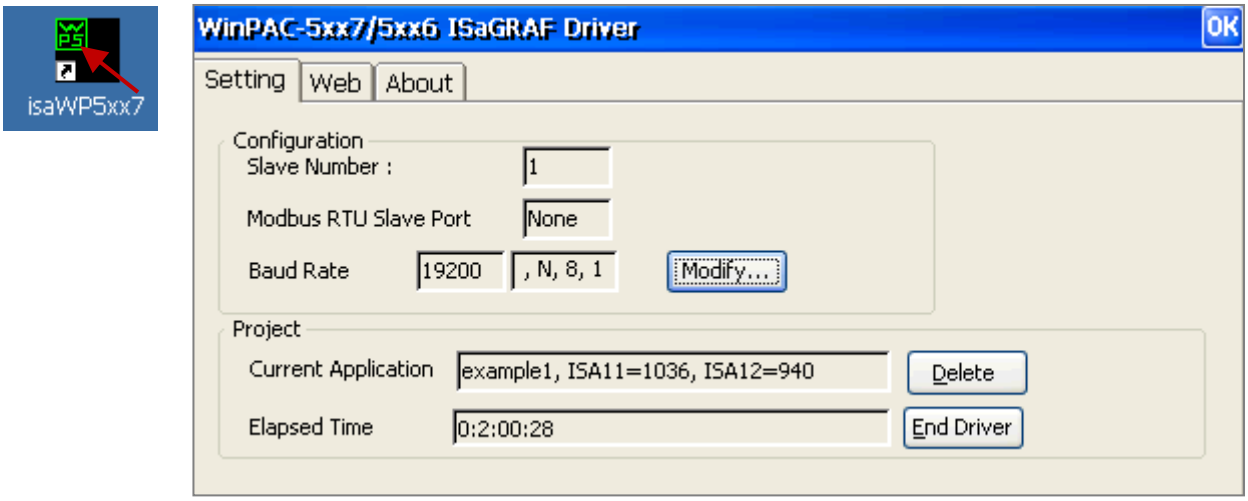
E. Run “Save and Reboot” to store the setting in step A thru. D and then it will auto-reboot the WinPAC once.



3. After the WinPAC reboot successfully, please stop the ISaGRAF driver again. (The original WP-5xx1 / 5xx9 doesn't have the ISaGRAF driver running, only the WP-5xx7/5xx6 have it)

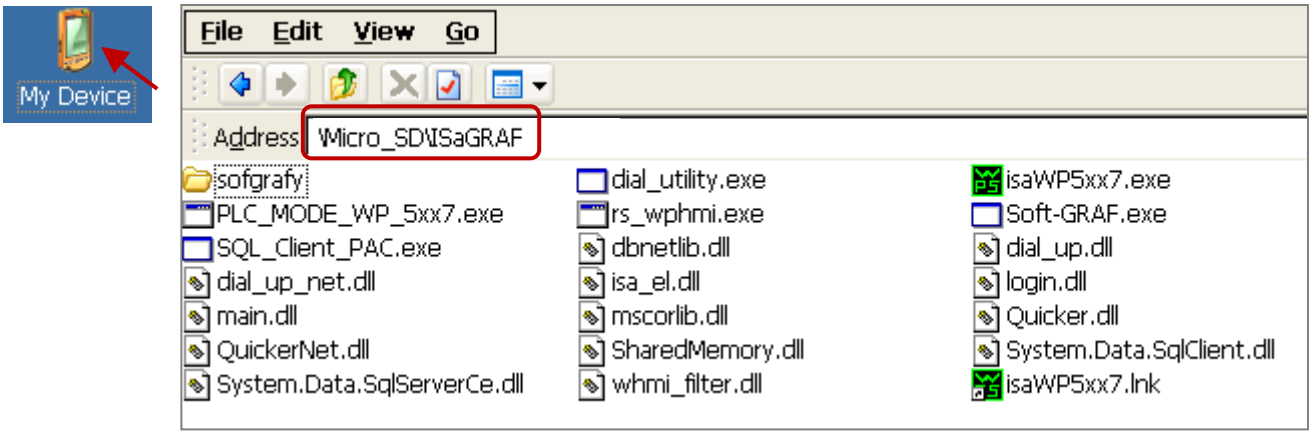
Note:

If the ISaGRAF driver is still running, the files copied are failed even your eyes tell you it is successful.



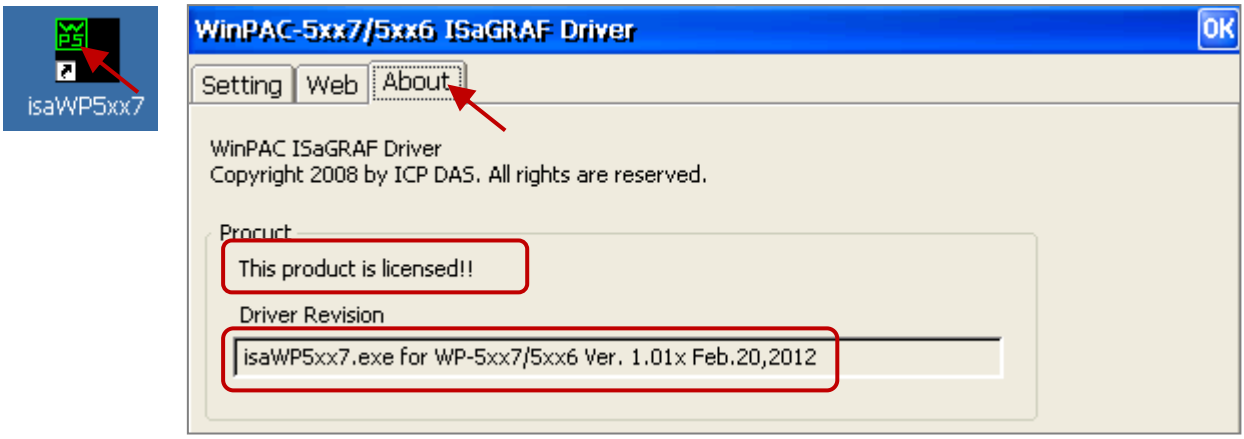
Then unzip the downloaded file (for example, “wp-5xx7-1.01.zip”) and copy all files in the sub-directory with a version number (for example, all files in the sub-directory “1.01”) into the path - “\Micro_SD\ISaGRAF\” of the WP-5xx7 via FTP or USB disk. And then re-cycle your WinPAC’s power.

(Note: Files shown in the below figure may be different depending on its driver version.)



You may use PC's ftp utility to download these files.
Please open Internet browser and then type in ftp://<IP address>, for ex. Ftp://192.168.1.178 , browse it to the \Micro_SD\ISaGRAF\. Then copy all of them & past it.

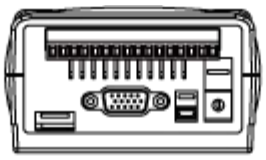
Then remember to re-cycle your WinPAC's power again. After it re-boot again, it will have the new ISaGRAF driver running. You can check if the version is correct.



Appendix C Dimension

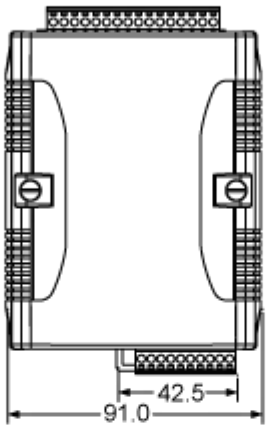
Unit: mm

Top View



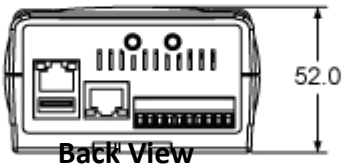
Left Side View

Front View

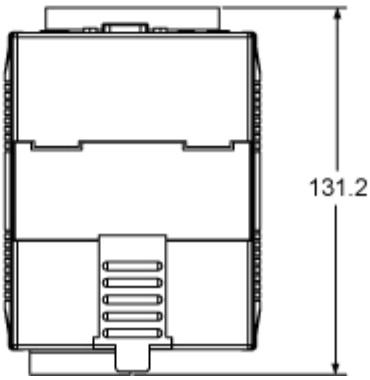


Right Side View

Bottom View



Back View



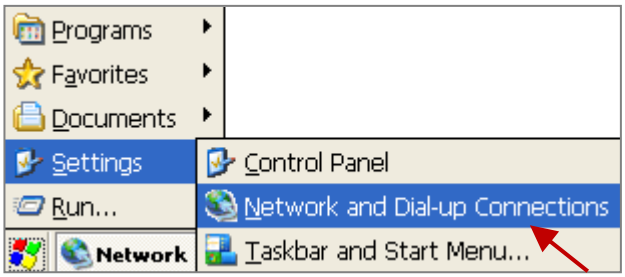
Appendix D How to Enable/Disable WP-5xx7's LAN2

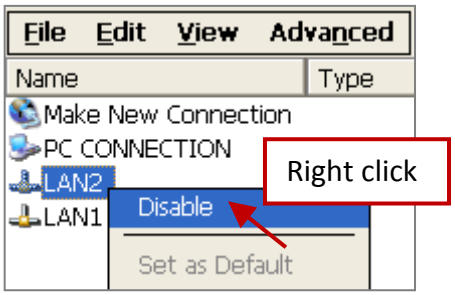
Important Notice:

1. Recommend to use the Industrial Ethernet Switch (NS-205/NS-208) or Real-time Redundant Ring Switch (RS-405/RS-408) for WP-5xx7/5xx6.
2. Please always set a fixed IP to LAN1 (and LAN2 if it is enabled) for ISaGRAF applications.
3. The default setting of LAN2 of WP-5xx7 is disabled. User must enable it before using LAN2 port.

ISaGRAF **must** use WP-5xx7's LAN2 when using "Ebus" (section 7.5 of the ISaGRAF User's Manual) and "New Redundant system" (please refer to www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-093). ISaGRAF **may** use LAN2 when using "Delivering message via UDP or TCP" (section 19.2 and 19.3 of the ISaGRAF User's Manual).

Please open [Start] > [Settings] and then click on "Network and Dual-up Connections" to set as LAN2 as Enable (or Disable).





Then run [Start] > [Programs] > [WinPAC Utility], click "Save and Reboot" to save the setting.

Appendix E Using Expansion RS-232/485/422

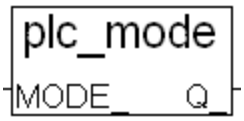
"Reserved".

Appendix F Slow Down ISaGRAF Driver's Speed

You may wonder why? The faster speed is not good?

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. Because the CPU is the 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 function – "PLC_Mode( )" 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 ~ 3 ms
1: Slow Mode, the minimum PLC scan time is about 6 ~ 7 ms
2: Slower Mode, the minimum PLC scan time is about 9 ~ 11 ms
3 or other value: Slowest Mode, the min. PLC scan time is about 19 ~ 21 ms

Return:

Q_ boolean always return True

Note:

1. The system's default setting is "Fast Mode"
2. User may call "PLC_mode( )" in the first PLC scan to change the PLC speed.
3. The reason to slow down the PLC speed is to improve the speed performance of other HMI program running with ISaGRAF driver at the same time, for example, running InduSoft with ISaGRAF 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 Salve Ports

The WinPAC-5xx7/5xx6 can setup up to five Modbus RTU slave ports in one of the COM2 or COM3 and in four of the COM1, (COM5 to COM8 are the expansion multi-serial ports in slot 0 to 3, refer to the Appendix E) .

1. The first Modbus RTU slave port can be one of the COM2 or COM3 which can be set on the "WinPAC's monitor" by mouse (refer to the Appendix A.2).

2. User may enable 2nd, 3rd, 4th or 5th Modbus RTU slave port in COM1, COM5 to COM8.
   (No support other COM port number)

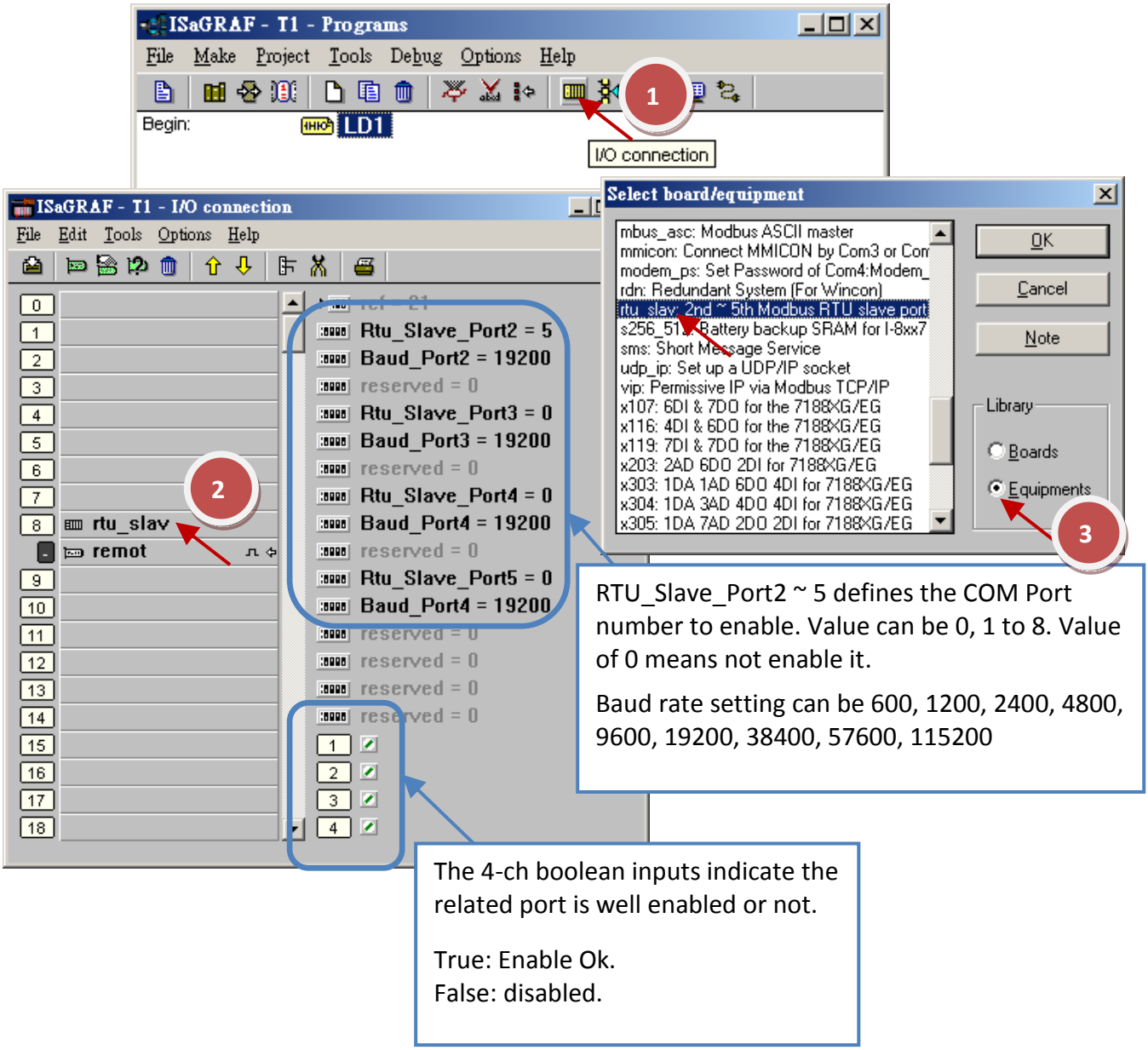
3. Before using this function, please make sure the above ports do exist and well configured. (refer to the Appendix E)

4. Via 2nd, 3rd, 4th or 5th Modbus RTU slave port, user may use ISaGRAF to Debug/Set_val to the controller, however user cannot Stop/Download/Update the ISaGRAF program.

5. To Debug/Set_val/Stop/Download/Update the ISaGRAF program, please use Ethernet port or the first Modbus RTU slave port (COM2 or COM3) if enabled. The second slave port of COM1, COM5 to COM8 are not for ISaGRAF to Stop/Download/Debug.

How to Setup ?

Please connect “Rtu_slav” in the ISaGRAF IO connection window. Re-compile the project and download to the WP-5xx7 via Ethernet (or first Modbus RTU port if it is enabled)

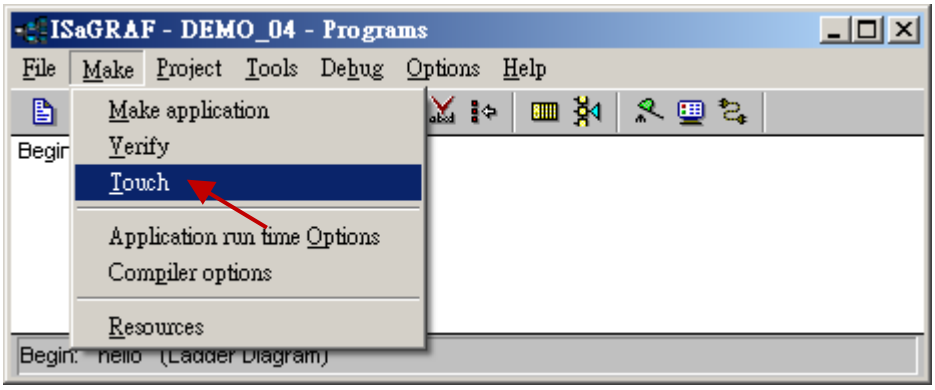


Appendix H Compiling Error Result in Different ISaGRAF Version

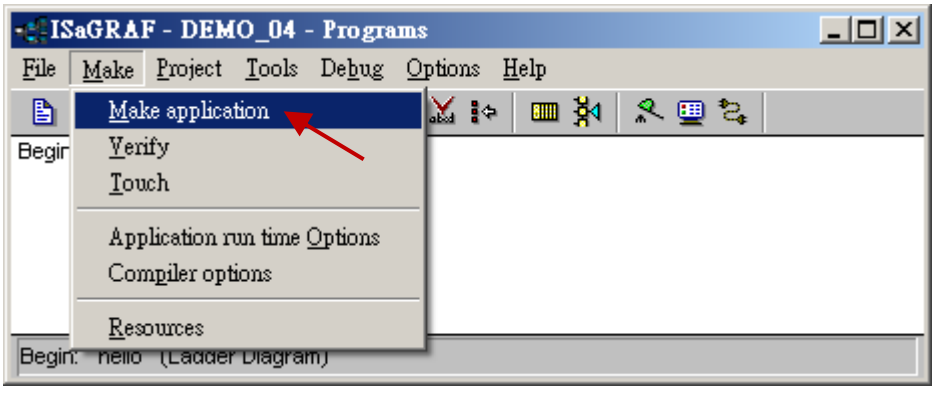
In the recent years since 2003, all the ISaGRAF example programs provided in the ICP DAS CD-ROM & Web site are written in ISaGRAF workbench version of 3.46. If your ISaGRAF workbench is version of 3.51 or newer version, it may generate error when you re-compile these example programs.

To erase this kind of error in different ISaGRAF workbench version, please run “Make” – “Touch” once. And then 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 next “Make” – “Make application” command will re-compile all of them.



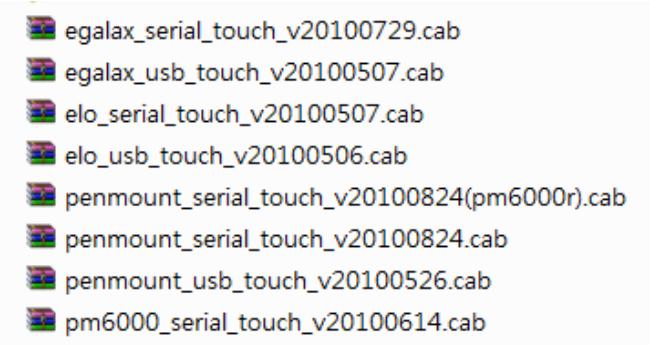
Appendix I Using RS-232 Serial/USB Touch Monitor

There are three types of RS-232 Serial or USB Touch monitor supported by the WinPAC.

"penmount_serial_touch" and "penmount_usb_touch" or penmount-compatible touch monitor.
"elo_serial_touch" and "elo_usb_touch" or elo-compatible Touch monitor.
"egalax_serial_touch" and "egalax_usb_touch" or egalax-compatible Touch monitor.

I.1 The Driver and Notice for installing the Touch Monitor

The touch monitor Drivers of WP-5xx7 are in the path " **\System_Disk\external_device_driver**" of PAC controller(listed below). Please run only the correct one for your Touch!
(The "_vyyyymmdd" may be a different name depends on its modification date.)



If you cannot find them, please download from the following web link:
ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/micro_sd/external_device_driver/
Then copy the "external_device_driver" dictory to your PAC's \System_Disk\ via ftp.

Important Notice:

- **DO NOT** install both USB and RS-232 drivers in the same PAC at the same time.
- If you installed the wrong driver. Please uninstall the driver (refer to Appendix I.4) and then install the driver again.
- After installed the Touch HMI driver, if the monitor cannot display well (such as too large, too small, moire…), please refer to Appendix I.5 to adjust the WinPAC display frequency.

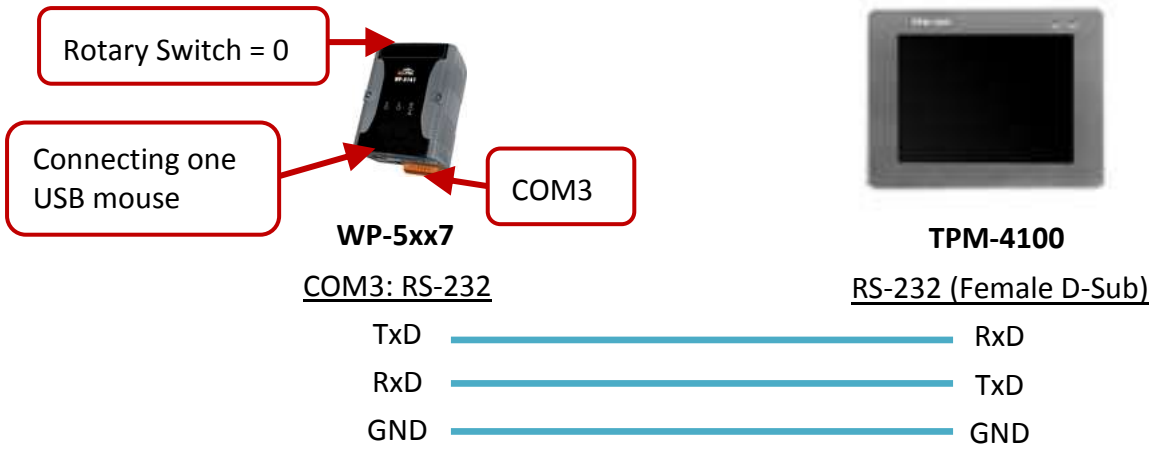
This Appendix I uses the "TPM-4100" Touch Monitor as the examples:

10.4" (800 x 600) Industrial resistive touch panel monitor with RS-232 or USB interface. Website:
www.icpdas.com > Product > Solutions > HMI & Touch Monitor > Touch Monitor > TPM-4100

I.2 The Steps for Using the RS-232 Touch Monitor on the WinPAC

1. Please connect the touch monitor and its RS-232 signal to the WinPAC's COM3 and connecting one USB mouse to your WinPAC for configuring the touch driver. Then make sure the rotary switch is in the "0" position (Normal Mode) then power on your WP-5xx7.

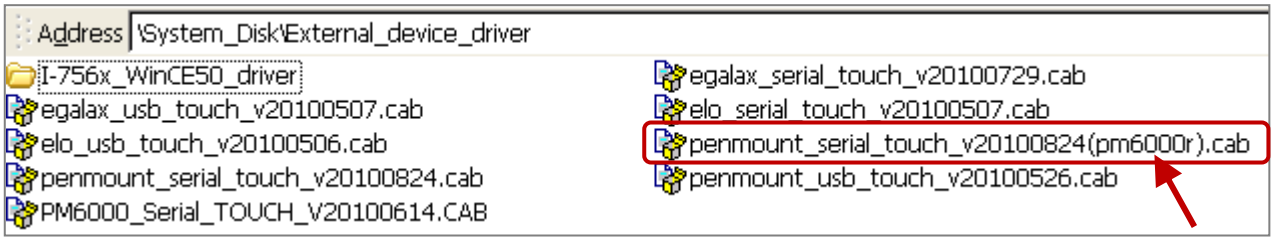
   For example, if the Touch monitor is "TPM-4100", 10.4" Industrial Panel Mount Monitor (aluminum front bezel), RS-232/USB Interface, refer to the website: www.icpdas.com > Product > Solutions > HMI & Touch Monitor > Touch Monitor > TPM-4100



   Please visit the website www.icpdas.com > Product > Solutions > Accessories > Cable to choose the appropriate cable.

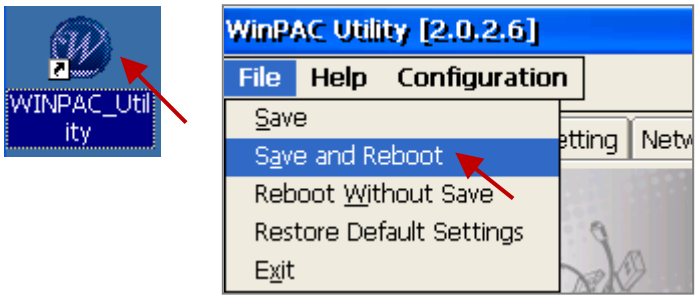
2. In this case, we use "TPM-4100" touch monitor.
   Please double-click on "penmount_**serial**_touch_v20100824(pm6000r).cab" in the WP-5xx7's \System_Disk\external_device_driver\ to install it. (The last "V20100824" may be a different name depends on its modification date)

Note : Users Must choose the correct driver! Moreover, the "egalax" and "penmount" versions can't be installed in the same PAC!



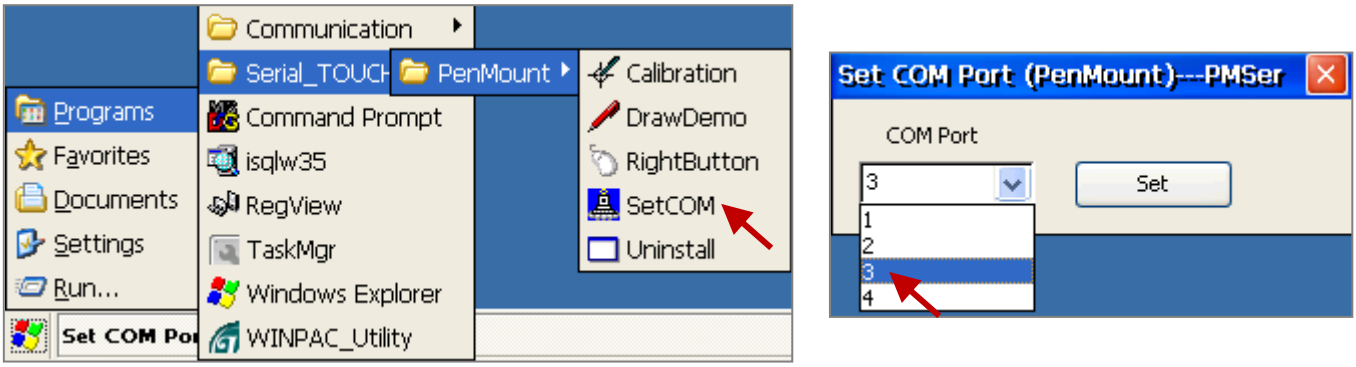
   (If you can't find out the driver under the \System_Disk\external_device_driver\, please visit ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/system_disk/ to download them, and then use FTP to copy the "external_device_driver" folder into the WP-5xx7's \System_Disk\)

3. After installing the driver, please run [WinPAC Utility] > [Save and Reboot] to save and reload.

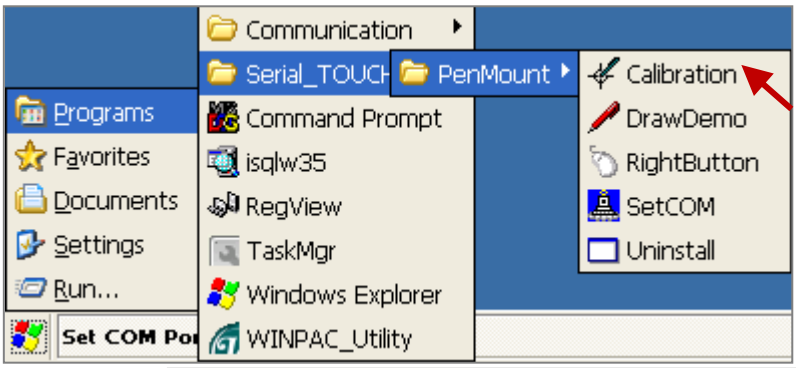


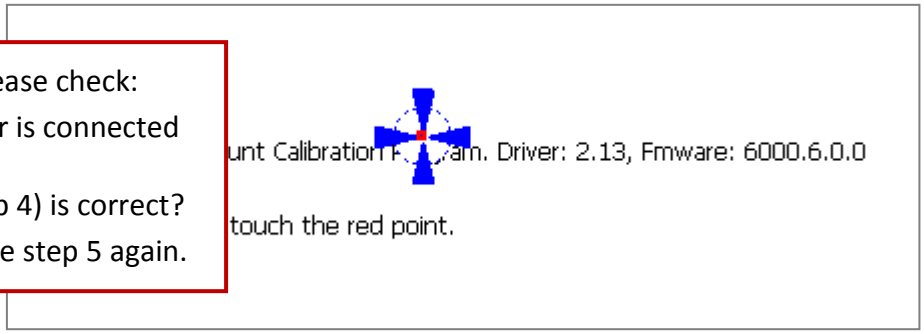
Note: If you ever remove the driver under the Safe Mode (Rotary Switch = "1"), please set the all settings again.

4. Click on "SetCOM" feature from the "Start" menu and set the COM Port number currently in use (e.g. COM3), then follow the step 3 to run [WinPAC Utility] > [Save and Reboot] to reboot the WP-5xx7.



5. Run the "Calibration" feature, and then follow the calibration command to touch the given point on the monitor by your finger. After doing this, follow the step 3 to run [WinPAC Utility] > [Save and Reboot] to save the calibration setting.





If you don't see this screen, please check:

1. The cable on touch monitor is connected well?
2. The "SetCOM" setting (Step 4) is correct?

Reboot the WP-5xx7 and do the step 5 again.

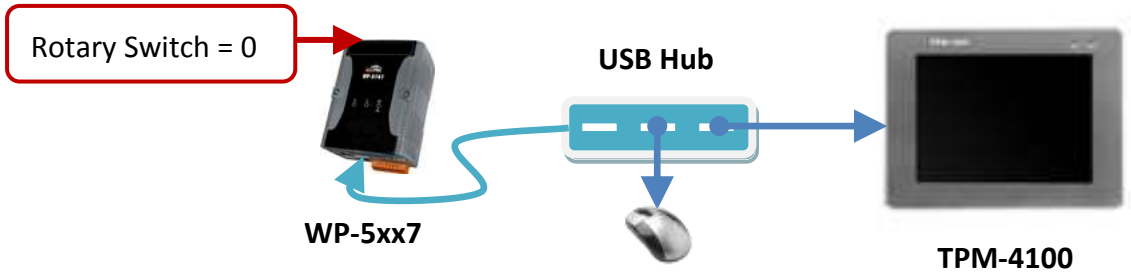
I.3 The Steps for Using the USB Touch Monitor on the WinPAC

In this section, we will use the ICP DAS "TPM-4100" (Panel Mount, RS-232/USB) touch monitor. Please refer to Section I.1 to get more information on the products page.

Note :

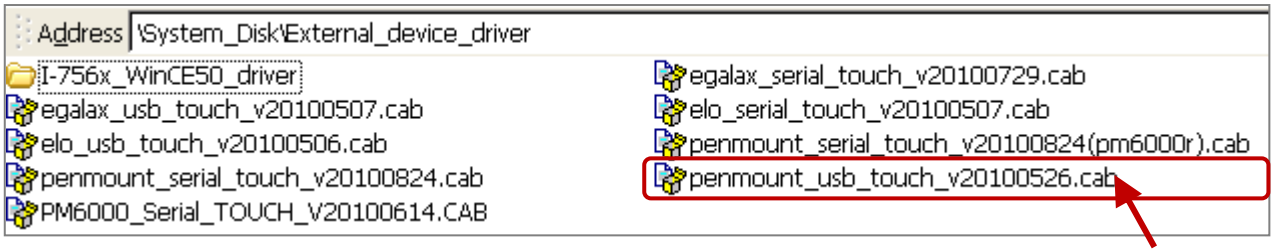
- To avoid the hardware conflicts, **DO NOT** install both the USB and RS-232 drivers in the same PAC.
- For using the USB touch monitor, it requires an external USB Hub and mouse to set the calibration. (After completing the setting, you can use the touch feature without USB Hub.)

1. Please connect the USB Hub to the WP-5xx7, and then connect a USB monitor and mouse to the USB Hub. Make sure the position of rotary switch is "0" (Normal Mode) then power on the WP-5xx7.



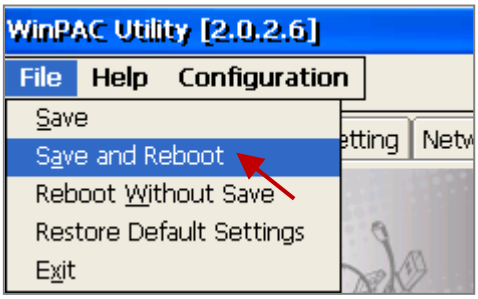
2. In this case, we use "TPM-4100" touch monitor.
   Please double-click on "penmount_**usb**_touch_v20100526.cab" in the WP-5xx7's \System_Disk\external_device_driver\ to install it. (The last "v20100526" may be a different name depends on its modification date)

Note : Users Must choose the correct driver! Moreover, the "egalax" and "penmount" versions can't be installed in the same PAC!



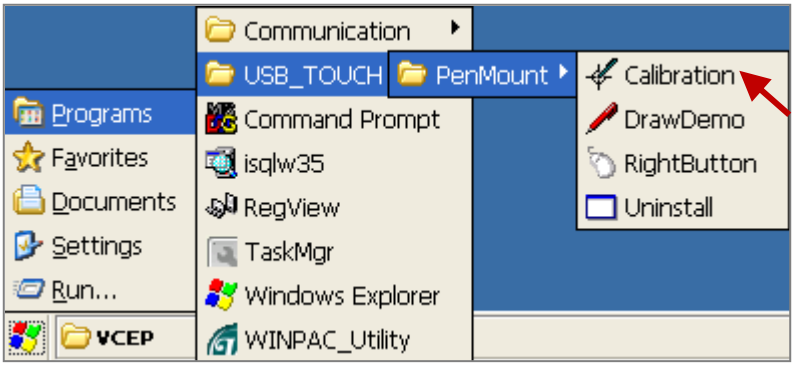
(If you can't find out the driver under the \System_Disk\external_device_driver\, please visit ftp://ftp.icpdas.com/pub/cd/winpac/napdos/wp-8x4x_ce50/system_disk/ to download them, and then use FTP to copy the "external_device_driver" folder into the WP-5xx7's \System_Disk\)

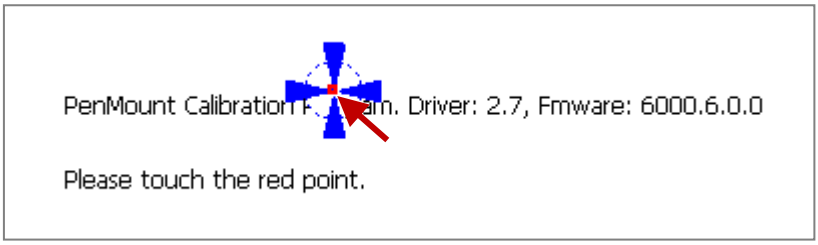
3. After installing the driver, please run [WinPAC Utility] > [Save and Reboot] to save and reload.



Note:
If you ever remove the driver under the Safe Mode (Rotary Switch = "1"), please set the all settings again.

4. Run the "Calibration" feature from the "Start" menu, and then follow the calibration command to touch the given point on the monitor by your finger.





5. After completing the calibration, you can start to try the touch function. Now, you can unplug the USB Hub and then connect the USB monitor directly to the WP-5xx7, then touch the monitor to run [WinPAC Utility] > [Save and Reboot] (refer to step 3) to save the calibration setting.

I.4 Uninstall the Touch Monitor Driver

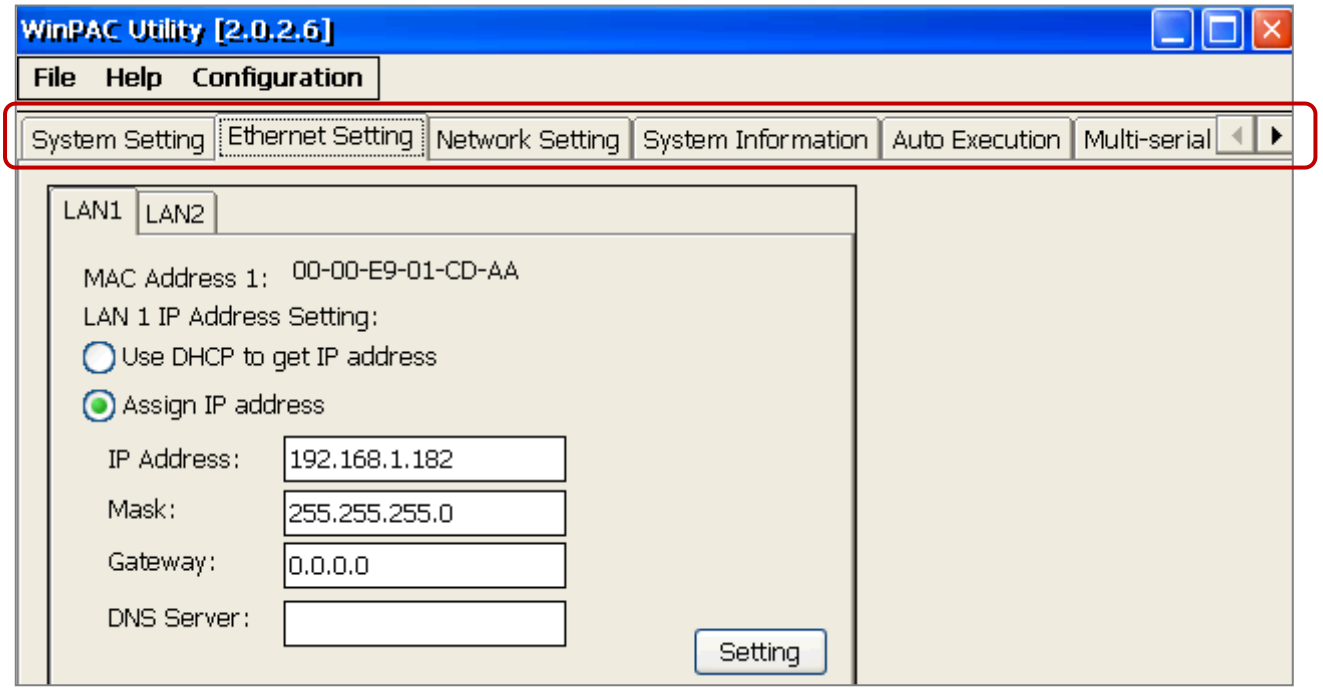
Note: After doing this procedure, the factory settings of ISaGRAF Driver such as "auto.exec" setting, IP setting (LAN1/LAN2) and so on will be removed. Please refer to Appendix A, Appendix A.3 to set it back.

Sometimes, users would like to uninstall the current driver due to install the wrong driver or need to replace different monitor. Please follow the steps to complete the procedure.

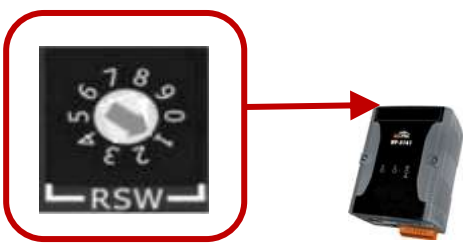
Important Notice:

- Before uninstall the driver, please unplug the cable between the touch monitor and PAC.
- Users must remove the driver under the Safe Mode (Rotary Switch = 1) to ensure a complete uninstall and to avoid driver conflicts.
- **In the Safe Mode, it will back to the factory settings. Please record all the settings of WinPAC_Utility.**

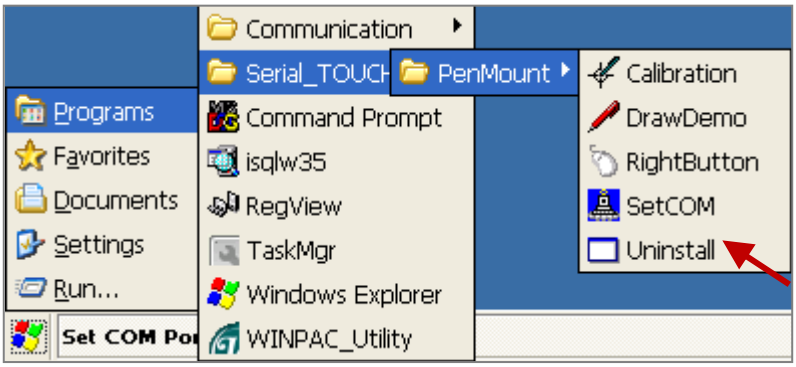
1. Run "WinPAC_Utility" and record all the settings in each setting tab.



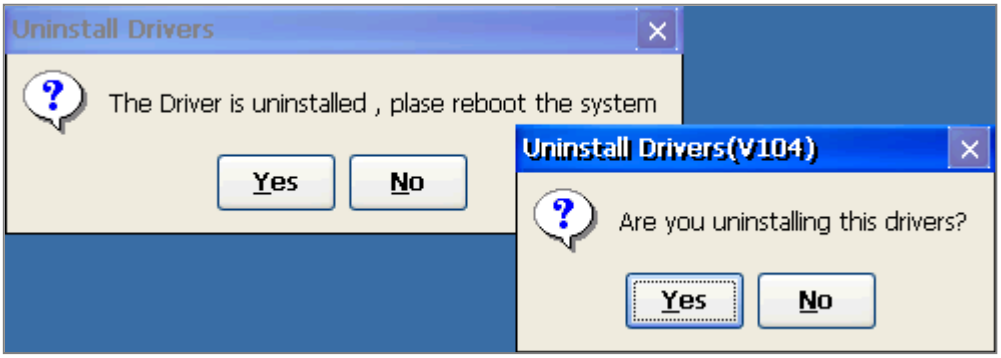
2. At the top of the WP-5xx7, please set the rotary switch to "1" position and then reboot.



3. In the Safe Mode, run the “Uninstall” feature from the “Start” menu to remove the driver.



4. As the figure below, click “Yes” to start the procedure and then click “Yes” to reboot the WP-5xx7.



Please back to Section I.2 (RS-232) or Section I.3 (USB) to install the proper driver and run the monitor calibration. Remember to run the “WinPAC_Utility” and set all settings that you recorded before.

I.5 Adjust the WinPAC Display Frequency

The default display settings of the WinPAC do not support all kinds of the monitor. Please refer to this appendix to adjust the display problems like the following list :

1. Moire.
2. No display.
3. The screen cannot be displayed properly. (Bigger or smaller)

The WP-5xx7 supports the function to adjust the display frequency since the following versions:

OS Version	WinPAC Utility Version
V1100 and latter	V2.0.2.7 and latter

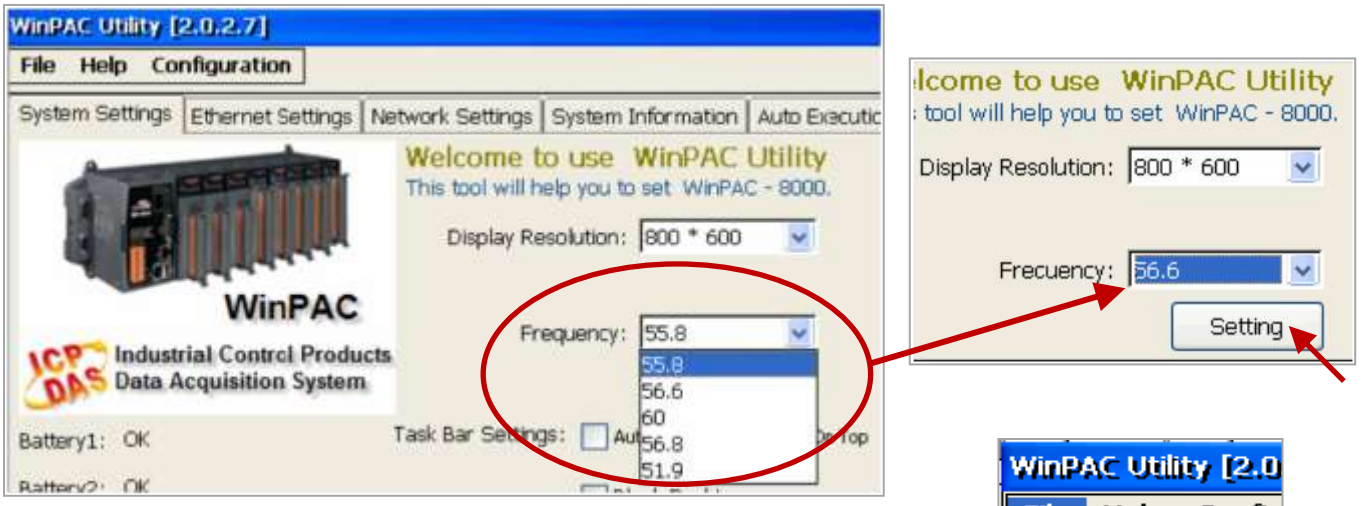
Note: Some frequency maybe cannot display on the monitor. So, please set the VCEP auto execute to remote control the WinPAC before you try to change the frequency to solve the display problems. (Refer to WinPAC FAQ Chappter 2-001)

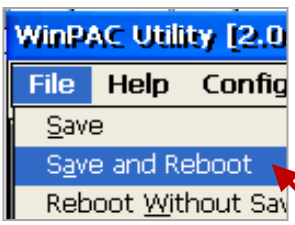
Step 1 : Push the auto adjust button on the monitor.

Step 2 : If the auto adjust cannot solve the problems, you can change the display frequency on the WinPAC.

Step 3 : Execute the WinPAC_utility on the desktop to enter the “System Settings” page.

Step 4 : Change to the other frequency and click “Setting” button.





Step 5 : Click [File] > [Save and reboot] to save and reboot the WinPAC.

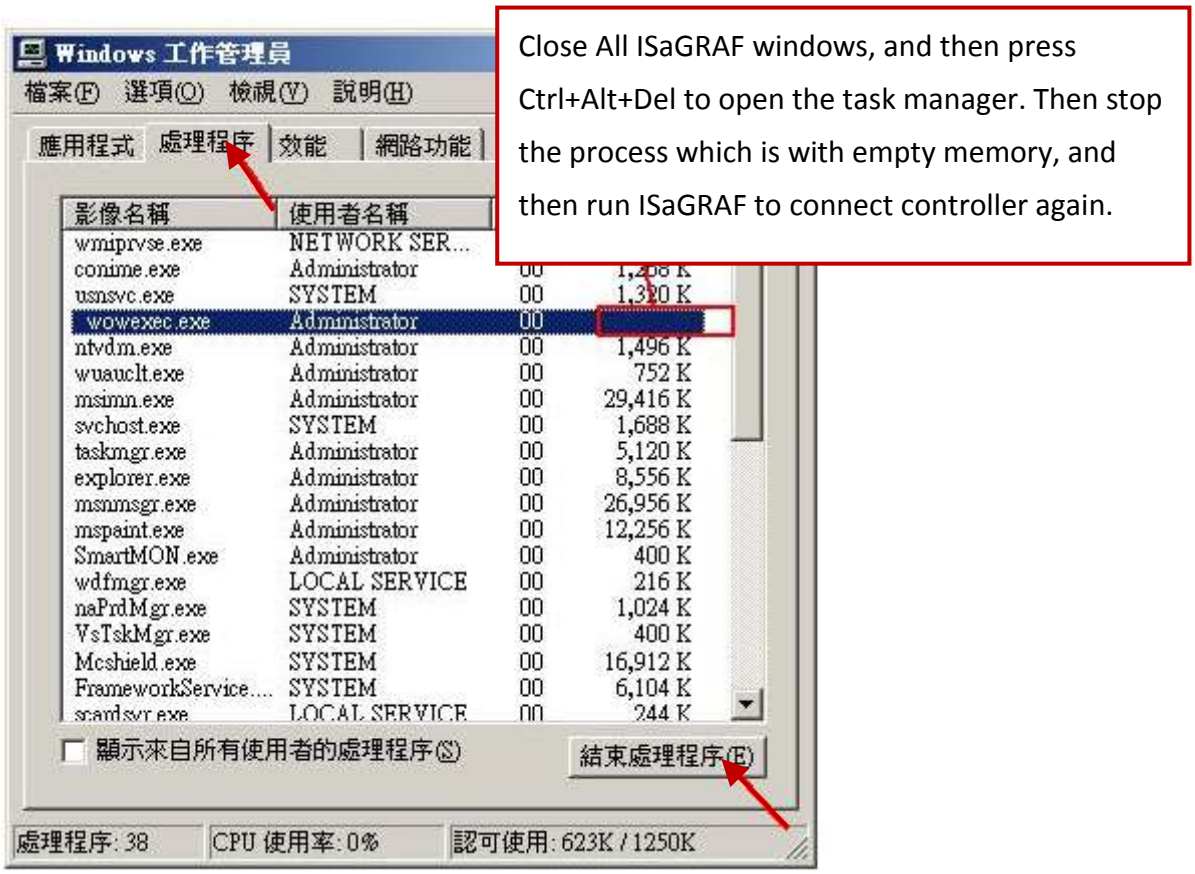
Step 6 : If the new frequency still has problems. Go back to the step 3 to try other frequencies until the Display normal.

Appendix J Why My PC Running ISaGRAF Cannot Connect the ISaGRAF PAC Correctly?

The document can also be download at www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC > FAQ-104. Sometimes when using the PC / ISaGRAF debugger to connect to the ISaGRAF controller will pop-up a window like “Can not link ...” or “Can not download” or “Can not find BMP ...” or so on.

To solve this problem, please do below steps.

1. First close all ISaGRAF windows. Then press and hold on “Ctrl” plus “Alt” key and then press “Delete” key to open the Task Manager.
2. Stop the process which is with empty memory. Then run PC/ISaGRAF again to connect to the controller.



3. If the problem is still there and you are using Ethernet to connect the controller, check if your PC and controller are set in the same IP domain. For example, PC with (IP, Mask) = (192.168.**1**.2, 255.255.255.0) can not connect controller = (192.168.**3**.5, 255.255.255.0). However it can connect the controller = (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 controller, check if your RS-232 cable is correct and check if you are setting the correct PC RS-232 port number to connect the controller.
5. The last way is re-start your PC and try again.

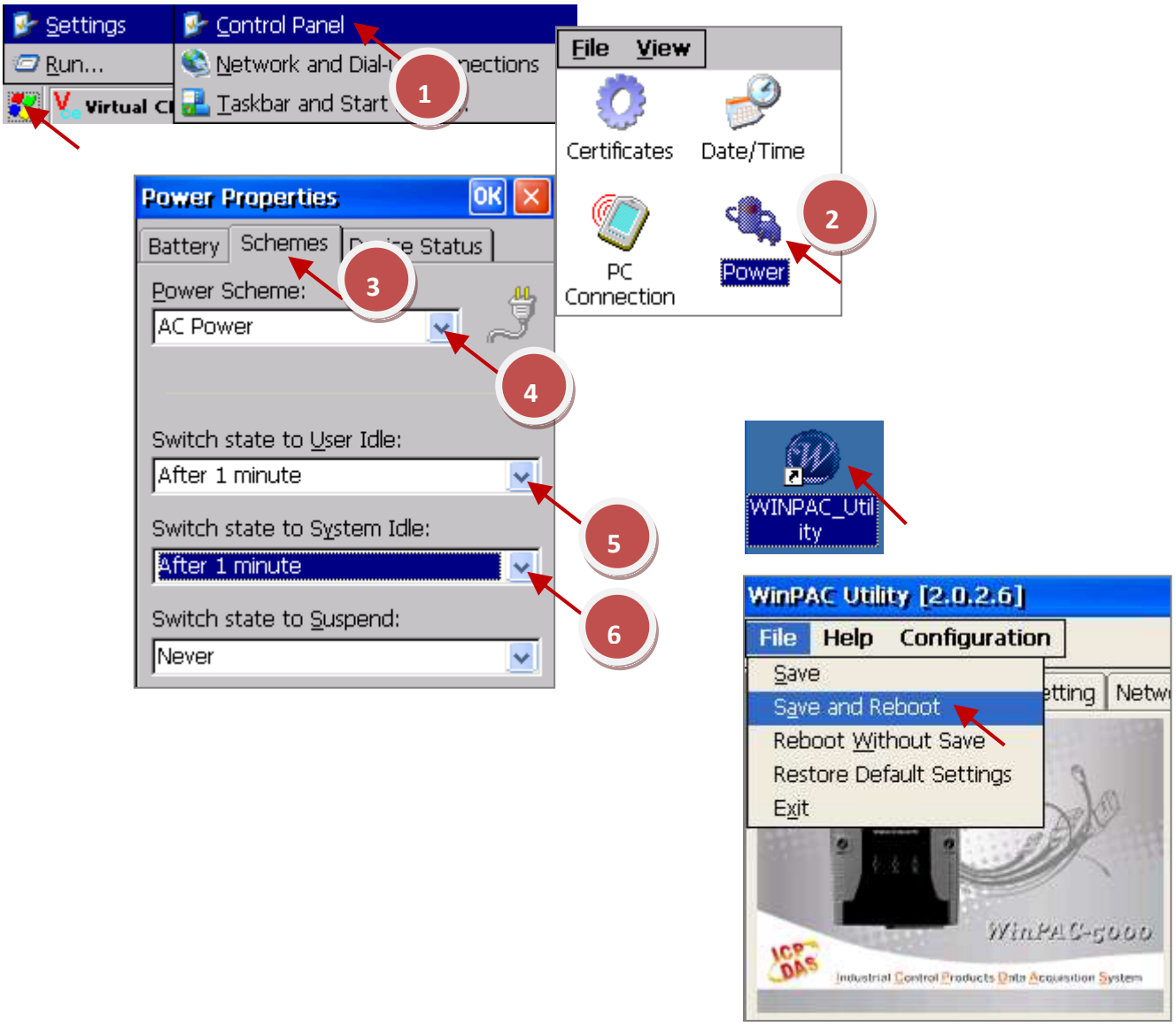
Appendix K Enable the Screen Saver of WinPAC

Please set the following two items to enable the screen saver of WP-5xx7.

In the "**Control Panel**" > "Power" > "Schemes" , please select "Power Scheme" as "AC power" and then set both "User Idle" and "System Idle" to the same value (or setting the "System Idle" value larger than the "User Idle" value) and then remember to run "**WinPAC Utility**" > "File" > "Save" and Reboot. The WP-5xx7 will turn off the backlight when time is up if user doesn't touch it (screen and pushbuttons).

Then after in any time if user touches the screen or pushbutton, the WP-5xx7 will turn on the backlight again.

To disable the screen saver, please set both "User Idle" and "System Idle" to "Never" and then remember to run "**WinPAC Utility**" > "File" > "Save".



Appendix L How to Detect the Status of Ethernet Port?

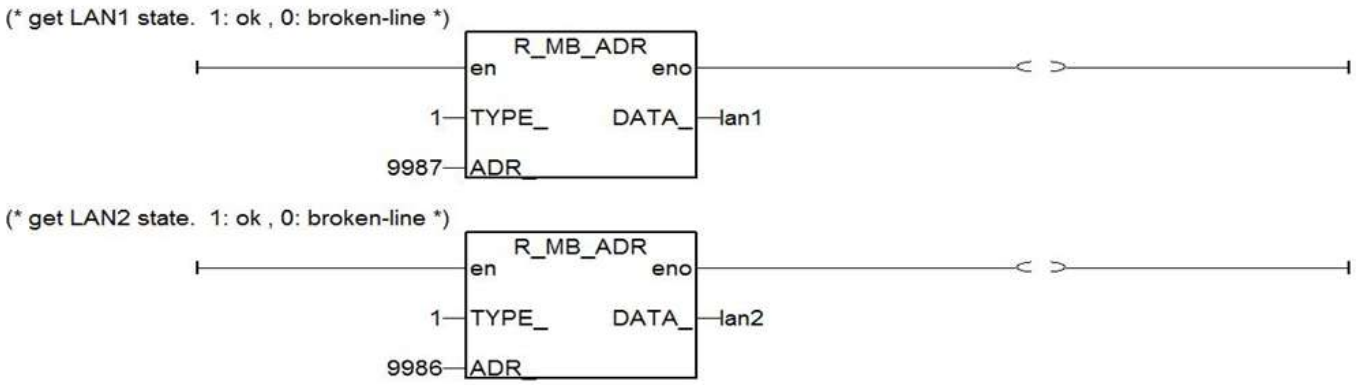
User can use the **"R_MB_ADR"** function in the ISaGRAF to detect the Status of Ethernet ports.

- **Use "R_MB_ADR" function to Detect the Status of Ethernet ports**

Use the Function "**R_MB_ADR**" and assign its parameter "ADR" as "**9987**" and "**9986**" to read the status of the Ethernet ports. Show as the figure below.

ADR number "9987" : the status of LAN1.
ADR number "9986" : the status of LAN2.

Name	Type	Attrib.	ADR	Description
lan1	Binary	Internal	9987	Detect the status of LAN1.
lan2	Binary	Internal	9986	Detect the status of LAN2.



After executing the program, the return values for parameters "lan1" & "lan2" status:

"1" : ok.
"0" : broken-line.