



μPAC-7186EGD



μPAC-7186PEGD



- **ISaGRAF Ver.3 SoftLogic Inside**
- **Support IEC 61131-3 + Flow Chart**
- **MiniOS7 Inside**
- **80186, 80 MHz CPU**
- **10/100 Base-TX Ethernet**
- **μPAC-7186PEG with PoE**

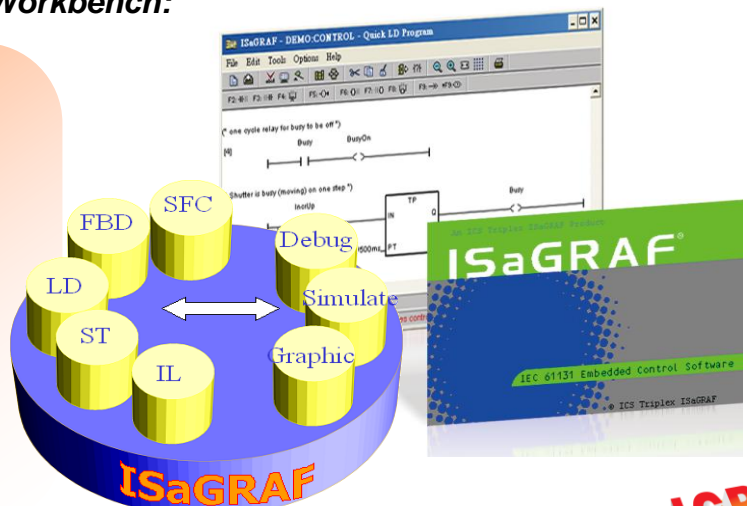


μPAC-7186EG Series is a palm-size PAC and includes ISaGRAF SoftLogic. It has one 10/100 Best-TX Ethernet port, one RS-232 port and one RS-485 port. The user can choose an I/O expansion board, X-board, to expand the I/Os or memories of μPAC. μPAC-7186EG/PEG support Modbus Serial protocol, Modbus TCP/IP protocol, Modbus Master protocol, Remote I/O, Fbus, Ebus, SMS: Short Message Service, modem link, MMICON/LCD, ZigBee wireless communication, GPS application, FRnet, CAN remote I/O connection and user defined protocol. Compared with I-7188EG, **μPAC-7186 is 2 ~ 4 times faster.**

μPAC-7186PEG is the model of μPAC-7186EG with PoE(Power-over-Ethernet). PoE allows power and data to be carried over a single Ethernet cable, so a device can operate solely with the power from the Ethernet cable instead of the electric wire. This innovation allows greater flexibility in office design, higher efficiency in systems design, and faster turnaround time in set-up and implementation.

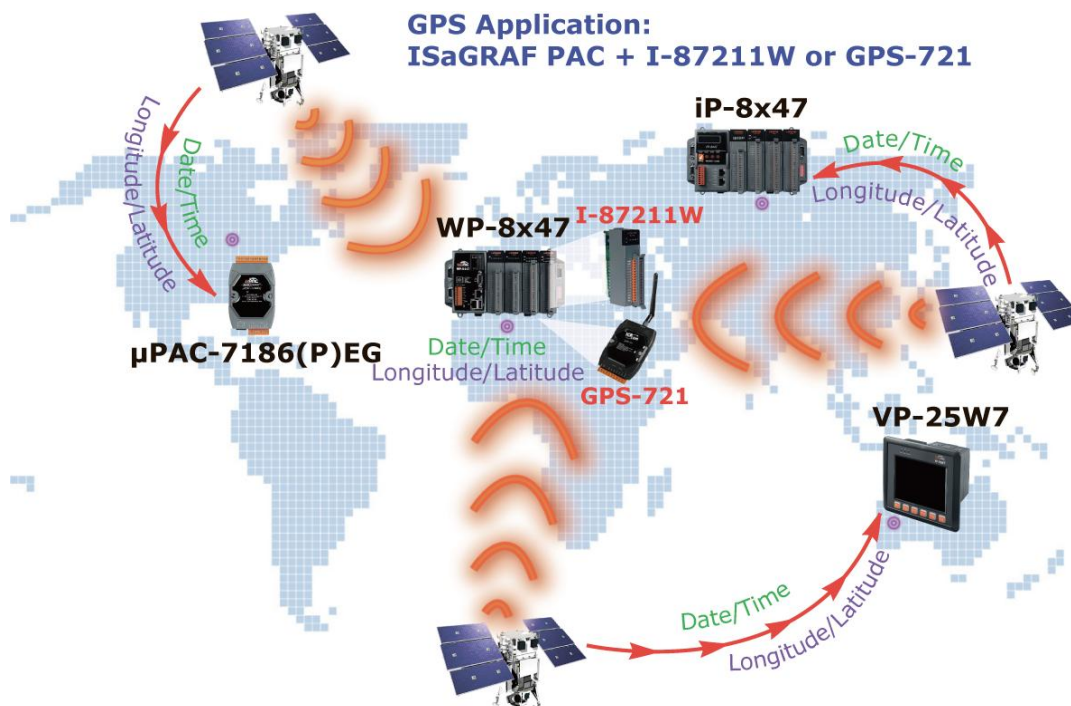
ISaGRAF μPAC supports ISaGRAF Ver.3 Workbench:

- **Support IEC 61131-3 Standard Open PLC Programming Languages + Flow Chart :**
 1. Quick Ladder Diagram (LD)
 2. Function Block Diagram (FBD)
 3. Sequential Function Chart (SFC)
 4. Structured Text (ST)
 5. Instruction List (IL)
 6. Flow Chart (FC)
- **On-line debugging/control/monitoring**
- **Off-line simulation**
- **Simple graphic HMI**



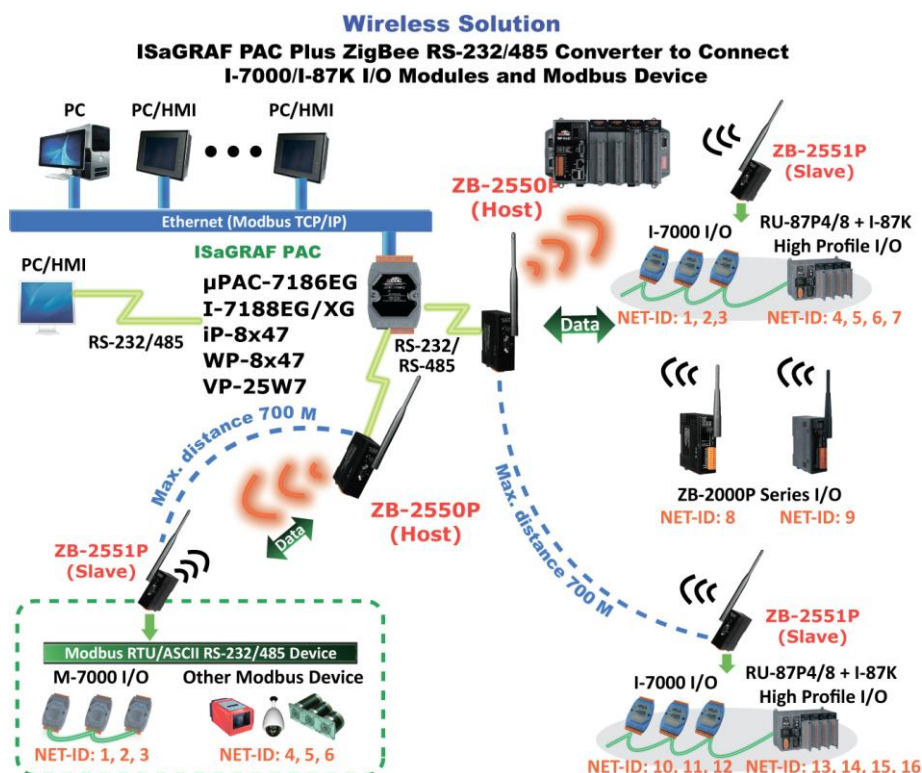
● GPS Applications: ISaGRAF PAC plus I-87211W or GPS-721

- WP-8xx7, VP-2xW7, iP-8xx7, μ PAC-7186(P)EG can support one I-87211W (slot 0~7) or I-87211W/GPS-721 as RS-485 remote GPS I/O.
- For doing auto-time-synchronization and getting local Longitude and Latitude
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 107 for more information
- More GPS receivers at www.icpdas.com > Products > Wireless..... > GPS receiver



● ZigBee Wireless Solution

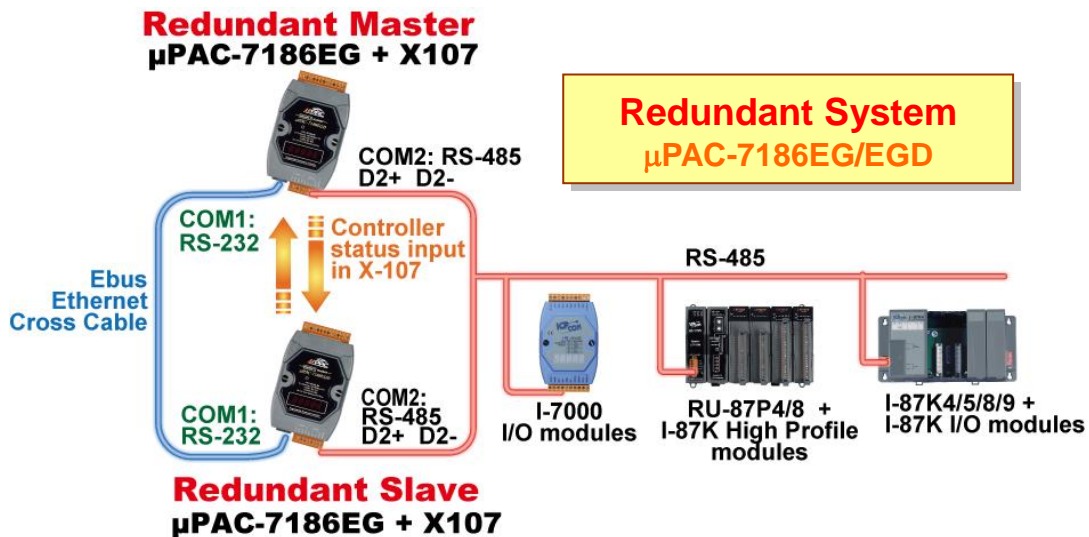
- ISaGRAF PAC plus ZB-2550P and ZB-2551P converters (ZigBee to RS-232/485)
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (Chinese) - 110 for more information



● Cost Effective Redundant Solution

- This is the most cost effective redundant solution.
- If using RU-87P4/8 I/O expansion unit with I-87K High Profile Remote I/O modules, it supports I-87K I/O run-time hot-swap and run-time plug & play.
- The Redundant Master is in charge of the system. If Redundant Master is damaged, the Redundant Slave will take over the control to make sure the whole system is alive.
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 084

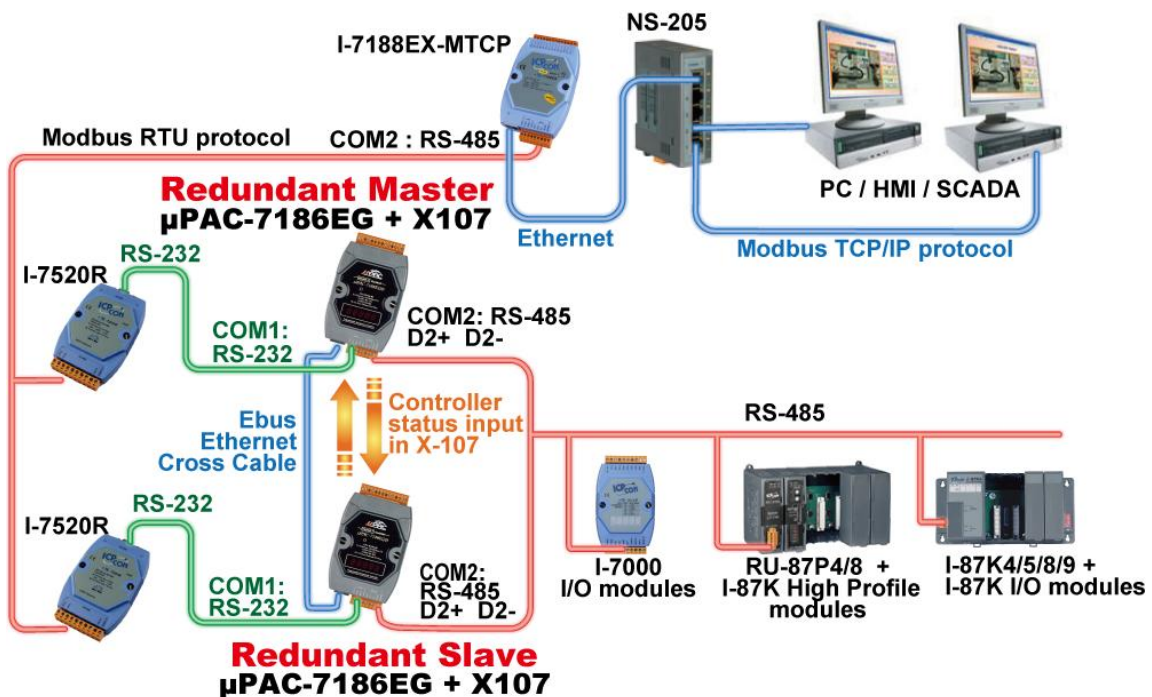
Limitation: Support only max. 20 pcs. of I/O modules (I-7000 + I-87K).



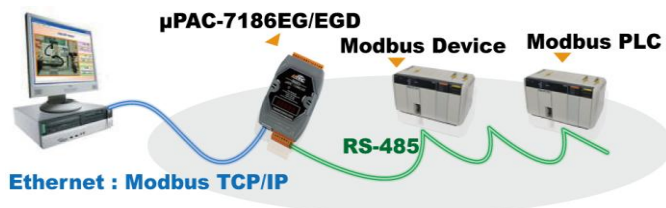
● Cost Effective Redundant Solution with PC/HMI/SCADA

- PC/HMI/SCADA can connect to the redundant system with only one IP of the I-7188EX-MTCP.
- Please assign these two μ PAC-7186EG PACs to have the same Net-ID and assign their IP number to be different from each other but in the same domain.
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 084 .

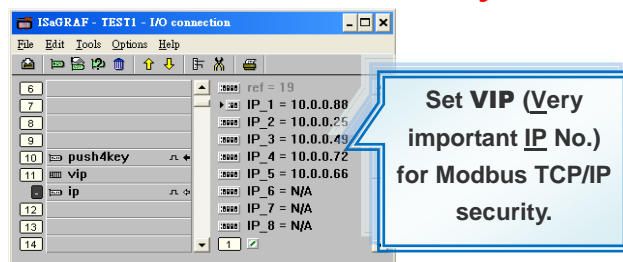
Limitation: Support only max. 20 pcs. of I/O modules (I-7000 + I-87K).



● Communication

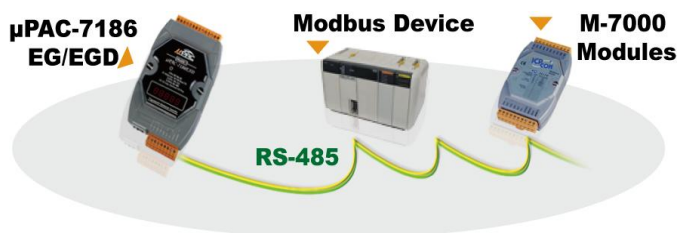


● VIP Communication Security



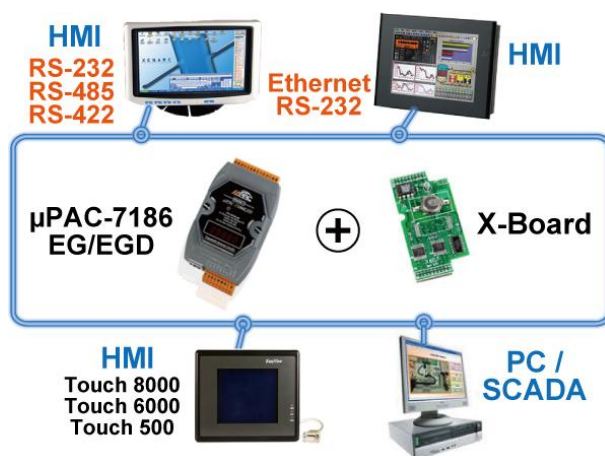
● Modbus Master (RTU, ASCII, RS-232/485/422)

- Support max. 2 COM Ports (COM1:RS-232 or COM2:RS-485 or COM3 if X-board is plugged in)
- Can link to Modbus PLC, M-7000 I/O or Modbus devices (ex: Power meter, temperature controller, inverter...)



● Modbus RTU/TCP Slave Ports

- Modbus RTU (RS-232/485/422) : max. 2 COM Ports
- Modbus TCP/IP: max. 6 PC/HMI/SCADA connections

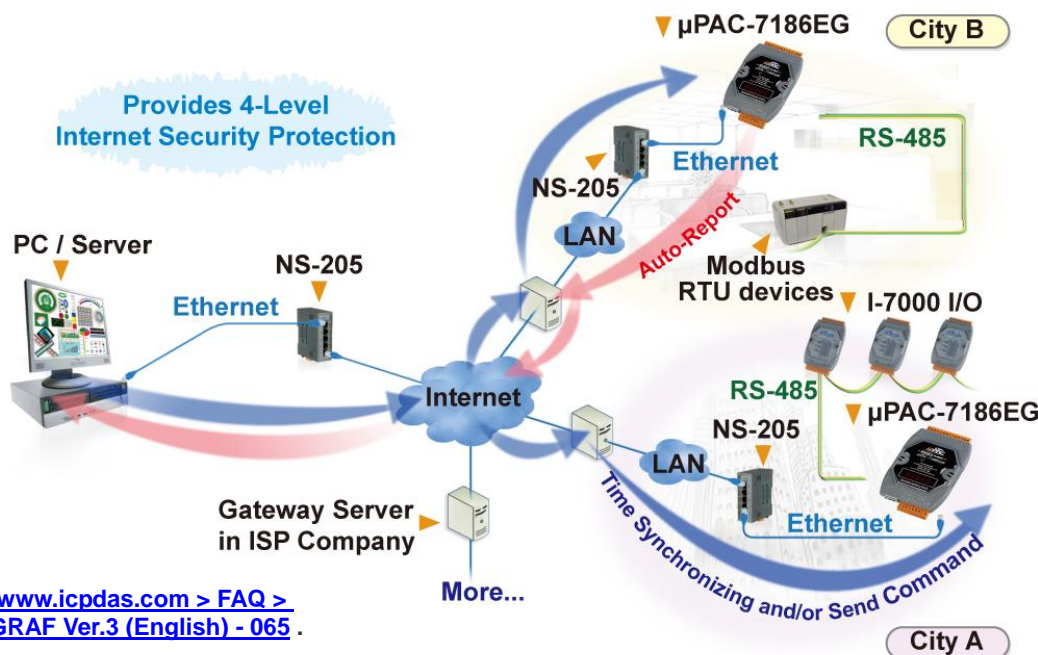


● Auto-report Acquisition Data & Control Data

μPAC-7186EG/PEG can use UDP/IP to auto-report acquisition data & control data to local or remote internet PC/Server.

Advantage: Every μPAC-7186EG/PEG in the different location doesn't need a fixed Internet IP.

Stable and Cost-effective Data Acquisition Auto-Report System



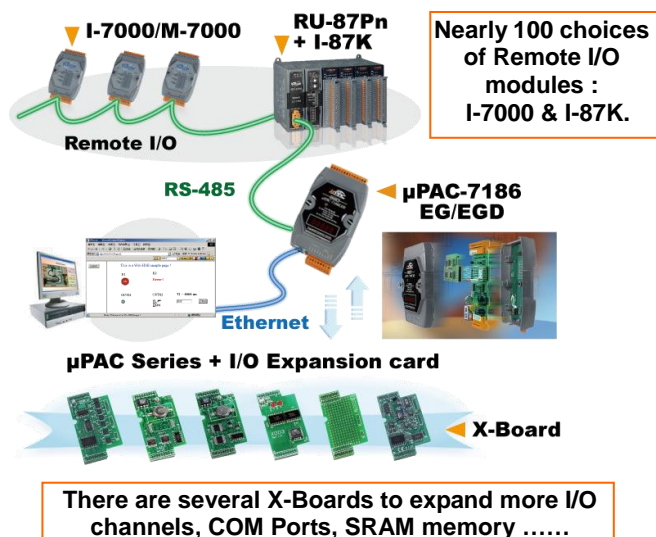
Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 065 .

Local & Remote I/O Application

Advantage of using RU-87P4/P8 + I-87K I/O modules :

- Hot-Swap
- Auto-Configuration at run time
- Plug & Play at run time

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



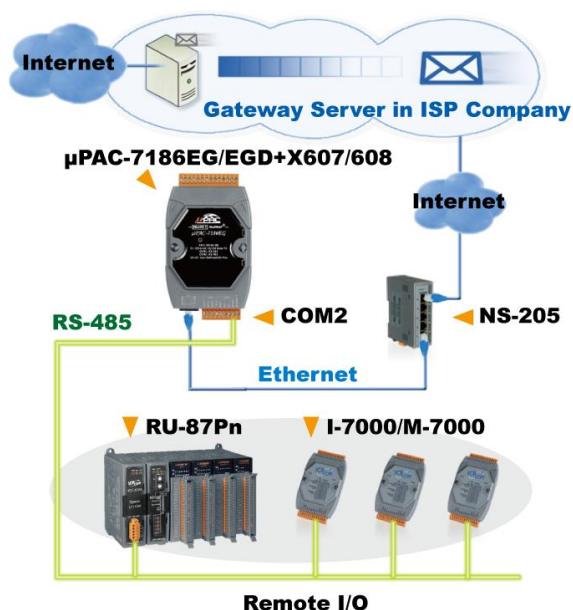
SMS: Short Message Service

- Short message can be sent in multiple language format (like Chinese, English... others)
- More at www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 111



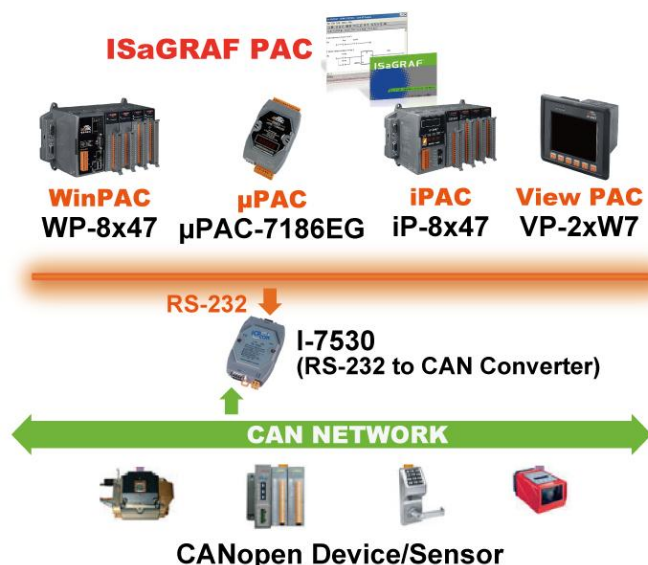
Send E-mail with One Attached File

- Send email to max. 10 receivers each time via internet.
- If applying with an X607/608 X-board, it could send email with one attached file and the maximum file size is about 488 KB for using X608 or about 112 KB for using X607.
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) > 067 & 077



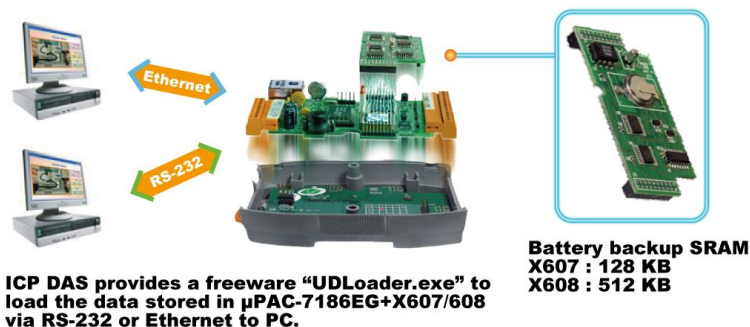
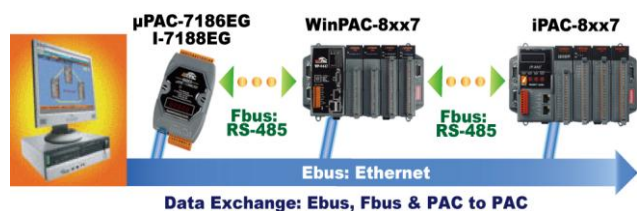
Integrate with CAN / CANopen Devices and Sensors

- μ PAC-7186EG/PEG Supports max. 3 I-7530 (RS-232 to CAN) Converters.
- Please refer to www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 086

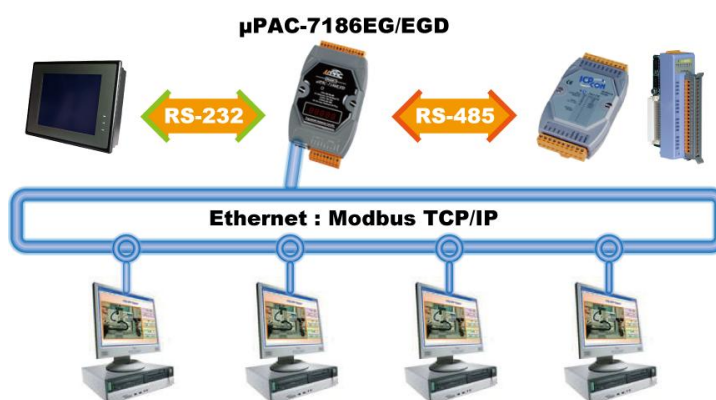


● Data Exchange: Ethernet & RS-485 ● Data Recorder and Data Logger

- Through Ethernet: Ebus
- Through RS-485: Fbus
- PAC to PAC



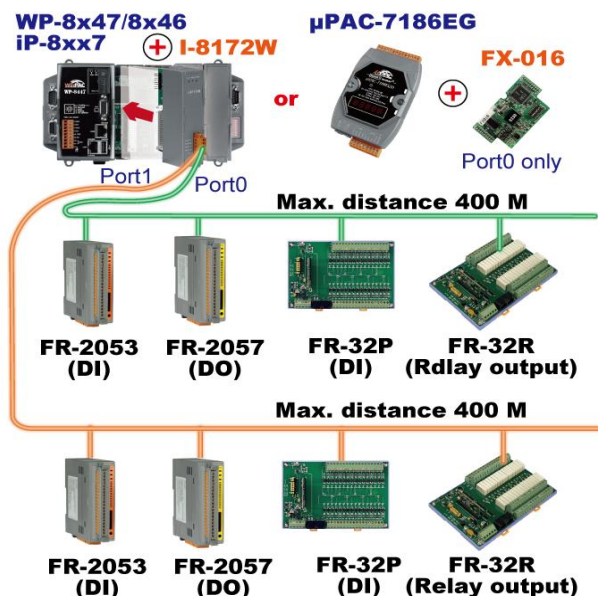
● Multi-Client Connection



● Fast FRnet Remote I/O

Advantage of FRnet I/O: Fast I/O scan time is about 3 ms/scan. (It depends on your program's PLC scan time. Ex: If the ISaGRAF program's PLC scan time is about 9 ms, then the scan time for all will be 9 ms, not 3 ms)

Note: FRnet I/O do not support AI & AO yet.



More at www.icpdas.com > FAQ > Software > ISaGRAF Ver.3 (English) - 082

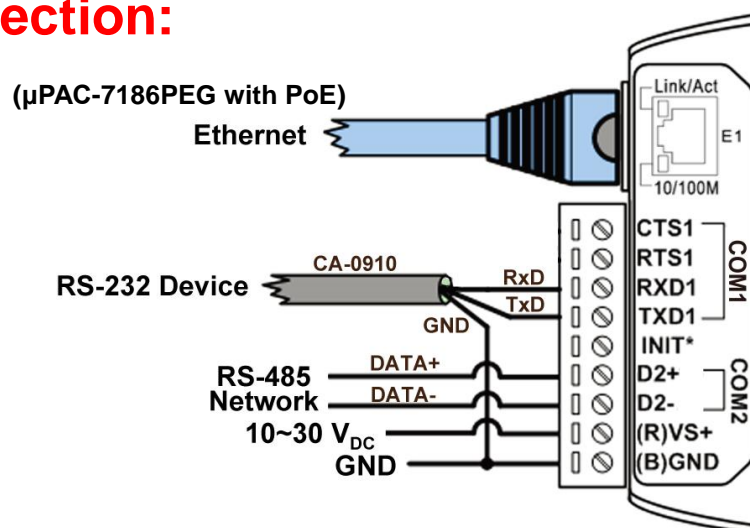
Specifications: µPAC-7186EG/EGD & µPAC-7186PEG/PEGD

Model	μPAC-7186EG	μPAC-7186EGD	μPAC-7186PEG	μPAC-7186PEGD
Power Supply				
Protection	Power reverse polarity protection			
Frame Ground	Yes (for ESD Protection)			
Input Range	+10 ~ +30 V _{DC}		+12 ~ +48 V _{DC}	
Power over Ethernet(PoE)	No		IEEE 802.3af, Class 1	
Power Consumption	1.5 W	2.5 W	1.5 W	2.5 W
General Environment				
Temperature	Operating: -25 ~ +75 °C; Storage : -30 ~ +80 °C			
Humidity	5 ~ 90 % RH (non-condensing)			
System				
CPU	80186 or compatible (16-bit and 80 MHz)			
Watchdog Timer	Yes (0.8 second)			
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year			
SRAM	640 KB		768 KB	
FLASH Memory	512 KB; Erase unit is one sector (64 KB); 100,000 erase/write cycles.			
NVRAM	31 bytes, battery backup, data valid up to 10 year.			
EEPROM	16 KB, retention > 100 years. 1,000,000 erase/write cycles			
LED Display	5-digit 7-Segment LED display on the front of μPAC-7188EGD/PEGD. It can display message & value.			
System LED Indicator	Yes (Red)		Yes (Red/Orange)	
PoE LED Indicator	No		Yes (Green)	
Expansion I/O Bus	One; One optional X-Board series I/O board can be plugged inside the μPAC.			
NET ID	User-assigned by software, 1 ~ 255			
Communication Ports				
COM1	RS-232: TxD, RxD, RTS, CTS, GND; Non-isolated Speed: 115200 bps max. Program downloads port.			
COM2	RS-485: D2+, D2-; Non-isolated Speed: 115200 bps max. Self-tuner ASIC inside. Program downloads port.			
Ethernet	RJ-45 x 1, 10/100 Base-TX, NE2000 compatible, Auto-negotiating, Auto MDI/MDI-X, LED indicator. Program download port			
Dimensions				
W x H x D	72 mm x 123 mm x 35 mm			
Development Software				
ISaGRAF Version 3	IEC 61131-3 standard. Languages: LD, ST, FBD, SFC, IL & FC			
Max. Code Size	Accept max. 64 KB ISaGRAF code size (Appli.x8m must < 64 KB)			
PWM Output				
Pulse Width Modulation Output	All X-Board series DO boards support PWM output. 8 channels max. for one controller 500 Hz max. for Off=1 & On=1 ms Output square curve: Off: 1 ~ 32767 ms, On: 1 ~ 32767 ms			
Counters				
Parallel DI Counter	All X-Board series DI boards support DI counter. 8 channels. max. for one controller. Counter value: 32 bit; 500 Hz max. Min. ON & OFF width must > 1 ms			
Remote DI Counter	All remote I-7000 & I-87K DI modules support counters. 100 Hz max. value: 0 ~ 65535			
Remote High Speed Counter	Optional I-87082:100 kHz max. , 32 bit			

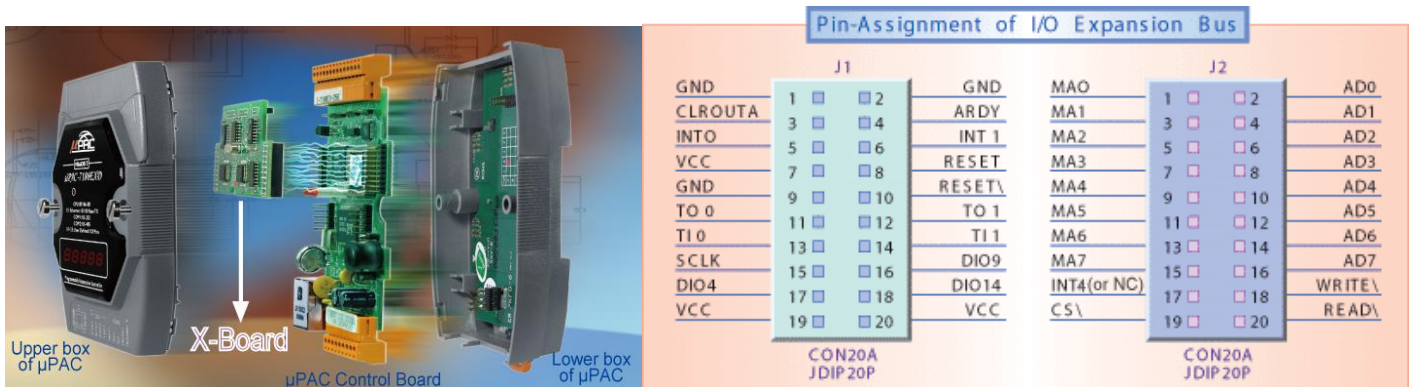
Specifications: μ PAC-7186EG/EGD & μ PAC-7186PEG/PEGD

Protocols	
Modbus RTU/ASCII Master Protocol	Up to 2 COM Ports (COM1, COM2 and COM3-in-X-Board) support Modbus RTU/ASCII Master protocol to connect to other Modbus Slave I/O devices. Max. Mbus_xxx Function Block amount: 128 .
Modbus RTU Slave Protocol	Up to 2 COM Ports (COM1 and one of COM2/COM3-in-X-Board) can support Modbus RTU Slave protocol for connecting ISaGRAF, PC/HMI/OPC Server & MMI panels.
Modbus TCP/IP Slave Protocol	Ethernet port supports Modbus TCP/IP Slave protocol for connecting ISaGRAF & PC/HMI. Max. 6 connections .
Remote I/O	One of COM2 or (COM3:RS-485 if found) supports I-7K, I-87K I/O modules as Remote I/O. I-87K series must plug on RU-87P(High profile) or I-87K(Low profile) I/O Unit. 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 E-mail	Send e-mail to maximum 10 receivers each time via internet. If applying with an X607/608 X-Board, it could send email with one attached file and the maximum file size is about 488 KB for using X608 or about 112 KB for using X607.
SMS: Short Message Service	One of (COM3:RS-232 or COM4:RS-232 if found) 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)
User-Defined Protocol	User can write his own protocol applied at COM1, COM2 & (COM3 ~ COM8 if found) by serial communication function blocks.
Modem Link	Supports PC remotely download & monitor the controller through COM4 of X504.
MMICON/LCD	COM3:RS-232 (if on X-Board) 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 Solution	Two PACs plug with X107 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 need any Ethernet Switch). All I/O should be RS-485 I/O except the status I/O in the slot 0: X107.
CAN/CANopen	Use COM1 or COM3 ~ COM8 (at the X5xx RS-232 X-board) to connect one I-7530 (the 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)
Battery Backup SRAM	
SRAM Expansion Card	Support max. 1024 retain variables if an X607/X608 plug in the expansion I/O slot. Data can be stored in X607/X608, and then PC can load these data via COM1 or Ethernet. PC can also download pre-defined data to the X607/X608. Optional: X607: 128 KB, X608: 512 KB

Wiring Connection:



Add-on Expansion Boards- X-Boards : More at www.icpdas.com > Products > PAC – I/O Expansion Boards



Expansion Board for DI, DO, Counter

X107 CR	6-ch DI & 7-ch DO (RoHS)
X109	7-ch PhotoMOS relay
X110 CR	14-ch DI (RoHS)
X111	13-ch DO
X116	6-ch relay output and 4-ch isolated DI (PAC cover must be removed)
X119	7-ch DO and 7-ch DI (PAC cover must be removed)

Expansion Board for A/D, D/A, DI, DO

X202	7-ch A/D (0~20 mA)
X203	2-ch A/D (0~20 mA), add 2-ch DI, 6-ch DO
X303	1-ch A/D (+/-5 V), 1-ch D/A (+/-5 V) add 4-ch DI, 6-ch DO
X304	3-ch A/D (+/-5 V), 1-ch D/A (+/-5 V) add 4-ch DI, 4-ch DO
X305	7-ch A/D (+/-5 V), 1-ch D/A (+/-5 V) add 2-ch DI, 2-ch DO
X308	4-ch A/D (0~10 V) add 6-ch DO
X310	1-ch A/D (0~10 V), 1-ch A/D (0~20 mA), 2-ch D/A (0~10 V) add 3-ch DI, 3-ch DO

Expansion Board for RS-232/422/485, DI, DO

X503	1-port RS-232 (5-Pin)
X504 CR	2-port RS-232 (5-Pin) and (9-Pin) (RoHS)
X505 CR	3-port RS-232 (5-Pin) (RoHS)
X506 CR	6-port RS-232 (3-Pin) (RoHS)
X507 CR	1-port RS-422/485 add 4-ch DI, 4-ch DO (RoHS)
X508 CR	1-port RS-232 (5-Pin) add 4-ch DI, 4-ch DO (RoHS)
X509 CR	2-port RS-232 (3-Pin) add 4-ch DI, 4-ch DO (RoHS)
X510	1-port RS-232 (3-Pin) add 5-ch DI, 5-ch DO (Does not support EEPROM of X510)
X510-128	1-port RS-232 (3-Pin) add 5-ch DI, 5-ch DO (Does not support EEPROM of X510-128)
X511 CR	3-port RS-485 (RoHS)
X518 CR	1-port RS-232 (5-Pin) add 8-ch DO (RoHS)
X560	8 MB Flash and 3-ch RS-232 (3-Pin) (PAC cover must be removed) (Does not support Flash of X560)
X561 CR	64 MB Flash and 3-ch RS-232 (3-Pin) (RoHS) (PAC cover must be removed) (Does not support Flash of X561)

Expansion Board for SRAM

X607	128 KB NVRAM (Battery Backup SRAM)
X608 CR	512 KB NVRAM (Battery Backup SRAM)

Expansion Board for Motion Control

X702	2-axis Encoder Module (24 bit)
X703	3-axis Encoder Module (24 bit)

Expansion FRnet Fast I/O

FX016	1-port FRnet Module
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RS-485 Remote I/O Modules	
I-7000	 Products > Remote I/O Modules/Units > I-7000 Modules > Selection Guide">www.icpdas.com > Products > Remote I/O Modules/Units > I-7000 Modules > Selection Guide
M-7000	 Products > Remote I/O Modules/Units > M-7000 Modules > Selection Guide">www.icpdas.com > Products > Remote I/O Modules/Units > M-7000 Modules > Selection Guide
RS-485 Remote Hot-Swap Expansion Unit + I-87K High Profile I/O Modules	
RU-87P1/2/4/8	 Products > Remote I/O Modules/Units > Remote I/O Expansion Unit > Selection Guide">www.icpdas.com > Products > Remote I/O Modules/Units > Remote I/O Expansion Unit > Selection Guide
High Profile I-87K I/O Modules	 Products > PAC - 8K & 87K I/O Modules">www.icpdas.com > Products > PAC - 8K & 87K I/O Modules
RS-485 Remote Expansion Unit + I-87K I/O Modules	
I-87K1/4/5/8/9	 Products > Remote I/O Modules/Units > Remote I/O Expansion Unit > Selection Guide">www.icpdas.com > Products > Remote I/O Modules/Units > Remote I/O Expansion Unit > Selection Guide
I-87K I/O Modules	 Products > PAC - 8K & 87K I/O Modules">www.icpdas.com > Products > PAC - 8K & 87K I/O Modules

Ordering Information

μPAC-7186EG-G CR	Palm-size μPAC (80 MHz CPU, 10/100 Ethernet, 640K SRAM, 512K Flash, RS-232*1, RS-485*1, (RoHS) with ISaGRAF License.
μPAC-7186EGD-G CR	Palm-size μPAC (80 MHz CPU, 10/100 Ethernet, 640K SRAM, 512K Flash, RS-232*1, RS-485*1, (RoHS) with ISaGRAF License and 7-segment display.
μPAC-7186PEG-G CR	Palm-size μPAC-7186EG with PoE (RoHS), 768K SRAM
μPAC-7186PEGD-G CR	Palm-size μPAC-7186EGD with PoE (RoHS), 768K SRAM

Optional

Development Software	
ISaGRAF-256-E	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with USB Dongle and English application book
ISaGRAF-256-C	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with USB Dongle and Chinese application book
ISaGRAF-32-E	ISaGRAF Workbench Software Ver.3 (32 I/O Tags) with English application book. *
ISaGRAF-32-C	ISaGRAF Workbench Software Ver.3 (32 I/O Tags) with Chinese application book. *
Application Book	
ISaGRAF Book-E	ISaGRAF application book (English version)
ISaGRAF Book-C	ISaGRAF application book (Chinese version)
Power Supply	
ACE-540A (DIN-540A)	24 V/1.7 A Output Power Supply (DIN-540A: ACE-540A with DIN-Rail Mount)
MDR-60-48	48V/1.25A, 60 W Power Supply with DIN-Rail Mounting
X-Board SRAM	
X607 CR	128 KB battery backup SRAM (RoHS)
X607 CR	512 KB battery backup SRAM (RoHS)
Ethernet Switch	
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)
NS-208 CR	Unmanaged 8-port Industrial 10/100 Base-T Ethernet Switch (RoHS)
NS-205PSE CR	Industrial 5-Port PoE Ethernet Switch

* Using ISaGRAF-32 can control more than 32 I/O tags. (Please refer to ISaGRAF User's Manual Ch. 3.4)
Note: No upgrade service from ISaGRAF-32 to ISaGRAF-256.