

### Features

- 80186, 80 MHz CPU
- MiniOS7 Inside
- Embedded ISaGRAF Ver.3 SoftLogic (IEC 61131-3)
- 512 KB Battery Backup SRAM to Retain Data
- 64-bit Hardware Serial Number
- 4/8 Hot-Swap Slots for I-87K High Profile I/O Modules
- Dual 10/100M Ethernet Ports (for iP-8447/8847)
- 4 Serial Ports (RS-232/485)
- Redundant Power Inputs
- Operating Temperature: -25 ~ +75 °C

### Introduction

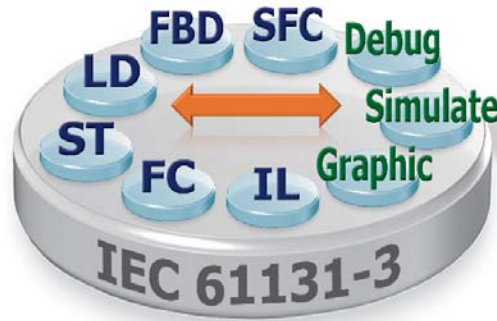
The **ISaGRAF iPAC-8000 Series (iP-8417/8817/8447/8847)** is the ISaGRAF SoftLogic PAC from ICP DAS. Each WP-8xx7 is equipped with an 80186, 80 MHz CPU running a MiniOS7 operating system, a variety of input/output ports (Dual 10/100 Base-TX Ethernet Ports for iP-8x47, one RS-232/485 port, one RS-485 port and two RS-232 ports) and a range of I/O slots (4/8) that can be used to integrate high performance parallel I/O modules (high profile I-8K Series) or serial I/O modules (high profile I-87K series). Users can also choose RS-485 Remote I/O modules (I-7000 series) or expansion units (RU-87Pn or I-87Kn) plugged with high profile I-87K serial I/O modules. Compared to I-8xx7, iPAC-8xx7 series is 2 ~ 4 times faster!

### ISaGRAF Features

ISaGRAF is the most powerful SoftLogic package on the market, and is a PLC-like software suite application that supports IEC 61131-3 standard PLC programming languages (LD, FBD, SFC, ST, IL) and Flow Chart (FC). ISaGRAF can be used to execute applications generated by the ISaGRAF workbench on any ISaGRAF PAC.

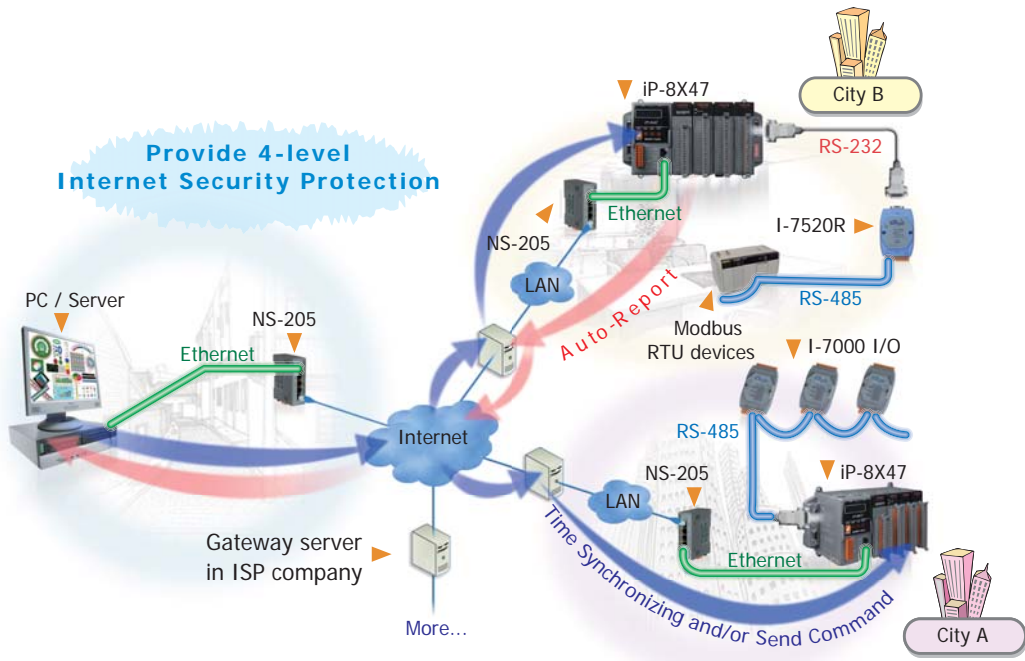
The features of the ISaGRAF workbench Ver. 3.x include:

- IEC 61131-3 Standard Open PLC Programming Languages (LD, FBD, SFC, ST, IL) + Flow Chart (FC)
- Auto-scan I/O
- Online Debug/Control/Monitor, Offline Simulation
- Simple Graphic HMI

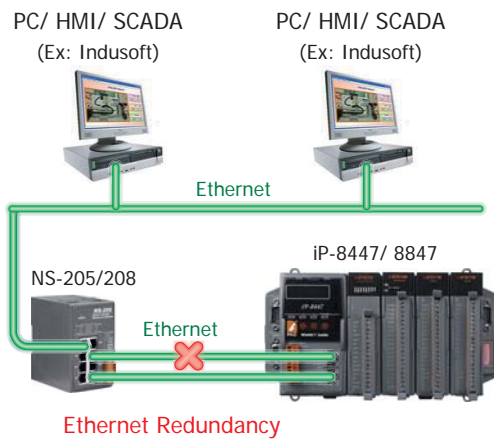


Applications

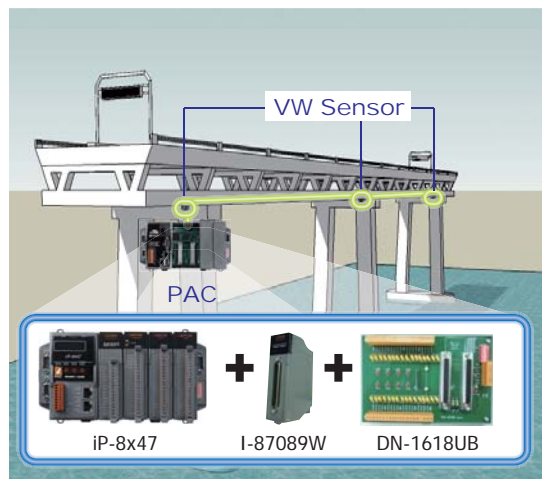
Cost-effective Auto-Report Data Acquisition/Control System



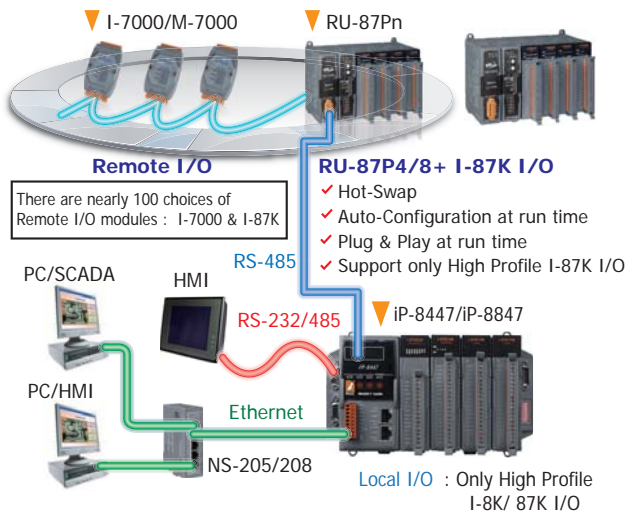
Ethernet Redundancy for HMI/PC/SCADA



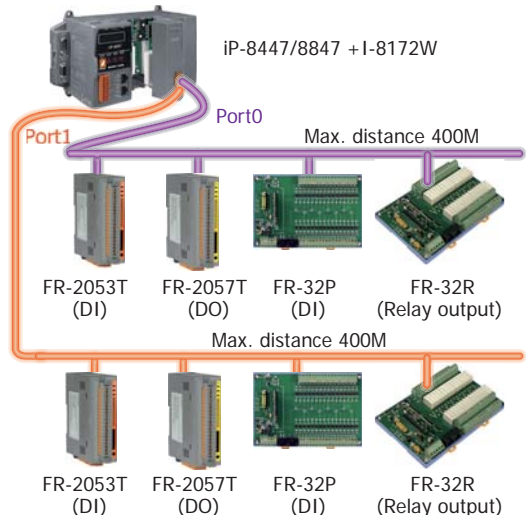
Stress Monitoring of Constructions



Local/Remote I/O Expansion & Multi-HMI



Fast FRnet Remote I/O



ISaGRAF MiniOS7 iPAC-8000

## ▣ PAC Specifications

Models	iP-8417	iP-8817	iP-8447	iP-8847
<b>System Software</b>				
OS	MiniOS7 (DOS-like embedded operating system)			
<b>Development Software</b>				
ISaGRAF Software	ISaGRAF Version 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		
<b>CPU Module</b>				
CPU	80186, 80 MHz			
SRAM	512 KB		768 KB	
Flash	512 KB; with Write Protect Switch			
microSD Expansion	Yes (but ISaGRAF doesn't support)			
Dual 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 5 years)			
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)			
DIP Switch	Yes (8 bits)			
<b>Communication Ports</b>				
Ethernet	-		RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)	
COM 0	Internal communication with the high profile I-87K series modules in slots			
COM 1	RS-232 (to update firmware) (Rx, Tx, D, GND); non-isolated			
COM 2	RS-485 (Data+, Data-) with internal self-tuner ASIC; 3000 VDC isolated			
COM 3	RS-232/RS-485 (Rx, Tx, D, GND, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated			
COM 4	RS-232 (Rx, Tx, D, GND, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated			
<b>SMMI</b>				
LED Display	Yes, 5-Digit			
Programmable LED Indicators	3			
Push Buttons	4			
Buzzer	-	-	Yes	
<b>I/O Expansion Slots</b>				
Slot Number	4	8	4	8
	Note: For High Profile I-8K and I-87K Modules Only			
Data Bus	8/16 bits			
Address Bus Range	2 K for each slot			
<b>Mechanical</b>				
Dimensions (W x L x H)	231 mm x 132 mm x 111 mm	355 mm x 132 mm x 111 mm	231 mm x 132 mm x 111 mm	355 mm x 132 mm x 111 mm
Installation	DIN-Rail or Wall Mounting			
<b>Environmental</b>				
Operating Temperature	-25 ~ +75°C			
Storage Temperature	-30 ~ +80°C			
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)			
<b>Power</b>				
Input Range	+10 ~ +30 VDC			
Isolation	1 kV			
Redundant Power Inputs	Yes, with one power relay (1 A @ 24 VDC) for alarm			
Capacity	30 W	30 W	30 W	30 W
Consumption	6.7 W	7.2 W	6.7 W	7.2 W

## ISaGRAF Specifications

Protocols (Note that certain protocols require optional devices)		
NET ID	8 bits DIP switch to assign NET ID as 1 ~ 255	
Modbus RTU/ASCII Master	A max. of 2 ports: COM1~5. (To connect to other Modbus Slave devices.) (*) A max. of Modbus_xxx Function Block amount for 2 ports: 128.	
Modbus RTU Slave	A max. of 2 ports: COM1 and one of COM2~3. (For connecting ISaGRAF, PC/HMI/OPC Server and HMI panels.)	
Modbus TCP/IP Slave	Two Ethernet ports support Modbus TCP/IP Slave Protocol for connecting ISaGRAF & PC/HMI up to 6 connections. (for iP-8x47 only)	
User-defined Protocol	Custom protocols can be applied at COM1~20 using Serial communication function blocks. (*)	
Remote I/O	One of COM2~4 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 64 I-7000/87K remote I/O modules can connect to one PAC. (*)	
Fbus	Built-in COM3 Port to exchange data between ICP DAS's ISaGRAF PACs.	
Ebus	Used to exchange data between ICP DAS ISaGRAF Ethernet PACs via the Ethernet port. (LAN2: upper port of iP-8x47 ONLY)	
Send Email	Provide functions to send email to a max. of 10 receivers with a single attached file via the Ethernet port through internet. The max. of file size is about 488 KB. (for iP-8x47 only)	
SMS: Short Message Service	One of COM4~5 can link to a GSM Modem to support SMS. The user can request data/control the controller via a cellular phone. The controller can also send data and alarms to the user's cellular phone. (*) Optional GSM Modem: GTM-201-RS232 (850/900/1800/1900 GSM/GPRS External Modem)	
Modem Link	COM4 can connect a general Modem. Supports PC to remotely download & monitor the controller.	
MMICON/LCD	One of COM3 or COM4 supports ICP DAS's MMICON. The MMICON is featured with a 240 x 64 dot LCD and a 4 x 4 Keyboard. User can use it to display picture, string, integer, float, and input a character, string, integer and float.	
Redundant Bus7000	Two ISaGRAF PACs can link to remote I-7000 & I-87K High profile I/O modules at the same time. Only one controller is active to control these Remote I/Os. If one is dead, the other one will take over the control of Remote I/Os.	
CAN/CANopen	COM1 or COM3~12 can connect to one I-7530 (converter: RS-232 to CAN) to support CAN/CANopen devices and sensors. One iP-8xx7 supports a max. of 3 RS-232 ports to connect a max. of 3 I-7530. (*) (FAQ-086)	
FRnet I/O	Enable a max. of 4 pcs. I-8172W boards to be used to connect to FRnet I/O modules, such as FR-2053, FR-2057, FR-32R, FR-32P. (Max. 1024-ch. DI + 1024-ch. DO) (FAQ-082, 154)	
FTP Client	Enable the FTP Client to upload files from the PAC to a remote FTP server on a PC. (FAQ-151)	
Optional I/O Functions (Refer to the ISaGRAF PAC I/O Selection Guide for I/O Module list)		
PWM Output	High Speed PWM Module	I-8088W, 8-ch PWM outputs, software support 1 Hz ~ 100 kHz (non-continuous), duty: 0.1 ~ 99.9%
	DO Module as PWM	8-ch max. for one controller. 500 Hz max. For Off=1 & On=1 ms Output Square Curve: Off: 1 ~ 32767 ms, On: 1 ~ 32767 ms. Optional DO Boards: I-8037W, 8041W, 8041AW, 8042W, 8050W, 8054W, 8055W, 8056W, 8057W, 8060W, 8063W, 8064W, 8068W, 8069W. (Relay Output boards cannot generate fast square wave)
Counters, Encoder, Frequency	Parallel DI Counter	8-ch. max. for 1 controller. Counter Val: 32-bit.; 500 Hz max. Min. ON & OFF width must >1 ms Optional DI boards: I-8040W, 8040PW, 8042W, 8046W, 8050W, 8051W, 8052W, 8053W, 8053PW, 8054W, 8055W, 8058W, 8063W.
	Serial DI Counter	Counter input: 100 Hz max. Counter value: 0 ~ 65535 (16-bit) Optional serial I-87K DI boards: I-87040W, 87046W, 87051W, 87052W, 87053W, 87053W-A5, 87054W, 87055W, 87058W, 87059W, 87063W.
	Remote DI Counter	All remote I-7K/I-87K DI modules support counters. 100 Hz max. value: 0 ~ 65535
	High Speed Counter	I-87082W: 100 kHz max., 32-bit; I-8084W: 250 kHz max., 32-bit
	Encoder	I-8093W: 3-axis Encoder Module, max. 1M Hz for quadrant input mode, max. 4M Hz for pulse/direction and cw/ccw input mode. (FAQ-112) I-8084W: 250 kHz max., 4-ch encoder, can be Dir/Pulse, or Up/Down or A/B phase (Quad. mode); Not support Encoder Z-index. (FAQ-100)
Motion	Frequency	I-87082W: 2-ch, 1 Hz ~ 100 kHz; I-87088W: 8-ch, 1 Hz ~ 100 kHz; I-8084W: 8-ch, 1 Hz ~ 250 kHz;
	Motion Control	Can be integrated with one I-8091W (2-axis) or two I-8091W (4-axis). Ethernet communication is also available when doing motion control.
* Note: The COM5 ~ COM20 ports are located in the expansion boards if they are installed in slots 0~7 of iP-8xx7.		
* ISaGRAF FAQ: <a href="http://www.icpdas.com">www.icpdas.com</a> > Support > FAQ > ISaGRAF Soft-Logic PAC		
* ICP DAS recommends using NS-205/208 or RS-405/408 (Ring Switch) Industrial Ethernet Switches.		

## Ordering Information

iP-8417 CR	4 slots, Faster CPU, ISaGRAF based iPAC-8000 (RoHS)
iP-8817 CR	8 slots, Faster CPU, ISaGRAF based iPAC-8000 (RoHS)
iP-8447 CR	4 slots, Faster CPU, Dual Ethernet ISaGRAF based iPAC-8000 (RoHS)
iP-8847 CR	8 slots, Faster CPU, Dual Ethernet ISaGRAF based iPAC-8000 (RoHS)

## Software and Accessories

ISaGRAF Development Software	
ISaGRAF-256	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with One USB Dongle
ISaGRAF-32	ISaGRAF Workbench Software Ver.3 (32 I/O Tags)
<b>Note:</b> No upgrade service from ISaGRAF-32 to ISaGRAF-256 is available. (ISaGRAF-32 can be used to control more than 32 I/O tags. Please refer to Ch. 3.4 of the ISaGRAF User Manual.)	
Power Supply	
DP-660	24 VDC/2.5 A, 60 W and 5 VDC/0.5 A, 2.5 W Power Supply with DIN-Rail Mounting
DP-665	24 VDC/2.5 A, 60 W and 5 VDC/0.5 A, 2.5 W Power Supply
DP-1200 CR	24 VDC/5.0 A, 120 W Power Supply with DIN-Rail Mounting (RoHS)
Converter	
I-7560 CR	USB to RS-232 Converter (RoHS)