CHAPTER 1
INTRODUCTION

The PCCOM PCI bus 4 port with isolator adapter is a 32 bits PCI bus board with Plug and Play (PnP) features, it provides four asynchronous serial communication ports (RS232 or RS422/RS485), which link the computer and serial peripheral devices such as terminals, modems, serial printers, plotters, ... etc. The on board isolator can isolate voltage up to 2500V r.m.s..

The PCCOM PCI bus 4 port adapter is particularly suited to facilitate the connection of terminals (VDUs) in multi-user operating systems. The PCCOM board may be installed in any Pentium or hardware compatible systems. The PnP features let hardware configuration for IRQ and I/O address is detected by BIOS automatically, you don't need set switch and jumper.

Since most of the computer has its own COM1 and COM2, the PCCOM PCI bus 4 port adapter can be configured from COM4.

On board ST16C554 chip provides four 16550 functions which contains 16 bytes FIFO buffer for each 16550 ports. There are two kinds of mode can be choose, one is normal speed mode that its baud rate up to 115200, another is high speed mode that its baud rate up to 460K.

The features of the PCCOM PCI bus 4 port adapter are:

- 32 bit PCI bus with Plug and Play (PnP) features.
- Four RS232 ports or RS422/RS485 ports for asynchronous communications.
- Provides isolator function, which can isolate voltage up to 2500V r.m.s..
- Suitable for SCO UNIX, Linux, MS/DOS, WINDOWS NT/2000, WINDOWS 95/98/ME, OS/2... etc.
- Pentium hardware compatibles.
- Baud rate up to 115200 for normal speed mode and up to 460K for high-speed mode.
- Provides 16550 port that contains 16 bytes FIFO for each port.
- Up to 4 boards be installed in one computer system.
- Software compatible with PCCOM98/2000.
- Operating temperature 0 to 60 ºC.
- Storage temperature -20 to 70 degree °C.
- Humidity 5% to 95% in non-condensing.

CHAPTER 2

UNPACKING INFORMATION

Check that your PCCOM package includes the following items:

- PCCOM PCI bus 4 port adapter, select one of the follows:
  1. RS232 board.
  2. RS422/RS485 board.
- Expansion cable with standard 25 pin connectors or 9 pin connectors.
- User manual.
- Decision Studio CD for PCCOM software.
- Warranty form.

CHAPTER 3

SYSTEM REQUIREMENTS

Before installing your PCCOM PCI bus 4 port adapter, make sure that:

- The host computer is a Pentium or its compatibles.
- The switch and the jumpers are properly configured.
- The operating system you intend to use is capable of driving multiple serial ports.

CHAPTER 4

HARDWARE INSTALLATION

Your PCCOM PCI bus 4 port adapter is designed to be inserted in any available PCI slot in your Pentium or compatibles. You must plug this board to your computer before installing PCCOM software. In order to gain access to the expansion slots, follow the steps listed below:

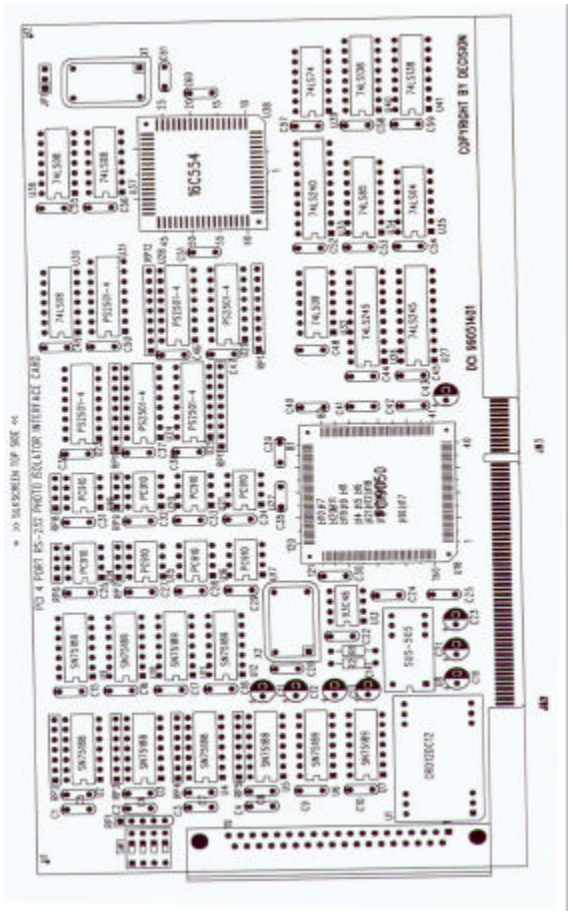
1. Turn off all power to your computer and all peripheral devices before installing your PCCOM PCI bus 4 port adapter.
2. Remove the cover of the computer.
3. Insert the PCCOM PCI bus 4 port adapter into any available PCI slot. Make sure the adapter is firmly seated in the chosen slot.
4. Replace the cover of the computer.
5. Connect cables to D25 or DB9 connectors as required.
6. Turn on the power of your computer.

CHAPTER 5

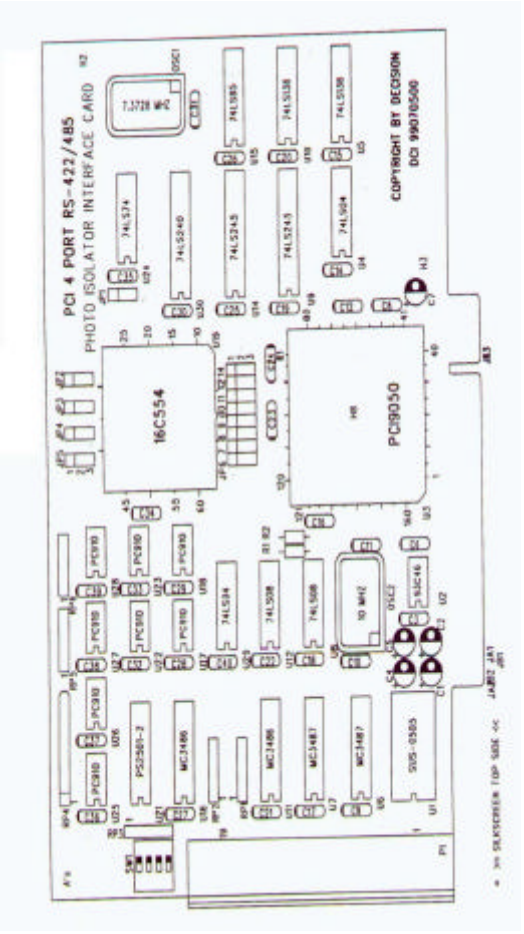
SWITCH AND JUMPER SETTING

The Plug and Play features let hardware configuration for IRQ and I/O address is detected by BIOS automatically, so that it need not switch and jumper setting. However if you need change RS422 or RS485 mode, you need set the jumpers, the on board switch also can be used to identify card number by the users (if you do not set the switch, the PnP BIOS will assign card number automatically).

DECISION Computer International Ltd.,



DECISION Computer International Ltd.,



JP1 (Jumper 1)
Select high speed mode or normal speed mode.

SW1 (Switch 1)
Identifies card number.

1. Select High Speed or Normal Speed Mode

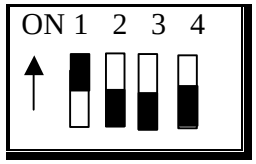
JP1

1
2
3

The JP1 is used to select high-speed mode or normal speed mode, the clock is 7.3728MHZ for high-speed mode, and 1.8432MHZ for normal speed mode. For high-speed mode, the baud rate speed up to 460K.

Pin	Mode
Short 1,2	Normal Speed
Short 2,3	High Speed

2. Card Identifier



The switch is used to identify card number, default setting is card 1. There are two methods to set the card number:

a. PnP mode
Just plug in PCCOM PCI bus 4 port adapter into PCI slot, the PCI BIOS will allocate I/O address to each adapter automatically and assign card number start from 0 to each adapter. However, if you plug in more than one adapter, please set whole adapters to card number 1 (default setting), then use software tools to distinguish port id.

b. manual mode
Set card number by card identifier switch, the PCI BIOS will assign pre-allocated I/O address to each adapter. Please set different card number to each adapter (do not duplicate card number setting).

1	2	3	4	Card Number
ON	OFF	OFF	OFF	1
OFF	ON	OFF	OFF	2
ON	ON	OFF	OFF	3
OFF	OFF	ON	OFF	4

☞ The card number starts from 0 to 15.

CHAPTER 6

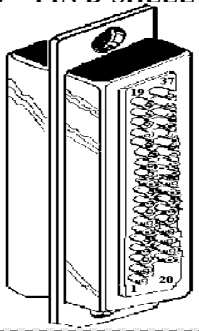
RS232 CABLING INFORMATION

6.1 DB25 Connector

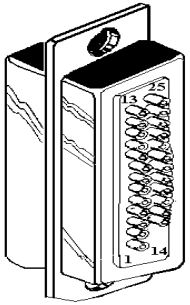
The communication interface follows the EIA RS232 standard. The signal assignments for a standard DB25 connector are shown below:

Pin #	DB25 Signal Name	RS-232C Name	Signal Direction
1	Chassis Ground(GND)	AA	Common
2	Transmit Data(TxD)	BA	Output
3	Receive Data(RxD)	BB	Input
4	Request to Send(RTS)	CA	Output
5	Clear to Send(CTS)	CB	Input
6	Data Set Ready(DSR)	CC	Input
7	Signal Ground(SG)	AB	Common
8	Data Carrier Detect(DCD)	CF	Input
20	Data Terminal Ready(DTR)	CD	Input
22	Ring Indicator(RI)	CE	Output

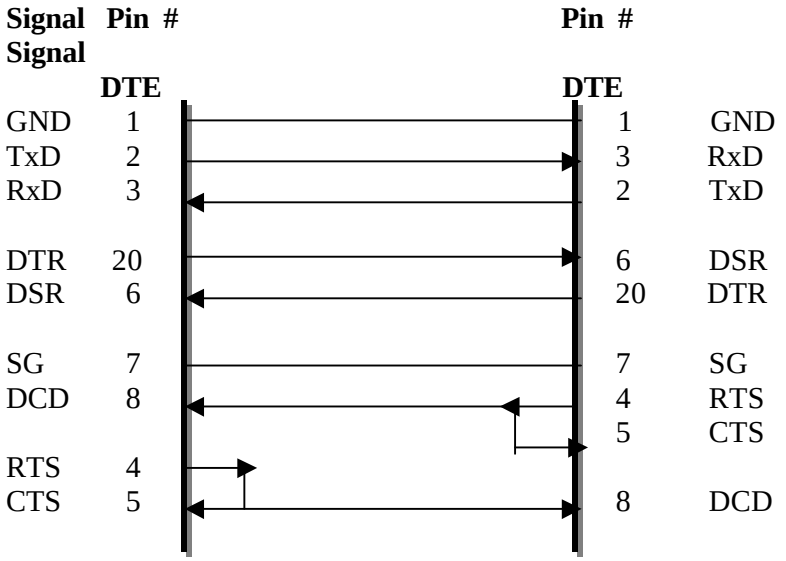
37 – PIN D-SHELL



25 – PIN D-SHELL



To connect the PCCOM 4 port adapter to other DATA TERMINAL EQUIPMENT (DTE) devices, we recommend using a DTE to DTE connection as shown below:



6.2 Null Modem Connections: RS232

If the software supplier or operating system does not specify a particular cable configuration, we recommend you use the following "null modem" cable when XON/XOFF is utilized.

HOST	REMOTE
2	3
3	2
4	4
5	5
6	6
7	7
8	8
20	20

If hardware handshaking is necessary, use the following cable:

HOST	REMOTE
2	3
3	2
4	4
5	5
6	20
7	7
8	8
20	6

Some serial devices have the buffer control signal on pin 19, in which case pin 6 on the host is connected to pin 19 on the remote device.

6.3 Modem Connections

A straight through cable is required, e.g. pin 2 to pin 2, pin 3 to pin 3, etc.

HOST	REMOTE
2	2
3	3
4	4
5	5
6	6
7	7
8	8
20	20

6.4 DB9 Connector

The signal assignments for a standard DB9 connector are shown below:

DB9 Pin #	Signal Name	RS-232C Name	Signal Direction
1	Data Carrier Detect(DCD)	CF	Input
2	Receive Data(RxD)	BB	Input
3	Transmit Data(TxD)	BA	Output
4	Data Terminal Ready(DTR)	CD	Output
5	Signal Ground(SG)	AB	Common
6	Data Set Ready(DSR)	CC	Input
7	Request to Send(RTS)	CA	Output
8	Clear to Send(CTS)	CB	Input
9	Ring Indicator(RI)	CE	Input

CHAPTER 7

RS422/RS485 CABLING INFORMATION

7.1 RS422 Cabling Information for DB25

The communication interface follows the EIA RS422 standard. The signal assignments for a standard DB25 connector are shown below:

DB25 Pin #	Signal Name	RS-232C Name	Signal Direction
1	Chassis Ground	GND	Common
2	Transmit Data+(TxD+)	TX+	Output
3	Receive Data+(RxD+)	RX+	Input
6	Receive Data-(RxD-)	RX-	Input
7	Signal Ground(SG)	SG	Common
20	Transmit Data-(TxD-)	TX-	Output

To connect the RS422 to other DATA TERMINAL EQUIPMENT (DTE) devices, the developers recommend using a DTE to DTE connection as shown below.

HOST	REMOTE
Ground	Ground
Signal Ground	Signal Ground
Transmit Data(+)	Receive Data(+)
Receive Data(+)	Transmit Data(+)
Transmit Data(-)	Receive Data(-)
Receive Data(-)	Transmit Data(-)

7.2 RS422 Cabling Information for DB9

The communication interface follows the EIA RS422 standard. The signal assignments for a standard DB9 connector are shown below:

Pin #	Signal Name	Name	Signal Direction
2	Receive Data+	RxD+	Input
3	Transmit Data+	TxD+	Output
4	Transmit Data-	TxD-	Output
5	Signal Ground	SG	Common
6	Receive Data-	RxD-	Input

7.3 RS485 Cabling Information for DB25

The RS485 signal assignment is shown as follows.

Pin #	Signal Name	Name	Signal Direction
1	Chassis Ground	GND	Common
2	Transmit Data+	TxD+	Output
3	Receive Data+	RxD+	Input
6	Receive Data-	RxD-	Input
7	Signal Ground	SG	Common
20	Transmit Data-	TxD-	Output

The RS485 communication is based on cable sharing method, which is connected as following:

Computer at site 1	Computer at site 2
TRD+	TRD+
TRD–	TRD–
Ground	Ground

Where TRD+ means short pin 2 and pin 3 at connector side, and TRD- means short pin 6 and pin 20 at connector side. You must short both pins by yourself.

7.4 RS485 Cabling Information for DB9

The RS485 signal assignment is shown as follows.

Pin #	Signal Name	Name	Signal Direction
2	Receive Data+	RxD+	Input
3	Transmit Data+	TxD+	Output
4	Transmit Data-	TxD-	Output
5	Signal Ground	GND	Common
6	Receive Data-	RxD-	Input

Where TRD+ means short pin 2 and pin 3 at connector side, and TRD- means short pin 4 and pin 6 at connector side. You must short both pins by yourself.

APPENDIX A

PC COM DIAGNOSTIC UNDER MS/DOS

The TESTCOM a diagnostic program, provide routines to test your PCCOM PCI 4 port serial adapter under MS-DOS. It has both internal and external loopback tests. During external loopback test a loop back plug must be connected to each port being tested. You can also select different hardware settings during testing from the SETUP RS232 menu.

- To test your PCCOM 4 port adapter under MS/DOS, please type

A>TESTCOM

(A> means system prompt)

The TestCom menu will appear.

Setup RS232 – is used to setup the baud rate, flow control, etc.
Internal loop test – is used to test the IC.
External loop test – is used to test the ports.
Auto – is used to test the IC and the ports of the card.

APPENDIX B

PC COM DEVICE DRIVER FOR MS/DOS

B.1 PCCOM Software

The PCCOM V4.0 is a high performance MS/DOS device driver for PC/XT, PC/AT, PC/386, PC/486, Pentium or compatibles. Under MS/DOS environment, you can set up your serial ports by PCCOM device driver. The setup procedure provides flexible functions to specify the configuration of multi-serial card, that is, for PCCOM ISA cards, the hardware configurations likes I/O port number, I/O port address, interrupt and interrupt vector are user selectable.

After the device driver is installed, It takes over communication between CPU and multi-serial cards such as four port card, eight port card, ... etc. For each I/O port, the service routine handles a ring buffer to keep track of all I/O data. Moreover, the PCCOM software provides library routines (C, PASCAL, BASIC, FoxPro) and DOS communication interface (DOS device driver, BIOS call) for several access levels.

The PCCOM V4.0 is an upgrade version of PCCOM V3.0 software. It can handle both PCCOM ISA and PCCOM PCI series cards. Each serial port may contain either 8250, 16450, 16550, or 16650 chip that can be automatically detected by the driver. The available baud rates are 600, 1200, 2400, 4800, 9600, 38400, 5600 and 115200 bps for normal speed. While for high speed, the available baud rates are 600, 1200, 9600, 38400, 56000, 115200, 230400 and 460800 bps.

📖 ***For more details, please refer PCCOMV2 manual.***

B.2 Software Installation

When the board is installed, please install software drivers as follows:

STEP 1: Prepare PCI.OPT file

The PCI.OPT file contents are :

```
/B:4
/D:COM3
/P:[:4:(2k:9600:N-8-1:RTS+DTR:XON) * 4]
```

STEP 2: Prepare CONFIG.SYS file

Insert statement into CONFIG.SYS file

For normal speed

```
DEVICE = PCCOM.SYS @c:\pci.opt
```

For high speed

```
DEVICE = PCCOMH.SYS @c:\pci.opt
```

The syntax of PnP function is

```
/P:[Card_id:Portno:Port]
```

The Card_id field is defined as 1 or 2 or 3 or 4 or nil, if you use PnP mode, just fill nil in card_id field that like step 1, otherwise you can specify card_id to match the card identifier switch. The Portno field is used to specify number of ports in this adapter. The Port field is defined as PCCOM V2.0.

☞ If more than one PCCOM board is installed, Please repeat directive /P of the step 1.

APPENDIX C
UNIX CONFIGURATION

The distribution disk contains SCO UNIX driver. Our drivers also provide transparent printer features that let user to connect local printer from auxiliary port of terminal. The PCI BIOS will assign card number automatically when you use PnP method, otherwise you can use card identifier switch to set your card number. The software installation procedures are shown is the bellows.

C.1 Hardware Configuration

1. First adapter

Port	Device Name	MODEM Name	Transparent Printer Name
1	/dev/ttyj11	/dev/ttyJ11	/dev/lpj11
2	/dev/ttyj12	/dev/ttyJ12	/dev/lpj12
3	/dev/ttyj13	/dev/ttyJ13	/dev/lpj13
4	/dev/ttyj14	/dev/ttyJ14	/dev/lpj14

2. Second Adapter

Port	Device Name	MODEM Name	Transparent Printer Name
1	/dev/ttyj21	/dev/ttyJ21	/dev/lpj21
2	/dev/ttyj22	/dev/ttyJ22	/dev/lpj22
3	/dev/ttyj23	/dev/ttyJ23	/dev/lpj23
4	/dev/ttyj24	/dev/ttyJ24	/dev/lpj24

3. Third Adapter

Port	Device Name	MODEM Name	Transparent Printer Name
1	/dev/ttyj31	/dev/ttyJ31	/dev/lpj31
2	/dev/ttyj32	/dev/ttyJ32	/dev/lpj32
3	/dev/ttyj33	/dev/ttyJ33	/dev/lpj33
4	/dev/ttyj34	/dev/ttyJ34	/dev/lpj34

4. Fourth Adapter

Port	Device Name	MODEM Name	Transparent Printer Name
1	/dev/ttyj41	/dev/ttyJ41	/dev/lpj41
2	/dev/ttyj42	/dev/ttyJ42	/dev/lpj42
3	/dev/ttyj43	/dev/ttyJ43	/dev/lpj43
4	/dev/ttyj44	/dev/ttyJ44	/dev/lpj44

C.2 Software Installation

The installation procedure for the device drivers is described as follows:

❶ Login as a root user.

❷ Insert distribution diskette (which contains device drivers) into floppy disk drive A:, then copy the files from the distribution diskette to a temporary directory.

```
#cd /
# doscp a:dc.tz ./dc.tar.Z
```



```
# zcat dc.tar / tar xvfp -
```

❸ To install device drivers, please type:

```
#cd /usr/sys/pccom/dc
# ./install
```

❹ Reboot the system. Now, your new UNIX system that includes device drivers is activated.

❺ Enable each terminal by using the **enable** command.

```
# enable  ttyj11
# enable  ttyj12
          .
          .
```

❻ Connect each terminal to connector.

NOTE:

❶ If the new system fails to reboot, please boot the original system. When system is boot, please press return key to halt autoboot, then type

```
:unix.old
```

❷ To remove device driver from UNIX, please type

```
a. login as a root user
b. # cd /usr/sys/pccom/dc
c. Remove PCCOM Driver from the kernel
   #./ remove
```

❸ After installation, please enable each port by **enable** command and disable port by **disable** command.

```
#disable ttyj11
```

❹ To change baud rate, please update /etc/inittab and /etc/conf/cf.d/init.base files.

C.3 Option for High Speed

The configuration of High-Speed Baud Rate card is change as follows:

Original	Extensible
50	14.4 K
75	28.8 K
110	57.6 K
134	76.8 K
150	115.2 K
200	153.6 K
300	230.4 K
600	460.8 K
1200	1200 (unchanged)
2400	2400 (unchanged)
4800	4800 (unchanged)
9600	9600 (unchanged)
EXTA	19200 (unchanged)
EXTB	38400 (unchanged)

C.4 Transparent Printer

The default device names to Transparent Printer(TP) are /dev/lpXYY, that is, the prefix name is changed from "tty" to "lp" but the other "XYY" is the same. e.g. under default device names, the corresponding TTY line of /dev/lpj11 is /dev/ttyj11.

By multiplexing a serial line, there are two sorts of data channels for TTY data(by /dev/ttyXYY) and TP data(by /dev/lpXYY). If the /dev/ttyj11 is used for a TTY, it has to be enabled before you would like to print data through /dev/lpj11 to a printer that connected to the terminal that is operated via /dev/ttyj11.

The channel for TP data that is uni-directional is used to transmit the data from a host to a terminal only. The differentiates of TTY data and TP data in the same serial line is that TP data are encapsulated within a couple of PRINT-ON and PRINT-OFF escape strings that are recognized by connected terminals. The PRINT-ON and PRINT-OFF is defined by connected terminals.

The scheme to multiplex a serial line for these two channels is based on time-division method. The time slices for TTY or TP data are generated according to the entry procedure, polling, in the PCCOM driver, which is periodically called by system clock. The period of system clocks is different among various operating systems, e.g. most UNIXs is 100hz, but SCO Xenix is 50hz.

The interval reserved for TTY or TP channel in the same serial line is important to output TP data to a low-speed printer

through high-throughput line from PCCOM cards if there is no flow control XON/XOFF to the serial line.

The lpx command is used to adjust the time interval for TTY or TP data and the TP protocol.

```
lpx [option] device name
```

- **option:**

```
-t number: set interval for TTY
-l number: set interval for Transparent Printer
-n string: set esc string to turn on printer
-f string: set esc string to turn off printer
-T : get interval for TTY
-L : get interval for Transparent Printer
-N : get esc_string to turn on printer
-F : get esc_string to turn off printer
```

- **device_name : lpXYY**

The range of interval reserved for TTY or TP channel is from 1 to maximum integer. The default setting for any /dev/lpXYY is as follows:

```
Interval for TTY : 50
Interval for TP : 1
PRINT - ON escape : "\033[5i" (ESC[5i)
PRINT – OFF escape : "\033[4i" (ECS[4i)
```


☞ **The examples to invoke lpx**

❶ Set 60 time slices reserved for /dev/ttyj11

```
# lpx -t 60 /dev/ttyj11
```

❷ Set 2 time slices reserved for /dev/lpj11

```
# lpx –12 /dev/lpj11
```

❸ Get the time slices reserved for /dev/lpj11

```
# lpx –L /dev/lpj11
```

❹ Set PRINT-ON string for /dev/lpj11

```
# lpx –n "\033[51" /dev/lpj11
```

❺ Get PRINT-OFF string for /dev/lpj11

```
# lpx –F /dev/lpj11 \033[4i
```

APPENDIX D

WINDOWS95/98 CONFIGURATION

The PCCOM 4 port adapter can be installed in the Windows 95 or Windows 98 by using serial device driver in the Decision Studio CD. Please do the following steps:

1. Install the PCCOM PCI bus 4 port adapter to PCI slot.
2. When you boot up your computer the Windows will automatically detect your new hardware. It will search for the information file (or driver). Specify the driver in the Serial co/ Pccom/ Multiuser/ Win_OS2/ Win 95-NT/ Pccom pci/ Win 95-98. Directory of the cd.
3. To set the COM ports of the PCI card, go to Control Panel, then system. Under system properties choose the Device Manager, Under the Device Manager, choose "Decision Pccom PCI cards" then double click "PCCOM PCI 4 Port Plug and Play Serial Controller". Then choose the heading "First COM Port". It is here were you can set the first COM Port of the PCI card.

APPENDIX E

WINDOWS/NT CONFIGURATION

The PCCOM 4 port adapter can be installed in the Windows NT by using serial device driver in the Decision Studio CD. Please do the following steps:

1. Install the PCCOM PCI bus 4 port adapter to PCI slot.

2. By using Windows Explorer, search for the PCCOM PCI.inf file in the Serialco/ PCCOM/ Multi-user/ Win_OS2/ Win 95-NT/ PCCOM PCI/ WIN NT directory of the cd. Right click this file and then choose Install.

3. To set the COM ports of the PCI card, go to Control Panel, and then select "Decision PCCOM PCI Adapters". In here you could set the starting COM port, enable the driver, disable the driver or to completely remove the Driver.

APPENDIX F
LINUX CONFIGURATION

The PCCOM 4 port adapter can be installed in the Linux by using serial device driver supported by Linux. For more details, please refer to 'setserial' man-pages.

☞ ***Please uncomment the appropriate lines in /etc/rc.d/rc.serial to enable auto-configuration of PCCOM PCI bus 4 port card.***

For example, uncomment the following lines for PCCOM PCI bus 4 port card.

```
${SETSERIAL} /dev/cua4 ${AUTO_IRQ}autoconfig${STD_FLAGS}
${SETSERIAL} /dev/cua5 ${AUTO_IRQ}autoconfig${STD_FLAGS}
${SETSERIAL} /dev/cua6 ${AUTO_IRQ}autoconfig${STD_FLAGS}
${SETSERIAL} /dev/cua7 ${AUTO_IRQ}autoconfig${STD_FLAGS}
```


APPENDIX G
DIAGNOSTIC UNDER WINDOWS

After installing the PCCOM PCI 4 port adapter to your computer you can test it if it is functioning correctly via HyperTerminal (a Windows package communication program) or by using the Decision Terminal (a software of the Decision Computer International Co. Ltd.) included on the CD. Just make sure that there is a loop back plug connected to the COM Port under test.

G.1 Using Hyper Terminal

To test the card using the Hyper Terminal. Please do the following steps:

1. Run the HyperTerminal program.

2. During connection, the program will ask you to enter your name and choose an icon for the connection. Enter any name and select any icon.

3. After entering your name and selecting icon you will be ask for country code, area code, phone number and connect using what. Ignore all edit box except for the connect using, click the combo box and select Direct to COMx (You can use any port but usually the Com1 and Com2 is used by the computer motherboard).

4. Put the proper COM x properties.

5. You can now begin to type any message. Take note that whatever you type must appear to the textbox as long as you have a loop back on the COM port of your card!

G.2 Using Decision Terminal

To test the card using the Decision Terminal. Please do the following steps:

1. Install the software using the Decision Studio (It is inside the CD AutoOpen program).

2. Run the program (Decision Terminal) at the program menu of the start menu.

3. Setup the COM port properties by selecting the setup option on the File menu.

4. You can now begin to type any message to transmit textbox. Take note that whatever you type must appear to receive textbox as long as you have a loop back on the COM port of your card.

5. You can also click the Test button to test your card automatically.

APPENDIX H

WARRANTY INFORMATION

H.1 Copyright

Copyright 1997, 1998 DECISION COMPUTER INTERNATIONAL CO., LTD. All rights reserved. No part of PCCOM software and manual may be reproduced, transmitted, transcribed, or translated into any language or computer language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of DECISION COMPUTER INTERNATIONAL CO., LTD.

Each piece of PCCOM package permits user to use PCCOM only on a single computer, a registered user may use the program on a different computer, but may not use the program on more than one computer at the same time.

Corporate licensing agreements allow duplication and distribution of specific number of copies within the licensed institution. Duplication of multiple copies is not allowed except through execution of a licensing agreement. Welcome call for details.

H.2 Warranty Information

DECISION warrants that for a period of one year from the date of purchase (unless otherwise specified in the warranty card) that the goods supplied will perform according to the specifications defined in the user manual. Furthermore that the

PCCOM product will be supplied free from defects in materials and workmanship and be fully functional under normal usage.

In the event of the failure of a PCCOM product within the specified warranty period, DECISION will, at its option, replace or repair the item at no additional charge. This limited warranty does not cover damage resulting from incorrect use, electrical interference, accident, or modification of the product.

All goods returned for warranty repair must have the serial number intact. Goods without serial numbers attached will not be covered by the warranty.

Transportation costs for goods returned must be paid by the purchaser. Repaired goods will be dispatched at the expense of PCCOM.

To ensure that your PCCOM product is covered by the warranty provisions, it is necessary that you return the Warranty card.

Under this Limited Warranty, DECISION's obligations will be limited to repair or replacement only, of goods found to be defective as specified above during the warranty period. DECISION is not liable to the purchaser for any damages or losses of any kind, through the use of, or inability to use, the PCCOM product.

DECISION reserves the right to determine what constitutes warranty repair or replacement.

Return Authorization: It is necessary that any returned goods be clearly marked with an RA number that has been issued by

DECISION. Goods returned without this authorization will not be attended to.