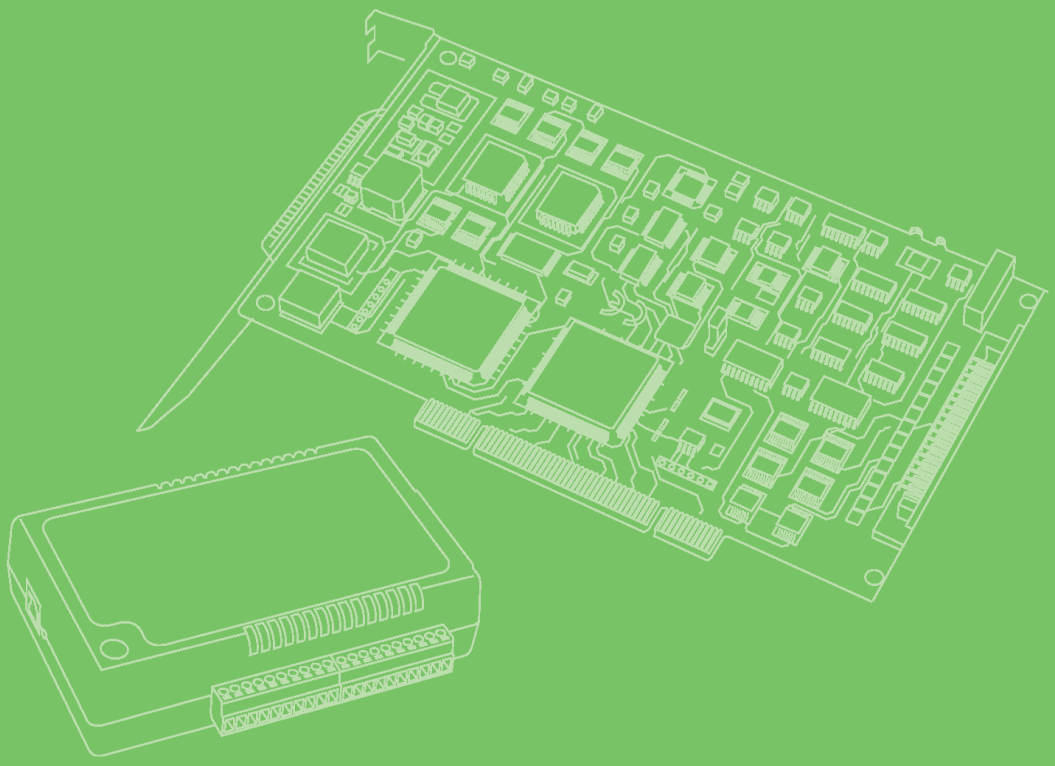

User Manual

PCM-3618

8-port RS-422/485 High-Speed Module

ADVANTECH
eAutomation

Copyright

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Product Warranty (2 years)

Advantech warrants to you, the original purchaser, that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products which have been repaired or altered by persons other than repair personnel authorized by Advantech, or which have been subject to misuse, abuse, accident or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most of our customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced at no charge during the warranty period. For out-of-warranty repairs, you will be billed according to the cost of replacement materials, service time and freight. Please consult your dealer for more details.

If you think you have a defective product, follow these steps:

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages you get when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain an RMA (return merchandize authorization) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a fully-completed Repair and Replacement Order Card and a photocopy proof of purchase date (such as your sales receipt) in a shippable container. A product returned without proof of the purchase date is not eligible for warranty service.
5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

Part no. 2000361801 Edition 2

Printed in Taiwan April 2009

Declaration of Conformity

CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from Advantech. Please contact your local supplier for ordering information.

CE

This product has passed the CE test for environmental specifications. Test conditions for passing included the equipment being operated within an industrial enclosure. In order to protect the product from being damaged by ESD (Electrostatic Discharge) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

FCC Class B

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Technical Support and Assistance

1. Visit the Advantech web site at www.advantech.com/support where you can find the latest information about the product.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before you call:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions and Notes

Warning! *Warnings indicate conditions, which if not observed, can cause personal injury!*

Caution! *Cautions are included to help you avoid damaging hardware or losing data. e.g.*

There is a danger of a new battery exploding if it is incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.

Document Feedback

To assist us in making improvements to this manual, we would welcome comments and constructive criticism. Please send all such - in writing to: support@advantech.com

Safety Instructions

1. Read these safety instructions carefully.
2. Keep this User Manual for later reference.
3. Disconnect this equipment from any AC outlet before cleaning. Use a damp cloth. Do not use liquid or spray detergents for cleaning.
4. For plug-in equipment, the power outlet socket must be located near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. DO NOT COVER THE OPENINGS.
8. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
9. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.
12. Never pour any liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If one of the following situations arises, get the equipment checked by service personnel:
15. The power cord or plug is damaged.
16. Liquid has penetrated into the equipment.
17. The equipment has been exposed to moisture.

18. The equipment does not work well, or you cannot get it to work according to the user's manual.
19. The equipment has been dropped and damaged.
20. The equipment has obvious signs of breakage.
21. DO NOT LEAVE THIS EQUIPMENT IN AN ENVIRONMENT WHERE THE STORAGE TEMPERATURE MAY GO BELOW -20° C (-4° F) OR ABOVE 60° C (140° F). THIS COULD DAMAGE THE EQUIPMENT. THE EQUIPMENT SHOULD BE IN A CONTROLLED ENVIRONMENT.
22. CAUTION: DANGER OF EXPLOSION IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER, DISCARD USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.
23. The sound pressure level at the operator's position according to IEC 704-1:1982 is no more than 70 dB (A).

Safety Precaution - Static Electricity

DISCLAIMER: This set of instructions is given according to IEC 704-1. Advantech disclaims all responsibility for the accuracy of any statements contained herein.Safety Precaution - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from your PC chassis before you work on it. Don't touch any components on the CPU card or other cards while the PC is on.
- Disconnect power before making any configuration changes. The sudden rush of power as you connect a jumper or install a card may damage sensitive electronic components.

Contents

Chapter 1

Overview

1.1 Introduction

The PCM-3618 is a PC/104-compatible module with eight individually configurable RS-422/485 ports. It works with PC/104 CPU modules to extend additional RS-2422/485 ports. The PCM-3618 also features lots of functions such as high transmission speed of 921.6 kbps, 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-3618 especially suitable for multitasking environments.

The PCM-3618 comes with 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 con-figuration utility provides self-diagnostics and performance analysis function for easy troubleshooting and debugging.

The PCM-3618 provides versatile function settings to meet users needs. These function settings include Shared IRQ mode setting and Speed mode setting. In Shared IRQ set-ting, all of the eight ports of interrupt can be specified to one. This solves problems of IRQ insufficiency within the embed-ded system. In Speed setting, the PCM-3618 allows trans-mission rate up to 921.6 kbps. It improves the performance of the system.

1.2 Features

- Eight shared 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/MEP.S. Windows 2000/XP/CE driver will soon be available on our Web site
- Built-in termination resistors
- LED indicators: TX, RX

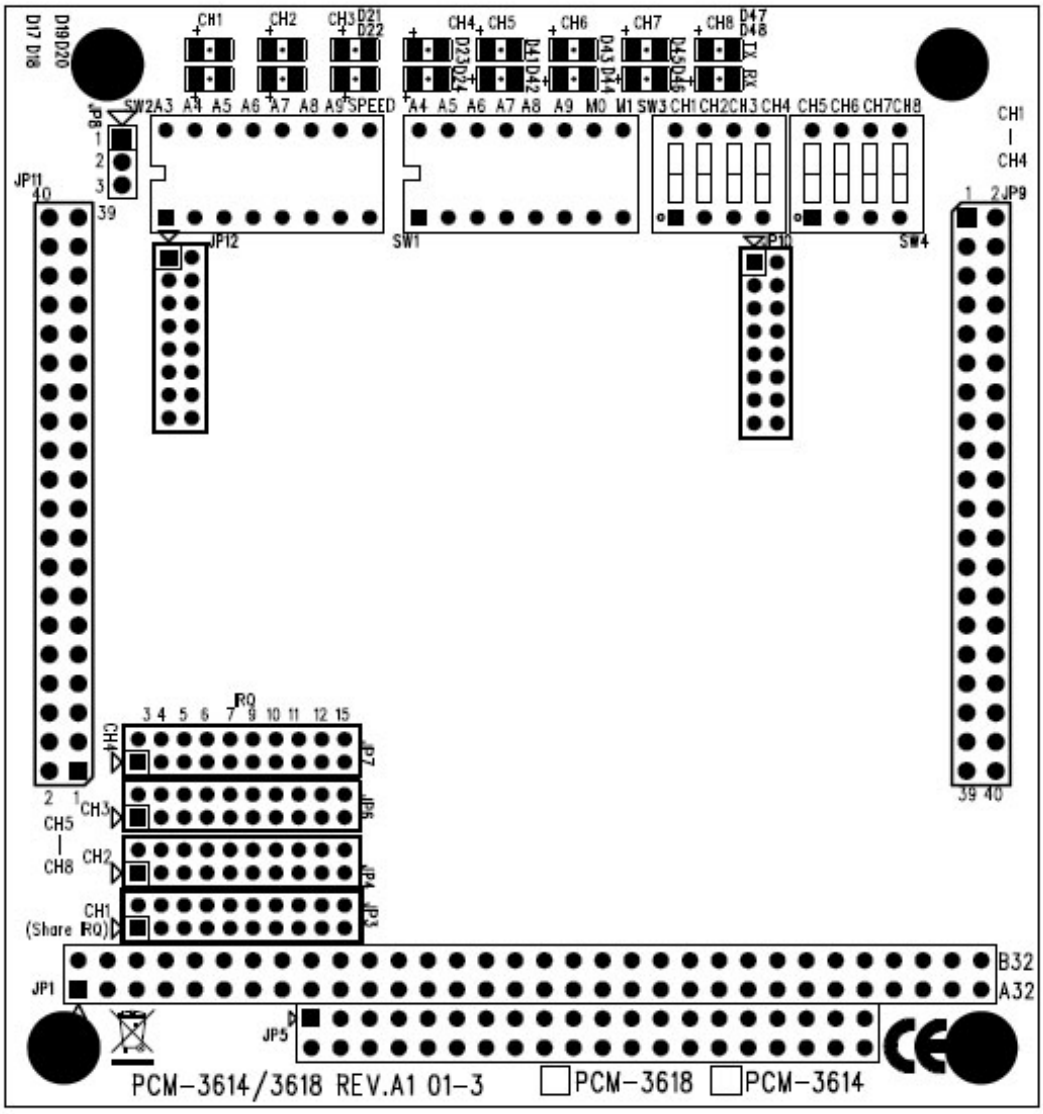
1.3 Specifications

- Bus interface: PC/104 (ISA)
- Number of ports: 8
- I/O address: 0x000 ~ 0x3F8
- UART: 8 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 ~ 921.6 K
- Connectors: Eight DB-9 male
- Signal support: TxD+, TxD-, RxD-, CTS+, CTS-,RTS+ and RTS-
- Surge protection: 1000 VDC
- 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

1.4 Initial Inspection

We carefully inspected the PCM-3618 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 change 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.

1.5 Board Layout



1.6 Card Configuration

Each port on the PCM-3618 card requires configuration prior to use. The DIP switches set the port to the appropriate I/O address (SW2) and different modes (SW1). The jumpers set the port's IRQ.

1.7 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.

Table 1.1: PCM-3618 Default Configuration

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

Chapter 2

Jumper and Switch Settings

2.1 Jumper and Switch Settings

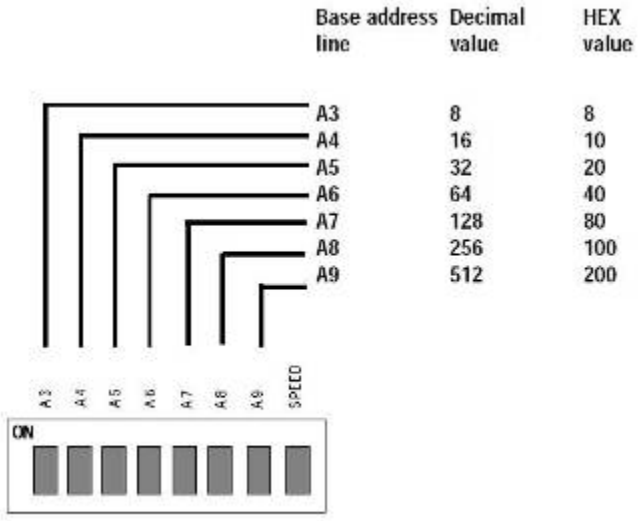
The PCM-3618 supports ENHANCED mode and SHAREDIRQ functionality. It can fully meet your application needs for high speed and multiple ports. The detail of specific settings are described as follows:

Enhanced Mode (M0)

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

The I/O address for the four ports are as follows:	
Port	I/O address
Port1	Base+00H
Port2	Base+08H
Port3	Base+10H
Port4	Base+18H
Port5	Base+20H
Port6	Base+28H
Port7	Base+30H
Port8	Base+38H

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".)



Port Base address (SW2)							
Base Address	A3	A4	A5	A6	A7	A8	A9
200-207	X	X	X	X	X	X	O
208-20F	O	X	X	X	X	X	O
*300-307	X	X	X	X	X	O	O
3E8-3EF	O	X	O	O	O	O	O
3F8-3FF	O	O	O	O	O	O	O
	X:ON	O: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.*

SW3				SW4			
CH1	CH2	CH3	CH4	CH5	CH6	CH7	CH8
ON	ON	ON	ON	ON	ON	ON	ON
Auto	Auto	Auto	Auto	Auto	Auto	Auto	Auto

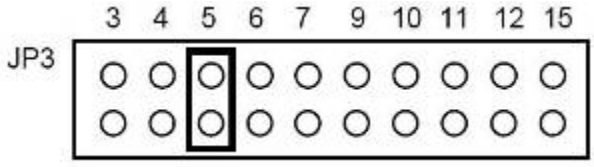
ON: always high or low status for RS-422 mode(RS-422 Master)

OFF(Auto): automatically sense direction of data flow for RS-485(RS-422 Slave)

Shared IRQ Selection (JP3)

Select an IRQ which is not in use by another card in the system. If you are installing more than one PCM-3618, set them to different IRQ numbers. Jumper Bank JP3 controls the card IRQ. Simply place jumper on desired pin head.

Independent IRQ Mode



Interrupt Status Register Setup (SW1, Vector Address)

This feature on the PCM-3618 is utilized in the shared IRQ. When data arrives at one of the eight 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. DIP switch SW1controls the card's interrupt status register, as shown in the following table.

Table 2.1: Interrupt Status Register SW1	
Bit	Function
0	Port1
1	Port2
2	Port3
3	Port4
4	Port5
5	Port6
6	Port7
7	Port8

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

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	110H
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

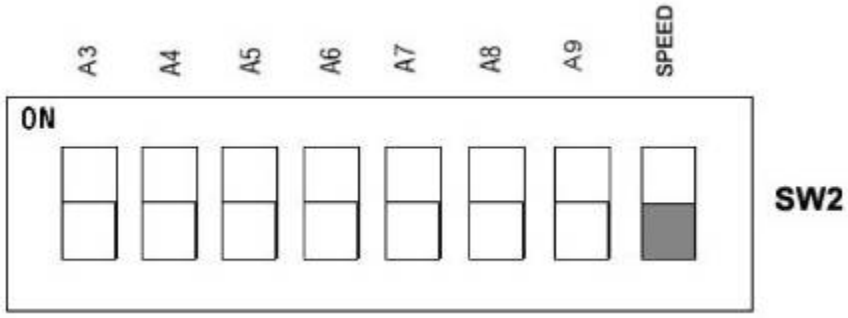
OFF	ON	ON	OFF	OFF	ON	190H
ON	OFF	ON	OFF	OFF	ON	1A0H
OFF	OFF	ON	OFF	OFF	ON	1B0H
ON	ON	OFF	OFF	OFF	ON	1C0H
OFF	ON	OFF	OFF	OFF	ON	1D0H
ON	OFF	OFF	OFF	OFF	ON	1E0H
OFF	OFF	OFF	OFF	OFF	ON	1F0H
ON	ON	ON	ON	ON	OFF	200H
OFF	ON	ON	ON	ON	OFF	210H
ON	OFF	ON	ON	ON	OFF	220H
OFF	OFF	ON	ON	ON	OFF	230H
ON	ON	OFF	ON	ON	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	OFF	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

Speed Selection

The PCM-3618 employs a unique speed option that allows the user to choose either normal speed mode (1x) or high speed mode (8x). Speed mode is selectable at SPEED ofSW2.

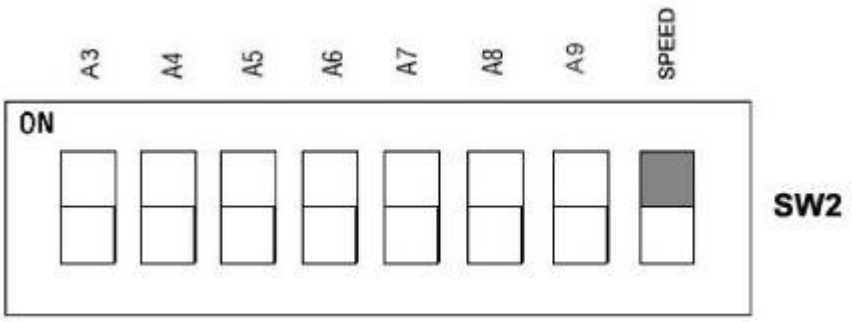
Normal Speed

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



High Speed

To increase up to eight times of the transmission rate in nor-mal mode, (e.g. if 115.2Kbps is selected, the rate can be in-creased up to 921.6 Kbps), place the switch as follows.

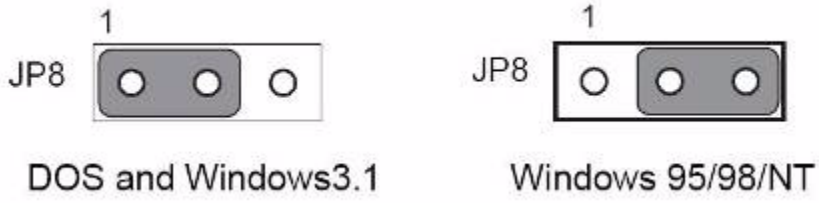


Chapter 3

Software & Drivers

3.1 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.



DOS and Windows3.1 Windows 95/98/NT

3.1.1 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 sub directory on your hard disk if you wish.

3.2 Card Setup

The PCM-3618's driver determines the configuration of the installed cards by reading a data file, GEN-DRV.CNF. When you first install the PCM-3618, 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 HDD. Insert the driver disk in your computer, type DOSINST from the A: (or B:)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. 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.

Its 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 to COM1~COM4.

After completing the installation, restart Windows. And additional line "comm.drv = sercomm.drv", will appear for the PCM-3618 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.

3.2.1 ICOM Utility Setup for Windows 95/98/NT

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-3618 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 Windows95.

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

Once the board and driver have been installed and the sys-tem 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.

3.3 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 aboard.

Board Type: PCM-3618

Base COM: specifies the COM number of the first port. Sub-sequent 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 308Hsequentially.

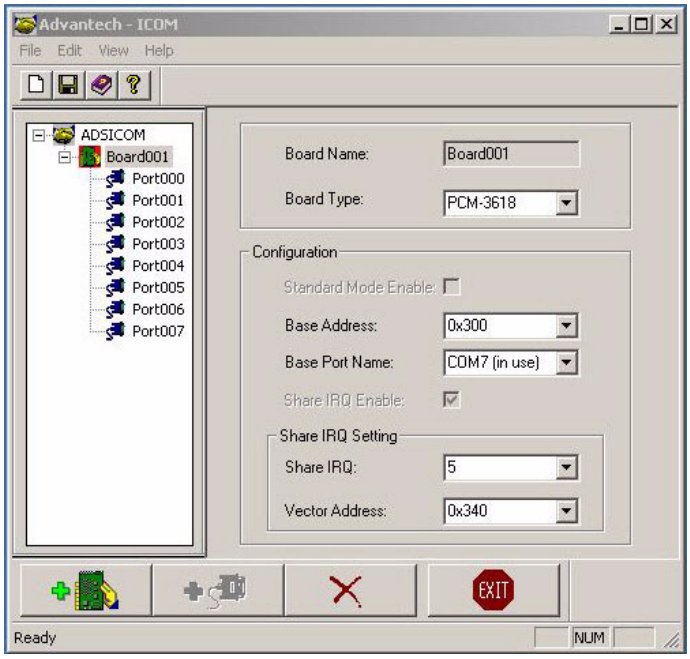
PCM-3618 series cards can be installed together in a single system as long as the system memory resources are sufficient and available in a system. Different boards should be assigned different IRQs.

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 con-figuration will not take effect.



3.4 Jumper Setting

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(*) Shared IRQ
Port 1	Base Address+00H	COM1	JP3
Port 2	Base Address+08H	COM2	JP3
Port 3	Base Address+10H	COM3	JP3
Port 4	Base Address+18H	COM4	JP3
Port 5	Base Address+20H	COM5	JP3
Port 6	Base Address+28H	COM6	JP3
Port 7	Base Address+30H	COM7	JP3
Port 8	Base Address+38H	COM8	JP3

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

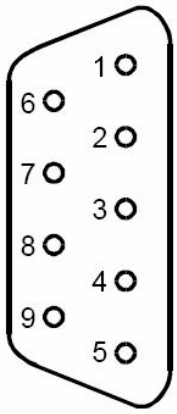
Connect the left two pins of JP8 to use DOS, Windows 3.1

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

3.5 Signal Wiring

Connector Pin Assignments

You access the PCM-3618's ports through four external maleDB-9 connectors. RS-422/485 connector pin assignment is as follows :



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

Chapter 4

Hardware Installation

4.1 Hardware Installation

Warning! *TURN OFF your PC power supply whenever you install or remove thePCM-3618 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-3618 with the PC/104connector. 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.

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