2.4. LinPAC-8000 Series

• LinPAC-8000 Overview

The LinPAC-8000 is a second generation Linux-based PAC from ICP DAS and is equipped with a PXA270 CPU (520 MHz) or LX 800 CPU (500 MHz) running a Linux kernel 2.6 operating system, multiple communication interfaces (VGA, USB, Ethernet and RS-232/485) and 1/4/8-slot or 0/3/7-slot backplane for both high performance Parallel I/O modules (high profile I-8K series) and Serial I/O modules (high profile I-87K series).

Compared with the first generation LinCon-8000, not only is the CPU performance improved have been added (from 206 MHz to 520 or 500 MHz) and uses an upgraded OS from Linux kernel 2.4 to Linux kernel 2.6, but many reliability features, such as dual LAN, redundant power input, and dual battery backup SRAM, etc. That's the powerful and flexible embedded control systems available.

LinPAC ≒ IPC+PLC

The LinPAC-8000 gives users all of the best features of both traditional PLCs and Windows capable PCs. The LinPAC-8000 includes a VGA port allowing users to choose a regular LCD monitor for display of HMI application, USB port to connect with Keyboard, Mouse, USB device for storage or touch monitor, microSD/ microSDHC memory for storage of program and data.

Main Components:

1 Main Control Unit (MCU)

The MCU is the powerhouse of the LinPAC Series. Each MCU comprises a Central Processor Module (CPM), a power supply, and a 1, 4, 8-slot or 0, 3, 7-slot backplane for I/O modules. The CPM is powerful integrated processing engine comprising a CPU, RAM and ROM, and an option of communication interfaces including Ethernet, RS-485, CAN bus and FRnet.

2 Embedded OS

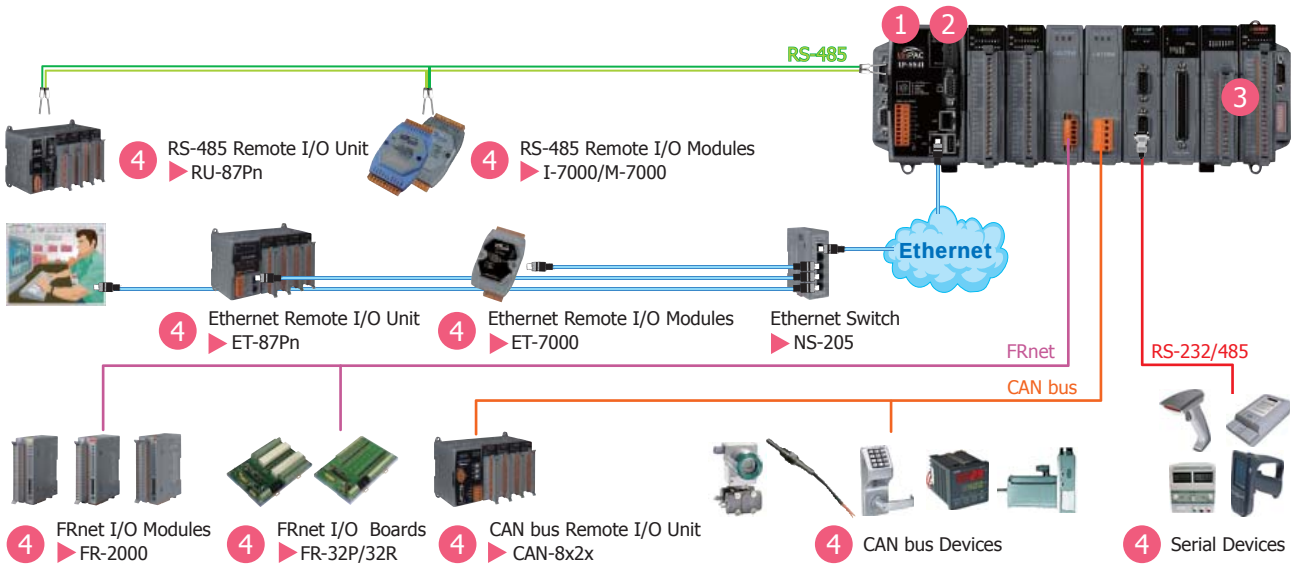
All LinPAC have Linux kernel 2.6 OS inside, most of the popular features in Linux are included, such as open source, stability and free of charge. LinPAC supports for rich software & development solutions: LinPAC SDK, GNU C Language, JAVA and GUI software, etc.

3 I/O Modules

There are two types of I/O modules, Parallel and Serial. The Parallel I/O modules (high profile I-8K series) are high-speed modules and have to be installed in slots of the LinPAC. The Serial I/O modules (high profile I-87K series) can be installed in slots or Expansion Units (RU-87Pn).

4 Remote I/O Expansion

LinPAC uses built-in RS-485 and Ethernet ports to connect RS-485/Ethernet remote I/O units (RU-87Pn/ET-87Pn) or modules (I-7000/M-7000/ET-7000). In this configuration, LinPAC expands the I/O very easily.
Using CAN or FRnet communication module, LinPAC can connect to CAN bus devices, remote I/O units or FRnet I/O modules for deterministic control system.



Selection Guide

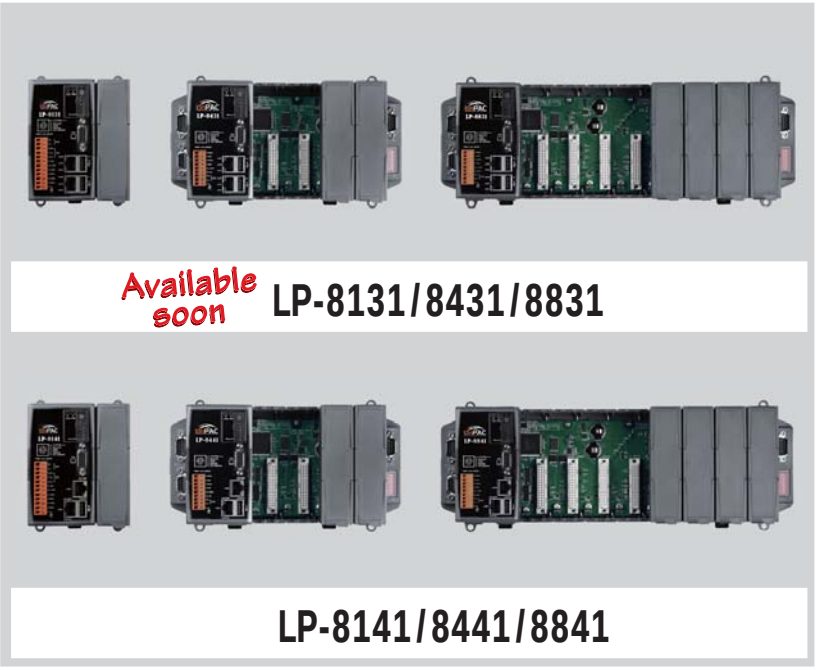
LP-8 X X X - XX

- **NO. of I/O Slot**
- **Hardware**
  - 3: PXA270 CPU & VGA 1024 x 768
  - 4: PXA270 CPU & VGA 800 x 600
  - 8: LX 800 CPU & VGA 1024 x 768
- **Software**
  - 1: Standard
- **Language**
  - EN: English

Standard LinPAC

Model Name	OS	Pre-installed Software	CPU	Flash	SDRAM	Ethernet	VGA Resolution	RS-232/ RS-485	I/O Slot	Audio Port	Page
LP-8131	Linux kernel 2.6	None	PXA270, 520 MHz	128 MB	128 MB	2	1024 x 768	2	1	None	2-4-3
LP-8431									4		
LP-8831									8		
LP-8141	Linux kernel 2.6	None	PXA270, 520 MHz	48 MB	128 MB	1	800 x 600	1	1	None	2-4-3
LP-8441									4		
LP-8841									8		
LP-8081	Linux kernel 2.6	None	LX 800, 500 MHz	4 G	1 GB DDR SDRAM	2	1024 x 768	2	0	None	2-4-7
LP-8381									3		
LP-8781									7		

The controller supports following software development tools:
1. SDK for Linux environment
2. SDK for Windows environment



Highlight Information

- Linux kernel 2.6 Inside
- Embedded Service: Web Server, FTP Server, Telnet Server, SSH Server
- Power PXA270 CPU: 32-bit & 520 MHz
- 1/4/8 Slots for High Profile I/O Modules
- Dual 10/100M Ethernet Ports
- 2/4 Serial Ports (RS-232/485)
- Redundant Power Input
- Operating Temperature: -25 ~ +75 °C

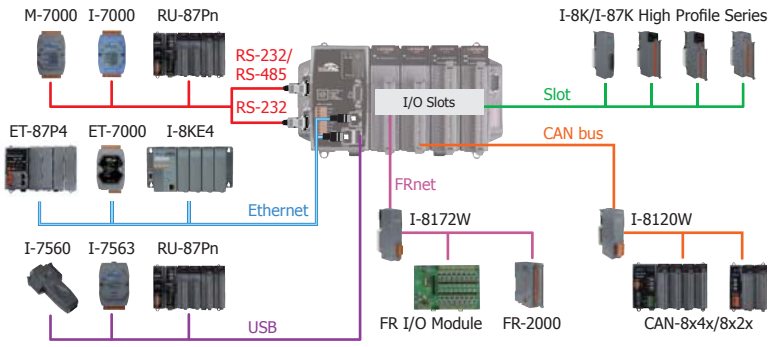
Introduction

LinPAC-8000 is the new generation Linux-based PAC (Programmable Automation Controller) from ICP DAS and is equipped with a PXA270 CPU (520 MHz) running a Linux kernel 2.6 operation system, multiple communication interfaces (VGA, USB, Ethernet and RS-232/485) and 1/4/8 slots for high performance parallel I/O modules (high profile I-8K series) and serial I/O modules (high profile I-87K series).

Main advantage of the LinPAC-8000 is its high quality control system, including its stably properties, open source and the standard LinPAC SDK for Windows and Linux using the GNU C language, JAVA and GUI software. The main purpose of LinPAC-8000 is to allow the numerous enthusiastic Linux users to control their own embedded system easily within the Linux environment.

Applications

Rich I/O Expansion Ability



Features

Software

- OS: Linux kernel 2.6:Open Sourse
- Development Environment
  - ☐ Provide LinPAC SDK for Windows and Linux Environment
  - ☐ Support for GNU C Language
  - ☐ Support for JAVA: JVM, JIOD (Java I/O Driver)
  - ☐ Support for GUI: Using GTK + Library
- Support for Server: Web, FTP, Telnet & SSH Server
- Supported Communication
  - ☐ Wireless, PPP over Modem, GPRS, Ethernet, Dual LAN
  - ☐ VxComm
  - ☐ Expansion Serial Ports
  - ☐ USB to Serial Converter
  - ☐ DCON and Modbus Protocols
  - ☐ Built-in Video Program support for USB WebCam
- Protocol: CAN Bus Network, Modbus TCP/RTU, SNMP
- Interpret: Perl, PHP
- Security: Firewall, NAT, VPN, Unique Serial Number

Hardware

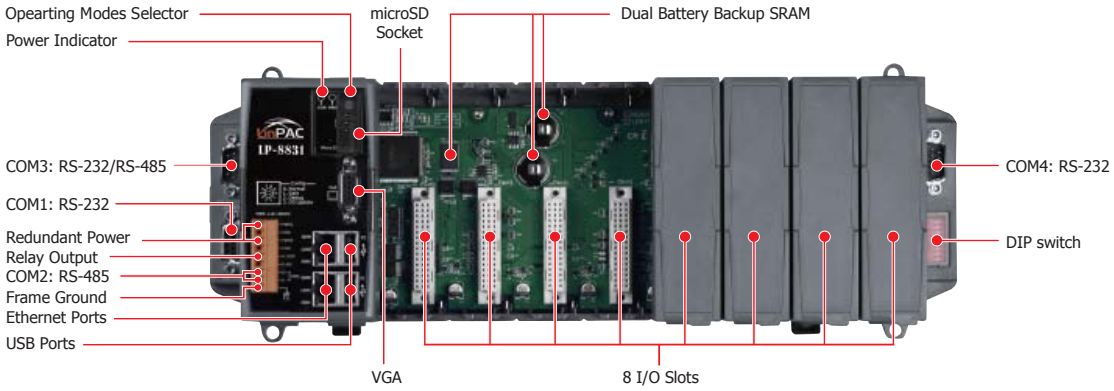
- Powerful CPU Module
- Built-in VGA Port: 640 x 480 ~ 1024 x 768 (for LP-8x31)
- Built-in VGA Port: 640 x 480 ~ 800 x 600 (for LP-8x41)
- 64-bit Hardware Serial Number
- Rich I/O Expansion Ability
- I/O Module Hot Swap Ability
  * Will be available
  (For High Profile I-87K Modules Only)
- 128 MB SDRAM
- Dual Watchdog Timers
- Dual Battery Backup SRAM (512 KB)
- Dual Ethernet Ports
- Redundant Power Inputs
- DIN-Rail or Wall Mounting
- Operating Temperature: -25 ~ +75 °C

Specifications

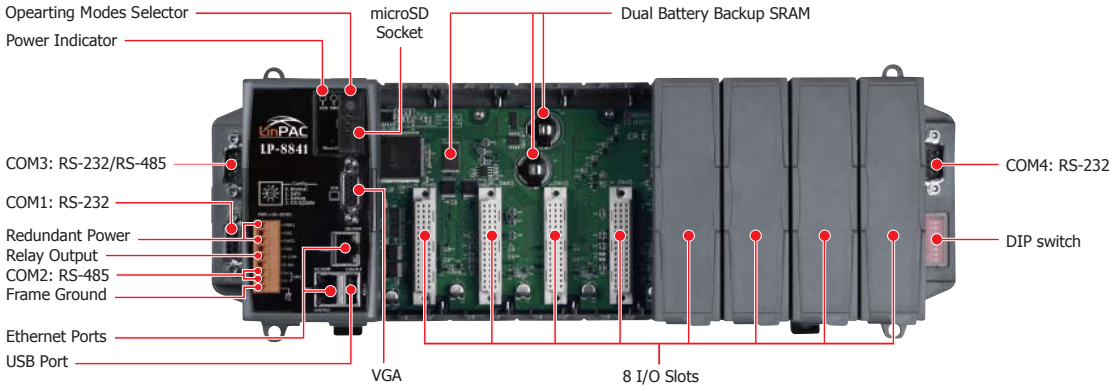
Models		LP-8131	LP-8141	LP-8431	LP-8441	LP-8831	LP-8841
System Software							
OS		Linux kernel 2.6					
Embedded Service		Web Server, FTP Server, Telnet Server, SSH Server					
SDK Provided		Standard LinPAC SDK for Windows and Linux by GNU C language					
CPU Module							
CPU		PXA270 or compatible (32-bit and 520 MHz)					
SDRAM		128 MB					
Dual Battery Backup SRAM		512 KB (for 5 years data retain while power off)					
Flash		128 MB	48 MB	128 MB	48 MB	128 MB	48 MB
EEPROM		16 KB					
		Data Retention: 40 years; 1,000,000 erase/write cycles					
Expansion Flash Memory		microSD socket with one 2 GB microSD card (support up to 16 GB microSDHC card)					
RTC (Real Time Clock)		Provide second, minute, hour, date, day of week, month, year					
64-bit Hardware Serial Number		Yes, for Software Copy Protection					
Dual Watchdog Timers		Yes					
Programmable LED Indicator		1					
Rotary Switch		Yes (0 ~ 9)					
DIP Switch		-		Yes (8 bits)			
VGA & Communication Ports							
VGA	VGA	Yes, with one extra GPU	Yes	Yes, with one extra GPU	Yes	Yes, with one extra GPU	Yes
	Resolution	1024 x 768, 800 x 600, 640 x 480	800 x 600, 640 x 480	1024 x 768, 800 x 600, 640 x 480	800 x 600, 640 x 480	1024 x 768, 800 x 600, 640 x 480	800 x 600, 640 x 480
Ethernet		RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)					
USB 1.1 (host)		2	1	2	1	2	1
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	D2+, D2-; self-tuner ASIC inside					
	Isolation	RS-485 (D2+, D2-); 2500 V_{DC}; isolated		3000 V_{DC}			
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			
I/O Expansion Slots							
Slot Number		1		4		8	
		(For High Profile I-8K and I-87K Modules Only)					
Hot Swap * Will be available		For High Profile I-87K Modules Only					
Mechanical							
Dimensions (W x L x H)		91 mm x 132 mm x 52 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		1.0 A, 5 V supply to CPU and backplane, 0.6 A, 5 V supply to I/O expansion slots, 8 W in total		1.1 A, 5 V supply to CPU and backplane, 4.9 A, 5 V supply to I/O expansion slots, 30 W in total		1.2 A, 5 V supply to CPU and backplane, 4.8 A, 5 V supply to I/O expansion slots, 30 W in total	
Consumption		7.3 W (0.3 A @ 24 V_{DC})		9.1 W (0.38 A @ 24 V_{DC})		9.6 W (0.4 A @ 24 V_{DC})	

Appearance

LP-8831



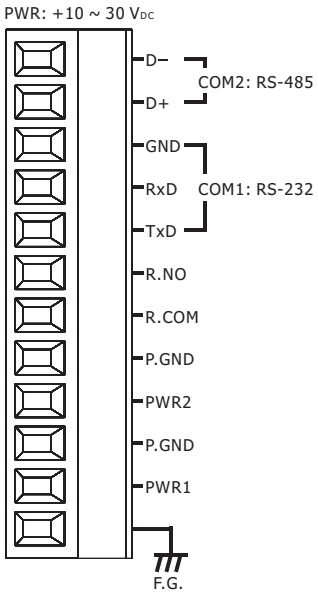
LP-8841



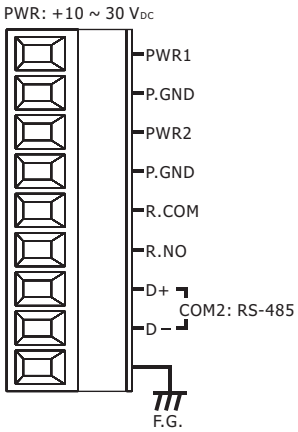
Pin Assignments

Terminal Block

LP-81x1

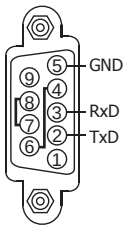


LP-84x1/88x1

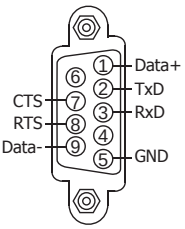


LP-84x1/88x1 COM Port

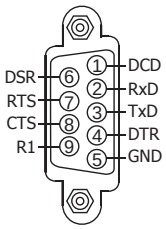
COM1: RS-232



COM3: RS-232/RS-485

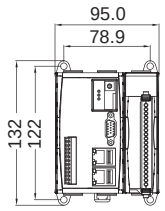


COM4: RS-232



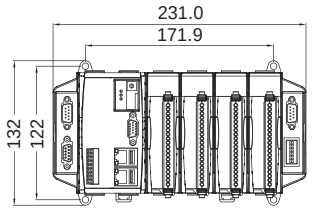
Dimensions (Units: mm)

LP-8131



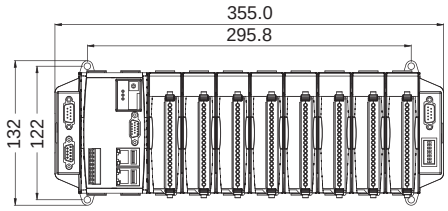
Front View

LP-8431



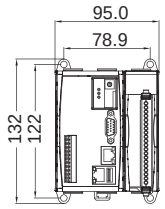
Front View

LP-8831



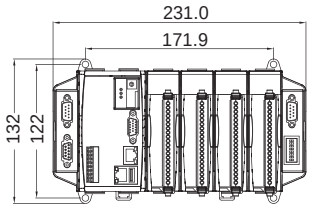
Front View

LP-8141



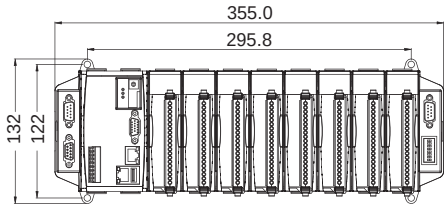
Front View

LP-8441



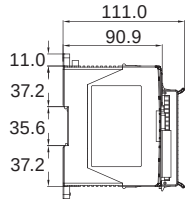
Front View

LP-8841



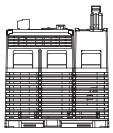
Front View

LP-8x31/8x41



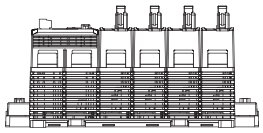
Left Side View

LP-81x1



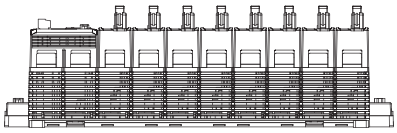
Bottom View

LP-84x1



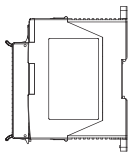
Bottom View

LP-88x1



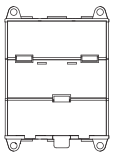
Bottom View

LP-8x31/8x41



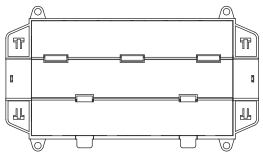
Right Side View

LP-81x1



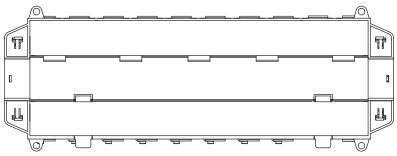
Rear View

LP-84x1



Rear View

LP-88x1



Rear View

Ordering Information

LP-8131-EN	LP-8141-EN	Standard LinPAC-8000 with 1 I/O Slot (English Version of OS)
LP-8431-EN	LP-8441-EN	Standard LinPAC-8000 with 4 I/O Slots (English Version of OS)
LP-8831-EN	LP-8841-EN	Standard LinPAC-8000 with 8 I/O Slots (English Version of OS)

Accessories

DP-660	24 V_{DC}/2.5 A, 60 W and 5 V_{DC}/0.5 A, 2.5 W Power Supply with DIN-Rail Mounting
DP-1200 CR	24 V_{DC}/5.0 A, 120 W Power Supply with DIN-Rail Mounting (RoHS)
MDR-60-24 CR	24 V_{DC}/2.5 A, 60 W Power Supply with DIN-Rail Mounting (RoHS)

Highlight Information

- Linux kernel 2.6 Inside
- Embedded Service: Web Server, Telnet Server, SSH Server
- AMD LX 800 CPU (32-bit and 500 MHz)
- 1 GB DDR SDRAM, 4 GB Flash, 8 GB CF Card
- 0/3/7 Slots for High Profile I/O Modules
- Dual Ethernet Ports (10/100M)
- 4/5 Serial Ports (RS-232/RS-485)
- 2 USB & 1 VGA Ports
- 64 bits Hardware Serial Number
- Operating Temperature: -25 °C ~ +75 °C

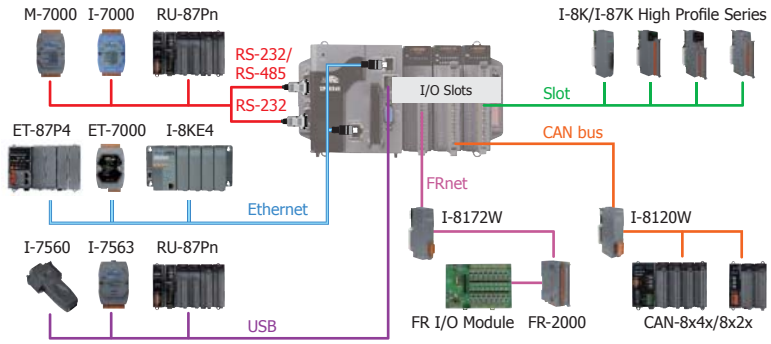
Introduction

LinPAC-8081/8381/8781 is the second generation Linux-based PAC (Programmable Automation Controller) from ICP DAS and is equipped with a LX 800 CPU (500 MHz) running a Linux kernel 2.6 operation system, multiple communication interfaces (VGA, USB, Ethernet and RS-232/485) and 0/3/7 slots for high performance parallel I/O modules (high profile I-8K series) and serial I/O modules (high profile I-87K series).

User's programs can be saved in external storage device, such as CF Card, USB device or RAM via Ethernet. LinPAC SDK is provided for users to develop LinPAC I/O applications rapidly and easily when I-7000/8000/87K series I/O modules are used in the LinPAC. Users can develop LinPAC applications using the GNU C Language. In the meanwhile, all kinds of servers and functions built-in make the LinPAC more powerful and users will be able to operate LinPAC to achieve their own project smoothly. With LP-8x81 Serial, users can achieve the redundancy function and it will make the whole control system safer.

Applications

Rich I/O Expansion Ability



Features

Software

- OS: Linux kernel 2.6:Open Sourse
- Development Environment
  - ☐ Provide LinPAC SDK
  - ☐ Support for GNU C Language, GUI (Using GTK + Library)
- GUI Desktop:
  - ☐ X-Window + GNOME
- Support Server:
  - ☐ Web Server
  - ☐ Telnet Server
  - ☐ SSH Server
- Protocol: CAN Bus Network, Modbus TCP/RTU, SNMP
- Security: Unique Serial Number
- Interpret: Perl, PHP
- MySQL Database

Hardware

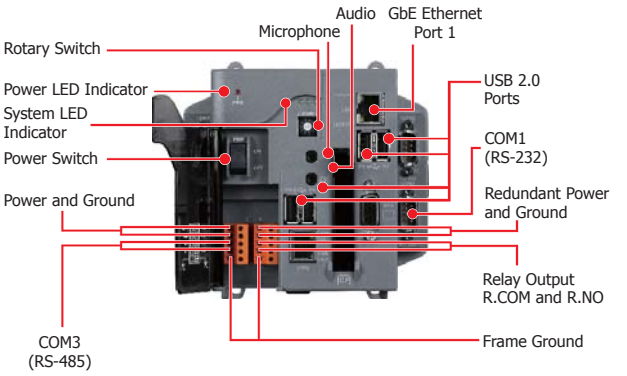
- Powerful CPU Module
  - ☐ AMD LX 800 CPU (32-bit and 500 MHz)
- Rich Memories
  - ☐ DDR SDRAM (1 GB), Built-in Flash Disk (4 GB)
  - ☐ EEPROM (16 KB), CF Card (8 GB)
  - ☐ Dual Battery Backup SRAM (512 KB)
- VGA Port x 1, USB 2.0 Ports x 2
- 64-bit Hardware Serial Number
- Dual Watchdog Timers
- 4/5 Serial Ports (RS-232/RS-485)
- Dual Ethernet Ports (10/100M)
- Redundant Power Inputs
- DIN-Rail or Wall Mounting
- Operating Temperature: -25 ~ +75 °C

Specifications

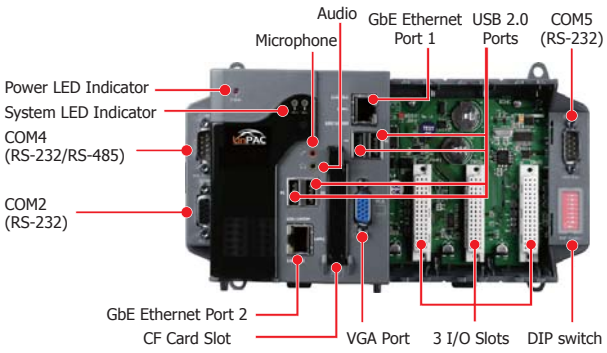
Models		LP-8081	LP-8381	LP-8781
System Software				
OS		Linux kernel 2.6		
Embedded Service		Web Server, Telnet Server, SSH Server		
SDK Provided		Standard LinPAC SDK for Linux by GNU C language		
CPU Module				
CPU		AMD LX 800 processor (32-bit and 500 MHz)		
System Memory		1 GB DDR SDRAM		
Dual Battery Backup SRAM		512 KB (for 5 years data retain while power off)		
Flash		4 GB as IDE Master		
EEPROM		16 KB		
		Data Retention: 40 years; 1,000,000 erase/write cycles		
CF Card		8 GB (support up to 32 GB)		
64-bit Hardware Serial Number		Yes, for Software Copy Protection		
Dual Watchdog Timers		Yes		
Rotary Switch		Yes (0 ~ 9)		
DIP Switch		-	Yes (8 bits)	
VGA & Communication Ports				
VGA		Yes, (resolution: 640 x 480 ~ 1024 x 768)		
Ethernet		RJ-45 x 2, 10/100 Base-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)		
USB 2.0		2		
COM 1		RS-232 (RxD, TxD and GND); non-isolated	Internal communication with the high profile I-87K series modules in slots	
COM 2		RS-232 (RxD, TxD and GND); non-isolated		
COM 3	RS-485	D2+, D2-; self-tuner ASIC inside		
	Isolation	3000 V_{DC}		
COM 4		RS-232/RS-485 (RxD, TxD, CTS, RTS and GND for RS-232, Data+ and Data- for RS-485); non-isolated		
COM 5		RS-232 (RxD, TxD, CTS, RTS, DSR, DTR, CD, RI and GND); non-isolated		
I/O Expansion Slots				
Slot Number		0	3	7
Hot Swap * Will be available		-	For High Profile I-87K Modules Only	
Mechanical				
Dimensions (W x L x H)		137 mm x 132 mm x 125 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		1.8 A, 5 V supply to CPU and backplane, 15 W in total	1.8 A, 5 V supply to CPU and backplane, 5.2 A, 5 V supply to I/O expansion slots, 35 W in total	2.0 A, 5 V supply to CPU and backplane, 5.0 A, 5 V supply to I/O expansion slots, 35 W in total
Consumption		14.4 W (0.6 A @ 24 V_{DC})	14.4 W (0.6 A @ 24 V_{DC})	16.8 W (0.7 A @ 24 V_{DC})

Appearance

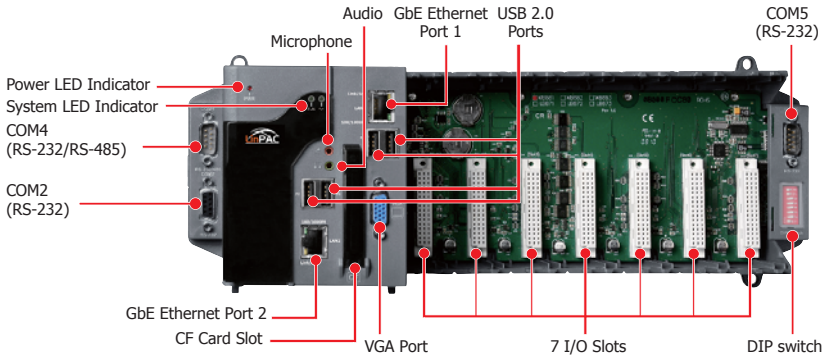
LP-8041



LP-8341

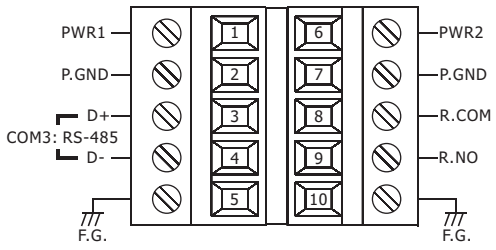


LP-8741

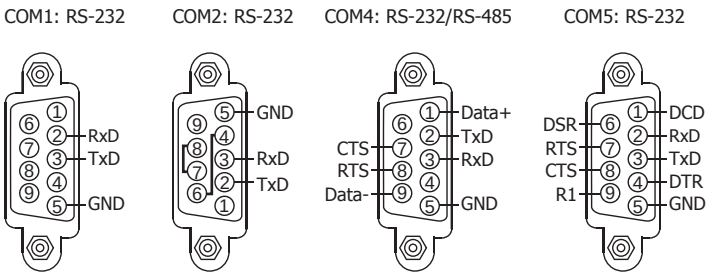


Pin Assignments

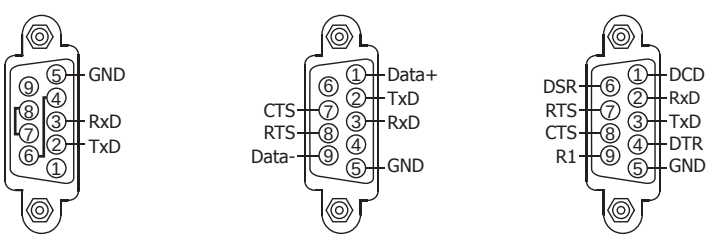
LP-8x41 Terminal Block



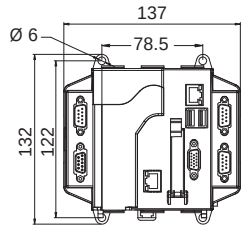
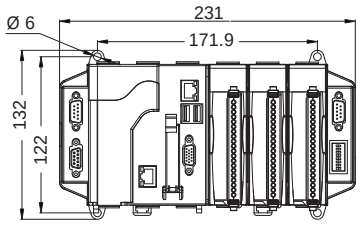
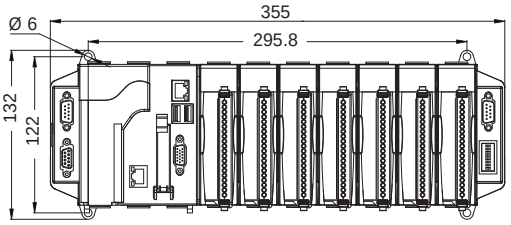
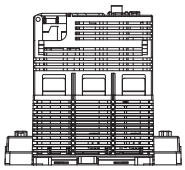
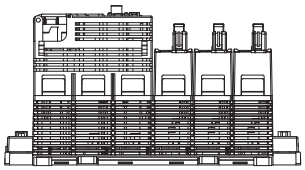
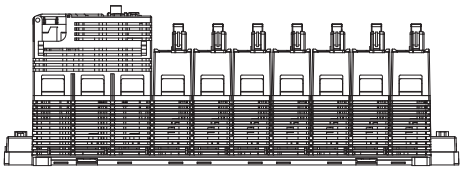
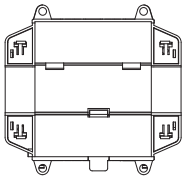
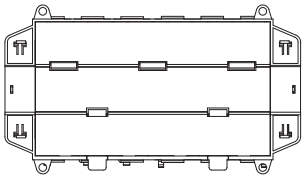
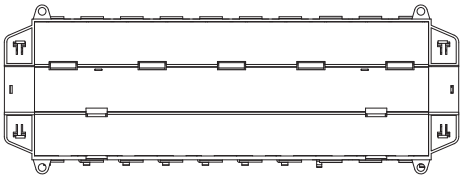
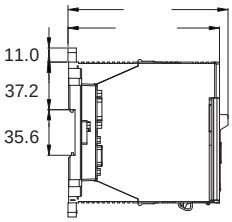
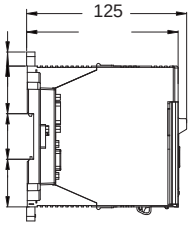
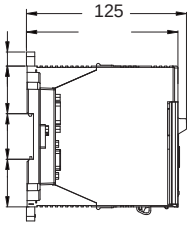
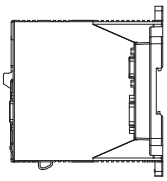
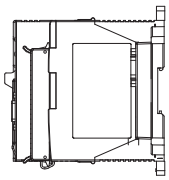
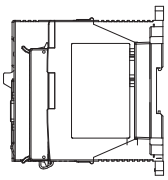
LP-8041 COM Port



LP-8141/LP-8341/8741 COM Port



Dimensions (Units: mm)

LP-8041	LP-8341	LP-8741
		
Front View	Front View	Front View
		
Bottom View	Bottom View	Bottom View
		
Rear View	Rear View	Rear View
		
Left Side View	Left Side View	Left Side View
		
Right Side View	Right Side View	Right Side View

Ordering Information

LP-8081-EN CR	Standard LinPAC-8000 without I/O Slot (English Version of OS) (RoHS)
LP-8381-EN CR	Standard LinPAC-8000 with 3 I/O Slots (English Version of OS) (RoHS)
LP-8781-EN CR	Standard LinPAC-8000 with 7 I/O Slots (English Version of OS) (RoHS)

Accessories

NS-208 CR	8-Port Unmanaged Industrial 10/100 Base-TX Ethernet Switch (RoHS)
USB-2560 CR	4-Port Industrial USB 2.0 Hub (RoHS)
DP-1200 CR	24 VDC/5.0 A, 120 W Power Supply with DIN-Rail Mounting (RoHS)
MDR-60-24 CR	24 VDC/2.5 A, 60 W Power Supply with DIN-Rail Mounting (RoHS)