

## CONTENTS

=====

Chapter 1. Introduction .....	1
1-1 An Introduction to the INDPOR Card .....	1
1-2 Hardware specifications .....	1
1-3 Software specifications .....	2
Chapter 2. Configuring Hardware .....	3
2-1 System Components .....	3
2-2 Installation Procedures .....	3
2-3 Hardware Configuration .....	3
2-4 Serial Interface Connection .....	4
Chapter 3. Windows NT Installation .....	5
Chapter 4. Windows 95/98 Installation .....	6
APPENDIX. A. Pin Assignments and Cable Wiring .....	7
APPENDIX. B. RS422/485 isolated Port user guide .....	10

-----Chapter 1-----  
Introduction

1-1. An introduction to the INDPOR card

P518 and P514 card are enhanced eight port and four port card which are suitable to PC AT with PCI bus machine. P518 and P514 card can reduce the interval for serial communication controller to interrupt main CPU (MPU) on the mainboard to improve the whole system performance.

The P518 card is made up of two parts:

1) P518 interface card:

P518 interface card includes an PGA to support the serial communication controller and a 62 pin connector to connect external I/O port.

2) Expansion cable:

This expansion cable have eight standard DB25 connectors and one DB62 connector to connect P518 interface card.

The P514 card is made up of two parts:

1) P514 interface card:

P514 interface card includes an PGA to support the serial communication controller and a 37 pin connector to connect external I/O port.

2) Expansion cable:

This expansion cable have four standard DB25 connectors and one DB37 connector to connect P514 interface card.

For a PC AT Windows NT/95/98 system, we can install up to 8 pcs P518 or P514 card, and support up to 64 or 32 users.

Traditionally, serial communication controller will interrupt MPU character by character. This action will waste MPU processing time and drop the system computation power. If the MPU is processing some non-interrupted task, then serial controller may be overrun and data lost. INDPOR card can support 16 bytes buffer capability in each port's transmit and receive channel simultaneously. This capability will reduce the number of interrupt to MPU and increase the non-interrupted task's interval.

1-2. Hardware specification

\*serial communication controller:

16C550A compatible.

1.8432MHz crystal. (can be used upto 7.3728MHz)

\*I/O Port: ----- RS232C compatible. (Port A/B/C in P514 card)

(Port A/B/C/D/E/F/G in P518 card)

isolated RS422/RS485 interface. (Port D in P514 card)

(Port H in P518 card)

\*Interrupt Control: ----- Plug & Play to be assigned by PCI BIOS. Each card must have one IRQ to be assigned. But multi-card can share the same IRQ.

\*I/O map: ----- Plug & Play to be assigned by PCI BIOS.

\*Flow control --- Xon/Xoff control or RTS/CTS control.

\*Baud Rate:

can be software programmable upto 112KBps for 1.8432MHz crystal  
or 448KBps for 7.3728MHz crystal.

\*Connector ----- Expansion cable can support DB25 male connectors.  
(Or user can prepare their pin definition and connector  
type by themself.)

P518 card: DB62 female connector.

P514 card: DB37 female connector.

\*Environment ----- PC/AT with PCI bus machine.

NOTE: some PCI motherboard may have wrong operation in P&P interrupt mode.  
User may set the IRQ in ISA legacy mode and not P&P mode. You must  
confirm that minimum one IRQ is left to be assigned by P&P mode. If  
you do not have any IRQ left, you may have wrong operation in INDPOR  
card.

1-3 Software specification:

\*Operating system -----can support

Windows NT

Windows 95/98/Me

WINDOWS 2000/XP

other operating system.

## Chapter 2. Configuring the Hardware

### 2-1 System components

An P518 card system includes following components:

- \*One P518 PCI interface card.
- \*One 62pin Expansion Cable to support eight DB25 connector.
- \*User manual.

An P514 card system includes following components:

- \*One P514 PCI interface card.
- \*One 37pin Expansion Cable to support four DB25 connector.
- \*User manual.

### 2-2 Installation Procedures

One P518 or P514 card needs a 5V 33MHz PCI system expansion slot.

The installation procedures are as follows:

- (1) Turn off the power switch of your system.
- (2) check the DIP switch 1--3 to select the proper card number assigned.
- (3) check the DIP switch 4 to select the proper RS422/RS485 interface.
- (4) Plug the P518 or P514 interface card to system expansion slot.
- (5) Connect the 62pin(37pin) cable to P518(P514) interface card.
- (6) Turn on the system power.
- (7) Start up the operating system.
- (8) execute the INDPOR card software installation procedure.

WARNING: You should not insert or remove the P518/P514 card from the system while power is on.

### 2-3 Hardware Configuration

\*In INDPOR card we have following DIP switch to set

- (1) DIP switch 1--3:

These three bits of DIP switch are used to select the card number assigned. User can set from ON-ON-ON to OFF-OFF-OFF for card 1 to card 8. User card check the mapping in INDPOR card. Because INDPOR will be assigned I/O mapping and IRQ mapping by PCI BIOS. We can install upto eight cards in each system. We need to fix the COM port number for each card. So it is very important for us to assigned the card number in each card.

- (2) DIP switch 4:

This bit will set PORT D in P514 card and PORT H in P518 card to be RS422 (ON) interface or RS485 (OFF) interface.

- (3) JP1 (RXD) & JP2 (CTS) in P518 card and JP2 (RXD) & JP3 (CTS) in P514 card can turn on (off) the terminator resistor for RS422/485 interface. Generally we may turn on in RS422 interface usage. In RS485 interface we may just turn on in the card located in end point.

2-4 Serial I/O port connection for RS232 port:

(1) Local terminal connection:

DB25 male connector		Terminal connector	
Pin No.	Signal	Pin No.	Signal
1	F.G.	1	F.G.
2	TXD	3	RXD
3	RXD	2	TXD
4	RTS	4	CTS
5	CTS	5	RTS
6	DSR	20	DTR
7	S.G.	7	S.G.
8	DCD	8	DCD
20	DTR	6	DSR

(2) Remote terminal connection:

DB25 male connector		MODEM connector	
Pin No.	Signal	Pin No.	Signal
1	F.G.	1	F.G.
2	TXD	2	TXD
3	RXD	3	RXD
4	RTS	4	RTS
5	CTS	5	CTS
6	DSR	6	DSR
7	S.G.	7	S.G.
8	DCD	8	DCD
20	DTR	20	DTR

(3) special DB9 connector:

DB9 male connector	
Pin No.	Signal
1	DCD (in)
2	RXD (in)
3	TXD (out)
4	DTR (out)
5	GND
6	DSR (in)
7	RTS (out)
8	CTS (in)

Note: Standard INDPOR T card can support three or seven RS232 interface and one extra RS422/485 interface. User can check Appendix B to know the usage of that port.

## Chapter 3 Windows NT Installation

### 3-1 Driver Installation

Once Windows NT system has been started, login using an account with administrative rights.

- a) Start the [Control Panel] applet by double clicking its icon in the [Program Managers] main group.
- b) In the [Control Panel] applet, double click [Network] icon to bring up the Network Control Panel Applet(NCPA).
- c) Within the NCPA, select the [Add Adaptor] button. A list of possible adaptors should be displayed. Go to the end of this list and select '<Other> Requires disk from manufacturer'
- d) When prompted for the path, specify the drive and directory where the NCPA can find the new driver for the card you installed.

For Example, we need to install P514 card. We may specify as follow:

a:\p514\nt4

For P518 card we may input

a:\p518\nt4

For P124 card we may input

a:\p124\nt4

- e) Now, you can follow the configuration dialog boxes to finish the PCI PORT card's driver. The important thing is to let COM port number no confliction with other card.

### 3-2 Note for multi-PCI PORT card installation.

- a) We can install upto eight P518 and eight P514 cards in one NT system.
- b) When we need to install two same type INDPORNT cards in one NT system, we must confirm to let each card's DIP switch setting have different card number.
- c) The card with small card number will have low COM port number. The card with larger card number will have higher COM port number to follow the card with small card number.
- d) If user install two INDPORNT cards with same card number setting, we can not confirm that both card will active properly.
- e) If user install P518 and P514 card in one NT system simultaneously, please confirm that the COM port number assigned do not have overlap. User may need to confirm the COM port number assigned for each card must be not overlapped. Or you may have improperly operation in your NT system.
- f) For easy to maintain one NT system's COM port number we suggest that user must set the DIP swtich to card number 1 for the first card to be installed in one NT system.

Chapter 4  
Windows 95/98 Installation

3-1 Driver Installation

Once Windows 95/98 system has been started, the Plug & Play function in 95/98 system will find the new INDPOR card. If this is the first time to install INDPOR card in your 95/98 system, you will be informed to install the driver. Please follow the instruction message to input the COM port number start value for each card. a:\win95

Because the resource will be assigned by PCI BIOS. It is not easy to check which card is first card or second card from resource. So we have one DIP switch in each card to set the first card or second card for this INDPOR card. Then we can fix the COM port number for each card. This is very important for INDPOR card. Traditionally, we check the resource in each card to confirm the card number. Use this rule we can assign the COM port number for each card. But in PCI bus all the resource for each card is assigned by PCI BIOS in power on procedure. So it is not easy for us to confirm the COM port number for each card. Then it is not easy to maintain the application environment for different time point (You may change your system configuration due to add extra new card. This may change your PCI system's resource condition). So our DIP switch to assign card number is very important.

After you had installed the INDPOR driver, you might be informed to have new hardware found. But you do not need to install the driver again. Windows 95/98 will add the COM port automatically.

3-2 Note for multi-INDPOR card installation.

- a) We can install upto eight P518 or P514 cards in one 95/98 system.
- b) When we need to install multi INDPOR cards in one 95/98 system, we must confirm to let each card's DIP switch to have different card number.
- c) The card with different card number setting will have COM port number assigned for corresponding card number.
- d) If user install two INDPOR cards with same card number setting, we can not confirm that both card will active properly.
- e) If user install P518 and P514 card in one 95/98 system simultaneously, please confirm that the COM port number assigned do not have overlap. User may need to confirm the COM port number assigned for each card must be not overlapped. Or you may have improperly operation in your 95/98 system.
- f) For easy to maintain one 95/98 system's COM port number we suggest that user must set to card number 1 for the first card to be installed in one 95/98 system.
- g) INDPOR card can be used in interrupt shared mode. PCI BIOS will assign IRQ for each INDPOR card. For multi-INDPOR application we can just share onr IRQ in each card. But user must confirm that one system may have minimum one IRQ left for P & P function. If there are no IRQ to be assigned to INDPOR card, you may have wrong operation.

Appendix A  
Pin assignments and Cable Wiring

A-1: DB62 Female Connector Pin assignment in P518 card.

DB62 Pin Number	Signal Name	DB62 Pin Number	Signal Name	DB62 Pin Number	Signal Name
1	TXD1 (Out)	22	TXD2 (Out)	43	TXD3 (Out)
2	RXD1 (In )	23	RXD2 (In )	44	RXD3 (In )
3	RTS1 (Out)	24	RTS2 (Out)	45	RTS3 (Out)
4	CTS1 (In )	25	CTS2 (In )	46	CTS3 (In )
5	DSR1 (In )	26	DSR2 (In )	47	DSR3 (In )
6	DTR1 (Out)	27	DTR2 (Out)	48	DTR3 (Out)
7	DCD1 (In )	28	DCD2 (In )	49	DCD3 (In )
8	GND 1 & 4	29	GND 2 & 5	50	GND 3 & 6
9	DCD4 (In )	30	DCD5 (In )	51	DCD6 (In )
10	DTR4 (Out)	31	DTR5 (Out)	52	DTR6 (Out)
11	DSR4 (In )	32	DSR5 (In )	53	DSR6 (In )
12	CTS4 (In )	33	CTS5 (In )	54	CTS6 (In )
13	RTS4 (Out)	34	RTS5 (Out)	55	RTS6 (Out)
14	RXD4 (In )	35	RXD5 (In )	56	RXD6 (In )
15	TXD4 (Out)	36	TXD5 (Out)	57	TXD6 (Out)
16	TXD7 (Out)	37	RTS7 (Out)	58	DTR7 (Out)
17	RXD7 (In )	38	CTS7 (In )	59	DCD7 (In )
18	GND7	39	DSR7 (In )	60	GND8 (isolated)
19	422RXD8+	40	422RXD8-	61	422CTS8-
20	422RTS8+	41	422RTS8-	62	422CTS8+
21	422TXD8+	42	422TXD8-	xxxx	xxxx

\*\*\*Note: P518 cable will support DB62 connector to eight DB25 male connector.  
P519 cable will support DB62 connector to eight DB9 male connector.

A-2: DB37 Female Connector Pin assignment in P514 card.

```

=====
DB37 Pin | P514 card      || DB37 Pin | P514 card
Number   | Signal Name    || Number   | Signal Name
=====
  1      | RXD1 (In )    || 20      | TXD1 (Out)
-----
  2      | CTS1 (In )    || 21      | RTS1 (Out)
-----
  3      | DSR1 (In )    || 22      | DTR1 (Out)
-----
  4      | DCD1 (In )    || 23      | RI1  (In )
-----
  5      | GND           || 24      | RXD2 (In )
-----
  6      | TXD2 (Out)    || 25      | CTS2 (In )
-----
  7      | RTS2 (Out)    || 26      | DSR2 (In )
-----
  8      | DTR2 (Out)    || 27      | DCD2 (In )
-----
  9      | GND           || 28      | RI2  (In )
-----
 10     | GND           || 29      | RI3  (In )
-----
 11     | GND           || 30      | DCD3 (In )
-----
 12     | DTR3 (Out)    || 31      | DSR3 (In )
-----
 13     | RTS3 (Out)    || 32      | CTS3 (In )
-----
 14     | TXD3 (Out)    || 33      | RXD3 (In )
-----
 15     | GND4 (isolated) || 34      | 422RTS4- (Out)
-----
 16     | 422CTS4- (In) || 35      | 422TXD4- (Out)
-----
 17     | 422RXD4- (In) || 36      | 422RTS4+ (Out)
-----
 18     | 422CTS4+ (In) || 37      | 422TXD4+ (Out)
-----
 19     | 422RXD4+ (In) || ----    | ----
=====

```

\*\*\*\*Note: P514 cable will support DB37 connector to four DB25 male connector.

\*\*\*\*Note: P124 cable will support DB37 connector to four DB9 male connector.

A-3: DB25/DB9 Male Connector Pin assignment in P518 & P514 card for RS232.

```

=====
DB25 Pin Number | DB9 Pin Number | Signal Name
=====
2                | 3                | TXD (Out)
-----
3                | 2                | RXD (In )
-----
4                | 7                | RTS (Out)
-----
5                | 8                | CTS (In )
-----
6                | 6                | DSR (In )
-----
7                | 5                | GND
-----
8                | 1                | DCD (In )
-----
20               | 4                | DTR (Out)
=====

```

A-4: DB25/DB9 Male Connector Pin assignment in P514 & P518 card for RS422/485.

```

=====
DB25 Pin Number | DB9 Pin Number | Signal Name
=====
2                | 3                | 422TXD+ (Out)
-----
3                | 2                | 422RXD+ (In )
-----
4                | 7                | 422RTS+ (Out)
-----
5                | 8                | 422CTS+ (In )
-----
7                | 5                | GND
-----
13               | 9                | 422RTS- (Out)
-----
14               | 6                | 422TXD- (Out)
-----
16               | 4                | 422RXD- (In )
-----
19               | 1                | 422CTS- (In )
=====

```

Note: RS422/485 port have fully isolated ground reference with other RS232 port.

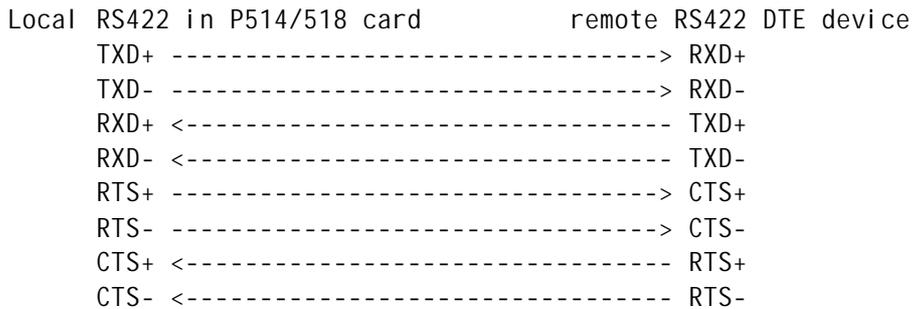
A-5: JP1 & JP4 & JP5 & JP6 Pin assignment in P514 card.

JP1	JP4 & JP5 & JP6		JP4 & JP5 & JP6	JP1
		+-----+		
TXD-	DCD	1 2	RTS-	DSR
RXD+	RXD	+-+ 3 4	RTS+	RTS
TXD+	TXD	5 6	CTS+	CTS
RXD-	DTR	+-+ 7 8	CTS-	RI
GND	GND	9 10	N. C.	N. C.
		+-----+		

NOTE: JP1 is RS422/485 interface for PORT D.  
 JP4 & JP5 & JP6 is RS232 interface for PORT C & B & A.

Appendix B  
RS422/485 Isolated port user guide

Port D in P514 card and Port H in P518 card is RS422/485 interface. This port is fully isolated ground reference with other RS232 port. User can set this port to be RS422 interface or RS485 interface by DIP switch bit 4. When this bit is set to ON will let this port have RS422 interface. In this mode we can have RTS/CTS hardware flow control handshake capability.



When this DIP switch bit is set to OFF will let this port have RS485 interface. In this mode we will disable the input data in data transmit out duration automatically. So user can control the data send/receive operation very easily. Because we do not have data echo problem in traditional RS485 interface. In traditional RS485 port user may need to use RTS pin to enable data transmission and disable the data receiver. But it is not easy for us to use RTS signal in NT/95/98 system to have this function. So we need to remove the echo problem in NT/95/98 system. That is why we let our P514 and P518 card's RS485 interface have echo cancellation function.

But user still need to have one architecture in software protocol to confirm that there are half-duplex operation in RS485 interface. If user can not promise this protocol, we may have data transmission confliction in RS485 interface. This may generate un-predictable result.

The other thing need to keep in mind is terminator resistor. In RS422 interface we may always have terminator resistor on the signal line. But in RS485 interface we may just put this terminator resistor in the terminated device. So we have JP1 & JP2 in P518 card and JP2 & JP3 in P514 card to let user to turn on the terminator resistor or not.

When user need to use in RS485 mode, they may let the TXD and RXD signal line to be shorted. Then they can connect this twist pair cable with other RS485 device.

In RS422 and RS485 interface user may need to confirm the plus and minus signal pin definition are same for different device. In P514/P518 card we have TXD signal from controller chip to be buffered to plus signal line and inverted to minus signal line. But some other device may have different definition. Then the signal to controller may be inverted. This will have wrong data received and break condition happened.

