PCIIOP Expandable Card
Owner's Manual

Support：IOP3927 card

P1688U card

P640NU card

RO-PCIEXP-007

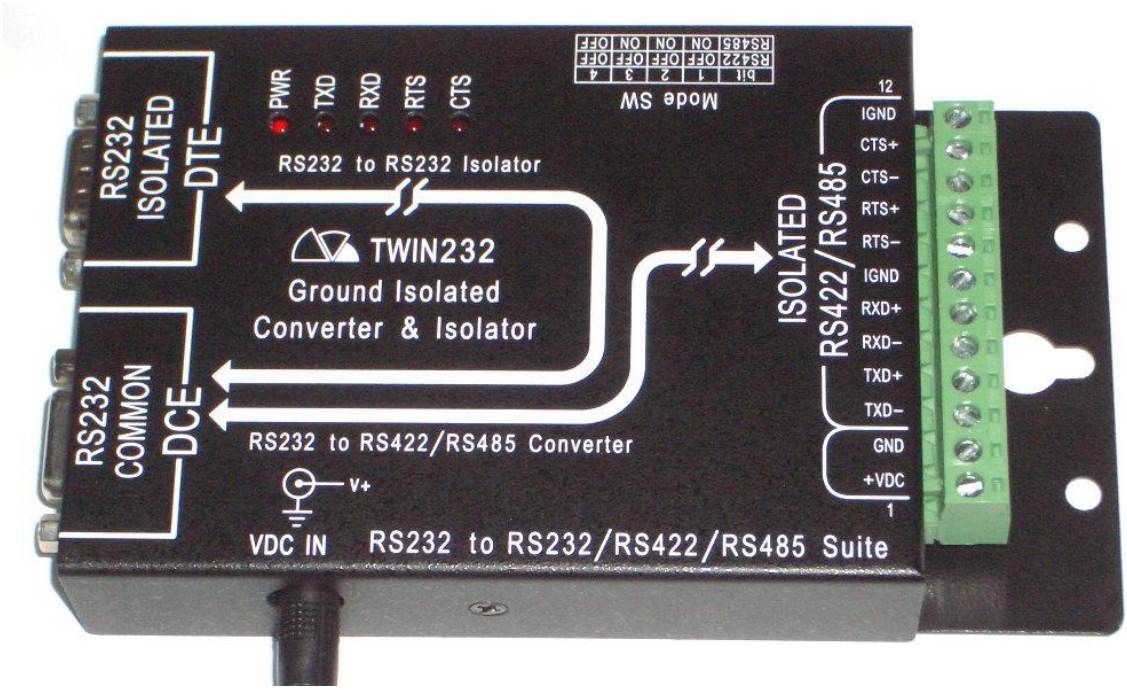
TWIN232

Industrial Ground Isolated RS232 to RS232,RS422,RS485 Suite

One Box to meet both requirement

Safety for local and remote connection

Powerful and Flexible for serial device



★**One set RS232 to RS232 isolator**

★**One set RS232 to RS422 converter**

★**One set RS232 to RS485 converter**

★**Fully Ground Isolated Function**

★**Auto Data Direction Control on RS485**

★**Support RTS/CTS handshake on RS422**

★**Support screw terminal and DC power adapter**

★**Wide VDC range suitable for 12V and 24V environment**

★**All function and Feature set by DIP switch**

★**RS232 data transmission LED indicator**

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

1-1. An introduction to the IOP

Intelligent Input/Output Processor (IOP) is an intelligent Input/Output control card which is suitable to PC AT or other compatible machine. IOP can reduce the loading of main CPU (MPU) on the mainboard to improve the whole system performance.

The IOP is made up of two parts:

1) IOP3927 CPU card:

IOP3927 CPU card includes a local high performance processor to manage the data flow between main CPU and external interface. This card also includes dual port RAM and one 37 pin connector to connect external I/O port. Through dual port RAM the local processor can communicate with main CPU. Because different application environment may have different cost/performance requirement. So we have many models and connector boxes to be selected.

2) external I/O connector box:

IOP3927 can support many types of external I/O interface. All the interface control function circuitry and connector are built in one box. For different interface and control function requirement we have different box. These connector boxes can be daisy chain together and connect to IOP3927 CPU card through one 37 pin cable. In the following description we will use F641 box as an example.

For one PC AT system, we can install up to 2 IOP3927 CPU cards together. And one IOP3927 CPU card can support upto 8 external boxes.So user can be easily to configure their resource and get the optimum cost performance solution anytime.

We have one special configuration for IOP3927 card with F641 box on one card. P1688U card is such special card for fixed 8 port application. P1688U card can support high performance and less expensive solution for user. All the data for IOP3927 card will be same as P1688U card's usage. For P1688U card's user following information for IOP3927 card will be same for P1688U card.

At present,most of the multi-user system handle the I/O communication procedure by MPU. MPU will process the I/O function character by character. This action will waste MPU processing time and drop the system computation power. If we can use an IOP to handle the I/O communication procedure, then we can reduce the MPU overhead and increase the system performance.

For one intelligent multi-user card we must have high performance local CPU built-in. Because different local processor may have different processing power. The transmission capability for every serial ports are depend on local CPU's processing power.

1-2. Hardware specification

IOP3927 CPU card and I/O connector box have many models, following specification is some example for user reference.

1-2-1 IOP3927 CPU card.

*CPU ---------- 133MHz TMPR3927 RISC processor.

*Memory --------- Can embed 16MByte SDRAM. This SDRAM is dual port RAM can be used by local processor and main system CPU simultaneously. This dual port RAM memory mapping can be set by PCI bus.

*Connector ------ Each IOP3927 has one 37pins D-type male connector to connect with external I/O box.
Each external I/O box has two 37pins D-type (one female and one male type) connector to connect with IOP3927 card and the other I/O box.

NOTE: one IOP3927 card can be in IOP3927A, IOP3927R, IOP3927F types. The box to connect with IOP3927 card must match the card type.
So IOP3927A card can only connect with A641 and A642 box. IOP3927R card can only connect with R641 and R642 box. IOP3927F card can only connect with F641,F642,NF116,NF216,NF316,IF108,IF208 and IF308 box.
Please confirm your card type and box type.

*Expansion capability ------ One system can install up to 2 pcs IOP3927 card. One IOP3927 card can connect up to 8 pcs external I/O box.
Each box can support 8(16) serial ports and 8(4) boxes can support upto 64 ports.

*Environment ----- PC/AT 80X86 or compatible machine.

1-2-2 F641N box.

*Interface ------- RS232C.

*Controller ------ FIFO type 16C554 UART chip.

*Connector ------ 25 pin D-type male. (8 ports per box)

*Connector ------ Pin 1 ----------Frame Ground.
Pin definition Pin 2 ----------Transmit Data Out.
Pin 3 ----------Receive Data In.
Pin 4 ----------RTS Out.
Pin 5 ----------CTS In.
Pin 6 ----------DSR In.
Pin 7 ----------Signal Ground.
Pin 8 ----------DCD In.
Pin 20----------DTR Out.

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

*Baud Rate ------ Can support 110, 135,300,600,1200,1800,2400,4800, 9600,19200,38400,57600,76800,115200,230400 bps.

NOTE: In software setting 57600,76800,115200,230400 bps will be set to 50,75,150,200bps for compatibility.

1-2-3 F642 box.

```
 *Interface ------- RS422.

 *Controller ------ FIFO type 16C554 UART chip.

 *Connector  ------ 25 pin D-type male.  (8 ports per box)

 *Connector  ------ Pin 1 -----------Frame Ground.
  Pin definition    Pin 7 -----------Signal Ground.
                    Pin 9 -----------RXD+ (in).
                    Pin 10----------RXD- (in).
                    Pin 11----------TXD+ (out).
                    Pin 12----------TXD- (out).
```

1-2-4 NF116 box.

```
 *Interface ------- RS232C.

 *Controller ------ FIFO type 16C554 UART chip.

 *Connector  ------ 9 pin D-type male.  (16 ports per box)

 *Connector  ------ Pin 1 -----------DCD In.
  Pin definition    Pin 2 -----------Receive Data In.
                    Pin 3 -----------Transmit Data Out.
                    Pin 4 -----------DTR Out.
                    Pin 5 -----------Signal Ground.
                    Pin 6 -----------DSR In.
                    Pin 7 -----------RTS Out.
                    Pin 8 -----------CTS In.
                    Pin 9 -----------RI In.
```

1-2-5 NF216 box.

```
 *Interface ------- RS422 or RS485 selectable.

 *Controller ------ FIFO type 16C554 UART chip.

 *Connector  ------ 9 pin D-type male.  (16 ports per box)

 *Connector  ------ Pin 1 -----------N.C.
  Pin definition    Pin 2 -----------RXD+ In
                    Pin 3 -----------TXD+ Out.
                    Pin 4 -----------TXD- Out.
                    Pin 5 -----------Signal Ground.
                    Pin 6 -----------RXD- In.
                    Pin 7 -----------N.C.
                    Pin 8 -----------N.C.
                    Pin 9 -----------N.C.
  Note: In RS485 mode pin2 & pin3 is short as DATA+ signal and pin4 & pin6
        is short as DATA- signal.
```

1-2-6 NF316 box.

```
 *Interface ------- RS232C, RS422 or RS485 selectable.

 *Controller ------ FIFO type 16C554 UART chip.

 *Connector  ------ 9 pin D-type male.  (16 ports per box)

 *Connector  ------ Pin 1 -----------DCD In.
  Pin definition    Pin 2 -----------Receive Data In.
                    Pin 3 -----------Transmit Data Out.
  (RS232 mode)      Pin 4 -----------DTR Out.
                    Pin 5 -----------Signal Ground.
                    Pin 6 -----------DSR In.
                    Pin 7 -----------RTS Out.
                    Pin 8 -----------CTS In.
                    Pin 9 -----------RI In.

 *Connector  --------- Pin 1 -----------N.C.
  Pin definition       Pin 2 -----------RXD+ In
                       Pin 3 -----------TXD+ Out.
  (RS422/RS485 mode)   Pin 4 -----------TXD- Out.
                       Pin 5 -----------Signal Ground.
                       Pin 6 -----------RXD- In.
                       Pin 7 -----------N.C.
                       Pin 8 -----------N.C.
                       Pin 9 -----------N.C.
  Note: In RS485 mode pin2 & pin3 is short as DATA+ signal and pin4 & pin6
        is short as DATA- signal.
```

1-2-7 IF108 box.

```
 *Interface ------- Ground Isolated RS232C.

 *Controller ------ FIFO type 16C554 UART chip.

 *Connector  ------ 9 pin D-type male.  (8 ports per box)

 *Connector  ------ Pin 1 -----------DCD In.
  Pin definition    Pin 2 -----------Receive Data In.
                    Pin 3 -----------Transmit Data Out.
                    Pin 4 -----------DTR Out.
                    Pin 5 -----------Signal Ground.
                    Pin 6 -----------DSR In.
                    Pin 7 -----------RTS Out.
                    Pin 8 -----------CTS In.
                    Pin 9 -----------RI In.
```

1-2-8 IF208 box.

*Interface ------- GROUND Isolated RS422 or RS485 selectable.

*Controller ------ FIFO type 16C554 UART chip.

*Connector ------ 9 pin D-type male. (8 ports per box)

*Connector ------ Pin 1 ----------N.C.
Pin definition Pin 2 ----------RXD+ In
Pin 3 ----------TXD+ Out.
Pin 4 ----------TXD- Out.
Pin 5 ----------Signal Ground.
Pin 6 ----------RXD- In.
Pin 7 ----------N.C.
Pin 8 ----------N.C.
Pin 9 ----------N.C.

Note: In RS485 mode pin2 & pin3 is short as DATA+ signal and pin4 & pin6 is short as DATA- signal.

1-2-9 IF308 box.

*Interface ------- GROUND Isolated RS232C, RS422 or RS485 selectable.

*Controller ------ FIFO type 16C554 UART chip.

*Connector ------ 9 pin D-type male. (8 ports per box)

*Connector ------ Pin 1 ----------DCD In.
Pin definition Pin 2 ----------Receive Data In.
Pin 3 ----------Transmit Data Out.
(RS232 mode) Pin 4 ----------DTR Out.
Pin 5 ----------Signal Ground.
Pin 6 ----------DSR In.
Pin 7 ----------RTS Out.
Pin 8 ----------CTS In.
Pin 9 ----------RI In.

*Connector --------- Pin 1 ----------N.C.
Pin definition Pin 2 ----------RXD+ In
Pin 3 ----------TXD+ Out.
(RS422/RS485 mode) Pin 4 ----------TXD- Out.
Pin 5 ----------Signal Ground.
Pin 6 ----------RXD- In.
Pin 7 ----------N.C.
Pin 8 ----------N.C.
Pin 9 ----------N.C.

Note: In RS485 mode pin2 & pin3 is short as DATA+ signal and pin4 & pin6 is short as DATA- signal.

1-2-10 R641 box.

*Interface ------- RS232C.

*Controller ------ RISC type CD1865 communication controller.

*Connector ------ 25 pin D-type male. (8 ports per box)

*Connector Pin definition ------ same as F641 box.

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

*Baud Rate ------ Can support 110, 135,150,200,300,600,1200,1800
,2400,4800, 9600,19200,38400,57600,76800 bps.

NOTE: In software setting 57600,76800 bps will be set to 50,75bps for
compatibility.

1-2-11 R642 box.

*Interface ------- RS422.

*Controller ------ RISC type CD1865 communication controller.

*Connector ------ 25 pin D-type male. (8 ports per box)

*Connector Pin definition ------ same as F642 box.

1-2-12 A642 box.

*Interface ------- RS422.

*Controller ------ SCN2681 communication controller.

*Connector ------ 25 pin D-type male. (8 ports per box)

*Connector Pin definition ------ same as F642 box.

1-2-13 A641 box.

*Interface ------- RS232C.

*Controller ------ SCN2681 communication controller.

*Connector ------ 25 pin D-type male. (8 ports per box)

*Connector ------ same as F641 box.
Pin definition

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

*Baud Rate ------ Can support 50,75,110, 135,150,200,300,600,1200
,1800,2400,4800, 9600,19200,38400 bps.

1-2-14 P1688U fix eight port card.

*CPU ---------- 133MHz TMPR3927 RISC processor.

*Memory --------- Can embed 16MByte SDRAM. This SDRAM is dual port RAM can be used by APU or MPU simultaneously. This dual port RAM memory mapping can be set by PCI bus.

*Interface ------- RS232C.

*Controller ------ FIFO type 16C554 UART chip.

*Connector ------ Each P1688U has one 62pins D-type female connector to connect with external expansion cable.

*Expansion cable ------ R801 cable: support eight DB25 male connector. (RS232) DB25 pin definition same as F641 box.
R804 cable: support eight DB9 male connector. (RS232) DB9 pin definition as follow:

pin1=DCD (in)	pin6=DSR (in)
pin2=RXD (in)	pin7=RTS (out)
pin3=TXD (out)	pin8=CTS (in)
pin4=DTR (out)	pin9=N.C.
pin5=GND	

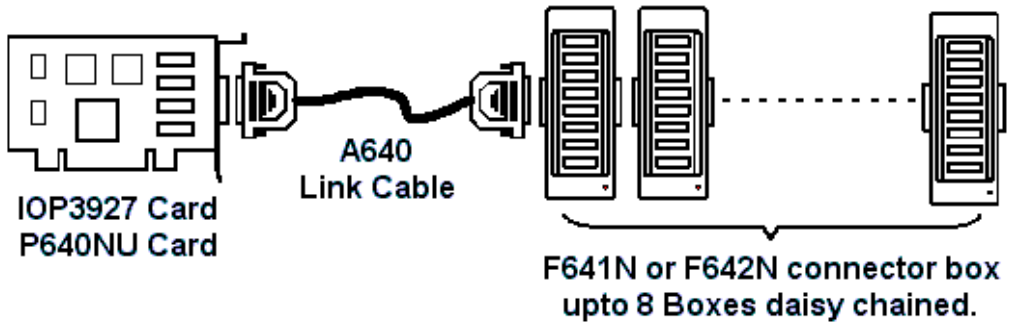
R803 cable: support P1688U card to connect with RS4232-8 box to support eight ground isolated RS422/485 interface.

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

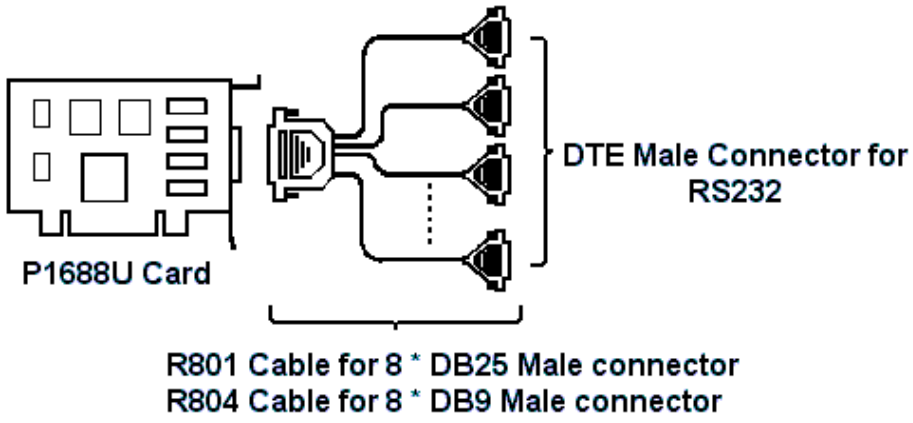
*Baud Rate ------ Can support 110, 135,300,600,1200,1800,2400,4800, 9600,19200,38400,57600,76800,115200,230400 bps.

NOTE: In software setting 57600,76800,115200,230400 bps will be set to 50,75,150,200bps for compatibility.

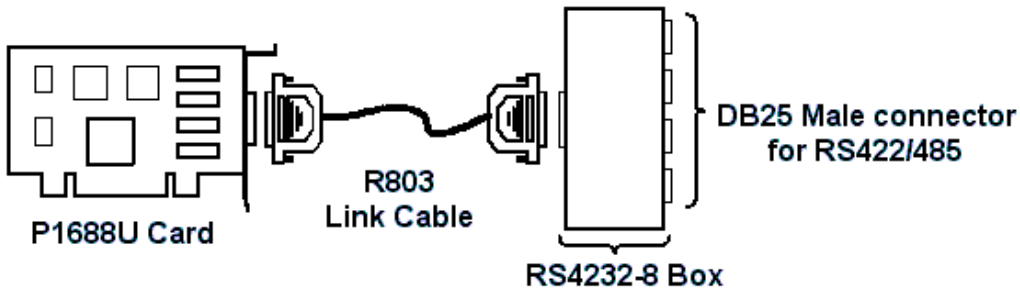
1.IOP3927F/P640NU card and F641N/F642N system structure.



2.P1688U card and R801/R804 cable for RS232 interface.



3.P1688U card and RS4232-8 Box for ground isolated RS422/485 interface.



Chapter 2
How to install SCO UNIX driver

2-1 Introduction:

Under the SCO UNIX operating system, IOP is an extra peripheral device. So a device driver should be linked with the kernel to build a new kernel system. The IOP system will work after the new kernel system is restarted.

2-2 Installation Environment:

(1) IBM PC/AT X86 or other compatible machine.

(2) SCO Openserver 5.0.x.

(3) Under the above environments, all of the Link Kit packages should be installed completely.

2-3 What may be happened while installing

(1) Link kit packages have not been installed completely.
Solution: Install Link kit completely.

(2) Can not boot the system due to low voltage level.
Solution: Reduce the number of IOP3927 card or F641/F642 box, or use a higher wattage power supply.

2-4 Installation procedures

There are two methods for installing the device driver of the IOP.

(1) use /etc/custom

a) Login as a super-user.

```
login : root
password :
# /etc/custom
```

*******Note: this command is used for following default condition. User has one 3.5 inch disk drive in DRIVE A and uses our 3.5 inch diskette. If the DRIVE A is not 3.5 inch disk drive or different format in system, please check the manual for "custom" command to set correct command line.

b) Choose the "Add a Supported Product" item.
And then select "Install one or more packages" item.

```
How many IOP3927 cards can be installed ?
Enter 1-2 or enter q to quit:
```

c) Please strike the numeric key 1 to 2 to continue the installation procedure.

```
Updating system configuration.
Making terminal devices 100%
Editing terminal definitions 100%
Installing IOP3927 driver.
You must create a new kernel to effect the driver change
you specified.
Do you wish to create a new kernel now? (y/n)
```

d) Now,strike "n" key if you want to quit this procedure, or "y" key to continue the procedure. (Of course you may need to choose "y")

e) From this procedure the screen message and installation procedure will be as following.

```
The UNIX Operating System will now be rebuild
This will take a few minutes. Please wait
The UNIX Kernel has been rebuilt
```

f) At sight of the above message, you can assure that you have finished your installation. At this moment, please shutdown the operating system and reboot it. You will find the system performance better than ever.

CAUTION: If it is not workable, check your procedure of installation. Maybe your device driver is not well-installed, correct your errors indicated on the screen and execute the installation procedure again.

(2) use tar command

When there is no "custom" command in system, we could use the "tar" command.

a) Login as a super user and go to root directory.

```
login : root
password :
# cd /
```

b) Extract all the files on the diskette by "tar" command.

```
tar xvf /dev/fd0135ds18
```

*******Note: this command is used for following default condition. User has one 3.5 inch disk drive in DRIVE A and uses our 3.5 inch diskette. If the DRIVE A is not 3.5 inch disk drive , please check the manual for "tar" command to set correct command line.

c) # cd /etc/IOP3927

d) # ./build

e) System will display following main menu on the screen:

```
RAYON Intelligent Input/Output Processor
Installation:
        1. Install IOP3927 Driver
        2. Remove IOP3927 Driver
Select an option or enter q to quit :

****please select 1 here******
```

f) Follow the same procedure as method 1 step b).

3) After restarting the new kernel, the IOP will indicate as follows:

```
PCIIOP: unit=0 type= IOP3927F bus=0 dev=0 fun=0 map= 0xF4000000
 .
 .
 .
 .
Downloading IOP3927 card(s) .......
PCIIOP: unit= 0 type= IOP3927F ports= 8(P641)
 .
 .
 .
 .
 .
```

Here:

"unit=" denotes the installation card number in this system.

"type=" denotes the IOP3927 CPU card's type.

"map=" denotes the mapping address and memory space of dual port RAM, should be assigned by PCI bus.

"ports=" denotes the number of ports,which should be octable of the number of P641 box.

When the above message appears and all of the LED in F641/F642 box light on, it means the IOP has been installed successfully.

Note: User login is not permitted for all of the IOP ports. Super-user should try to enable it.

If the message of "map=" or "ports=" is not correct (including no message) or any of the LED in F641/F642 box is not on, we should proceed error detecting and correcting procedure as follows:

(1) Shutdown the operating system, turn off the power.

(2) If you can not boot the system successfully, please check the voltage level. If the voltage level is too low to boot the system, check the number of IOP3927 card and F641/F642 box.

(3) Insure the IOP3927 card has been inserted correctly at system expansion slot. Insure the 37 pin cable has been connected correctly between IOP3927 card and F641/F642 box.

(4) Turn on power and reboot the operating system.
If you can insure that the IOP device driver has been installed successfully, it is not necessary to re-execute the software installation procedure. Otherwise you may need to re-execute the software installation procedure.
Please confirm that IOP3927 card is inserted in PCI slot correctly. We can check the BIOS message in boot procedure to confirm all the PCI device inserted in your system include IOP3927 card's vendor ID code (0x102F) and Device ID code (0x000A). If you could not find such vendor ID and device ID for IOP3927 card, you need to insert IOP3927 card again or clean the golden finger of IOP3927 card.

(5) If the message does not indicate correctly, please repeat previous procedure or contact your supplier.

2-5 The definitions of serial port device

1) Card number definition

IOP3927 Card No.	Device Name
1'st	tty6??
2'nd	tty7??

Note: Card number 1 is the card with JP1 jumper on.
In new version driver user can specify the device name from 1--A and not just 6 & 7. The default value is still 6 & 7.

2) F641/F642 box number definition

F641/F642 box No.	Device Name
1	tty?1?
2	tty?2?
3	tty?3?
4	tty?4?
5	tty?5?
6	tty?6?
7	tty?7?
8	tty?8?

Note: The box near IOP3927 card is Box number 1.The box number will be increased 1 for the next box one by one.
Note: NF116/NF216/NF316 box will be seen as two F641 boxes.
Note: IF108/IF208/IF308 box will be seen as one F641 boxes.

3) I/O port number definition

Port No.	Device Name (non MODEM)	Device Name (MODEM)
A	tty??a	tty??A
B	tty??b	tty??B
C	tty??c	tty??C
D	tty??d	tty??D
E	tty??e	tty??E
F	tty??f	tty??F
G	tty??g	tty??G
H	tty??h	tty??H

2-6 The usage of P1688U card.

P1688U card is special version for IOP3927 card with one F641 box to one card. So all the message for P1688U card will be same as IOP3927 card with one F641 box. In software issue there are no difference for P1688U card and IOP3927 card. So there are no message for P1688U card.

In UNIX system you must have message for IOP3927F card to be displayed for P1688U card. So we must have IOP3927F card with 8 ports to be checked for P1688U card. Never try to find message for P1688U card.

Chapter 3
How to install WINDOWS NT driver

1. In our IOP3927 card series we can support WINDOWS NT driver in our IOP3927F card only. User can install the driver as following procedure.

1) Enter Windows NT system.
2) Enter "Main".
3) Enter "Control Panel".
4) Choose "Network".
5) Choose "Add adaptor". (Must Must Must not choose "Add Software").
6) put our NT driver diskette to FDD "A".
7) Choose "<other>" Requires disk from manufacture
8) Giving the path as follow:
   A:\NT4 (we suggest that your diskette is in FDD A)
9) Follow the normal procedure we can install the driver successfully.

2. In the default condition the TTY port is given name from "COM3". User can specify the start "COM" port number in installation procedure. All the serial port will be assigned COM port name from this COM port number. In default condition the start COM port number is COM3. So we may have COM3 for IOP3927F card's first F641 box's port A. Then port B will be COM4.....

3. When your system is installed multiple IOP3927 cards. The card with JP1 jumper on(set in 1'st card mode) will have small "COM" port number. The card with JP1 jumper off(set in 2'nd card mode) will have large "COM" port number.

4. After you install the driver, you need to reboot your PC.When you reboot your PC, you can find the LED in IOP3927 card's external F641 box is turned on. Then you can have more COM ports to be available.

5. You can use "Hyperterm" to confirm your installation successfully. If there are problem to access the COM port, "Hyperterm" will reply "open fail" message.

6. When "Hyperterm" can work properly and RAS can not work properly. You may need to remove the "MODEM" device and add "MODEM" device again. You can not use the MODEM device before installed our driver. You need to create new MODEM device to be used by our COM port.

#######WARNNING###
  If you had installed our NT driver in your system before, you might remove this driver firstly. Then you can install our new version driver. Or you may have some problem in your system. (Keep in mind that you always need to remove the older version driver before you can install the new version driver.
#######WARNNING###

7. The usage of P1688U card.
   P1688U card is special version for IOP3927F card with one F641 box to one card. So all the message for P1688U card will be same as IOP3927 card with one F641 box. In software issue there are no difference for P1688U card and IOP3927 card. So there are no message for P1688U card.

Chapter 4
How to install WINDOWS 2000/XP/Vista driver

1. In our IOP3927 card series we can support WINDOWS 2000/XP/Vista driver in our IOP3927F card. User can install the driver as following procedure.

2. Once Windows 2000/XP/Vista system has been started, the Plug & Play function in WIN2000/XP/Vista system will find the new IOP3927 card. If this is the first time to install IOP3927 card in your Windows system, you will be informed to install the driver. Please follow the instruction message to specify the driver location.

A:\WIN2000

3. Due to the COM port start number will be assigned by Win2000/XP/Vista system in driver installation procedure. If you need to specify other COM port number for IOP3927 card, you can setup in our driver. You can enter <control panel> <system> <hardware> <device manager> <multi-port serial adapter> <setup> to specify your target value.

After driver installation user need to check in "control panel" the COM port number for IOP3927 card. Because WIN2000/XP/Vista system will assign the COM port number for each port of IOP3927 card. We can not confirm the physical serial port with logic COM port number after driver installation.

4. When your system is installed multiple IOP3927 cards. The card with JP1 jumper on(set in 1'st card mode) will have small "COM" port number. The card with JP1 jumper off(set in 2'nd card mode) will have large "COM" port number.

5. You can use "Hyperterm" to confirm your installation successfully. If there are problem to access the COM port, "Hyperterm" will reply "open fail" message.

6. When "Hyperterm" can work properly and RAS can not work properly. You may need to remove the "MODEM" device and add "MODEM" device again. You can not use the MODEM device before installed our driver. You need to create new MODEM device to be used by our COM port.

7. WIN2000 and WIN XP/Vista system use same driver. Please specify
A:\WIN2000 in WIN2000 and WIN XP/Vista driver installation.

8. In WIN2000 system we can install the card's driver firstly and the COM port driver will be installed automatically. In WIN XP/Vista system we can install the card's driver firstly and the COM port driver will be install one by one for each port. NOTE: we can only install one IOP3927F card in WIN XP/Vista system. We just support single CPU system.

9. The usage of P1688U card.
P1688U card is special version for IOP3927 card with one F641 box to one card. So all the message for P1688U card will be same as IOP3927 card with one F641 box. In software issue there are no difference for P1688U card and IOP3927 card. So there are no message for P1688U card.

Chapter 5
How to install WINDOWS 7 System driver

1. In our IOP3927 card series we can support WINDOWS 7 system driver in our IOP3927F card. User can install the driver as following procedure.

2. Because IOP3927F/P1688U card's driver is not in WIN7's driver store, so we can not install driver in WIN7 system automatically.

3. After installed IOP3927F/P1688U card in your PC, we may find one new hardware without driver installed properly in "control panel" "system" "device manager". Please select this device and enter "properties" to update new version driver.

4. Please specify correct driver directory(ex., "A:\WIN2000") to install WIN7 driver.

5. After driver installed, we may find extra COM ports generated.

6. But we may find the COM port number for each serial port do not have correct relationship with physical location. For example, we may have 8 serial ports in P1688U card with physical name port A--H. In WIN2000, XP,Vista system we may have correct relationship for COM3--COM10 in port A--H. In WIN7 system we may have random COM port number for port A--H. It is not easy for user to know which COM port number is which serial port. Fortunately, we have SETUP in IOP3927 card's driver to set COM port start number for serial port A--H. In "control panel" "device manager" you can select IOP3927 card in "multi-serial port card" and double strike mouse to enter "properties" with SETUP screen. Then you can modify COM port start number to other value. So we can have serial port A--H with corresponding COM port sequentially.

7. You can have extra COM port with correct COM port number in next boot.

Chapter 6
How to install Linux driver

Due to the system configuration in different environment may have big difference in kernel image. So we support source file type driver in Linux system. User must have kernel source file in their system. Then user must use this kernel source file to generate their run time image file. This run time image file will meet their application environment. This procedure is same as user to have new kernel version available. User may get new kernel version source file from LINUX WEB site. Then they will prepare and generate one run time image file for this kernel version. Our source file type driver will be installed in such system without any problem.

Following is the procedure to install our source file type driver.

1. Please use "tar" command to install all the files in diskette to your Linux system in root directory.

```
# cd /
# tar xvf /dev/fd0
# cd /etc/rayon
# ./Install
```

2. Follow the procedure to configure the module:
   a) choose your Linux distribution type. (Currently we just support Slackware and Redhat media) ===> This action just add our module installation command line in dedicated file of /etc/rc.d . For different system they may have different file to be added.
   b) choose your target card type. (Because we have all products in same diskette to install, so you need to select IOP3927 card).
   c) choose your Linux kernel version number. ===> Right now we ship with diskette for 2.2 and 2.4 kernel. For 2.6 kernel please check with supplier.
   d) exit and reboot with new setting.

**********Note**********
We can have upto 64 ports for one IOP3927 card. So our device name will be
/dev/tty[6--7][1--8][a--h]
for box number [1--8] in each card and port number [a--h] in each box.
In 1'st card mode (JP1 short on) is tty6xx and 2'nd card mode (JP1 open off) is tty7xx.
****

3. We suggest that user may have kernel source file in directory
   /usr/src/linux
   If you had different directory path, please link to above path.

4. If you had some "unresolved variable" or error message in next boot procedure, then you must have different run time image version with your kernel source file. Because our driver source file will be compiled and linked with your kernel source file's system configuration. If your run time image had different system configuration with kernel source file, you may have such error condition. In this condition you must use your kernel source file to generate one run time image file as your boot image file. This is very important for kernel version 2.4.x and later.

5. In our system you can have "etty" directory to test your TTY port.This utility file can be used to transmit/receive data and verify in assigned TTY port.

```
   ./etty -t 9600 64K 1 tty61a
```

above command line will use 9600bps to transmit 64KByte data in /dev/tty61a port without flow control.

#######WARNNING###

Because Linux system is not commercialized product. They do not have one fixed interface for driver. So different version Linux system may have different structure. If you had any problem in Linux system, please send me E_mail in rayon@ms1.hinet.net

#######WARNNING###

6. In our system you can have "om" directory to monitor your TTY port.This utility file can be used to monitor all the data transmission/receive action in each port. In one screen we can only show 16 TTY ports. So we have two type utility to show. One type is used to monitor 16 TTY ports only. The other type is used to monitor all TTY ports and change the display screen different 16 TTY ports periodically.

7. When you need to remove our driver, you just need to run "Uninstall" command in /etc/rayon directory.

8. The usage of P1688U card.

P1688U card is special version for IOP3927 card with one F641 box to one card. So all the message for P1688U card will be same as IOP3927 card with one F641 box. In software issue there are no difference for P1688U card and IOP3927 card. So there are no message for P1688U card.

9. How to confirm driver installed successfully.

a)In Linux boot procedure we may have two console out message for IOP3927 card. You can use "dmesg" to check such console out message in boot procedure. Generally you must see the port number for IOP3927 card. If there are no message about IOP3927 card, you may not have driver installed successfully. Please confirm that you have module driver installed command in correct boot initialized file. (In our "Install" script file we just suggest to support REDHAT and SLACKWARE system). Different Linux distribution system may have different file name for boot initialized file. So we may put the module driver installed command in wrong file name. Then Linux system may not install our module driver in boot procedure.

b)After boot procedure you must check the LED in external box to be turned on. In power on reset condition LED is turned off. The driver will check IOP3927 card and external box's hardware. If everything is OK, the box's LED will be turned on. Because our IOP3927 card must have same card type and box type to use. For IOP3927F card we must connect with F641 and F642 box. For IOP3927R card we must connect with R641 and R642 box. For IOP3927A card we must connect with A641 and A642 box. If you just connected with different type card and box, we can not have port available.

c)We can use "etty" to send data in one dedicated port. We can use "om" utility to monitor data transmission function in IOP3927 card.

Appendix A
How to use P640N/P640NU card

A-1: How to use P640N/P640NU card.

P640N card and P640NU card have same software function. So we will use P640N card in following description for P640N card and P640NU card.

P640N card can only support 5V PCI slot. P640NU card can support 5V and 3.3V PCI slot.

P640N card will connect with F641N,F642N,NF116,NF216,NF316,IF108,IF208 and IF308 box.

P640N card can have two types available. One type is memory map mode. The other type is I/O map mode. Due to we can only use I/O map mode to support DOS and WIN95/98/Me system. So the factory default mode is I/O map mode. But some PC may not support I/O map in 512byte size. So we just use 256byte size in I/O map and support only 32 serial ports. The other limitation for I/O map is in WIN2000/XP/2003 system. In such system they just support upto 16 serial ports for I/O map card. In memory map mode we can support upto 64 serial ports in WIN NT/2000/XP/Vista and WIN 7 system. When I/O map mode can not meet your requirement, we need to change to memory map mode.

Every P640N card must have one IRQ assigned. For any system do not support APIC feature we must confirm that this IRQ do not conflict with other system device.

A-2: How to install DOS driver.

Only P640N card in I/O map mode can support DOS driver. When you need to install DOS driver, you need to prepare one directory (for example c:\RAYON). Then we need to copy all files in Windows diskette \DOS directory to this working directory.

a)You just need to run "P640N" in this directory to install driver.
b)The DOS driver API is specified in "READ.ME" file.
c)In directory \DOS\DEMO you can find the demo program with source file.

A-3: How to install WIN95/98/Me driver.

Only P640N card in I/O map mode can support WIN95/98/Me driver.

Once Windows 95/98 system has been started, the Plug & Play function in 95/98/Me system will find the new P640N card. If this is the first time to install P640N card in your 95/98/Me system, you will be informed to install the driver. Please follow the instruction message to input the COM port number start value for first card and second card.

A:\WIN95

NOTE: You must specify correct path for system to find INF file.

When we need to install two P640N cards in one 95/98/Me system, we must confirm to let one card's jumper is ON. And the other card's jumper is OFF.

In WIN98/Me system we need to assign from COM5 or later. Because COM3/4 had been reserved for legacy COM port. If user specify COM port number from COM1/COM2/COM3/COM4 may have some unpredictable problem in some application package.

A-4: How to install NT4 system driver.

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.

a:\NT4.IO ===> specify for P640N card in I/O map mode.

a:\NT4.MEM ===> specify for P640N card in memory map mode.

NOTE: It is very important for user to assign correct directory for each type of cards. Factory is shipped with I/O map mode normally.

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

f) After above procedure we need to select "Binding" function to let more serial port available. If you do not have "Binding" function done, you may not have extra COM port available in next boot procedure.

A-5: How to install WIN2000/XP/Vista driver.

Once Windows 2000 system has been started, the Plug & Play function in 2000/XP/Vista system will find the new PCIPORT card. If this is the first time to install PCIPORT card in your 2000/XP/Vista system, you will be informed to install the driver. Please follow the instruction message to specify the driver location.

A:\WIN2000 (NOTE: don't select wrong path a:\WIN95)

Due to the COM port start number will be assigned by WIN2000/XP/Vista in driver installation procedure. If you need to specify other COM port start number for PCIPORT card, you may need to setup it in our driver. When you installed PCIPORT driver in your WIN2000/XP/Vista system, you can enter "control panel--> system-->Hardware-->Device Manager-->Multi-port serial adapter--> setup" to specify your target value.

In WIN2000 and Vista system the driver for port is installed automatically. In XP 2003 system the driver for port is installed and confirmed for each port.

A-6: How to install WIN 7 System driver.

Once Windows 7 system has been started, the Plug & Play function in WIN 7 system will find the new PCIPORT card. Because our PCIPORT driver for P640NU card is not embedded in WIN 7 system. If this is the first time to install PCIPORT driver in your WIN 7 system, then WIN 7 system can not find the driver for P640NU card. And WIN 7 system do not ask us to install driver for P640NU card.

After installed P640NU card in your PC, we may find one new hardware without driver installed properly in "control panel" "system" "device manager". Please select this device and enter "properties" to update new version driver.

Please specify correct driver directory(ex., "A:\WIN2000") to install WIN7 driver.

After driver installed, we may find extra COM ports generated.

But we may find the COM port number for each serial port do not have correct relationship with physical location. For example, we may have 8 serial ports in P640NU card and one F641N box with physical name port A--H. In WIN2000,XP,Vista system we may have correct relationship for COM3--COM10 in port A--H. In WIN7 system we may have random COM port number for port A--H. It is not easy for user to know which COM port number is which serial port. Fortunately, we have SETUP in P640NU card's driver to set COM port start number for serial port A--H. In "control panel" "device manager" you can select P640NU card in "multi-serial port card" and double strike mouse to enter "properties" with SETUP screen. Then you can modify COM port start number to other value. So we can have serial port A--H with corresponding COM port sequentially.

You can have extra COM port with correct COM port number in next boot.

A-7: How to install Linux system driver.

P640N card has same diskette as IOP3927 card. Detail installation procedure can check chapter 6.

User need to specify the card type with correct item. Because P640N card can be I/O map mode type and memory map mode type. The default condition for P640N card is I/O map mode.

The TTY device name for P640N card is
a) /dev/tty9[1-8][a-h] for 1'st card mode (JP1 jumper on).
b) /dev/ttyA[1-8][a-h] for 2'nd card mode (JP1 jumper off).

A-8: How to install SCO Openserver driver.

P640N card has similar function as IOP3927 card. Detail installation procedure can check chapter 2.

User need to specify the card type with correct item. Because P640N card can be I/O map mode type and memory map mode type. The default condition for P640N card is I/O map mode. After driver installation the driver is in directory /etc/NTCARD. If user installed the driver with wrong type (one memory map card use I/O map card's driver or one I/O map card use memory map card's driver), you may have following error message in boot procedure.

a) NTCARD: ERROR Wrong type driver installed.
   this error message is due to wrong hardware type and driver type. User need to specify correct DRIVER in /etc/NTCARD/OBJ directory. In this directory we have Driver.o as working driver. We also have "Driver.io" for I/O map type driver and "Driver.mem" for memory map type driver. Please copy the target type driver to working driver "Driver.o" file.

b) NTCARD Mem translate error!
   this error message is due to wrong PCI resource report in P640N card. Generally we have I/O map P640N need 512byte I/O map from system. But some system can not support 512byte I/O and don't assign I/O map to P640N card. In this condition user need to memory mode P640N card. (NOTE: new P640N just use 256byte I/O to support 32 serial ports only).

  The TTY device name for P640N card is
a) /dev/tty9[1-8][a-h] for 1'st card mode (JP1 jumper on).
b) /dev/ttyA[1-8][a-h] for 2'nd card mode (JP1 jumper off).

  Because P640N card need IRQ service in SCO Openserver system. SCO Openserver system need to bundle IRQ service routine to kernel. So we must know the IRQ number in driver installation procedure. User must insert P640N card in system and install driver. But PCI system is P&P system. So the PC environment changed may let P640N card be assigned different IRQ number. This will let P640N card with wrong IRQ service routine and no data transmission function available. In this condition (system environment is changed and assign different IRQ to P640N card) we need to rebuild driver. User can go to directory /etc/NTCARD and run "./rebuild" to link system again. In next boot procedure you must have correct operation in TTY device.

Appendix B
RAYON REPAIR PROCEDURE

1. RETURN MATERIAL AUTHORIZATION (RMA or RA)

RAYON requires that you provide the following information :

* Model number

* RAYON serial number

* The reason for returning the products

```
#########################################################################
#  We strongly suggest that you can check with RAYON by E_mail before#
#you can confirm the reason for returning the products. Because some #
#problem may be due to wrong software usage or setup.                 #
#                 rayon@ms1.hinet.net                                  #
#########################################################################
```

* Your purchase-order number

You will be given the following information from your RAYON Service Representative:

* Your Return Material Authorization Number (RMA or RA Number)

* Information regarding applicable charges

* The address to which you will return the products

2. REPAIR CHARGES

All RAYON products have a one year warranty. Products that are damaged or modified are not covered.

This limited warranty covers defects in materials and workmanship in your RAYON-branded hardware products. This limited warranty does not cover problems that result from:

*external causes such as accident,abuse,misuse,or problems with electrical power.
*Servicing not authorized by us.
*Usage that is not in accordance with product instructions.
*Failure to follow the product instructions or failure to perform preventive maintenance.

Products that are covered under the original warranty and that are found defective by RAYON will be repaired at no cost. A standard handling and testing charge will be assessed for products returned for warranty repair that are found to be operating properly.

Products that are no longer covered under warranty will be repaired, if deemed repairable, for a flat rate charge regardless of the repair work required.

Please contact the nearest RAYON Service Center for current pricing information.

如何在 SCO UNIX 系統安裝 IOP3927 卡驅動程式

一、基本原理

1.每片 IOP3927 最多可以支持 64 個 COM 端口。每個系統都可以支持兩片 IOP3927 卡。

2.我們的每個 COM 端口採用下列方式來給 TTY 設備名稱。

／dev／ttyCBP　　例如：／dev／tty61a

(1)C 代表卡號。

當 IOP3927 卡設在 1'st 模式（JP1 跳線短接），則 C 的缺省值為 6。

當設在 2'nd 模式（JP1 跳線移除），則 C 的缺省值為 7。

此數值亦可在安裝驅動程式時指定。

(2)B 代表座號。

我們可以有最多 8 個座，所以其值為 1～8。最靠近 IOP3927 的座，其值為 1。

(3)P 代表端口號。其值為 a～h 或 A～H。

二、安裝程序

1.我們可以直接利用〝custom〞命令安裝驅動程式。

2.我們也可以利用〝tar〞命令拷貝磁片到系統上再安裝。

(1)#cd　／　　（先到根目錄）

(2)#tar　xvf　／dev／fd0　　（拷貝磁片）

(3)#cd　／etc／IOP3927　　（到工作目錄）

(4)#.／build　　（執行驅動程式安裝）

3.當安裝完驅動程式在下一次開機時就可以有額外 TTY 設備端口可以使用。

三、安裝注意事項

1.由於我們的 IOP3927 卡與座之間所用的 37 蕊電纜內含＋5V，＋12V，－12V 電源，所以在插拔電纜或座的時候務必要關 PC 電源。最好是把 PC 電源的 AC 線拔掉。因為某些 PC 主板在 PC 電源關閉時仍存在 Standby 電源，此時插拔電纜可能造成 IOP3927 卡或座的不可預期損壞現象。

2.雖然我們的缺省設備名稱為／dev／tty6xx 或／dev／tty7xx，但是使用者可以安裝驅動程式時指定自己所期望的設備名稱。例如：　　／dev／tty2xx。

3.使用者可以利用／ect／IOP3927 目錄上面的〝etty〞應用程序來對端口進行資料的送收動作。

4.使用者可以利用／etc／IOP3927 目錄上面的〝om〞應用程序來監控每一個端口的資料送收狀況。

如何在 Linux 系統安裝 IOP3927 卡驅動程式

一、基本原理

1.每一片 IOP3927 都可以支持 64 個 COM 端口。每一個系統都可以支持兩片 IOP3927 卡。

2.每一個 COM 端口的 TTY 設備名稱，命名規則如下：

／dev／ttyCBP　　例如：／dev／tty61a

C：代表 1'st card 模式（JP1 跳線短接）時為 6。

代表 2'nd card 模式（JP1 跳線移除）時為 7。

B：代表第幾個座，可以為 1～8（最靠近卡的座其號碼為 1）。

P：代表座上面的端口號，可以為 a～h。

3.由於 Linux 系統核心自從 2.4.x 版本開始，受到系統組態設定的影響極大。因此我們是採用源程式方式來安裝驅動程式。如此我們才有辦法配合系統組態安裝模組化（Module driver）驅動程式。

二、安裝步驟

1.當我們由 root 登錄 Linux 系統後，先到根目錄。

2.此時把我們的驅動程式盤片拷貝到 Linux 系統上

```
#cd　／
#tar　xvf　／dev／fd0
```

3.於是可以到／etc／rayon 目錄執行 Install 命令開始安裝工作

```
#cd　／etc／rayon
#　./Install
```

4.於是在給定卡的類型（因為我們所有卡都共用磁片），Linux 核心版本等選項後會開始編程。

5.如果上述動作過程未出現任何錯誤訊息（Error）則下一次開機你就有額外的 TTY 端口設備可用。

三、使用注意事項

1.由於某些 Linux 廠商所提供之 CD 片的執行檔與其所附 kernel 源程式之系統組態並不相同。所以當我們利用 kernel 源程式之系統組態與驅動程式的源程式（source file）進行編譯的結果，可能在開機過程出現〝unresolved variable〞等錯誤。所以使用者必須利用其 kernel 源程式來編譯產生一個執行檔來作開始執行檔才可以避免此問題。這個動作就如同任何一個使用者要由 Linux 官方網站拿到最新版本的 kernel 源程式時，會自行產生一個執行檔的動作相同。

2.由於我們基本上假設 kernel 源程式所在的目錄是在／usr／src／linux 位置，如果您的系統並非用此路徑，則請用〝ln〞命令把路徑鏈結到　　／usr／src／linux 之後再進行我們的驅動程式安裝。否則在編譯過程會出錯。

3.由於 Linux 的核心版本持續更新，而且更新過程某些界面可能會更改，所以可能出現問題。請利用 rayon@ms1.hinet.net 與我們聯絡。

如何在 Windows 2000/XP/Vista 系統安裝 IOP3927 卡驅動程式

一、基本原理

1. 每片 IOP3927 卡最多可以支援 64 個端口。
2. 由於 WIN2000/XP/Vista 系統是 P&P 的系統，所以各個端口的 COM 端口號是 WIN2000/XP/Vista 系統所指定。但是使用者可以在安裝完驅動程式後再到我們的 Setup 進行修改以符合我們的期望 COM 端口號。

二、安裝程序

1. 當 Windows 2000/XP/Vista 系統開機後，其 P&P 功能在偵測到 IOP3927 卡時，會要求安裝驅動程式。
2. 我們要指定其路徑在
   A：＼WIN2000
3. 此後系統會完成卡的驅動程式安裝，然後 WIN2000/Vista 系統會自動完成各個 COM 端口的驅動程式安裝。可是對於 WIN XP 系統而言，我們必須逐一安裝及確認 COM 端口的驅動程式安裝（相當累人，但是 XP 系統要求如此進行）。
4. 當我們完成上述驅動程式過程，則立刻就擁有 COM 端口可以使用，不必等到下一次開機。

三、安裝注意事項

1. 由於我們的 IOP3927 卡與座之間 37 蕊電纜內含＋5V，＋12V，－12V 電源的導線，所以我們在進行電纜的插拔過程務必要關 PC 電源。最好是 PC 電源 AC 線拔掉。因為某些 PC 主板在電源關閉時仍會有額外 Standby 電源存在，此時插拔 IOP3927 卡與座電纜線，可能造成不可預期的損壞結果。
2. 如果我們想修改期望的 COM 端口號可以到〝控制台〞（Control Panel）→〝系統〞（System）→〝硬體〞（Hardware）→〝裝置管理員〞（Device Manager）→〝多埠串列卡〞（Multi-port serial adapter）→〝設置〞（Setup）來查看及修改期望值。例如您的系統可能原先有安裝多種不同類型的卡，因為未移除或移除不乾淨.於是在安裝 IOP3927/P1688U 卡時被給予的 COM 端口號可能不連續.我们最好重新給予新的 COM 起始端口號.於是我們就可以獲得連續 COM 端口號在 IOP3927/P1688U 卡的串口上。
3. 基本上我們在安裝完驅動程式後可以到〝控制台〞→〝系統〞→〝硬體〞→〝裝置管理員〞→〝端口〞來查看我們擁有的 COM 端口號。
4. 使用者可以利用〝超級終端〞（Hyperterm）來驗證每一個 COM 端口的可使用性。

如何在 Windows 7 系統安裝 IOP3927 卡驅動程式

一、基本原理

1. 每片 IOP3927 卡最多可以支援 64 個端口。
2. 由於 Windows 7 系統是 P&P 的系統，所以各個端口的 COM 端口號是 Windows 7 系統所指定。但是使用者可以在安裝完驅動程式後再到我們的 Setup 進行修改以符合我們的期望 COM 端口號。

二、安裝程序

1. 當 Windows 7 系統在插上 IOP3927/P1688U 卡後第一次開機後，其 P&P 功能在偵測到 IOP3927 卡時，因為在其內建驅動程式找不到對應的檔案，所以不會要求安裝驅動程式，而是直接在〝裝置管理員〞標示〝其他裝置〞。
2. 現在我們要自己手動來安裝驅動程式。首先要到〝控制台〞〝系統及安全性〞〝系統〞〝裝置管理員〞看到〝其他裝置〞底下有〝!PCI 簡單通訊控制器〞。
3. 這就是我們的 IOP3927/P1688U 卡，在 WIN 7 系統找不到驅動程式又不問我們如何安裝所放在此處
4. 我們移動滑鼠到此裝置，再雙擊左鍵進〝內容〞畫面.選〝更新驅動程式〞開始安裝驅動程式。
5. 在〝瀏覽電腦上的驅動程式軟體〞時我們要指定其路徑在

   A：＼WIN2000　　或　D:\NCD001\IOP3927\WIN2000
6. 此後系統會完成卡的驅動程式安裝，然後 WIN 7 系統會自動完成各個 COM 端口的驅動程式安裝。
7. 當我們完成上述驅動程式過程，則立刻就擁有 COM 端口可以使用，不必等到下一次開機。
8. 可是我們會發現每一個串口所被指定的 COM 端口號不像 Vista 以前的系統是有規律性而是亂給，幸運的是我們可以利用重新給卡的 COM 起始端口號來重新給定有規律性的 COM 端口號在每個串口上。

三、安裝注意事項

1. 如果我們想修改期望的 COM 端口號可以到〝控制台〞（Control Panel）→〝系統及安全性〞→〝系統〞（System）→〝裝置管理員〞（Device Manager）→〝多埠串列卡〞（Multi-port serial adapter）→〝內容〞的〝設置〞（Setup）來查看及修改期望值。例如您的系統可能原先有安裝多種不同類型的卡，因為未移除或移除不乾淨.於是在安裝 IOP3927/P1688U 卡時被給予的 COM 端口號可能不連續。我們最好重新給予新的 COM 起始端口號.於是我們就可以獲得連續 COM 端口號在 IOP3927/P1688U 卡的串口上。
2. 使用者可以利用〝超級終端〞（Hyperterm）來驗證每一個 COM 端口的可使用性。

如何在 Windows NT 系統安裝 IOP3927 卡

一、基本原理

1. 每一片 IOP3927 卡，可以支持 64 個 COM 端口。
2. 目前只有 IOP3927F 卡配上 F641 及 F642 座可以支援 NT 驅動程式。
3. 我們可以指定 COM 端口的起始號，這個起始號缺省值為 COM3.亦即我們由第一個 BOX 的 Port A 開始其端口號為 COM3,然後由 Port A 到 Port H 逐一會累加其 COM 端口號，然後再由下一個 BOX 開始繼續累加 COM 端口號。

二、安裝步驟

1. 當我們由系統管理員進入 Windows NT 系統，才擁有可以安裝驅動程式的權利。
2. 進入〝控制台〞（Control Panel）畫面。
3. 選擇〝網路〞（Network）設定。
4. 敲選〝添加附加卡〞（Add Adaptor）選項。
5. 指定由磁片安裝，把我們的驅動程式磁片插入軟驅 A。
6. 指定路徑為　A：\NT4
7. 接著對話框，可以指定 COM 端口號的起始值。缺省值為 COM3.您可以指定期望值，但不要與別人衝突。
8. 重新開機後，您可以發現有許多 COM 端口可以使用了。

三、使用注意事項

1. 由於 Windows NT 系統並無 P&P 功能，所以我們在添加卡之後，如果要移除 IOP3927 卡，也要記得移除 IOP3927 的驅動程式。否則我們的驅動程式仍會工作，而可能造成不可預期的問題。
2. 由於 IOP3927 卡與座之間是以 37 蕊的導線連接，其上面除了有 TTL 信號線之外，尚有＋5V，＋12V，－12V 的電源線存在。所以我們要對 IOP3927 卡及座進行插拔動作時，務必要關掉 PC 電源。最好是拔掉 PC 的 AC 線。因為某些 PC 在關掉電源時，仍有 Standby 電源存在。如果其主板設計不良就有可能仍有電源洩漏到 IOP3927 卡與座上面而造成插拔時有損壞現象。
3. 使用者在安裝完成驅動程式重開機，可以由控制台查看有無添加 COM 端口。另外可以使用超級終端（Hyperterm）來使用這些 COM 端口以確認安裝驅動程式正常否。

P640N／P640NU 卡的使用指南

一、P640N／P640NU 卡的使用

基本上 P640N 與 P640NU 卡擁有相同軟件功能，所以我們在底下的說明就以 P640N 卡來代表 P640N 及 P640NU 卡。

P640N 卡只可以插在 5V 的 PCI 插槽，但是 P640NU 卡則可以插在 5V 及 3.3V 的 PCI 插槽。在使用時每一片 P640N 卡都需要一個 IRQ 來使用。當 P640N 卡與 F641N 座及 F642N 座連接時可以支持 64 個端口。每個系統可以支持兩片卡而達到 128 個端口。

基本上我們的 P640N 卡可以採用 I/O 模式，或 Memory 模式，標準出廠時採用 I/O 模式。因為只有 I/O 模式才可以支援 DOS、WIN95、WIN98/Me 等作業系統的驅動程式。然而 I/O 模式也有其限制，由於 I/O 地址空間最多只有 256byte，所以每片 P640N 卡只能支持 32 端口（而非 Memory 模式的 64 端口）。另外在 WIN2000/XP/Vista 及 WIN7 作業系統方面每片卡只能支持 16 端口（而非 Memory 模式的 64 端口）。所以出廠時標準為 I/O 模式，如果用戶使用時可能會超出上述限制則要改成 Memory 模式。

二、如何安裝 DOS 驅動程式

我們只有在 I/O 模式下才可以安裝 DOS 驅動程式。此時您可以在 DOS 系統建立一個目錄（例如：C:\RAYON），然後把 WINDOWS 磁片上面有關\DOS 的目錄底下所有檔案複製到此目錄。

(1)在此目錄下執行 P640N 就可以進行驅動程式安裝。

(2)此驅動程式的 API 定義在 READ.ME 檔。

(3)在此目錄的\DEMO 目錄下可以有一個演示範例包含源程序供使用者參考。

三、如何安裝 WIN95/98/ME 驅動程式

我們只有在 I/O 模式下才可以支持 WIN95/98/ME 驅動程式。一當 WIN95/98/ME 系統開始工作就會找到 P640N 卡，而指示您進行驅動程式安裝。在此我們只要指定驅動程式的目錄位置在 A:\WIN95 即可。其他則可以指示我們卡所擁有 COM 端口號的起始值。

基本上我們如果要插兩片卡在同一個系統上，一定要記住其中一片的 JP1 跳線短接指示 1’st card，另外一片的 JP1 則斷開指示 2’nd card。記得我們的 COM 端口號儘可給定起始值由 COM5 開始，而不要用 COM1～COM4，因為某些應用軟件可能會直接存取 COM1～COM4 的 I/O 地址空間而造成不可預期的錯誤出現。

四、 如何安裝 NT4 驅動程式

由於 NT4 並不是 P&P 系統，所以不會自動找到 P640N 卡及要求安裝驅動程式。所以我們要依照下列步驟來安裝。

(1)先進入控制台（Control Panel）找到网络（Network）項目下，進行卡的添加（Add adapter）。

(2)此時我們指示有磁片可以添加，然後指示路徑為
A:\NT4.IO→如果 P640N 卡在 I/O 模式
或 A:\NT4.MEM→如果 P640N 卡在 MEMORY 模式。

(3)然後依據指示進行 COM 端口號起始值的給定。

(4)完成上述動作，下一次重新開機就可以有額外 COM 端口可使用。

五、 如何安裝 WIN2000/XP/Vista 驅動程式

當 WIN2000/XP/Vista 系統開機後，它會找到 P640N 卡而要求你安裝驅動程式。現在我們最重要的是去指定驅動程式目錄在 A:\WIN2000。

請注意：WIN2000/XP/Vista 系統可能會列出所有的驅動程式，包括 A:\WIN95 目錄的 INF 檔及 A:\WIN2000 目錄的 INF 檔。

我們一定要指示正確的 A:\WIN2000 目錄，如果給錯則出現極大問題。

基本上在 WIN2000/Vista 系統與 P640N 卡的驅動程式安裝完畢，則 COM 端口的驅動程式會逐一自動進行安裝。但在 WIN XP 系統則是 COM 端口的驅動程式則是逐一被要求安裝。

另外要注意 WIN2000/XP/Vista 系統在安裝完驅動程式後，各個 COM 端口號是由系統指示。所以使用者必須到控制台查看，才知道真正的 COM 端口為何值。

六、 如何安裝 WIN7 驅動程式

當 WIN7 系統在插上 P640N 卡後第一次開機後，它會找不到 P640N 卡的驅動程式卻也不會要求你安裝驅動程式，我們只能進入〝控制台〞進行手動安裝。

在〝控制台〞〝系統及安全〞〝系統〞〝裝置管理員〞看到〝其他裝置〞底下有〝!PCI 簡單通訊控制器〞.這就是 P640N 卡在 WIN 7 找不到驅動程式而被放在此.把滑鼠移到此裝置雙擊左鍵進入〝內容〞畫面選〝更新驅動程式〞開始安裝。在〝瀏覽電腦上的驅動程式軟體〞後，現在我們最重要的是去指定驅動程式目錄在 A:\WIN2000。

基本上在 WIN 7 系統把 P640N 卡的驅動程式安裝完畢，則 COM 端口的驅動程式會逐一自動進行安裝。可是我們會發現每一個串口所被給定的 COM 端口號不像 Vista 以前的系統有規律性。這樣對使用者而言管理相當困難.我們必須讓串口的 COM 端口號有規律性.幸運的是我們在卡的〝內容〞可以執行 setup 設定 COM 起始端口號，於是每個串口可以依序給定 COM 端口號。

七、如何安裝 Linux 系統驅動程式

基本上 P640N 卡使用與 IOP3927 卡相同的磁片及安裝程序，所以詳細內容請參考〝如何在 Linux 系統安裝 IOP3927 驅動程式〞相關內容。

由於 P640N 卡有 I/O 模式及 MEM 模式兩種，所以在安裝過程中一定要選對種類。我們的標準出廠模式為 I/O 模式。

基本上 P640N 卡安裝完畢後有下列設備名稱。

(1)/dev/tty9[1～8][a～h]是在第一片卡模式（JP1 跳線短接）。

(2)/dev/ttyA[1～8][a～h]是在第二片卡模式（JP1 跳線斷開）。

八、如何安裝 SCO Openserver 系統驅動程式

基本上 P640N 卡與 IOP3927 卡有類似安裝程序與功能，所以詳細安裝步驟可以參考〝如何在 SCO UNIX 系統安裝 IOP3927 卡驅動程式〞這個章節內容。

由於我們的 P640N 卡可以有 I/O 模式及 MEM 模式，所以我們在安裝驅動程式一定要選對。基本上出廠為 I/O 模式。如果硬體的模式與安裝驅動程式選用的模式不合，則無法正常工作，而且出現下列錯誤訊息：

(1)NTCARD:ERROR Wrong type driver installed.

這是因為硬件的模式與安裝軟件選用的模式不合。我們在 /etc/NTCARD/OBJ 目錄上面有〝Driver.o〞這個驅動程式的工作檔案，另外我們有〝Driver.io〞這個檔是供 I/O 模式的 P640N 卡使用，〝Driver.mem〞是供 MEM 模式使用。請把期望的檔案複製成〝Driver.o〞檔。然後到/etc/NTCARD 目錄底下進行./build 動作重新安裝驅動程式。

(2)NTCARD Mem translate error!

這是因為 P640N 給的 PCI 資源報告有錯誤造成。例如我們問 P640N 卡的 I/O 地址空間位置在何處，結果取得值為不合理值則我們顯示此錯誤訊息。

基本上 P640N 卡的設備名稱缺省值如下：

(1)/dev/tty9[1～8][a～h]是在第一片卡模式（JP1 跳線短接）。

(2)/dev/ttyA[1～8][a～h]是在第二片卡模式（JP1 跳線斷開）。

由於 P640N 卡在 SCO 系統必須使用 IRQ 服務程式，而 SCO 系統又要求 IRQ 服務程式要鏈結到系統核心。所以我們在驅動程式安裝過程必須知道 IRQ 的值。因此使用者安裝驅動程式時 P640N 卡一定要已經插到系統上。可是 PCI 系統本身是一個 P＆P 系統。所以當 PC 系統環境改變時可能被指定給 P640N 卡的 IRQ 值也改變。於是 P640N 卡就有錯誤的 IRQ 服務程式，於是無法進行正常的資料送收工作。在這個時候我們就必須重新建立驅動程式。我們可以在 /etc/NTCARD 目錄下重新執行〝./rebuild〞命令即可。

P1688U 卡的使用

一、 基本原理

P1688U卡是一塊特殊的 IOP3927F卡，我們把一個 F641 連接盒與一片 IOP3927F卡整合到一塊 PCI 卡上面。所以 P1688U卡只能提供 8 個端口。

P1688U 卡擁有一個 DB62 母頭的連接頭，當我們只使用 RS232 界面時，我們可以配合 R801 轉接線與之連接來提供 8 個 DB25 公頭連接頭。或者我們可以配合 R804 轉接線來提供 8 個 DB9 公頭連接頭。如果我們想要使用 RS422 界面時，我們可以採用 R803 電纜連接在 P1688U 卡與 R422 轉換盒之間。R422 轉換盒提供有 8 個 DB25 公頭連接頭提供 RS422 界面。如果我想要使用帶地電位隔離的 RS422 或 RS485 界面，則我們可以採用 R803 電纜連接在 P1688U 卡與 RS4232-8 轉換盒之間。R4232-8 轉換盒提供有 8 個 DB25 公頭連接頭來提供 RS422 或 RS485 界面。我們可以由 RS4232-8 轉換盒的前面板撥接開關（DIP Switch）來獨立指定每一個端口的界面為 RS422 或 RS485。

對於某些人有特殊應用時，他們可能要求一部端口為 RS232 界面，另一部份則要求地電位隔離的 RS422 或 RS485 界面。我們可以採用 R801 電纜與 P1688U 卡連接，另外有 R802 電纜與 RS4232-8 轉換盒連接。對於要使用 RS232 界面的應用，我們就與 R801 電纜上面 DB25 公頭連接頭連接。對於要使用 RS422 或 RS485 界面應用而言，我們先把 R801 電纜上面的 DB25 公頭連接頭與 R802 電纜上面的 DB25 母頭連接頭連接上，再把設備電纜與 RS4232-8 連接的 DB25 公頭連接頭進行連接。

二、軟體使用

P1688U 基本上就是 IOP3927F 卡及一個 F641 連接盒的組合，所以 P1688U 的軟體完全與 IOP3927F 卡相同。我們可以支持 Windows NT、WIN 2000、WIN XP、Vista、WIN7、Linux 及 SCO UNIX 作業系統。

由於 P1688U 卡基本上與 IOP3927F 卡在軟體上完全一樣，所以我們在使用 P1688U 卡在作業系統上，並不會出現任何 P1688U 的字眼，完全只有 IOP3927 卡的字眼。所以任何有關 P1688U 卡的使用，都請參考及遵照 IOP3927F 卡的使用。亦即 P1688U 卡所顯示的訊息必須為 IOP3927F 卡及 8 個端口。如果我們發現其顯示的端口數並不是 8 個端口（可能為 Ø 個端口或 64 個端口或其他非 8 的值）代表 P1688U 卡出現問題，我們有必要送修。

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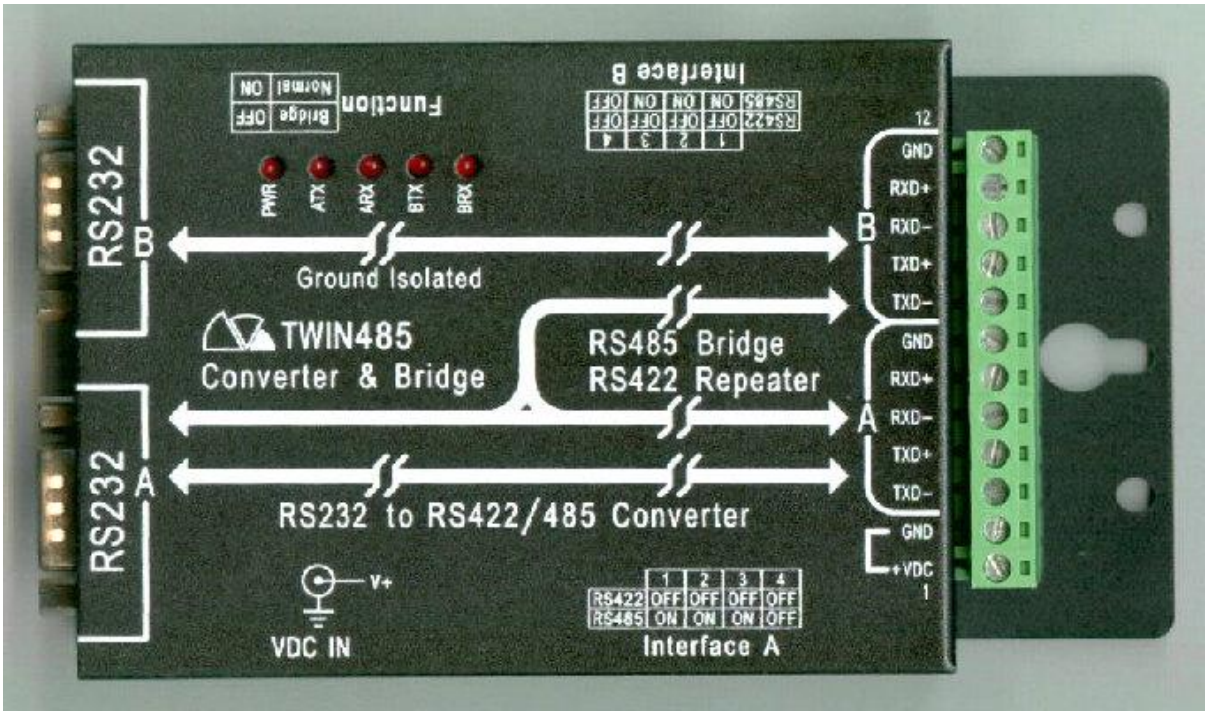

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