ISaGRAF µPAC-5000(D) Series

Features

- 80186, 80 MHz CPU
- MiniOS7 Inside
- Embedded ISaGRAF Ver.3 SoftLogic (IEC 61131-3)
- Various Storage Media
  - 512 KB Flash
  - 16 KB EEPROM
  - 512 KB Battery Backup SRAM
- Various Communication Interface Options
  - 10/100 Base-TX Ethernet
  - RS-232/485
  - GPS
  - 2G (GPRS) / 3G (WCDMA)
- 64-bit Hardware Serial Number
- I/O Expansion Bus
- Redundant Power Inputs
- Operating Temperature: -25 ~ +75°C

Introduction

The **ISaGRAF µPAC-5000** series **(µPAC-5xx7, µPAC-5xx7D)** is an enhanced version of palm-size µPAC. It provides ISaGRAF workbench for PLC user. Owing to the bigger and special form factor design, the µPAC-5xx7(D) can add an internal wireless module, such as 2G, 3G, ZigBee, GPS for different wireless application. The optional I/O expansion board, XW-board, is two times larger than the X-board of µPAC-7186 and provides high-protection I/O.

For hardware expansion, it also supports an I/O expansion bus. The I/O expansion bus can be used to implement various I/O functions such as DI, DO, A/D, D/A, Timer/Counter, UART, and other I/O functions. Nearly all kinds of I/O functions can be implemented by this bus. But the bus can support only one board. There are more than 10 boards available for µPAC-5xx7(D) series, you can choose one of them to expand hardware features.

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

Rich I/O Expansion Ability
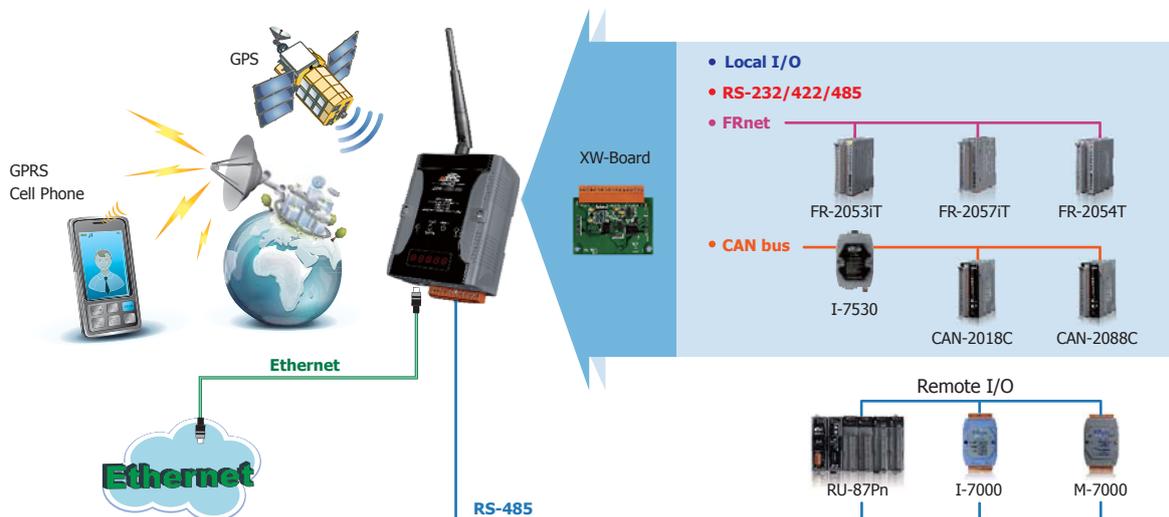
Cost-effective Auto-ReportData Acquisition/Control System

Provide 4-level Internet Security Protection

μPAC-5xx7

City B

RS-232

Ethernet

I-7520R

NS-205

RS-485

LAN

Modbus RTU devices

I-7000 I/O

PC / Server

Ethernet

NS-205

Auto-Report

RS-485

Internet

NS-205

LAN

μPAC-5xx7

Gateway Server in ISP Company

Ethernet

City A

More...

Time Synchronizing and/or Send Command

2G/3G SMS: Short Message Service

Report

Alarm Message

Request/Control

μPAC-5207/5307
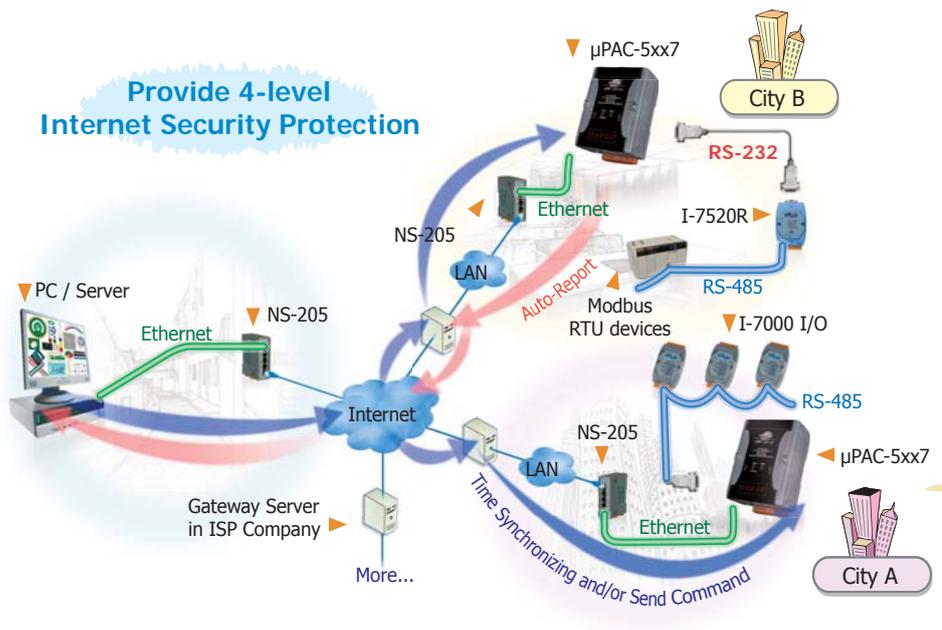
Modbus RTU/ASCII Master Ports

Modbus Device

M-7000 Module

tM-7000 I/O

μPAC-5xx7

RS-485
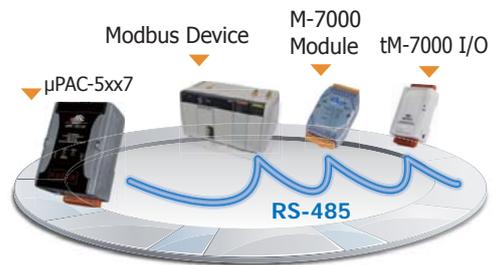
Modbus RTU/TCP Slave Ports

HMI
RS-232
RS-485
RS-422

HMI
Ethernet
RS-232

μPAC-5xx7

+

XW-Board

HMI
Touch 8000
Touch 6000
Touch 500

SCADA
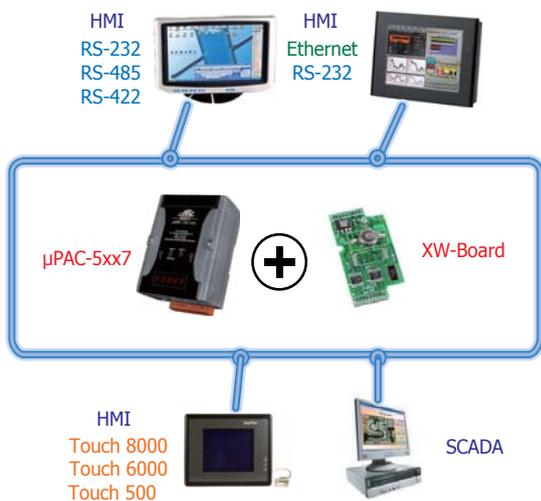
Send Email with one Attached File

Gateway Server in ISP Company

Internet

μPAC-5xx7

Internet

NS-205

RS-485

Ethernet

RU-87Pn

I-7000/M-7000

Remote I/O Modules

ISaGRAF μPAC-5000 Series

2
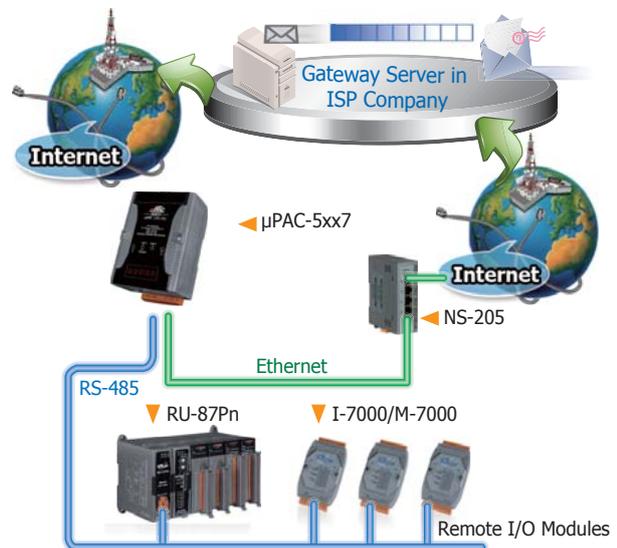
● µPAC-5000 + XW-Board

● Common Specifications

Models	µPAC-5007(D)	µPAC-5107(D)	µPAC-5207(D)	µPAC-5307(D)
System Software				
OS	MiniOS7 (DOS-like embedded operating system)			
Development Software				
ISaGRAF Software — ISaGRAF Ver.3	IEC 61131-3 standard			
ISaGRAF Software — Languages	LD, ST, FBD, SFC, IL & FC			
ISaGRAF Software — Max. Code Size	64 KB			
ISaGRAF Software — 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	512KB ; data valid up to 5 years (for retain variables)			
EEPROM	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)			
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			
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			

◪ ISaGRAF Specifications

Protocols (Note that certain protocols require optional devices)	
NET ID	1 ~ 255, user-assigned by software
Modbus RTU/ASCII Master Protocol	A max. of 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	A max. of 2 COM ports: COM1 and one of (COM2, COM3) (*). (For connecting ISaGRAF, PC/HMI/OPC Server and HMI panels.)
Modbus TCP/IP Protocol	Ethernet port supports Modbus TCP/IP Slave Protocol for connecting ISaGRAF & PC/HMI up to 6 connections.
User-defined Protocol	Custom protocols can be applied at COM1, COM2 and COM3~8 using Serial communication function blocks. (*)
Remote I/O	One of COM2 or COM3:RS-485 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 COM2 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.
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.
SMS: Short Message Service	One of COM1 or COM3 or COM4 (RS-232) 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) **Note:** µPAC-5207, 5307 has built-in GPRS, no external GSM/GPRS modem required.
Redundant 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	COM1 or COM3~8 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)
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	
Pulse Width Modulation Output	All XW-Board 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 series support DI 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

* Note: The COM3 ~ COM8 ports are located in the optional XW-Board series if it is installed inside the µPAC-5xx7. (Will be available.)
* ISaGRAF FAQ: www.icpdas.com > Support > FAQ > ISaGRAF Soft-Logic PAC
* ICP DAS recommends using NS-205/208 or RS-405/408 (Ring Switch) Industrial Ethernet Switches.

ISaGRAF µPAC-5000 Series

● Wireless Selection Guide

☑ ISaGRAF μPAC-5000

| Models	μPAC-5007(D)	μPAC-5107(D)	μPAC-5207(D)	μPAC-5307(D)
Wireless Communication	-	GPS	2G (GPRS)	3G (WCDMA)

☑ μPAC-5107(D) with GPS

The Global Positioning System (GPS) is a space-based global navigation satellite system (GNSS) that provides reliable location and time information anytime and anywhere on the Earth when and where there is an unobstructed line of sight to four or more GPS satellites. The GPS is widely used for driving navigation, geographic monitoring, fleet management and cargo tracking, etc. We also can use GPS for industrial application according to its longitude and latitude value and UTC time.

GPS Specifications	
Channels	32 channels 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 ms
Protocol	NMEA

Standard Antenna for GPS		
	ANT-115-03	
	Connector	SMA Male
	Radiation	Directional
	Band	1575.42 ±1.023MHz
	Gain(dBi)	2~3
	Cable Length	5 m
	Installation	Magnetic mount base

☑ μPAC-5207(D)/μPAC-5307(D) with 2G (GPRS) / 3G (WCDMA)

The wireless 2G(GSM, GPRS) and 3G(WCDMA) are the public wireless telephone technologies. The wide range of remote control applications are enabled by 2G/3G services such as audio, SMS, GPRS and WCDMA. Additionally, these applications can manage a small, medium and large number of unmanned remote devices as well as mobile terminals using the 2G/3G telecom network. They are widely applied in various applications like hydrographic monitoring, intelligent power, flow meter report system and GPS car-tracking system anytime anywhere.

2G (GPRS) Specifications	
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(1W @ 1800/1900 MHz)
Coding Schemes	CS 1, CS 2, CS 3, CS 4
SMS	Text and PDU mode

3G (WCDMA) Specifications	
Band	UMTS : 2100/1900/850 MHz
Data Transfer	UMTS / HSDPA / HSUPA Upload: Max. 5.76 Mbps; Download: Max. 7.2 Mbps

Optional Antenna for 2G and 3G		
	ANT-421-01	
	Connector	SMA Male
	Radiation	Omni-Directional
	Band	824 ~ 960 MHz 1710 ~ 2170 MHz
	Gain(dBi)	1.0 ±0.7 @ 830 MHz 0.5 ±0.7 @ 1730 MHz
	Cable Length	3 m
	Installation	Magnetic mount base

Standard Antenna for 2G and 3G		
	ANT-421-02	
	Connector	SMA Male
	Radiation	Omni-Directional
	Band	824 ~ 960 MHz 1710 ~ 2170 MHz
	Gain(dBi)	-0.9 ±0.7 @ 890 MHz +1.7 ±0.7 @ 1930 MHz
	Cable Length	14 cm

ISaGRAF μPAC-5000 Series

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ISaGRAF µPAC-5000

Model Name	CPU	Flash	SRAM	Memory Expansion	Ethernet	Wireless Communication	RS-232/RS-485
µPAC-5007(D)	80 MHz	512 KB	768 KB	microSD + 512 KB Battery Backup SRAM	10/100 BaseTX	–	1/1
µPAC-5107(D)						GPS	
µPAC-5207(D)						2G (GPRS)	
µPAC-5307(D)						3G (WCDMA)	

Ordering Information

µPAC-5007(D)	ISaGRAF based µPAC-5000 with LAN
µPAC-5107(D)	ISaGRAF based µPAC-5000 with LAN and GPS
µPAC-5207(D)	ISaGRAF based µPAC-5000 with LAN and 2G (GPRS)
µPAC-5307(D)	ISaGRAF based µPAC-5000 with LAN and 3G (WCDMA)
Note: (D) means with 7-Segment LED Display.	

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)
Note: 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.)	

Accessories	
NS-205 CR	Unmanaged Industrial 5-Port Ethernet Switch
MDR-20-24	24V/1A, 24 W Power Supply with DIN-Rail Mounting
DIN-KA52F	24V/1.04A, 25 W Power Supply with DIN-Rail Mounting

ISaGRAF µPAC-5000 Series