

## IPC-P2104SI

4 ports RS-422 / 485 Universal PCI  
With Surge & Isolation



### Introduction

SUNIX IPC-P2104SI, industrial standard universal PCI serial communication card, allows users to expand four RS-422/485 ports on PC-based system. Each serial port achieves data rates up to 921.6 Kbps and utilizes 16C950 UART with an on-chip 128-bytes hardware FIFO buffer for reliable, high-speed serial I/O. With SUNIX patented Auto-Switching RS-422/485 and RS-485 AHDC™ technology, user can easily manage different serial interfaces selection and RS-485 signal direction control. Under RS-485 mode, the board can connect up to 31 daisy-chained RS-485 devices within a range of 1.2 km.

SUNIX IPC-P2104SI uses on-board 2500V optical isolators which achieve on power and serial signal lines to protect your PC and equipment against damages from ground loops, increasing system reliability in harsh environments. To further increase reliability, this board offers 500W surge protection technology, protecting your system from abrupt high voltage surges, such as those caused by lightning. SUNIX serial board supports a wide variety of operating systems, including Windows, Linux, DOS, and UNIX. It is the best serial communicating solution for industrial and harsh environment applications.

### Features

- Expands 4 independent RS-422/485 serial ports with communication speeds up to 921.6Kbps
- High reliability SUN1999 16C950 compatible UART controller on-board.
- Compliance with PCI 33MHz Ver 3.0, 2.3, 2.2 & 2.1 specifications
- Supports both 64-bit & 32-bit PCI bus slot and 3.3V & 5V power
- RS-422/485 auto detect and switching technology – jumper and software free
- AHDC/CS™ technology for collision free communication
- 2.5 KV Isolation Protection for all signal and power
- Circuit Damage Protection of 500W Peak Per IEC 61000-4-5
- Ultra low power consumption design for Green Environment.
- Built-in ±15KV ESD protection for all serial signals meets IEC1000-4-2 standard.
- Plug-n-Play, I/O address and IRQ assigned by BIOS
- Certified by CE, FCC, RoHS, and Microsoft WHQL approval
- Support Microsoft Windows, Linux, and DOS

## Specifications

### Serial Communication

<b>Interface</b>	RS-422/485	<b>Baud rate</b>	50bps ~921.6Kbps
<b>Controller</b>	SUNIX SUN1999 (16C950 UART Compatible)	<b>Stop bit</b>	1, 1.5, 2
<b>BUS</b>	Universal PCI 64/32bit 3.3V/5V PCI Ver 3.0, 2.3, 2.2, 2.1	<b>Parity</b>	even, odd, none, mark, space
<b>No. of Port</b>	4-port	<b>Flow Control</b>	Xon/Xoff (software)
<b>IRQ &amp; IO</b>	Assigned by System	<b>FIFO</b>	128byte Hardware
<b>Signal</b>	RS-422: TxD+, TxD-, RxD+, RxD-, GND, RI 4-wire RS-485: TxD+, TxD-, RxD+, RxD-, GND 2-wire RS-485: Data+, Data-, GND		
<b>ESD Protection</b>	±15KV ESD protection for each signal Human Body Model (HBM) ±15KV IEC1000-4-2 Air Gap Discharge ±8KV IEC1000-4-2 Contact Discharge		
<b>Surge Protection</b>	500W peak surge protection for all signal lines meet IEC 61000-4-5		
<b>Isolation</b>	2.5 KV Isolation Protection for all signal and power		
<b>PCB Connector</b>	DB44 Female		

### Driver Support

<b>Windows Client</b>	Windows XP/Vista/7/8/8.1 (X86/X64)
<b>Windows Server</b>	Windows 2000 / 2003 / 2008 / 2008 R2 / 2012 / 2012 R2 (X86/X64)
<b>Windows Embedded</b>	Windows CE 4.2/5.0/6.0/XP Embedded/POSReady 2009/POSReady 7/ Embedded System 2009/Embedded Standard 7
<b>Linux</b>	Linux 2.4.x/2.6.x/3.x
<b>DOS</b>	DOS

### Regulatory Approvals

<b>Hardware</b>	EN55022 Class B, EN55024, EN61000-3-2, EN61000-3-3, FCC Part 15 Class B, BSMI: CNS13438, C-Tick: CISPR22 AS/NZS, RoHS
<b>Software</b>	Microsoft WHQL Windows <ul style="list-style-type: none"> <li>◆ <b>Microsoft Client:</b> XP/Vista/7/8/8.1 (X86/X64)</li> <li>◆ <b>Microsoft Server:</b> 2000 / 2003 / 2008 / 2008 R2 / 2012 / 2012 R2 (X86/X64)</li> </ul>

### Environment

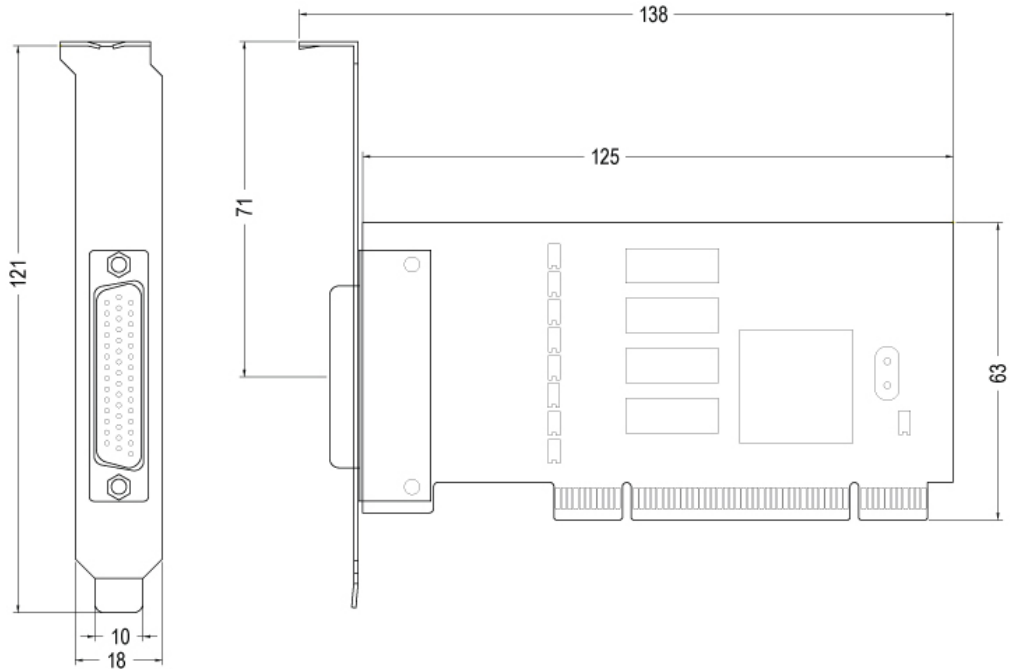
<b>Operation Temperature</b>	0 to 70°C (32 to 158°F)
<b>Operation Humidity</b>	5 to 95% RH
<b>Storage Temperature</b>	-20 to 85°C (-4 to 185°F)

### Dimension

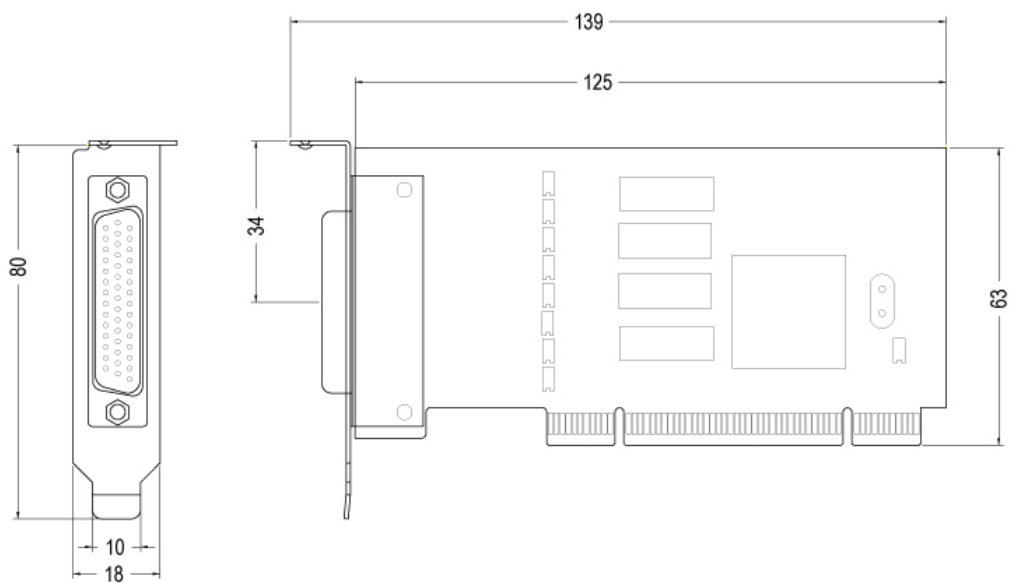
<b>PCB Dimension</b>	125 x 63 mm
<b>Bracket</b>	Standard 121 mm / Low Profile 80 mm
<b>Bracket Space</b>	1

## Mechanical Drawings(Unit = mm)

### ■ Standard

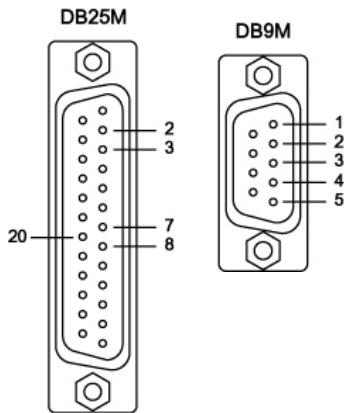


### ■ Low Profile



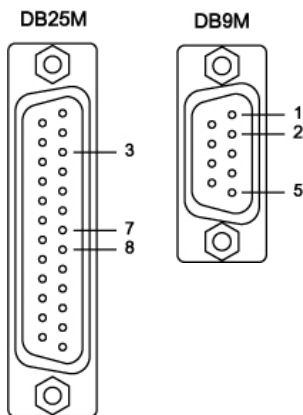
## Pin Assignment

### ■ RS-422



PIN	DB25M	DB9M
TxD-	8	1
TxD+	3	2
RxD+	2	3
RxD-	20	4
GND	7	5

### ■ RS-485

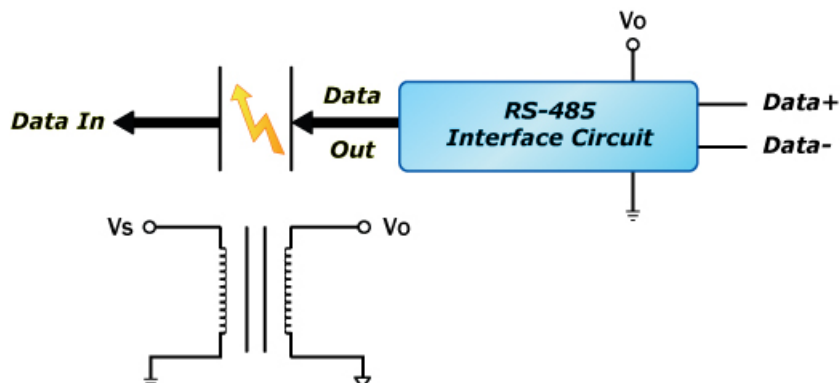


PIN	DB25M	DB9M
Data--	8	1
Data+	3	2
GND	7	5

## Tech Forum

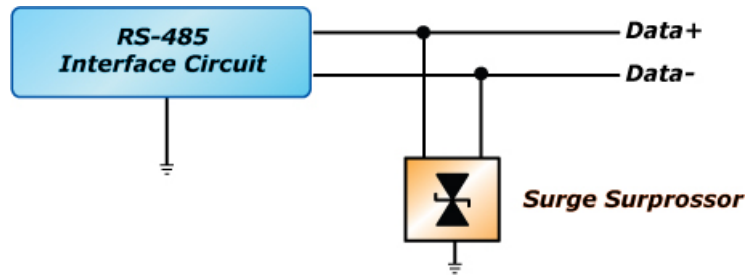
### Optical Isolation Protection

The ground loop is a common problem in many industrial environments, especially when ground voltage levels differ between connected devices by a longer transmission line in critical or harsh factory environments. Communication devices connected by long cables may be damaged by the mismatch between ground voltage levels at the two ends of the wire. Optical isolation uses photo cells at both ends of the line to isolate the devices' sensitive components from this type of electrical damage. SUNIX provides 2.5KV optical isolation for power and signals to eliminate this kind of problem.



## Surge Protection

Surges are high amplitude electrical pulses lasting only several millionths of a second in duration. They can be caused by heavy-duty equipment, power lines, short circuits, or large motors. A surge suppressor has the ability to effectively absorb the high energy in an extremely short period of time, preventing the connected devices from damage. To eliminate this problem, we provide the embedded 500W surge protection for all signals, and it meets IEC61000-4-5 standards.



## RS-422/485 Auto Detect & Switching Design

SUNIX developed a unique technology "Auto Detect & Switching RS-422/485, which can automatically detect the state of RS-422 full duplex or RS-485 half duplex and control the data transmitting and receiving wires at the same port without any jumper settings. This design gives users the convenience to change the communication mode setting without any system shut downs.



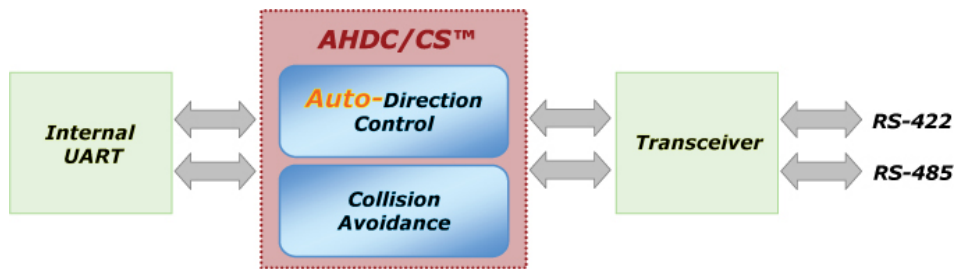
## Ultra Low Power Consumption

Low power consumption is always a large part of the needs expressed by customers. Recently, low power consumption has become essential not only for system development but also for environmental reasons, and in fact low power consumption has become an ever larger part of the needs expressed by customers. SUNIX has pursued this issue via various approaches, as it seeks to provide special cell-bases ASICs that meet today's challenging needs for lower power consumption during active and standby modes. According to our typical test result, SUNIX UART controller, SUN1999 costs 0.033W (3.3V@0.01A) power consumption under full-loading working condition.



### AHDC/CS™ Technology

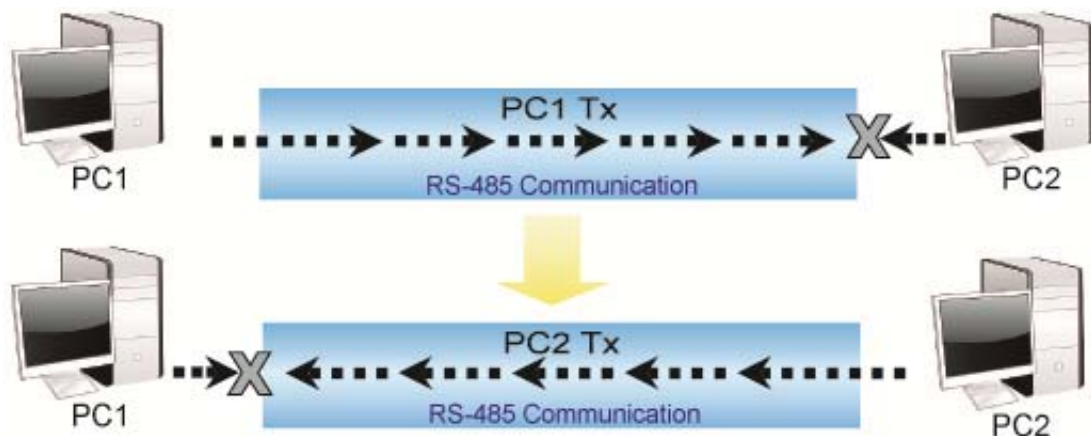
Since RS-485 is bidirectional which means the driver is turned on only when it needs to transmit some data, otherwise it is floating. SUNIX developed a new design to control the direction of driver (On or off) automatically which is called Auto Hardware Direction Control/Carrier Sense. AHDC/CS™ works on the same principle and only turns on the driver when UART needs to transmits some data; but the advantage is that AHDC/CS™.



Auto Hardware Direction Control (AHDC™) technology makes it easier to manage 2-wire RS-485 half-duplex communications, eliminating the need for software interference. User does not necessary to write extra code for Windows applications to control the half-duplex protocol. Auto Hardware Direction Control (AHDC™) technology is the key feature of SUNIX UART, and this function is default enabling.

### RS-485 ACS™ Technology

Auto Carrier Sense (ACS™) technology is the data flow control under RS-485 half duplex (one-way traffic) communicating. It manages data flow between computers or devices or between nodes in a RS-485 network, so that the data can be handled at an efficient pace



Auto Carrier Sense (ACS™) technology will check the status of RS-485 communication bus. If the bus is idle, it starts transmission. If the bus is not idle (some data flows in the bus), then it will postpone the transmission of UART until the bus is idle. Due to the reduction of TX/RX packet conflicting on RS-485 one-way traffic bus, it will enhance better system performance and RS-485 communication ability. SUNIX recommend enabling this feature.

## Ordering Information

Bus	Port	Connector	Baud Rate	ESD Protection	Surge Protection	Isolation Protection	Model No.
PCI Express	8	DB44 Female	921.6 Kbps	±15KV	-	-	IPC-E2108
					600W	2.5KV	IPC-E2108SI
	4	DB44 Female	921.6 Kbps	±15KV	-	-	IPC-E2104
					600W	2.5KV	IPC-E2104SI
	2	DB9 Male	921.6 Kbps	±15KV	-	-	IPC-E2102
					600W	2.5KV	IPC-E2102SI
PCI	16	DB78 Female	921.6 Kbps	±15KV	-	-	IPC-P2116
	8	DB44 Female	921.6 Kbps	±15KV	-	-	IPC-P2108
					600W	2.5KV	IPC-P2108SI
	4	DB44 Female	921.6 Kbps	±15KV	-	-	IPC-P2104
					600W	2.5KV	IPC-P2104SI
	2	DB9 Male	921.6 Kbps	±15KV	-	-	IPC-P2102
					600W	2.5KV	IPC-P2102SI
	PCI/104	8	5x2 Pin Header	921.6 Kbps	±15KV	-	-
600W						2.5KV	IPC-B2108SI
4		5x2 Pin Header	921.6 Kbps	±15KV	-	-	IPC-B2104
					600W	2.5KV	IPC-B2104SI
2		5x2 Pin Header	921.6 Kbps	±15KV	-	-	IPC-B2102
					600W	2.5KV	IPC-B2102SI