

iP-8417



iP-8817



iP-8447



iP-8847

ISaGRAF based iPAC-8000

## 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

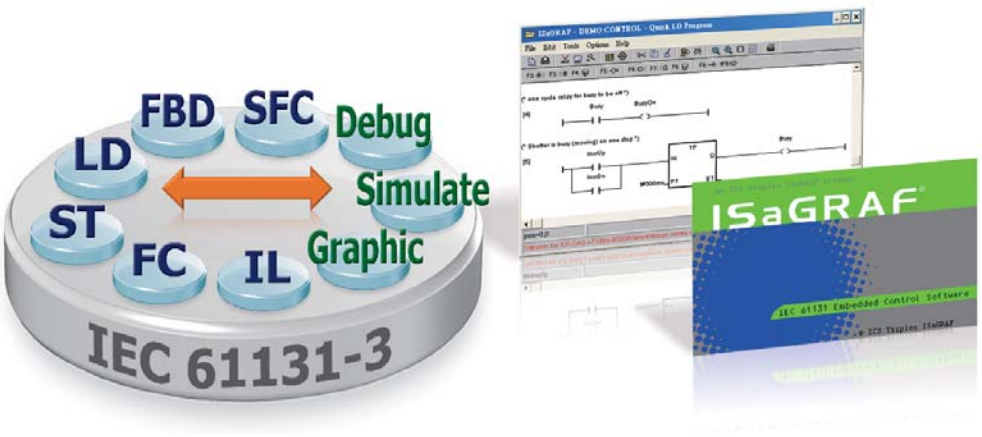
**The ISaGRAF iPAC-8000 Series (iP-8417/8817/8447/8847)** is the ISaGRAF SoftLogic PAC from ICP DAS. Each iP-8xx7 is equipped with an 80186, 80 MHz CPU running a MiniOS7 operating system, a variety of input/output ports (Dual 10/100 Base-TX Ethernet Ports for iP-8x47, one RS-232/485 port, one RS-485 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 Debugging/Control/Monitoring, Offline Simulation
- Simple Graphic HMI






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## PAC Specifications

| Models | | iP-8417 | iP-8817 | iP-8447 | iP-8847 |
|---|---|---|---|---|---|
| **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<br>10 ~ 125 ms (or more) for complex or large program | | | |
| **CPU Module** | | | | | |
| 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) | | Provides seconds, minutes, hours, date, day of the week, month, year | | | |
| 64-bit Hardware Serial Number | | Yes, for Software Copy Protection | | | |
| Watchdog Timers | | Yes (0.8 second) | | | |
| DIP Switch | | Yes (8 bits) | | | |
| **Communication Ports** | | | | | |
| Ethernet | | - | | RJ-45 x 2, 10/100 Base-TX<br>(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) (RxD, TxD and GND); non-isolated | | | |
| COM 2 | | RS-485 (Data+, Data-) with internal self-tuner ASIC; 3000 $V_{DC}$ isolated | | | |
| COM 3 | | RS-232/RS-485 (RxD, TxD, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated | | | |
| COM 4 | | RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated | | | |
| **SMMI** | | | | | |
| LED Display | | Yes, 5-Digit | | | |
| Programmable LED Indicators | | 3 | | | |
| Push Buttons | | 4 | | | |
| Buzzer | | - | - | Yes | |
| **I/O Expansion Slots** | | | | | |
| 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 | | | |
| **Mechanical** | | | | | |
| 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 | | | |
| **Environmental** | | | | | |
| Operating Temperature | | -25 ~ +75°C | | | |
| Storage Temperature | | -30 ~ +80°C | | | |
| Ambient Relative Humidity | | 10 ~ 90% RH (non-condensing) | | | |
| **Power** | | | | | |
| Input Range | | +10 ~ +30 $V_{DC}$ | | | |
| Isolation | | 1 kV | | | |
| Redundant Power Inputs | | Yes, with one power relay (1 A @ 24 $V_{DC}$) for alarm | | | |
| Capacity | | 30 W | 30 W | 30 W | 30 W |
| Consumption | | 6.7 W | 7.2 W | 6.7 W | 7.2 W |



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## 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.) (*)<br>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.<br>(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 or control the controller via a cellular phone. The controller can also send data and alarms to the user's cellular phone. (*)<br>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.<br>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-2057, FR-32R. (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 cycle: 0.1 ~ 99.9% |
| | DO Module as PWM | Optional DO Boards: I-8037W, 8041W, 8041AW, 8042W, 8050W, 8054W, 8055W, 8056W, 8057W, 8060W, 8063W, 8064W, 8068W, 8069W. (Relay Output boards cannot generate fast square wave)<br>Support max. 8-ch for one PAC; Max. frequency: 500 Hz for OFF=1 & ON=1 ms.<br>Output square wave: OFF: 1~32766 ms, ON: 1~32766 ms. |
| Counters, Encoder, Frequency | Parallel DI Counter | Optional I-8K DI boards: I-8040W, 8040PW, 8042W, 8046W, 8048W, 8050W, 8051W, 8052W, 8053W, 8053PW, 8054W, 8055W, 8058W, 8063W.<br>Support max. 8-ch for one PAC; Max. count/frequency: 32-bit, 500 Hz; Min. pulse width > 1 ms |
| | Serial DI Counter | Optional I-87K DI boards: I-87040W, 87046W, 87051W, 87052W, 87053W, 87053W-A5, 87054W, 87055W, 87058W, 87059W, 87063W.<br>Max. count/frequency: 16-bit (0~65535), 100 Hz. |
| | Remote DI Counter | All remote I-7000 & I-87K DI modules support counters. Max. count/frequency: 16-bit (0~65535), 100 Hz. |
| | High Speed Counter | Max. count/frequency for I-87082W: 32-bit, 100 kHz ; Max. count/frequency for I-8084W: 32-bit, 250 kHz |
| | Encoder | I-8093W: 3-axis Encoder Module, max. 1M Hz for quadrant input mode, max. 4M Hz for Pulse/Direction and CW/CCW input mode. (FAQ-112)<br>I-8084W: 250 kHz max. , 4-ch encoder, can be Pulse/Direction, or Up/Down or A/B Phase (Quad. mode); Not support Encoder Z-index. (FAQ-100) |
| | Frequency | I-87082W: 2-ch, 1 Hz ~ 100 kHz; I-87088W: 8-ch, 1 Hz ~ 100 kHz; I-8084W: 8-ch, 1 Hz ~ 250 kHz; |
| Motion | 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.** | | |

## 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) |
| **iP-GUP-17000** | Upgrade the iP-8xx1 to become iP-8xx7 |

## Related Products

| ISaGRAF Development Software | |
|---|---|
| ISaGRAF-256 | ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with one USB Dongle |



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