Brain Boxes

1 Port Rs232 Card

By Paul D. Sinclair

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Information

Guarantee.

FULL 36 MONTHS GUARANTEE.

BRAIN BOXES 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 BRAIN BOXES or 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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Due to Brain Boxes commitment to quality, software is subject to continuous improvements: upgrades can be obtained from :

www.brainboxes.com/software

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Chapter 1
Serial Solutions Software

Introduction

This chapter is a brief description of the Serial Solutions software package; this can also be purchased SEPARATELY and is available from YOUR DEALER.

Introducing Serial Solution Software.

The perfect partner for any Serial Port is Serial Solutions Software! Serial Solutions is a fully featured suite of programs designed to squeeze the most from PC serial communications.

Serial Solutions is made up of the following components: -

Serial Solutions for DOS

Serial Solutions for Windows 3.x

Serial Solutions for Windows 9x

Serial Solutions for Windows NT

Serial Solutions for Windows 2000

All the Serial Solutions drivers have the following features: -

- Drivers for PC FIFO UARTs e.g. 16550 as well as the new improved 32 byte 16650 and 64 byte 16750 UARTs.
- Support for any mix of RS232, RS422, and RS485 handshake schemes.
- Support for wider range of Baud rates and for more than 4 serial ports.

Serial Solutions For DOS.

Serial Solutions for DOS consists of the following programs: -

NewCOM.sys

A device driver, it supports COM1 to COM16, allowing 16 serial ports to be used under DOS. It also includes an interrupt handler for enhanced performance with user definable buffer sizes. Accessible from all DOS languages, it is the heart of the Serial Solution.

It has extensive handshaking support, implementing both hardware handshaking using any combination of the DTR, DSR, CTS, RTS, and DCD lines, and a software handshake using the XON/XOFF protocol.

NewCOM24.sys

A device driver providing support for 24 ports.

NewCOM32.sys

A device driver providing support for 32 ports.

NewMode.exe

A replacement for the DOS 'mode com...' command. NewMode is used to set the serial parameters, including the port address, IRQ line used, the baud rate, parity and data and stop bit options. Baud rates supported are from 110 baud to 115,200 baud! Included is a very handy query mode that reports the settings of the various serial ports. Flexible and fast!

EASY programs

The EASY disk contains short, simple to understand and use EASYBAS, EASYC and ASYPAS programs, providing straight forward, file type I/O to serial ports with debug information. Use these FIRST, base your sample applications on them. Source code, make files and compiled ready to run programs supplied.

TERM programs

A suite of larger terminal emulation programs written in C (Cterm), Assembly language (Aterm), Pascal (Pasterm), BASIC (BASterm) and FORTRAN (FORterm) show how to access the NEWBIOS routines as well as the simple file I/O to ports. They contain many lines of code and are thus harder to grasp. They demonstrate in depth serial port programming in a variety of languages but they are also useful tools for using serial devices.

Comtest.exe

Comtest is a short but invaluable program that is used to check that the serial port at a particular I/O address is functioning correctly and is connected to the particular IRQ line. The program correctly identifies the UART type by employing the built in loop back capability of the PC serial port chip, a full test of the baud rate generator, transmitting and receiving buffer, parity enable and start stop bit is performed. There is no need for a second serial port or a cable when using this utility.

Serial Solutions For Windows 3.x

Serial Solutions for Windows 3.x works with Windows 3.0, 3.1 and 3.11 as well as Windows For Workgroups 3.11.

Serial Solutions for Windows 3.x consists of the following programs: -

Setup.exe

The install routine for the package.

Port.DLL

Enhanced Control Panel applet. Allows configuration of extra serial ports from the Windows Control Panel. Supports single as well as multiport cards using shared interrupts.

BbLynx.drv

Replacement for COMM.DRV.

LynxAPI.dll

Enhancement to the Windows Comms API's allowing support for more than 9 ports.

Term.exe

Terminal program.

EasyCWIN

C source code, project files and ready to run.exe program for an easy to understand Windows terminal program. Learn how to write Windows comms apps correctly the easy way.

Serial Solutions For Windows 9x.

Windows 95 has an improved communication API and directly supports up to 255 ports. Our Windows 95 driver supports the shared interrupt mechanism used on our multiport cards. Serial Solutions for Windows 95 consists of the following programs: -

PCI.inf

The information files to aid the

ISA.inf

Installation process "Have Disk....”

ssmodem.inf

Setup file for Serial Solutions modems.

sscardui.dll ssportui.dll

The device manager configuration DLLs and…

ssenum.vxd ssv485.vxd

…the virtual device drivers providing the shared

ssvel.vxd ssmult.vxd ssm485.vxd

interrupt handlers and dispatch routines etc for the various Serial Solutions serial cards.

Serial Solutions For Windows NT.

Windows NT has an improved communication API and directly supports up to 255 ports. No extra driver is necessary for Windows NT to drive multiport cards. Serial Solutions for Windows NT consists of the following programs: -

Setup.exe

Expands into the Control Panel applet and associated files which allows the configuration of all ports on Serial Solutions serial cards.

Ssmodem.inf

Setup file for Serial Solutions modems.

Serial Solutions for Windows 2000

BBISA.inf, BBMulti.inf, BBPCMCIA.inf

The ISA...PCI...and PCMCIA card information files, which make the installation with the hardware installation wizard possible.

BBPort.inf

Information file, which contains information for the installation of individual ports.

ssInstal.sys

The driver, which handles the installation and setup of each card, be it PCI, ISA or PCMCIA.

SsPort.sys

The driver, which gets COM ports going.

SsPar.sys

The driver for Parallel ports

SsCard.dll

A Dynamic Link Library, which provides a user interface to configure cards and their ports under Device Manager / Multi-port serial adapters

SsCard.hlp

The help file for the SsCard.dll user interface.

Complete Documentation and Technical Backup.

We believe in supplying complete documentation with every package we sell. We guarantee your Serial Solution Software package for a full 12 months from purchase. A complete technical backup service is available to ensure that you get the maximum performance out of your investment.

Chapter 2
Hardware Configuration

Hardware Configuration

This chapter details the specifications of the PCI 1 Port RS232 card. This half-sized card will work happily in any PCI 2.0 or greater compliant PC compatible.

General Card Features.

A 9 pin D RS232 Serial port.

Reliable communications up to 50 feet, 15m, and beyond!

Word length of 5, 6, 7 or 8 bits.

Even, Odd, None, Mark or Space parity options.

1 start bit always sent.

1, (1.5 for 5-bit data word length) or 2 stop bits.

Full modem control TXD, RXD, DSR, DCD, DTR, RTS, CTS and RI signals.

Fully double buffered for reliable asynchronous operation.

High-speed integrated circuitry ensures operation with fast PC's e.g.700MHz PentiumIII WITHOUT extra wait states.

16C550 FIFO provides 16-byte input and 16-byte output buffer on each port.

Maximum baud rate of 115,200 Baud.

Clock input of 1.8432 Mhz

Configuring PCI Cards.

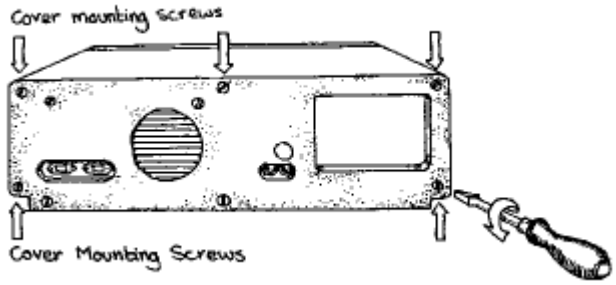
PCI cards, by definition, require no hardware configuration and can be installed "directly from the box".

Chapter 3
Installing the Card

Installing The 1 Port RS232 Card In The Computer.

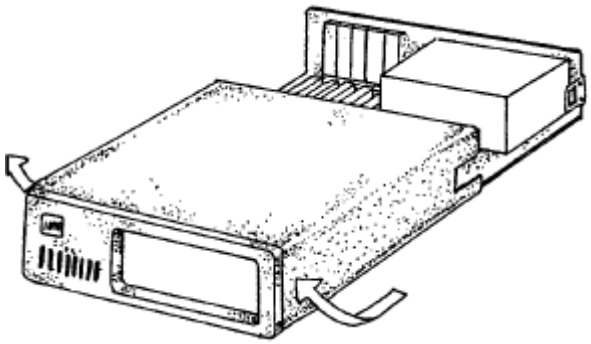
NOTE: Always turn the computer OFF before installing or removing any interface board!

STEP 1:Remove Cover Mounting Screws.



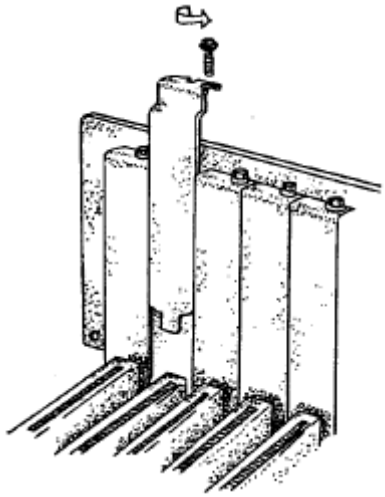
Then using a screwdriver, remove the cover mounting screws on the back panel of the PC system unit.

STEP 2:Remove The PC Cover.



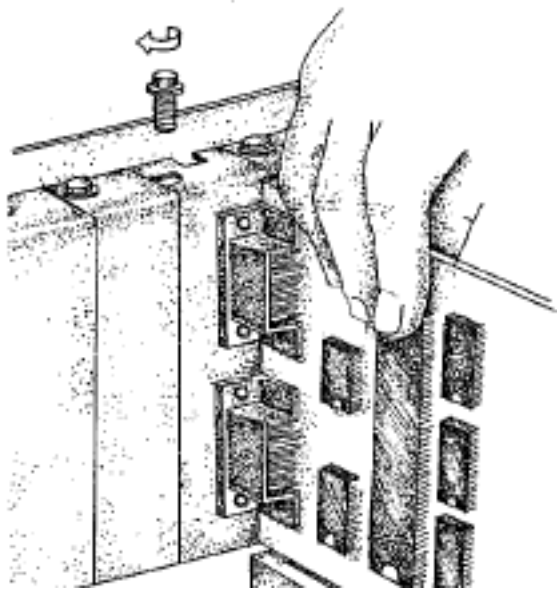
Next, remove the PC's cover by sliding it forward and up. It usually helps to disconnect the keyboard from the PC since it tends to get in the way when the case is removed.

STEP 3: Remove the Blanking Cover.



Choose an empty expansion slot. This Card will fit into one of the white PCI slots on your motherboad. Remove the blanking cover protecting the slot on the PC back panel. KEEP the blanking cover screw safely for later.

STEP 4: Insert The Card.



Now insert the card in the 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 card.

STEP 5: Secure the Card into Your PC

The 9 pin D connector should fit neatly through the slot's aperture to the outside world.

Use the screw kept back from the blanking cover to screw the retaining bracket into the PC back panel housing.

STEP 6: Replace Cover

Now replace the system unit's cover by carefully sliding it down and over the system unit. Replace the cover screws.

STEP 7: Reattach All Cables

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:

1. Ensure that the PC Serial card is installed correctly.
2. Ensure that other cards in the PC have not been upset.
3. 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 inspect the area surrounding the card to ensure that any potentially harmful bits of metal etc. are not present, if the problem persists ask your dealer to check the card or contact help@brainboxes.com

Chapter 4
DOS Installation

Dos Installation

The DOS installation procedure consists of two steps after the PCI Dual RS232 card is inserted:

1. Determining the resources that the PCI Dual RS232 has claimed.
2. Informing the Serial Solutions DOS device driver of those resources.

Insert the PCI 1 Rs232 Card into your PC, as described in Chapter 3 Installing the Card, and restart.

Determining PCI Dual RS232 Resources.

Run BBCARDS.EXE, from the supplied Serial Solutions CDROM by typing the following:

```
<Drive>:\diskimg\ssutil\pci\BBcards
```

```
Where <Drive> is the letter of  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=5, revision 2: 1 Port RS232
interrupt line 11 has been assigned
2 sets of 16550-compatible registers are at I/O address 0140
```

Note down IRQ and I/O which in this case:
The IRQ = 11
The I/O address = 0140

NEWCOM.SYS Parameters.

The NewCOM.SYS device driver included with the PCI Dual RS232 driver software is used to set up the card in DOS and has the following syntax:

NEWCOM.SYS /A port address, /I IRQ,range /B number buffer /S buffer /H hardware handshake

/A port address

specifies COM port number followed by a hexadecimal address in the form /A*x*,*y* where *x* is COM port range and *y* is I/O address.

/I IRQ, range

specifies card interrupt and COM port range. The COM port range specifies the COM port(s). Range may be a single port OR a range of ports.

/B number buffer

is used to set the number of pairs of buffers to be allocated to ports and is a decimal number in the range 1-maxport.

/S buffer

Set size of all buffers in bytes, *buffer* is rounded to the nearest power of 2 and must be a decimal number in the range 32 to 32768. For any serial port opened two buffers of size *buffer* are allocated, one for input and the other for output.

/H hardware handshake

selects which hardware handshake type to use on the specified ports. This is used in the following manner: /H *range*, *hs* where *range* specifies the COM port or ports and *hs* selects handshake type. Handshake types available are:

Type 0 RS232 DTR/CTS - The PC only transmits when CTS is input true. When the PC is able to receive its sets DTR output true. The DSR and DCD inputs are ignored. The RTS output line is set true just in case the external serial device needs a true signal.

Type 4, 3 Wire Handshake - Really no handshake at all since the PC transmits irrespective of the handshake lines. The 3 wires are TxD, RxD and Ground, no other lines are required. Thus the CTS, DSR and DCD inputs are ignored. The RTS and DTR output lines are set true just in case the external serial device needs a true signal.

Note: If hardware handshaking is not specified in the NEWCOM.SYS parameters, type 4, 3 Wire Handshake is selected automatically.

Configuring And Installing NEWCOM.SYS

To load the Serial Solutions for DOS device driver an entry needs to be added to the CONFIG.SYS file. Any simple text editor, EDIT for example, can edit the CONFIG.SYS file for example. The installation procedure given below is for a PCI Dual RS232 as COM 5 - COM6.

The parameter required by the NEWCOM.SYS driver are those returned by the BBCARDS.EXE application earlier. A brief explanation for the parameters required by NEWCOM.SYS follows:

Port Address.

/A5,0140

COM port 5 defined, with an i/o address range that begins at 0140h.

IRQ, Range.

/I 11,5

11 is the IRQ and since the COM port range is COM5 range is entered as 5.

Number Buffer.

/B5

Five buffers are defined, though only two ports are in use - this is because buffers in DOS are assigned in a sequential order from COM1. Since the PCI 1 Port RS232 has been assigned a COM port value of 5 , all preceding COM ports, must have buffers assigned to them also.

Buffer Size.

/S512

Buffer size set to 512 bytes.

Hardware Handshaking.

/H,4

Type 4, 3 Wire Handshake selected for all ports. Type 4, 3 Wire Handshake selected for all ports.

Modifying Command Line Parameters.

When "assembled" the NEWCOM.SYS command line looks like…

DEVICE=NEWCOM.SYS /A5,0140 /I 11,5 /B5 /S 512 /H,4

…and should be entered into the CONFIG.SYS file. Once you are sure that these parameters have been entered correctly, restart your PC and your PCI Dual RS232 should be ready to use immediately. Sample terminal applications are provided on "Serial Solutions CD" enabling communications to be established to your peripherals quickly and easily.

Chapter 5
Windows 3.x Installation

Introduction

The Windows 3.x installation procedure consists of two steps after the PCI Dual RS232 CARD is inserted:

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

Insert the PCI 1 Rs232 Card into your PC, as described in Chapter 3 Installing the Card, and restart.

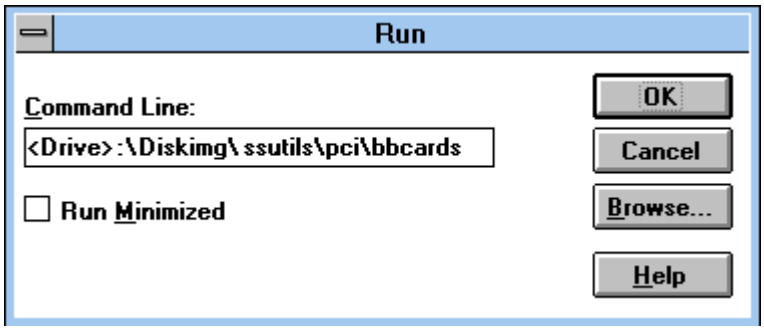
Determining PCI 1 Port RS232 Resources.

Run BBCARDS.EXE, from the supplied Serial Solutions CDROM:

Place the supplied Serial Solutions CDROM disk in a suitable drive. From File Manager choose 'Run' and enter

<Drive>:\diskimg\ssutil\pci\bbcards

(where <drive>: is the letter of your CDROM drive).



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):

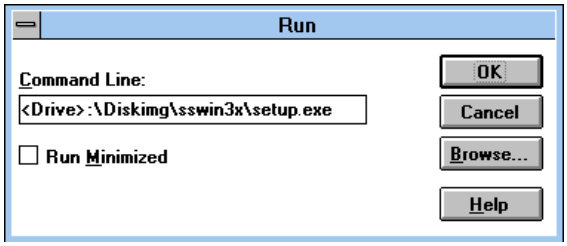
```
card 1 is on bus 0, device 16, function 0
Card ID=5, revision 2: 1 Port RS232
interrupt line 11 has been assigned
1 sets of 16550-compatible registers is at I/O address
0140
```

Note down IRQ and I/O address, which in this case are:
The IRQ = 11
The I/O address = 0140

Driver Installation.

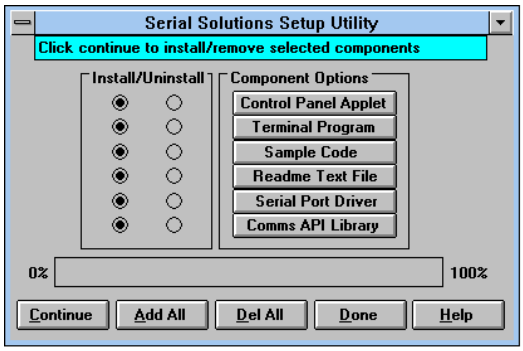
Place the supplied Serial Solutions CDROM in a suitable drive. From File Manager choose 'Run' and enter

```
<Drive>:\diskimg\sswin3x\setup.exe
```



Where <Drive> is the letter of your CDROM drive

Click **OK**



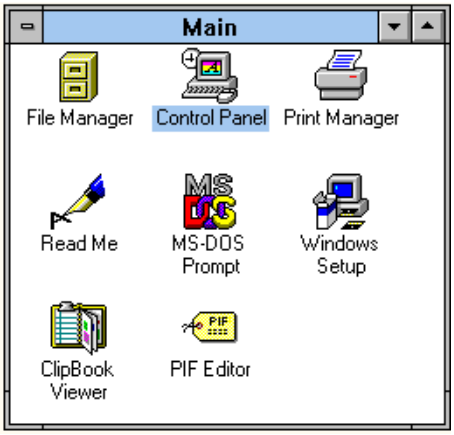
By default, all component options will be installed, selecting the "Del All" button will select all installed components for deletion and "Add All" chooses all uninstalled components for installation; options may not be changed when the components are installed. For further details on the Component Options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

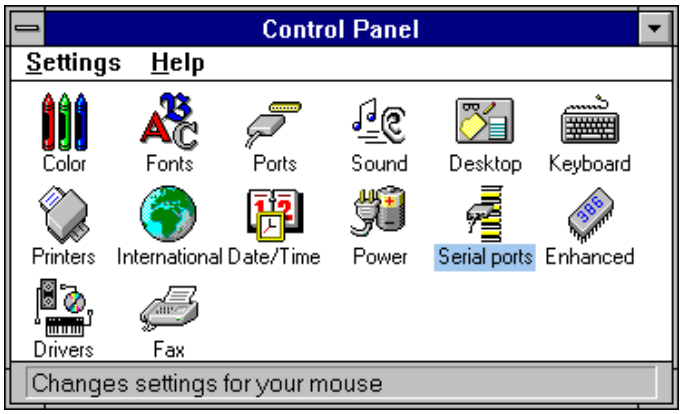
When you have made your choice of Component Options click **Continue** and when the setup program has finished select the **Done** button.

Note: If the Serial Port driver options 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.

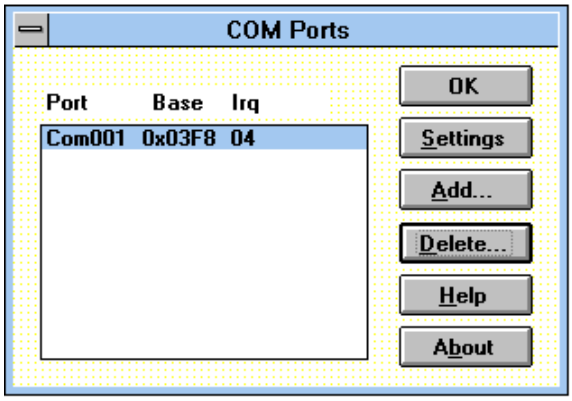
Serial Port Installation.



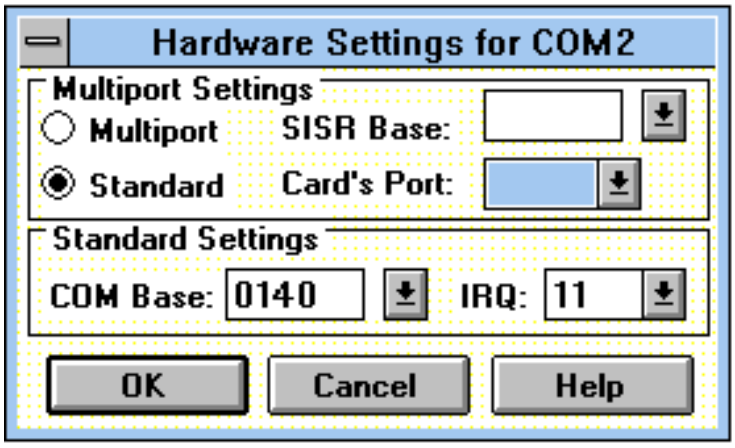
From **Main**, double click **Control Panel**:



Double-click on **Serial Ports**:



Click on the **add** button



In **Standard Settings:**

In the **COM Base** field, enter the value 0140.

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 has an address of 0140h, then COM3 has an address of 0148h.

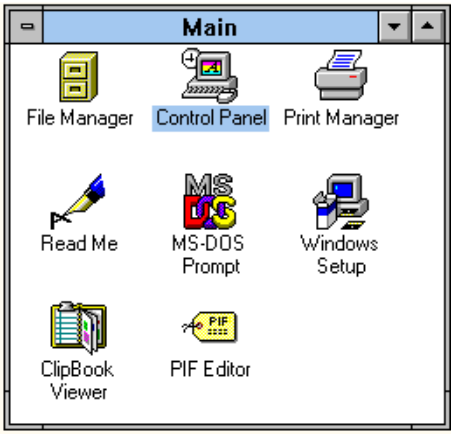
In the IRQ field, enter the value 11.

Note: The values used in the above section were those returned by the BBCARDS program, as described in the above section.

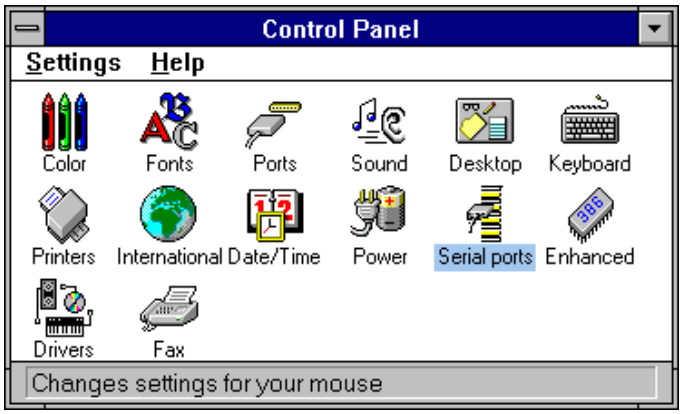
When you have finished, click on **OK**. A restart message will be displayed.

You will now need to reboot your machine

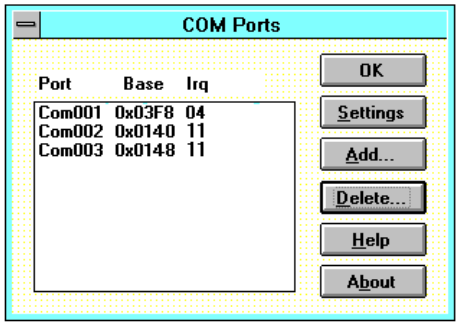
Serial Port Configuration.



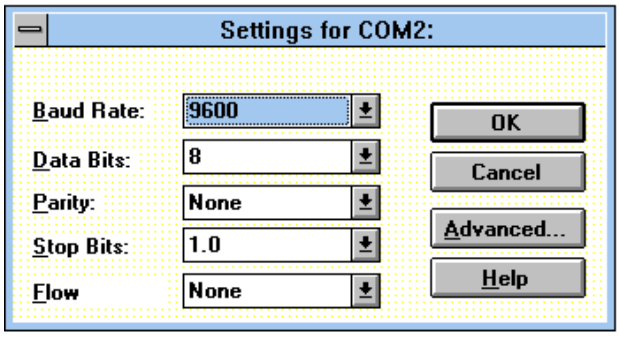
From **Main**, double-click **Control Panel**:



Double-click on **Serial 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

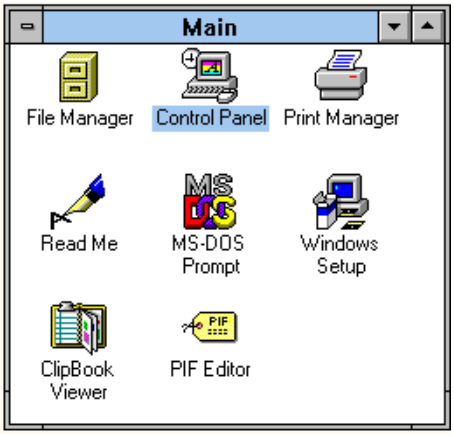
Parity: None

top Bits: 1.0

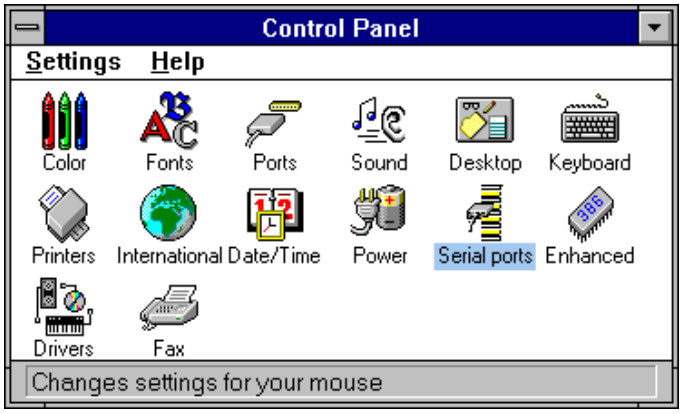
Flow: None

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

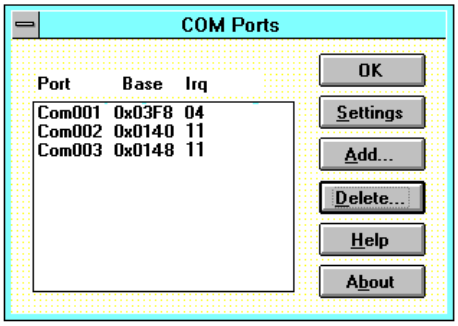
Deleting Ports in Windows 3.x.



From **Main**, double-click **Control Panel**:



Double-click on **Serial Ports**:



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.

Chapter 6
Windows 95 Installation

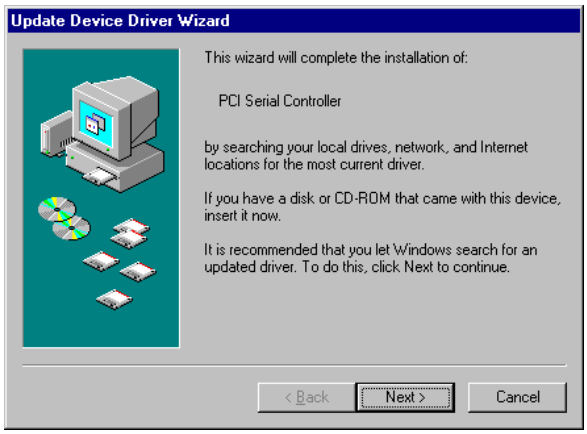
Introduction

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

Insert the PCI 1 Rs232 Card into your PC, as described in Chapter 3 Installing the Card, and restart.

Installing the Driver

During the booting process, Windows 95 will detect the PCI 1 Port RS232 Card, but will display it simply as a "PCI CARD", and you will briefly see a message box to this effect

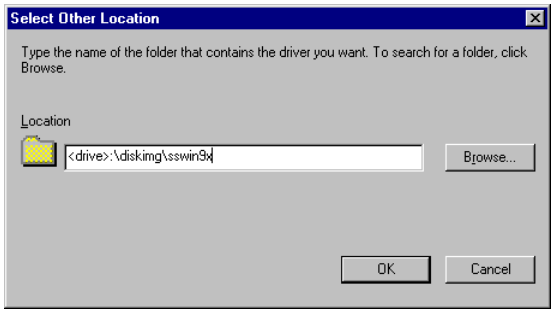


Windows will then display the "Update Device Driver Wizard", which asks you to “insert any disk which came with the PCI card”.

Insert the Serial Solutions CD ROM into an appropriate drive and click **Next.**

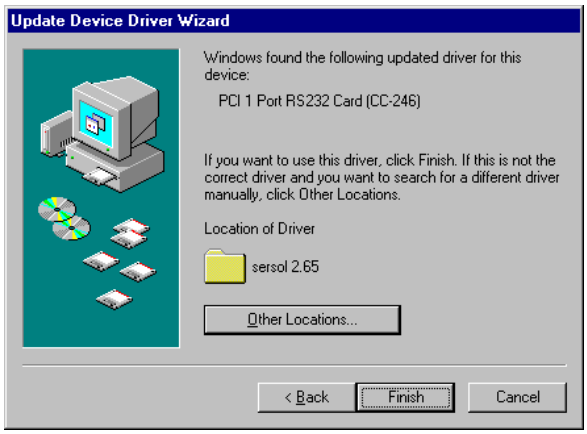
The Wizard should then display the following:

Click **Other Locations**



In the location space type **<drive>:\diskimg\sswin9x** where drive is the appropriate letter for your CDROM drive

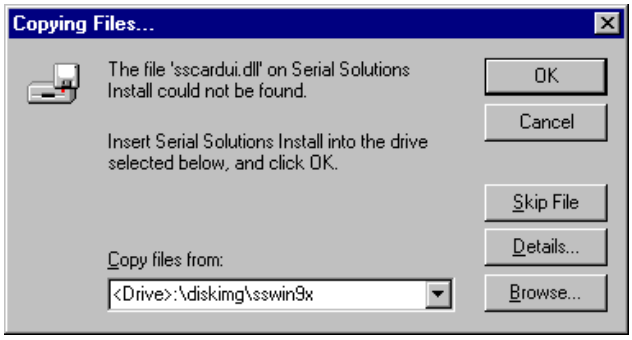
Click **OK**



The screen shot above shows that the **Update Device Driver Wizard** has found a suitable driver and the location of that driver.

Click **Finish**

Click **OK**



In the location space type **<drive>:\diskimg\sswin9x** where drive is the appropriate letter for your CDROM drive

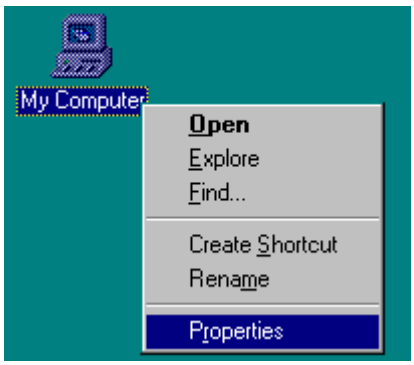
Click **OK**

After copying the file, Windows 95 will then detect each of the serial ports in turn and install them as communications ports.

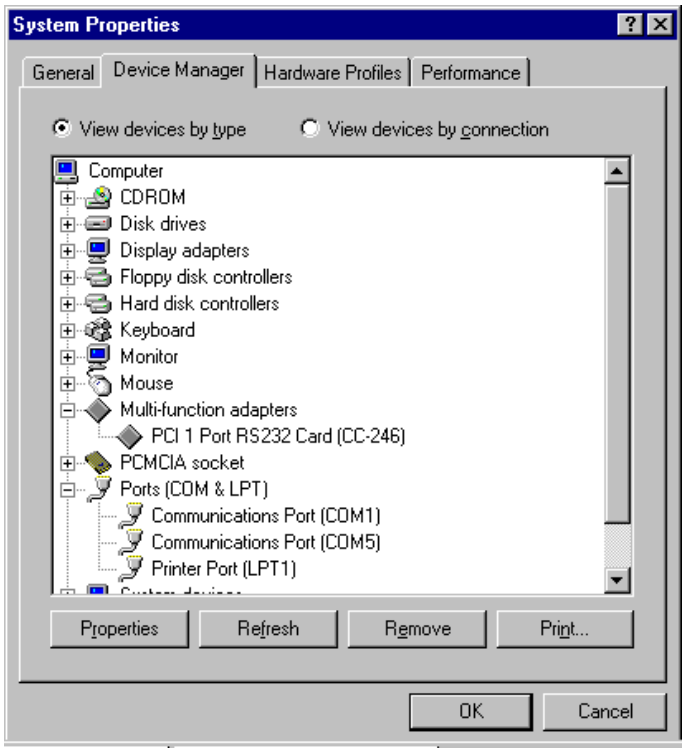
Checking Card Installation

Using the right-hand mouse button click on the **My Computer** icon on your desktop.

Click on **Properties.**



Select the **Device Manager** tab



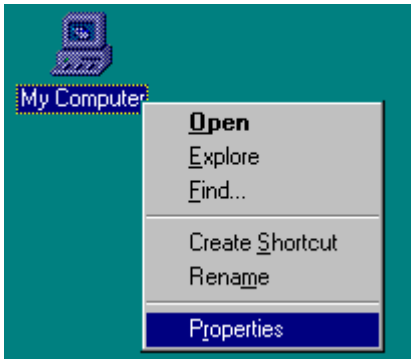
When the "**Device Manager**" is viewed the PCI 1 port RS232 card will appear under the "**Multi-function adapters**" branch. Also, a Communications Port will appear under the "**Ports (COM & LPT) branch**".

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

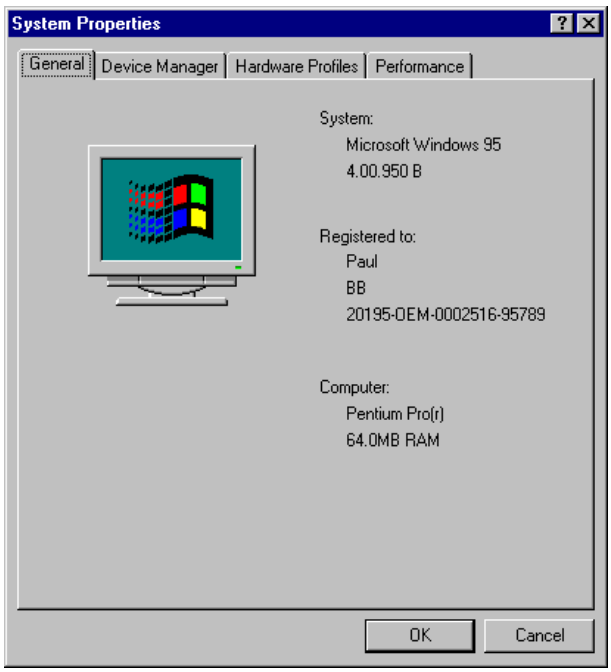
Card Configuration

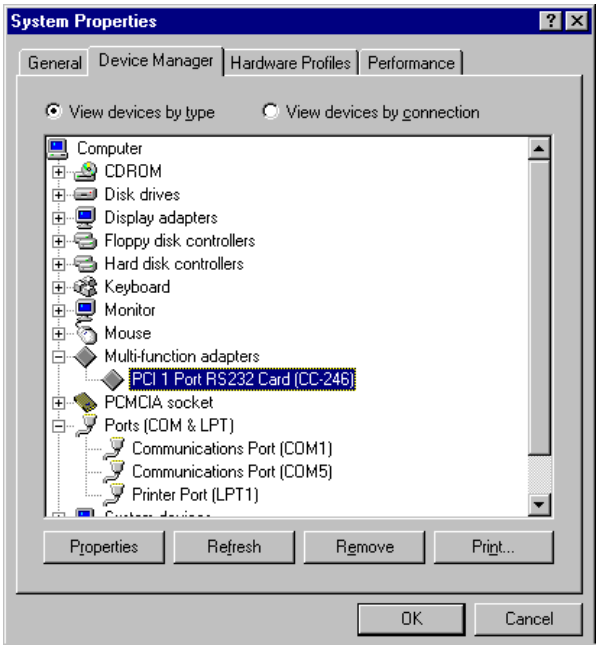
Using the right-hand mouse button click on the **My Computer** icon on your desktop.

Click on **Properties.**



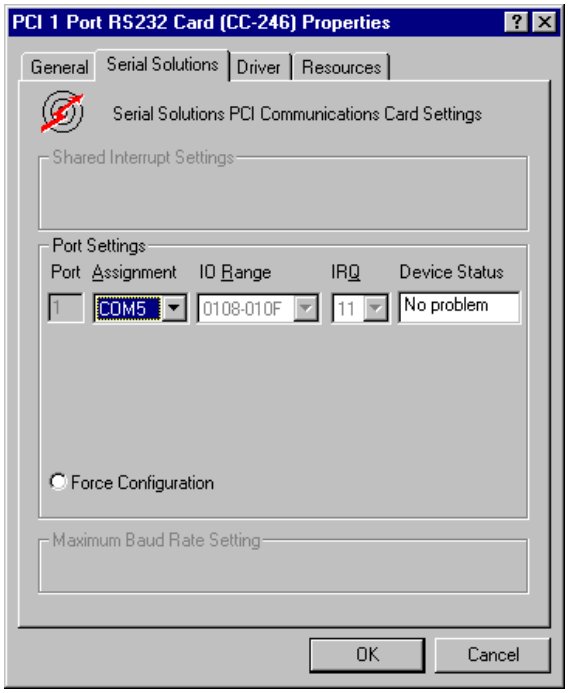
Click on the **Device Manager** tab





By double-clicking on the **Multi-function adapters** label you will reveal any cards that you have installed. Click on the **PCI 1 Port RS232 Card** label to highlight it, then click on the Properties button

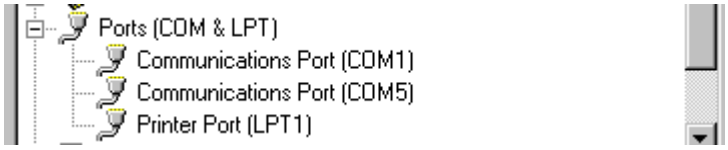
Click on the **Serial Solutions** tab Solutions tab produces.



The I/O address and interrupt are assigned to the card by the "Plug and play" system of the PC. These values CANNOT usually be changed with the current version of the driver.

The Force Configuration radio button enables you to force the I/O address and interrupt and is usually used only for legacy devices which require specific settings. This is an advanced feature which should only be tackled by experieced users.

In this window, the COM 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 PCI 1 Port 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:**



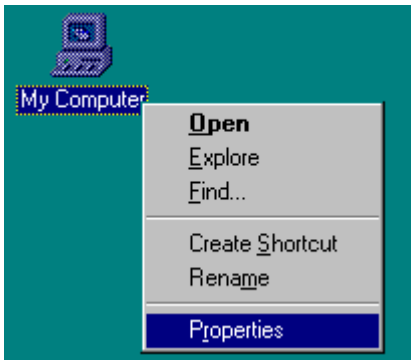
All COM ports present will be listed under the entry "**Ports (COM & LPT)**." The above screenshot indicates that COM2 - 4 and COM6 and above are not installed, and therefore may be used.

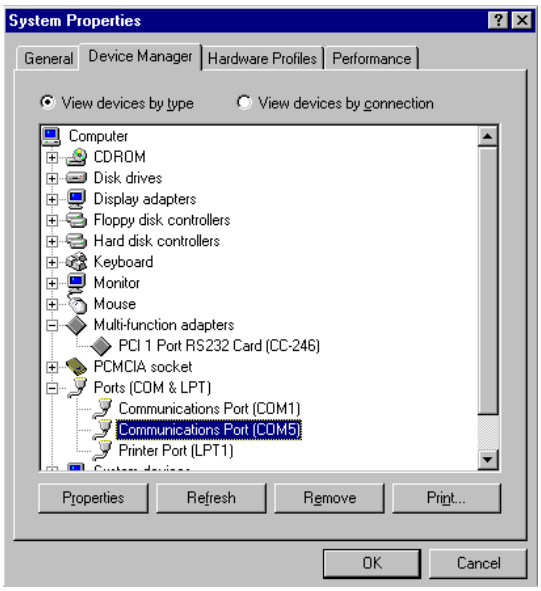
Port Configuration

Open the Device Manager

Using the right-hand mouse button click on the **My Computer** icon on your desktop.

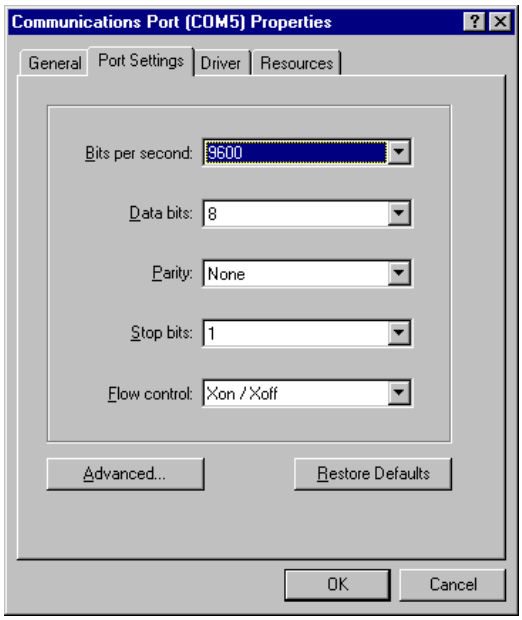
Click on **Properties.**





Double-clicking on the **Ports (COM & LPT)** label you will reveal a list of ports installed on your machine. Click on the port you wish to configure to configure to highlight it, then click on the **Properties** button.

Selecting the **Port Settings** tab produces:



Settings available in these windows are:

Bits per Second - 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.

Data Bits.*

Parity.*

Stop Bits.*

Flow Control.*

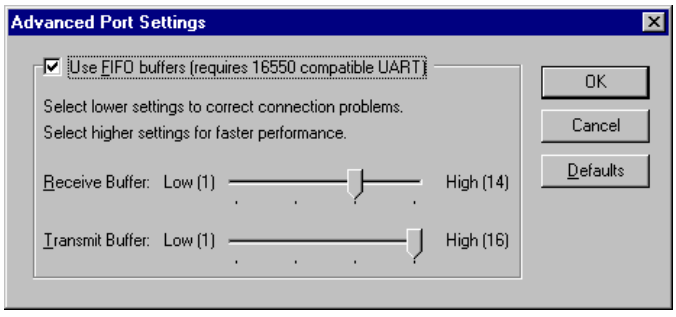
*Change to suit the remote device being used

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

Advanced

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.

Chapter 7
Windows 98/Millenium Installation

Windows 98/Millenium Installation.

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

Insert the PCI 1 Rs232 Card into your PC, as described in Chapter 3 Installing the Card, and restart.

Driver Installation

During the booting process, Windows 98 will detect the PCI 1 port RS232, but will display it simply as a "PCI Serial Controller", and you will briefly see a message box to this effect.

Insert the **Serial Solutions CD-ROM** which came with your card

Click **Next**

Select Search for the best driver for your device.

Click **Next**

Click **Specify a location**

In the location space type **<drive>:\diskimg\sswin9x** where drive is the appropriate letter for your CDROM drive

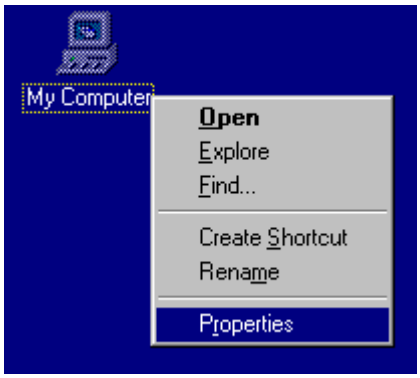
Click **Next**

Click **Finish**

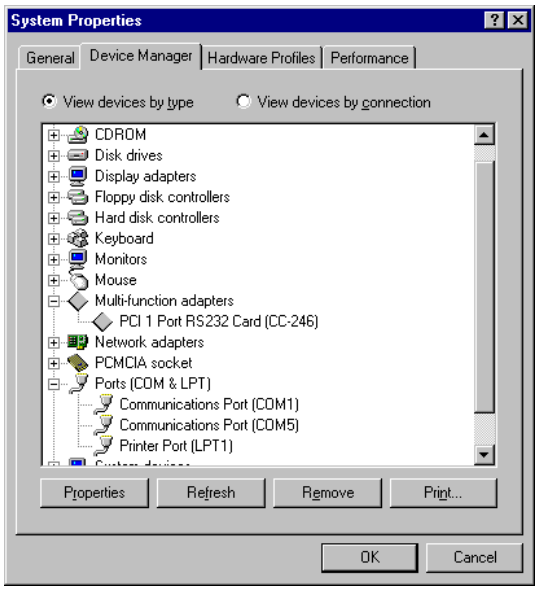
After copying the file, Windows 95 will then detect each of the serial ports in turn and install them as communications ports.

Checking your Installation

Using the right-hand mouse button click on the **My Computer** icon on your desktop. Click on **Properties.**



Click on the **Device Manager** tab



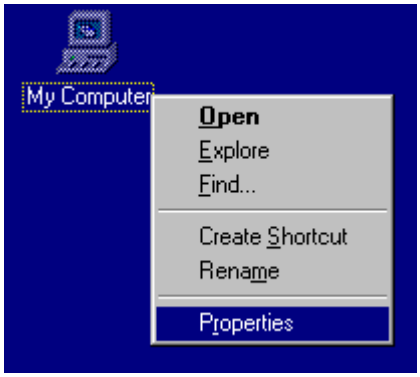
When the **Device Manager** is viewed the PCI 1 port RS232 card will appear under the **Multi-function adapters** branch. Also, a Communications Port will appear under the **Ports (COM & LPT) branch**.

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

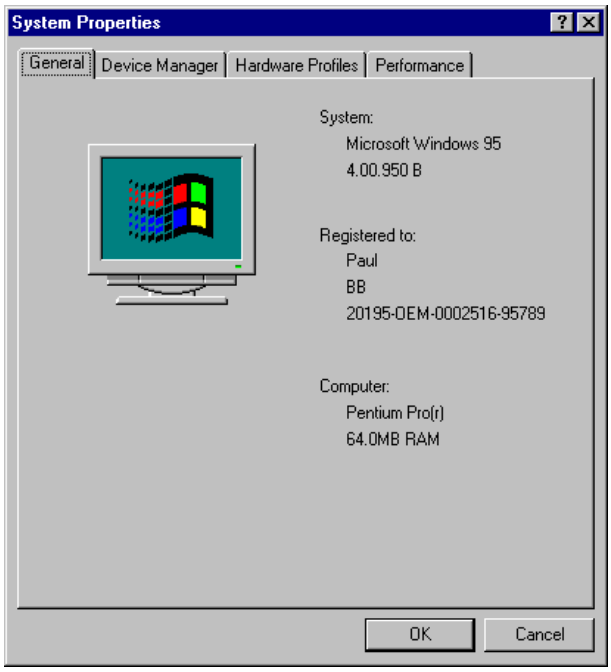
Card Configuration

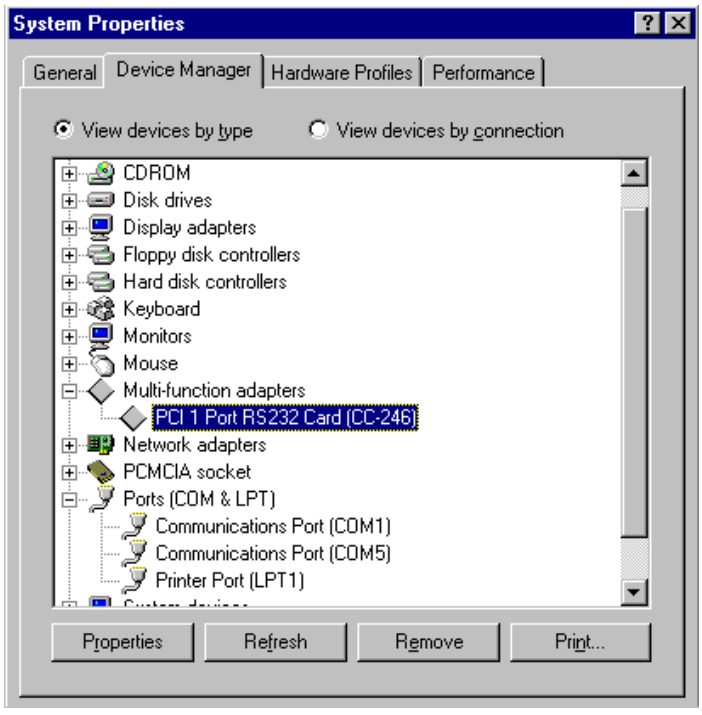
Open the Device Manager

Using the right-hand mouse button click on the **My Computer** icon on your desktop. Click on **Properties.**



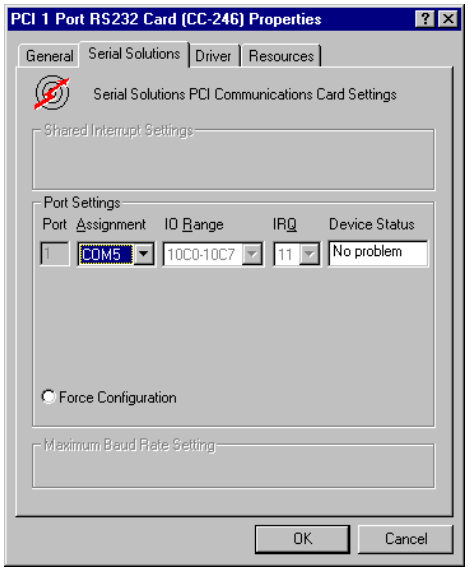
Click on the **Device Manager** tab





By double-clicking on the **Multi-function adapters** label you will reveal any cards that you have installed. Click on the **PCI 1 Port RS232 Card** label to highlight it, then click on the Properties button

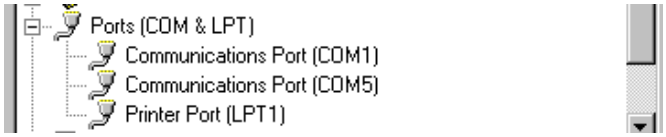
Click on the **Serial Solutions** tab



The I/O address and interrupt are assigned to the card by the "Plug and play" system of the PC. These values CANNOT be changed with the current version of the driver.

The Force Configuration radio button enables you to force the I/O address and interrupt and is usually used only for legacy devices which require specific settings. This is an advanced feature which should only be tackled by experieced users.

In this window, the COM 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 PCI 1 Port 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** window:



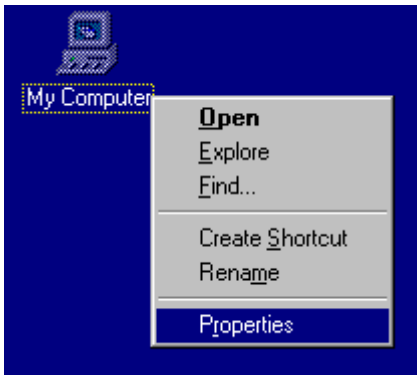
All COM ports present will be listed under the entry "**Ports (COM & LPT)**." The above screenshots indicates that COM2 - 4 and COM6 and above are not installed, and therefore may be used.

Port Configuration

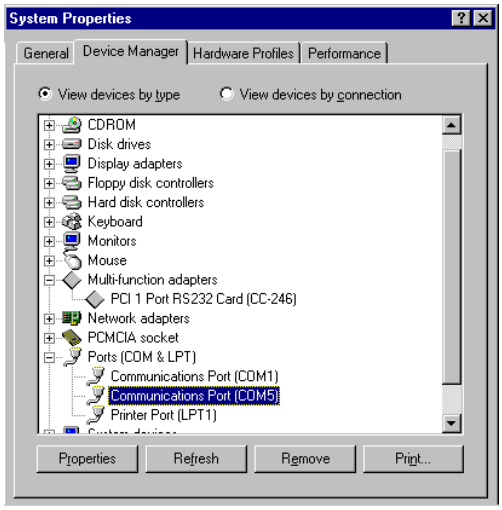
Open the Device Manager

Using the right-hand mouse button click on the **My Computer** icon on your desktop.

Click on **Properties.**

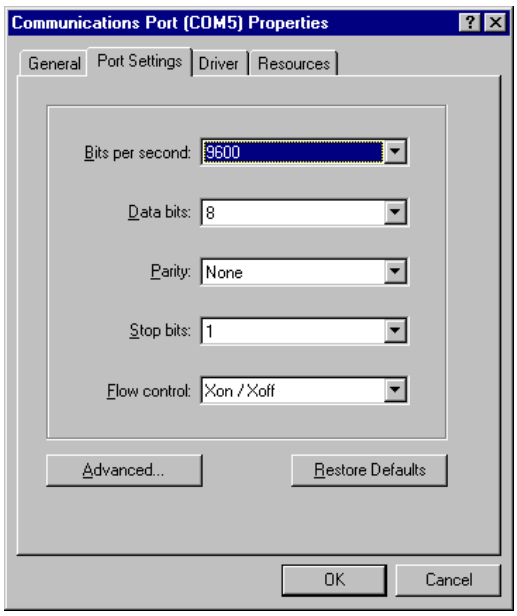


Select the **Device Manager Tab**



Double-clicking on the **Ports (COM & LPT)** label you will reveal a list of ports installed on your machine. Click on the port you wish to configure to configure to highlight it, then click on the **Properties** button.

Selecting the Port Settings tab produces



Settings available in these windows are:

Bits per second - 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.

Data Bits.*

Parity.*

Stop Bits.*

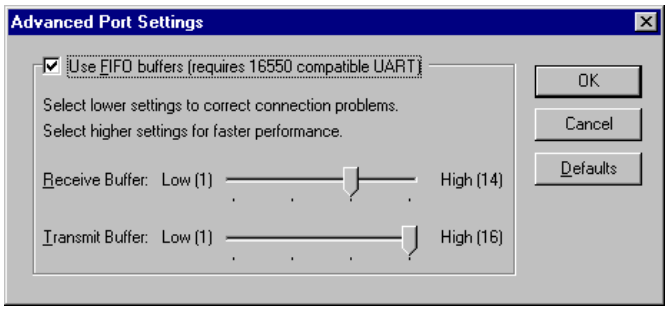
Flow Control.*

*Change to suit the remote device being used

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

Advanced



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.

Chapter 8
Windows NT4 Installation

Introduction

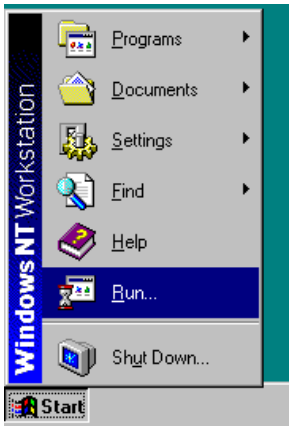
Microsoft Windows NT Provides built in support for 255 standard serial ports. To setup your PCI RS422/485 serial card you should follow these steps. Please note that to change any kind of hardware configuration under Windows NT you must be logged in as a user with Administrator level privileges, if you do not have these please contact your system administrator.

Insert the PCI 1 Rs232 Card into your PC, as described in Chapter 3 Installing the Card, and restart.

Driver Installation.

Insert the PCI 1 Port RS 232 Card into your PC, as described in chapter 2, and restart. Place the supplied CDROM titled "Serial Solutions Software" in a suitable drive.

Select **Start** then click **Run**



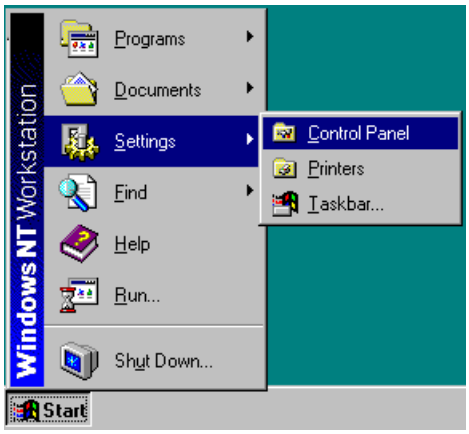
In the dialog box, type **<drive>:\diskimg\ssnt\setup** as shown below (where **<drive>**: is the path to the CDROM drive containing the installation disk).

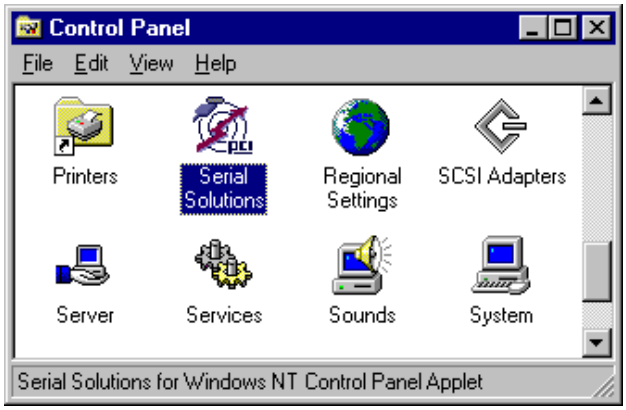
InstallShield will then install the driver software as shown below

Click **Next**

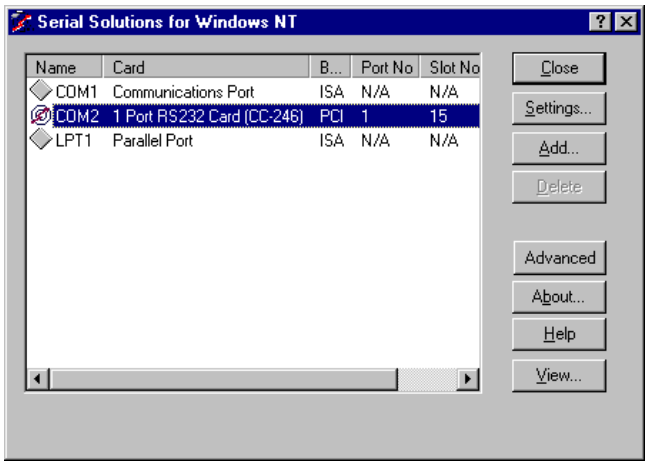
Checking Your Installation

Open the Control panel by clicking on **Start** then **Settings** then **Control Panel**





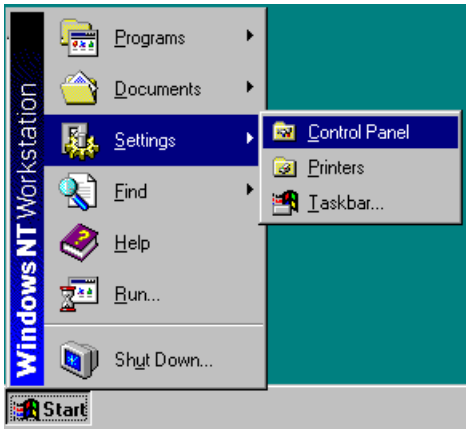
Double click on **Serial Solutions** icon

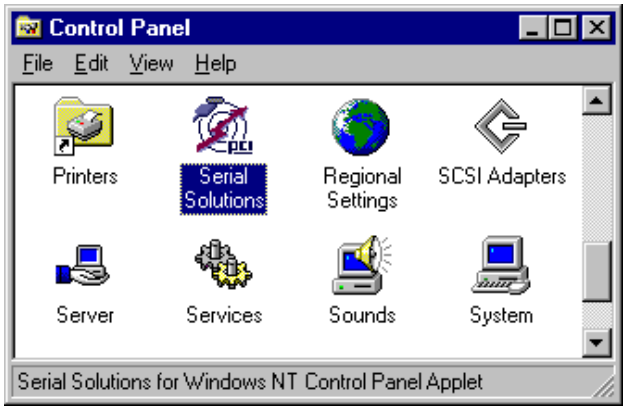


This window will show the Card and the ports which have been installed by the Serial Solutions driver.

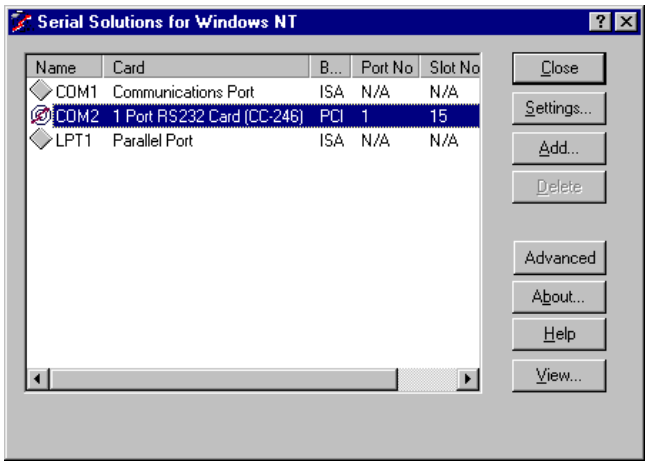
Port Configuration

Open the Control panel by clicking on **Start** then **Settings** then **Control Panel**





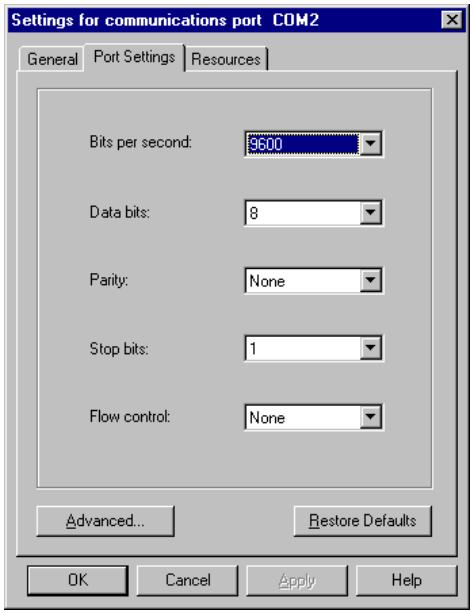
Double click on **Serial Solutions** icon



Highlight the port which you wish to configure by clicking on it's label

Click the **Properties** button

Select the **Port Settings** tab.



Settings available in these windows are:

Bits per second - 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.

Data Bits.*

Parity.*

Stop Bits.*

Flow Control.*

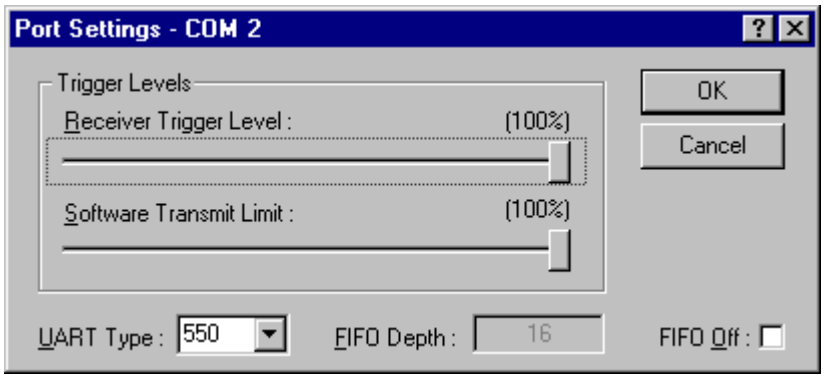
*Change to suit the remote device being used

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

Advanced

Advanced Port Settings.



Settings available in this window are:

FIFO Off - turns the selected ports FIFO buffer on or off. It is strongly recommended that the FIFO for both ports is left enabled.

Receive Trigger Level - 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.

Software Transmit Level - 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.

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 9
Windows 2000 Installation

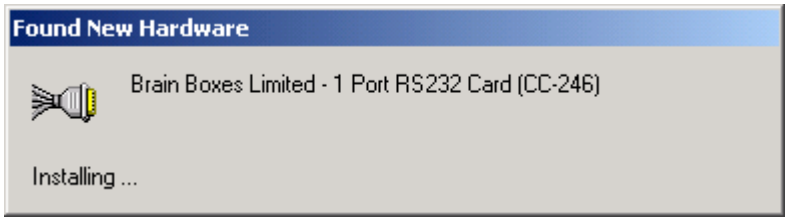
Introduction

Microsoft Windows 2000 Provides built in support for 255 standard serial ports. To setup your PCI 1 Port RS232 serial card you should follow these steps. Please note that to change any kind of hardware configuration under Windows2000 you must be logged in as a user with Administrator level privileges, if you do not have these please contact your system administrator.

Insert the PCI 1 Rs232 Card into your PC, as described in Chapter 3 Installing the Card, and restart.

Driver Installation.

As your machine restarts the information box shown below will appear and disappear:



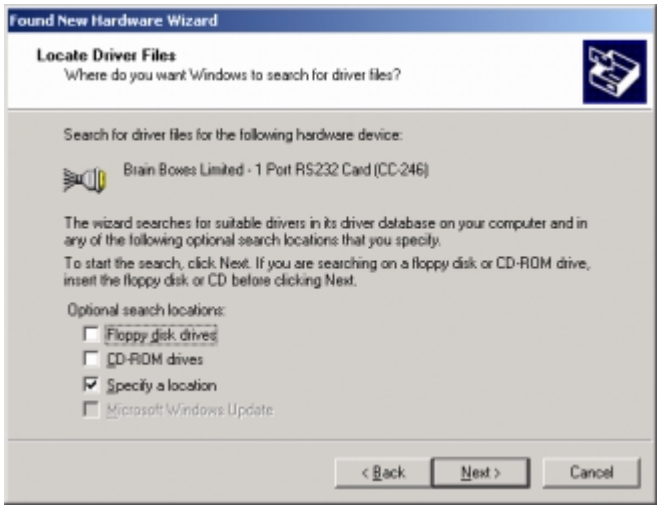
The welcome dialog box shown below will then appear.

Place the supplied CDROM titled **Serial Solutions Software** in a suitable drive

Click **Next**

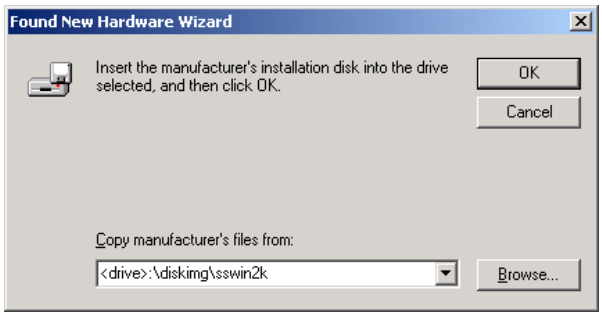
Select **Search for a suitable driver for my device**

Click **Next**



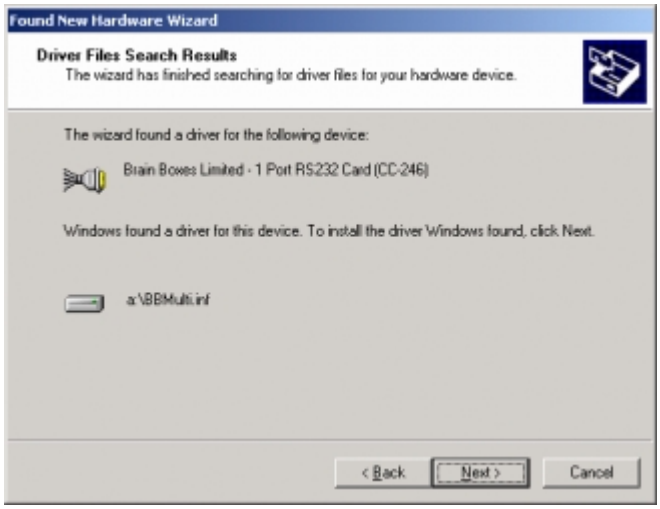
Select **Specify a location**

Click **Next**

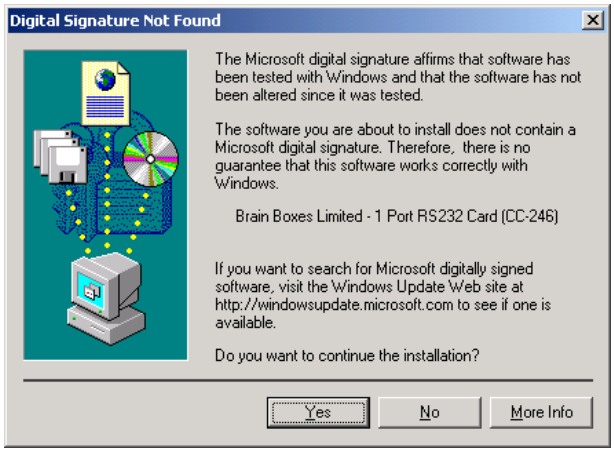


Type **<drive>:\diskimg\sswin2k** where **<drive>** is the letter of the CDROM drive containing the Serial Solutions CD

Click **OK**



Click **Next**

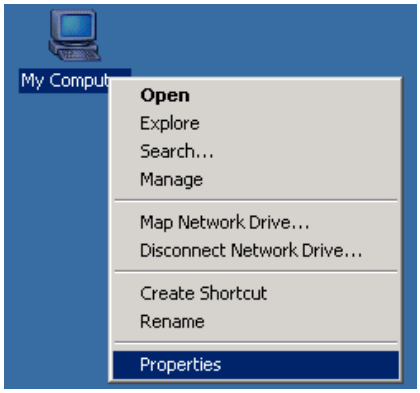


Click **Yes**

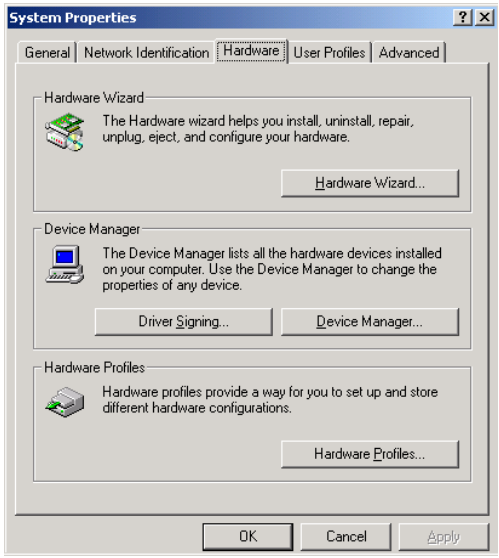
Click **Finish**

The Brain Boxes serial port will now be installed and messages will flash on the screen to indicate that this is happening

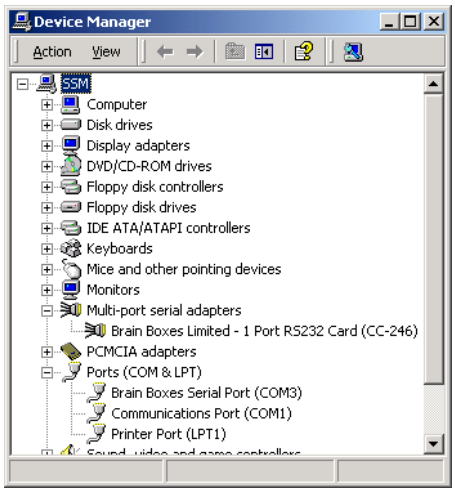
Using the right-hand mouse button click on the **My Computer** icon on your desktop. Click on **Properties.**



Select the **Hardware** Tab



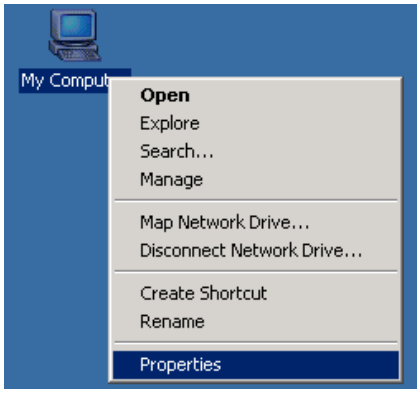
Click on the **Device Manager Button**



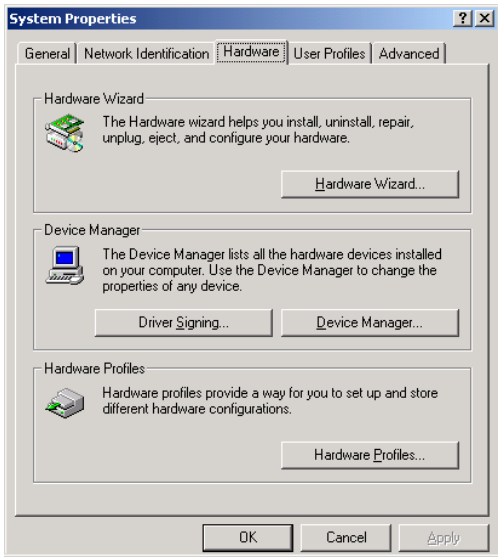
The PCI 1 port RS232 card will appear under **Multi-port serial adapters** . Also, a Brain Boxes Serial Port will appear under **Ports (COM & LPT) .**

Card Configuration

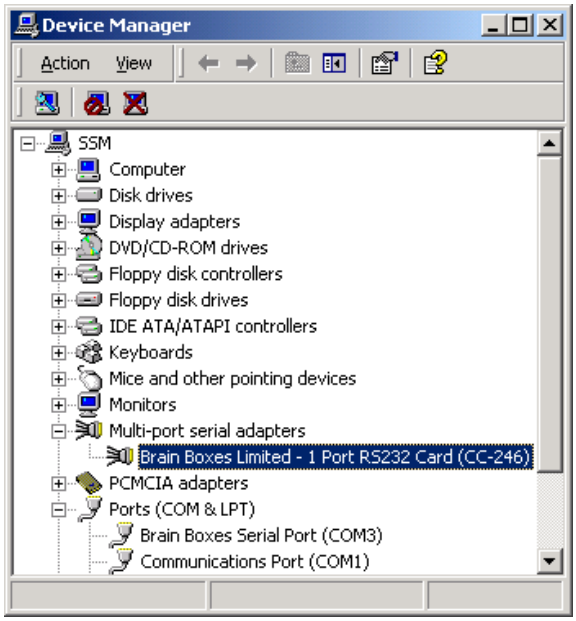
Using the right-hand mouse button click on the **My Computer** icon on your desktop. Click on **Properties.**



Select the **Hardware** Tab

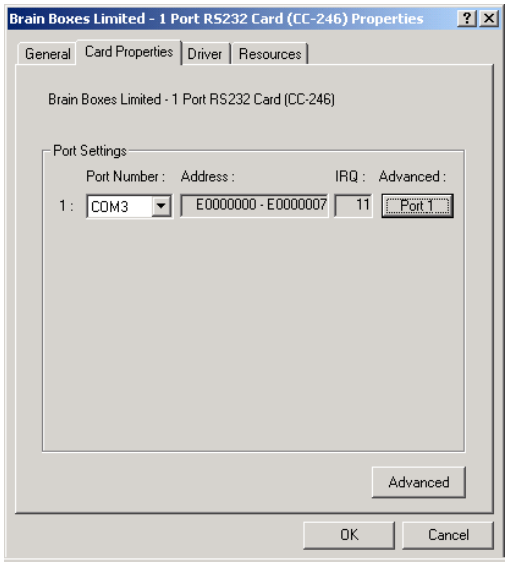


Click on the **Device Manager Button**

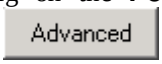


By double-clicking on the **Multi-port serial adapters** label you will reveal any cards that you have installed. Double-click on the **PCI 1 Port RS232 Card** label.

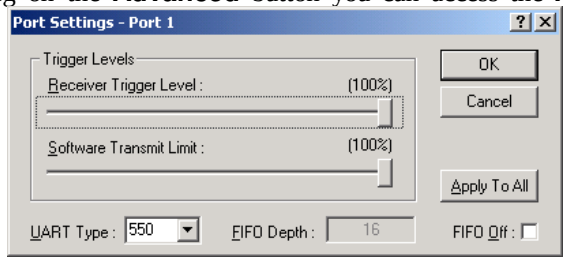
Select the **Card Properties** tab



In this window, the COM 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 PCI 1 Port 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** window:

By clicking on the **Port 1** button you can access the **Advanced port settings.** 

By clicking on the **Advanced** button you can access the **Advanced Card Settings**.

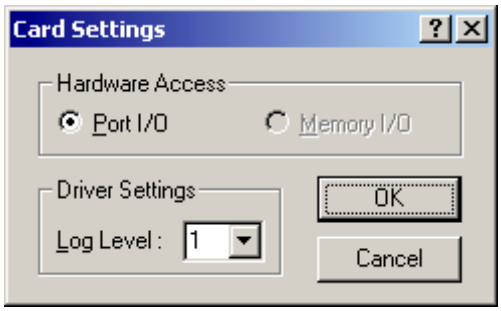


Settings available in this window are:

FIFO Off - turns the selected ports FIFO buffer on or off. It is strongly recommended that the FIFO for both ports is left enabled.

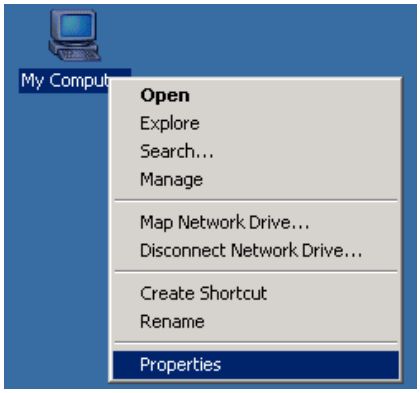
Receive Trigger Level - These settings allow the selection of a receiver FIFO trigger setting. Selecting a low value will allow the interrupt to be serviced quicker, which is good for slow machines. If you have a fast machine, setting a high value will give you more time for multi-tasking operations.

Software Transmit Level - 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.

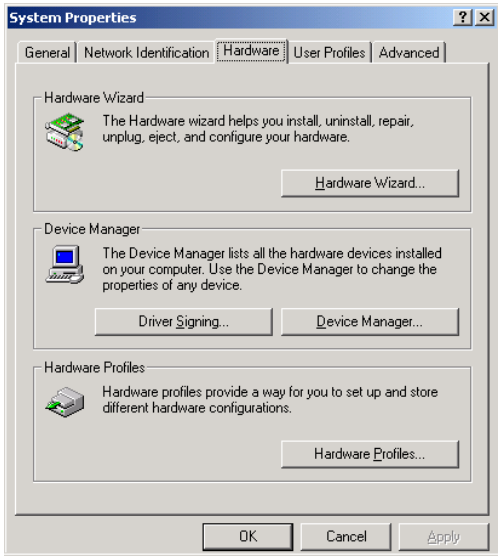


Port Configuration

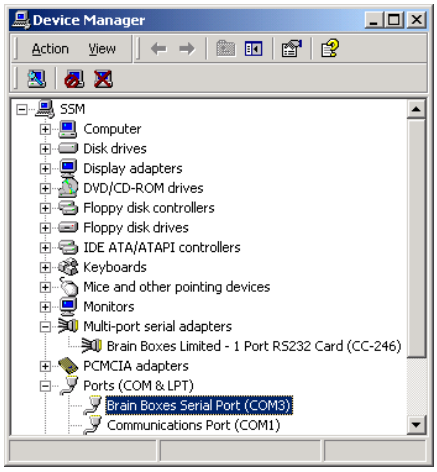
Using the right-hand mouse button click on the **My Computer** icon on your desktop. Click on **Properties.**



Select the **Hardware** Tab

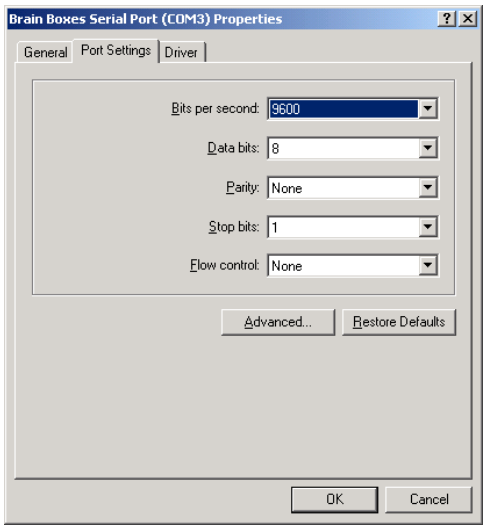


Click on the **Device Manager Button**



Double-clicking on the **Ports (COM & LPT)** label you will reveal a list of ports installed on your machine. Double-click on the port you wish to configure.

Select the **Port Settings** tab



Settings available in these windows are:

Bits per second - 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.

Data Bits.*

Parity.*

Stop Bits.*

Flow Control.*

*Change to suit the remote device being used

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

Advanced

Chapter 10
RS232 Pinouts and 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 and how to make a selftest loop back connector.

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.

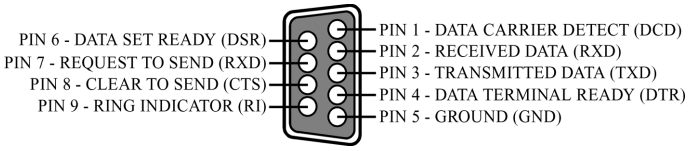
RS232 Point To Point Connection.

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

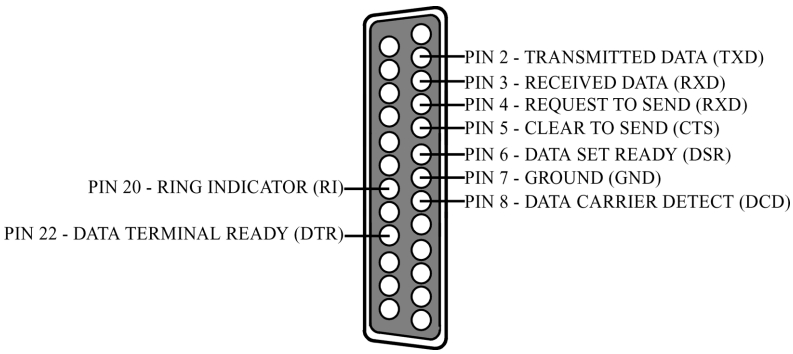
Serial Port Pin Outs.

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

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.

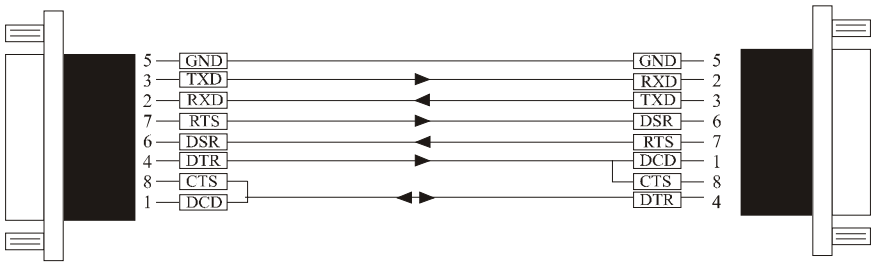
In general, you will need to make up a "cross over" cable to correctly interface the PC to the RS232 port of another computer or device. Traditionally, making up the cross over cable has been considered a black art. However, provided you have the pin outs and handshake requirements of both sides of your 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.

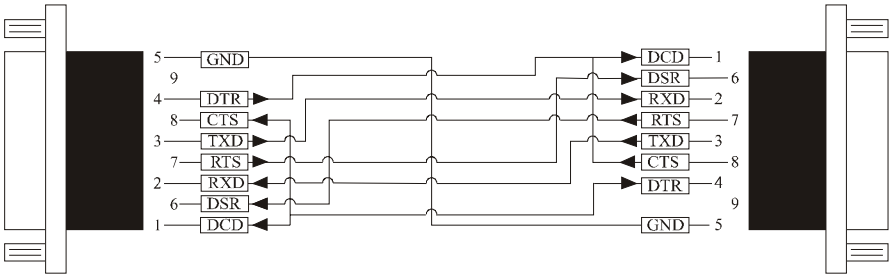
AT SERIAL PORT Side — Other PC SERIAL PORT Side.

9 PIN D CONNECTOR — 9 PIN D CONNECTOR

SCHEMATIC REPRESENTATION:



ACTUAL REPRESENTATION:



Suppose we want to connect the AT style 9 pin D Serial Port to the serial port of another IBM PC.

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.

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.

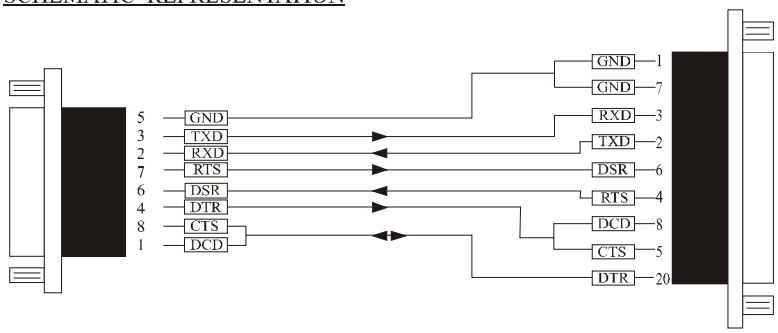
Connect the Port 2 DTR line, pin 4 to the other PC DCD, pin 8 and CTS, pin 5, lines.
Also, connect up the other PC DTR line, pin 20 to the Port 2 DCD, pin 1 and CTS, pin 8, lines.
This allows the receiving device to signal when it can no longer accept data. The receiving device sets DTR false when it 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.

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.

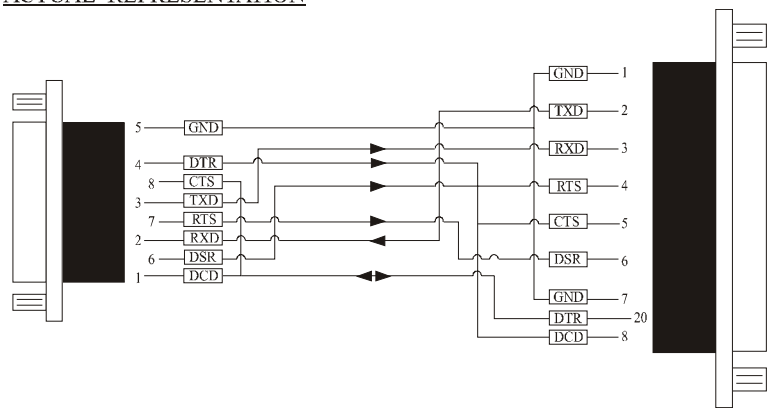
9 Pin D Serial Port To Other PC Cable.

9 PIN D CONNECTO 25 PIN D CONNECTOR

SCHEMATIC REPRESENTATION



ACTUAL REPRESENTATION



9 Pin D Serial Port To A Modem.

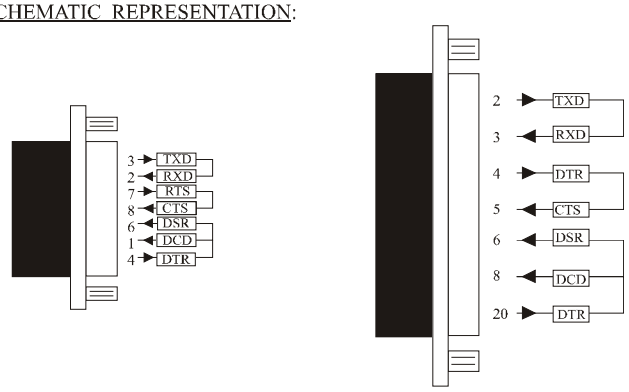
If you are connecting a MODEM to a 9 pin D Serial Port then you will NOT need a cross over cable and a straight through cable connected as the 9 to 25 pin adapter.

9 Pin D Serial Port Loop Back Connector.

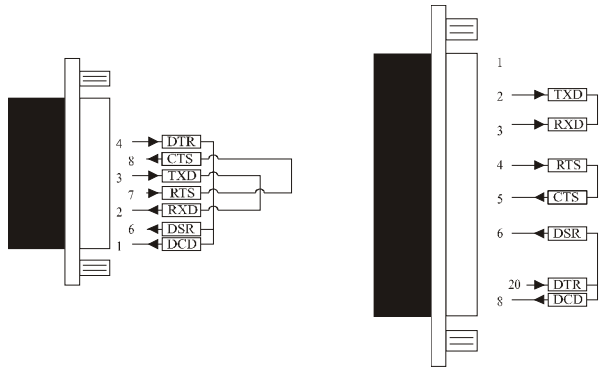
A loop back connector can be used to echo RS232 data transmitted by a serial port back into its own RS232 receiver. In this way, the function of the serial port can be tested.

9 PIN D CONNECTOR **25 PIN D CONNECTOR**

SCHEMATIC REPRESENTATION:



ACTUAL REPRESENTATION:

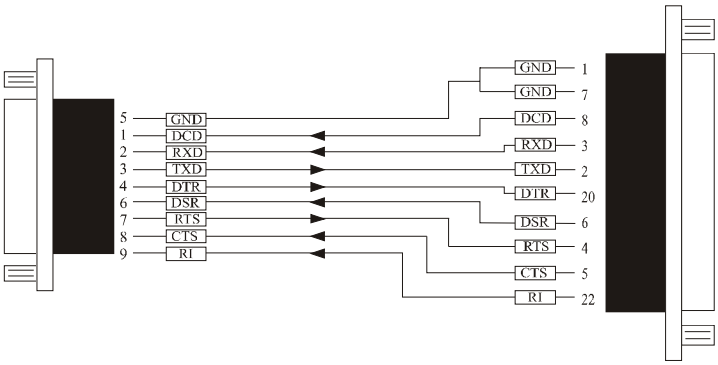


9 To 25 Way Adapter.

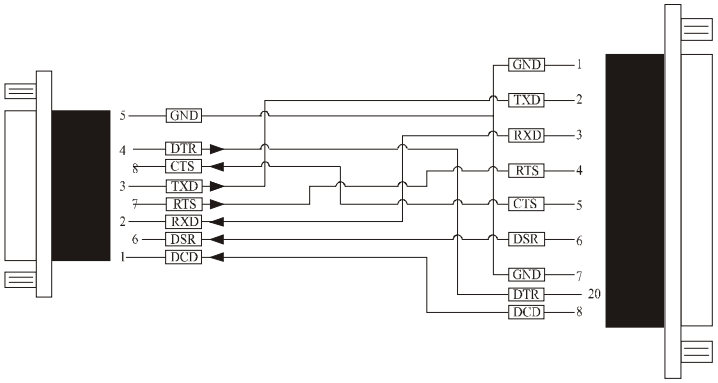
This adapter cable makes the AT style 9-pin serial port, look like the standard PC 25 pin serial port. It is NOT a cross over cable!

9 Pin AT SERIAL PORT	25 Pin PC SERIAL PORT
9 Pin Female D Connector	25 Pin Male D Connector

SCHEMATIC REPRESENTATION:



ACTUAL REPRESENTATION:



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