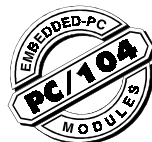


# PCM-3614

## 4-port RS-422/485 High-Speed Module



### Introduction

The PCM-3614 is a PC/104-compatible module with four individually configurable RS-422/485 ports. It works with PC/104 CPU modules to extend additional RS-422/485 ports. The PCM-3614 also features lots of functions such as high transmission speed 921.6 kbps, independent/shared IRQ and more. It also provides high-performance 16C550 UART communication chip with 16-byte FIFO to reduce CPU load. This makes the PCM-3614 especially suitable for multitasking environments.

The PCM-3614 comes with a Windows 95/98/NT/ME configuration utility (Windows 2000/XP utility will soon be ready and allowed to download through our Web site). The Windows configuration utility provides functions such as self-diagnostics and performance analysis for easy troubleshooting and debugging.

The PCM-3614 provides versatile function settings to meet users' needs. These function settings include Standard/Enhance mode, Independent/Shared IRQ mode and Speed mode. Standard/Enhance mode setting helps the user use base address more flexible. Especially in Enhance mode, different base addresses can be set according to the application. In Shared IRQ mode, all ports of interrupt can be specified to one. This solves the problem of IRQ insufficiency within the embedded system. In Speed mode, the PCM-3614 allows transmission rate up to 921.6 kbps, improving the overall performance of the system.

### Features

- Four Independent RS-422/485 serial ports
- Automatic RS-485 data flow control
- Transmission speeds up to 921.6 Kbps
- Shared IRQ settings for each port
- Windows configuration utility for Windows 95/98/NT/ME  
P.S. Windows 2000/XP/CE driver will soon be available on our Web site
- Built-in termination resistors
- LED indicators: TX, RX
- Standard PC ports: COM1, COM2, COM3, COM4 compatible

### Specification

- Bus interface: PC/104 (ISA)
- Number of ports: 4
- I/O address: 0x000 ~ 0x3F8
- UART: 4 x 16C550

- IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15
- Data bits: 5, 6, 7, 8
- Stop bits: 1, 1.5, 2
- Parity: none, even, odd
- Speed (bps): 50 ~ 921.6K
- Connectors: Four DB-9 male
- Signal support: TxD+, TxD-, RxD-, CTS+, CTS-, RTS+ and RTS-
- Surge protection: 1000 V<sub>DC</sub>
- Temperature: Operating : 0 ~ 65° C  
(refer to IEC-68-1-1,2) ( 32~149° F)  
Storage : -25 ~ 80° C (-13~176° F)
- Operation Humidity: 0% ~ 90% Relative Humidity, non-condensing

### Product Package

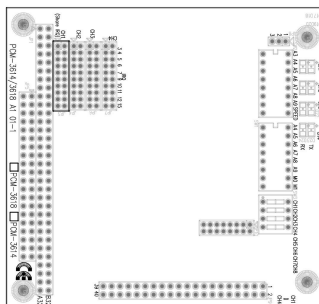
- PCM-3614 PC/104 4-port RS-422/485 High-Speed Module
- Advantech ICOM Driver/Utility CD
- One cable

### Initial inspection

We carefully inspected the PCM-3614 both mechanically and electrically before we shipped it. It should be free of marks and scratches and in perfect electrical order on receipt.

Handle the board only by its edges. The static charge on your body may damage its integrated circuits. Keep the card in its anti-static package whenever it is not installed. You can use this package to return the card if it should need repair.

### Board Layout



## Card Configuration

Each port on the PCM-3614 card requires configuration prior to use. The DIP switches set ports to the appropriate I/O address (SW2) and different modes (SW1). The jumpers set the port's IRQ.

## Default Settings

The board is shipped with default settings. If you need to change these settings, however, see the following sections. Otherwise, you can simply install the card.

PCM-3614 Default Configuration	
Setting	Default Function
JP3	IRQ 5
Speed Mode	1 x
IRQ mode	Share
Base Address	Address 300H
Vector Address	Interrupt 280H
Standard/ Enhanced	Enhance
Operating System	Windows 95/98/NT

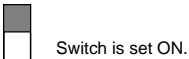
## Jumper and switch settings

The PCM-3614 can function in many different modes according to your application needs. These modes include Standard/Enhanced Mode, Independent/Shared IRQ Mode, Speed Mode, and Operating System Mode. Details of these specific modes are described as follows:

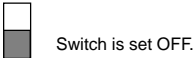
### Standard/Enhanced Mode (M0)

PCM-3614 can be used in standard or enhanced mode. In standard mode the I/O addresses are compatible with the standard PC communication ports, COM1 ~ COM4. In enhanced mode you can select a different base address. The offset of each port from the base address is fixed. You can use M0 of DIP switch (SW1) to select standard or enhanced mode.

In the following sections, we will use the icons shown below to represent switches set for ON or OFF.

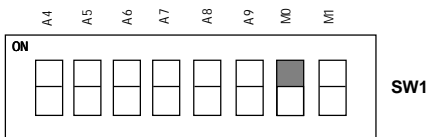


Switch is set ON.



Switch is set OFF.

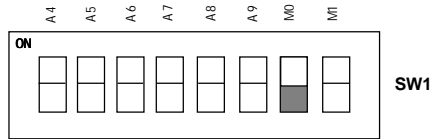
### Standard mode



In standard mode, the I/O address of the ports are as follows:

Port	I/O address	Interrupt No.
Port 1	3F8	Selectable
Port 2	2F8	Selectable
Port 3	3E8	Selectable
Port 4	2E8	Selectable

### Enhanced mode



In enhanced mode, you can select a different base address. The base address determines the address for each of the four ports.

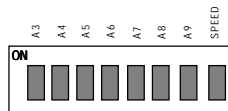
The I/O addresses for the four ports are as follows:

Port	I/O address
Port 1	Base + 00H
Port 2	Base + 08H
Port 3	Base + 10H
Port 4	Base + 18H

You use switches 1~7 of DIP switch SW2 to set the base address anywhere from hex 200 to 3F8.

To set the base address, you have to calculate the base address as follows: (switch ON is "0", switch OFF is "1").

Base address line	Decimal value	HEX value
A3	8	8
A4	16	10
A5	32	20
A6	64	40
A7	128	80
A8	256	100
A9	512	200



The following table shows different base address settings.

Port base address (SW2)							
Base Address	A3	A4	A5	A6	A7	A8	A9
200 - 207 (hex)	●	●	●	●	●	●	○
208 - 20F (hex)	○	●	●	●	●	●	○
*300 - 307 (hex)	●	●	●	●	●	○	○
3E8 - 3EF (hex)	○	●	○	○	○	○	○
3F8 - 3FF (hex)	○	○	○	○	○	○	○

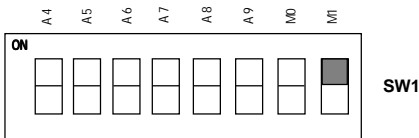
●: ON    ○: OFF    \*: Default

**Note:** If your CPU module or card has serial interface ports, you will need to adjust the I/O port addresses (or disable the ports) to avoid conflicts.

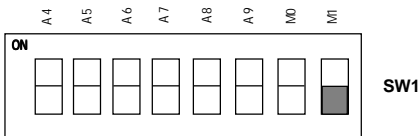
## Independent/Shared IRQ mode (M1, JP3, JP4, JP6, JP7)

The card's IRQ can be set using M1 of SW1. Please note that the DIP switch is for setting the mode as shown below.

### Shared IRQ Mode



### Independent IRQ Mode



### Independent IRQ (JP1-JP4)

In this mode, each of the four ports can have IRQ channels set individually. For each port, select an IRQ not in use by other devices in the system. The map of jumpers and ports is shown below.

Port 1 → JP3

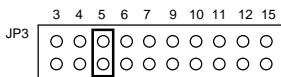
Port 2 → JP4

Port 3 → JP5

Port 4 → JP6

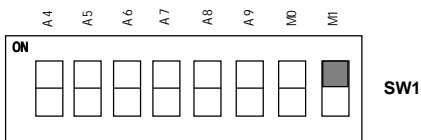
### Shared IRQ (JP3)

Select an IRQ which is not in use by another card in the system. If you are installing more than one PCM-3614, set them to different IRQ numbers. Jumper Bank JP3 controls the card IRQ. Please refer to the following figure for example.



### Interrupt Status Register Setup (SW1, Vector address)

The feature on the PCM-3614 is utilized in the shared IRQ mode. When data arrives at any one of the four ports, an interrupt will be generated in the interrupt register. The PC software can read this, and identify immediately which port generated the interrupt. This saves time and makes programming easier. When a data bit of the interrupt status register is set to 0, the corresponding channel is selected to generate an interrupt. If the bit is 1, then no interrupt is generated. The DIP switch, SW1, controls the card's interrupt status register, as shown in the following figure and table.

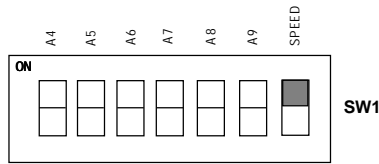


Interrupt Status Register SW1	
Bit	Function
0	Port 1
1	Port 2
2	Port 3
3	Port 4
4	Not Used
5	Not Used
6	Not Used
7	Not Used

The user may change the interrupt status address via SW1. Please note that the address decoder will occupy a continuous, 16-byte area, according to the switch setting. For example, if you set the switch to 210H, then the address 210H to 21FH will be decoded. The various DIP switch settings (SW1) for the interrupt status register are shown in the table below.

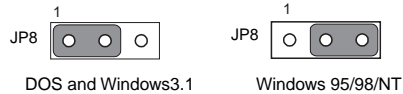
A4	A5	A6	A7	A8	A9	Interrupt Register
ON	ON	ON	ON	ON	ON	000H
OFF	ON	ON	ON	ON	ON	010H
ON	OFF	ON	ON	ON	ON	020H
OFF	OFF	ON	ON	ON	ON	030H
ON	ON	OFF	ON	ON	ON	040H
OFF	ON	OFF	ON	ON	ON	050H
ON	OFF	OFF	ON	ON	ON	060H
OFF	OFF	OFF	ON	ON	ON	070H
ON	ON	ON	OFF	ON	ON	080H
OFF	ON	ON	OFF	ON	ON	090H
ON	OFF	ON	OFF	ON	ON	0A0H
OFF	OFF	ON	OFF	ON	ON	0B0H
ON	ON	OFF	OFF	ON	ON	0C0H
OFF	ON	OFF	OFF	ON	ON	0D0H
ON	OFF	OFF	OFF	ON	ON	0E0H
OFF	OFF	OFF	OFF	ON	ON	0F0H
ON	ON	ON	ON	OFF	ON	100H
OFF	ON	ON	ON	OFF	ON	110H
ON	OFF	ON	ON	OFF	ON	120H
OFF	OFF	ON	ON	OFF	ON	130H
ON	ON	OFF	ON	OFF	ON	140H
OFF	ON	OFF	ON	OFF	ON	150H
ON	OFF	OFF	ON	OFF	ON	160H
OFF	OFF	OFF	ON	OFF	ON	170H
ON	ON	ON	OFF	OFF	ON	180H
OFF	ON	ON	OFF	OFF	ON	190H
ON	OFF	ON	OFF	OFF	ON	1A0H
OFF	OFF	ON	OFF	OFF	ON	1B0H
ON	ON	OFF	OFF	OFF	ON	1C0H
OFF	ON	OFF	OFF	OFF	ON	1D0H
ON	OFF	OFF	OFF	OFF	ON	1E0H
OFF	OFF	OFF	OFF	OFF	ON	1F0H

A4	A5	A6	A7	A8	A9	Interrupt Register
ON	ON	ON	ON	ON	OFF	200H
OFF	ON	ON	ON	ON	OFF	210H
ON	OFF	ON	ON	ON	OFF	220H
OFF	OFF	ON	ON	ON	OFF	230H
ON	ON	OFF	ON	ON	OFF	240H
OFF	ON	OFF	ON	ON	OFF	250H
ON	OFF	OFF	ON	ON	OFF	260H
OFF	OFF	OFF	ON	ON	OFF	270H
ON	ON	ON	OFF	ON	OFF	280H
OFF	ON	ON	OFF	ON	OFF	290H
ON	OFF	ON	OFF	ON	OFF	2A0H
OFF	OFF	ON	OFF	ON	OFF	2B0H
ON	ON	OFF	OFF	ON	OFF	2C0H
OFF	ON	OFF	OFF	ON	OFF	2D0H
ON	OFF	OFF	OFF	ON	OFF	2E0H
OFF	OFF	OFF	OFF	ON	OFF	2F0H
ON	ON	ON	ON	OFF	OFF	300H
OFF	ON	ON	ON	OFF	OFF	310H
ON	OFF	ON	ON	OFF	OFF	320H
OFF	OFF	ON	ON	OFF	OFF	330H
ON	ON	OFF	ON	OFF	OFF	340H
OFF	ON	OFF	ON	OFF	OFF	350H
ON	OFF	OFF	ON	OFF	OFF	360H
OFF	OFF	OFF	ON	OFF	OFF	370H
ON	ON	ON	ON	OFF	OFF	380H
OFF	ON	ON	OFF	OFF	OFF	390H
ON	OFF	ON	OFF	OFF	OFF	3A0H
OFF	OFF	ON	OFF	OFF	OFF	3B0H
ON	ON	OFF	OFF	OFF	OFF	3C0H
OFF	ON	OFF	OFF	OFF	OFF	3D0H
ON	OFF	OFF	OFF	OFF	OFF	3E0H
OFF	OFF	OFF	OFF	OFF	OFF	3F0H



## Operating Environment Selection

Set jumper 8 (JP8) to correspond with your desired software operating environment. Connect the left two pins of JP8 to operate in DOS or Windows 3.1 mode, as shown below. Connect the right two pins to operate in Windows 95/98/NT mode.



## Driver Installation for DOS Users

Make a duplicate copy of the driver diskette in case the original disk becomes lost or damaged. Copy the files to a subdirectory on your hard disk if you wish.

### Card setup

The PCM-3614's driver determines the configuration of the installed cards by reading a data file, GEN-DRV.CNF. When you first install the PCM-3614, and each time you change the card's address and IRQ, you will need to run the card setup program to save the settings to the configuration file. Program files should be installed to the hard disk. Insert the driver disk in your computer, type DOSINST from the prompt and press enter. Once the files have been installed, type SETUP from the \COMLIB\BIN prompt and press ENTER. After the screen shows up, move the cursor bar (using the arrow keys or the mouse) to the general serial board field and press ENTER. The screen shown below will appear.

When you finish setting up the ports, press the ESC key to return to the previous windows. Press F10 to save the new configuration or ESC to quit without saving. The setup program will then create a new configuration data file GEN-DRV.CNF.

It is a simple example program capable of sending and receiving data after each port is opened with selected communication parameters. As Windows 3.x features multitasking, multiple windows for the ports can appear simultaneously under TTY. However, Terminal, the application provided by Windows is limited for the use of COM1 to COM4.

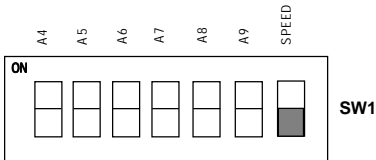
After completing the installation, restart Windows. And additional line "comm.drv = sercomm.drv", will appear for the PCM-3614 in the [boot] section of the Windows SYSTEM.INI file. In addition, a Windows group "PC-ComLIB Standard COMM Driver" will be generated for reconfiguration, driver removal, etc. At this point, you are ready to execute applications that support Windows COMM API calls.

## Speed Mode Selection

The PCM-3641 employs a unique speed option that allows the user to choose either normal speed mode (1x) or high speed mode (8x). This high speed mode is selected at SPEED of SW2.

### Normal Speed Mode

To select the baud rate commonly associated with COM ports, such as 2400, 4800, 9600...115.2 Kbps, place the switch as follows.



### High Speed Mode

To increase normal mode rates up to eight times, (e.g. if 115.2 Kbps is selected, the rate can be increased up to 921.6 Kbps), place the switches as follows.

# ICOM Utility Setup for Windows 95/98/ NT Environments

This section discusses the ICOM utility software package installation, configuration and upgrade/ removal procedure for the Windows 95/98 and NT environments.

## Utility Installation

Follow the installation procedure below to install the PCM-3614 under Windows 95/98/NT:

- 1.Run Setup.exe on the driver diskette.
- 2.Select "Advantech ICOM Utility" to install and configure the board, following the on-line instructions.
- 3.After the Advantech ICOM Utility configuration panel pops up, please refer to the software help file for more details.
- 4.Following completion of the installation, restart Windows 95.

## Following completion of installation, please restart your system as prompted.

Once the board and driver have been installed and the system restarts successfully, users can execute any ready-made applications, such as HyperTerminal to transmit/receive data, or Remote Access Service to provide dial-up networking capability.

## Configuration:

Enter the configuration program to install the device driver, or click the Taskbar [Start] button, then select the [Programs] menu, then the [Advantech Icom Utility] menu and then [Icom].

When the configuration panel pops up, click the [Add Board] button to add a board. Click the [Delete] button to remove a board.

Board Type: PCM-3614

Base COM: specifies the COM number of the first port. Subsequent ports are mapped to subsequent COM numbers. For instance, if the first port is mapped to COM10, then the second port is mapped to COM11 sequentially.

Base Address (200H~3F8H): Specifies the base address of the first port. Subsequent base addresses are mapped to subsequent COM numbers. For instance, if the first port is mapped to 300H, then the second port is mapped to 308H sequentially.

PCM-3614 series cards can be installed together in a single system as long as the system memory resources are sufficient and available in a system. Different boards should be assigned different IRQs.

Click the [Share IRQ Enable] button to set the share IRQ function.

Share IRQ: 3, 4, 5, 6, 7, 9, 10, 11, 12, 15

Vector Address: 200H ~ 3F0H

After you finish the installation, you can click [Exit] and restart your system. Unless the system is restarted, the latest configuration will not take effect.



## Quick Reference

### Jumper Setting

#### STANDARD/ENHANCED Mode

**M0** of **SW1** is used to set the Standard/enhanced mode of this card.

**M0: ON** (Upper) position → **STANDARD** mode

**M0: OFF** (Lower) position → **ENHANCED** mode

#### STANDARD Mode:

In this mode, the I/O addresses and IRQ level for each port are set to default as shown below (disable BIOS setting of on-board COM1 ~ COM4).

Port No.	I/O Address	COM Port No.	IRQ Level (*)	
			Independent IRQ	Shared IRQ
Port 1	3F8h	COM1	JP3	JP3
Port 2	2F8h	COM2	JP4	JP3
Port 3	3E8h	COM3	JP6	JP3
Port 4	2E8h	COM4	JP7	JP3

#### ENHANCED Mode:

In this mode, the I/O addresses and IRQ level for each port are set to default as shown below (make sure that the I/O address on BIOS setting of on-board COM1 ~ COM4 does not conflict with [Base Address] ~ [Base Address + 20h]).

Port No.	I/O Address	COM Port No.	IRQ Level (*)	
			Independent IRQ	Shared IRQ
Port 1	Base Address + 00h	COM1	JP3	JP3
Port 2	Base Address + 08h	COM2	JP4	JP3
Port 3	Base Address + 10h	COM3	JP6	JP3
Port 4	Base Address + 18h	COM4	JP7	JP3

• **IRQ Mode**

DIP 8 (M1) of SW2 is used to set the IRQ mode of this card.

**M1: ON** (Upper) position → **Shared IRQ** mode

**M1: OFF** (Lower) position → **Independent IRQ** mode

• **SPEED Mode**

**SPEED** of SW2 is used to decide the speed mode of this card.

**SPEED: ON** (Upper) position → High Speed Mode

**SPEED: OFF** (Lower) position → **Normal Speed Mode**

• **Operating System Mode**

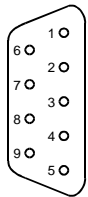
Connect the left two pins of **JP8** to use DOS, Windows 3.1

Connect the right two pins of **JP8** to use Windows 95/98/NT

**Signal Wiring**

**Connector pin assignments**

You access the PCM-3614's ports through four external male DB-9 connectors. RS-422/485 connector pin assignment is as follows :



**Pin description**

1	TX-(DATA-) or send data - (DTE)
2	TX+(DATA+) or send data + (DTE)
3	RX+ or received data + (DTE)
4	RX- or received data - (DTE)
5	ground
6	RTS- or clear to send -
7	RTS+ or clear to send +
8	CTS+ or clear to send
9	CTS- or clear to send

**RS-422/485 Configuration:**

JP9

CH	DATA-	TX-	TX+	1	2	RTS-
CH1	DATA+	TX-	TX+	3	4	RTS+
		RX+	RX-	5	6	CTS+
		RX-	RX+	7	8	CTS-
		GND	GND	9	10	NC
CH2	DATA-	TX-	TX+	11	12	RTS-
		RX+	RX-	13	14	RTS+
		RX-	RX+	15	16	CTS+
		GND	GND	17	18	CTS-
				19	20	NC
CH3	DATA-	TX-	TX+	21	22	RTS-
		RX+	RX-	23	24	RTS+
		RX-	RX+	25	26	CTS+
		GND	GND	27	28	CTS-
				29	30	NC
CH4	DATA-	TX-	TX+	31	32	RTS-
		RX+	RX-	33	34	RTS+
		RX-	RX+	35	36	CTS+
		GND	GND	37	38	CTS-
				39	40	NC

**Hardware Installation**

**Warning!** *TURN OFF your PC power supply whenever you install or remove the PCM-3614 or connect and disconnect cables.*

Installing the module on a CPU card

1. Turn the PC's power off. Turn the power off to any peripheral devices such as printers and monitors.
2. Disconnect the power cord and any other cables from the back of the computer.
3. Remove the system unit cover (see the user's guide for your chassis if necessary).
4. Remove the CPU card from the chassis (if necessary) to gain access to the card's PC/104 connector.
5. Screw the brass spacer (included with the module) into the threaded hole on the CPU card. Do not tighten too much, or the threads may be damaged.
6. Carefully align the pins of the PCM-3614 with the PC/104 connector. Slide the module into the connector. The module pins may not slide all the way into the connector; do not push too hard or the module may be damaged.
7. Secure the module to the CPU card to the threaded hole in the CPU card using the included screw.