brainboxes

Brainboxes Serial Solutions

Range Manual

Contents

1. Introduction

The Serial Solutions Range

1.1 UC Product Range

The UC range includes 1, 2, 4, and 8 port devices which will provide an RS-232 and/or RS-422/485 9-pin COM port to any device with a PCI slot. The UC cards are compatible with 3.3V and 5V signalling.
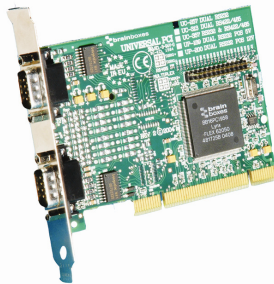
1.2 PM Product Range

The PM Product range includes 1 and 2 port devices which provide an RS-232 or RS-422/485 9-pin COM port

to any device with a PCMCIA slot.
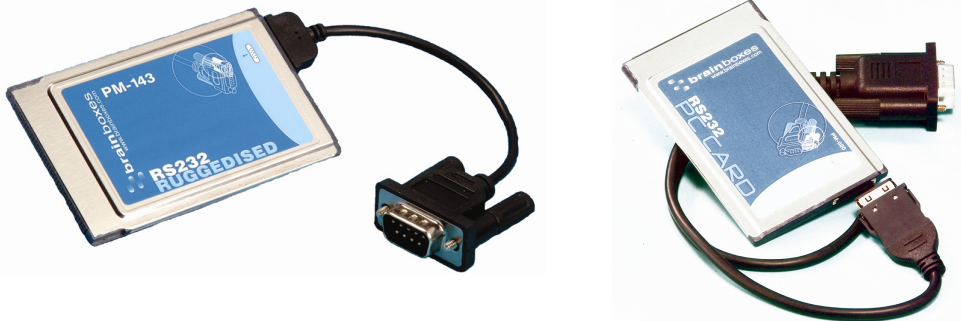
1.3 CC Product Range

The CC Product range includes 1, 2, 4 and 8 port devices which provide an RS-232 and/or RS-422/485 9-pin COM port to any device with a PCI slot. The CC cards are only capable of 5V signalling compared with the UC cards 3.3V and 5V signalling.
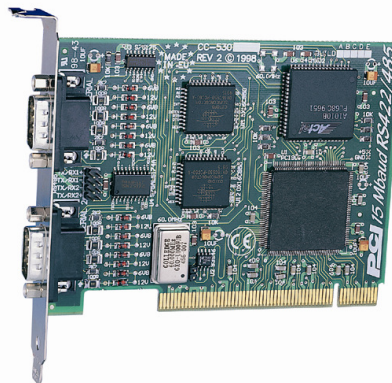
1.4 PX-275/279

The Serial Solutions driver covers the PX-275/279 which provides 8 RS-232 COM ports to any device with a PCI express slot.
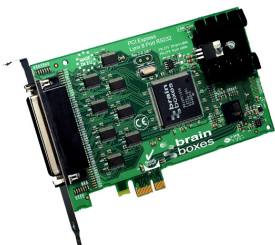
2. The Serial Solutions Software

Serial Solutions is the device driver for managing the UC, CC, PM range and the PX-279 in Windows. For a full list of supported Operating Systems, please see the list below.

3. Supported Operating Systems

The UC, CC and PM ranges and the PX-279/275 can be used with the following Microsoft Operating systems with the supplied drivers;

- Windows 8 32 & 64 bit
- Windows Server 2008 R2
- Windows 7 32 & 64 bit
- Windows Vista 32 & 64 bit
- Windows Server 2008 32 & 64 bit
- Windows Server 2003 32 bit & 64 bit
- Windows XP 32 & 64 bit

Windows XP 32 bit & 64 bit Editions

Windows Server 2003 32 bit & 64 bit Editions

Windows Vista 32 bit & 64 bit Editions

Windows Server 2008 32 bit & 64 bit Editions

Microsoft Windows 7 32 bit & 64 bit Editions

Microsoft Windows 8 32 bit & 64 bit Editions

Brainboxes PCI and PCMCIA Drivers have undergone Microsoft testing. Upon passing these tests, the drivers were signed by Microsoft, as an indication of their quality and stability.

![brainboxes]

4. Installation Instructions

4.1 Windows XP/Server 2003 Installation

1. After your computer has booted up, a New Found Hardware Wizard will appear for the card that you inserted into the computer.

2. Insert the CD that came with your Brainboxes device and point the New Found Hardware Wizard to the CD.

3. The driver files will start to copy across to your computer. This example is for the PM-121 and may differ slightly for each product.
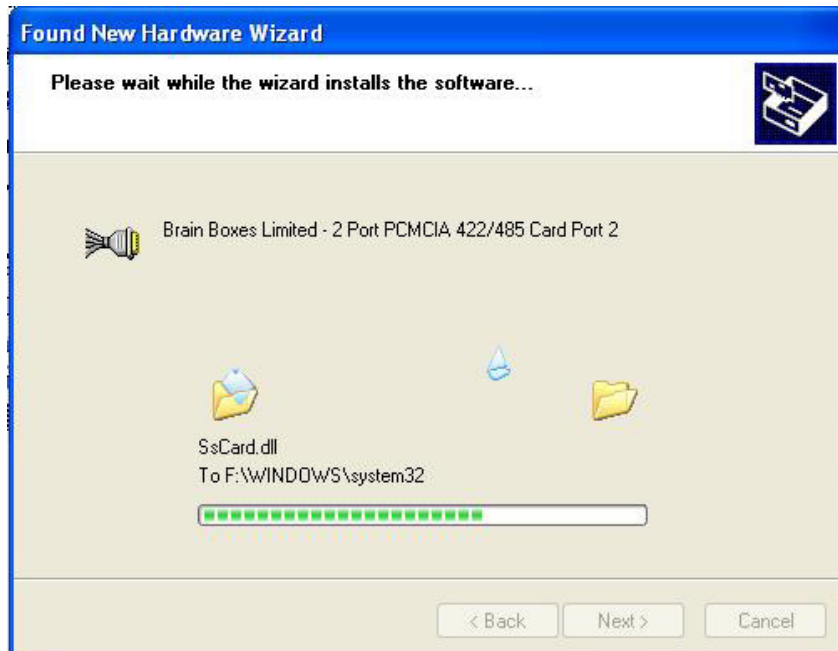
4. When the files have finished copying across the New Found Hardware Wizard will finish. Press 'Finish'.
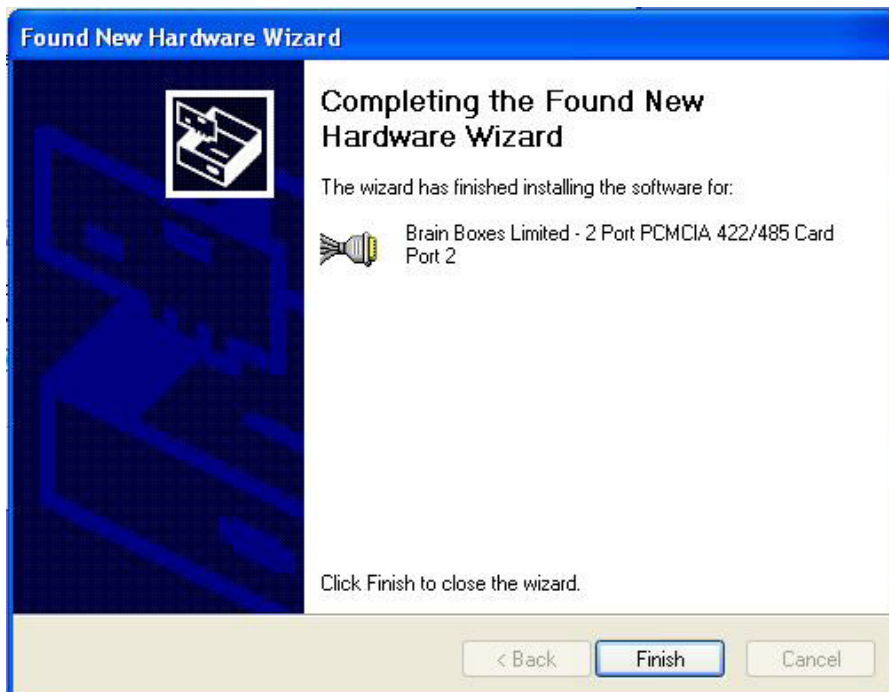
5. A second New Found Hardware Wizard will appear. Choose to Install from a specific location (Advanced)

6. Again select to search from the removable media to search the CD.
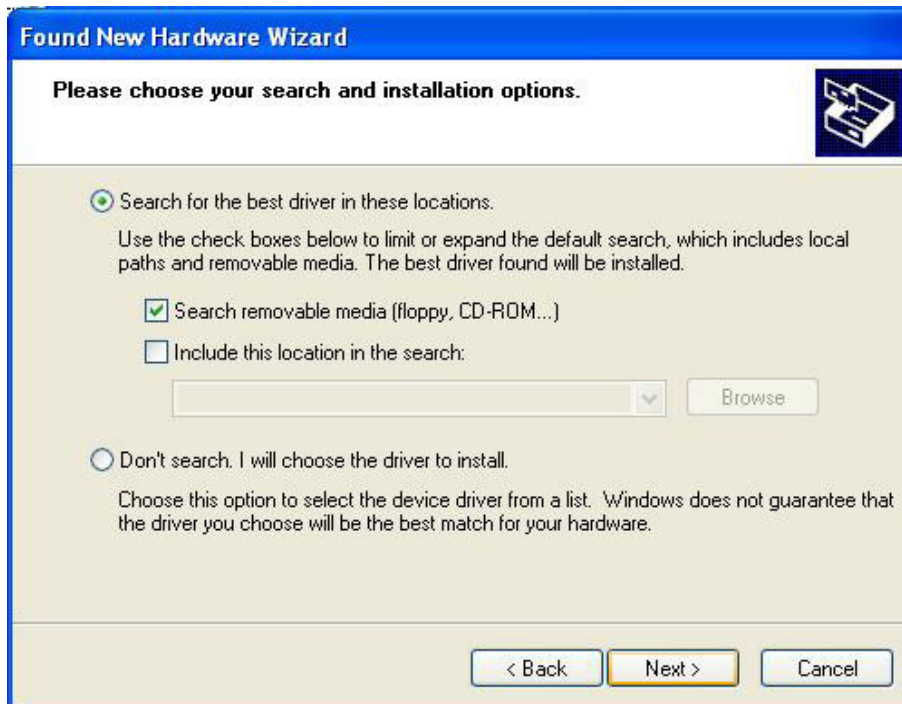
7. When the files have finished copying across the Found New Hardware Wizard will finish. Press 'Finish'.

8. The New Found Hardware Wizard will appear again for other ports that are on the device. Follow the above instructions again to install the ports.

4.2 Windows Vista/Server 2008 32 & 64 bit Installation

1. Once you have booted up the computer the Found New Hardware wizard will appear and give you options to install the driver software for the Serial Solutions card. Click on the Locate and install driver software option and Windows update will be searched and install the drivers for the card and ports.
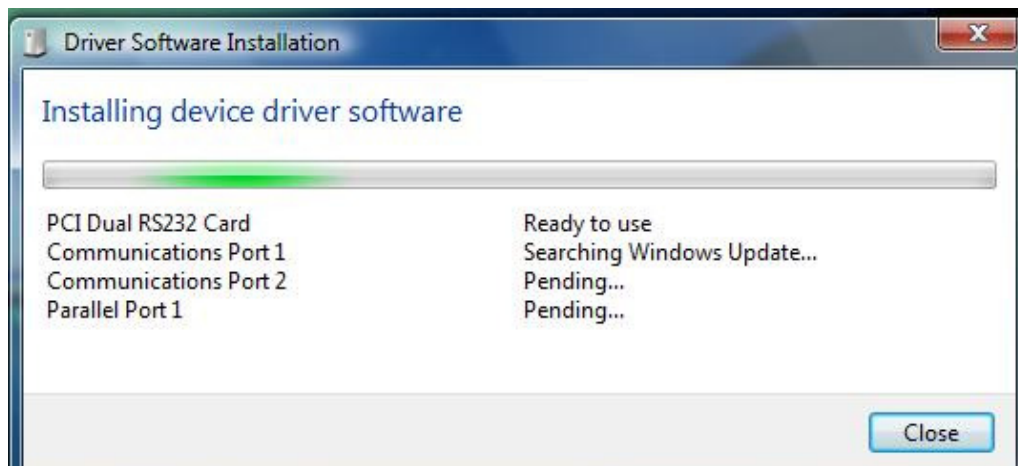
2. If the search on Windows update fails, or you are not connected to the internet you will be asked to insert the CD that came with the Brainboxes card. The CD will then be searched for the drivers and installed automatically. Please move on to step 6 if the drivers install automatically.

3. If you don't have a disc, or have downloaded the latest drivers from our website, click on the option at the bottom of the page to show other options.
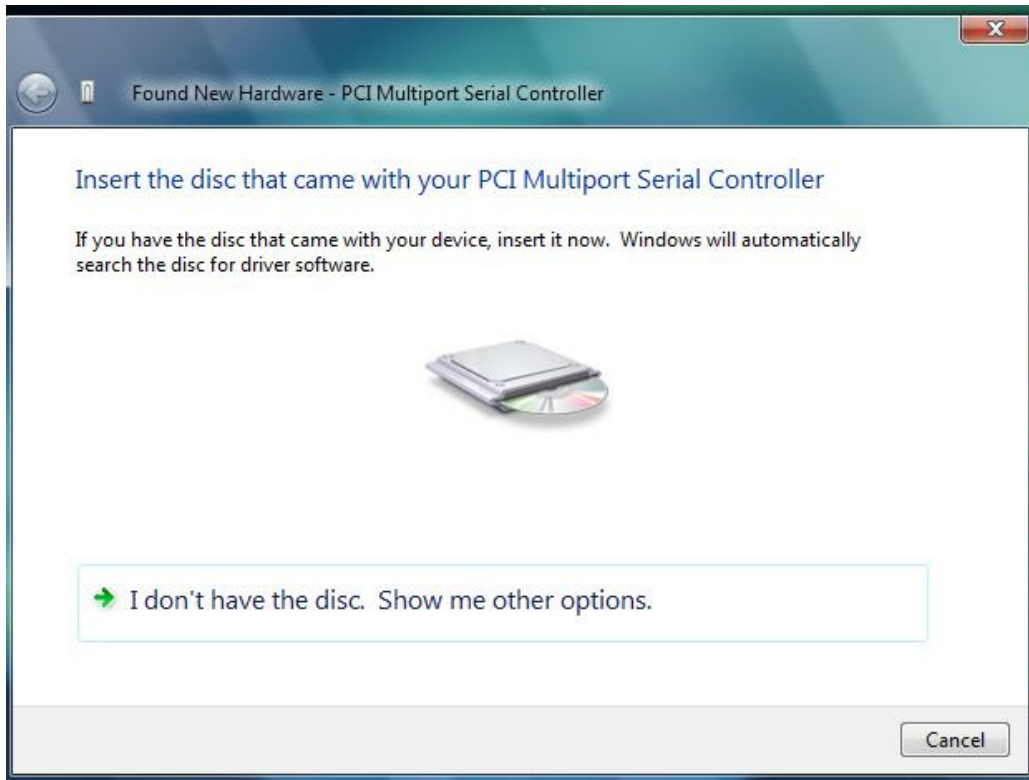
4. You will then be presented with two options. Click on the second one to browse your computer for the driver software.
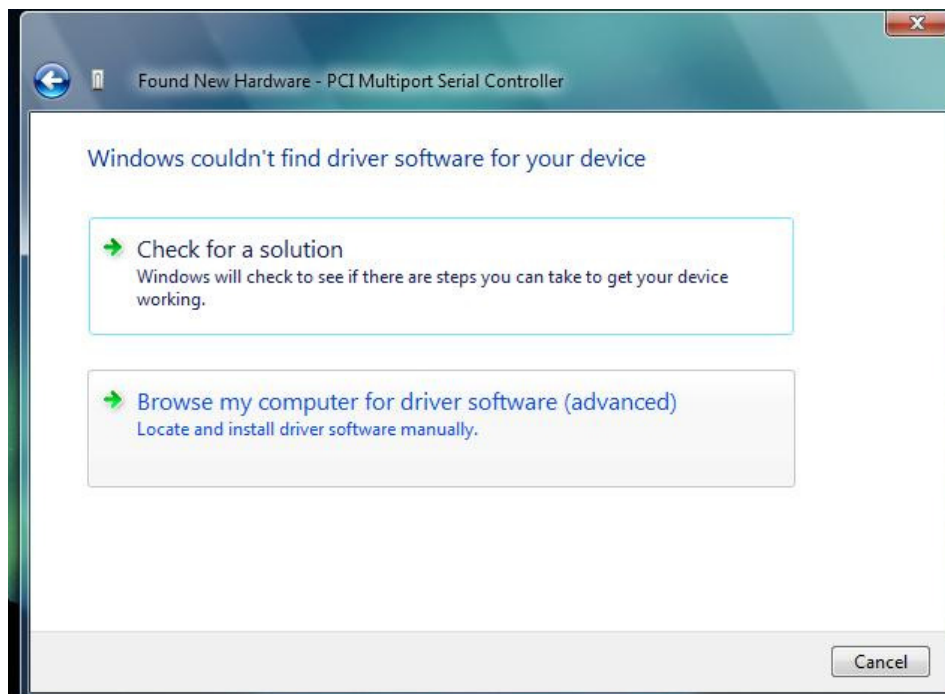
5. You will then be asked to browse your computer for the folders with the drivers in. Select the file that has the drivers you want to install and click OK. Click next and the drivers will be automatically installed for the card.
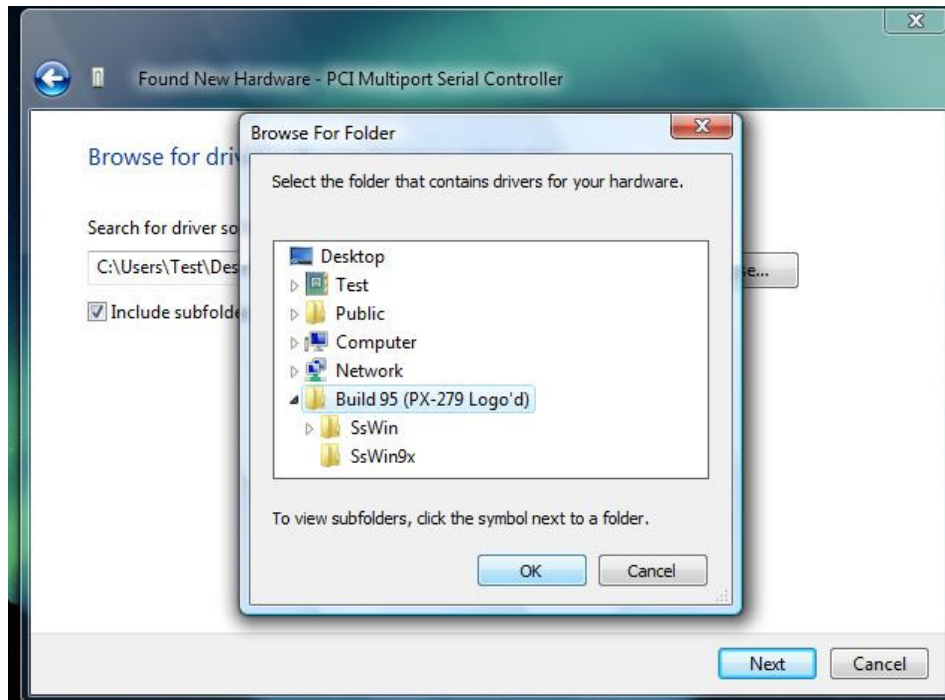
6. The drivers for the card will then have been successfully installed.
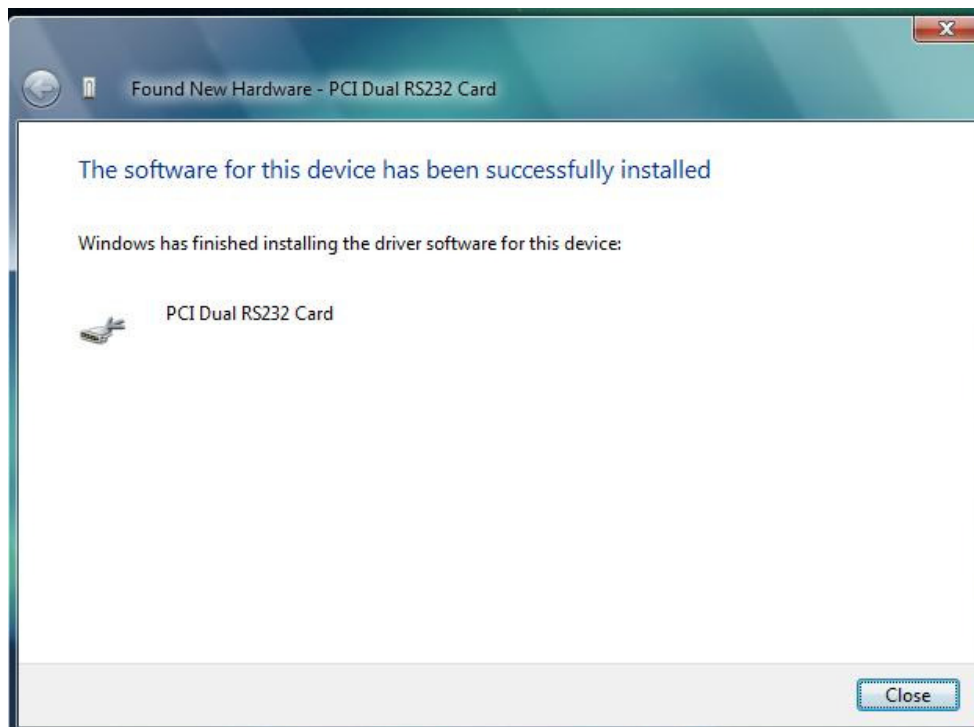
4.3 Windows 7/Server 2008 R2 Installation

1. When you boot into Windows 7, Windows update will automatically search for the latest drivers. If you have a connection to the internet, the drivers will be installed and the device will be ready to use.
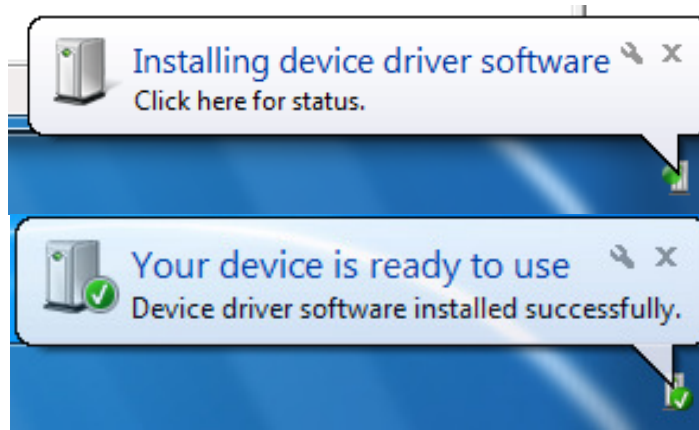
2. If there is no connection to the internet available then a message will appear saying that the drivers were not installed successfully.
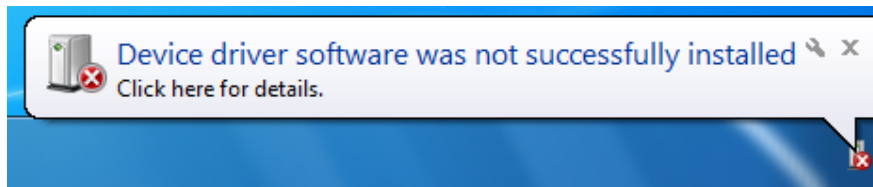
3. To install the drivers Device manager will need to be opened. To open device manager go to the control panel, system, hardware tab, then click on device manager button.

4. Once this is open you will see the yellow ! icon in the other devices node. Right click on the device and select Update Driver Software.
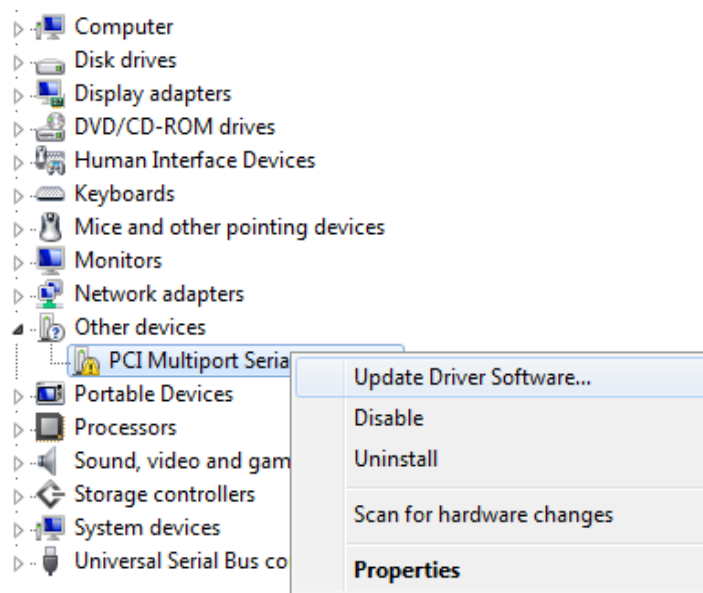
5. If your Brainboxes card came with a CD insert it now and select to search automatically and the driver software will be found and installed. If not and you have a folder with the drivers, select to browse your computer for the drivers.
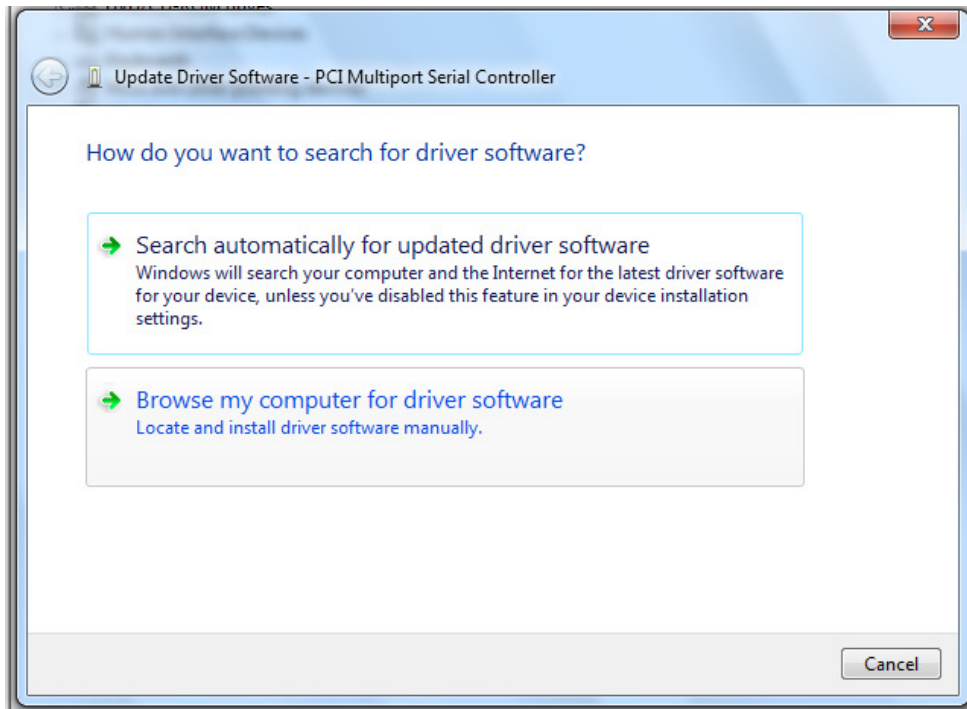
6. Select the folder which contains the driver files and then the folder will be searched and the drivers found. The drivers will then be installed and then you will get a message saying that the drivers have been installed successfully.
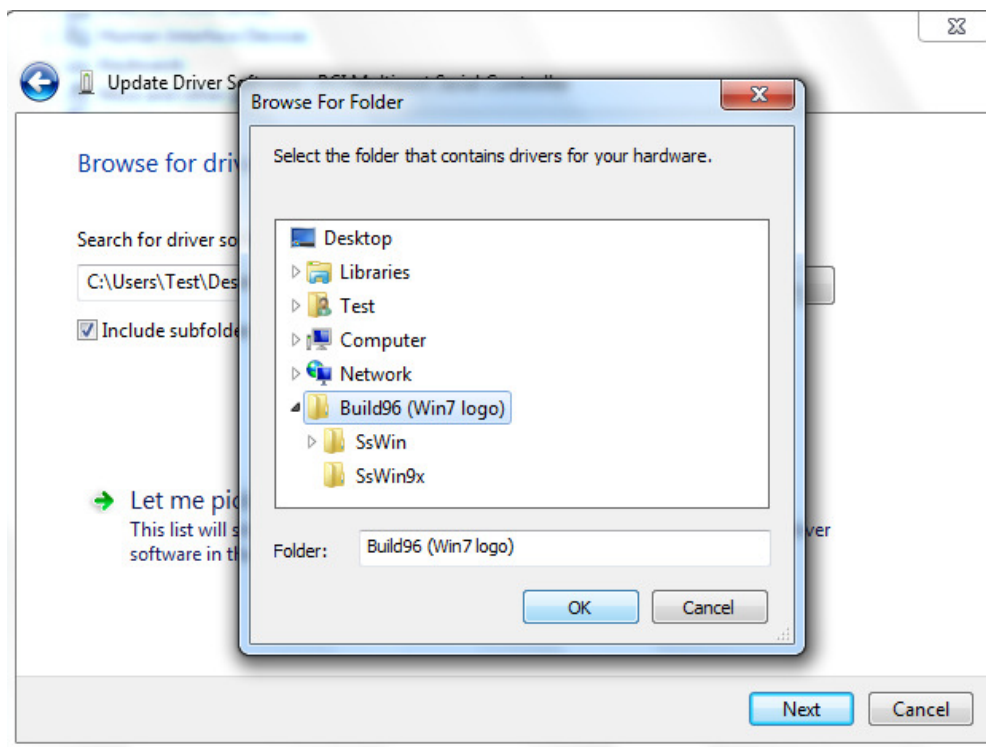
4.4 Windows 8 Installation

To install in this case, a UC card on to a Windows 8 system, you will need to insert the card whilst the system is turned off.

5   Once the card has been inserted, power on the system and then insert the Serial Solutions CD. When the CD is inserted, a few seconds later the below purple pop-up window will appear – click on it.

DVD RW Drive (I:) Brainboxes Serial Soluti...
Tap to choose what happens with this disc.
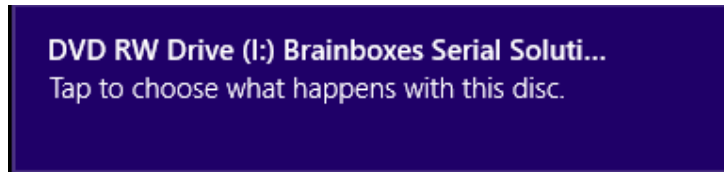
6   You will now need to select the 'Open folder to view files' option. Please see below:

DVD RW Drive (I:) Brainbox...

Choose what to do with this disc.

Install or run program from your media

Run SerialSo.exe
Publisher not specified

Other choices

Open folder to view files
File Explorer

Take no action
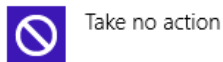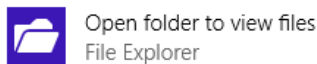
7   To begin the installation of the drivers, you will need to double-click on the Setup.exe file which is the second bottom file of the list of files pictured below:

BBPort.inf	21/03/2011 11:15	Setup Information	15 KB
DriverLanguageMap.xml	18/09/2009 14:17	XML Document	1 KB
SerialSo.exe	21/10/2004 18:38	Application	124 KB
SerialSo.ini	12/03/2013 12:16	Configuration sett...	1 KB
SerialTest.exe	21/03/2011 11:30	Application	480 KB
Setup.exe	21/03/2011 11:30	Application	580 KB
SsUnist.exe	21/03/2011 11:30	Application	408 KB

8   When the Setup.exe file has been clicked on a new window will appear. You will now need to click Next to proceed.
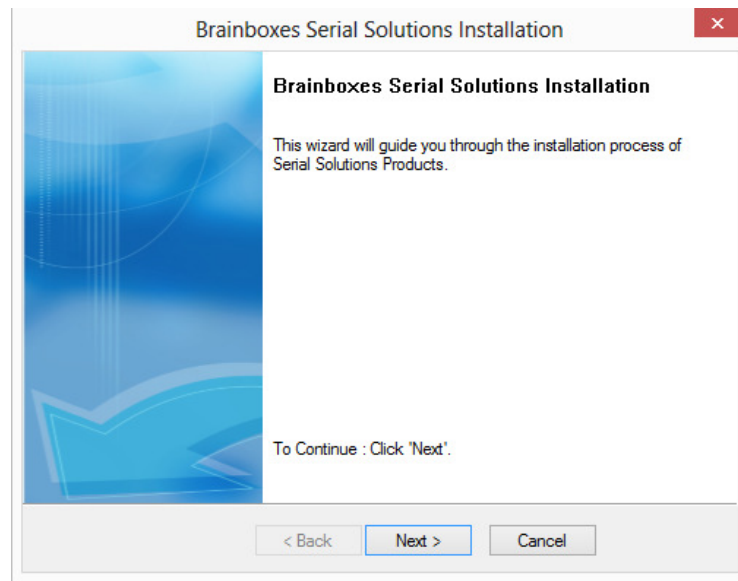
9   Once you have clicked Next, there will be a window which shows you that the drivers are installing. It looks like this:
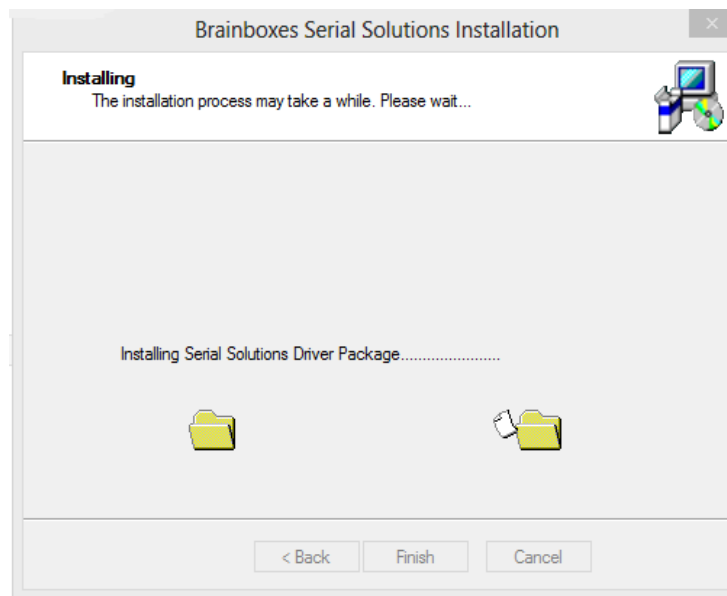
10 Once this has completed, you will see a window saying 'Finish'. Click on it and the driver will finish the installation procedure.
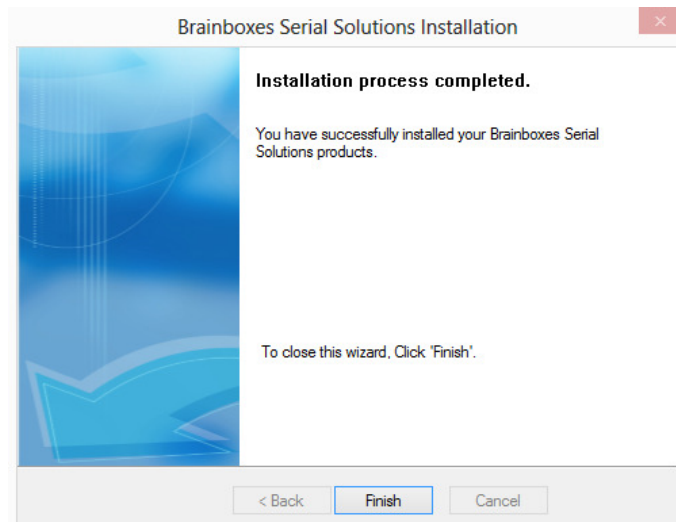
11 Now that the installation procedure has finished, you will need to go to Device Manger and check the COM ports. It should look like this:

You will now be able to use the card. Simply select the COM port you are assigned and you will be able to use it with your application/equipment.

5. Product Configuration

5.1 Windows XP, Server 2003 Vista, Server 2008, Windows 7 and Windows 8

5.1.1. Finding your Brainboxes COM port

- Open device manager (Found by right clicking on My Computer (or Computer in Windows 8) and clicking *Manage*. Then select *Device Manager* from the list.)

- Find the Brainboxes Serial Port entry in Device Manager. (Found under "Ports" section)

- The Brainboxes Serial Port entry displays the current COM number in brackets after the name. (This is usually COM3 following install, but may be different if other serial devices have been installed in the past)

- To change your COM label, see **Section 3.3: Changing your COM label**
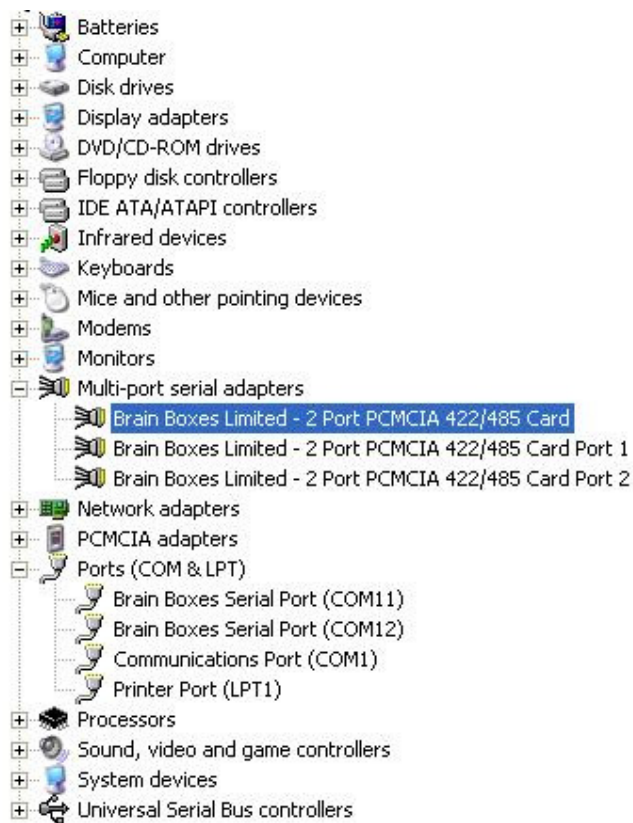
5.1.2. Port Settings

The port settings allow you to set a Default or Override Settings for the Serial Communication and how to deal with incoming hardware handshaking events.

- To open 'Port Settings', open Device Manager and Double Click on the Brainboxes COM port entry under the 'Ports' section.

- Then click on the 'Port Settings' tab.
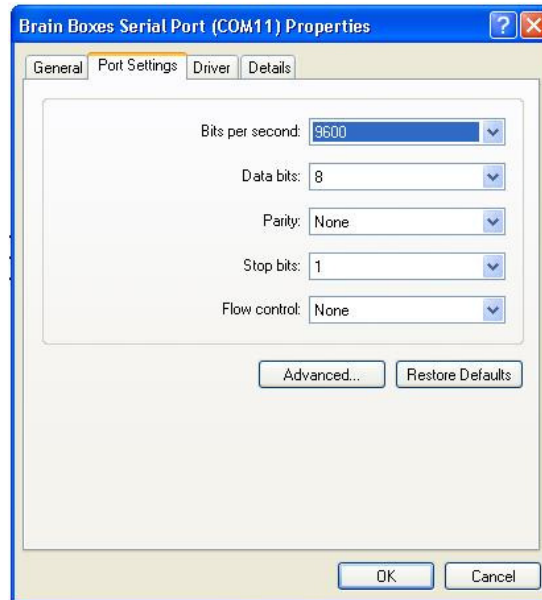
- All options can be selected from the dropdown menus.

NB – Once the desired settings have been achieved, you must click **OK** to activate them. At any time click the 'Restore Defaults' button to return to the original set up.

5.1.3. Changing the COM labels

- If you need to change the COM label, **Double Click** on the Brainboxes COM port entry under the 'Ports' Section.

- Click on the port settings tab and click **Advanced**
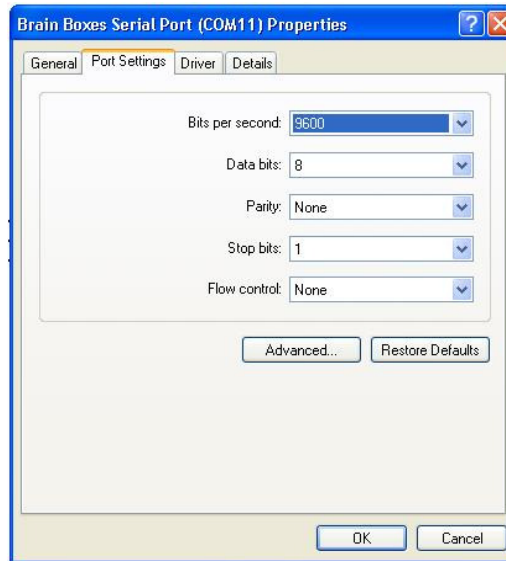
- A new COM port number can then be selected from the drop down box.
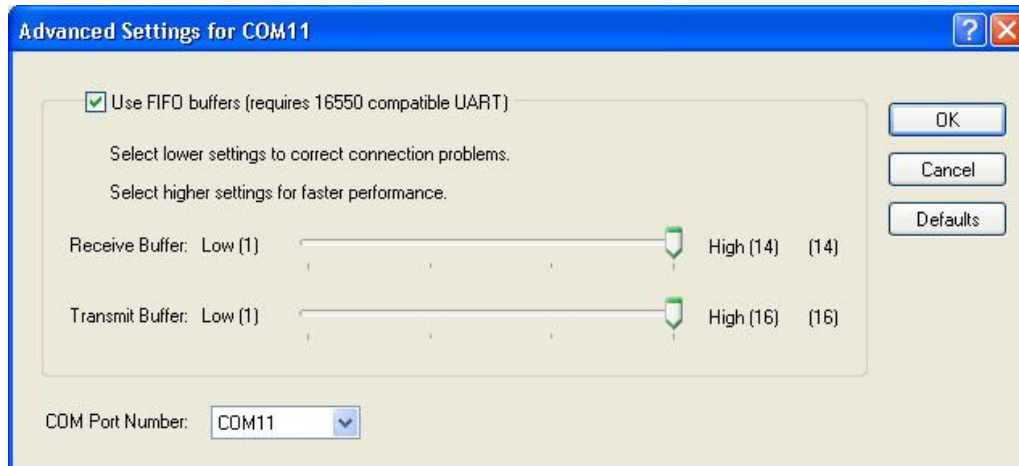
- If the COM port number is labelled 'In Use', it is either currently used by a COM port present on the system, or is reserved for a device which is not currently present. It is possible to select this COM number and force the change, if you are sure it is not required by another device.

5.1.4. RS-422/485 Settings

For RS-422/485 products only, in the 'Multi-port Serial Adaptors' section in Device Manager double click on the Brainboxes card port number then click on the Card Properties tab.
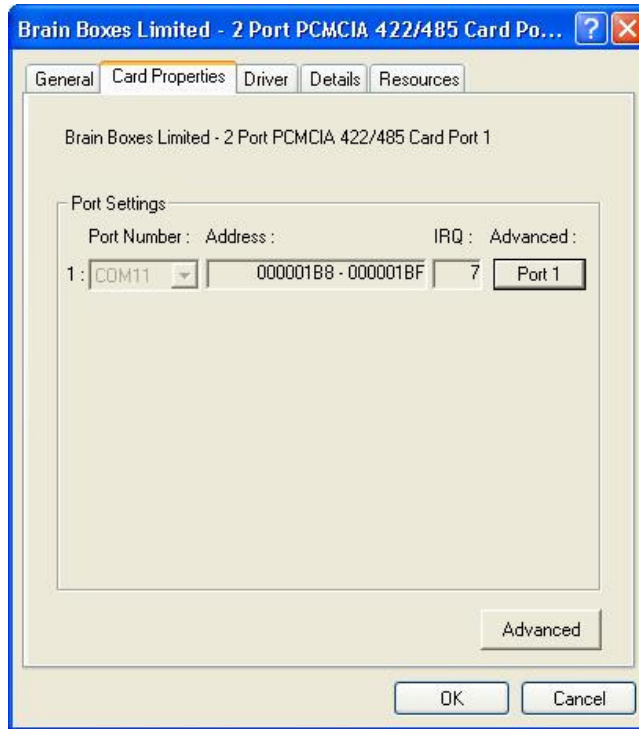
- Click Port 1 advanced button to open up the Ports settings window.

- The drop down list for Duplex operation allows users to choose the desired RS-422/485 operations mode.
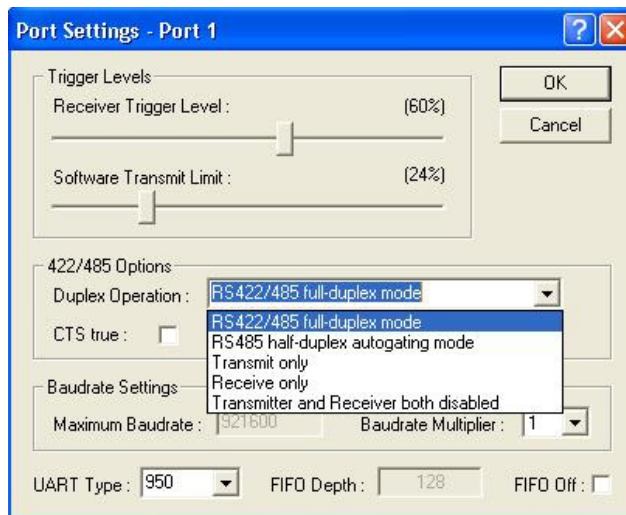
- Select 'RS-422/485 full-duplex mode' for full duplex communications

- Select 'RS-485 half-duplex autogating mode' for half duplex communications

- Select 'Transmit only' to just transmit communications

- Select 'Receive only' to just receive communications

- Select 'Transmitter and Receiver both disabled' for no communications

- For further details on wiring see **Section 9.2: Device Pinout**

6. Uninstallation

The Uninstallation steps below are applicable to all the cards in the UC, CC, PM and UP ranges.

6.1 Uninstallation for Windows XP, Server 2003, Vista, Server 2008, Windows 7 and Windows 8

- Open Device Manager and right click on the Card entry in Device Manager, and click uninstall.

- Click *OK* to confirm device removal
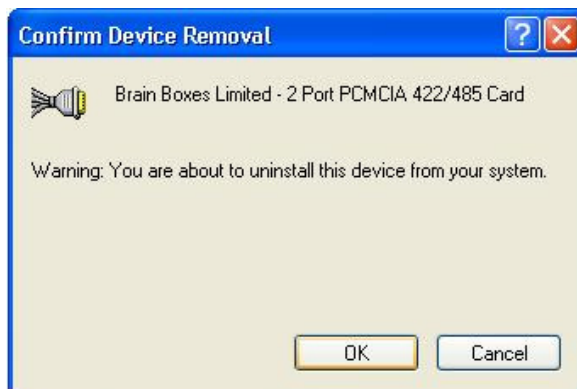
- The Brainboxes Serial Solutions installer will launch. Please see **Section 4.2: Brainboxes Serial Solutions Uninstaller**.

6.2 Brainboxes Serial Solutions Uninstaller

- The Brainboxes Uninstallation wizard will launch which will remove all driver files and associated registry entries. Just click **Next** on each page of the Wizard. When the drivers have been uninstalled, click **Finish**.
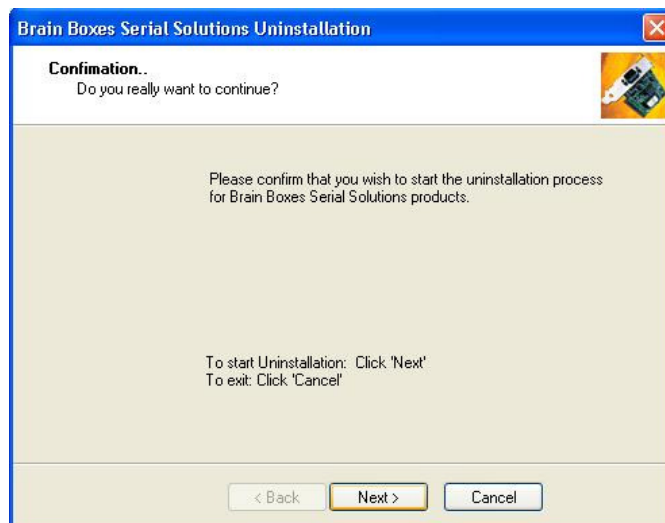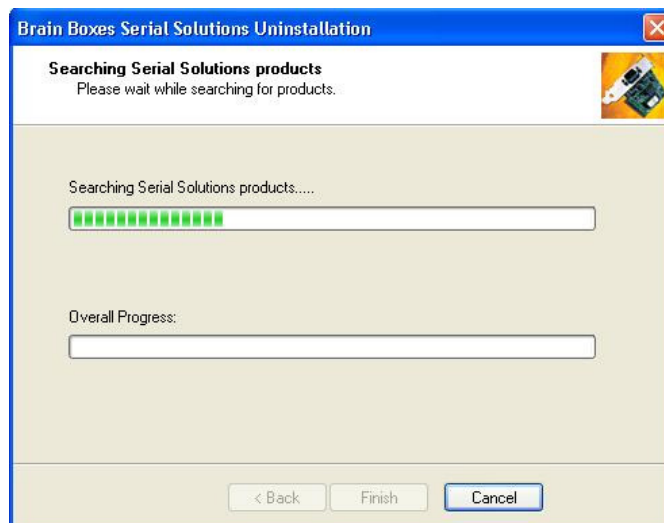
- When finished, you may turn off your PC and unplug your Serial Solutions card. To reinstall, simply plug in the card again and follow the installation instructions as in **Section 2: Installation Instructions**. Alternatively, restart your PC, or scan for hardware changes in device manager and the New Found Hardware Wizard will appear.

7. Serial Solutions Driver Upgrade / Rollback

There are two parts to the Serial Solutions driver.

(Taking for example the PCMCIA PM-121 2 port Device)

- Card Driver: "Brainboxes Limited – 2 Port PCMCIA 422/485 Card"

- Card Driver: "Brainboxes Limited – 2 Port PCMCIA 422/485 Card Port 1"

- Card Driver: "Brainboxes Limited – 2 Port PCMCIA 422/485 Card Port 2"

- Port Driver: "Brainboxes Serial Port (COM7)

- Port Driver: Brainboxes Serial Port (COM8)

NB: If you need to upgrade or roll back the Serial Solutions driver, we recommend to completely uninstall the existing drivers first, and then to install the new drivers from fresh. This will restore all the factory settings to default. However, if you instead wish to keep all of your existing settings, you can use the 'Update Driver' or 'Rollback driver' in device manager for upgrading/rolling back the Serial Solutions driver.

7.1 Upgrading the Serial Solutions Driver

1. Go to Device Manager and Right click on the Serial Card entry (Found under Multiport Serial Adaptors – see image below)
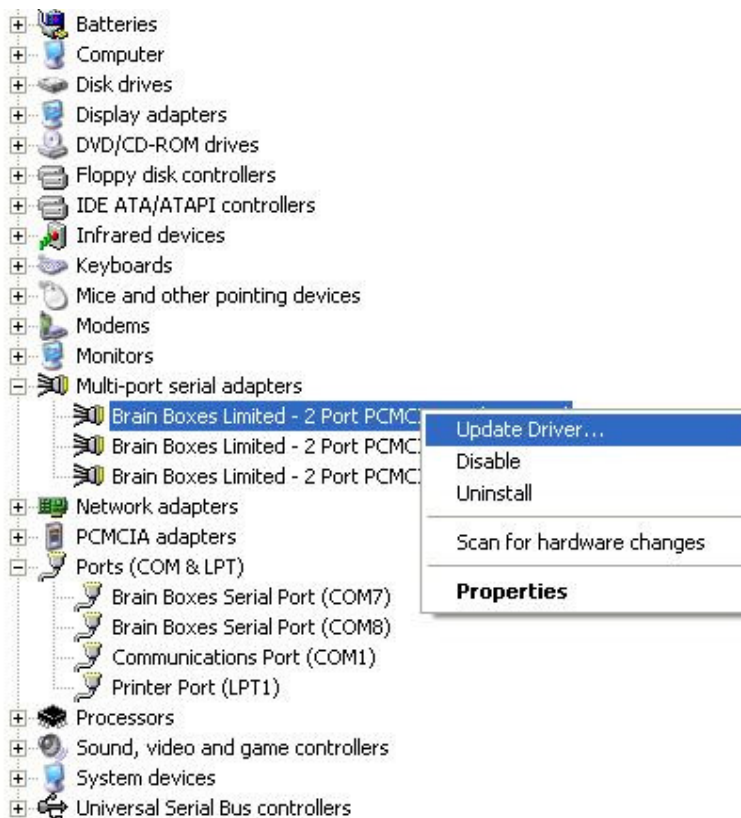
2. Select Upgrade Driver. This will launch the Found New Hardware Wizard. Follow the on screen instructions and point to the location of the new driver package.

3. Repeat this for every Serial card and port entry.

7.2 Rolling back the Serial Solutions Driver

1. Go to Device Manager and Double click on the Serial Card entry. Click on the Driver tab of the Card properties page.

2. Click on the Roll back Driver button.
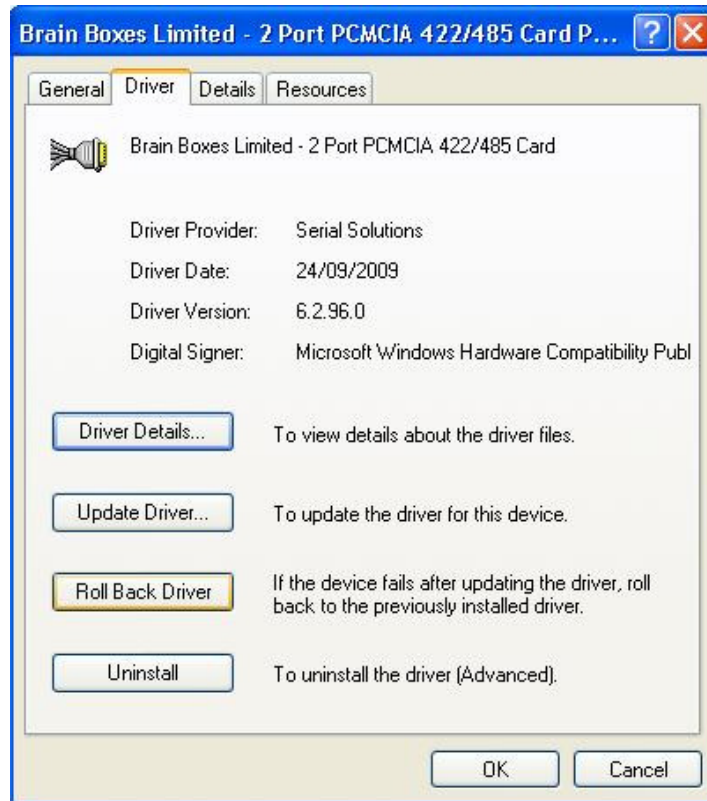
3. Click Yes to roll back the driver to the previous version, and click No to keep the current driver version.
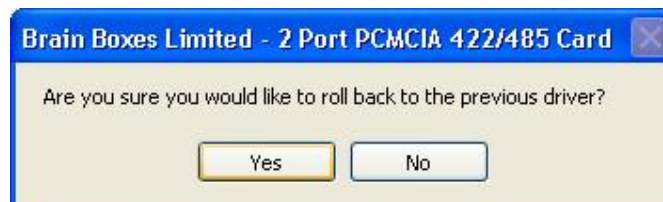
4. Click on the Close button to close the properties

5. You may have to restart your computer for the changes to take effect.
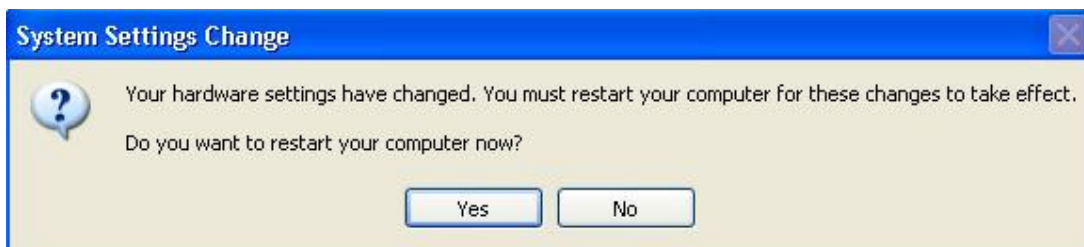
8.Troubleshooting and Testing

8.1 Installation Problems

- Check the Brainboxes card is correctly installed, and the ports appear in Device Manager without any errors (Errors indicated by yellow ! icons)

- If the installation did not complete or shows any error messages then restart the computer.

- If Device Manager is still showing error messages, it is wise to uninstall and re-install. This should cure issues such as Resource Conflicts or failed installations. See **Section 2: Installation Instructions** and **Section 4: Uninstallation**.

- If the problem still persists try the following to try and help narrow down the problem.

    1. A different PCI/PCMCIA slot

    2. A different PC

- If the problem still persists please contact Brainboxes Technical Support. **See Section 8 Lifetime Warranty and Support**

8.2 Communication Problems

If you are experiencing communication problems:

- Check the Brainboxes card is installed correctly, and the ports appear in device manager without any errors (Errors are indicated by a yellow exclamation mark (!) icon). If there are any errors follow **Section 6.1**.

- Perform a loopback test on one of the ports. A loopback test will verify that your card is able to Transmit and Receive Data. The Transmit and Receive pins will need to be connected so that a data sent out of the card is then received back in the same port.

- Please contact Brainboxes Technical Support with your loopback test result should the problem persist with your application.

8.3 Testing your Serial COM port

To test your Brainboxes COM port works correctly you can use the Serial Test application. It is a simple application which will guide you through the steps to check that your Brainboxes COM port is working correctly.

You will need to select the COM port you want to test, and connect a loopback connector to transmit and receive pins of the respected COM port. You will then be given a result as to whether the test has passed or failed.
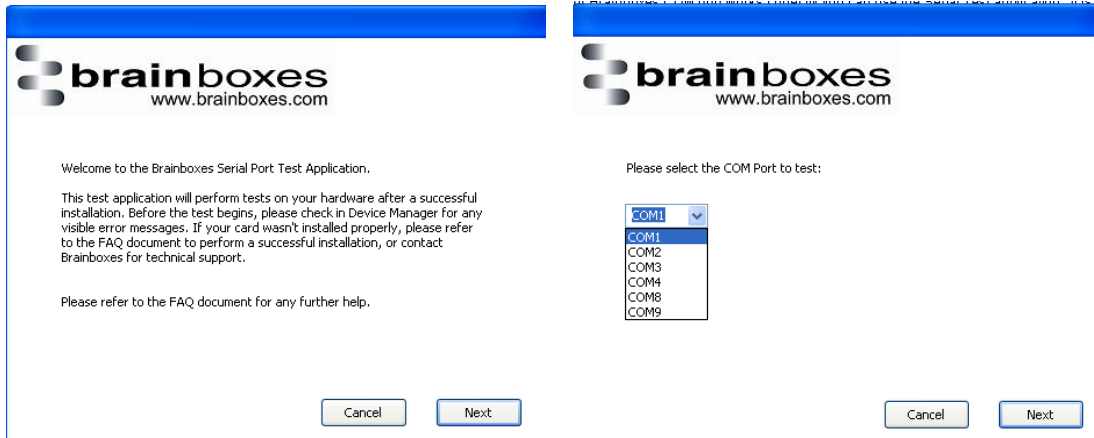
8.4 Baud rate test application

To test to see if a specific baud rate is supported by one of our cards, the Baud rate test application can be used. You simply put the Baud rate details into the program and then click calculate and the details will be output. This software is supplied on the Serial Solutions CD.
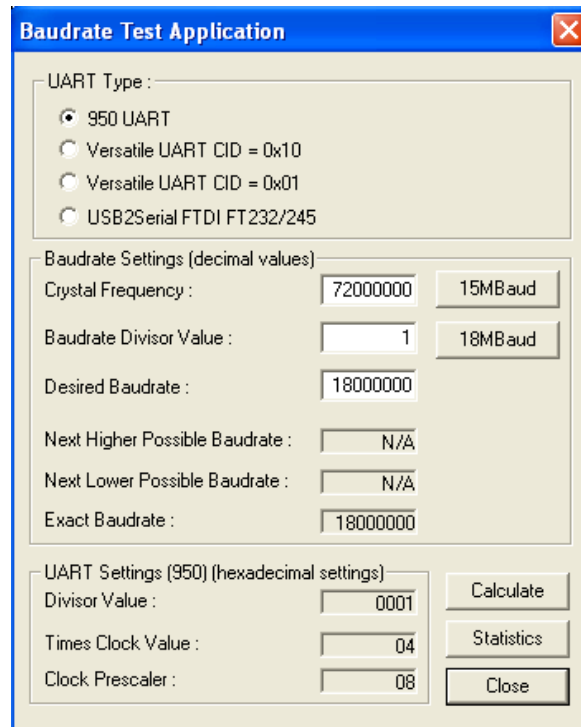
The following settings need to be applied for specific Brainboxes products

- If you have a PM-121 or CC-530/525 you will need to select the 950 UART type.

- If you have any UC card set the UART type to Versatile UART CID = 0x10

- If you have any other PM card set the UART type to Versatile UART CID = 0x01

- The last option is for USB devices so is not applicable for the Serial Solutions software product ranges.

The crystal frequency will also need to be set to a specific value for the card that you are using. For UC and PM cards the frequency is 1475600.

9. Optional RS-422/485 Operation

9.1 The RS-422 Standard

The RS-422 standard defines a serial communications standard. RS-422 is a high speed and/or long distance data transmission. Each signal is carried by a pair of wires and is thus a differential data transmission system. Over distances up to 40 feet the maximum data rate is 10 Megabits per second, and for distances up to 4000 feet the maximum data rate is 100 Kilobytes per second. A 120-Ohm resistor should be used to terminate the receiving end of the line. It is generally used between one transmitter receiver pair to ONLY one other transmitter receiver pair, but each output can drive up to 10 receivers.

RS-422 Standard 1 Driver up to 10 receivers	
Line Length	Max Baud Rate
40 feet = 12m	10 Mbits/sec
400 feet = 122m	1 Mbits/sec
4000 feet = 1219m	100 its/sec
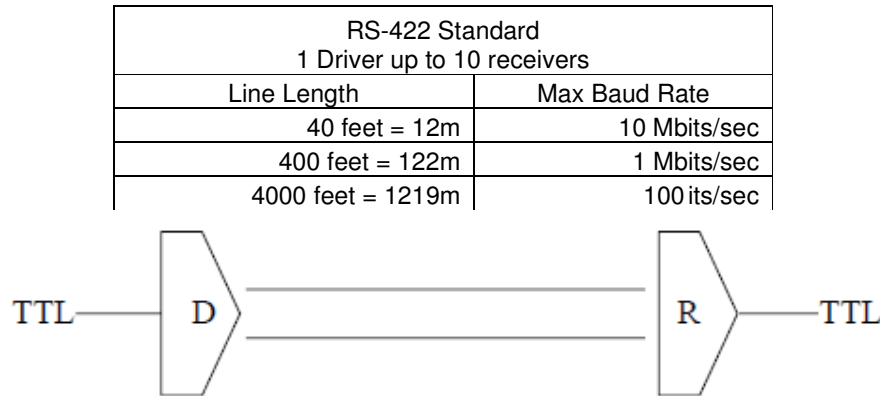
9.2 The RS-485 Standard

The RS-485 standard is similar to the RS-422 standard upon which it is based. The main difference is that up to 32 transmitter receiver pairs may be present on the line at one time. A 120-Ohm resistor should be used to terminate either end of the main line. If more than one device may transmit data, the RTS line is used as transmit enable signal, so preventing contention between talkers.

RS-485 Standard Up to 32 Driver/Receiver Pairs	
Line Length	Max Baud Rate
40 feet = 12m	10 Mbits/sec
400 feet = 122m	1 Mbits/sec
4000 feet = 1219m	100 Kbits/sec
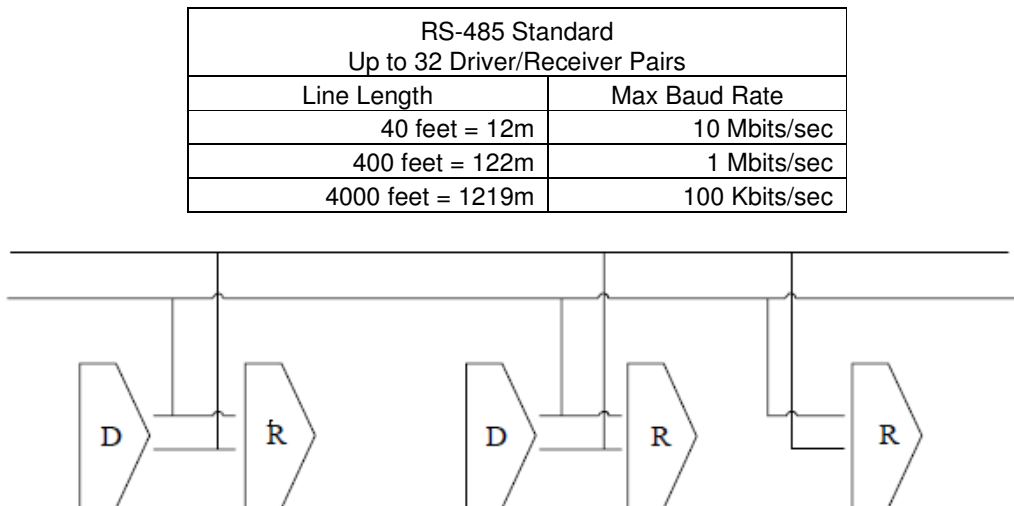
9.3 Terminating Impendence's

RS-422 and RS-485 lines should be terminated at the end of the main branch of the RECEIVER, in the cables characteristic impedance. These terminating impedance's stop echoes caused by the serial data being reflected back at the cable ends. It is not necessary to terminate the transmitter end of the twisted pair.

PCI Quad 422/485 Card Chapter 10 Optional RS-422/485 Operation • 49 The AT Dual Port RS-422/485, Opto Isolated AT Dual Port RS-422/485 and AT Velocity RS-422/485 cards have the correct 120 Ohm

(nominal) terminating resistors for the RXD twisted pair line and the CTS twisted pair line fitted on the RS-422/485 card for both the serial ports on the card.

There is no need to add any more at the PC end.

The terminating impedance's shown later in the wiring diagrams are automatically provided by the on board resistors and do not have to be added by the user.

9.4 Fail Safe Open Circuit Detection

Open circuit is when there are no drivers on the circuit. This occurs by design in party line multi driver/receiver systems and unintentionally when the twisted pair line is accidentally cut or disconnected or the transmitting device fails. In RS-485 party line systems there are extended periods of time when none of the many possible talkers are gated onto the bus. This is known as the line idle state and occurs when all the driver outputs are in the high impedance state. The lines float, perhaps being pulled to the high or low state by noise or other voltages on the line.

Without fail safe open circuit detection false start bits are detected by the receivers, either corrupting good communications or causing noise to masquerade as good data.

The on board fail safe open circuit detection causes the receiver to go to a known, predetermined state and prevents false start bits and bad data being detected during open circuits.

9.5 Fail Safe Short Circuit Protection

Short circuits are when the two lines of a twisted pair are connected together. This occurs due to either accidental damage to the cable or due to failure of one or more transmitter/receivers on the line. The short circuit condition is dangerous since damage to the receiver may occur and communication may be corrupted or prevented.

The on board fail safe short circuit detection prevents the line impedance from going to zero and thus protects the inputs of receivers and the outputs of drivers.

9.6 RS-422 Operation

Generally, in RS-422 systems all 8 signal lines from the 9 pin D connector participate in the data transfer sequence, thus 4 twisted pair cables are used. One twisted pair carries the TXD data outwards, one pair brings the RXD data inward, another pair carries the RTS handshake outwards and the fourth pair brings the CTS handshake inwards. There is no need to carry the ground from one device to another.

This RS-422 arrangement allows data to be transmitted and received simultaneously since each signal has its own data cable pair. In addition, the receiver can set RTS true so telling the transmitter on its CTS input that the receiver is ready to accept data. In this way, no data will ever be transmitted when the receiver is unable to accept it, due to a full input buffer etc. And so no data will be lost.

9.7 RS-422 Serial Port Cables

Use screened twisted pair Belden cable 9729 and 9829, L type 2493 and 2919 or IBM Part No 4716748 cable to make the RS-422 connection. Unscreened Belden type 8795 may also be used in less noisy environments.

The on board resistor networks terminate the receiving end of the twisted pair cable in its characteristic impedance.

9.8 Serial Port 1 to Other PC Cable

SERIAL PORT 1 Side

9 Pin Female D Connector

Other PC SERIAL PORT Side.

9 Pin Female D Connector

SCHEMATIC REPRESENTATION:

ACTUAL REPRESENTATION:
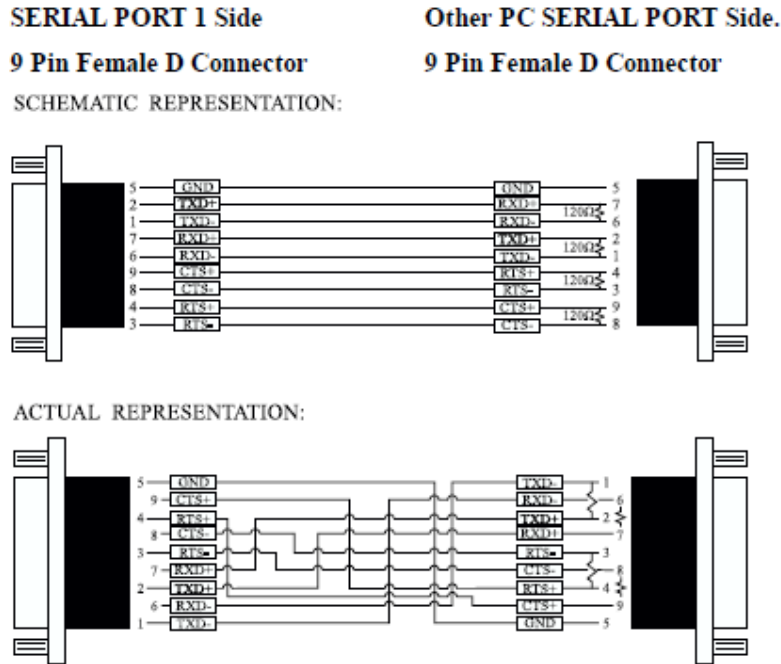
9.9 RS-485 Operation

The RS-485 standard is intended for up to 32 driver receiver pairs on the bus. The line drivers used in the Serial Solutions RS-422/485 card are designed to work correctly in both RS-422 and RS-485 systems. The main difference therefore is in how the system is implemented. Though the card uses a 9 pin D connector, in general, not all the lines are used for RS-485 systems. The RTS+/- and CTS+/- lines, though driven by the card, are usually not connected. In two wire, Half-Duplex configurations the TXD+ line is connected to the RXD+ whilst the TXD- line is connected to the RXD-, only one pair of twisted wire cable is used in RS-485 Half Duplex communications.

The hardware handshaking performed by the CTS+/- and RTS+/- lines in RS-422 systems are handled by a software protocol in RS-485 systems. In situations where more than one device may transmit data on the shared data line, each cards RTS line is used as a gating signal to enable the TXD driver only when that card needs to transmit data, i.e. set TXD GATE or AUTO jumper. This mechanism prevents bus contention caused by multiple transmitters holding the line in opposing states. Revision 3 and higher versions of this card have a facility which automatically "gates" the RTS line, thus enabling the transmitter independently of any software. This "Auto gating" is described in more detail in the previous 485 half duplex section

The three wiring schemes given described below are: -

RS-485 One Talker Many Listeners (HALF DUPLEX)
RS-485 Many Talkers Many Listeners (HALF DUPLEX.)
RS-485 Many Talkers Many Listeners (FULL DUPLEX.)

9.10   RS-485 Cable

For best noise immunity use twisted pair cables to make the RS-485 connection. In Half Duplex wiring only 1 twisted cable pair is needed. Two twisted pair cables are needed for Full Duplex communications.

Use screened twisted pair Belden cable 9729 and 9829, UL type 2493 and 2919 or IBM Part No 4716748 cable to make the RS-485 connection. Terminate the twisted pair cable

9.11 RS-485 One Talker – Many Listeners, Half Duplex

There are several schemes for connecting RS-485 devices depending on the characteristics of the system. In many cases there will be only one device, which can transmit, data and all the others simply listen to it. This scheme is used for theatrical lighting intensity control in the DMX512 standard. This is shown below. For the talker the RS-485 TXD GATE jumper should remain in the factory set position, i.e. transmitter is always enabled. There is NO multiplexing of the TXD and RXD lines. Data is only flowing one way, from PC outwards, and is thus a Half-Duplex configuration so only one twisted pair cable is needed.
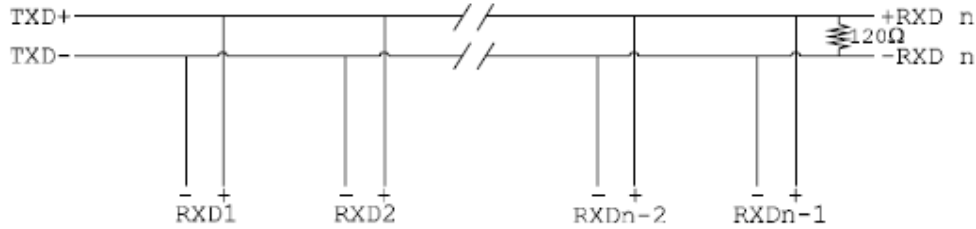
Note: The Receiver end of MAIN line terminated in characteristic impedance by ONBOARD resistor networks stubs off the main not terminated.

In the above scheme, one RS-485 device is talk only, it transmits data, but it does not receive any. The other RS-485 devices are receive only, they do not transmit any data at all.

9.12 Half Duplex Settings of RS-485 Multiplex
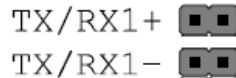
Both jumpers shorted, causing the RXD- & TXD- and the RXD+ & TXD+ signals to short together at the 9-pin connector.

9.13 RS-485 Many Talkers – Many Listeners, Half Duplex

Another popular RS-485 layout is for multiple talkers and multiple listeners. This is shown below. This is also known as "party line" transmission. It is imperative to have some method of preventing two devices trying to drive the data lines at the same time. The normal method is to use the RTS line as a talk enable. The RTS line should go true immediately prior to the data transmission and go false immediately after the last byte in the stream is sent.
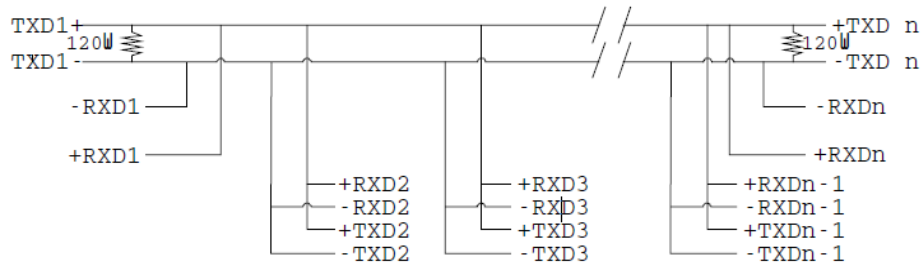
Note: BOTH ends of MAIN line terminated in characteristic impedance, stubs off main line not impedance, since both ends receive. The twisted pair ends are wired to both RXD+ & TXD+ and RXD- & TXD- at each RS-485 device!

9.14   RS-485 Many Talkers – Many Listeners, Full Duplex

The RS-485 many talkers, many listeners, Full Duplex system can be used when all the RS-485 devices have separate Transmit and Receive channels. There is NO multiplexing of the TXD and RXD signals on the same device. This system is especially useful when there is no flow control available on the PC, usually due to the use of a third party communications program that prevents the use of the RTS signal as a "transmit enable" control, via the TXD GATE jumper. It can be used in the following situations:-

a) The PC is connected to only ONE RS-485 device.

b) The PC is communicating with several RS-485 devices that are each able to recognize and respond to their own unique address. The RS-485 devices only drive their TXD lines when they are responding to requests from the PC to send data. In effect, the RS-485 device's address and the command it receives is used to control access to the devices TXD channel.

This is a Full Duplex system. Two twisted pair cables are required. One twisted pair, is the PC's TXD channel, it carries the data sent from the PC's TXD outputs to the RXD inputs of each of the RS-485 devices. The second twisted pair, is the Devices TXD channel, it carries the data sent from each of the devices' TXD outputs to the RXD inputs of the PC.

The advantages of this system are great, since no new communications, software is needed, and the PC can talk and listen at the same time. In effect, the handshaking is performed by the intelligence of the RS-485 devices attached to the PC. When wired as below, the PC can transmit data at any time and all the RS-485 devices #1 to #n simultaneously receive it. Only one of the RS-485 devices may talk, i.e. transmit data, at any one time. Each RS-485 device recognizes commands and data addressed to it, it only talks when the PC commands it to do so. When the RS-485 device receives the command to talk from the PC, it gates its TXD drivers on, sends the data down the device TXD channel, and disables its TXD drivers. The other RS-485 devices remain in the receive only mode when they are not being addressed, they do not transmit any data at all.

RS-485 Jumpers

```
TX/RX1+ [■ ■]
TX/RX1- [■ ■]
```

Both jumpers left unconnected (not shorted)

RS-485 Full Duplex
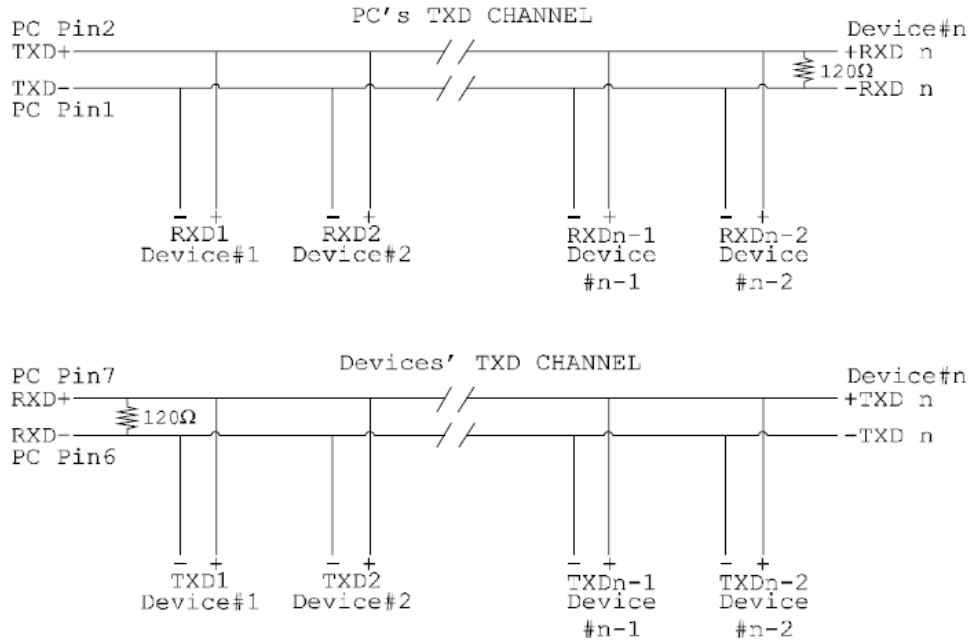
Note: The receiver end of MAIN line terminated in characteristic impedance, stubs off the main not terminated.

9.15   Optional Grounding Arrangements

Proper operation of the cable circuit, according to TIA EIA: 485 A (1995) requires that the cable ground shield is not connected directly to the equipment ground shield. A current limiting resistor should be used in series with the shield to avoid possible large current flow due to differences in ground potential. Any one of the methods shown below can do this.

Configuration A)
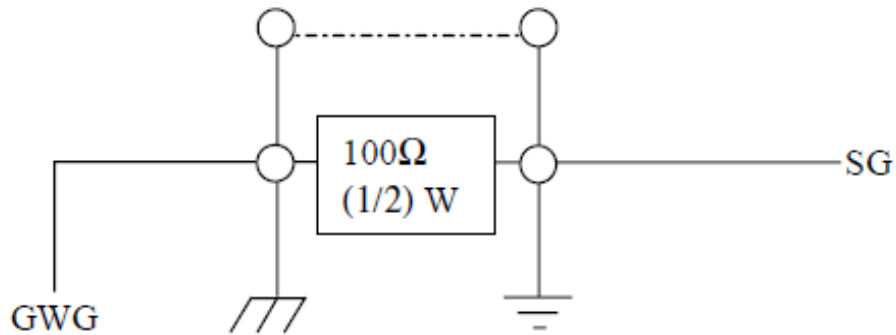
Configuration B)
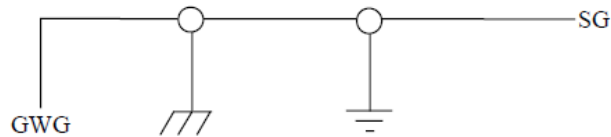
SG	=	Signal Ground Interchange circuit.
GWG	=	Green wire ground of power system.
///	=	Protective ground of frame ground.
⏚	=	Circuit ground or circuit common.

Configuration A) The circuit common of the equipment is connected to protective ground, at one point only by a 100 Ω, ±20% resistor with a power dissipation rating of 1/2W. An additional provision may be made for the resistor to be bypassed with a strap to connect signal common and protective ground directly together when specific installation conditions necessitate.

10. Lifetime Warranty and Support

To receive the lifetime warranty, you need to register your product with us using our online form.

NB: this must be done within 28 days of purchase.

Lifetime Warranty Sign up

*Terms and Conditions are available online. Standard warranty period is 3 years if a product is not registered.

Since 1983, Brainboxes have designed, tested and manufactured our products all under one roof. One of our greatest strengths is after sales service. Technical Support is provided by members of our Test Team, who know our products inside out and have direct access to the chip and board designers as well as the technicians who built and tested your product.

If you have any issues, questions or suggestions about our Products and Services then please contact us.

Technical support is free*. As long as you have a Brainboxes Product we will be happy to help, even if it's discontinued or out of warranty. Excellent Customer Service, just as it should be.

For the quickest solution to your issue, if you email us, please include as much detail of your setup and the fault you are experiencing.

*Standard rate call charges for phone support apply.

Email

Technical Support: support@Brainboxes.com

Sales Enquiry: sales@Brainboxes.com

Telephone

You can speak to Brainboxes Support or Sales teams direct.

Monday – Friday, 9am to 5pm (UK Time)

Tel: +44(0)151 220 2500

11. Technical Specifications

11.1 Supported Serial Settings

Serial Setting

Baud Rate	Up to 921,600
Data Bits	5,6,7 or 8
Parity	None, Odd, Even, Mark & Space
Stop Bits	1, 1.5 or 2
Handshaking	RTS/CTS DTR/DSR Xon/Xoff
Break	Supported

11.2 Device Pin-out

11.2.1 37 Way D Connector

RS-232 pinout

RS-232 Card(s): UC-268

37 way D connector Pinouts						
Port #1	Port #2	Port #3	Port #4	Pin Function	9 Pin	25 Pin
3	26	12	35	Transmitted Data (TXD)	3	2
2	25	11	34	Received Data (RXD)	2	3
21	7	30	16	Request To Send (RTS)	7	4
22	8	31	17	Clear To Send (CTS)	8	5
20	6	29	15	Data Set Ready (DSR)	6	6
5	28	14	37	Ground (GND)	5	7
1	24	10	33	DataCarrier detect(DCD)	1	8
4	27	13	36	Data terminal Ready (DTR)	4	20
23	9	32	18	Ring Indicator (RI)	9	22

NOTE: Pin 19 on the 37 pin D connector is not used.

RS-422 pinout

RS-422/485 Card(s): UC-346 and UC-368

Port #1	Port #2	Port #3	Port #4	Pin Function	9 Pin
38 way D connector Pinouts					
1	24	10	33	Transmitted Data (TXD-)	1
2	25	11	34	Transmitted Data (TXD+)	2
3	26	12	35	Request to Send (RTS-)	3
4	27	13	36	Request to Send (RTS+)	4
5	28	14	37	Ground (GND)	5
20	6	29	15	Received Data (RXD-)	6
21	7	30	16	Received Data (RXD+)	7
22	8	31	17	Clear to Cend (CTS-)	8
23	9	32	18	Clear to Cend (CTS+)	9

NOTE: Pin 19 on the 37 pin D connector is the ground for the D connector shell

11.2.2 44 Way D pin connector

RS-232 Card(s): UC-263, UC-260, UC-701, UC-049, UC-061, UC-072, UC-083, UC-295, UC-253, UC-734

Port #1	Port #2	Port #3	Port #4	Pin Function	9 Pin
44-Way D Connector Pinouts					
13	25	21	17	Transmitted Data (TXD)	1
14	26	22	18	Received Data (RXD)	2
29	10	6	2	Request To Send (RTS)	3
28	9	5	1	Clear To Send (CTS)	4
30	11	7	3	Data Set Ready (DSR)	5
43	39	36	32	Ground (GND)	6
15	27	23	19	Data Carrier Detect (DCD)	7
12	24	20	16	Data Terminal Ready (DTR)	8
42	8	4	33	Ring Indicator (RI)	9

NOTE: Pins 31, 34, 35, 37, 38, 40, 41 and 44 are not used.

11.2.3 78 Way D pin connector

RS-232 Card(s): UC-279

78 way D connector Pinouts						
Port #1	Port #2	Port #3	Port #4	Pin Function	9 Pin	25 Pin
30	50	11	10	Transmitted Data (TXD)	3	2
55	17	37	56	Received Data (RXD)	2	3
51	31	12	14	Request To Send (RTS)	7	4
16	53	59	57	Clear To Send (CTS)	8	5
54	34	58	38	Data Set Ready (DSR)	6	6
68	69	70	71	Ground (GND)	5	7
35	33	39	18	Data Carrier Detect (DCD)	1	8
49	32	13	52	Data terminal Ready(DTR)	4	20
36	15	20	19	Ring Indicator (RI)	9	22

78 way D connector Pinouts						
Port #5	Port #6	Port #7	Port #8	Pin Function	9 Pin	25 Pin
40	2	63	64	Transmitted Data (TXD)	3	2
28	8	46	27	Received Data (RXD)	2	3
21	41	62	60	Request To Send (RTS)	7	4
25	4	9	45	Clear To Send (CTS)	8	5
5	42	29	26	Data Set Ready (DSR)	6	6
72	73	74	75	Ground (GND)	5	7
43	23	48	6	Data Carrier Detect (DCD)	1	8
22	3	61	1	Data terminal Ready(DTR)	4	20
44	24	47	7	Ring Indicator (RI)	9	22

NOTE: Pins 65,66,75 - 78 on the above connector are not used

11.2.4 RS-232 Devices

Pin 1	:	DCD
Pin 2	:	RXD
Pin 3	:	TXD
Pin 4	:	DTR
Pin 5	:	GND
Pin 6	:	DSR
Pin 7	:	RTS
Pin 8	:	CTS
Pin 9	:	RI
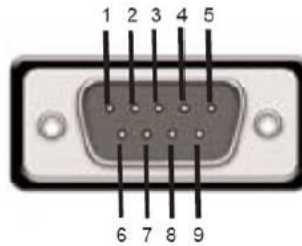
11.2.5 RS-422/485 Devices

Pin 1	:	TXD-
Pin 2	:	TXD+
Pin 3	:	RTS-
Pin 4	:	RTS+
Pin 5	:	GND
Pin 6	:	RXD-
Pin 7	:	RXD+
Pin 8	:	CTS-
Pin 9	:	CTS+
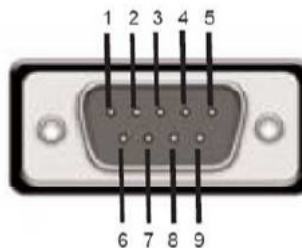
PLEASE NOTE:

- DTR/DSR Handshaking is not available on RS-422/485 devices

- For RS-422 Full Duplex communications, please note outputs above.

- To achieve RS-485 Half Duplex communications, using two wires for communication, Pins 1 and 6, 2 and 7 must be physically shorted.

- Once your wiring is setup, you will also need to set the card to FULL or HALF Duplex mode in the software. For further details, see **Section 3: Product Configuration.**

11.3   Terminating Resistors

RS-422 and RS-485 lines should be terminated at the end of the main branch of the RECEIVER, in the cables characteristic impendence. These terminating impendence's stop echoes caused by the serial data being reflected back at the cable ends. It is not necessary to terminate the transmitter end of the twisted pair.

The AT Dual Port RS-422/485, Opto Isolated AT Dual Port RS-422/485 and AT Velocity RS-422/485 cards have the correct 120 ohm (nominal) terminating resistors for the RXD twisted pair line and the CTS twisted pair line fitted on the RS-422/485 card for both the serial ports on the card.

There is no need to add any more at the PC end.

The terminating impendence's shown later in the wiring diagrams are automatically provided by the on board resistors and do not have to be added by the user.

11.4   Storage and Operating Environment Guidelines

Storage

Temperature: -10 ˚C to +70 ˚C

Humidity: 8% to 95% non-condensing

Operational

Temperature: 0˚C to +70˚C

Humidity: 20% to 75% non-condensing

12. Regulatory Approvals / Compliance

For up to date details of global certifications, please check the product datasheet on the Brainboxes website: www.brainboxes.com

12.1 Company Accreditation

Brainboxes is accredited to internationally recognised standards for our Quality and Environmental Management Systems. Our ISO9001 Quality System was first accredited in 1994, followed by our ISO14001 Environmental System in 2008. These standards help ensure we can demonstrate effective management of all our quality systems and our environmental impacts, together with a process of continuous improvement.

All our Quality systems are subject to internal and external assessment on a regular basis. Copies of Certificates are available for download from our website: www.brainboxes.com

Linked with our Lean and Six Sigma techniques, we believe we have the most reliable products on the market, and to back this up we are offering a Lifetime Warranty* on all our Serial Products.

12.2 Europe – EU Declaration of Conformity

Brainboxes products are designed to conform to the protection requirements of European Council Directive 2004/108/EC and its subsequent revisions.

A Declaration of Conformity and supporting Technical Construction File is available by request from Brainboxes, and will identify any updated legislation that may have been introduced since the publication of this Manual.

Warning: This is a Class A Product. In a domestic environment this product may cause interference in which case the user may be required to take adequate measures to address this.

12.3 WEEE Directive (Waste Electrical and Electronic Equipment)

The Waste Electric and Electronic Equipment (WEEE) Regulations 2013 became law in the UK on the 1st of January 2014 and replaced the 2006 Regulations. Brainboxes is fully compliant with this legislation.

Customer Responsibilities

You are encouraged to dispose of WEEE in an environment friendly way.

This can be done through your local civic amenities site, an approved treatment facility or alternatively through a relevant compliance scheme.

Brainboxes' Responsibilities

Brainboxes has a legal responsibility, as producer, to provide a free of charge collection service to our customers for our obligated WEEE.

Brainboxes is defined as a producer under the WEEE regulations because we sell own brand Electrical & Electronic Equipment (EEE) in the UK. Our WEEE Producer Registration Number is WEE/AH0004XR.

For details of our WEEE recovery service options, please see our Website, or email us at:

weeerecovery@Brainboxes.com

12.4 RoHS Compliance

All Brainboxes Serial and Bluetooth products are fully RoHS compliant.

Brainboxes identified at an early stage the importance of rapid compliance to RoHS guidelines and established a project team to actively manage the transition. The initial step in the process was to use our close relationships with suppliers to ensure early access to RoHS compliant components for all of our Bluetooth and Serial Products. In addition, the project team worked to ensure that our manufacturing processes meet all RoHS requirements well in advance of the deadline.

To verify supplier declarations on RoHS compliancy, we have also sent fully built products to an external test house for X-Ray system XDAL. This technique is capable of determining percentages of different elements and is accurate to 0.1% Wt.

RoHS Compliant Brainboxes products have been available since January 2005.

What is the RoHS Directive?

The Restriction of the Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment (EEE) Directive (2011/65/EU) was transposed into UK law on 2 January 2013.

This legislation bans the placing on the EU market of new EEE containing more than the agreed levels of:

- lead (Pb)
- cadmium (Cd)
- mercury (Hg)
- hexavalent chromium (Cr6+)
- polybrominated biphenyls (PBB)
- polybrominated diphenyl ethers (PBDE)

Any future revisions to this legislation will be complied with, and identified in a Declaration of Conformity, available on request.

13. Copyright

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