
Getting Started of h ° # - 5007/5107/5207/5307/5507

This manual is intended for integrators, programmers, and maintenance personnel who v installing and maintaining a PAC5x07 controller system.

ISaGRAF PAC Series of ICP DAS includes:

h ° # h ° # - 8-7186PEG, 7188EG, 7188XG,
h ° # - 5007/5107/5207/5307/5507
iPAC: iP-8447, iB847, 84370, 88370, 8417, 8817,
WinPAC: WP-8147, W8447, W8847 (WinCon: 8847, W8747)
ViewPAC: VP-25W7, V23W7, V2117
XPAC: XP-807-CE6, X8347CE6XP-8747CE6

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Please visit www.icpdas.com > [FAQ](#) > [Software](#) > [ISaGRAF](#) Frequently Asked Questions.

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Reference Guide

ISaGRAFUsers Manual(English Manual)

CDROM:\napdos\isagraf8000\english_man\user_manual_i_8xx7.pdf"
"user_manual_i_8xx7_appendix.pdf" or
http://www.icpdas.com/products/8000/getting_started_manual.htm

ISaGRAF (Chinese Manual)

CDROM:\napdos\isagraf8000\chinese_man\chinese_user_manual_i_8xx7.pdf"
"chinese_user_manual_i_8xx7_appendix.pdf"
http://www.icpdas.com/products/PA8000/getting_started_manual.htm

Hardware Manual

aPAC5x07: CD\NAPDOS\PaPAC5000\document or
<ftp://ftp.icpdas.com/pub/cd/8000cd/napdos/pac5000/document/>

ISaGRAFResource on the Internet

Newly updated ISaGRAF IO libraries, drivers and manuals can be found at
<http://www.icpdas.com/products/8000/isagraf.htm>

Industrial Ethernet Switch NS205 / NS208/ NS205PSE

Best choice for Industrial Ethernet Communication.
http://www.icpdas.com/products/Switch/switch_list.htm



Model:NS-205



Model:NS-208



Model: NS-205PSE

Note TheNS-205PSE is aPoE Switch

FAQ:

Please refer to our website www.icpdas.com > FAQ > Software > ISaGRAF Frequently Asked Question or click directly on <http://www.icpdas.com/faq/isagraf.htm>

Performance Comparison Table of SaGRAF PACs

Please click on the [SaGRAF Comparison Table](#) follow the below steps

The screenshot shows the ICP DAS website homepage. A red arrow points to the address bar containing the URL `1. www.icpdas.com/home.htm`. Another red arrow points to the 'ISaGRAF SoftLogic PAC' link in the left sidebar, with the text `2. Click here to go to the ISaG` next to it.

The screenshot shows the ISaGRAF PAC product page. A red arrow points to the 'Comparison Table (All)' link in the left sidebar, with the text `3. Comparison Tab` next to it. The main content area features a central diagram of the ISaGRAF PAC system, surrounded by various product categories and protocols.

Specifications PAC-5x07(D)

Models	D 5 75007(D)	D 5 75107(D)	D 5 75207(D)	D 5 75307(D)	D 5 75507(D)
System Software					
OS	MiniOS7 (DOS -like embedded operating system)				
Development Software					
ISaGRAF Software	ISaGRAF Ver. 3	IEC 61131 -3 standard			
	Languages	LD, ST, FBD, SFC, IL & FC			
	Max. Code Size	64 KB			
	Scan Time	2 ~ 25 ms for normal program; 10 ~ 125 ms (or more) for complex or large program			
CPU Module					
CPU	80186, 80 MHz				
SRAM	768 KB				
Flash	512 KB				
microSD Expansion	Yes (but ISaGRAF doesn't support)				
Battery Backup SRAM	512 KB ; data valid up to 5 years (for retain variables)				
EEPROM	16 KB				
NVRAM	31 Bytes (battery backup, data valid up to 10 year)				
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year				
64-bit Hardware Serial Number	Yes, for Software Copy Protection				
Watchdog Timers	Yes (0.8 second)				
Communication Ports					
Ethernet	RJ-45 x 1, 10/100 Base -TX (Auto -negotiating, Auto MDI/MDI -X, LED indicators)				
COM 1	RS-232 (TxD, RxD, RTS, CTS, GND), non -isolated, Speed: 115200 bps max.				
COM 2	RS-485 (Data+, Data -) with internal self-tuner ASIC; non -isolated, Speed: 115200 bps max.				
LED Indicator					
Programmable LED Indicators	2				
LED Display	5-digit 7-segment LED display for (D) versions				
Hardware Expansion					
I/O Expansion Bus	Yes (for one XW -Board only)				
Mechanical					
Dimensions (W x H x D)	91 mm x 123 mm x 52 mm				
Installation	DIN -Rail Mounting				

Models	D 5 75007(D)	D 5 75107(D)	D 5 75207(D)	D 5 75307(D)	D 5 75507(D)
Environmental					
Operating Temperature	-25 ~ +75°C				
Storage Temperature	-30 ~ +80°C				
Ambient Relative Humidity	10 ~ 90% RH (non -condensing)				
Power					
Input Range	+12 ~ +48 V _{DC}				
Isolation	-				
Redundant Power Inputs	Yes				
Protection	Power reverse polarity protection				
Frame Ground	Yes (for ESD Protection)				
Power Consumption	2 W; 2.5 W for (D) version				
Wireless					
Wireless Communication	-	GPS	2G (GPRS)	3G (WCDMA)	Wi-Fi
GPS : D 5 707(D)					
Channels	32 (all-in-view tracking)				
Sensitivity	-159 dBm				
Acquisition Rate	Cold start: 42 seconds; warm start: 35 seconds; reacquisition rate: 0.1 second				
Accuracy	Position: 25 m CEP (S/A off); Velocity: 0.1 second (S/A off); Time: ± 1 m s				
Protocol	NMEA				
& ; : fl ; D F G E . -5207(D)					
Band	850/900/1800/1900 MHz				
GPRS Multi-slot	Class 10/8				
GPRS Mobile Station	Class B				
GPRS Class 10	Max. 85.6 kbps				
CSD	Up to 14.4 kbps				
Compliant to GSM phase 2/2+	Class 4 (2 W @ 850/900 MHz); Class 1 (1 W @ 1800 /1900 MHz)				
Coding Schemes	CS 1, CS 2, CS 3, CS 4				
SMS	Text and PDU mode				
' ; : fl K 7 8 A 5 E . -5307(D)					
Band	UMTS : 2100/1900/850 MHz				
Data Transfer	UMTS / HSDPA / HSUPA Upload: Max. 5.76 Mbps; Download: Max. 7.2 Mbps				

Wi-Fi: 802.11 b/g, 2.4 GHz, 13 channels, WEP-64/WEP-128/WPA-TKIP/WPA-AES, -87 dBm (IEEE 802.11b) / -72 dBm (IEEE 802.11g), 12 dBm (IEEE 802.11b) / 14 dBm (IEEE 802.11g)	
Protocol	IEEE 802.11 b/g
Frequency Range	2.412 GHz ~ 2.484 GHz
Channels	13 channels
Security	WEP-64/ WEP-128/WPA-TKIP/WPA -AES
Receive Sensitivity	-87 dBm (IEEE 802.11b) / -72 dBm (IEEE 802.11g)
Transmit Power	12 dBm (IEEE 802.11b) / 14 dBm (IEEE 802.11g)
Protocols (some protocols need optional devices)	
NET ID	1 ~ 255, user -assigned by software
Modbus RTU/ASCII Master Protocol	Max. 2 COM Ports: COM1, COM2 and COM3 (*). (To connect to other Modbus Slave devices) Max. Modbus_xxx Function Block amount for 2 ports: 128.
Modbus RTU Slave Protocol	Max. 2 COM Ports, COM1 and one of (COM2, COM3) (*). For connecting ISaGRAF, PC/HMI/OPC Server & MMI panels.
Modbus TCP/IP Protocol	Max. 6 connections, Ethernet ports support Modbus TCP/IP Slave Protocol for connecting ISaGRAF & PC/HMI.
User-defined Protocol	COM1, COM2 & COM3 ~ COM8 (*) by serial communication function blocks.
Remote I/O	One of COM2 or COM3 (RS-485) (*) supports I-7000 I/O modules & (I-87Kn or RU-87Pn + I-87K High Profile I/O boards) as Remote I/O. Max. 64 I/O modules for one PAC.
Fbus	Built-in COM2 Port to exchange data between ICP DAS's ISaGRAF PACs.
Ebus	To exchange data between ICP DAS's ISaGRAF Ethernet PACs via Ethernet port.
Send Email	Actively or passively sending Email via Ethernet port through internet. Max.10 receivers for each sending and can send Email with an attached file. (Max. file size is about 488 KB)
SMS: Short Message Service	One of COM1 or COM3 or COM4 (RS-232) (*) can link to a GSM modem to support SMS. User can request data/control the controller by cellular phone. The controller can also send data & alarms to user's cellular phone. Optional GSM modem: GTM-201-RS232 (GSM/GPRS 850/900/1800/1900) or the GSM/GPRS Modem on the website: http://www.icpdas.com/products/GSM_GPRS/wireless/GSM_GPRS_modem.htm . Note: D5-5207, 5307 has built-in GPRS, no external GSM/GPRS modem required.
Redundancy Solution	Two PACs plug with XW107 in slot0. One is Master, one is Slave. Master handles all inputs & outputs at run time. If Master is damaged (or power off), Slave will take over the control of Bus7000b. If Master is alive from damaged (or power up again), it takes the control of Bus7000b again. The change over time is about 5 seconds. Control data is exchanging via Ebus (if using a cross cable, no require any Ethernet Switch). All I/O should be RS-485 I/O except the status I/O in the slot 0: XW107.
CAN/CANopen	Use COM1 or COM3 ~ COM8 (*) to connect one I-7530 (RS-232 to CAN converter) to support CAN/CANopen devices and sensors. One PAC supports max. 3 RS-232 ports to connect max. 3 I-7530 modules. (FAQ-086)
FTP Client	Support FTP client to upload files in the PAC to a remote FTP server on PC. (FAQ-151)

Optional I/O Functions (Refer to ISaGRAF PAC I/O Selection Guide for I/O Module list)	
PWM Output	
Pulse Width Modulation Output	All XW-Board DO series support PWM output. Max. 8 channels for one controller. 500 Hz max. for Off = 1 & On = 1 ms Output square wave: Off : 1 ~ 32767 ms, On: 1 ~ 32767 ms
Counters	
Parallel DI Counter	All XW-Board DI series support counter. Max. 8 channels for one controller. Counter value: 32-bit 500 Hz max. Min. ON & OFF width must > 1 ms
Remote DI Counter	All remote I-7K/I-87K DI modules support counters. 100 Hz max. value: 0 ~ 65535
Remote High Speed Counter	I-87082: 100 kHz max., 32-bit
<p>* Note: COM3 ~ COM8 are resided at the optional XW-Board</p> <p>* ISaGRAF FAQ: http://www.icpdas.com/faq/isagraf.htm</p> <p>* Recommend to use NS-205/NS-208 Industrial Ethernet Switch.</p>	

Chapter 1. Typical Application

1.1 Comparison Table

Model	CPU	Flash	SRAM	Memory Expansion	Ethernet	GPS	GPRS	3G (WCDMA)	Wi-Fi	RS-232/RS-485
h °-5007	80186 80M	512 KB	768 KB	512 KB Battery backup SRAM	10/100 Base TX	-	-	-	-	1/1
h °-5107						Yes	-	-	-	
h °-5207						-	Yes	-	-	
h °-5307						-	-	Yes	-	
h °-5507						-	-	-	Yes	

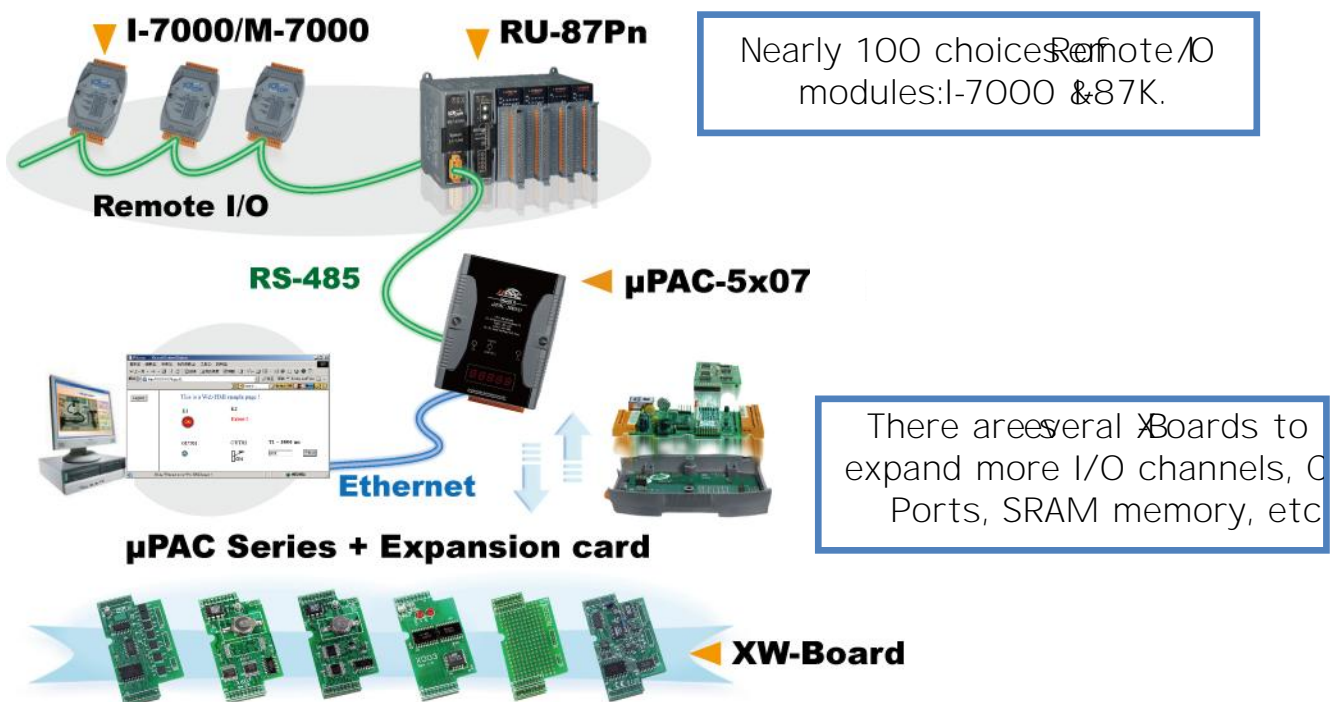
All of the following applications are applicable to μ PAC-5x07 (DIPAC user manual μ PAC-5007) is used in following diagram

1.2 Local & Remote I/O Application

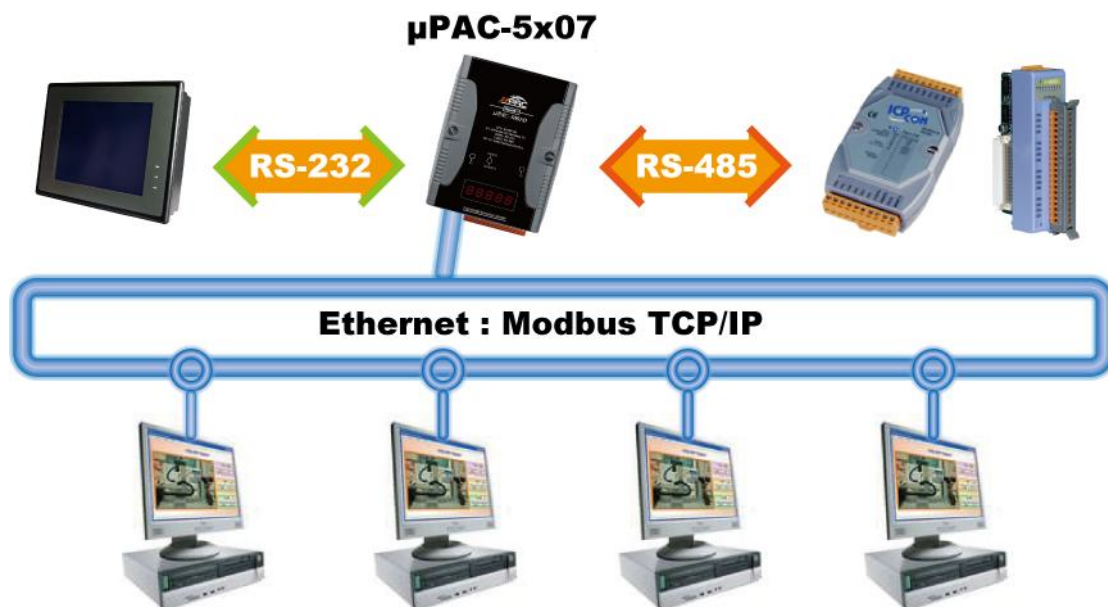
Advantage of using μ PAC-5x07 I/O modules:

- HotSwap
- AutoConfiguration At Run Time
- Plug & Play at Run Time

NOTE:RU-87Pn support only High impedance 87K I/O module



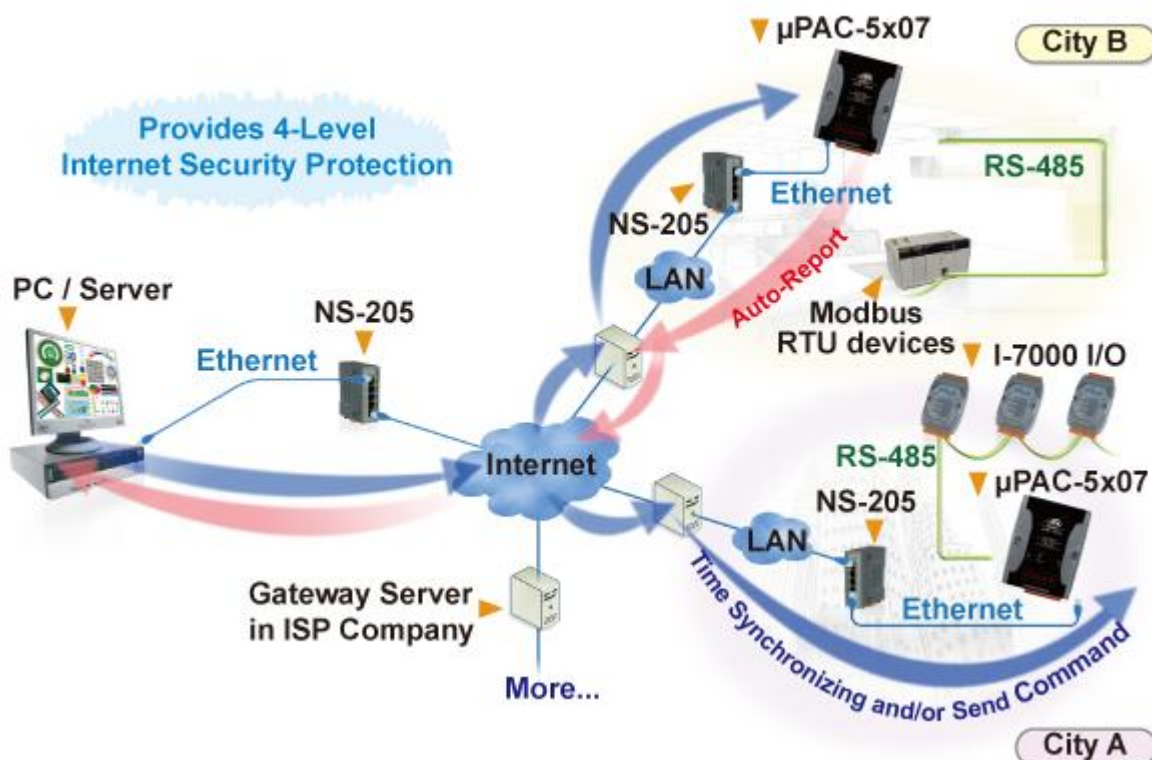
1.3 MultiHMI Application



1.4 ActiveDataAcquisition& AutoReportSystem

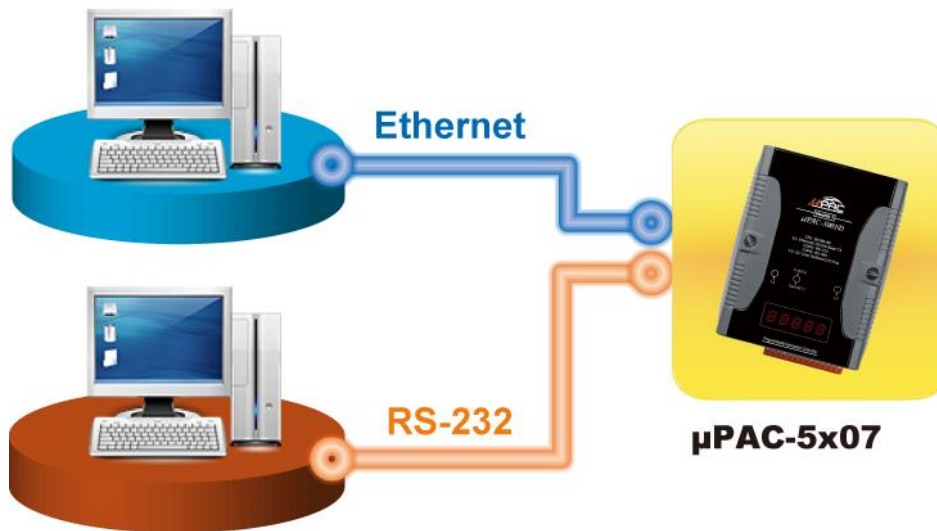
- The μPAC-5x07 can use UDP/IP Client protocol to report acquisition data & control data to local or to remote internet PC/Server.
- **Advantage** Each PAC in the different location does not require a fixed Internet IP.
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3.0.5 (English)

Stable and Cost-effective Data Acquisition Auto-Report System



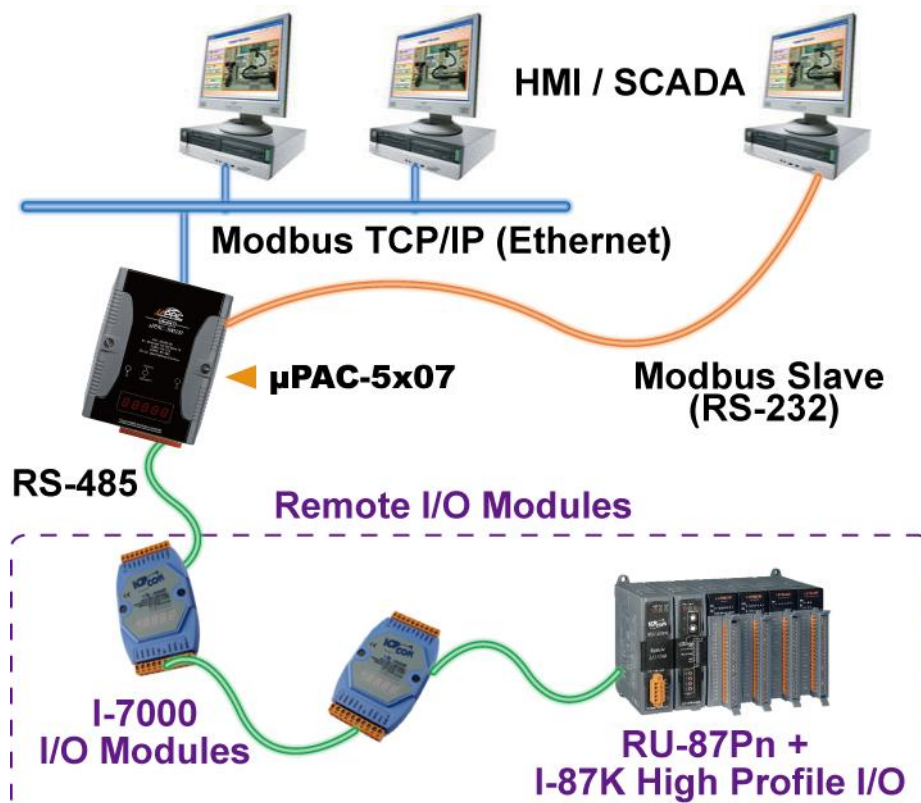
1.5 Data Logger

- ICP DAS provides a free utility `Loader.exe` to load the data stored in backup SRAM via RS-232 or Ethernet port



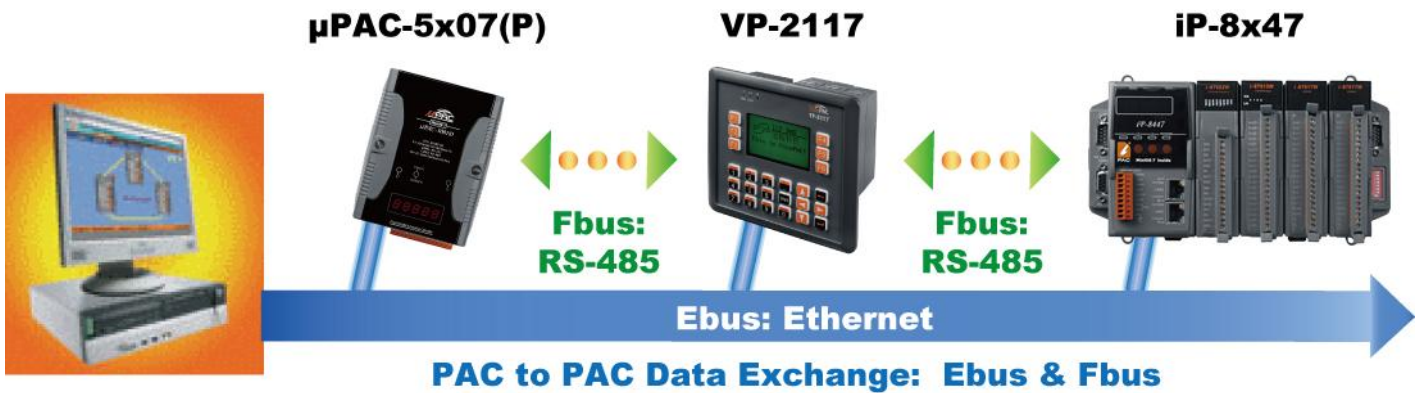
1.6 Modbus Converter of Remote Modules

- The **μPAC-5x07** can be a Modbus RTU Serial and TCP/IP converter for I-7000 & 87K series I/O modules.



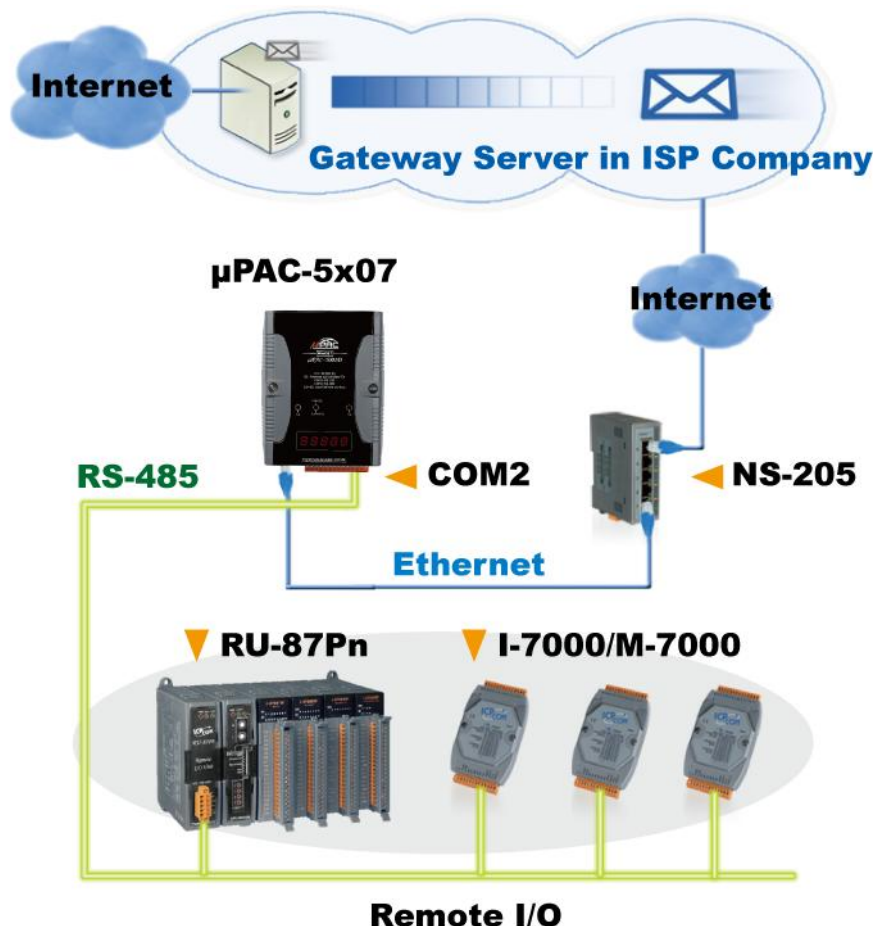
1.7 Data Exchange through Ethernet-485

- Each h⁵0 can send or receive data to each other via Ebus (Ethernet) or Fbus (RS-485) communication mechanism in the same network.



1.8 Send Email with an Attached File

- h⁵0 can send Email with an attached file via Ethernet Port. The maximum file size is about 488K bytes and one Email can send to 10 receivers at a sending.



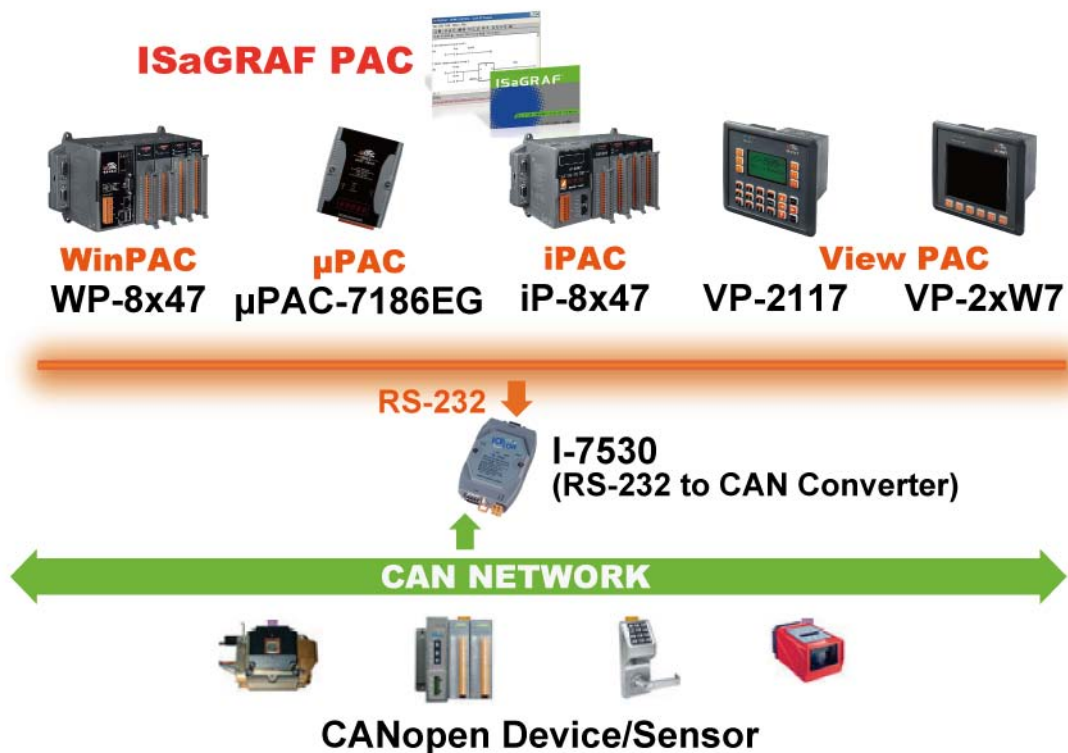
1.9 SMS Short Message Service

- Short message can be sent in multiple languages (Chinese, English... others)
- Please refer to www.icpdas.com > [FAQ](#) > [Software](#) > [ISaGRAF Ver.3 \(English\)](#)
- h^o-5#07/507 has built GPRS, no external GSM/GPRS modem required



1.10 Integrate with CAN/CANopen Devices and Sensors

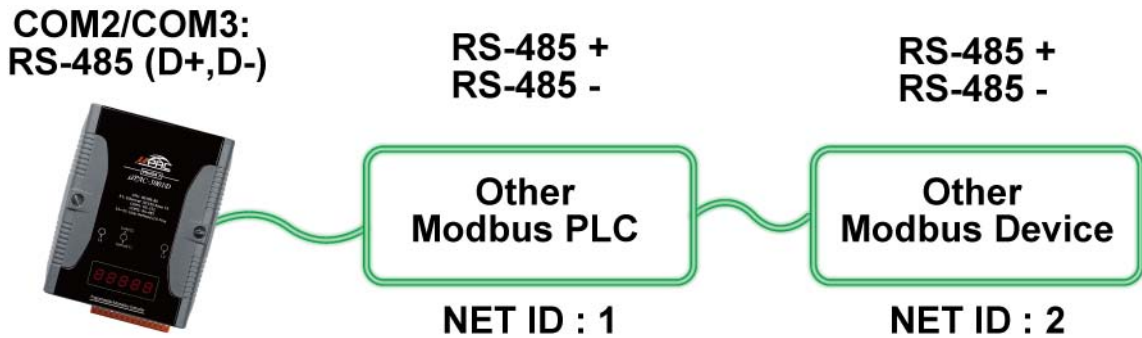
- h^o-5#07 supports max. I-7530 (RS232 to CAN) converters.
- Please refer to www.icpdas.com > [FAQ](#) > [Software](#) > [ISaGRAF Ver.3 \(English\)](#)



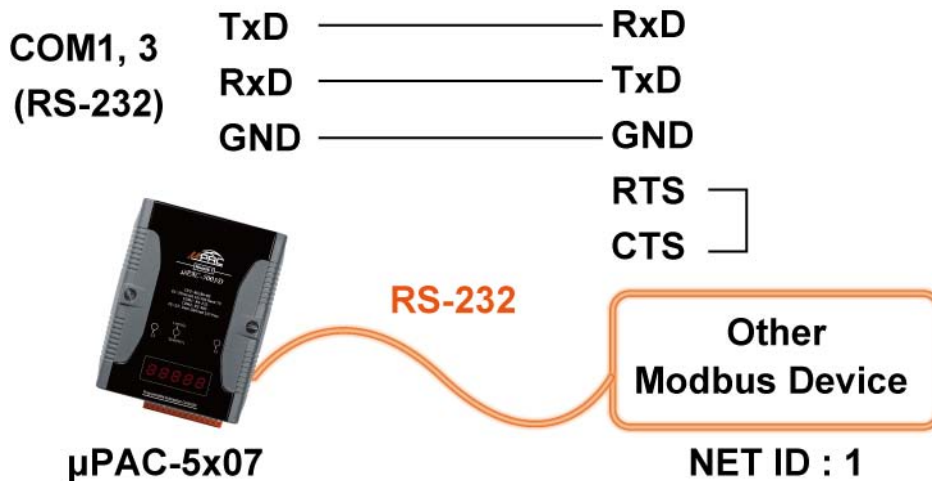
1.11 Connecting other Device with Modbus Master

- PAC5x0 supports up to 2 COM ports of Modbus Master protocol to communicate with other Modbus devices

RS-485



RS-232



Note COM3 ~ COM8 is optional for Board (XW5xx), RS-232/RS-422/RS-485 expansion board.

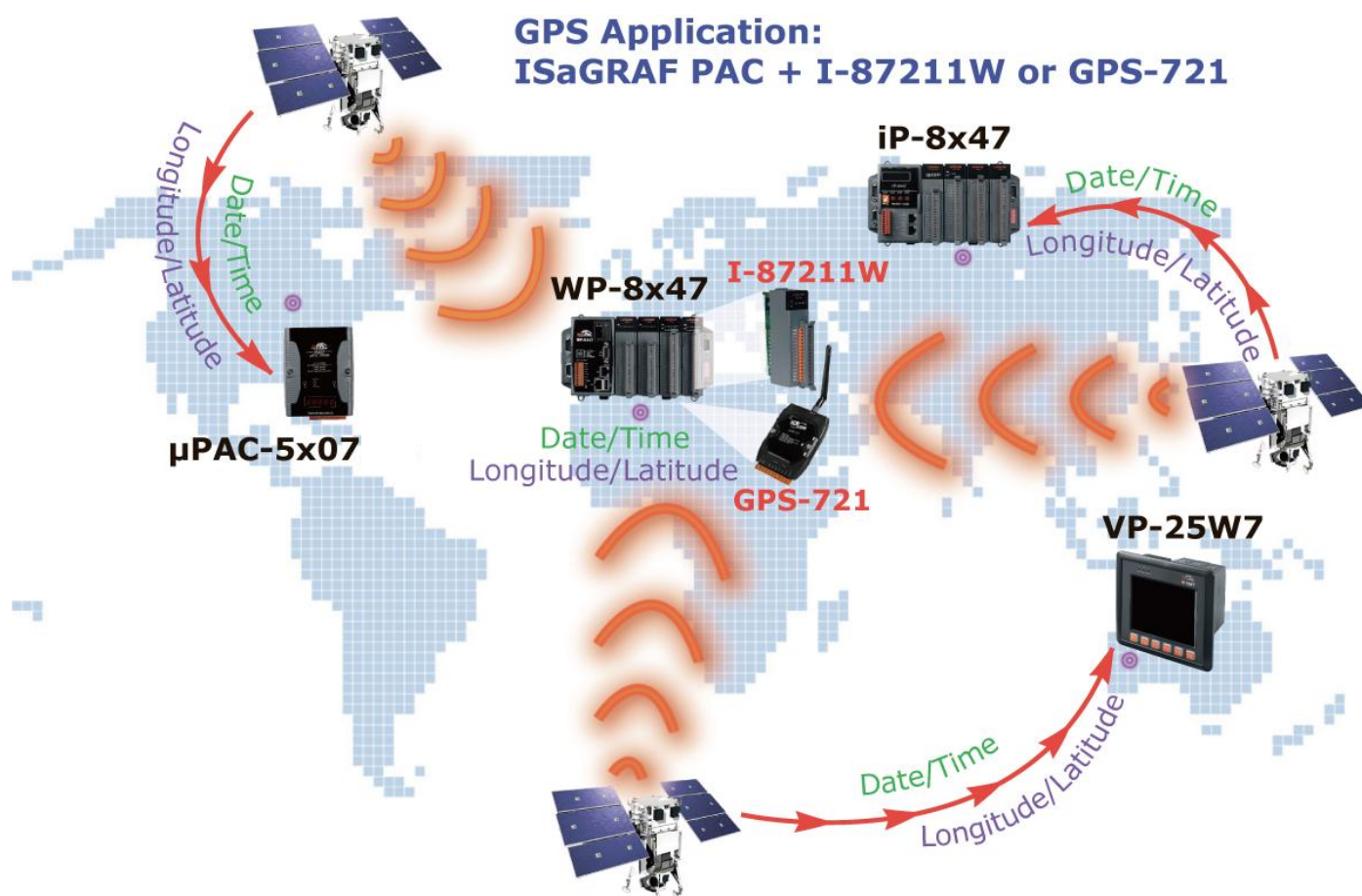
PAC5x07 can plug I/O Expansion boards side the main board. To install it, user has to loosen the screw, remove the shell of PAC5x07 and then plug in the board. Please refer to below web for new products

<http://www.icpdas.com.tw/product/solutions/pac-board-selection.html>

1.12 GPS Applications: ISaGRAF PAC plus I-87211W or GPS721

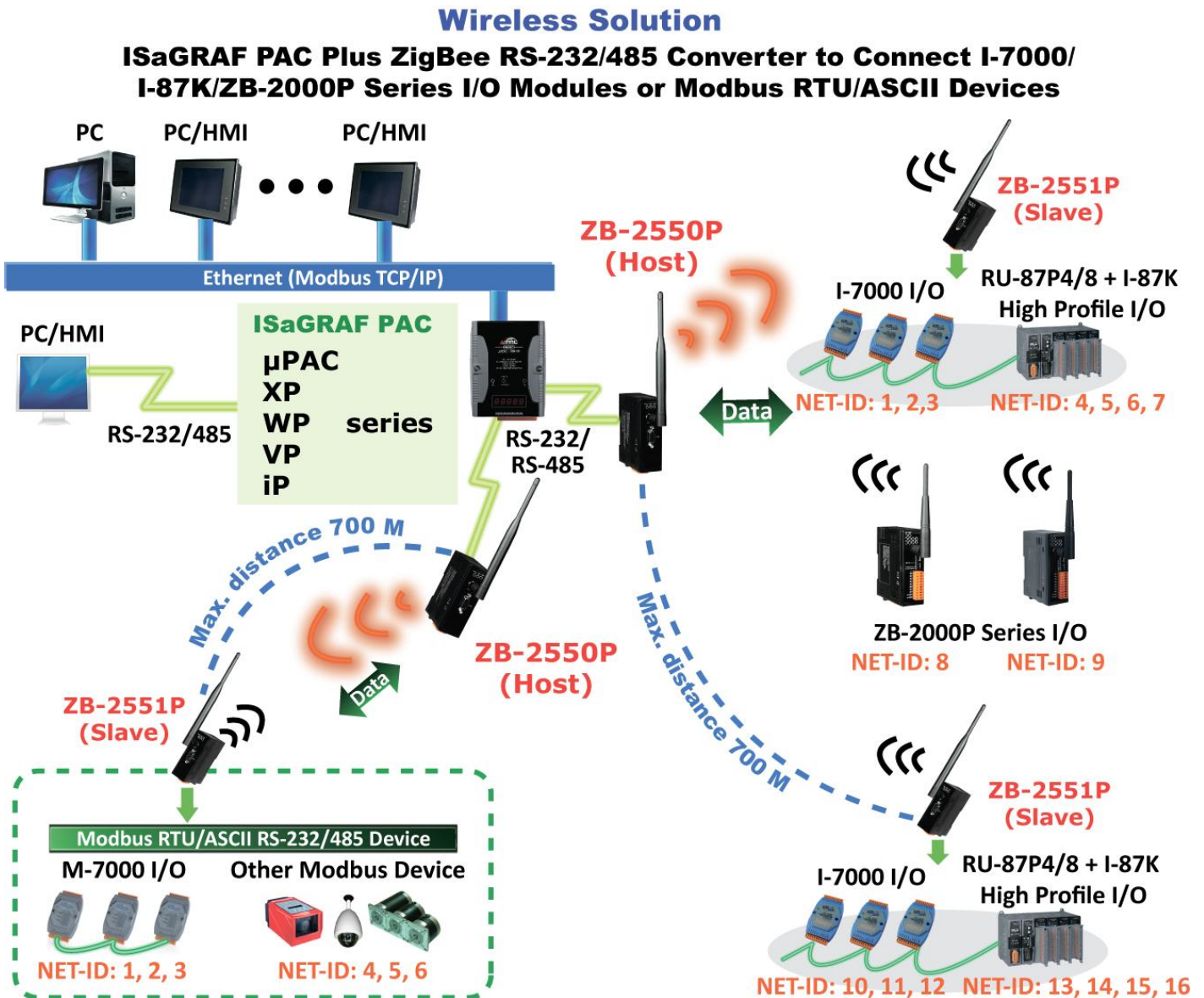
- PAC5007/5207/5307/5507 can support on I-87211W or GPS721 as GPS I/O.
(The PAC can communicate with the GPS RS485/232; the I-87211W can plug into Remote I/O Expansion units)
- For doing real-time synchronization and getting longitude and latitude
- Please refer www.icpdas.com > [FAQ](#) > [Software](#) > [ISaGRAF Ver.3.10.7 \(English\)](#)
- GPS Receiver www.icpdas.com > [Products](#) > [Wireless...](#) > [Selection Guide](#) > [GPS Solution](#)

Note PAC5107 has built-in GPS function.



1.13 ZigBee Wireless Solution

- ISaGRAF PAC plus ZB-2550P and ZB-2551P (ZigBee to RS-232/485 Converters) can apply wireless communication, reduce the wiring cost, and achieve the mission of control and data acquisition.
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3.1 (English)



Chapter 2. Software Programming

2.1 Step 1 Installing ISaGRAF Software

There are two kinds of software to be installed in PC before user can program on the ISaGRAF PAC system. They are

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

User has to purchase at least one ISaGRAF workbench Version 3 (ISaGRAF 3.5) to install on his PC to edit, download, monitor & debug the controller system. It is free and it is burned inside the ROM which is delivered with PAC5x07.

Operating system Requirements:

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

- › Windows 95 / Windows 98 / Windows 2000
 - › Windows NT Version 3.51 or Windows NT Version 4.0
 - › Windows XP or Vista or Windows 7
- Please refer to www.icpdas.com FAQ > Software > ISaGRAF Ver.3 > FAQ117)

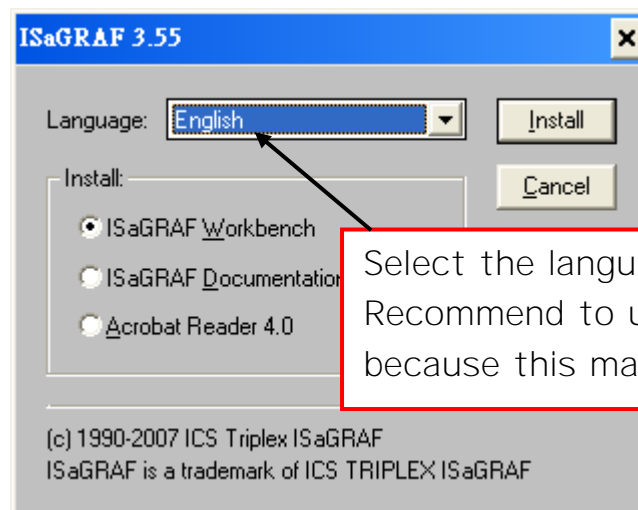
Steps to Installing the ISaGRAF Workbench:



If your operating system is Windows (32bit), please refer to [2.1.4](#)
If your operating system is Windows (64bit), please refer to [2.1.5](#)

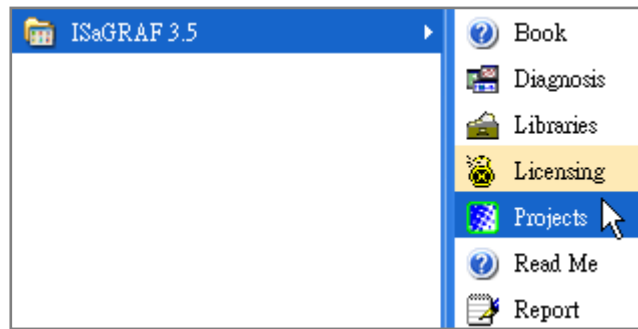
Insert the ISaGRAF Workbench CD into your CD drive. If your computer does not have the auto start feature active, use the Windows Explorer and go to the CD drive where the Workbench CD is installed, then double

click on the ISaGRAF CD, then double



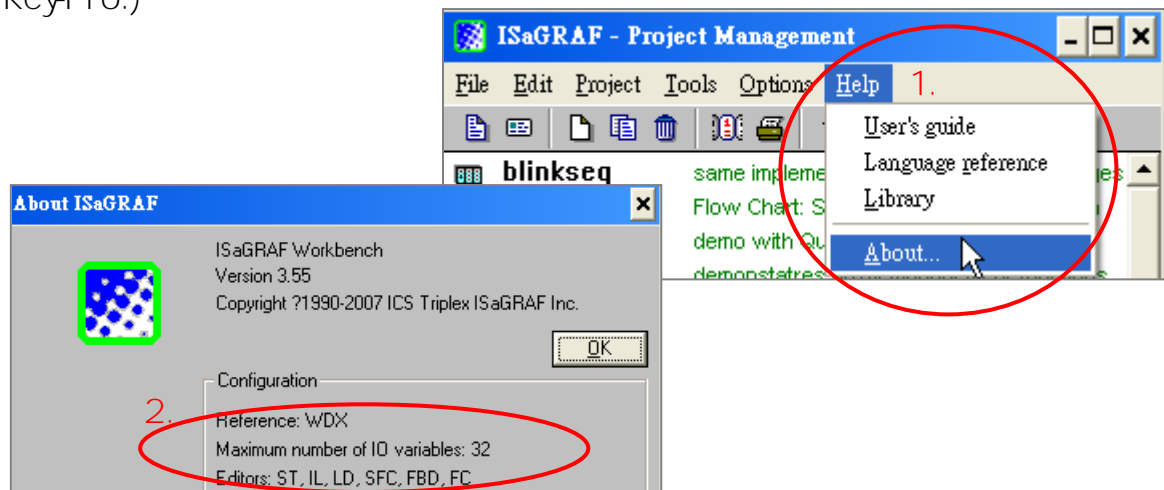
Select the language.
Recommend to use "English"
because this manual is

could click Projectsto start the program.



21.1: TheHardwareProtectionDevice (Dongle & USB KeyPro)

You must install the hardware protection device (dongle) provided with the ISaGRAF software on your computers parallel port to the ISaGRAF program to achieve fully authorized functionality. (ISaGRAF & ISaGRAB2C DO NOT need dongle or USB KeyPro.)



While using ISaGRAF and the dongle is plugged we help the About says Maximum number of IO variables: 32 means ISaGRAF workbench cannot find the dongle well. Please reset your PC and then help the About again. If it still displays Maximum number of IO variables: 32 driver may not be installed well. Please do the following steps.

Dongle Protection:

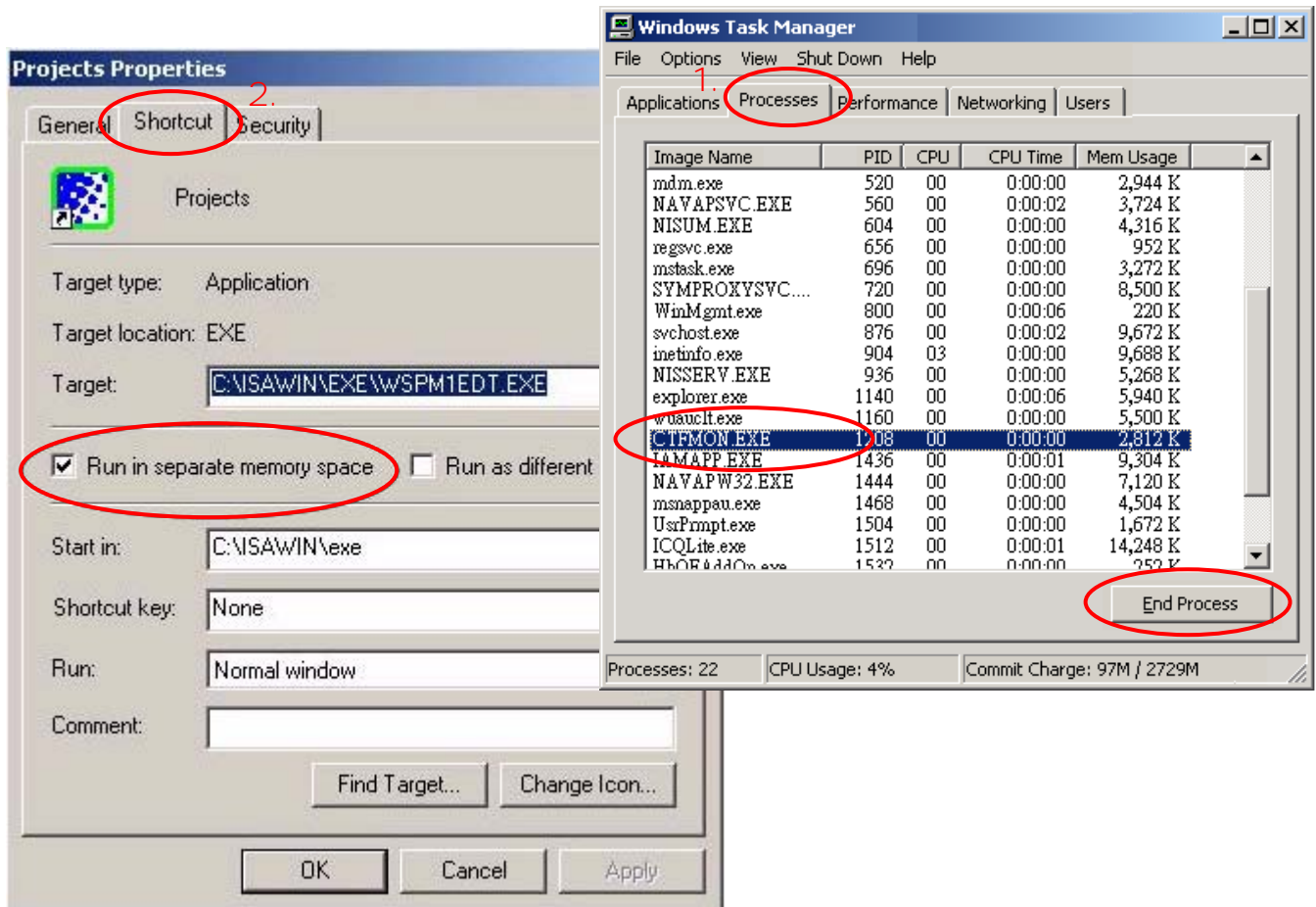
Please execute the ISaGRAF CD\ROM\Inel5382\Setup.exe for ISaGRAF or \Sentinel\Setup.exe for other ISaGRAF version and then reset the PC again.

USB KeyPro 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 execute the Sentinel\SSD541-B2\bit.exe in the ISaGRAF 3.55-CDM (or later version) after you have installed the ISaGRAF. Then please reset your PC.
2. To run ISaGRAF Ver. 3.5x, please always use the USB protection port.

21.2 Important Notice for Window 2000 Users

If you close some ISaGRAF windows, it holds about 20 seconds (No response). This may be caused by the procedure of Windows 2000. To stop the process, you may create a short cut for the ISaGRAF project manager and then check Run in separate memory space in the shortcut property.



21.3 Important Notice for Window NT Users

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

C:\ISAWIN\EXE\isa.ini

You can use any ASCII based text editor (Notepad or UltraEdit32) to open the isa.ini file. Locate the [WS001] header in the initialization file (it should be at the top of the file). Anywhere within the [WS001] header portion of the 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\hsm
IsaTmp=C:\ISAWIN\TMP
```

21.4: Important Notice for Windows Vista or Windows 7 (32bit) Users

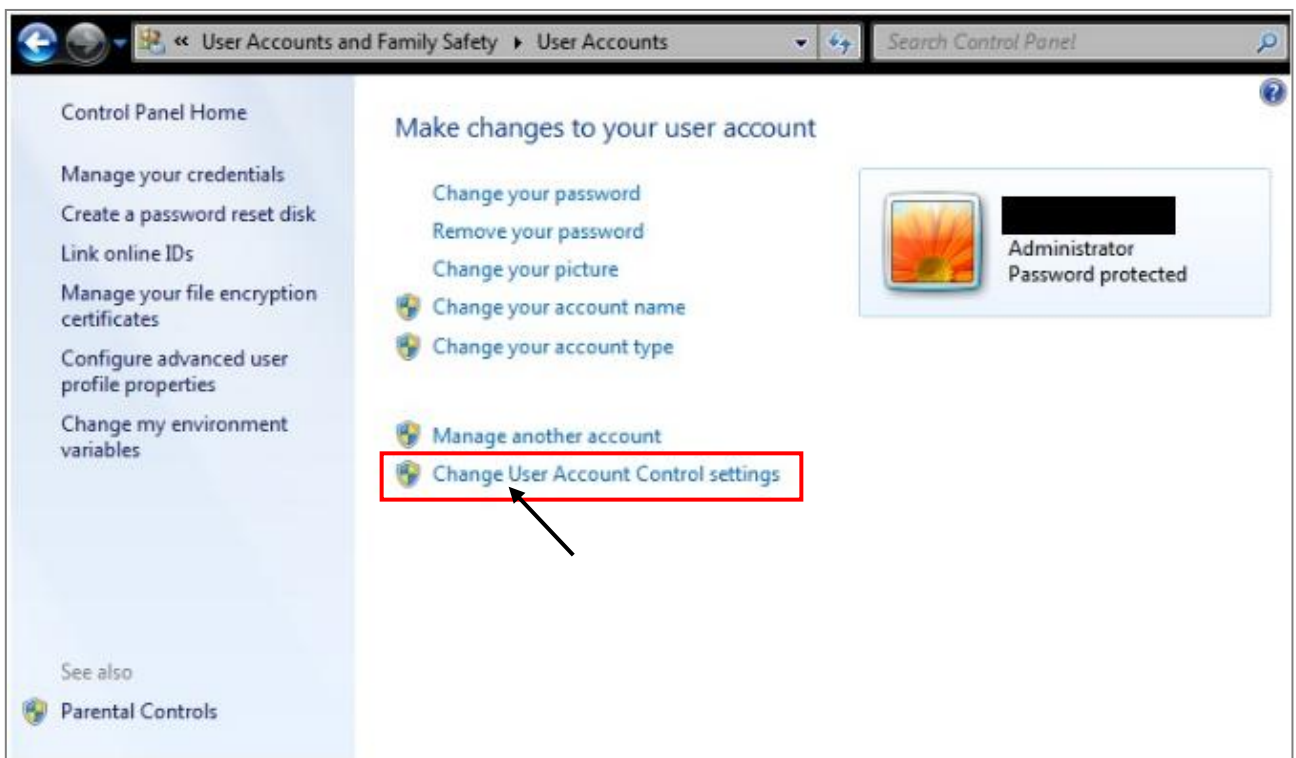
Before installing the SaGRAF if your operating system is Windows Vista or Windows (32bit), please change the User Account Control settings to avoid some of the restrictions.

How to disable your User Account Control



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

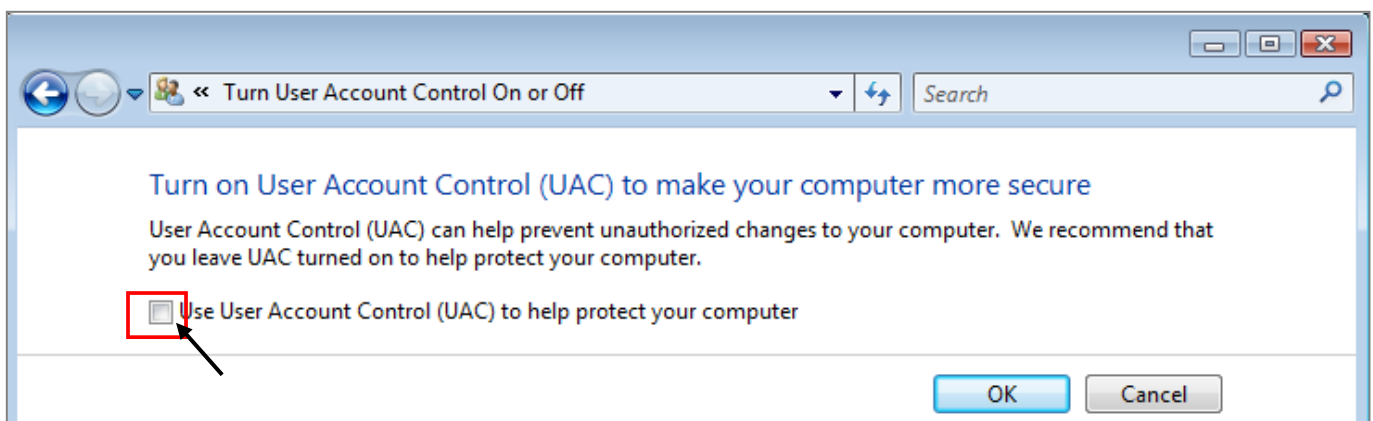
- 1.7 After clicking, choose Start > User Accounts and Family Safety > User Accounts, then click Change User Account Control settings to turn User Account Control on or off



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

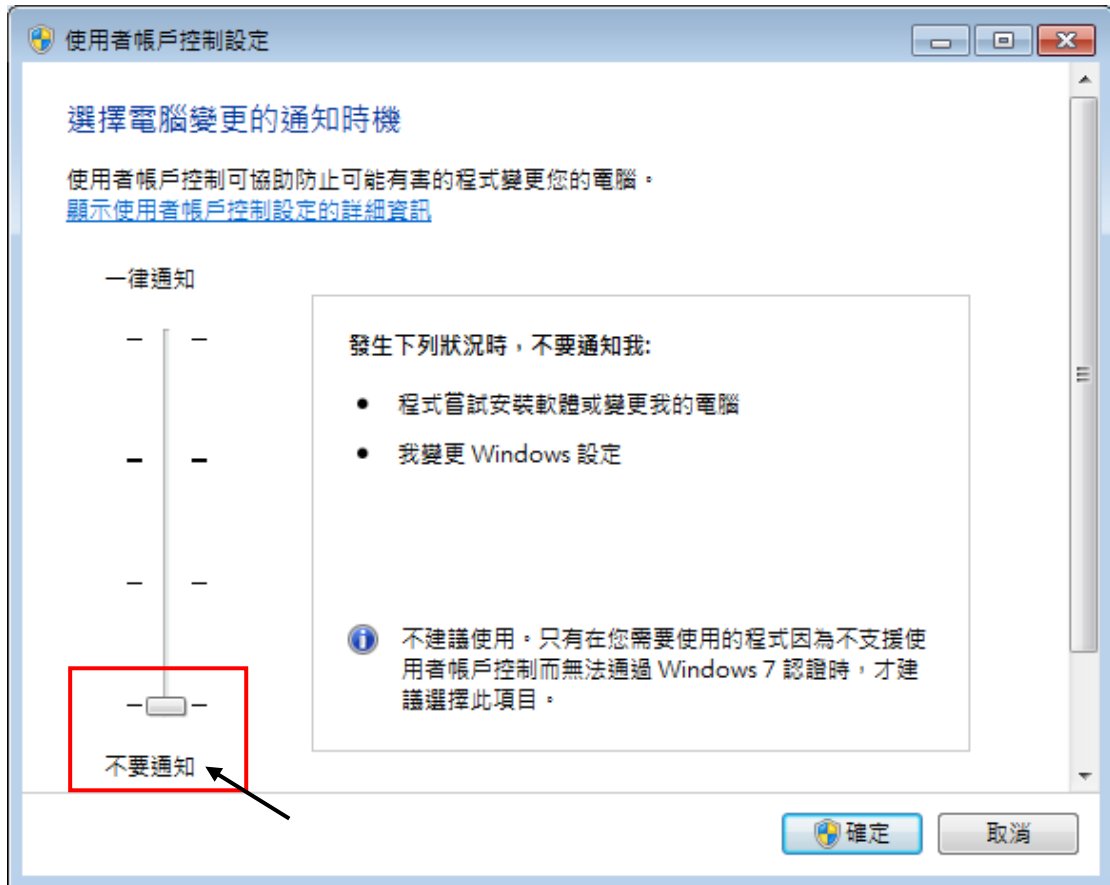
Windows Vista

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



Windows 7:

Move the slider down to **Never Notify** and then click **OK**.



3. Reboot your computer to apply the change.

4. After rebooting, please refer to [section installing the ISaGRAF Software](#)

21.5: Important Notice for Windows (64bit) Users

If your operating system is Windows 7 (64bit) Professional, Enterprise, or Ultimate, ISaGRAF must be installed under the XP Mode. 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 from the Windows Virtual PC Web site (<http://go.microsoft.com/fwlink/?LinkID=60479>)
2. Doubleclick on WindowsXPMode-en-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. Doubleclick on Windows6-KB958556-4.msuto install Windows Virtual PC
4. Reboot your computer.
5. After rebooting, click on "Start All Programs" in 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 required to log on to your virtual machine.
7. Now, go back [section 2.1](#) to install the ISaGRAF.

21.6 Important Setting for Using Variable Arrays

Please add two more lines on the top of the `isa.ini` file to enable the usage of variable arrays.

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

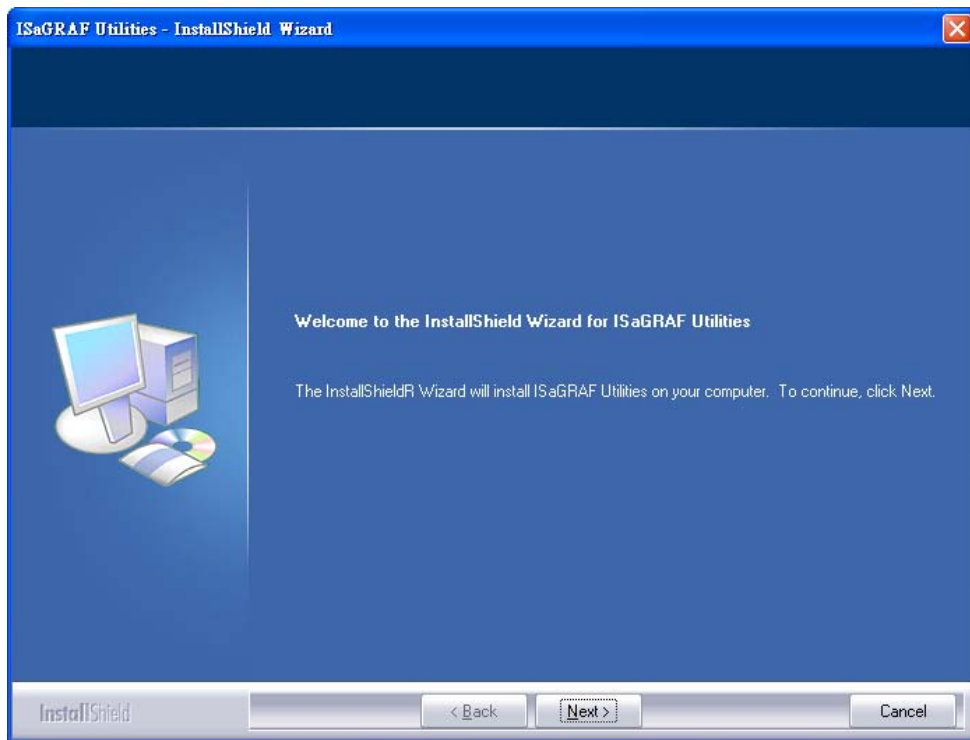
2.2 Step 2 Installing ICP DAS Utilities for ISaGRAF

The installation consists of 3 major functions

- Ø I/O libraries for all ISaGRAF PAC
- Ø Modem_Link utility
- Ø Autoscan I/O utility

Note Make sure you have installed the ISaGRAF Workbench program, IF NOT, please refer to [Ch2.1 Step 1](#) before continuing.

There is a CD-ROM supplied with each of PAC-5x7 PAC. Insert the CD-ROM into your CD-ROM drive. Then run `cdrom:\napdoisagrafsetup.exe` Follow the step to install it.



If you cannot find the CD-ROM, please refer to the website of <http://www.icpdas.com/products/8000/isagraf.htm>, then find the CD-ROM.

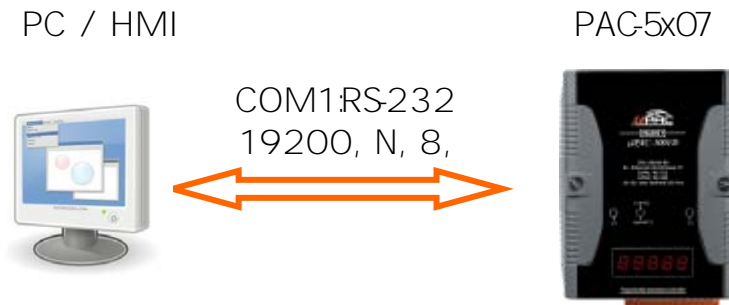
Chapter 3. Hardware System & Setting

3.1 Connect Your PC COM1 Port

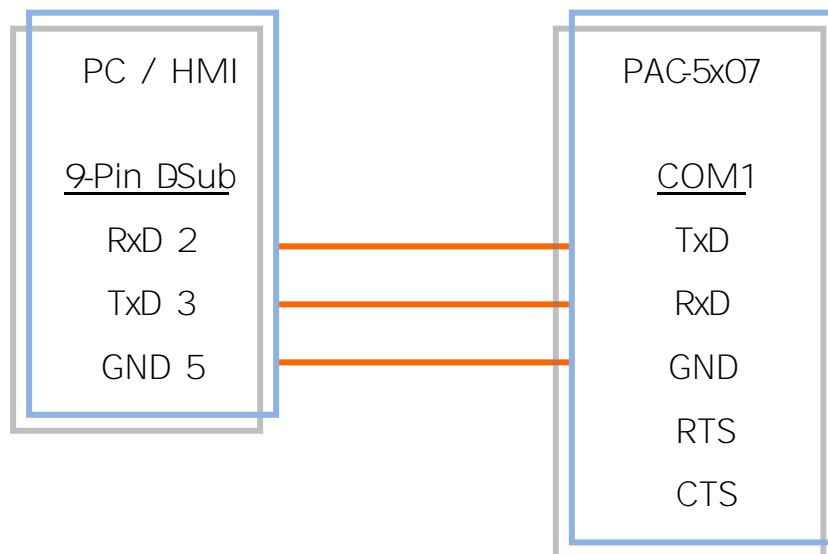
The COM1 port of the PAC5x07 is a Modbus Slave port which can talk with HMI software or for the ISaGRAF workbench to download the ISaGRAF project.

COM1:RS-232:

One PC/HMI can only link to COM1 port of one PAC5x07.



COM1:RS-232 Pin Assignments

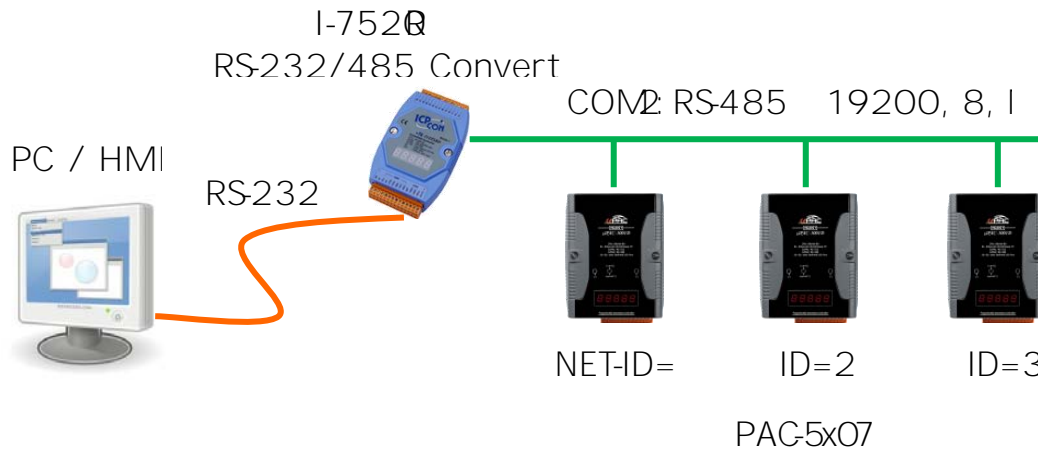


For the ISaGRAF Workbench RS-232 communications to operate properly, only the RxD, TXD, and the GND signals are used. If your PC is running a hardware device or program that uses RTS and CTS signals, then you will need to wire the RTS and CTS signals together.

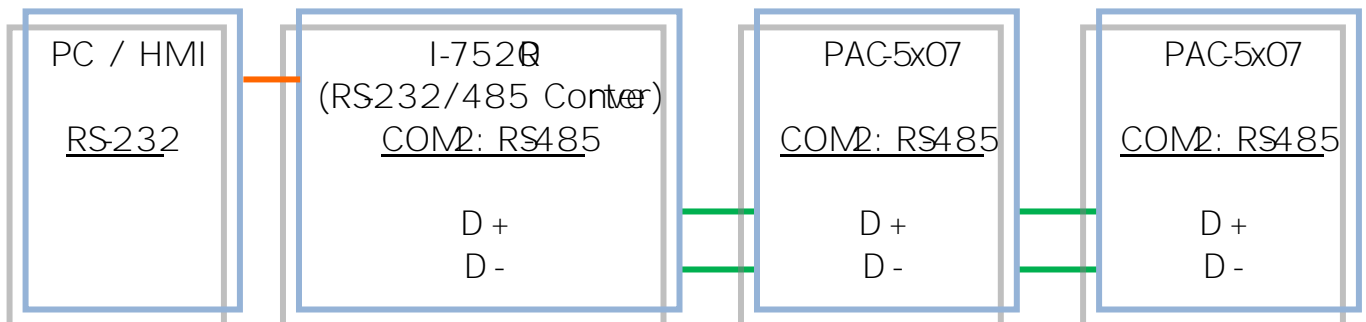
3.2 Connect Your PC COM2 Port

One PC or HMI can talk through COM2 RS-485 port to MANY PAC5x07 if each of them on the same RS-485 network has a unique NET

COM2 RS-485:



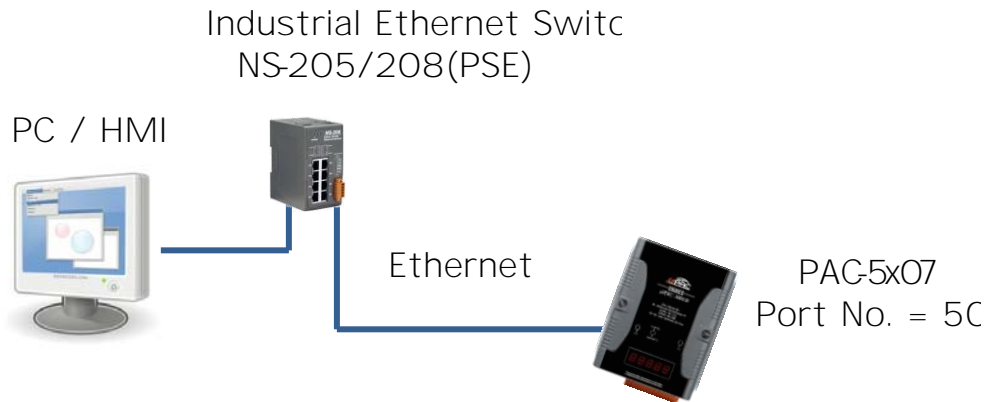
COM2 RS-485 Pin Assignments



Note Please make sure each PAC5x07 on the same RS-485 network has a distinct NET-ID. Refer to [Section 3.4 to set the NET](#)

3.3 Connect Your PC Ethernet Port

The Ethernet port of PAC5x07 PAC provides Modbus TCP/RTU protocol. It can be used to connect to the PC or HMI software. PC/HMI can talk to one PAC5x07 at the same time through the Ethernet port.



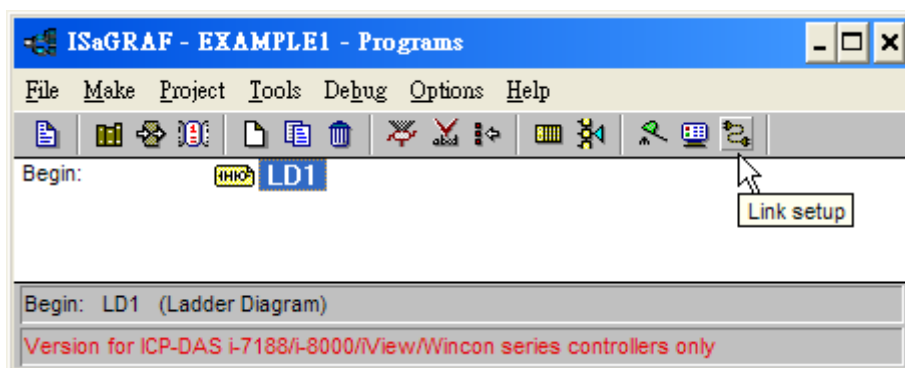
Before you can download an ISaGRAF application PAC5x07 PAC using the Ethernet port, you must first setup the Ethernet port to properly communicate with host PC.

PAC5x07:

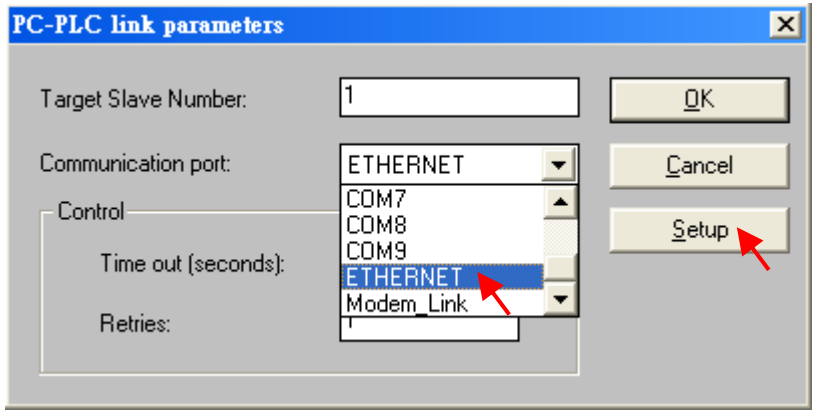
Set IP address, Mask and Gateway. Please refer [Section 3.9](#)

PC:

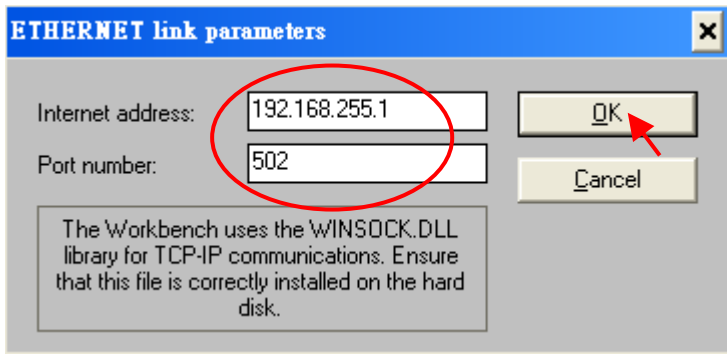
First open an ISaGRAF project and select a program you wish to communicate with your PC and then PAC5x07 PAC system. Next click on "Link Setup" button in the project screen as shown below.



A "PGPLC Link Parameters" dialog box will appear as shown in the next section. Select the "Ethernet" communications option and click on "Setup" button.



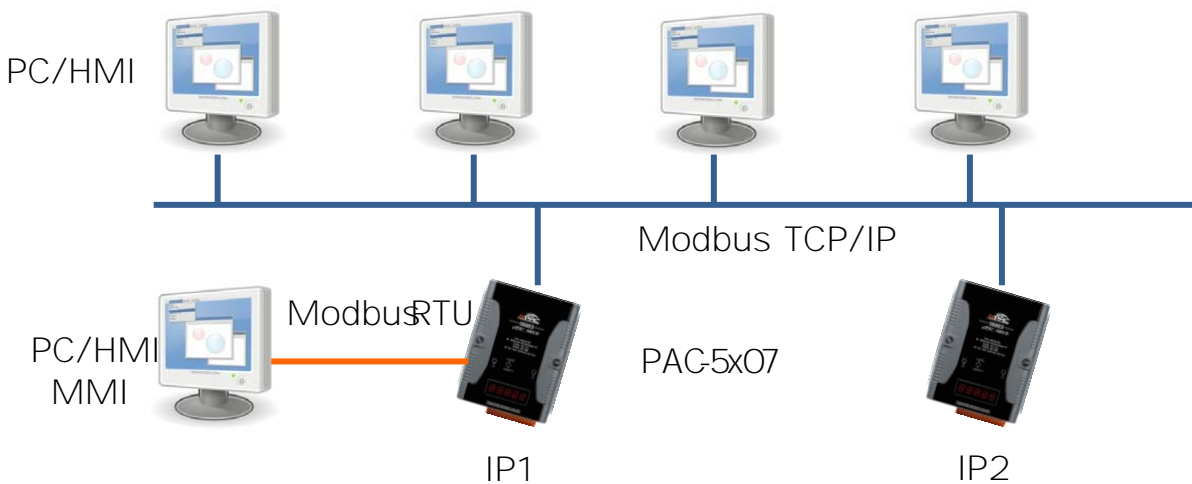
After you click on "Setup" button, an "Ethernet Link Parameters" dialog box will appear. Set the "Port Number" to "502" and the Internet address (IP) of your PAC5x07 PAC. (Please refer [Section 3](#))



Once you have entered the appropriate information, click on "OK" button, and you have configured your PC to communicate with PAC5x07 through the Ethernet port.

Multi-Client Connection to PAC5x07

Each PAC5x07 has an IP address and with a fixed Ethernet port No. 6502. Up to 4 can link to one PAC throughout Ethernet (Modbus TCP/IP protocol). Another PC or can link to COMRS-232 port (Modbus RTU protocol). Therefore the maximum number of clients can be linked is



3.4 How to Update Hardware Driver

Our newly released driver can be obtained from the below website
<http://www.icpdas.com/products/PAC5000/isagraf.htm>

Steps We use ver. 1.00 of h-5307 driver as an example to show how to upgrade the driver.

Download the Driver:

1. Create a file folder named PAC-5307 in your hard drive (Ex."c:\ PAC-5307")
2. Copy the following listed files under
 \Napdos\ISaGRAF PAC-5000\Driver\5307\1.00 or download the zip file from
 website <http://www.icpdas.com/products/PAC5000/isagraf.htm>
 (PAC-5307 ver. 1.00 please extract the file

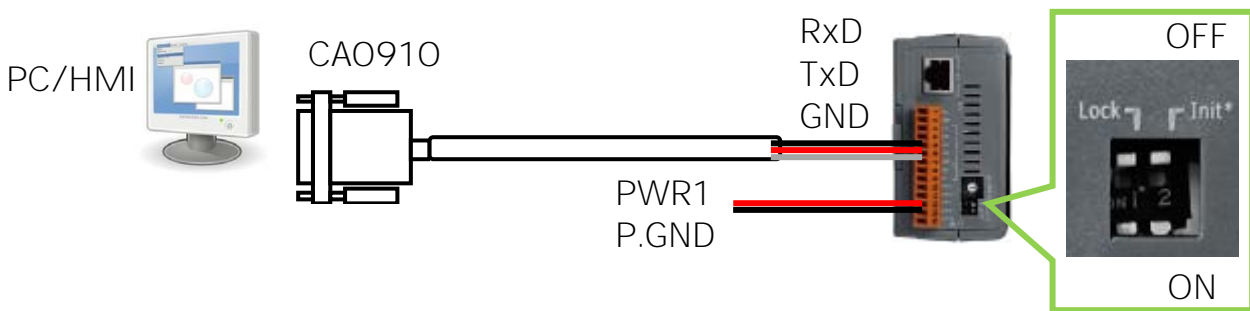
1. 7188xw.exe
2. 7188xw.f4
3. 7188xw.ini
4. autoexec.bat
5. 5k090903.img
6. is5307.exe

Future version may not use the same img file.

3. Run "7188xw.exe" in your hard drive. A "7188xw" screen will appear (Press F1 if need help)

Hardware Connection & Setting

4. Link COM1 or COM2 of your PC to COM1 of the PAC through RS-232 cable.



Note: If your computer has no COM1/COM2 or you use other COM (like COM5) to link h-5307 #

- E y

PAG5307.A# shown below:

```
C1B115200 P0 D8 S1
F
Xautoexec.bat X5307.exe
w25
```

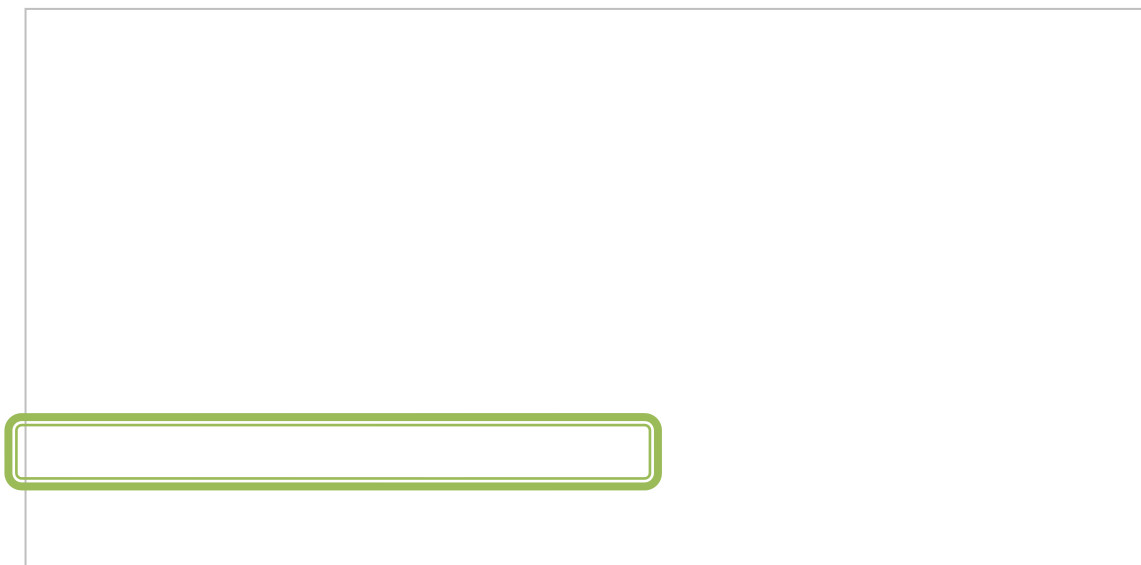


```
C5B115200 P0 D8 S1
F
Xautoexec.bat X5307.exe
w25
```

- 5. o then power it up \ V
- 6. If the connection is 0PAG5001 messages will appear on the screen.

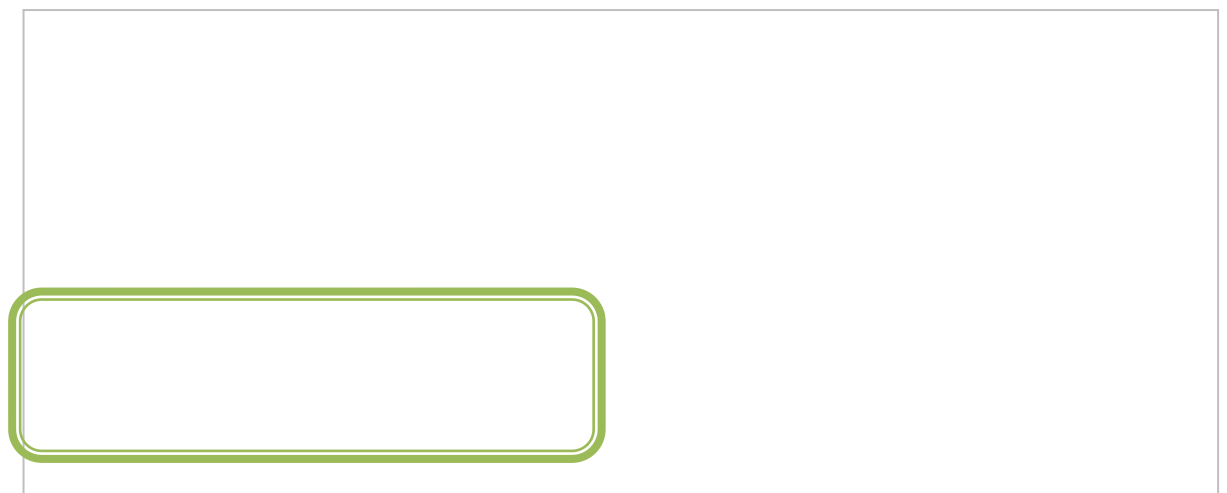
Upgrade ISaGRAF Embedded Driver:

- 7. Press "F4" to auto download the following files into system.
"autoexec.bat", "is5307.exe", "5k090903.img"



A Please Wait about 60SEC. to update ISaGRAF system
DO NOT Remove the Power*.

- 8. When the system automatically reboot, you have completed.
Type "dir" to make sure "autoexec.bat" and "5307.exe" have been downloaded



View the OS Version & Date:

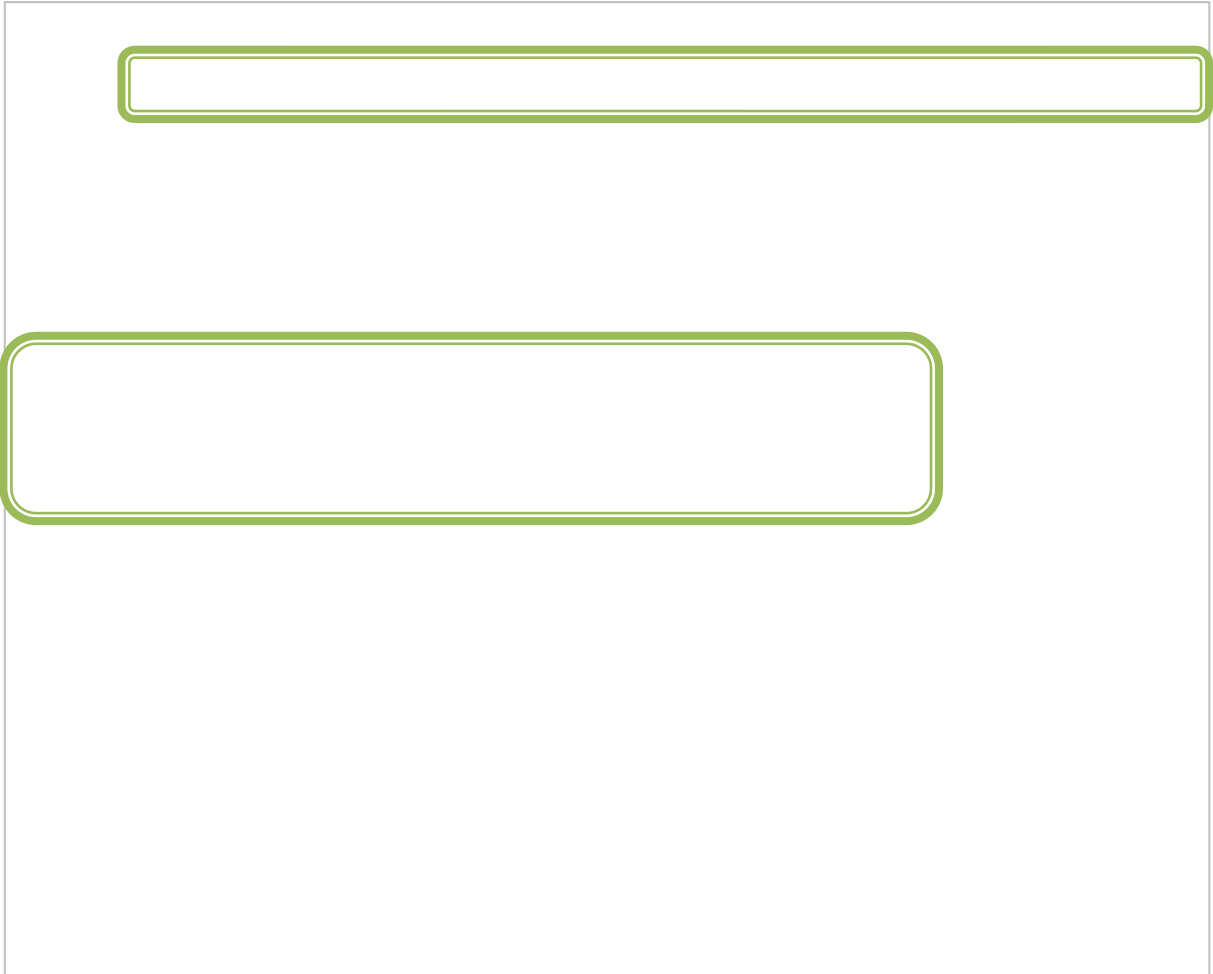
9. Type "ver" to see the current OS version & date

View the Driver Version & PAC Settings

10. Type "isa5307*p=" to see the current driver version, PAC settings and instruction description.

Note1: Please depend on the PAC model to type instruction (Ex. isa5307*p=)

Note2: After typing instruction, you have to reboot to continue step.



11. Press ALT_X to exit the 7188xw screen

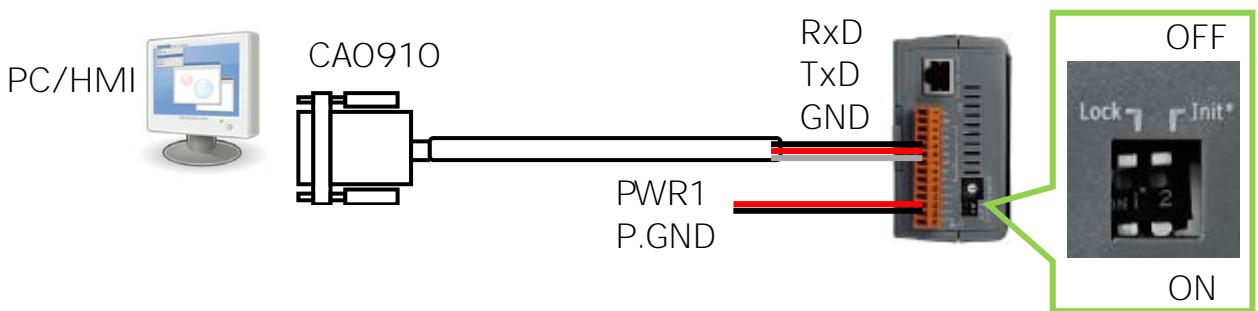
12. o then power it up \ 7 7

3.5 Set NETID for Controller System

Each PAC5x07 has a NETID Number. The valid numbers are from 1 to 255. The default No. is 1. NetID must be unique in the same RS-485 network. To set the NET-ID No, please follow below steps.

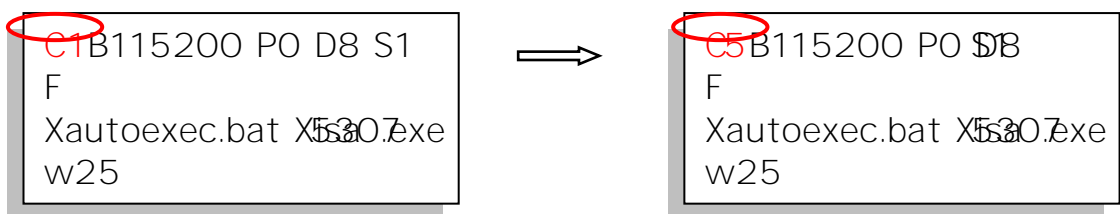
Related Files & Hardware Connection (Use h-5307 as an example)

1. Create a file folder named "PAC-5307" in your hard drive (Ex. "c:\ PAC-5307")
2. Copy the following listed files under PAC-53 folder
CD \Napdo\ISaGRAF PAC-5000\Drive\5307\1.00
3. Run "7188xw.exe" in your PAC-53 folder.
4. Link COM1 or COM2 of your PC to COM1 of the controller through a RS-485 cable.



If your computer has no COM1/COM2 or you use other COM (like COM5) to link to PAC5307, you need to change COM1 to COM5.

- Copy the following files to link to PAC5307. You need to change COM1 to COM5.



5. Open the file path and then power it up.
6. If the connection is OK, PAC5001 messages will appear on the screen.

Set NET-ID:

7. Type "isa5307s=2", to set NET-ID to 2



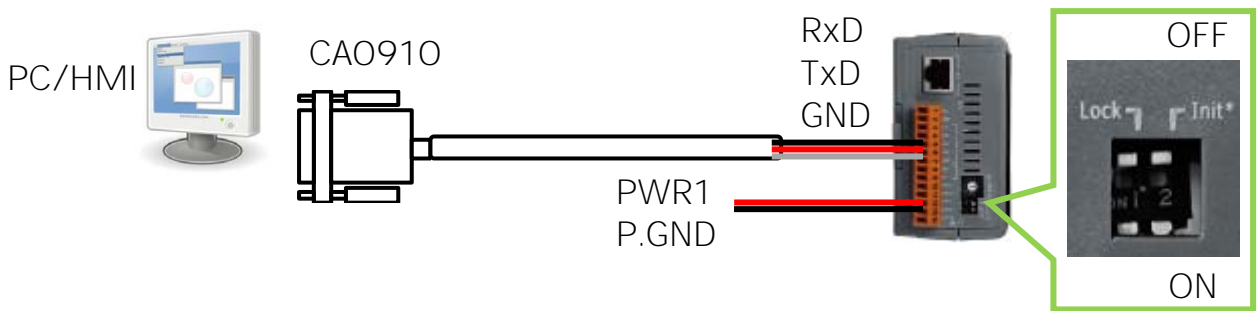
Please type the instruction according to the controller model (Ex. isa5307s=2)

8. Open the file path and then power it up.

3.6 Set Baud Rate for COM1

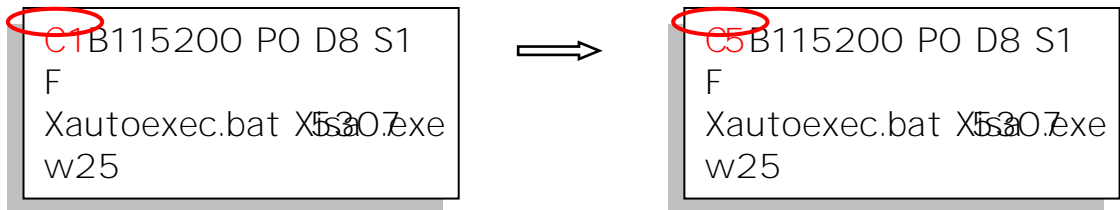
Related Files & Hardware Connection

1. Create a file folder named "PAC5307" in your hard drive (Ex. "c:\ PAC5307")
2. Copy the following listed files under PAC-53 folder
 CD \Napdos\ISA GRAF PAC-5000\Driver\5307\1.00
3. Run "7188xw.exe" in your PAC-53 folder.
4. Link COM1 or COM2 of your PC to COM1 of the PAC through a RS232 cable.



If your computer has no COM1/COM2 or you use other COM (like COM4) then use the h ^5307 #

- Copy PAC5307. You need to change C1 to C5.



5. then power it up \ V
6. If the connection is OK PAC-5001 messages will appear on the screen.

Start the Baud Rate Setting

7. Type "isa5307b=n" to set baud rate COM1 "n" is the setting code 0-9.

1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600,
 7=115200, 8=300, 9=600, 0=1200



Please type the instruction according to the controller model (Ex. isa307b=3)

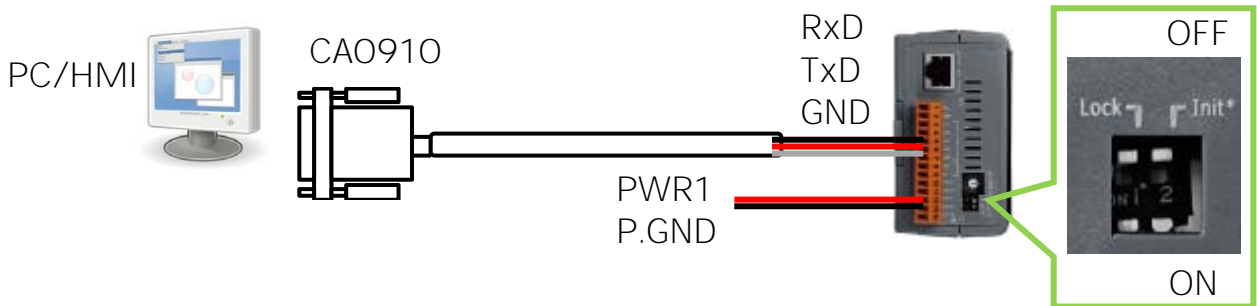
8. then power it up. \ 7 7

3.7 Set COM1 to Non-Modbus Slave for PAC-5x07

The COM1 of PAC-5x07 supports Modbus RTU Slave protocol by default. You can use it as a Non-Modbus Slave port for other usage. For example, user may write his own defined protocol on COM1 or use COM1 as a Modbus Master port.

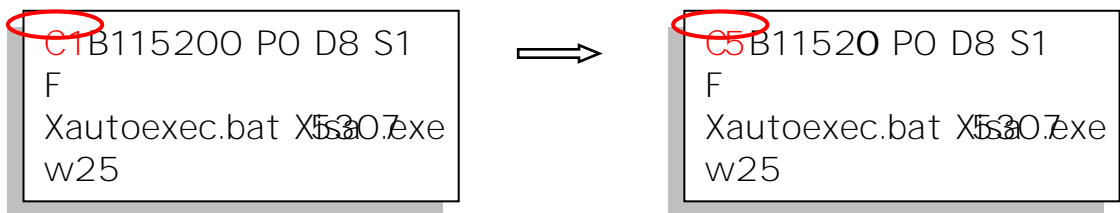
Related File & Hardware Connection

1. Create a file folder named "PAC-5307" in your hard drive (Ex. "c:\ PAC-5307")
2. Copy the following listed files under PAC-5307 folder
 CD \Napdos\ISA\GRA\ PAC-5000\Driver\5307\1.00
3. Run "718xw.exe" in your PAC-5307 folder.
4. Link COM1 or COM2 of your PC to COM1 of the PAC-5307 through a RS32 cable.



If your computer has no COM1/COM2 or you use other COM (like COM5) to connect to the PAC-5307, you need to change the COM port in the software.

Example: If you use COM5 to connect to the PAC-5307, you need to change C1 to C5.



5. After the connection is established, then power it up.
6. If the connection is successful, QPAC5001 messages will appear on the screen.

FreeCOM1

7. Type "isa5307f=1" to freeCOM1 (freeCOM1 as Non-ModbusSlave)



Please type the instruction according to the controller model. Ex. isa5307f=1)

8. Exit the 7188xw\$screen else the COM1/COM2 always in use

9. o then power it up. \ 7 7

Important Note

If user wants to change COM1 back to a Modbus RTU Slave again, follow the same steps as above and then type "isa5307f=0" as below



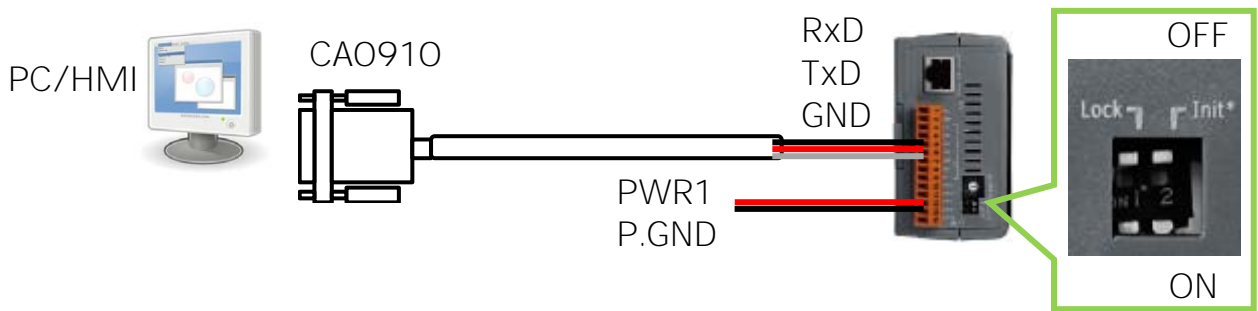
3.8 Set COM2 or COM3 as a Modbus RTU Slave Port

PAC507 can install M5xx expansion board to have a COM3 or COM2 user can customize one of COM2/COM3 to support Modbus RTU Slave protocol

Note COM2/COM3 Non-Modbus RTU Slave Port by default.

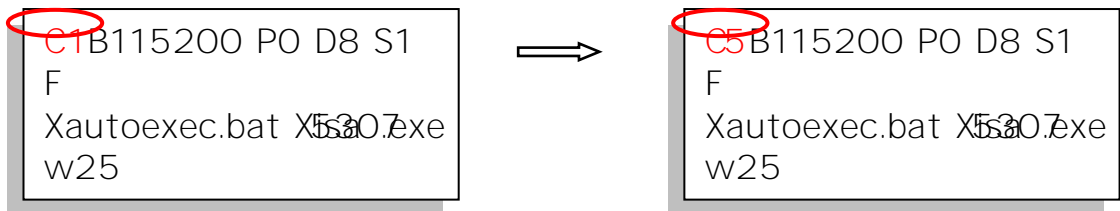
Related Files & Hardware Connection (Use h-5307 as an example)

1. Create a file folder named "PAC5307" in your hard drive (Ex. "c:\ PAC5307")
2. Copy the following listed files under PAC53 folder
CD \Napdo\ISA GRAF PAC5000 Drive\5307\1.00
3. Run "7188xw.exe" in your PAC5307 folder.
4. Link COM1 or COM2 of your PC to COM1 of PAC through a RS232 cable.



If your computer has no COM1/COM2 or you use other COM (like COM5) to h-5307 #

Example: If you need to change C1 to C5.



5.0 then power it up \ V

6. If the connection is OK, PAC5001 messages will appear on the screen.

Set COM2 or COM3 as Modbus RTU Slave

7. Type "isa5307*x=PB" to set the baud rate of COM2/3 and as a Modbus RTU slave port

"P" means the COM Port number (P = 2 or 3)

"B" means the baud rate (B = 0 ~ 9)

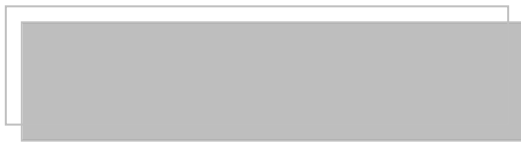
1=2400, 2=4800, 3=9600, 4=19200, 5=38400, 6=57600,
7=115200, 8=300, 9=600, 0=1200

Set COM2/3 baud rate and define as a Modbus RTU

"PB" = 20 ~ 29, set COM2 to Modbus Slave Port

"PB" = 30 ~ 39, set COM3 to Modbus Slave Port

Ex Set COM2 as Modbus RTU Slave Port, baud rate is 19200



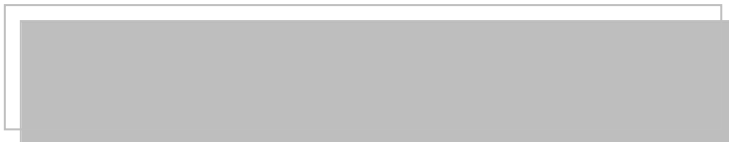
Please type the instruction according to the controller mode (Ex. isa5307x=24)

8. Exit the 7188xw screen else the COM1/COM2 always in use

9. o then power it up. \ 7 7

Recovery the COM2/COM3 Setting

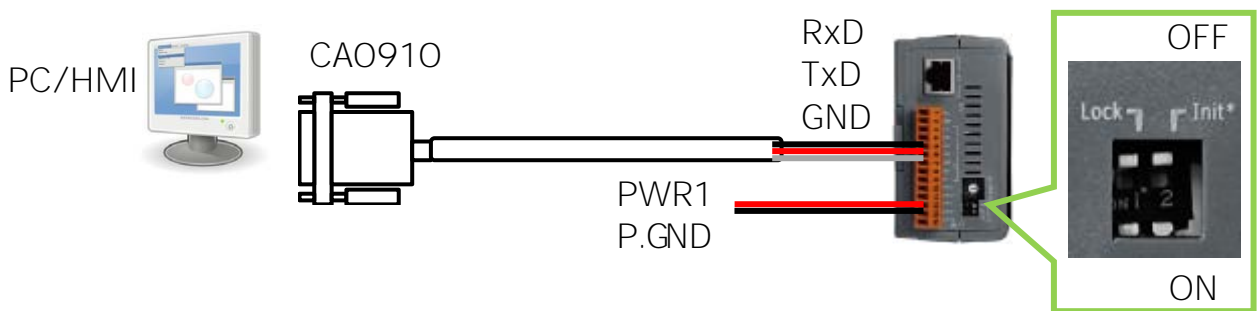
If you want to COM2/COM3 as Non-Modbus RTU Slave Port, please type "isa5307*x=f" to release it.



3.9 Set IP & MASK & Gateway for PAC5x07

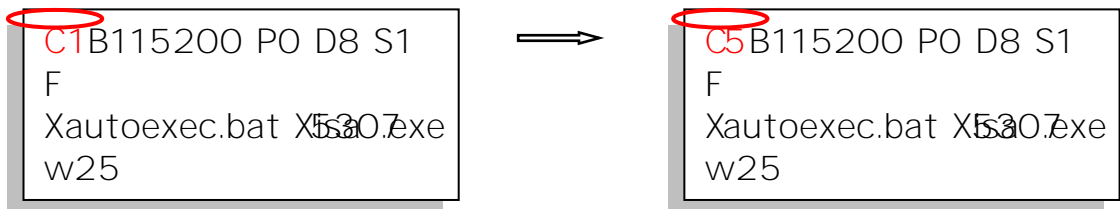
Related Files & Hardware Connection (Use h-5307 as an example)

1. Create a file folder named "PAC5307" in your hard drive (Ex."c:\ PAC5307")
2. Copy the following listed files under PAC5307 folder
CD \Napdos\ISaGRAF PAC-5000\Driver\5307\1.00
3. Run "7188xw.exe" in your PAC5307 folder.
4. Link COM1 or COM2 of your PC to COM1 of the PAC5307 through a RS232 cable.



If your computer has no COM1/COM2 or you use other COM (like COM5) to connect to the PAC5307, you need to change the COM port in the configuration file.

Example: If you use COM5, you need to change C1 to C5.



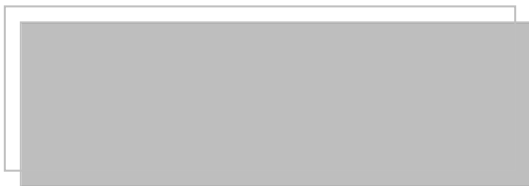
5. Open the configuration file and then power it up.
6. If the connection is OK, PAC5001 messages will appear on the screen.

Set IP & Mask & Gateway

7. Type "ip" to see the current IP address.
Type "ip xxx.xxx.xxx.xxx" to set a new IP.
Ex. > ip 192.168.150



8. Type "mask" to see the current address mask
Type "mask xxx.xxx.xxx.xxx" to set a new address mask
Ex. > mask 255.255.



9. Type "gateway" to see the current gateway address.
Type "gateway xxx.xxx.xxx.xxx" to set a new gateway address
Ex. > gateway 192.168.4



10. Exit the 7188xw screen else the COM1/COM2 always in us

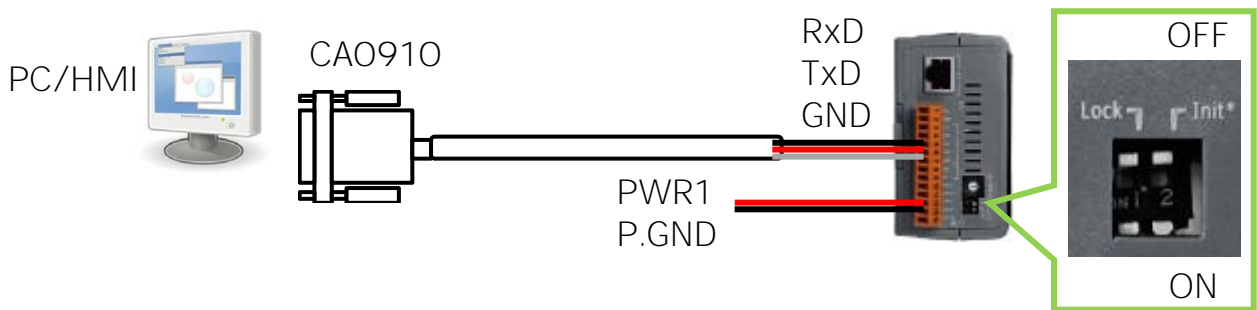
11. Sw then power it up. \ 7 7

3.10 Delete an ISaGRAF Project from the PAC

If there is a project exists in the PAC, you may use ISaGRAF Workbench to download a new one to replace. By some reasons, you may want to delete the ISaGRAF project from the PAC. If you use PAC507, please follow the steps below.

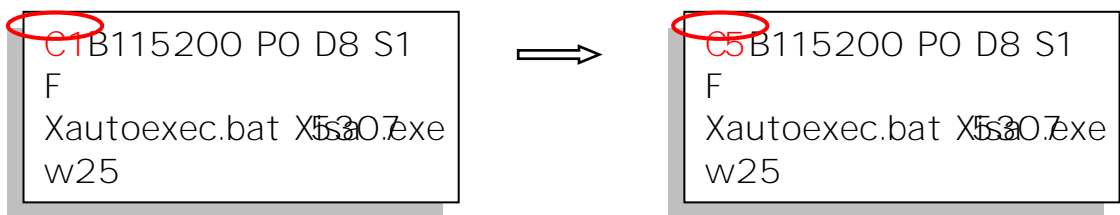
Related Files & Hardware Connection (We use h°5307 as an example)

1. Create a file folder named "PAC5307" in your hard drive (Ex: "c:\ PAC5307")
2. Copy the following listed files under PAC5307 folder
 CD \Napdo\ISaGRAF PAC5000\Driver\5307\1.00
3. Run "7188xw.exe" in your PAC5307 folder.
4. Link COM1 or COM2 of your PC to COM1 of the PAC through a RS232 cable.



If your computer has no COM1/COM2 or you use other COM (COM1) then link the h°5307 #

- (E) y PAC5307. You need to change C1 to C5.



5. o then power it up \ V
6. If the connection is OK, PAC5001 messages will appear on the screen.

Delete SaGRAF Project

7. Type isa5307*d=" to delete the project.



Please type the instruction according to the controller model (Ex. isa5307*d=)

8. Exit the 7188xw screen and switch the Init* to OFF then power it up.

3.11 SetI-7000 and I-87K Remote I/O by DCON Utility

PAC5x07 can link up to 28 pcs ICP DAS's remote I/O modules series remote I/O modules.

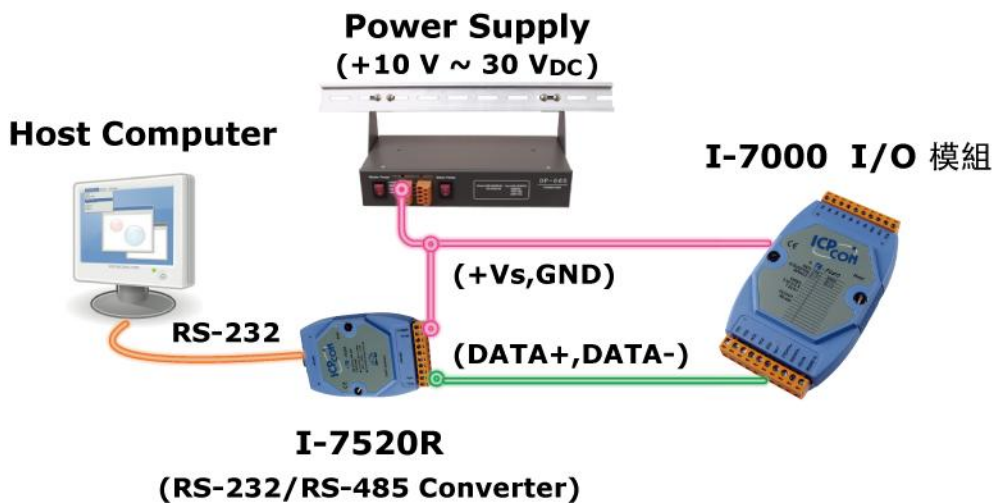
Preset: Before linking I-7000 and I-87K modules, must use DCON Utility to set each I-7000 and I-87K remote module to has a unique address (NEED) and the same baud rate (included the PAC) this host PAC system

The DCON Utility is a toolkit that helps user to search network, easily to configure and test the I/O modules. For DCON Utility program and manual please to http://ftp.icpdas.com/pub/cd/8000cd/napdos/driver/dcon_utility/

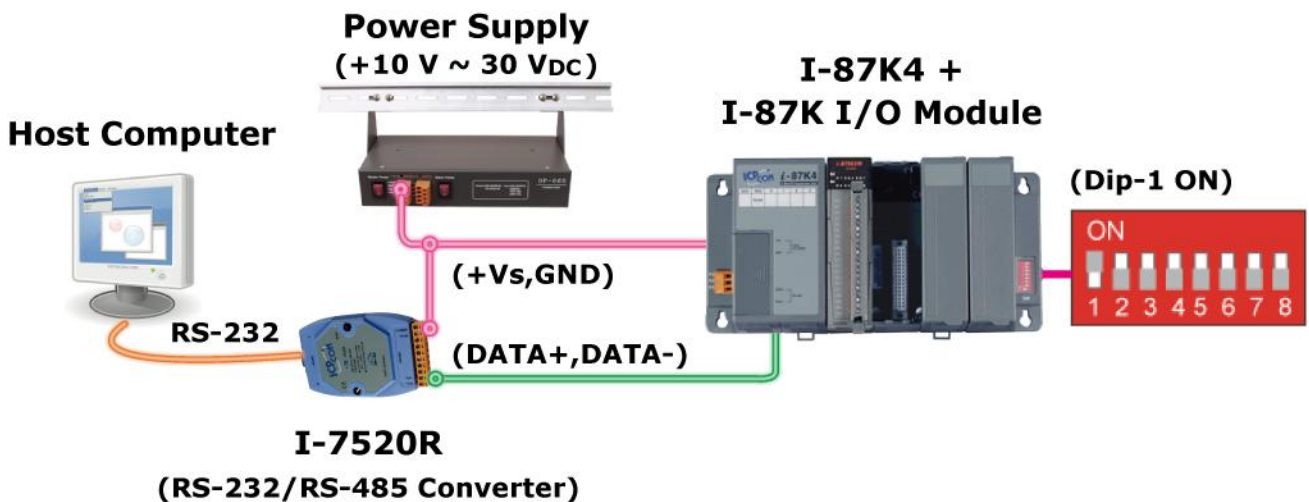
Step1: Hardware Connection

Note: The power supply must be DC power between 30V
Search and configure the modules one by one

Wire Connection for I-7000 (Configure one module at once)



Wire Connection for I-87K: (Configure one module at once)



Step2: Set I/O module to the initial state

Every new module has the factory default settings (as figure 1) for users convenience. If you use an old one and you set the I/O module to the initial state (as figure 2).

The Factory Default Setting

I/O Module	I-7000	M-7000	I-87K
Address	1	1	1
Baud rate	9600	9600	115200
Checksum	Disabled	Not defined	Disabled
Protocol	DCON Protocol	Modbus Protocol	DCON Protocol

The Initial Settings:

I/O Module	7000 Series (I-7000 & M-7000)	I-87K Series
Address	0	0
Baud rate	9600	115200
Checksum	Disabled	Disabled
Protocol	DCON Protocol	DCON Protocol

HOWTO: Initialize the I/O module

I-7000: To set I-7000 module to the initial state, please wire the INIT to GND (if there is a DIP switch on the back of it, just set the switch position) and power on the module. Then the module will become initial state.

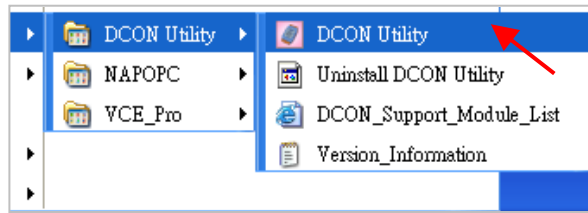
*I-87K: To set I-87K module to the initial state please set the related DIP Switch on the I-87K4/5/8 I/O expansion unit. For example change DIP-1 to ON and restart the power, the I/O module in the first slot will become initial state.

Note: If you use I-87K9 or I-87K5 I/O expansion unit, the DIP-1 is corresponding to the second slot so do not use the first slot.

Following, we would like to set I-87K I/O module as an example to show how to search and configure with DCON utility.

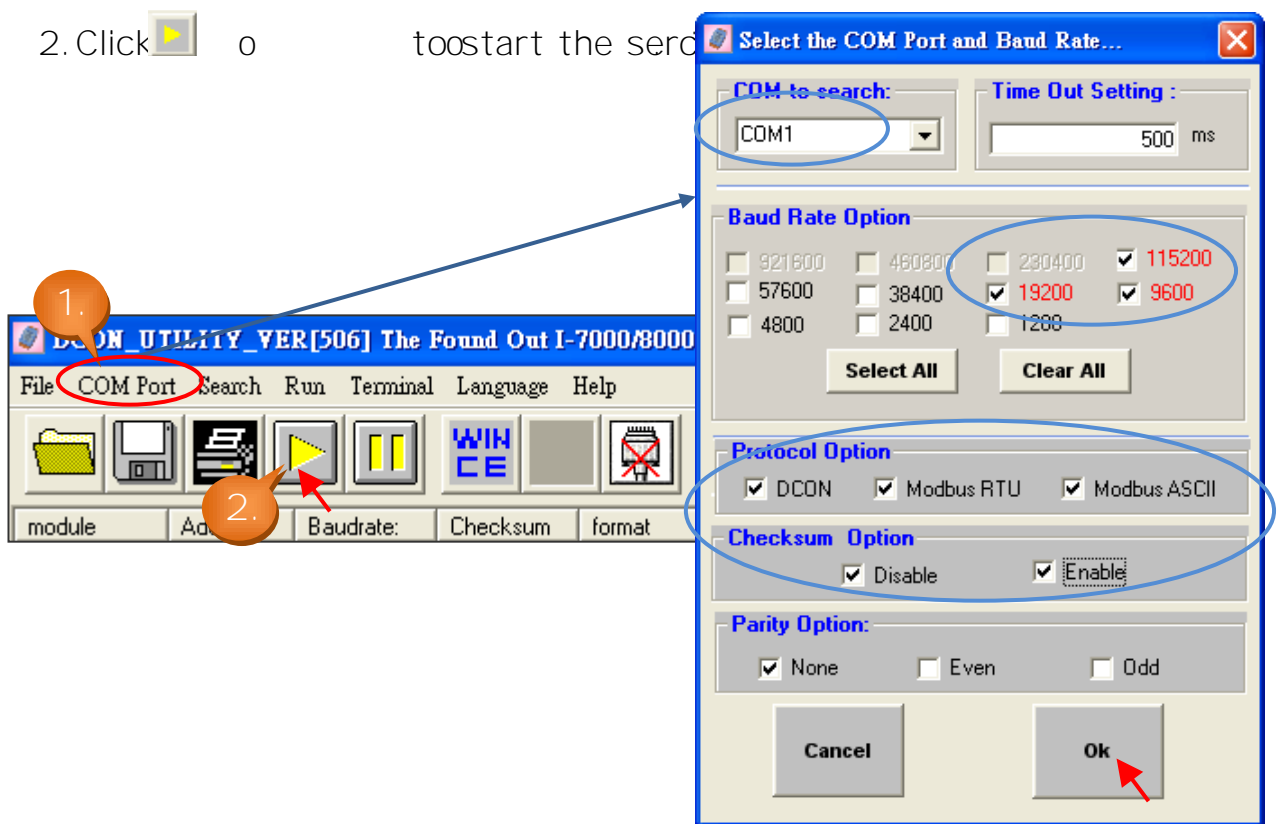
Step3: Select COM Port & Baud Rate to Search

Execute the DCON Utility:



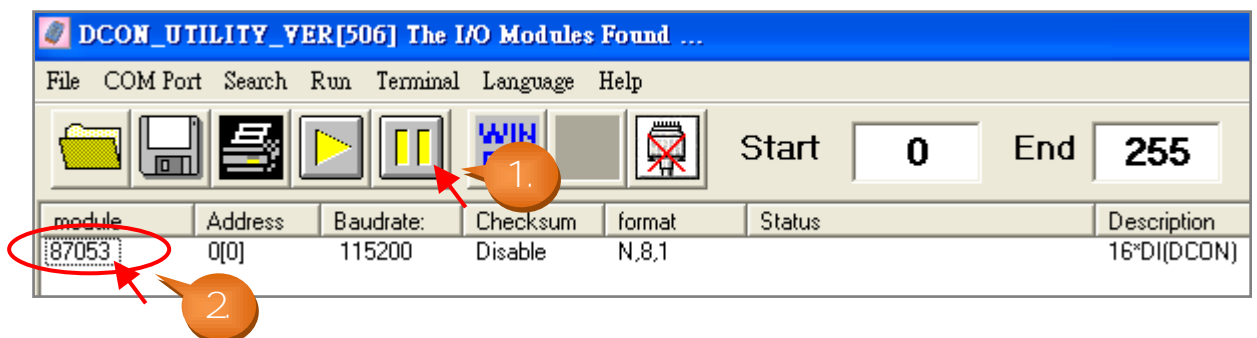
1. # # \ U h Baud rate to search Select # \ multiple baud rate, protocol or check options if you do not know the modul setting, but it takes more reserch

2. Click to start the search

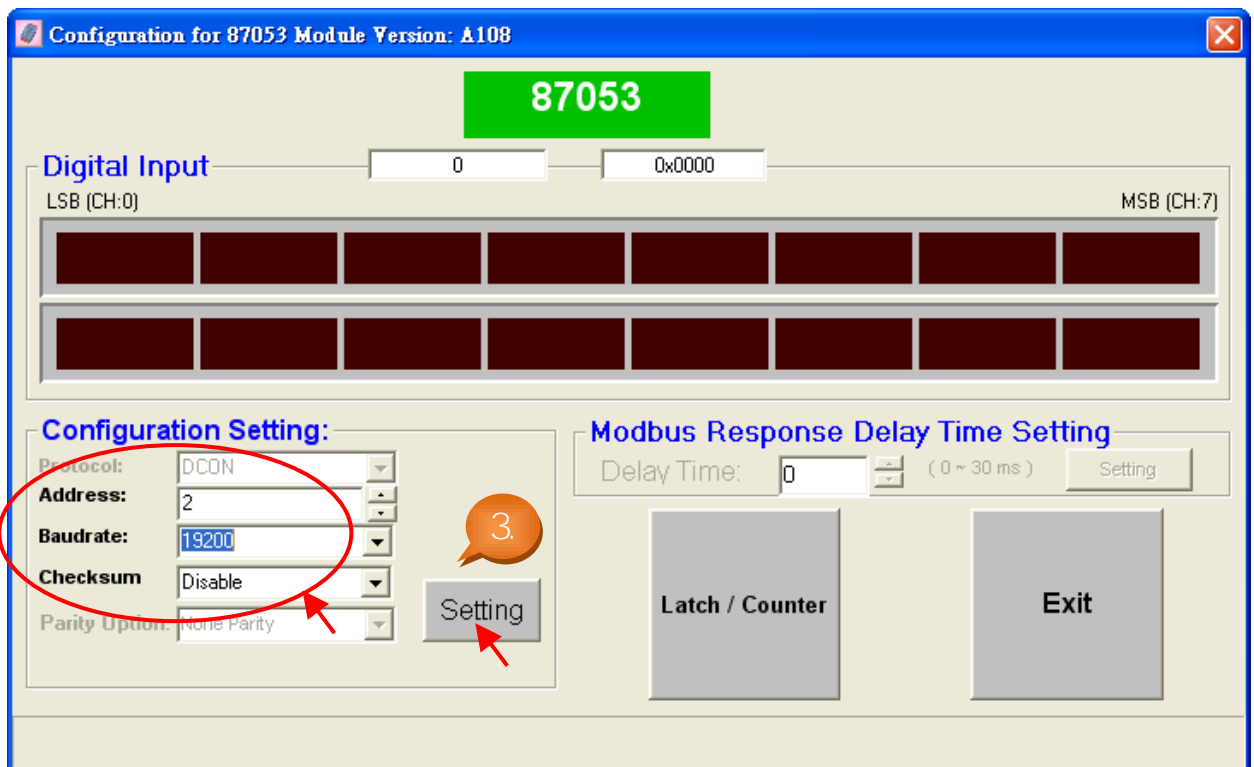


Step4: Click the Module Name to Configure

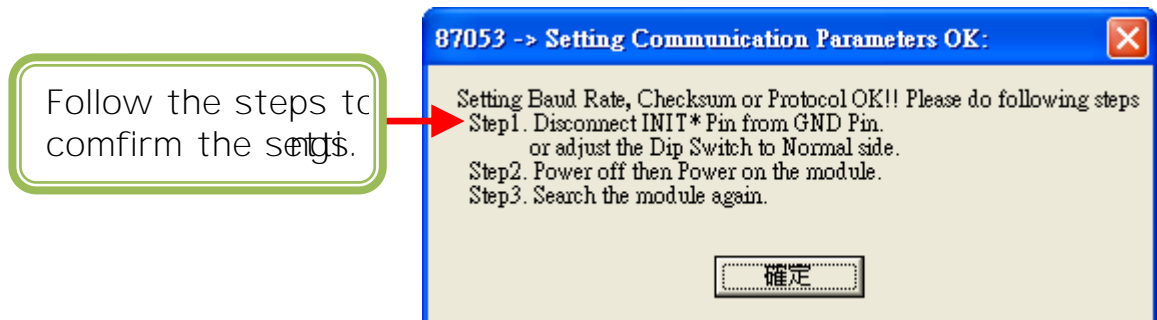
1. When you see the module name on screen please click button to stop search.
2. Double click the module name to enter the configure screen.



3. Now, you can set the Address, Baudrate and Checksum. After configuration, you must click Setting to save the settings.



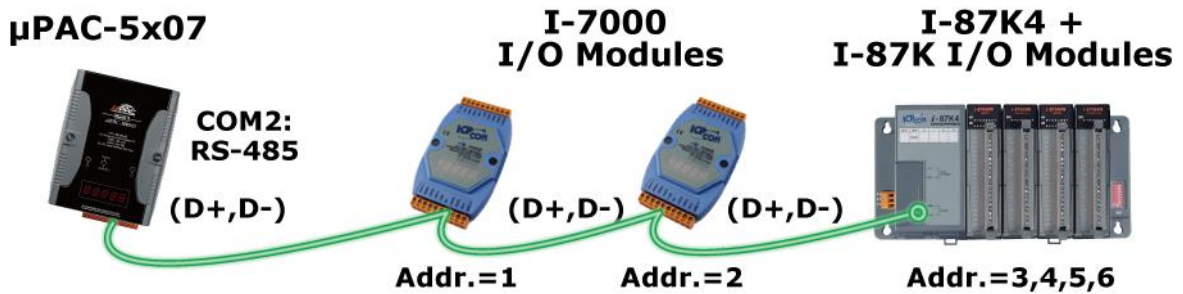
4. You have completed the setting, please adjust the Switch to OFF position and restart the power. Finally, you can search the module again to confirm settings.



Note Remember to remove the wire between INIT* and GND, then restart the power, you use the 7000 I/O module.

3.12 Link to I-7000 and I-87K Remote I/O Modules

A PAC5x07 PAC system can use its COM2 RS-485 port to link to ICP DAS I-7000 and I-87K Remote I/O modules. This configuration can be very useful in applications that require distributed remote I/O throughout the system.



Note You can link up to 4 pcs of I-7000 or I-87K series Remote I/O modules to one μPAC-5x07 PAC

You must remember to set each I-7000 and I-87K Remote I/O module a unique address (NETID), and set them and the μPAC to have the same baud rate & checksum (Default: Disable)

For more information regarding setting up and programming I-7000 or I-87K remote module, please refer to [ICP DAS I-7000 and I-87XX Modules User Manual](#)

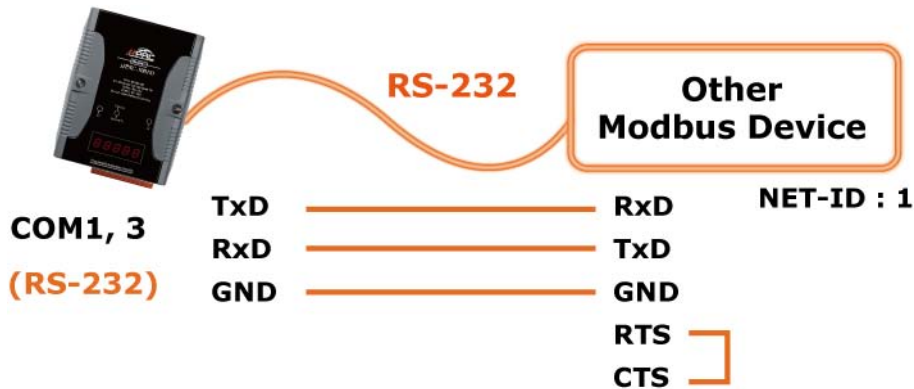
3.13 Create Two Modbus Master/Slaves Link

PAC5x07 can support max. two Modbus "Slave" (COM1, 2, 3) or two Modbus "Master" (COM1 or 2/3) at the same time for various kinds of application.

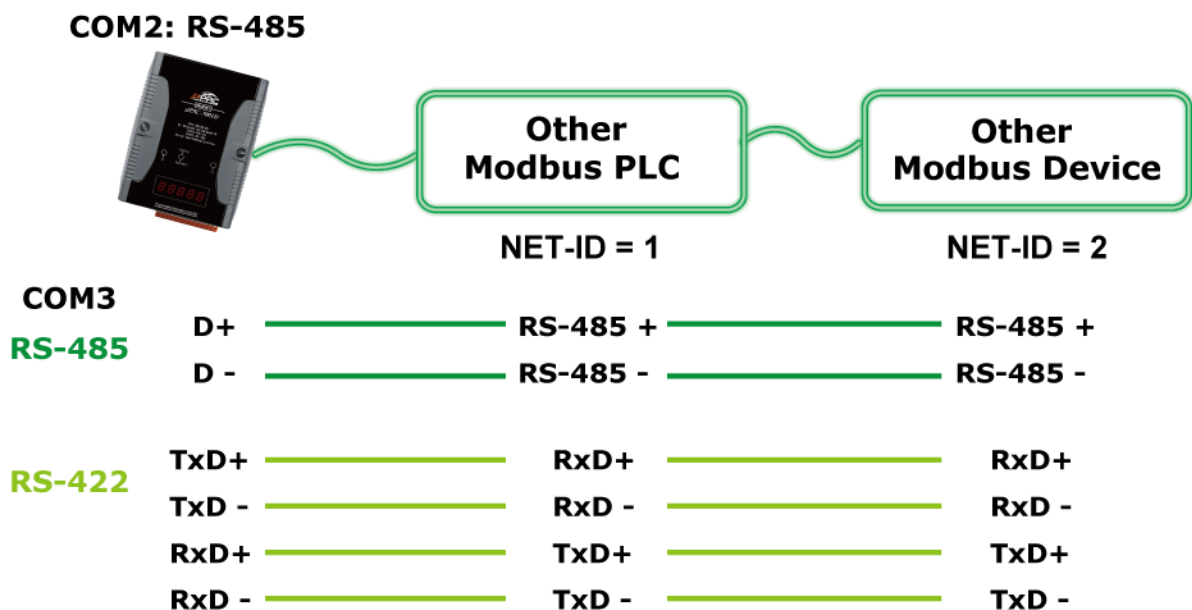
COM3: The COM3 of h^o-5x07 is on the plugged W-Board XW5xx (RS-232 (with on XW503, XW504.XW-board) or RS-485 (with on XW511... XW-board) or RS-422 (with on XW507... XW-board))

MultiLink One h^o-5x07 PAC can link multi Modbus devices RS-485 or RS422 Every linked device must have one unique NET-ID (1 ~ 255) Their Baud rate and the Checksum must be the same as the PAC

Wire Connection RS-232



Wire Connection RS-485/RS-422

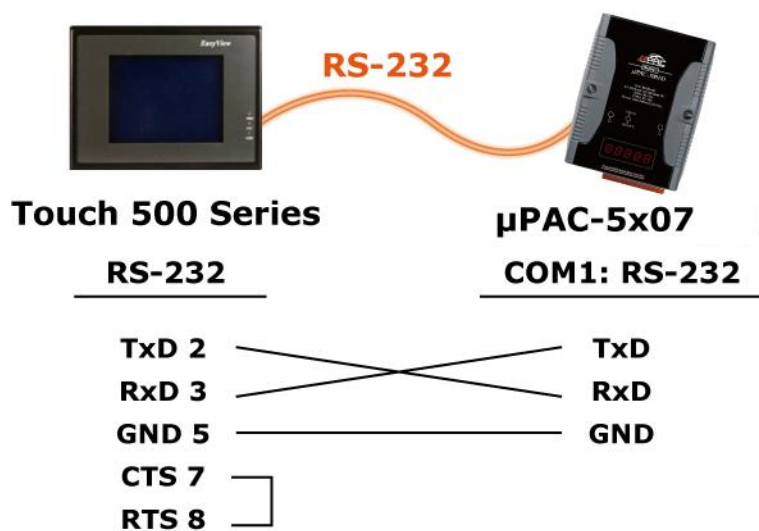


3.14 Link to HMI Interface Device

The COM1 RS-232 port of the μ PAC-5x07 can be used to interface with additional Human Machine Interface (HMI) devices such as touch screen displays

ICP DAS provides series of touch screen displays, such as the "Touch 500 Series". This product comes in various size and model

For new & detail information please visit web site:
<http://www.icpdas.com/products/Product.htm#P8>

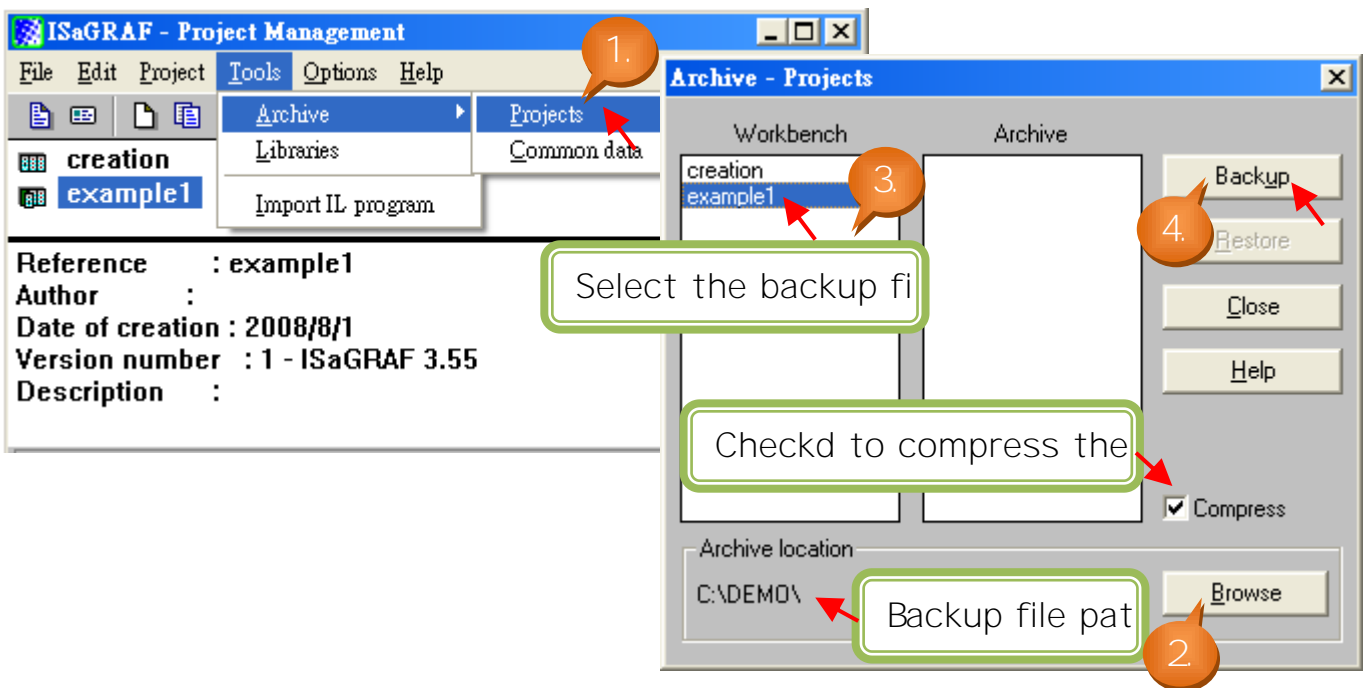


3.15 Backup & Restore an ISaGRAF Project

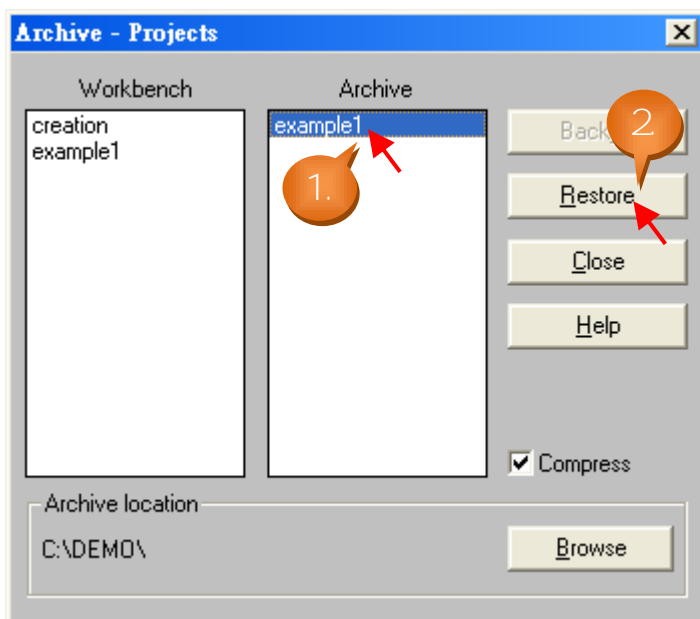
For users archiving purposes, ISaGRAF Workbench provides the backup and restore function. Sometimes, you would like to compress your projects, such as e-mail to service@icpdas.com for technical support.

Backup an ISaGRAF Project

1. Click Tools > Archive > Projects in ISaGRAF Project Management window
2. Click Browse to select the path of the backup file in Archive Projects window
3. Select the project name you want to backup in Workbench field
(You can click Compress checkbox to compress the file)
4. Click Backup to backup the file in the folder.



Restore an ISaGRAF Project



To restore an ISaGRAF project from a backup folder, use the same method as above

Select the project name you want to restore from the "Archive" field

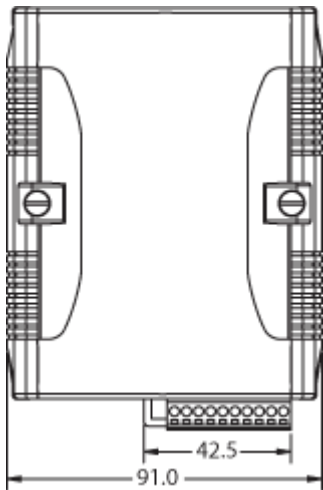
1. Click on the "Restore" button, the project will be restored to the Workbench field

Now, you can open, edit and download the restored ISaGRAF project file.

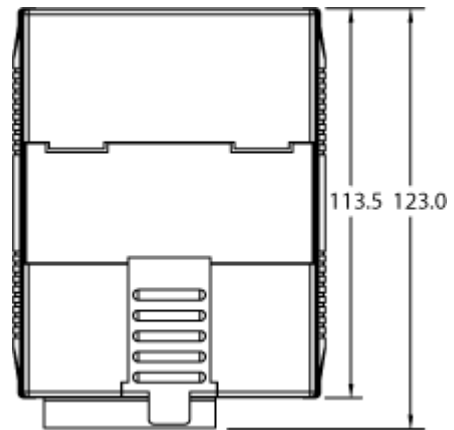
3.16 Dimension & Mounting for PAC-5x07

Unit : mm

Front View



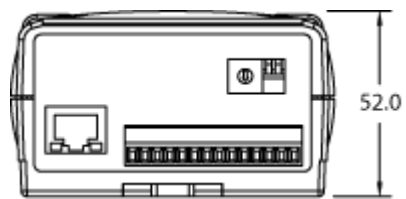
Back View



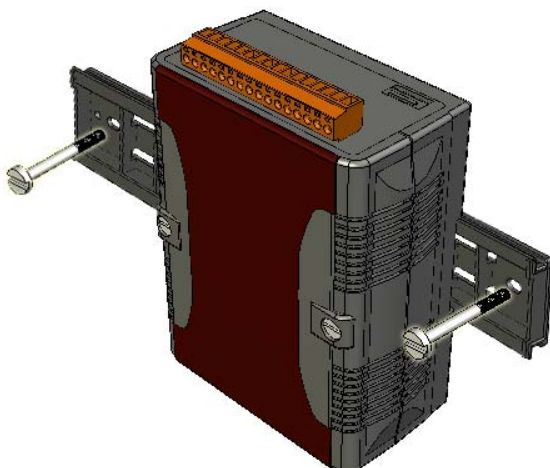
Top View



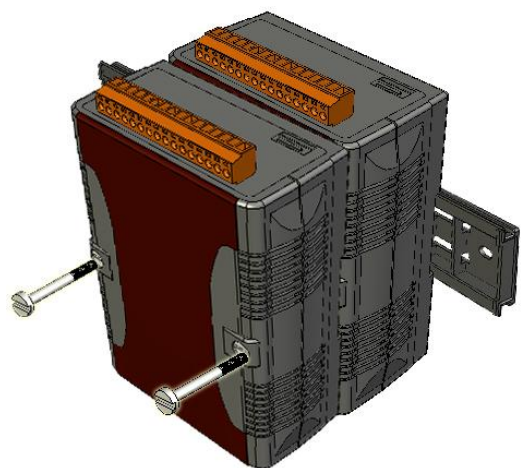
Bottom View



DIN-Rail Mountin



Piggyback Mounting



Chapter 4. ISaGRAF Demo

4.1 Writing a Simple ISaGRAF Program

Note The following is a step by step example on how to create a ladder logic (henceforth referred as "LD") program and download it to PAC-5x07 PAC. If you do not install the ISaGRAF Workbench and ICP DAS Utilities for ISaGRAF software, please refer to [Section 2.1: Step 1 & 2](#)

Example of LD Program

The following is a step by step example on how to create ladder logic (henceforth referred as "LD") program using a PAC-5307 PAC (plugged XW-board XW107)

Variable Declaration

Name	Type	Attribute	Description
SW1	Boolean	Input	Input Switch 1
SW2	Boolean	Input	Input Switch 2
SHUT	Boolean	Input	Input Shutdown button
OUT01	Boolean	Output	Output 1
OUT02	Boolean	Output	Output 2
OUT03	Boolean	Output	Output 3
TMR1	Timer	Internal	Time Period of blinking, initial value is set at

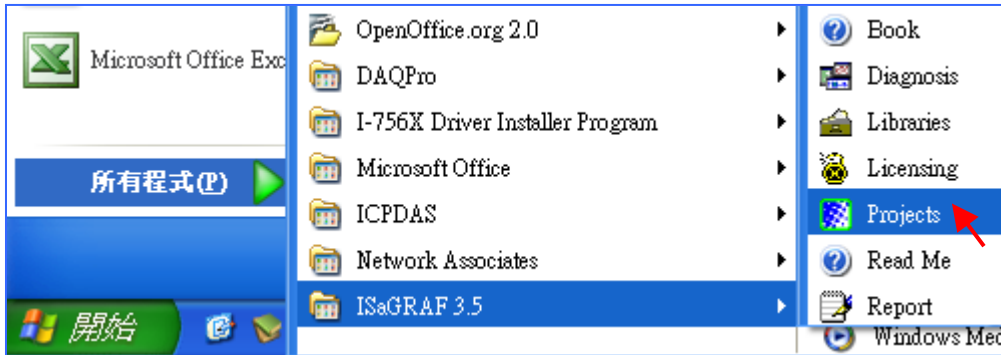
LD Program

Action Procedure

1. Monitor the SW1 (Default: OFF) and SW2 (Default: OFF).
2. Monitor the SHUT button (Default: OFF, Normal Close)
3. If either SW1 or SW2 is ON and the SHUT is OFF, start the (blinking) timer TMR1.
4. OUT01~03 will switch to ON and OFF per second
5. Press SHUT to stop the blinking of OUT01~03

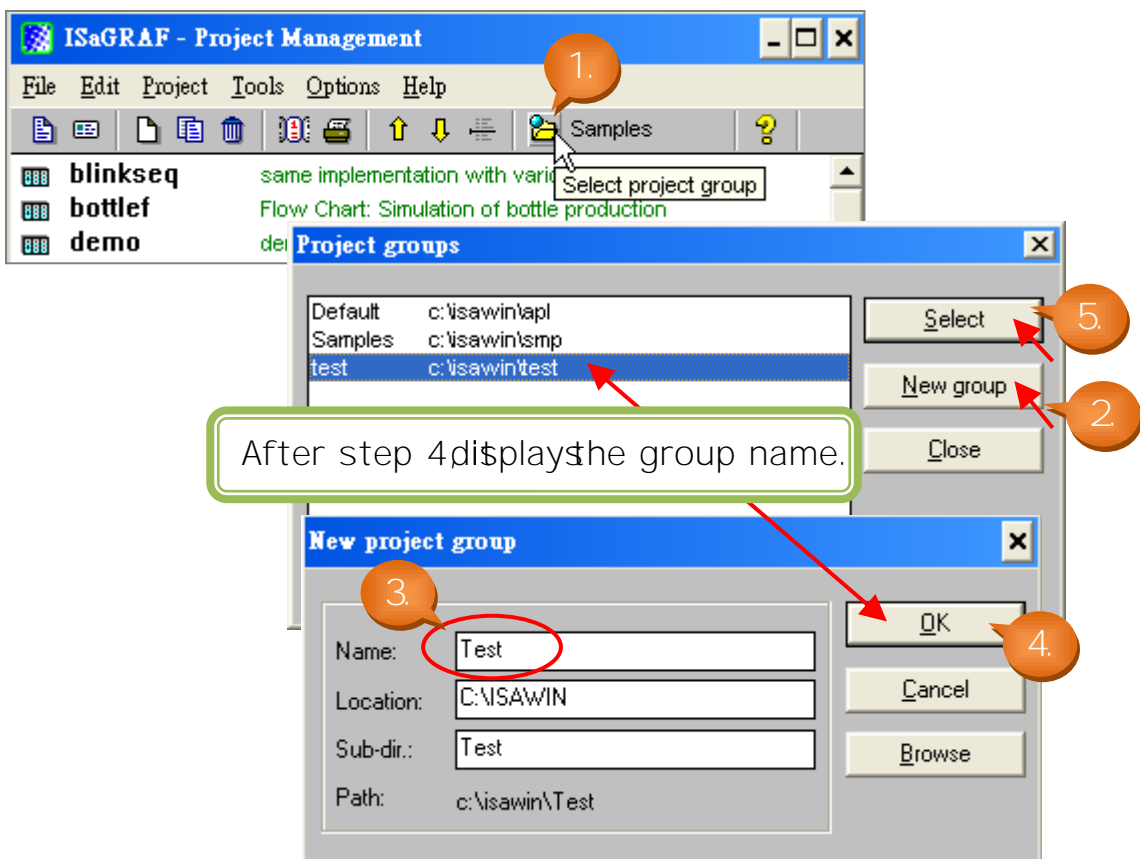
4.1.1: Start ISaGRAF Project Management

First, start the ISaGRAF Workbench software. Please click on the Windows Start > [All Programs] > [ISaGRAF 3] > [Project Management] as shown below.



4.1.2: Creating an ISaGRAF Project Group

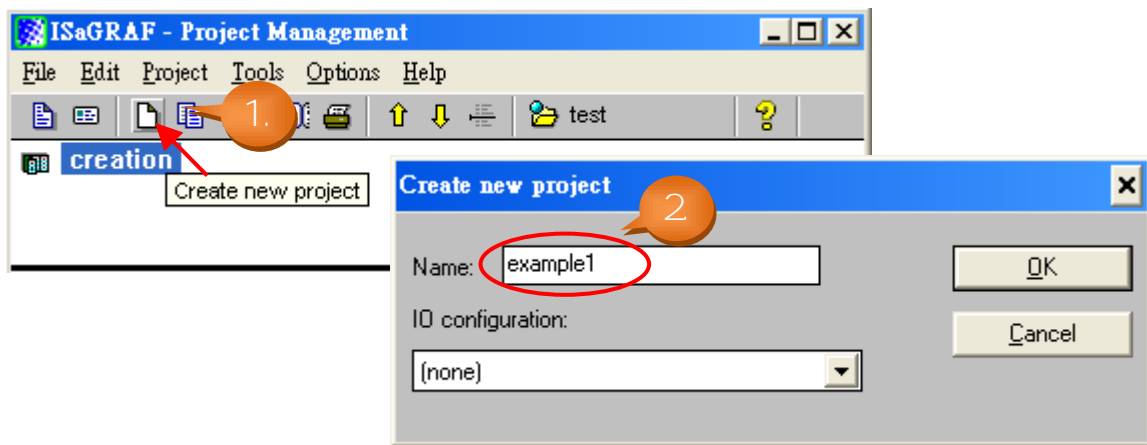
Click the "Select Program Group" button then click "New Group" button in the name for the new group you wish to create then click on "OK".



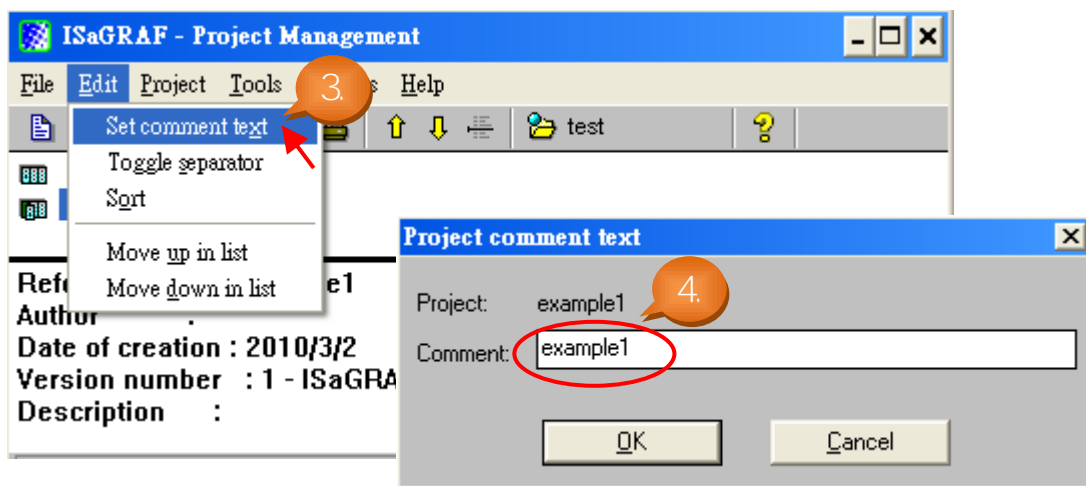
After press OK, it will create a new folder under the 'isawin' and show the group name and file path in Project Groups window. Now you can click 'Select' button or Doubleclick the group name to open it.

4.1.3: Creating a New ISaGRAF Project

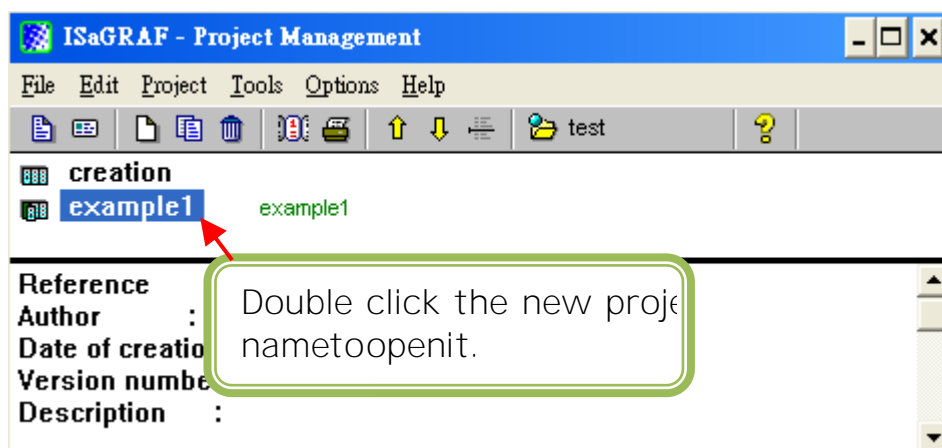
To create a new ISaGRAF project, click the "Create New Project" then enter the name of the new project.



You can enter additional information about a project by clicking on the 'Edit' menu > [Set Comment Text]



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

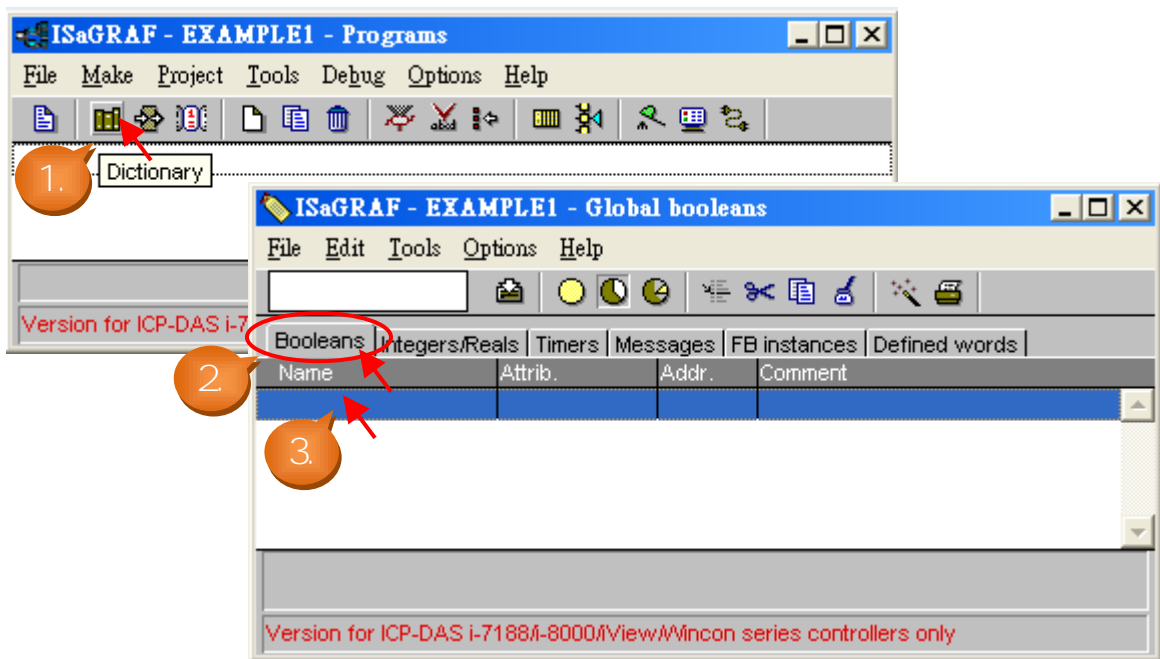


4.1.4: Declaring the ISaGRAF Project Variables

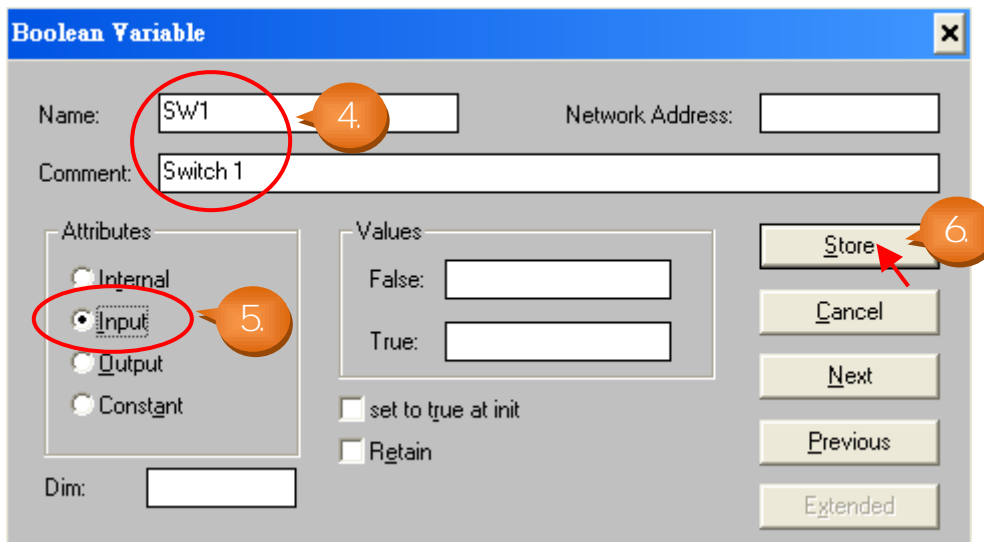
Before you start creating an ISaGRAF program, you must first declare the variables that will be used in the ISaGRAF program.

Declaring Boolean

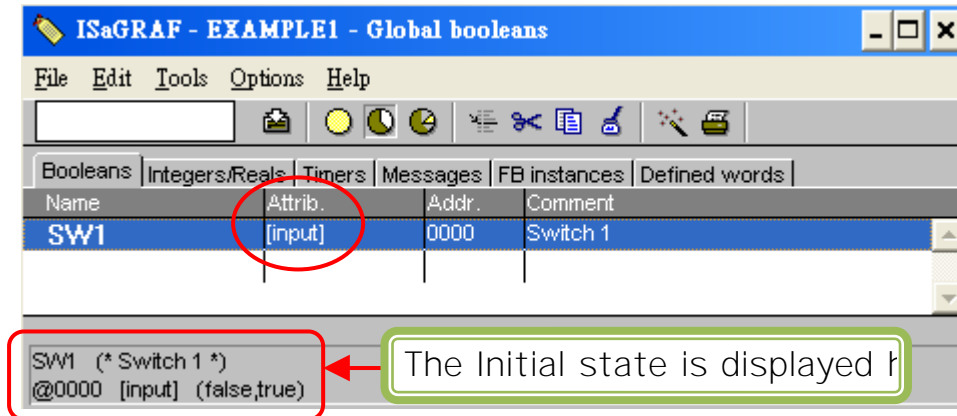
1. Click "Dictionary" tool button
2. Click "Booleans" tab to declare the Boolean variable which required in program.
3. Double click on the colored area below the "Booleans" tab to go into Boolean Variable window



4. In this example type "SW1" as the name and type "Switch" as the comment
5. Set the attribute as "Input".
6. Finally click "Store" button to save.



In this screen you have declared the Boolean variable

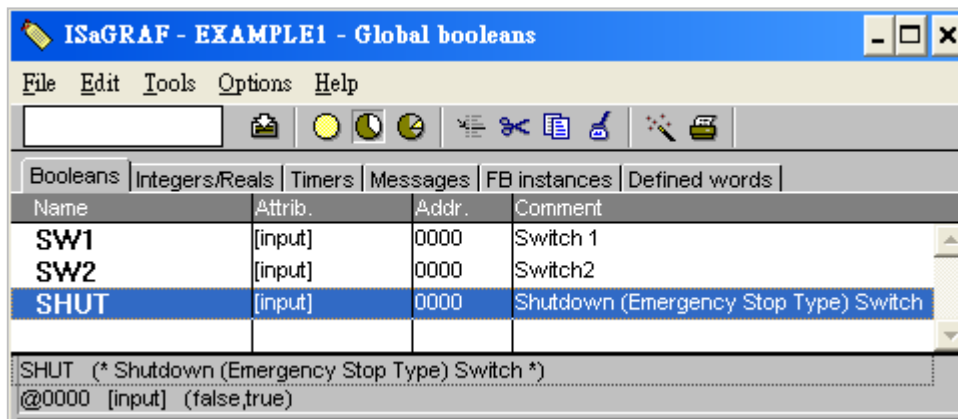


Note The other variables declared in the program will be displayed with detail information for this variable.

Note Ensure that you have declared the proper attribute of the variable. If you need to change the attribute, just double click on the variable to assign it.

Using the same method described above, declare other Boolean variables for this example program, "SW2" and "SHUT".

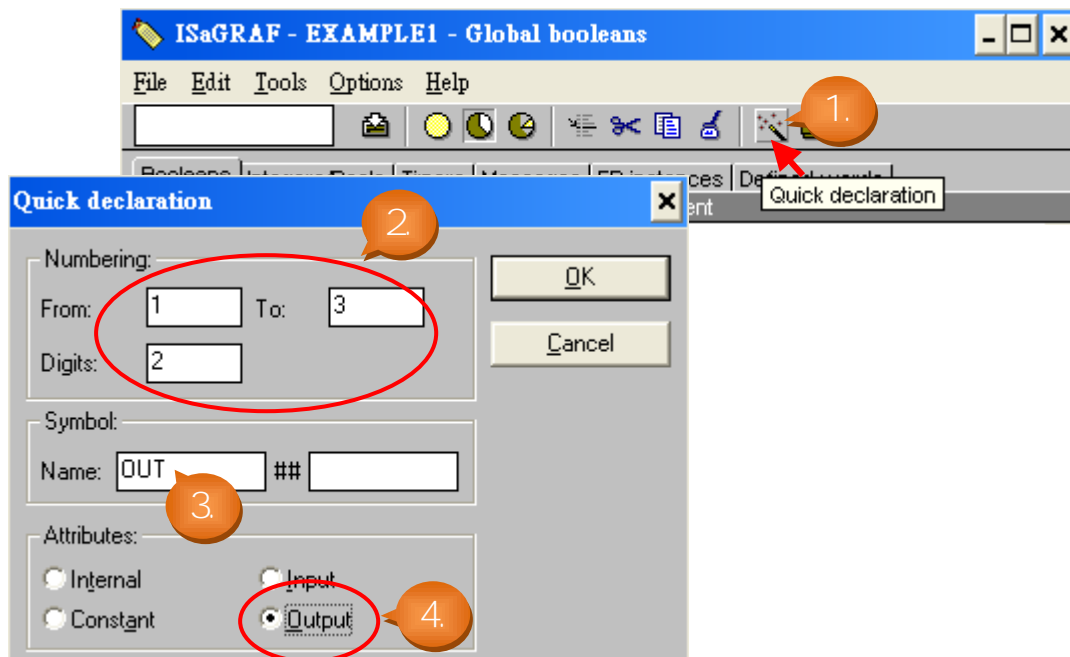
When you have completed the Boolean variable assignments, the Global Boolean window should be looked like below



Quick Declaration

There are three outputs used in this example named OUT01, OUT02, and OUT03. For these sequentially ordered variables, SaGRAF provides a quick and easy way to declare them.

1. Click "Quick Declaration" tool button
2. In the "Numbering" area
From and "To" indicates the ordinal number of the variable (i.e. From 1 To 3)
Digits indicates the number of digits to display (e.g. input 2, means 01 ~ 03)
3. In the Name field of "Symbol" area, type OUT as the variable name.
4. Finally set the attribute "Output".



After you press "OK", all three outputs will be immediately added to the "Global Booleans" window. Remember to press Save to store these settings.

