

### Features

- 80186, 80 MHz CPU or 80188, 40 MHz CPU
- MiniOS7 Inside
- Development Software: ISaGRAF Ver.3
- Ethernet
  - 10/100 Base-TX (for  $\mu$ PAC-7186EG)
- Support Modbus Master
  - RTU, ASCII, RS-232/485/422
- Support Modbus RTU/TCP Slave
  - Modbus RTU (RS-232/485/422) Slave
  - Modbus TCP Slave (not for I-7188XG)
- Operating Temperature: -25 ~ +75°C



### Introduction

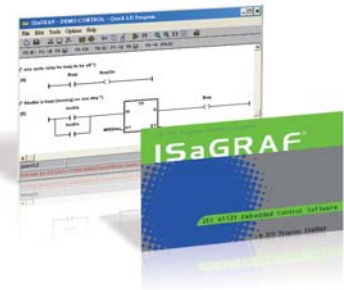
$\mu$ PAC-7186EG Series is a palm-size PAC and includes ISaGRAF SoftLogic. It has one 10/100 Base-TX Ethernet port, one RS-232 port and one RS-485 port. The user can choose an I/O expansion board, X-Board, to expand the I/Os or memories of  $\mu$ PAC.  $\mu$ PAC-7186EG support Modbus Serial protocol, 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.

I-7188XG series is a palm-size PAC with ISaGRAF SoftLogic. It has 2 Serial ports (COM1:RS-232/RS-485 & COM2:RS-485).

The user can choose an I/O expansion board, X-Board, to expand COM Ports, I/Os or memories of I-7188XG and  $\mu$ PAC-7186EG.

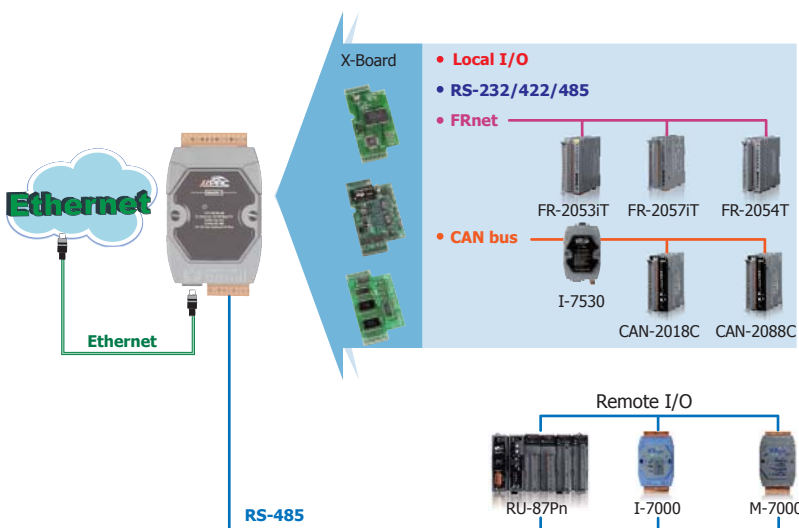
The ISaGRAF workbench Ver. 3.x features:

- IEC 61131-3 Standard Open PLC Programming Languages (LD, FBD, SFC, ST, IL, FC) + Flow Chart (FC)
- Auto-Scan I/O
- On-Line Debug/Control/Monitor, Off-Line Simulation
- Simple Graphic HMI
- Support Soft-GRAF HMI

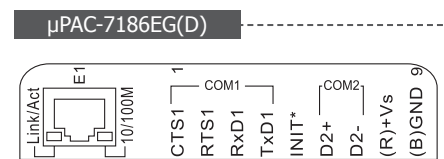
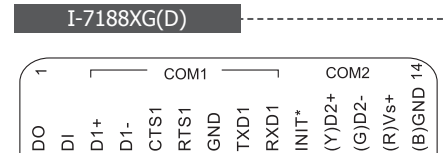


### Applications

Rich I/O Expansion Ability

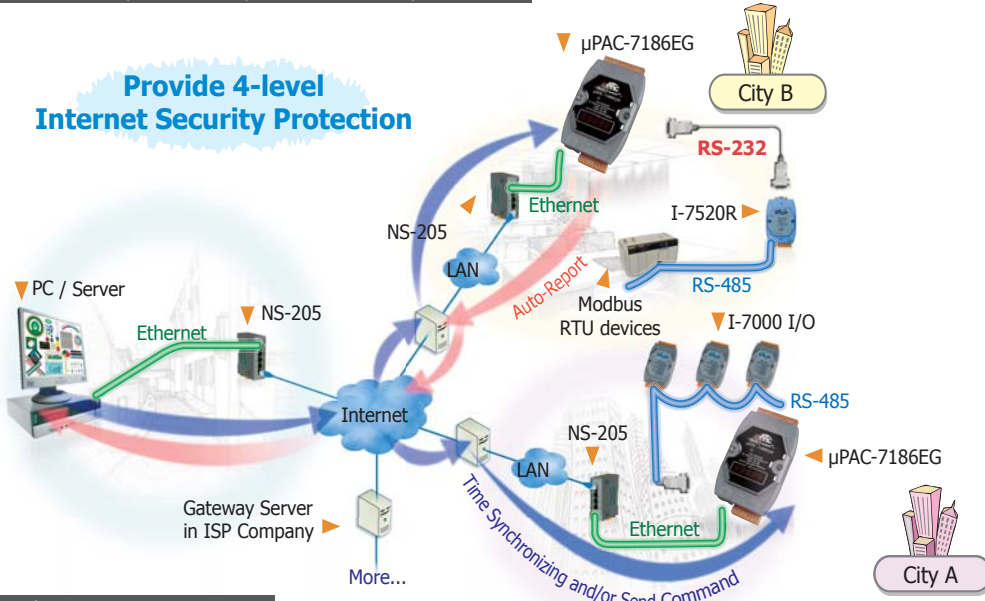


### Pin Assignments

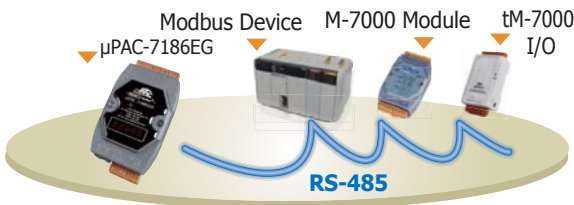


Cost-effective Auto-Report Data Acquisition/Control System

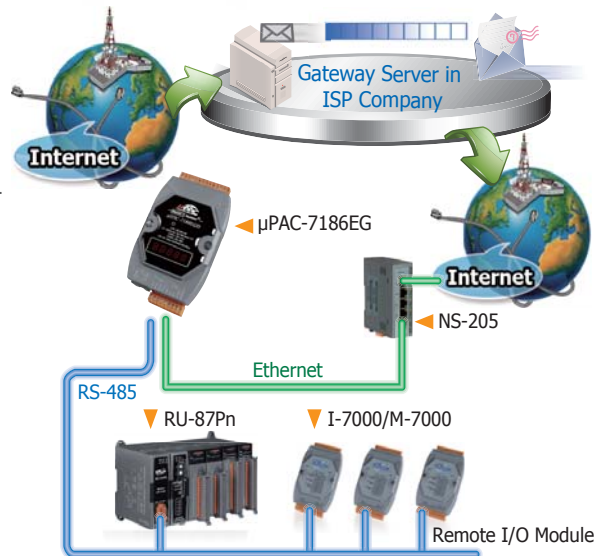
Provide 4-level Internet Security Protection



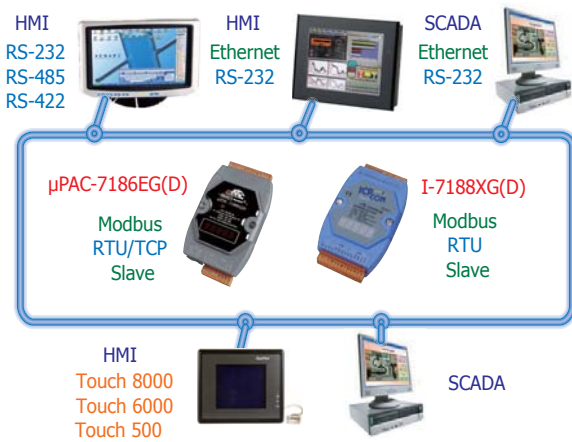
Modbus RTU/ASCII Master Ports



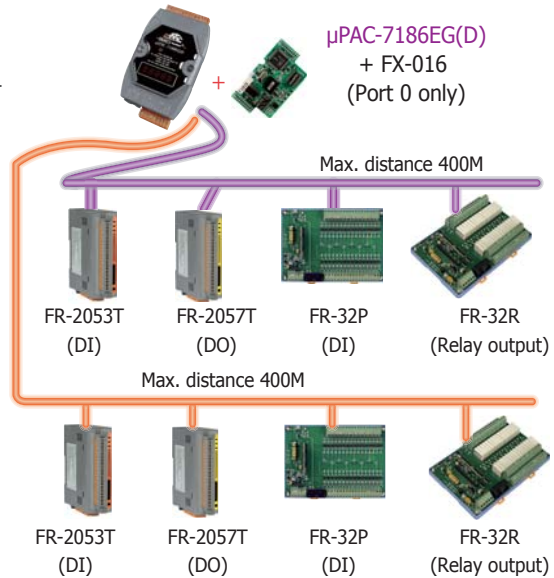
Send Email with one Attached File



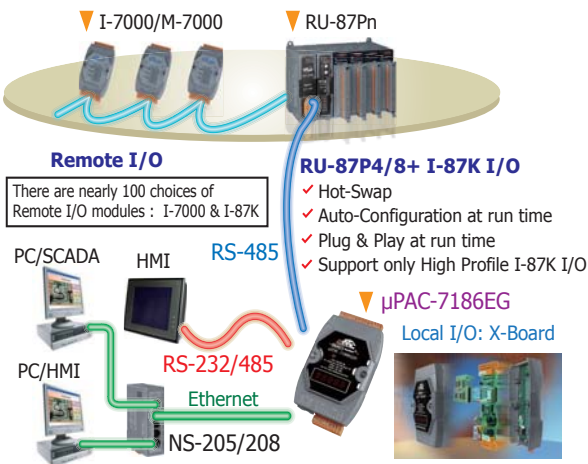
Modbus RTU/TCP Slave Ports



FRnet I/O Application



Local/Remote I/O Expansion & Multi-HMI



7188/7186 Series μPAC

## ■ $\mu$ PAC Specifications

Models		I-7188XG(D)	$\mu$ PAC-7186EG (D)
<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	5 ~ 100 ms for normal program 25 ~ 500 ms (or more) for complex or large program	2 ~ 5 ms for normal program 10 ~ 125 ms (or more) for complex or large program
<b>CPU Module</b>			
CPU	80188, 40 MHz	80186, 80 MHz	
SRAM	512 KB	640 KB	
Flash	512 KB		
EEPROM	2 KB	16 KB	
NVRAM	31 Bytes (battery backup, data valid up to 10 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)		
<b>Communication Ports</b>			
Ethernet	-	RJ-45 x 1, 10/100 Base-TX	
COM 1	RS-232 or RS-485 with internal self-tuner ASIC; non-isolated	RS-232 (TxD, RxD, RTS, CTS, GND), non-isolated	
COM 2	RS-485 with internal self-tuner ASIC; non-isolated		
<b>LED Indicator</b>			
System LED	Yes		
LED Display	5-digit 7-segment LED display for (D) version		
<b>Digital Input</b>			
Channels	1	-	
Contact	Dry	-	
On Voltage Level	Connect to GND	-	
Off Voltage Level	Open	-	
<b>Digital Output</b>			
Channels	1	-	
Output Type	Open Collector	-	
Load Current	100 mA	-	
Load Voltage	30 VDC Max.	-	
<b>Hardware Expansion</b>			
I/O Expansion Bus	Yes, 1 (14 Pins)		
<b>Mechanical</b>			
Dimensions (W x L x H)	72 mm x 123 mm x 33 mm	72 mm x 123 mm x 35 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		
Protection	Power reverse polarity protection		
Power Consumption	2 W; 3 W for (D) version	1.5 W; 2.5 W for (D) version	

## ISaGRAF Specifications

Protocols (some protocols need optional devices)		
NET ID	User-assigned by software, 1 ~ 255	
Modbus RTU/ASCII Master Protocol	Up to 2 COM ports: I-7188XG COM 2 ~3, $\mu$ PAC-7186EG COM 1~3 (*). (To connect to other Modbus Slave I/O devices) Max. Mbus_XXX Function Block amount for 2 ports : $\mu$ PAC-7186EG: 128; I-7188XG: 64.	
Modbus RTU Slave Protocol	Up to 2 COM Ports: COM1, one of COM2 or COM3 (*). (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. connections: $\mu$ PAC-7186EG: 6; I-7188XG: 0.	
User-Defined Protocol	By serial communication function blocks. $\mu$ PAC-7186EG: COM1 ~ COM8 (*) or I-7188XG: COM2 ~ COM8 (*).	
Remote I/O	One of COM2 or COM3:RS-485 (*) supports I-7K, I-87K I/O modules as Remote I/O. I-87K series must plug on RU-87Pn (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 controllers.	
Ebus	To exchange data between ICP DAS's ISaGRAF Ethernet controllers via Ethernet port. (Not for I-7188XG)	
Send Email	Send Email 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 X608:488 KB or X607:112 KB. (Not for I-7188XG)	
SMS: Short Message Service	One COM port ( $\mu$ PAC-7186EG: one of COM1 or COM3 or COM4; I-7188XG: one of COM3 or COM4) (*) 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 modems: GTM-201-RS232 (GSM/GPRS 850/900/1800/1900)	
Modem Link	Support PC remotely download & monitor the controller through COM4 of X504. (*)	
MMICON/LCD	COM3: RS-232 (*) 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	One is Master, one is Slave. Master handles all inputs & outputs at run time. If Master is damaged (or Power off), Slave takes the control of Bus7000b. If Master is alive 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, there is no need of any Ethernet switch). All I/O should be RS-485 I/O except the status I/O in the slot 0: X107. (for $\mu$ PAC-7186EG only)	
CAN/CANopen	Use COM1 or COM3 ~ COM8 (*) to connect one I-7530: the RS-232 to CAN converter to support CAN/CANopen devices/sensors. One PAC supports Max. 3 RS-232 ports to connect Max. 3 I-7530 modules. (FAQ-086) (for $\mu$ PAC-7186EG only)	
Optional I/O Functions (Refer to ISaGRAF PAC I/O Selection Guide for I/O Module list)		
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-7K/I-87K DI modules support counters. 100 Hz Max. value: 0 ~ 65535 (16-bit)
	Remote High Speed Counter	I-87082: 100 kHz Max., 32-bit
SRAM Expansion	Battery Backup SRAM	With an X607/X608 plug in the only 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. (for retain variables) Optional: X607: 128 KB, X608: 512 KB
* Note: COM3 ~ COM8 are reserved at the optional X-board series if it is plugged inside the $\mu$ PAC-7186EG & I-7188XG. * ISaGRAF FAQ: <a href="http://www.icpdas.com/faq/isagraf.htm">http://www.icpdas.com/faq/isagraf.htm</a> * Recommend to use NS-205/NS-208 Industrial Ethernet Switch.		

## Ordering Information

$\mu$ PAC-7186EG CR	ISaGRAF based $\mu$ PAC with 10/100M Ethernet (RoHS)
$\mu$ PAC-7186EGD CR	$\mu$ PAC-7186EG with display (RoHS)
I-7188XG CR	ISaGRAF based $\mu$ PAC with 1 DI, 1 DO (RoHS)
I-7188XG CR	I-7188XG with display (RoHS)

## Accessories

ISaGRAF Development Software	
ISaGRAF-256-E	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with One Application Book (English version) and one USB Dongle
ISaGRAF-256-C	ISaGRAF Workbench Software Ver.3 (256 I/O Tags) with One Application Book (Chinese version) and one USB Dongle
ISaGRAF-32-E	ISaGRAF Workbench Software Ver.3 (32 I/O Tags) with One Application Book (English version)
ISaGRAF-32-C	ISaGRAF Workbench Software Ver.3 (32 I/O Tags) with One Application Book (Chinese version)
Note: Do not offer upgrade service from ISaGRAF-32 to ISaGRAF-256. (Using ISaGRAF-32 can control more than 32 I/O tags. Please refer to ISaGRAF User's Manual Ch. 3.)	
Others	
MDR-20-24 CR	24 VDC/1.0 A, 24 W Power Supply with DIN-Rail Mounting (RoHS)
GPSU06U-6 CR	24 VDC/0.25 A, 6 W Power Supply (RoHS)
DIN-KA52F CR	24 VDC/1.04 A, 25 W Power Supply with DIN-Rail Mounting (RoHS)
I/O Expansion Boards	Other add-on expansion boards refer to expansion board selection guide
NS-205 CR	Unmanaged 5-port Industrial Ethernet Switch (RoHS)