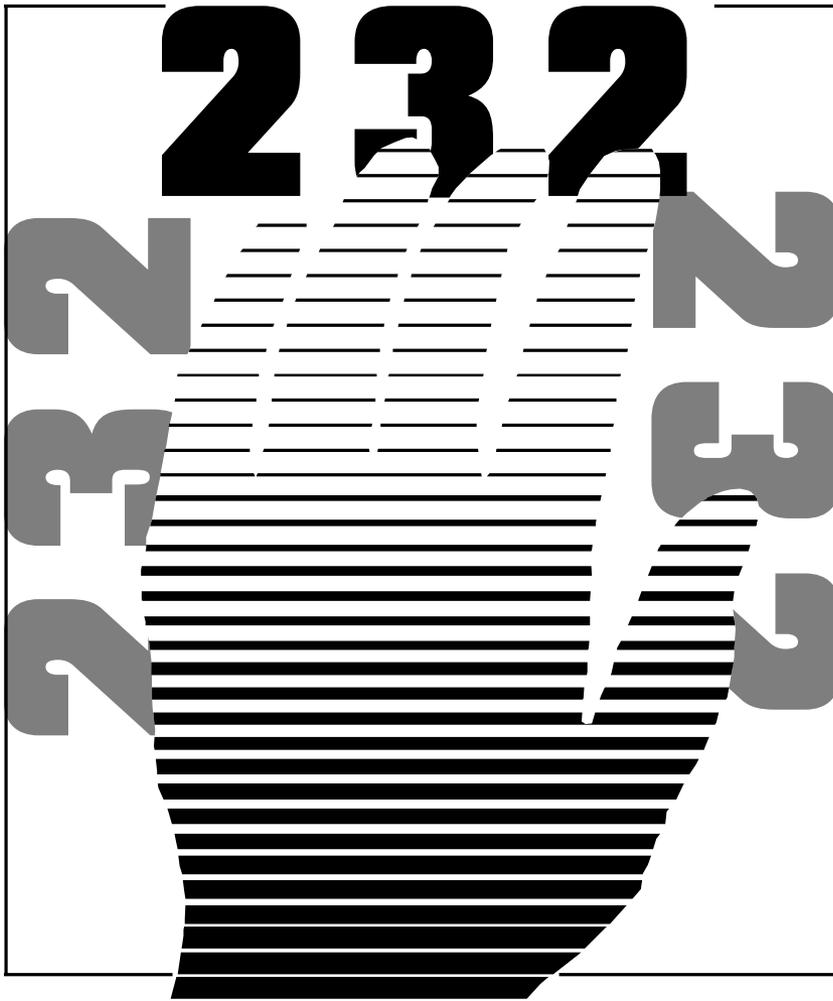


Hardware Manual



PCI

QUAD RS232

2.0 EDITION JUNE 1999

Guarantee.

FULL 36 MONTHS GUARANTEE.

We guarantee your Serial Port Card for a full 36 months from purchase, parts and labour, provided it has been used in the specified manner. In the unlikely event of failure return your interface to your Dealer, with proof of purchase, who will determine whether to repair or replace this product with an equivalent unit.

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ACKNOWLEDGEMENTS.

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THE LAYOUT OF THIS MANUAL

Chapter 1 - PCI Quad RS232 Hardware

Configuration, after a brief discussion on the RS232 standard shows how to configure the settings of the cards. Details of COM, IRQ and Shared Interrupt mechanisms are given.

Chapter 2 – Installing the card into the PC, shows you how to install the card into a IBM PC or compatible.

Chapter 3 – PCI Quad RS232 Software Installation

Chapter 4 – PCI Quad RS232 DOS Installation

Chapter 5 –RS232 Port Cabling

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CHAPTER 1

PCI QUAD RS232 HARDWARE CONFIGURATION.

Introduction.

This chapter explains how to configure the PCI QUAD RS232 in a PC compatible.

This three quarter size RS232 card will work happily in any PC compatible up to and exceeding Pentium III 550 MHz class machines.

PCI QUAD RS232 Card Features.

- Four independent modified RS232 Serial ports.
- Reliable communications up to 50 feet, 15m, and beyond!
- 100% PC Compatible serial port TI 16C554, up to 115,200 baud.
- Fully Plug and Play
- Operationally PCI 2.1 compliant
- Modem control TXD, RXD, DSR, DTR, RTS, and CTS signals.
- Fully double buffered for reliable asynchronous operation.
- High-speed integrated circuitry ensures operation with fast PC's e.g. 550 MHz Pentium III WITHOUT extra wait states.
- 16554 FIFO provides 16-byte input and 16-byte output buffer on each port.

The PCI QUAD RS232 has the following features:

Baud Rate:	50 Baud to 115200 Baud.
Word Length:	5, 6, 7 or 8 bits.
Parity:	Even, Odd, None, Mark or Space.
Start Bit:	1 start bit always sent.
Stop Bits:	1, (1.5 for 5 bit data word length) or 2.
Clock Input:	1.8432 MHz.

Figure 1-1. PCI QUAD RS232 Layout**PCI QUAD RS232 Specifications:**

Dimensions: 105 x 170 mm, 4.13 x 6.8 in

I/O Connection: 4 nine pin serial ports

Serial Port 1: 9 pin Male D type.

Serial Port 2: 9 pin Male D type.

Serial Port 3: 9 pin Male D type.

Serial Port 4: 9 pin Male D type.

The PCI Quad is fully Plug and Play, it's address and interrupt settings will be fully configured by **YOUR** system.

CHAPTER 2

INSTALLING THE PC CARD IN THE COMPUTER.

Serial Card Installation.

Once the card has been correctly configured it can then be installed in the PC. For the PCI card it is best to make a note of the serial port I/O address selection and if appropriate IRQ jumper settings for later use.

Finally cables should be attached and communication with the serial peripheral devices should be established.

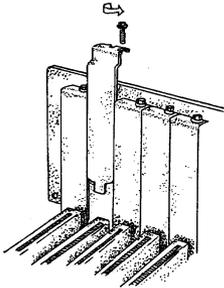
Provided that the RS232 installation is attacked in this orderly manner, everything should work first time. If it does not then check the software selectable communications parameters, Baud rate, Parity, stop bits first, and that the communications program is attempting to access the serial port installed. If this fails to solve the problem check the cable connections. Finally check that the card is indeed configured as you believed.!

NOTE: Always turn the computer OFF before installing or removing any interface board..!!!

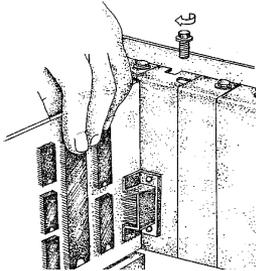
After having made sure that the I/O address and if appropriate jumpers are correctly set, now is the time to insert the PC Serial card into the I/O connector slots in the computer.

STEP 1: Before the PC card can be installed the power to the PC **MUST** be switched **OFF!**

STEP 2: Remove the case.

Figure 2-1. Removing Blanking Cover

STEP 3: Choose an empty appropriate expansion slot. Remove the blanking cover protecting the slot on the PC back panel. KEEP the blanking cover screw safely for later (Figure 2-1).

Figure 2-2. Inserting The PC Serial Card.

STEP 4: Now insert the PC Serial card in the available slot. Be careful to ensure that the gold plated PCB fingers fits neatly into the I/O expansion connector. Press down firmly but evenly on the top of the PC Serial card (Figure 2-2).

STEP 5: The D connectors should fit neatly through the slot's aperture to the outside world. NB. Use the screw kept back from the blanking cover to screw the PC Serial retaining bracket into the PC back panel housing.

STEP 6: Now replace the system units cover by carefully sliding it down and back over the system unit. Replace the cover mounting screws.

STEP 7: After attaching all the monitor and keyboard cables, power up the PC. Do not forget the mains power cable! The PC should power on in the normal way.

Problems!

If the system fails to power up normally check the following.:

- i.) Ensure that the PC Serial card is installed correctly.
- ii.) Ensure that other cards in the PC have not been upset.
- iii.) Ensure that the power is connected and the PC is switched ON!

■ If all these have been checked and the PC still does not power up then there is probably a fault in the hardware. Please contact technical support.

CHAPTER 3

PCI QUAD SOFTWARE INSTALLATION

Introduction.

This section describes the software installation procedure allowing the PCI Quad RS232 to be configured within the Windows 3.x, Windows 95/98 and Windows NT operating systems.

The setup procedures in this chapter assume that your PC has only COM1 present.

Configuring Ports In Windows 3.x

The Windows 3.x installation procedure consists of 2 steps after the PCI Quad RS232 card is inserted:

1. Determining the resources that the PCI Quad RS232 has claimed.
2. Informing Windows 3.x of those resources.

Determining PCI Quad RS232 Resources.

- Insert card into PC, as described in Chapter 2.
- If you are installing from floppy disk run BBCARDS.EXE, from the supplied DOS driver disk titled "Serial Solutions Utility Disk" by typing the following:
`<drive>:\PCI\BBCARDS`
- If you are installing from the Serial Solutions CDROM the path will be `<drive>:\diskimg\ssutil\pci\bbcards`

Where `<drive>:\` is the drive containing the supplied disk.

BBCARDS.EXE will return a string that looks similar to the following (values contained in the string may differ in individual PC's due to resource availability):

```
card 1 is on bus 0, device 16, function 0
Card ID=2, revision 3: Quad
interrupt line IRQ11 has been assigned
4 sets of 16550-compatible registers are at Bank I/O address FF40
SISR is at I/O address FFA0
Baud clock control is at I/O address FFC0
Write 0xf6 for /8 (default), 0xf2 for /4, 0xd6 for /2, 0xd2 for /1.
```

- Note down IRQ, I/O address and SISR (the SISR is the Shared Interrupt Status Register, which is a read only register which returns an index value that identifies which port on the card has an interrupt awaiting servicing by the driver software.) In our example:

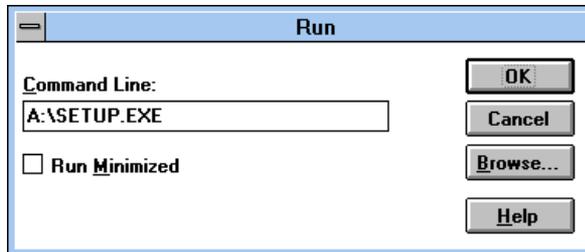
The IRQ = 11

The I/O address = FF40

The SISR = FFA0

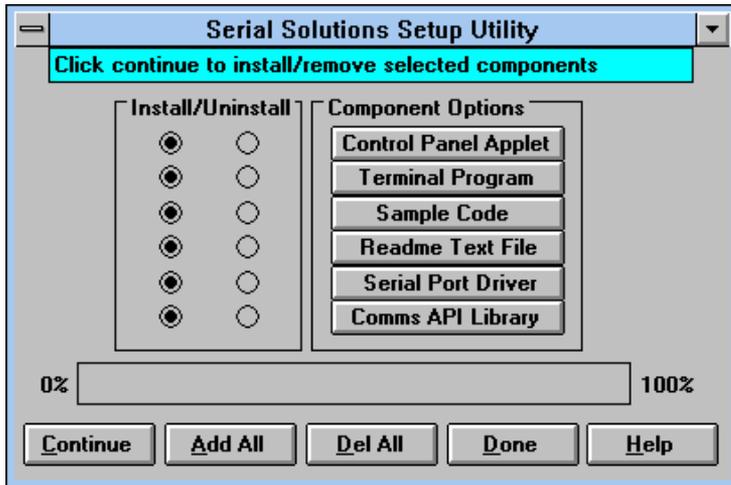
Windows 3.x Software Installation.

Place the Serial Solutions for Windows 3.x disk into a suitable drive. From the File Menu choose 'Run' and enter "a:\setup" (where a: is the path to the floppy drive with the installation disk).



If you are installing from the Serial Solutions CDROM you will need to insert the disk into your CDROM drive select **File, Run** and type in the path <disk>:\disking\sswin3x\setup.exe where <drive>:\ is the letter of your CDROM drive.

- Click OK, the Setup Program Main Screen is displayed:



By default, all component options will be installed, selecting the "Del All" button will select all installed components for deletion and "Add All" chooses all uninstalled components for installation; options may not be changed when the components are installed. For further details on the Component Options consult the README.TXT file on the supplied disk.

If only logical ports COM1 to COM9 are to be used then de-select the Comms API library option in the "Install" column. This library is only necessary to allow the use of logical ports greater than COM9 e.g. COM10, COM11 etc.

- When you have made your choice of Component Options click **Continue** and when the setup program has finished select the **Done** button.

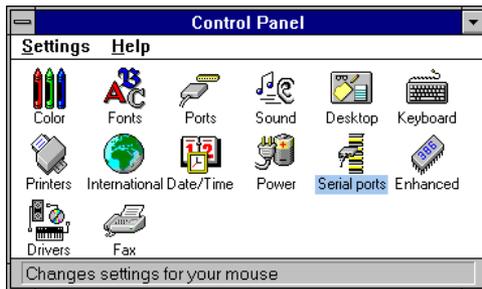
Note: If the Serial Port driver option has been selected, after the setup program has finished, Windows will display a restart message - answer **Yes** and Serial Solutions will be ready to run upon Windows restarting.

Serial Port Installation.

- From **Main**, select **Control Panel**:



- Click on **Serial Ports**:



The following dialogue will be displayed:

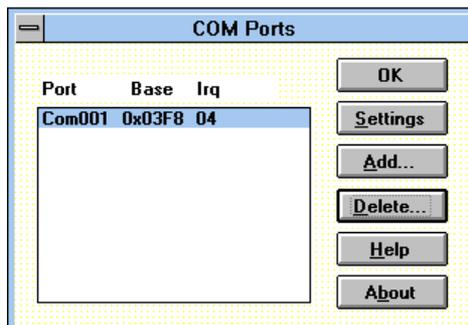
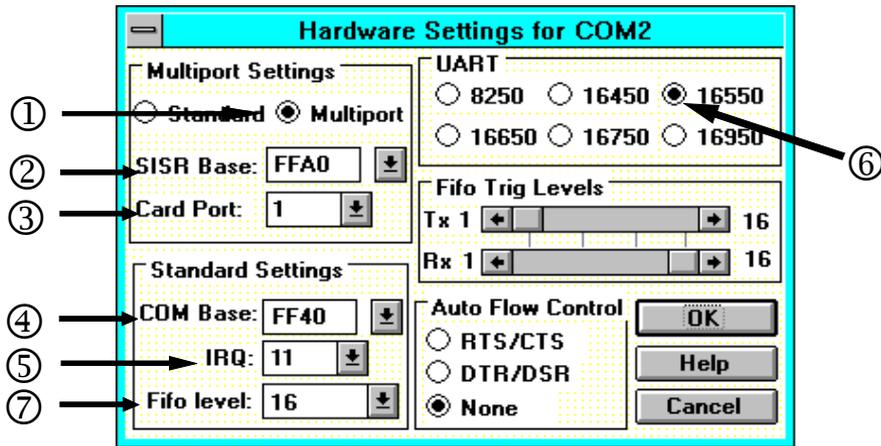


Figure 5-2. PCI Quad Serial Card Settings.**Multiport Settings:-**

① Each Port should have the **Multiport** button selected, this tells Windows 3.x that the port is one of several ports using a SISR (shared interrupt status register).

② The **SISR Base** address must be set as indicated by the BBCARDS program.

③ The **Card Port** setting tells Windows whether this is the first, second, third or fourth port of the Quad card.

Standard Settings:-

④ The **COM Base** is determined from the Bank Address.

⑤ The **IRQ** must be set as indicated by the BBCARDS program.

⑥ The **UART** on the port is 16550 UART.

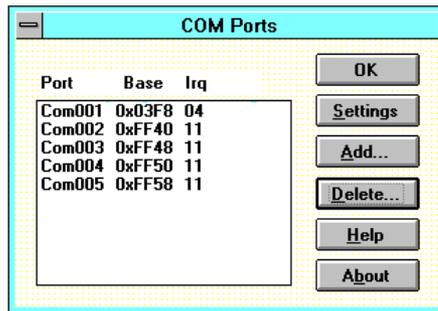
⑦ Having selected the 16550 you can then set the **FIFO level** at 16 bytes.

To add a COM port:

- Click on the **add** button and a Window similar to the following will be displayed:

- **In Multiport Settings:**
 - Select the Multiport radio button.
 - In SISR base box, enter a SISR value of 0104 (this value was returned by the BBCARDS program, as described in the above section.)
 - In the Card's Port field enter a value of 1, as this is the first port of the PCI Quad RS232 to be installed.
- **In Standard Settings:**
 - In the COM Base field, enter the value 0140 (this value was returned by the BBCARDS program, as described in the above section.)
Note: COM ports are defined with an i/o address range, which in this case begins at 0140, and all subsequent ports have an i/o address that is 8 higher than the previous. **i.e.** if COM2(Port1) has an address of 0140h, then COM3(Port2) will have an address of 0148h, COM4(port3) an address of 0150h etc.
 - In the IRQ field, enter the value 11 (this value was returned by the BBCARDS program, as described in the above section.)

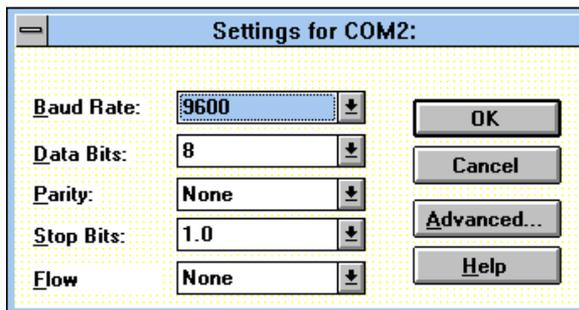
- When you have finished, click on **OK**. A restart message will be displayed; to save time only restart when all four ports have been added and correctly configured.
- Repeat the above process to add the next 3 COM ports of the PCI Quad RS232 . For example, for the second port of the PCI Quad RS232 (designated COM3) the SISR value of **0104** will remain the same, the Card's Port value will be **2** (the second port of the Quad RS232 card), COM base will be **0148** and the IRQ value is **11**. After adding the remaining COM ports the COM Ports Window will look similar to the following:



Configuring The COM Ports.

- From the COM Ports window choose the port that you wish to configure and click on **Settings** - the following dialogue will be displayed:

Note: A port that has been added has the default values of:



Baud Rate: 9600
Data Bits: 8
Parity: None
Stop Bits: 1.0
Flow: None:

Change the communications Settings in the COM Ports to match the baud rate, parity settings etc. of the remote serial device.

Deleting Ports in Windows.

The **Delete** button can be used to discard the entries of ports that have been removed from the system.

Note: Never try to leave out a serial port number when using the delete button, because Windows may automatically shift serial port numbers which results in a mis-match of settings in the Serial Ports Applet (COM1-COM4 only).

Restarting Windows.

Whenever certain values have been entered or changed in the hardware settings window, a message prompting to restart Windows will appear. Only after having made ALL the necessary changes restart Windows so that the new settings come into effect.

Warning

Due to the nature of 'Plug and Play', changes in system can lead to changes in resources allocated to a 'P & P' device.

If you alter your system configuration in any way after installing your PCI Quad RS232 card, you will need to run BBcards to verify the resources allocated to that card.

Installing Ports In Microsoft Windows 95 & 98.

Although covering the installation of the Quad RS232 into the Windows 95 operating system, the procedure is also valid, with only minor differences, in the Windows 98 Operating System. The Windows 95 environment now supports up to 255 standard serial ports, RS232, RS422, RS485 etc.

To obtain a trouble free mix-and-match of the COM ports:

- Switch off your computer, insert your Quad RS232 card into a free PCI slot, as described in the section "**Hardware Installation**" in Chapter 2, and switch your computer on again.
- During the booting process, Windows 95 will detect Quad RS232, but will display it simply as a "PCI CARD", and you will briefly see a message box to this effect.
- Windows will then display the "Update Device Driver Wizard", which asks you to "insert any disk which came with the PCI card". Insert the Serial Solutions CDROM into an appropriate drive and click 'Next'.



- The Wizard should then display something similar to following:



- Click **Other Locations**

- Type "<Drive>:\Disking\SSWIN9x" Where <Drive> is the drive letter of your CDROM drive.

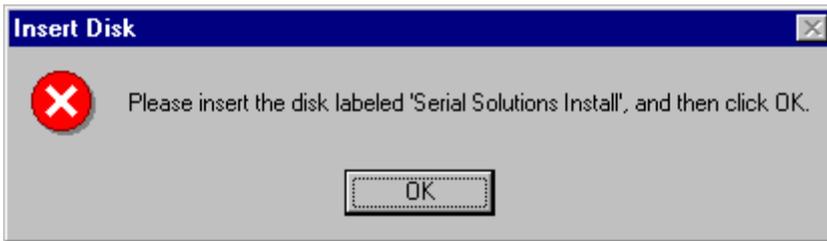


- Click **OK**

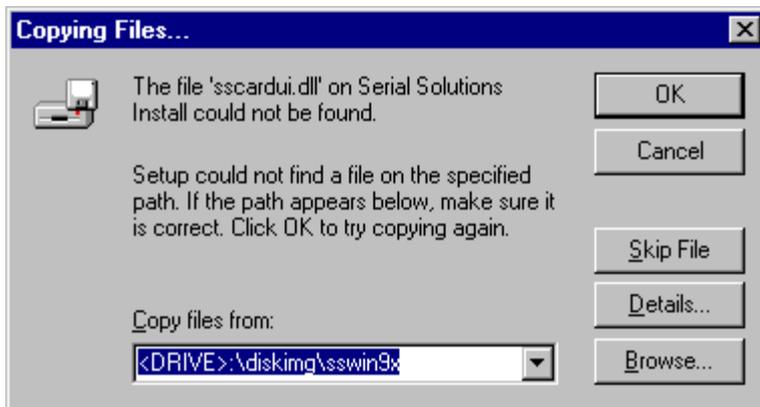


- Click **Finish**

- The following dialog box will appear



- Click **OK**



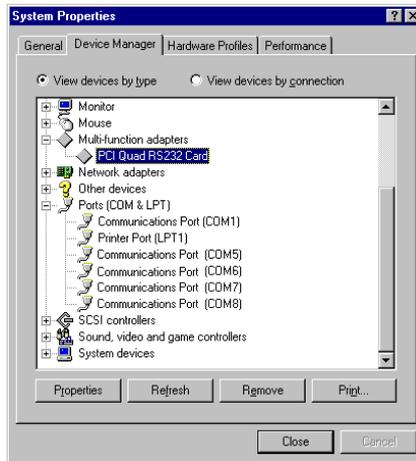
- A "Copying Files..." window should now appear. In the Path type "<Drive>:\Diskimg\SSWIN9x" Where <Drive> is the drive letter of your CDROM drive.
- Click **OK**
- After copying the file, Windows 95 will then detect each of the serial ports in turn and install them as communications ports it will also detect the parallel port, and then install it as a printer port.

Quad RS232 Card Settings

- Right Click **My Computer** => **Properties**



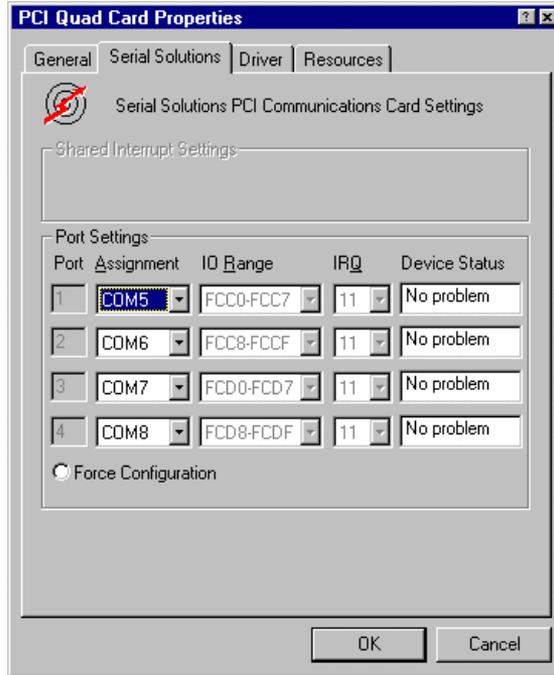
- Select the **Device Manager** Tab



- Quad RS232 will appear under the "**Multi-function adapters**" branch, two Communications Ports and a Printer Port will appear under the "**Ports (COM & LPT) branch.**"

For most users who have 4 or less COM ports the new ports will appear as COM5 and COM6, as pictured below; for users with more than 5 COM ports the new ports will appear as the first available COM ports.

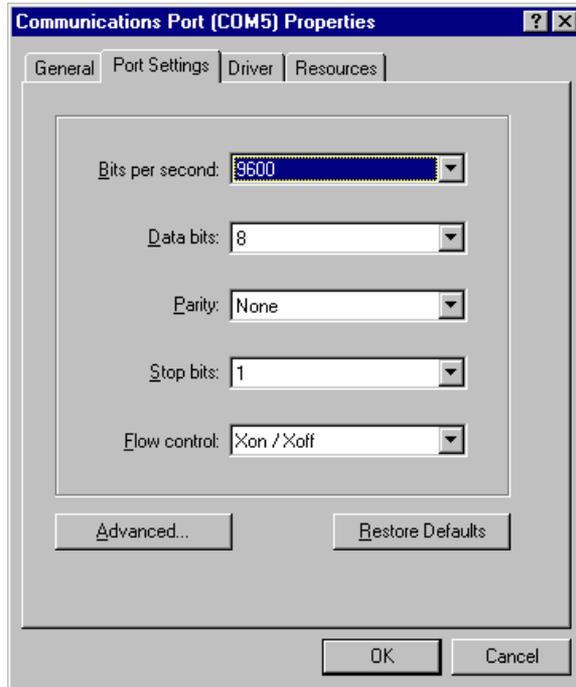
- Select the Quad RS232 card from the "**Multi-Function Adapter**" entry in **Device Manager** and click on properties to view the cards general properties; clicking on the Serial Solutions tab produces:



In this window, the COM (and LPT) port assignment may be changed, simply by selecting a new COM port value from the pull down menu relevant to the port. However, COM port usage other than those for the Quad RS232 card itself are not checked, so it is advisable to first check which COM ports are in use - port availability can be checked by viewing the **Device Manager**.

Quad RS232 Port Settings

Double clicking on a Communications Port that belongs to a Quad RS232 card will display general properties window for that port (in this case COM5). Selecting the Port Settings tab produces:

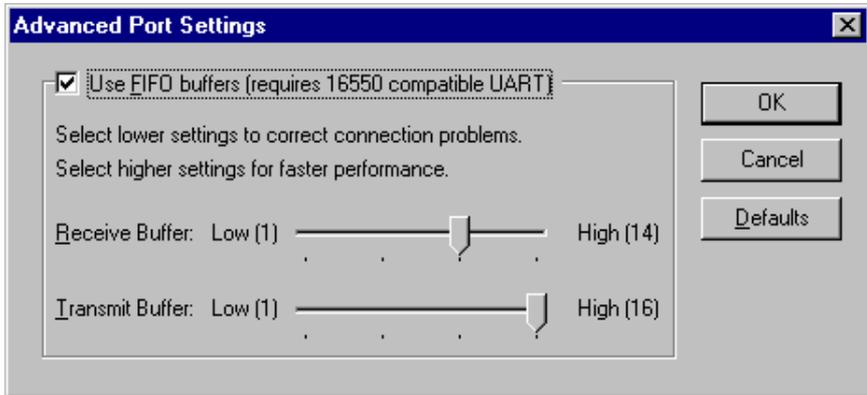


Settings available in these windows are:

1. **Baud Rate** - determines the baud rate at which the selected port operates.
 - The maximum value of operation is 115,200, even though the maximum value selectable is 921,600 - this is due to standard Windows COM port drivers being used.
 2. **Data Bits.**
 3. **Parity.**
 4. **Stop Bits.**
- } Change to suit remote device.

5. Flow Control.

6. **Advanced** - clicking on this will display the following window:



Settings available in this window are:

- **Use FIFO Buffers** - turns the selected ports FIFO buffer on or off. It is strongly recommended that the FIFO for both ports is left enabled.
- **Receive Buffer** - These settings allow the selection of a receiver FIFO trigger setting. Selecting a low value will allow the interrupt to be serviced quicker, which is good for slow machines. If you have a fast machine, setting a high value will give you more time for multi-tasking operations.
- **Transmit Buffer** - These settings allow the selection of a transmitter FIFO trigger setting. Selecting a low value will send fewer data-bytes per interrupt, and this is recommended if you are communicating to a slower machine. Selecting a high value will send more data-bytes per interrupt, and will give more time for multi-tasking operations.

- **Defaults:** when clicked this button restores the advanced settings for the selected port to:

Use FIFO Buffers: On (Checked)

Receive Buffer: High (14)

Transmit Buffer: High (14)

7. **Restore Defaults** - when clicked, resets the selected COM port to the following values:

Baud Rate: 9600

Data Bits: 8

Parity: None

Stop Bits: 1

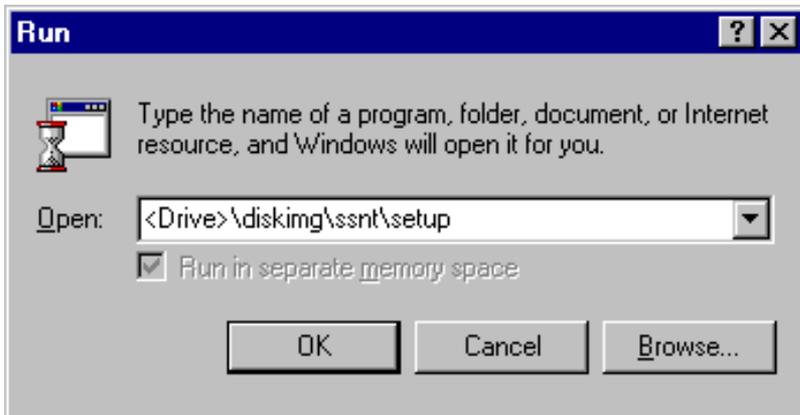
Flow Control: Xon / Xoff

Configuring Ports In Microsoft Windows NT 4.0

Microsoft Windows NT Provides built in support for 255 standard serial ports. To setup your Quad RS232 serial card you should follow these steps. Please note that to change any kind of hardware configuration under Windows NT you must be logged in as a user with Administrator level privileges, if you do not have these please contact your system administrator.

Software Installation.

Insert the Quad RS232 into your PC, as described in chapter 2, and restart. Place the supplied Serial Solutions CDROM in a suitable drive and from the Start Menu choose Run and enter <Drive>:\diskimg\ssnt\setup (where <Drive> is the Drive Letter of your CDROM drive).



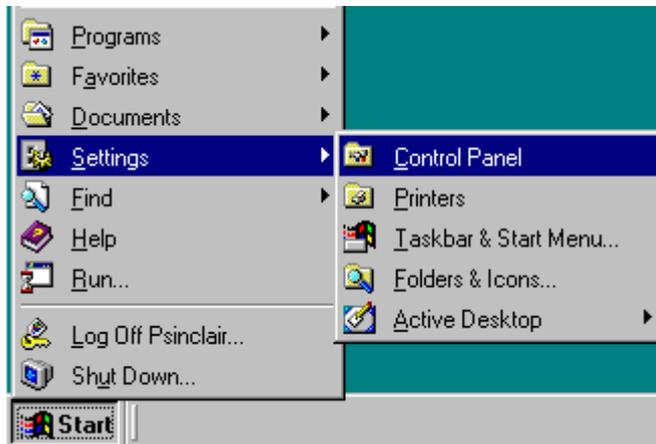
- You will be then see the SSNT splash screen followed by am welcome screen



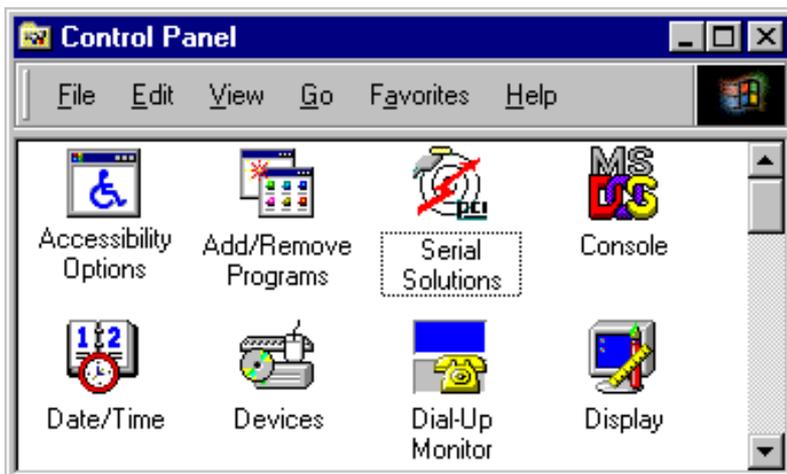
- Click **Next**.
- Installshield will then complete the software installation

Examining Card Configuration.

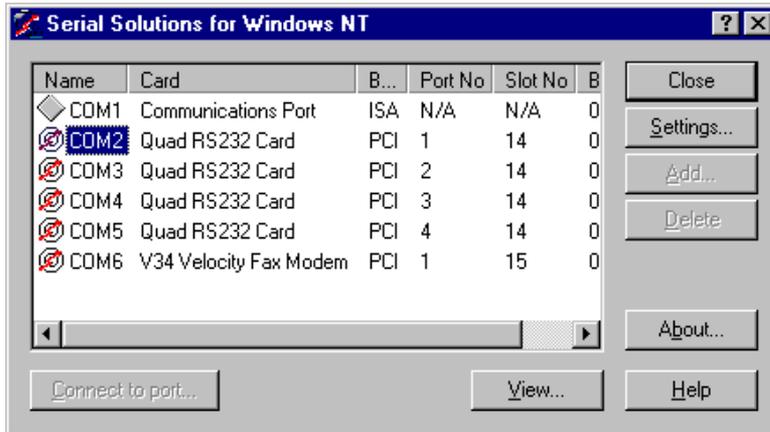
Go to Control Panel (Start/Settings/Control Panel)



- Double Click **Serial Solutions**

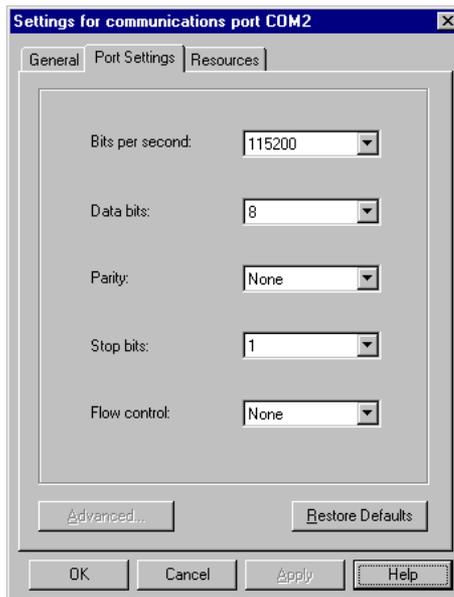


You will be presented with a Serial Solutions PCI Port Configuration window:



Configuring Ports.

To view the settings of a port, select it and click on settings, and then click on the resources tab:



Settings available in this window are:

1. **Baud Rate** - determines the baud rate at which the selected port operates.
 - The maximum baud rate available is 115,200.
 2. **Data Bits.**
 3. **Parity.**
 4. **Stop Bits.**
 5. **Flow Control.**
- } Change to suit remote device.
6. **Advanced** - see the section below, titled "Advanced Port Settings."

7. **Restore Defaults** - when clicked, resets the selected COM port to the following values:

Baud Rate:	9600
Data Bits:	8
Parity:	None
Stop Bits:	1
Flow Control:	Hardware

Uninstalling Serial Solutions PCI.

To uninstall Serial Solutions PCI:

- From Control Panel, open the Add/Remove Programs applet, then close the Control Panel.
- Select from the list Serial Solutions PCI.
- Click the Add/Remove button.

Windows NT will then uninstall the Serial Solutions PCI applet without the need for restarting.

CHAPTER 4

PCI QUAD DOS INSTALLATION PROCEDURE

Determining PCI Quad Resources.

- Insert the card into a PC, as described in Chapter 2, power up the PC
- From DOS Run BBCARDS.EXE, Found on the Serial Solutions CDROM, by typing the following:
`<drive:>\diskimg\ssutil\pci\bbcards`
- If you are installing from floppy disk then the path will be
`<drive:>\pci\bbcards`

Where <drive>is the drive containing the supplied disk.e.g. a:\

BBCARDS.EXE will display a message that looks similar to the following (the values displayed may differ due to resource availability):

```
card 1 is on bus 0, device 16, function 0
Card ID=2, revision 3: Quad
interrupt line IRQ11 has been assigned
4 sets of 16550-compatible registers are at Bank I/O address FF40
SISR is at I/O address FFA0
Baud clock control is at I/O address FFC0
Write 0xf6 for /8 (default), 0xf2 for /4, 0xd6 for /2, 0xd2 for /1.
```

Note the IRQ, I/O address and SISR Address values

In our example:

The IRQ = 11

The IRQ is the interrupt line shared amongst the Quad card's serial ports

The Bank address = FF40

The Bank address determines the COM Port Base addresses in the following manner:

COM Base of port 1 = the Bank Address

COM Base of port 2 = the Bank Address + 8hex

COM Base of port 3 = the Bank Address + 10hex

COM Base of port 4 = the Bank Address + 18hex

The SISR Address = FFA0

The SISR Address is the Shared Interrupt Status Register, this is a read-only register indicating which of the four serial ports requires service by the driver software.

These values will be required when setting up the Newcom.sys DOS device driver

Informing The PC Of The Port Address.

If using Serial Solutions driver Newcom.sys this section should be ignored.

The BIOS of most new PC's automatically detects whether serial ports COM1 - COM4 addresses are present in a machine. Other, older PC's are capable of detecting serial ports COM1 - COM2, but the problem comes with serial ports COM3 and COM4. PC's have a table of information that stores the setup of the PC, this is the BIOS data area. It has space for 4 serial port addresses. The trick, for the older PC's, is to get the right addresses into the third and fourth port areas. However, PC's are not capable of recognising ports above COM4 - specific device drivers are responsible for this.

On the utility disk included with your card there are several programs for setting the COM3 and COM4 addresses. To set COM3 address from the DOS command line enter:-

ADDRCOM3 03E8 <return>

To set COM4 address from the DOS command line enter:-

ADDRCOM4 02E8 <return>

To set the COM port address from within the

AUTOEXEC.BAT file use a text editor to add the following lines to the file:-

ADDRCOM3 03E8
ADDRCOM4 02E8

DOS 4, 5 and DOS 6 have features allowing access to COM3 and COM4. DOS 2 and DOS 3 only allowed access to COM1 and COM2, though some manufacturers their own DOS versions, e.g. COMPAQ, had enhanced MODE commands etc. to set up and use the extra ports.

If you are uncertain how many serial and parallel ports are in the machine, it is wise to run the ADDRCOM3 program BEFORE installing an AT Quad RS232 series card type: -

ADDRCOM3 <return>.

The PC responds with something like:-

COM1: 03F8
COM2: 02F8
COM3: <not set>
COM4: <not set>
LPT1: 03BC
LPT2: <not set>
LPT3: <not set>

If the RS232 installation is attacked in this orderly manner, every thing should work first time. If it does not then check the software selectable communications parameters, Baud rate, Parity, stop bits first, and that the communications program is attempting to access the serial port installed. If this fails to solve the problem check the cable connections. Finally check that the card is indeed configured as you believed.

Settings for DOS Software.

Most users will require that the IRQ is set to correspond to the interrupt used by their serial communications software. **Note**, that a serial port that is USING interrupts must not share the same IRQ line as another serial port that is USING interrupts AT THE SAME TIME, otherwise some interrupts will be missed. IE no two ports may use the same IRQ line simultaneously.

Some serial communications software, especially older versions, assume that COM1 and COM3 both use IRQ4 and that COM2 and COM4 both use IRQ3. Other older packages assume that COM1 is on IRQ4 and that COM2, COM3 and COM4 all use IRQ3. Both kinds of older packages will therefore not allow simultaneous interrupt driven I/O on all four ports. It may be necessary to upgrade your serial communications software.

Newer, more up to date, serial communications programs are configurable. They allow the user to specify the I/O address and the interrupt used by the serial port. Procomm and many other packages are configurable in this way.

Figure 4-1 PCI Quad as COM3-COM6 NewCOM.SYS.

```
DEVICE=NEWCOM.SYS /A3, FF40 /A4, FF48 /A5, FF50 /A6,  
FF58 /L FFA0,7,3,4,5,6
```

- PC already has COM1 installed on IRQ 4
- PC already has COM2 installed on IRQ 3
- Quad card set as Bank shared IRQ 7.
- All interrupts set to Shared

On power up the PC will display the following messages:-

Serial Solutions serial port Device Driver V2.5 6th Jan 1993

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Set address COM3 to FF40h

Set address COM4 to FF48h

Set address COM5 to FF50h

Set address COM6 to FF58h

Setup quad card, status register at FFA0th interrupt line 11

COM3 is card's port 1

COM4 is card's port 2

COM5 is card's port 3

COM6 is card's port 4

Setting number of Buffers to 10

Setting buffer size in bytes to 512

The /A switch is used to set the address of the chip used for a particular COM: port. Thus:-

/A3, FF40 specifies COM3 has an I/O address of FF40

/A4, FF48 specifies COM4 has an I/O address of FF40

/A5, FF50 specifies COM5 has an I/O address of FF50

/A6, FF58 specifies COM6 has an I/O address of FF58

This is the default setting for the Quad cards port 1-4.

The /L switch is used to specify a multiport card with interrupt sharing is in use.

The parameters specify the SISR address, the interrupt line, and how the ports are assigned as COM ports. Thus:-

/L FFA0, 11, 3,4,5,6

Specifies that the Shared Interrupt Status Register, SISR, is at I/O address FFA0 hex, that interrupt 11 is the shared interrupt line, and that:-

Multiport #1 is mapped as COM3

Multiport #2 is mapped as COM4

Multiport #3 is mapped as COM5

Multiport #4 is mapped as COM56

The /B switch, /B 5, works as before and sets the number of buffers to 5. The 5 buffers are 1 for the (built in) COM1: port and one each for the 4 ports on the card.

The /S switch, /S 512, also works as before and sets the buffer size for the 9 buffers specified. This is a 512-byte input buffer and a 512 byte output buffer. When many ports are simultaneously in use in a PC then the larger the buffers the better especially at high baud rates. This allows more time for processing the data before any port's buffer becomes full.

I/O Address.

Switch: /A n,add

Switch: /A n-m,add NEW

Switch: /A n-,add NEW

Purpose:

Set the I/O address of one serial port, COMn.

Sets the I/O address of several ports starting at COMn.

'n' specifies the COM port. 'n' must be given.

If only 'n' is given only one ports address is set.

If 'n-m' or 'n-' are given then the addresses of all the ports in the range is set starting at the I/O address 'add'.

'add' is the address of the port, it must be in hexadecimal, and can be optionally suffixed with an 'h' or 'H'.

For example:

/A1,FF40 /a2,FF48H

Sets COM1 to FF40H and COM2 to FF48H.

For example:

/A3,FF40 /A4,FF48 /A5,FF50 /A6,FF58

Is used with the card to set the I/O address of the serial ports. The above line specifies COM3 to COM6, port#2-5 on the card. The built in COM1 port on the PC and the port#1 will both be found by the PC's BIOS on power up since they are at the default COM1 and COM2 addresses.

Number Buffers.

Switch: /B n

Purpose:

Set number of pairs of buffers to set up.

n is in range 0 to 16 and is the number of buffers to allocate. This is one factor which sets the maximum number of serial ports that can be used in interrupt mode. NewCOM reserves space for the buffers from main memory when the machine is booted.

For example:

/B 5

Reserves 5 buffers, one for the built in COM1 port and one each for the 4 ports on the card.

For example:

/B 4

Reserves space for four pairs of buffers, enough for four serial ports. The default is six pairs. The buffer allocated contains an equal amount of room for both the incoming data and the outgoing data.

Hardware Handshake.

Switch: /H [n],[hs]

Purpose:

Select which hardware handshake type to use on port COMn.

'n' specifies the COM port. If n is not specified the handshake is applied to all serial ports.

'hs' is a number indicating the type of handshake, and 0 is the default. This does not override a previous XON/XOFF setting, in conjunction with which it may be used. The types are listed below and detailed under 'hardware handshakes' later.

For example:

/H1,2 Set COM1, handshake 2

/H,1 Set handshake 1 for all ports

The /H switches are processed from left to right, so for example /H,2 /H1,0 /H2,1 would set COM3 to COM16 to handshake mode 2, COM1 to mode 0 and COM2 to mode 1.

The hardware handshakes currently supported are:

Type 0 RS232 DTR/CTS

Type 1 RS422 RTS/CTS

Type 2 RS485 Half duplex

Type 3 RS485 Send only.

Type 4 No handshake used, only TxD, RxD and Gnd need be connected.

Hardware Interrupt.

Switch: /I n,i

Purpose:

Set interrupt lines for COMn.

'n' specifies the COM port. If n is not specified the interrupt line is applied to all ports.

'i' is the interrupt line in the range 2 to 7 and 10 to 15 or, to indicate no interrupt line, -1 or nothing.

For example:

/I1,4 set COM1 to use line 4

/i,-1 sets all ports to no interrupt

/i2, sets COM2 to no interrupt

The /I switches are processed from left to right, so for example

/I,3 /I1,4 sets COM1 to line 4 and COM2 to COM16 to line 3.

A serial port must be assigned an interrupt line before it can be used. On PC/XT/AT machines and EISA bus machines only one serial port can use an interrupt line. On PS/2 machines serial ports can share interrupts. Multiport cards with special interrupt hardware have different rules- see the information for setting up those cards.

When allocating interrupt lines to serial ports note that the six IRQ lines available to PC cards are traditionally designated as follows:

IRQ 2 Usually Free.

IRQ 3 COM2, COM3, COM4 etc.

IRQ 4 COM1

IRQ 5 LPT2:

IRQ 6 Floppy disk

IRQ 7 LPT1

IRQ 10 Usually Free.

IRQ 11 Usually Free.

IRQ 12 Usually Free.

IRQ 15 Usually Free.

4 Port RS232 cards

Switch: /L add,i,p1,p2...

Purpose:

Set up one or more cards. This command is entirely equivalent with the /D command with which it is interchangeable.

'add' is the address of the Shared Interrupt Status Register, SISR, set on the card.

'i' is the interrupt line set on the Shared IRQ jumper block.

'p1', 'p2', etc. are the COM port allocation for the card. For example if p1 is '3', then port 1 on the card will be accessed as COM3. The COM3 I/O address, ie the address of the card port#1, is specified elsewhere on the CONFIG.SYS file line, using the /A3 switch. The 'p' places can be empty, indicating those ports on the card that are not being set up to use the shared interrupt mechanism.

For example:

/L FFA0,11,2,3,4,5,6,7,8,9

Specifies that the Shared Interrupt Status Register, SISR, is at I/O address FFA0 hex, that interrupt 11 is the shared interrupt line, and

that:-

port#1 is mapped as COM2

port#2 is mapped as COM3

port#3 is mapped as COM4

port#4 is mapped as COM5

For example:

/L 300,7,3,4,5,6

sets up a card with a status register at 0300H. The card uses interrupt 7 as the shared interrupt line. Ports 1 and 2 are designated as COM3 and COM4, Ports 3 and 4 are designated COM5 and COM6, and all the shared interrupt IRQ 7.

Multiple cards can be installed separately, each card using its own status registers and interrupts. Note that although linked cards can share interrupts, separate cards cannot share any interrupt line.

/L 0120,7,3,4,5,6 1st card SISR at 0120

/L 0300,10,7,8,9,10 2nd card SISR at 0300

The interrupt line specified in the /L switch overrides any interrupts set via the /I switch for the same COM ports, because cards use a slightly different mechanism for interrupts.

Buffer Size.

Switch: /S n

Purpose:

Set size of all buffers in bytes. n is rounded to the nearest power of 2, and must be in the range 32 to 32768. For any serial port opened two buffers of size n are allocated, one for input and the other for output. The space for the buffers is reserved by the driver when the machine is booted. For example:

/S 512

sets the buffer size to 512 bytes. The default size is 256 bytes.

Note that in actual operation only n-1 bytes are available, so the default buffer, nominally 256 bytes long, can only hold 255 bytes.

Software Handshaking.

Switch: /X n[,xon,xoff]

Purpose:

Set port COMn to XON/XOFF handshaking. In this mode the hardware handshake lines are ignored and the characters XON and XOFF are used to control the flow of characters on the serial line. The optional parameters XON and XOFF are decimal numbers which are to be used as the XON and XOFF characters. Their default values are 17 (DC1) and 19 (DC3) respectively. For example:

/X2 or /X3,18,20

If n, the port number, is not given, then XON/XOFF handshaking and any specified handshake characters are set for all ports, as /X or /X,18,20

Driver Defaults.

When no switches are specified in the CONFIG.SYS file the following defaults are used:

I/O Addresses.

On PC/XT/AT machines the ROM BIOS checks for COM1 and COM2 at their usual I/O addresses (03F8H and 02F8H respectively), and so these ports are automatically recognised. If a port is present at 02F8H only then this becomes COM1. IBM PS/2 machines recognise the first 4 serial ports are automatically.

Interrupt Lines.

COM 1- 4

COM 2- 3

COM 8- -1 (meaning none set)

Multiport Cards.

No multiport cards are assumed to be present.

Hardware Handshake.

All ports default to H0, the DTR/CTS handshake used by RS232 systems.

Software Handshake.

XON/XOFF handshaking is disabled and the characters are XON=17, XOFF=19, should software handshaking be turned on.

Buffer Size.

Buffers are 256 bytes long.

Buffer Number.

The maximum number of pairs of buffers is 6 (that is up to six ports can use buffered I/O).

Baud rate etc.

These depend on a variety of factors. Ports recognised by the ROM BIOS are reset to 2400 Baud, no parity, 8 data bits and one stop bit when the machine is powered up. The other ports reset to no parity, 5 data bits and one stop bit via the chip reset. They maintain their baud rates over a reboot, but tend to lose them if the machine is switched off, when they reset to approximately 1.8 Baud.

Buffer enabling.

When the machine is rebooted all buffers are deallocated. When a port is first used its buffers are allocated and enabled.

CHAPTER 5

RS232 PINOUTS AND PORT CABLING.

Introduction.

This chapter gives details of the 9 and 25 pin RS232 pin outs, cabling and connections, with information on how to connect the serial ports of two PCs, how to make a selftest loop back connector and the pinouts of the Quad RS232 cards.

The RS232 Standard.

The RS232 standard is ancient in computer industry terms. Introduced in 1962, it is now widely established. RS232 is a slow speed, short distance, single ended transmission system (i.e. only one wire per signal). Typical RS232 maximum cable length is 50 feet with a maximum data rate of 20K bits per second.

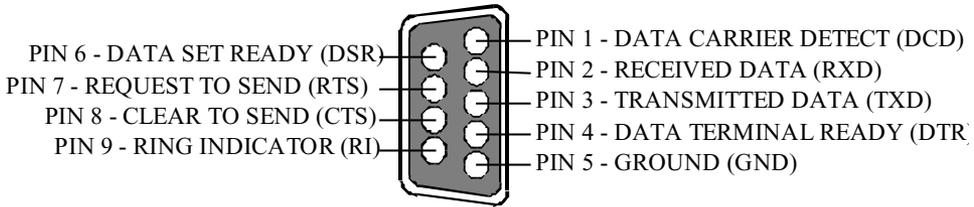
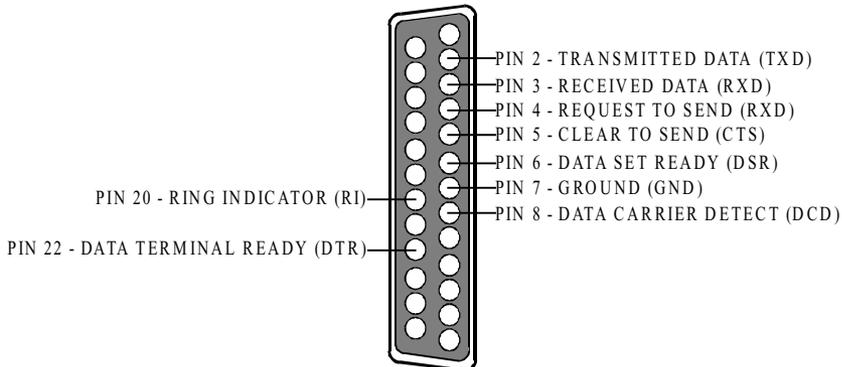
Figure 5-1. RS232 Point To Point Connection.



RS232C Standard	
1 Driver 1 Receiver	
Line Length	Max Data Rate
50 Feet = 15m	20 Kbits/sec

Serial Port Pin Outs.

The pinouts of the 9 & 25 pin Male D connectors are given below.

Figure 5-2. Serial Port RS232 Pin Outs.**9 Pin connector:****25 Pin connector:****9 Pin D Serial Port RS232 Cables.**

To connect to the AT style RS232 Serial Port you will need a cable terminating in a 9 way female D connector. It is sound practice to use cables with screws fitted that will allow you to fasten the cable securely to the PC card.

In general, you will need to make up a "cross over" cable to correctly interface the PC to the RS232 port of another computer or device. Traditionally, making up the cross over cable has been

considered a black art. However, provided you have the pin outs and handshake requirements of both sides of your RS232 connection, the cross over cable becomes a matter of common sense. The cross over cable is simply to ensure that the right signals going out of one RS232 port go into the appropriate lines of the other RS232 port.

9 Pin D Serial Port Connection To Another PC.

Suppose we want to connect the AT style 9 pin D Serial Port to the serial port of another IBM PC 25 pin D. See Figure 8-3.

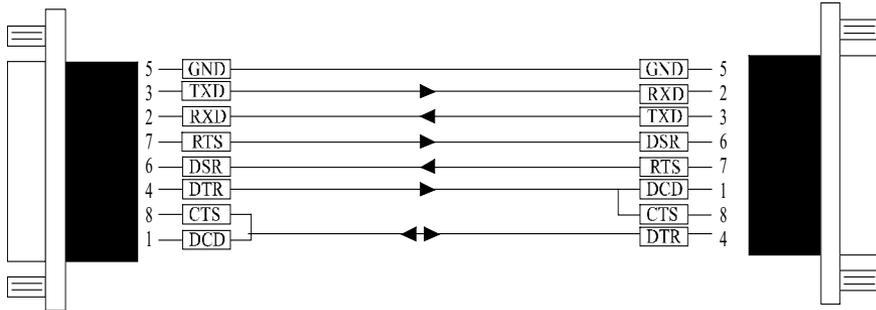
- 1) Connect the earth lines.
Line 5 of Serial Port 2 to lines 1 & 7 of the other PC.
This gives the two devices a common earth level.
- 2) Connect the Transmit and Receive lines together.
Line 3, TXD, Port 2 goes to line 3, RXD, of the other PC.
Line 2, RXD, Port 2 goes to line 2, TXD, of the other PC.
This allows each to receive the data transmitted by the other.
- 3) Connect the Port 2 DTR line, pin 4 to the other PC DCD, pin 8 and CTS, pin 5, lines.
Also, connect up the other PC DTR line, pin 20 to the Port 2 DCD, pin 1 and CTS, pin 8, lines.
This allows the receiving device to signal when it can no longer accept data. The receiving device sets DTR false when it is unable to receive any more data. The sending device reads DTR on its CTS and DCD pins. It should stop sending when CTS goes false.
- 4) Connect the Port 2 RTS line, pin 7, to the other PC DSR line, pin 6.
Also, connect the other PC RTS line, pin 4, to the Port 2 DSR line, pin 6. This RTS line is used to let the other device know that it is ready for data exchange.

Figure 5-3. 9 Pin D Serial Port To Other PC Cable.

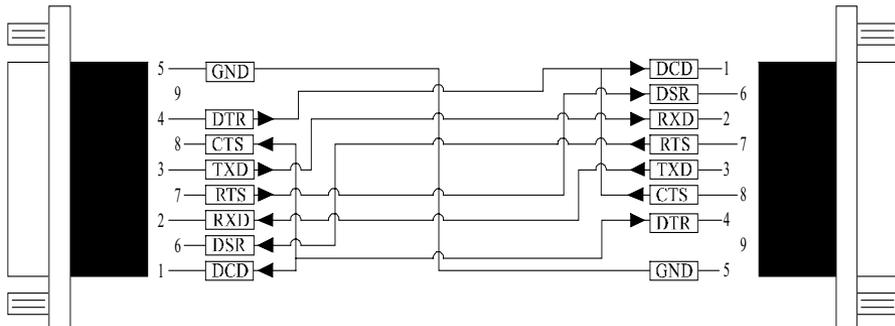
AT SERIAL PORT Side
9 PIN D CONNECTOR

Other PC SERIAL PORT Side.
9 PIN D CONNECTOR

SCHEMATIC REPRESENTATION:



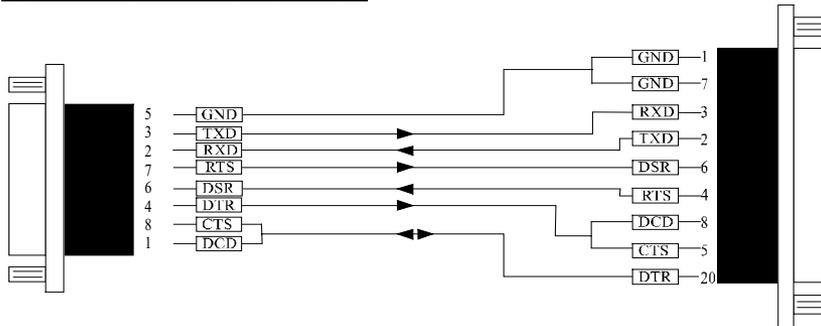
ACTUAL REPRESENTATION:



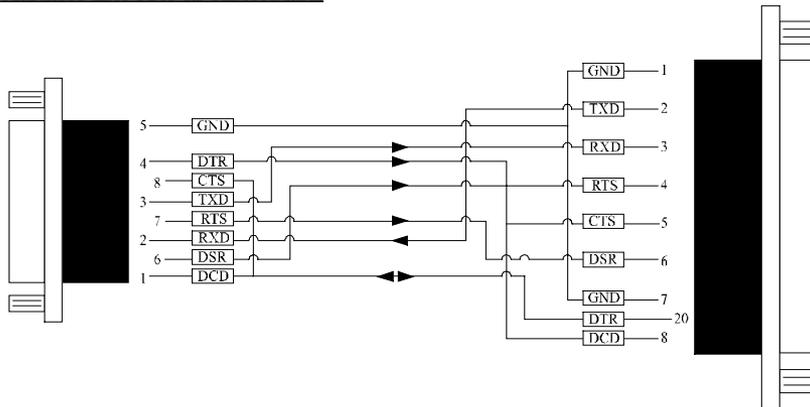
9 PIN D CONNECTOR

25 PIN D CONNECTOR

SCHEMATIC REPRESENTATION



ACTUAL REPRESENTATION



9 Pin D Serial Port To A Modem.

If you are connecting a MODEM to a 9 pin D Serial Port then you will NOT need a cross over cable and a straight through cable connected as the 9 to 25 pin adapter given in Figure 5-5.

9 Pin D Serial Port Loop Back Connector.

A loop back connector can be used to echo RS232 data transmitted by a serial port back into its own RS232 receiver. In this way, the function of the serial port can be tested.

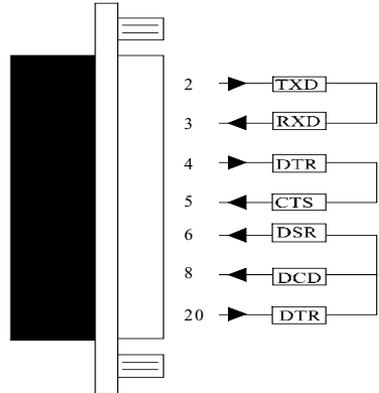
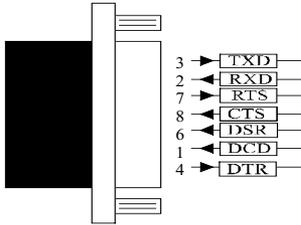
For an AT style Serial Port use the a female 9 way connector wired as in Figure 5-4.

Figure 5-4. 9 Pin D Serial Loop Back Connector.

9 PIN D CONNECTOR

25 PIN D CONNECTOR

SCHEMATIC REPRESENTATION:



ACTUAL REPRESENTATION:

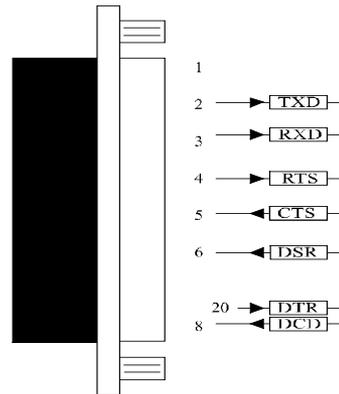
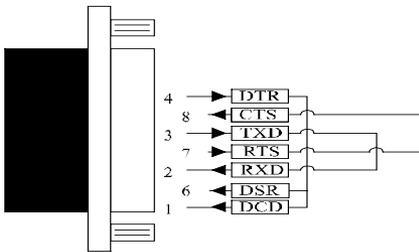


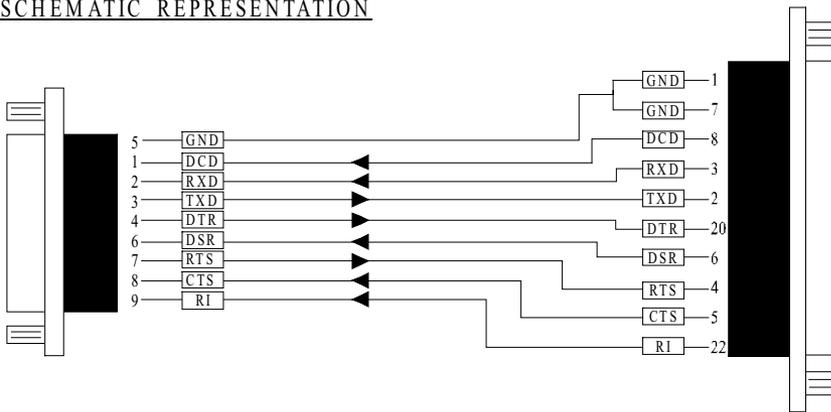
Figure 5-5. 9 To 25 Way Adapter.

This adapter cable makes the AT style 9 pin serial port, look like the standard PC 25 pin serial port. It is NOT a cross over cable!

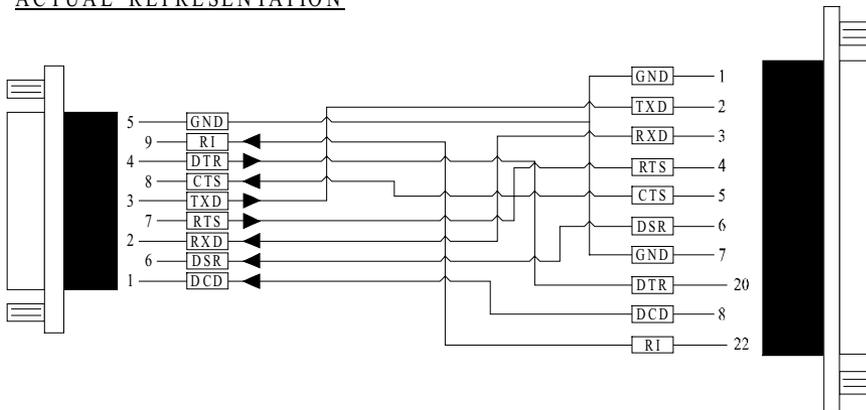
9 Pin AT SERIAL PORT
9 Pin Female D Connector

25 Pin PC SERIAL PORT
25 Pin Male D Connector

SCHEMATIC REPRESENTATION



ACTUAL REPRESENTATION



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