

Product Manual

BL-819, BL-830, BL-875

RS-232 Bluetooth Adapters

Version: 6.1



INTRODUCTION.....	4
1.1. PREAMBLE	4
1.2. PRODUCTS AND FIRMWARE	4
PHYSICAL PRODUCT FEATURES	5
1.3. BL-819 / 830	5
1.4. COMPARISON OF BL-819 AND BL-830 FEATURES	5
1.5. BL- 819 / 830 POWER OPTIONS	5
PRODUCT CONFIGURATION	6
1.6. CONFIGURATION FEATURES AT A GLANCE	6
1.7. USING THE CONFIGURATION UTILITY	6
1.7.1. <i>Device Info</i>	7
1.7.2. <i>Support/Links</i>	7
1.8. CURRENT SETTINGS	8
1.8.1. <i>Baud Rate</i>	8
1.8.2. <i>Parity</i>	8
1.8.3. <i>Stop Bits</i>	8
1.8.4. <i>Data bits</i>	8
1.8.5. <i>PIN Code</i>	9
1.8.6. <i>Client/Server</i>	9
1.8.7. <i>Partner Device</i>	9
1.8.8. <i>Connect Using</i>	9
1.9. ADVANCED SETTINGS	11
1.9.1. <i>Device Address</i>	11
1.9.2. <i>Device Name</i>	11
1.9.3. <i>Discoverability</i>	11
1.9.4. <i>Security Mode</i>	12
1.9.5. <i>Encryption</i>	12
1.9.6. <i>Switch Role</i>	13
1.9.7. <i>Class of Device</i>	13
1.9.8. <i>Handshaking</i>	13
1.9.9. <i>Connect Scheme</i>	13
1.9.10. <i>Interactive Menu</i>	14
1.10. DEFAULT SETTINGS	15
1.11. UPGRADE DEVICE	15
ALTERNATIVE PRODUCT CONFIGURATION	16
1.12. ACCESSING THE CONFIGURATION MENUS AND COMMANDS	16
1.13. CONFIGURATION MENU	17
1.13.1. <i>Navigation</i>	17
1.13.2. <i>Main Menu</i>	18
1.13.3. <i>Communications Parameters</i>	18
1.13.4. <i>Handshaking</i>	19
1.13.5. <i>Bluetooth Parameters</i>	20
1.13.6. <i>Display, Restore and Update Current and Factory Settings</i>	21
1.13.7. <i>Disabling Interactive Menu</i>	22
1.13.8. <i>Upgrading Firmware</i>	23
1.14. COMMAND INTERFACE	25
REMOTE CONFIGURATION	26
RESETTING THE PRODUCT	26
UPGRADING YOUR DEVICE	27
PHYSICALLY CONNECTING TO YOUR RS-232 DEVICE	30
1.15. CONFIGURING THE COMMUNICATIONS PARAMETERS	30
1.16. PHYSICALLY CONNECTING YOUR DEVICE TO ADAPTER VIA THE RS-232 CONNECTOR	30

CONNECTING ADAPTERS OVER BLUETOOTH.....	31
1.17. CLIENT/SERVER PAIR: "CABLE REPLACEMENT".....	31
1.17.1. Configuration by Windows Application.....	31
1.17.2. Configuration by Menu.....	32
1.17.3. Configuration by Commands.....	33
1.18. CLIENT: ADAPTER IS THE BLUETOOTH DEVICE WHICH INITIATES THE CONNECTION.....	33
1.19. SERVER: CONNECTING TO ADAPTER FROM A REMOTE BLUETOOTH DEVICE.....	34
1.19.1. Configure and connect the adapter.....	34
1.19.2. Bluetooth Enable your PC.....	34
1.19.3. Discover the device.....	34
1.19.4. Secure the relationship.....	34
1.19.5. Connect to the Serial Port profile.....	35
1.19.6. Connect your application to the new COM port.....	35
11. CUSTOM FACTORY CONFIGURATION.....	36
12. TROUBLESHOOTING	37
13. TECHNICAL SPECIFICATIONS.....	38
13.1. STORAGE AND OPERATING ENVIRONMENT	38
13.1.1. Storage	38
13.1.2. Operational.....	38
13.2. POWER REQUIREMENTS	38
13.2.1. Input Voltage Requirements.....	38
13.3. CHIPSET.....	38
14. REGULATORY APPROVALS / COMPLIANCE.....	39
14.1. COMPANY ACCREDITATION.....	39
14.2. EUROPE – EU DECLARATION OF CONFORMITY	39
14.3. WEEE DIRECTIVE (WASTE ELECTRICAL AND ELECTRONIC EQUIPMENT)	39
14.4. ROHS COMPLIANCE.....	40

Introduction

1.1. Preamble

Brainboxes' RS-232 Bluetooth adapters are fully embedded, stand-alone Bluetooth solutions, which will Bluetooth enable any device with an RS-232 port. These adapters do not require any additional Bluetooth software.

For many applications, a Bluetooth Adapter used in combination with another Bluetooth product (e.g. Brainboxes' USB to Serial adapter connected to a PC with Brainboxes' Bluetooth Software Suite, or a second adapter) essentially replaces the serial cable. This means freeing the device from the limits imposed by the cable specification and in many applications removes the need for expensive cable installation and maintenance. The devices are designed to appear transparent to a user's applications that would otherwise be communicating via a COM port and over a cable, therefore no specific Bluetooth programming is required. The connection uses Bluetooth security to ensure that sensitive data is not "sniffed" by any unauthorised source, although this feature can be turned off.

The products described by this document are designed as cable replacement products. Their primary function is to offer "point to point" Bluetooth capabilities to devices which otherwise do not have the capacity for such behaviour. This capability is configured by a "set and forget" interface, which is not designed to cater for multiple device connection scenarios. At the time of publication, the adapters are only capable of connecting to one other Bluetooth device at a time.

The Adapter is user configurable to baud rates between 1200 and 921,600 baud with none, odd, or even parity, and with 1 or 2 stop bits. The default factory settings are 115,200 baud, no parity, 8 data bits and 1 stop bit.

A convenient reset button can be used to restore various functions of the device including a restore of factory settings.

We trust that if you adhere to the following procedures you will enjoy many years of useful service from your Brainboxes Bluetooth Adapter.

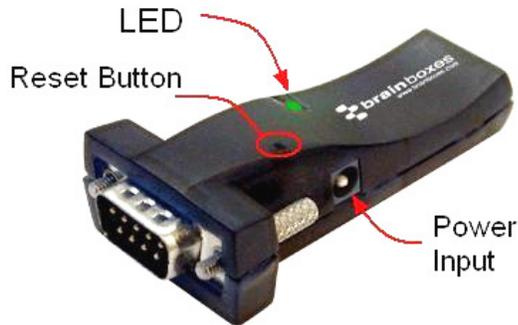
1.2. Products and Firmware

This document covers Brainboxes part numbers BL-819, BL-830 and BL-875 (pre-paired BL-819 and BL-830). Any features that apply to a specific part code will be clearly identified.

New versions of firmware will become available in the future, along with an updated Product Manual. Both of these items will be available for download from our website, <http://www.brainboxes.com/>

Physical Product Features

1.3. BL-819 / 830



Product Shown: BL-819 (male version)

Reset button

See section 6 for more details on how to use the reset button.

LED

The Green LED on the top of the device indicates the current device status. There are 2 states that the light will indicate;

Permanently On – The device has power but no Bluetooth Connection

Flashing – The device has power and has a Bluetooth Connection

On when power is applied, then permanently off – This occurs when the device is in Upgrade mode.

1.4. Comparison of BL-819 and BL-830 Features

The BL-819 and BL-830 adapters share almost identical features, with the only difference being the gender of the adapter. The BL-819 is 9-pin male (DTE) with the BL-830 being female (DCE).

The main anticipated use of BL-819 is to be connected to a DCE device that would normally plug into the back of a PC. If you wish to use BL-819 as a DCE device (e.g. to plug into the back of a PC or similar for configuration) you will need to use the provided gender changer.

The BL-830 is supplied with a DCE connector (female). This device will plug into any serial port on a PC or Laptop.

1.5. BL- 819 / 830 Power Options

The BL-819 & BL-830 also carry the ability to be powered through Pin 9 by a suitable serial port. This negates the need for an external power source. Brainboxes offer two serial cards, which can perform this function for the BL-830, UP-189 and UP-200. For information of the power requirements of your RS-232 Bluetooth Adapter, please see the Input Voltage Requirements in the Technical Specification Section.

Product Configuration

This device contains a comprehensive set of Bluetooth and COM port features which can be changed from an easy to use Windows Configuration Application. This section gives full details about the changes that can be made, how to make them, and the implications the changes will have on the manner in which your Adapter behaves.

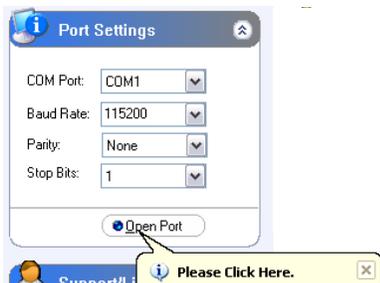
1.6. Configuration features at a glance

Below is a quick list of the configuration options that are available from the configuration application. They will be covered in more detail later in this section.

- View/Set local COM port settings (baud rate, parity, stop bits)
- View/Set Discoverability, Security mode and PIN number
- View/Set Pairing options (including pairing to another adapter)
- View/Set Client/Server configuration (Client connects to Server – important if “pairing” 2 adapters)
- View/Set Local Device Name and Device Class
- View all “factory” and modified settings plus local Bluetooth Address
- Disable command interface and configuration menu
- Permanently update “factory” settings
- Upgrade Device Firmware

1.7. Using the Configuration Utility

The Configuration Utility will display allowing selection of the appropriate COM port settings for the Adapter device you have attached to the port:



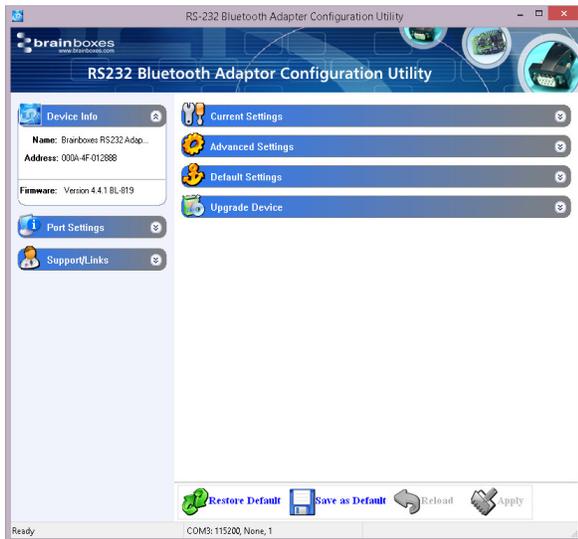
COM Port: Select the port number of the COM port to which you have attached your adapter. Select “Auto” if you don’t know the number and the utility will attempt to find the device for you.

Other Settings: Select the other parameters to match those that have been set on the adapter. If you don’t know them, select “auto” and the utility will attempt to find the device for you. The default parameters for the adapters are 115200 baud, No Parity and 1 Stop bit.

When the device has been opened in the Configuration Utility, at the bottom of the application there will be four ‘action’ icons. These can be used to restore the local RS-232 Bluetooth Adapter to its default settings, save the current settings as default settings, reload the current settings and apply the current settings:



The feature that allows a user to change the default configuration settings on their Adapter would be useful in cases where the Adapter was in use in an application where the physical security of the Adapter couldn’t be guaranteed. If the application required that the settings were very different from the original factory settings then if a long reset were performed (restoring default settings) the application would no longer work until the Adapter was reconfigured. Updating the default settings to the required ones means that should a long reset be performed the device will power up with the settings required by the application.



The application will now load. There may be a short delay whilst the device is detected and its current configuration is queried and the appropriate fields are populated.

As a rule, sections on the left-hand side of the application display information about your device. Settings cannot be changed here. Sections on the right-hand side are where settings can be changed as well as viewed.

Useful “tips” are displayed if the cursor is “hovered” over various fields to help explain those options.

Each section can be expanded to see or change the relevant settings for your RS-232 Bluetooth Adapter

All the settings are described in full detail below.

1.7.1. Device Info



The Device Info section displays the Bluetooth address, name and firmware of the product currently attached.

The local device name field displays the “friendly” name of the device that is connected. This can be changed to any name as required as detailed further below.

Each Bluetooth device in the world must have a unique address. Some Bluetooth devices need to know the address of the device they are connecting to. This address is also identified on the label attached to your product.

The firmware loaded onto your connected device is also displayed here. This is provided mainly for technical support purposes, but also allows you to check for available or suitable updates.

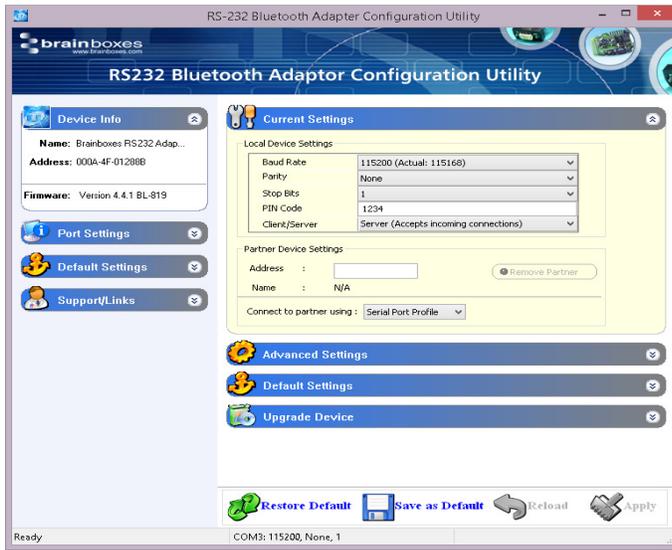
1.7.2. Support/Links



The Support/Links section can be used to get more help from Brainboxes should you be experiencing any difficulties.

The Brainboxes Bluetooth Support website and support email address are available in this section.

1.8. Current Settings



The Current Settings section is broken down into two sections; Local Device Settings and Partner Device Settings. Each field will be discussed further below.

When the Current Settings has been selected, an additional section appears in the left-hand section called Default Settings. Both sections can be expanded at the same time to enable the user to view the current settings and the default settings at the same time.

As each section is opened, the previously opened section will close to prevent information moving off the bottom of the screen and thus requiring the user to scroll down.

Whenever a setting is changed, the field changes colour to indicate that a change has been made but not applied.

1.8.1. Baud Rate

Click the drop down arrow at the far right of this field to display a list of popular baud rates. Due to some technical limitations, it is not possible for the product to achieve all of these baud rates exactly, although most of them are available to within 1%. Normal RS-232 operation is not affected by such small differences in data rates unless very long streams of continuous data are being used. The Actual baud rate achieved is displayed next to your selection.

This option is only applied when the “Apply” icon is clicked. Along with updating the device, the application will immediately change its own communications parameters to match those new settings so it can continue to interact with the device. Multiple changes to communications settings are ALL applied when the “apply” icon is selected.

NOTE: It is possible for the adapters to be configured to baud rates that are not supported by a PC’s COM port. If your application requires such a “non-standard” baud rate, you may no longer be able to communicate to the Adapter from your PC. If you “apply” the setting inadvertently, you can restore the default settings of the Adapter by performing a reset as documented below.

The adapter’s normal factory set baud rate (and default baud rate) is 115200 baud.

1.8.2. Parity

Click the drop down arrow at the far right of this field to display the available options for Parity.

This option is only applied when the “Apply” icon is clicked. Along with updating the device, the application will immediately change its own communications parameters to match those new settings so it can continue to interact with the device. Multiple changes to communications settings are ALL applied when the “apply” icon is selected.

1.8.3. Stop Bits

Click the drop down arrow at the far right of this field to display the available options for Stop Bits.

This option is only applied when the “Apply” icon is clicked. Along with updating the device the application will immediately change its own communications parameters to match those new settings so it can continue to interact with the device. Multiple changes to communications settings are ALL applied when the “apply” icon is selected.

1.8.4. Data bits

Unfortunately this setting cannot be changed. Your RS-232 Adapter only supports the 8 data bit format. Thus there is not a configuration menu option for this setting.

1.8.5. PIN Code

The PIN (Personal Identification Number) is used to create a secure and trusted connection between 2 Bluetooth devices during a process called pairing or bonding. The PIN can be any combination of printable characters. The PIN is only used when the adapter is configured to be in security mode 2 or 3 (High or Medium security).

The factory set PIN is “1234”. This can be changed and you may enter your own combination up to a maximum of 16 characters. If you try to create a PIN code that is larger than this, an error message is generated and you will be given another opportunity to enter your own PIN.

To change your device’s PIN number, click in this field and simply type the new code you want applied. This can be any printable alphanumeric character or symbol, but you should take care to choose a PIN appropriately remembering that some Bluetooth devices (e.g. cell phones) only have limited input mechanisms and may not have a full range of characters available. Press the “Apply” icon to apply the new PIN code.

If your RS-232 Bluetooth Adapter is to be configured into Client mode, this is the PIN that will be used by your Adapter to initiate pairing with the remote device before any connection is made. If your remote device is another Brainboxes RS-232 Adapter in Server mode, you will need to ensure that “both” devices are configured to use the same PIN number.

1.8.6. Client/Server

The option Client/Server changes the default behaviour of your product. This is important if you want a remote device to connect to the product or whether you want the product to connect to a remote device. Click on the drop down arrow on the far right of this field to see the 2 selectable options. The default configuration of your product is set to “Server” operation. This means that the product will wait for devices to connect to it (just like a network or web server). Changing this setting to “Client” will put the product into a state where it will attempt to connect to remote devices contained in its internal database.

The “remote” or “partner” device feature is explained below. It is this option that requires attention if you wish to configure 2x Brainboxes RS-232 Adapters to communicate to each other to create a “true” cable replacement scenario.

Due to the nature of this feature (it connects to a remote device and therefore renders the configuration utility unavailable) we recommend that this setting is changed after all other configuration changes have been made and applied.

1.8.7. Partner Device

This feature serves 2 purposes:

In Server mode it shows the address of the last device to successfully bond and connect.

In Client mode, it shows the device to which the product will attempt to pair/connect.

A remote device address must first be entered into the “partner device” field before the product, configured in Client mode, will be able to initiate any connections to that remote device. Adding a partner device using this feature will stop remote devices bonding with the device in Server Mode if one of those remote devices is not the partner device.

Click on the field to enter the Bluetooth Address (BD_ADDR) of the remote device you wish to connect to. This should be in the same format as indicated on the products label (NAP-UAP-LAP, for those of you who know). The option to remove this newly entered device exists at this point should you have made a mistake. You should be sure to check that the PIN number entered above exactly matches the PIN code requirement of the remote device to which you are trying to connect.

Once the RS-232 Bluetooth Adapter has successfully added a partner device the menu will update to give the user the option to remove the partner. All settings must be applied using the “Apply” icon before they are set.

1.8.8. Connect Using

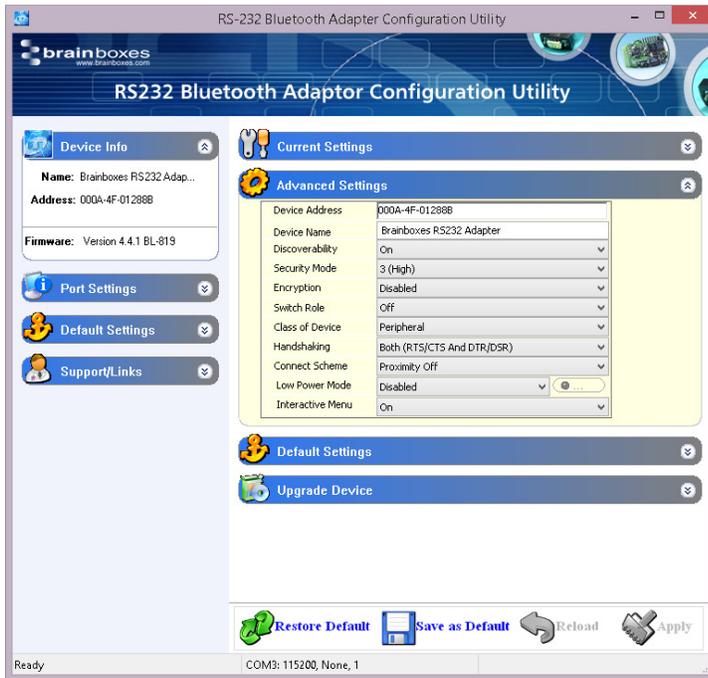
Clicking the arrow on the far right of this field shows a drop down list of the available service options. It should be noted that this feature does not actually query the remote device for its supported services, so you must be sure that your remote device actually supports your selection.

This feature can be used to connect to remote devices that support DUN, LAN or FAX services i.e. some Bluetooth phones will only let devices that are Dial-Up Networking clients to connect to them. Although Brainboxes Bluetooth Adapters do not

actually include all the software necessary for it to support DUN, LAN and FAX fully, these are all based on SPP, which the Brainboxes devices do support. The additional software can come from the Operating System such as XP.

For example, a Bluetooth phone can be used by an RS-232 Bluetooth Adapter to dial out to the internet on a PC if the Connect Using feature is set to DUN, partner address is the phone's Bluetooth address and the Adapter is in Client mode. When the phone confirms that a Bluetooth connection is present, a modem can be installed on the PC, which would use the COM port that the Adapter is connected to. Some Bluetooth phone's such as Nokia and Sony Ericsson have a special Bluetooth modem driver that you can download from their website. Once installed you can then use the Create a New Connection wizard from Control Panel/Network Connections to dial out using the new modem. You will require an ISP with username and password for this.

1.9. Advanced Settings



The Advanced Settings section contains a more detailed range of settings that are least likely to require modification for any particular scenario to work. Each field will be discussed further below.

When the Advanced Settings has been selected, an additional section appears in the left-hand section called Default Settings. Both sections can be expanded at the same time to enable the user to view the current settings and the default settings at the same time.

As each section is opened, the previously opened section will close to prevent information moving off the bottom of the screen and thus requiring the user to scroll down.

Whenever a setting is changed, the field changes colour to indicate that a change has been made but not applied. After making a selection select the "Apply" icon to apply the setting.

1.9.1. Device Address

This field shows the Bluetooth Address (BD_ADDR) of the local device. As each Bluetooth device must have its own unique address, this field cannot be edited or modified in any way.

1.9.2. Device Name

In scenario's where more than 1 Adapter is to be used in the same geographical location (i.e. they are all in range of each other/the controlling device), it may be wise to change the name of each device so that human users can more easily identify each individual.

This field does not have a drop down list of options. You must select the field and edit the name to your requirements.

Memory constraints on the Adapter mean that you must ensure that your desired name is less than 30 characters. The Factory setting for the local device name is "Brainboxes RS-232 Adapter".

1.9.3. Discoverability

Discoverability is a feature that allows any other Bluetooth device to find (or not find) your Bluetooth device. Just because a Bluetooth device is non-discoverable it doesn't mean it's not also connectable. Because a Bluetooth connection is made using only the device's address, if an application already knows the address of a non-discoverable remote device, and it has already bonded (if appropriate) or knows the correct PIN number, then it can connect to that device. You may wish to set this option to help avoid confusion when many RS-232 Bluetooth Adapters exist in close proximity to each other.

This field has 2 options selected from the drop down list.

- 1) "On" is the default setting for the adapters. This setting will make the Adapter "viewable" by any other Bluetooth device.
- 2) Selecting "Off" immediately renders the adapter "non-discoverable". No other Bluetooth devices will be able to see the Adapter when they perform a device discovery. However, in this mode, your adapter is still "connectable".

1.9.4. Security Mode

The factory set security mode is 3 (Highest). This field has 3 available settings from the drop down list:

1) Selecting option “1” will immediately place your adapter into security mode 1. This is the lowest security mode that the Adapter can be configured to. Connections, including service discovery, can take place without the need for “pairing” or “bonding”. In mode 1, the Adapter automatically accepts all access requests without initiating authentication, encryption, or authorization procedures. Any attempt by a remote application to perform authentication or encryption procedures will be rejected.

2) Selecting option “2” will immediately place your Adapter into security mode 2. This mode allows remote Bluetooth devices to search for and retrieve the services on your Adapter without pairing, but will not allow them to connect unless the 2 devices are paired.

3) Selecting option “3” will immediately place your Adapter into security mode 3 (default). This is the highest security mode available. Connections of any kind (other than a device discovery) from a remote Bluetooth device are only allowed after a successful “pairing” has been performed. No services will be shown to other Bluetooth devices unless the 2 devices are successfully paired.

The tables below show some more information with regards to the application of the security settings...

Security modes for Adapter as Client (initiates Connections):

Security:	Who can Pair?	Who can it connect to?	Possible use:
High (Mode 3)	BL-819 / 830 will only pair with device entered in the ‘Set Partner’ menu. Other device must have identical PIN number	Only device entered in the ‘Set Partner’ Menu, after pairing.	Secure connection between the BL-819 / 830 and a pre-set device (Link level enforced security – can see device but not services unless paired)
Medium (Mode 2)	BL-819 / 830 will only pair with device entered in the ‘Set Partner’ menu. Other device must have correct link key	Only device entered in the ‘Set Partner’ Menu, after pairing.	Secure connection between the BL-819 / 830 and a pre-set device (Service level security – can see services but not connect unless paired)
Low (Mode 1)	N/A	Only device entered in the ‘Set Partner’ Menu.	When users who do not want to spend time pairing and do not require a secure connection

Security mode for Adapter as Server (receives connections):

Security:	Who can Pair?	Who can Connect?	Possible Use:
High (Mode 3)	Any Device with correct PIN.	Any device	Secure connection between the BL-819 / 830 and a pre-set device (Link level enforced security – can see device but not services unless paired)
Medium (Mode 2)	Any Device with correct PIN.	Any device	Secure connection between the BL-819 / 830 and a pre-set device (Service level security – can see services but not connect unless paired)
Low (Mode 1)	N/A	Any device	When users who do not want to spend time pairing and do not require a secure connection

1.9.5. Encryption

Encryption is a method of ensuring that the communications between 2 devices cannot be “bugged” or “listened” to by any unauthorised source. This encryption is performed in lower layers of the protocol stack as defined by the Bluetooth Specification.

The factory set Encryption mode is “Disabled”. This field has a drop down list from which the configuration can be changed to enable “Point to Point” or “Point to Point & Broadcast”.

1.9.6. Switch Role

This Function will allow an RS-232 Bluetooth Adapter to connect to another device as a Client, then when the connection has been made, to switch the role to Server. This option is required if you wish to connect two or more adaptors to a control device, with the adaptors initiating the connection. NB, the adaptors are only capable of being connected to one other device at time.

1.9.7. Class of Device

Some remote device applications will only communicate to devices of a certain type. This option allows you to reconfigure your RS-232 Bluetooth Adapter to appear as a number of different device types. The Factory setting for the Class of device is “Peripheral”. The available options are: Peripheral, Desktop, Laptop, Imaging, Phone/Modem and LAN.

IMPORTANT NOTE: Changing this Class of Device setting does not alter the published functionality of the product. It will continue to offer ONLY One Serial port profile connection.

1.9.8. Handshaking

This setting allows the user to select the handshaking scheme used for the device. By default the setting is no handshaking. Handshaking options are RTS/CTS, DTR/DSR, RTS/CTS & DTR/DSR or none. When changing between handshaking options, a power cycle is required before the configuration utility can be re-accessed.

RTS/CTS handshaking is used between the Adapter and the port to which it is connected (hardware handshaking). DTR/DSR handshaking is used over the Bluetooth connection between the adapter and the device to which it is connected via Bluetooth (over-the-air handshaking).

As shipped from the factory, this product is configured NOT to require the use of RTS/CTS handshaking. Its implementation is such that these control signals are NOT transferred over the Bluetooth link, but instead are used to control the passage of data between the adapter and the physically connected RS-232 device (PC, modem etc.). It is therefore not possible to use this product in an application that uses the RTS and/or CTS handshake lines for purposes other than simply to control the flow of data.

Whilst the Adapter is configured NOT to require RTS/CTS handshaking, some devices to which it may be connected will require this flow control. If this is the case, unless the following procedures are undertaken the Adapter will not send any data and the communications between the 2 devices will appear corrupt or broken.

Whilst the product ships without handshaking to make initial configuration easier, Brainboxes do not recommend that you leave RTS/CTS handshaking disabled unless you are connecting the Adapter to a device that specifically does not use any itself. This handshaking exists to ensure that no data is lost between the 2 devices. In applications where there is a significant amount of data flowing between devices, there is an increased risk of data being lost. Disabling handshaking unnecessarily may cause your application to fail intermittently due to this lost data.

No provision has been made in the current design for the implementation of the DCD and RI lines.

1.9.9. Connect Scheme

This allows the selection of a connection scheme called Proximity. This connection scheme tells the adapter to go out, find the first Bluetooth device in range and connect to that device. If there are any problems connecting or pairing, then the adapter will give up and go out to search again.

There are two different proximity schemes, 1 and 2. Scheme 1 finds a device to connect to and then saves that device’s address as its partner device, so that the next time the adapter is powered up, it will always connect to that partner device. Scheme 2 finds a device to connect to and doesn’t save that device’s address, so that next time the adapter is powered up, it will go out and find a new device to connect to again. It may be the same device as last time (if it is still in range) or it may be a new device.

The closest device to the adapter is not necessarily going to be the device that responds to the inquiry first. The adapter needs to be in Client mode for Proximity to work and as soon as a partner address is populated in the partner address field, the adapter behaves just as though it is in Client mode with a partner device to connect to.

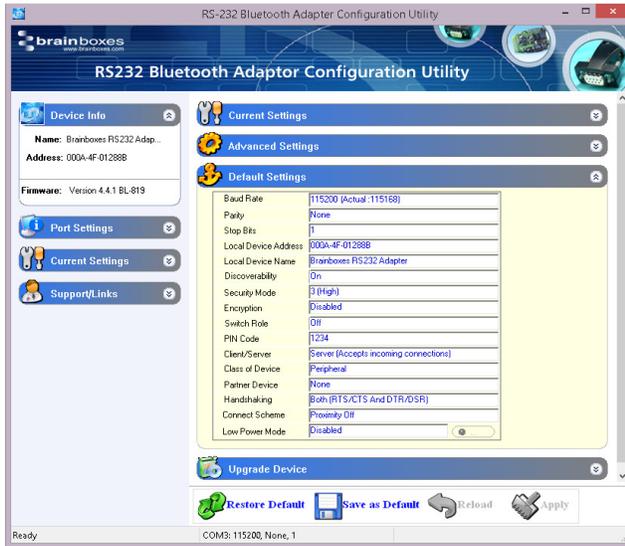
1.9.10. Interactive Menu

Some RS-232 devices (GPS devices for example) emit a continuous stream of data regardless of whether a cable is connected. When there is no Bluetooth connection, this data (from the RS-232 device) will be interpreted by the Adapter as commands to (or interaction with) the menu and ultimately change settings (such as baud rate) that render the Adapter inoperable. Selecting “off” for this setting will stop the Adapter being unwontedly re-configured in this manner. Unfortunately, this will also disable all the functionality required for this configuration application to interact with this product.

If you inadvertently select “off” for this setting, the menu/command interface (and thus the operation of the configuration application on this device) will only be re-enabled by a long reset as documented below.

WARNING: Use with care: Selecting the “off” option of this feature will render further configuration impossible if set as a default setting.

1.10. Default settings

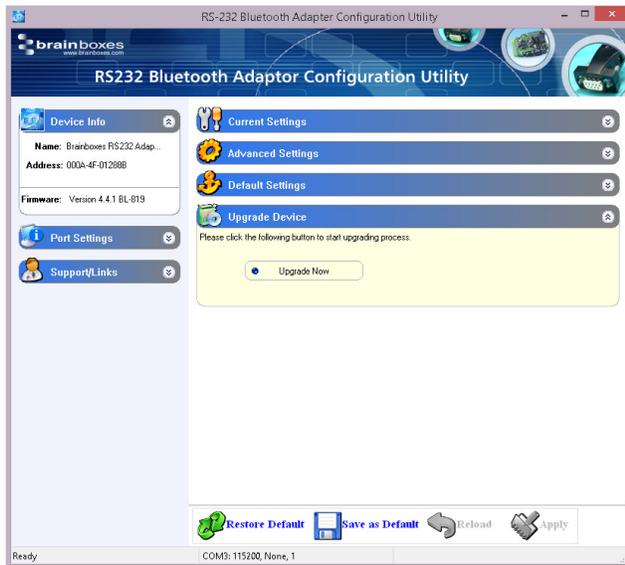


The “Default Settings” section is simply a display page showing all the configuration options either as they were set in the factory (default or custom) or as the user has chosen to update them from this application or menu.

These are the settings that will be restored if the “Restore Default” icon is selected at the bottom of the page.

When the Default Settings section is opened (on the right-hand side of the application), a new section appears in the left-hand side called Current Settings, which can also be expanded so that the current and default settings can be viewed at the same time.

1.11. Upgrade Device



The “Upgrade” section allows the user to upgrade the adapter firmware using a simple upgrade wizard. Updated firmware will be available from the Brainboxes support website so please check the site regularly:

<http://www.brainboxes.com>

Alternative Product Configuration

1.12. Accessing the configuration menus and commands.

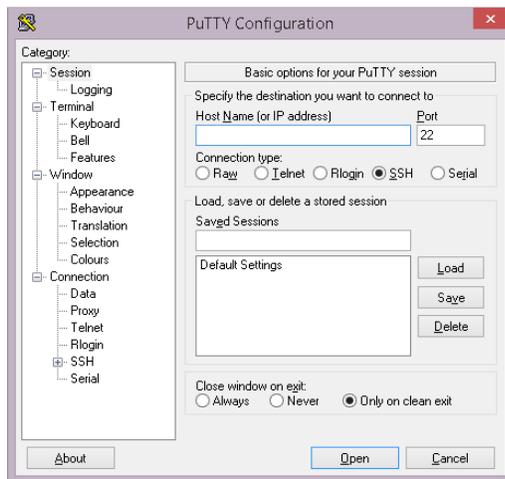
The adapter's configuration menu is available at any time that there is no Bluetooth radio connection established with another device (unless of course you have selected the option to disable the menu). As soon as a Bluetooth connection is made, the data sent to the Adapter will be sent over the radio link to the remote device. A short time after the Bluetooth connection is broken, the configuration menu's become available again.

Sending a single "Carriage Return" (Enter) character to the Adapter whilst no Bluetooth connection exists will activate the initial main menu, or typing the command required will initiate the appropriate response. Both the menu and command list are documented further below.

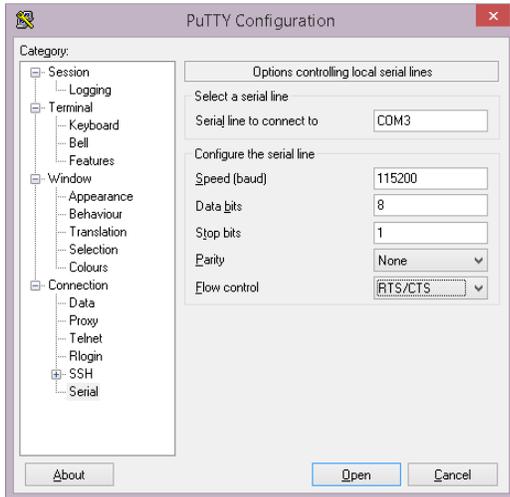
The example given below to connect to the configuration menu is performed in Windows 8.1 using PuTTY, a terminal application which can be downloaded from here: <http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html>. If you are using a different version of Windows the specific steps to invoke and use the PuTTY application may be slightly different.

First, connect the adapter to an available serial port on your computer. In this example, the COM3 port on the PC has been used.

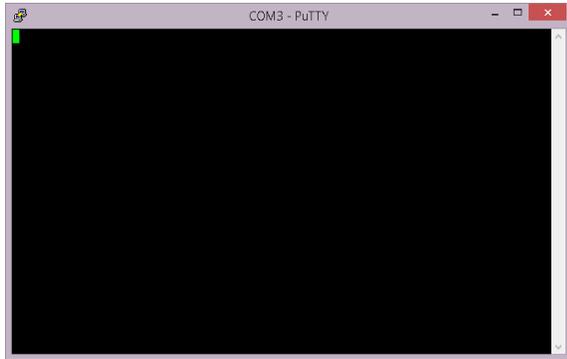
Ensure the power adapter is connected and switched on (the leftmost green LED on the Adapter should light).



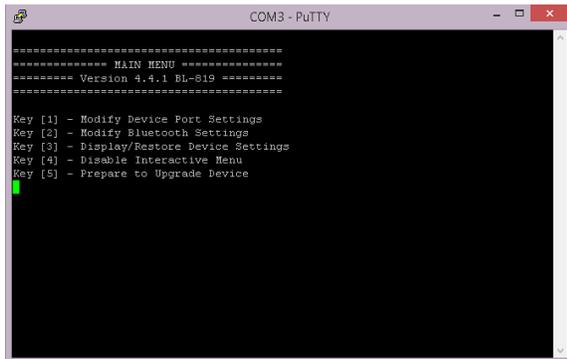
When PuTTY is first opened, you will be presented with the window shown here. You now need to input the COM port and choose the port settings which you want to open the COM port with. To do this, select the 'Serial' option on the left side of the window (at the bottom of the list).



This is the Serial connections section. Here you are able to select the COM port which you want to open and the speed (baud rate), data bits (always 8), stop bits, parity and flow control. Once you have entered the settings for the BL-819/830, press Open.



This is how the PuTTY terminal will appear when the COM port is first opened. If you now press Enter (Carriage Return), you will then see the Interactive Menu appear, like below.



This is the Interactive Menu. Here you can configure the BL-819/830's port settings.

1.13. Configuration Menu.

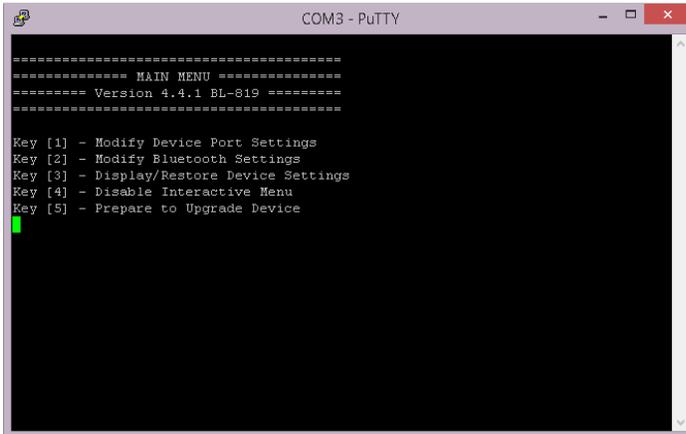
1.13.1. Navigation

As a general principle, from any menu screen hitting the "Enter" key refreshes the current menu and hitting the "Esc" or "Escape" key returns the user to the previous menu or skips a particular option.

Menu selection is performed by pressing the number on your keyboard that corresponds to the number listed on the menu item you wish to view/configure.

Reminder: The configuration menu is not available whilst a radio (Bluetooth) connection is established.

1.13.2. Main Menu



```

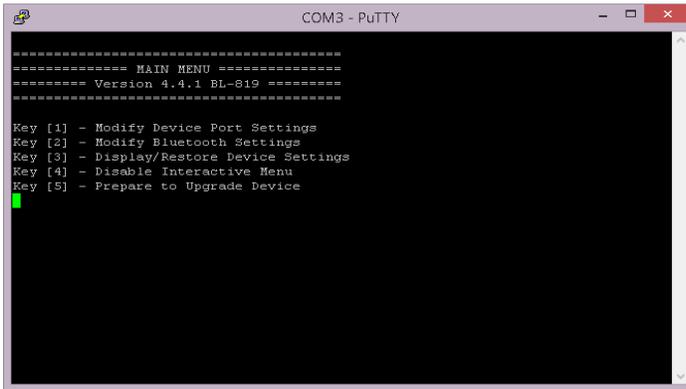
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
  
```

Sending the “Enter” character to the adapter accesses its main menu. This is also sometimes referred to as “Carriage Return”.

All basic configuration options for adapter are accessed via this menu. Advanced features are not available from the menu interface.

Users wishing to alter “advanced” settings can do so by either using the Windows Configuration application documented above, or by using the commands documented below.

1.13.3. Communications Parameters



```

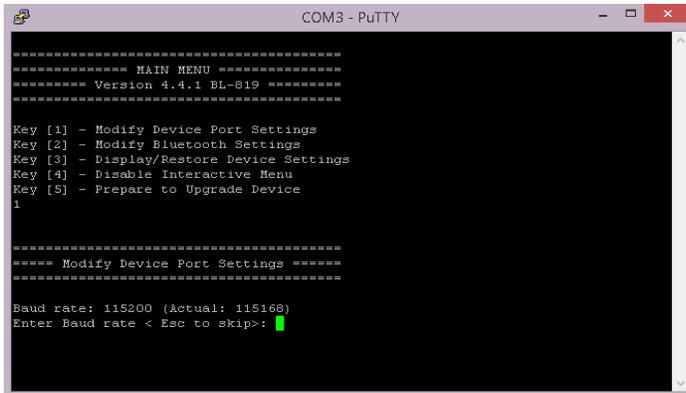
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
  
```

Selecting option 1 from the “Main Menu” menu displays the Communications settings menu.

It is from this menu that all available serial port settings can be changed. The available options are detailed below.

The factory set communications parameters for your adapter are as follows...

- Baud Rate: 115,200
- Data Bits: 8 (non-configurable)
- Parity: None
- Stop Bits: 1



```

===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
1

===== Modify Device Port Settings =====
Baud rate: 115200 (Actual: 115168)
Enter Baud rate < Esc to skip>:
  
```

You are first prompted to change the Baud Rate. The current setting is shown. To change the baud rate, just type the rate you want to use and press <enter>. The Adapter will accept any number you type, but will set the baud rate to the one that’s closest to what it can actually achieve.

Press “Esc” to skip this setting – the current setting will remain unchanged

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
1

=====
===== Modify Device Port Settings =====
=====
Baud rate: 115200 (Actual: 115168)
Enter Baud rate < Esc to skip>:

Current Parity: NO parity
Enter Parity <Enter 'n','o','e' or Esc to skip>: █

```

Next you'll be prompted to set the adapter's Parity. Options here are None, Odd or Even.

"Esc" skips this selection leaving the current setting unchanged.

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
1

=====
===== Modify Device Port Settings =====
=====
Baud rate: 115200 (Actual: 115168)
Enter Baud rate < Esc to skip>:

Current Parity: NO parity
Enter Parity <Enter 'n','o','e' or Esc to skip>:

Current Stop Bits: 1 stop bit
Enter Stop Bits < Enter 1, 2 Or Esc to skip>: █

```

You are then prompted to change Stop bits. Options here are 1 or 2.

Pressing "Esc" skips this selection leaving the current setting unchanged.

```

COM3 - PuTTY
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
1

=====
===== Modify Device Port Settings =====
=====
Baud rate: 115200 (Actual: 115168)
Enter Baud rate < Esc to skip>: 9600

Current Parity: NO parity
Enter Parity <Enter 'n','o','e' or Esc to skip>:

Current Stop Bits: 1 stop bit
Enter Stop Bits < Enter 1, 2 Or Esc to skip>:

Do you want to apply 9600,n,1 (Actual: 115168) setting?
<Press 'y' to apply now Or Esc to skip>: █

```

You are then asked if you wish to Apply the new settings immediately. If settings are not immediately applied, the changes will only take effect after the Adapter has had its power cycled.

This is to minimise the disruption to the device configuration by having to reconfigure the terminal application after changing each setting.

If you have changed any communications parameters, and wish to continue to access the configuration menu, you will need to update your terminal applications settings. The easiest method of performing this in PuTTY is to close and re-start the application, setting the new parameters during the initial application configuration.

1.13.4. Handshaking

Handshaking is discussed in more detail in the section below, as it is not an option directly available from the menu.

1.13.5. Bluetooth Parameters

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device

```

Selecting option 2 from the “Main Menu” menu displays the Bluetooth settings menu shown below left.

The factory set Bluetooth Parameters are:

Partner device: None
 Role (Client/Server): Server
 PIN: 1234
 Local device name: Brainboxes RS-232 Adapter

It is from this menu that all available Bluetooth settings can be changed. The available options are detailed below.

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

===== Modify Bluetooth Settings =====
=====
Current Partner Device: None
Enter New Partner Address < Esc to skip>:

```

The Currently configured partner device is shown (if any). The user is then prompted to enter a new partner device address.

To keep the same partner, or skip this option, press the “Esc” key

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

===== Modify Bluetooth Settings =====
=====
Current Partner Device: None
Enter New Partner Address < Esc to skip>:
Skip entering partner device..

Current role as Client/Server: Server (accepts incoming connections)
Enter New Role <Enter 's', 'c' or Esc to skip>:

```

Next the user is prompted to choose a role for the device (the current one is identified). “s” chooses Server, “c” chooses Client or “Esc” skips this section leaving the current setting unchanged.

```

COM3 - PuTTY
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

=====
==== Modify Bluetooth Settings =====
=====

Current Partner Device: None
Enter New Partner Address < Esc to skip>:
Skip entering partner device..

Current role as Client/Server: Server (accepts incoming connections)
Enter New Role <Enter 's', 'c' or Esc to skip>:
Skip entering role..

Current PIN Code: 1234
Enter PIN < Esc to skip>:

```

The user is then prompted for a new PIN to be entered. You can enter any characters you wish here up to a maximum of 16 characters. You should bear in mind that some devices have limited input mechanisms and may not be able to use a full character set.

```

COM3 - PuTTY
=====
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

=====
==== Modify Bluetooth Settings =====
=====

Current Partner Device: None
Enter New Partner Address < Esc to skip>:
Skip entering partner device..

Current role as Client/Server: Server (accepts incoming connections)
Enter New Role <Enter 's', 'c' or Esc to skip>:
Skip entering role..

Current PIN Code: 1234
Enter PIN < Esc to skip>:
Skip entering PIN..

Current Local Device Name: Brainboxes RS232 Adapter
Enter Local Device Name: < Esc to skip>:

```

Lastly, the user is offered to change the adapter's friendly name. Typing your chosen name followed by "enter" will immediately alter the published name, hitting the "Esc" key will skip this setting leaving the current name unchanged.

1.13.6. Display, Restore and Update Current and Factory Settings

```

COM3 - PuTTY
=====
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====

Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device

```

Selecting option 3 from the "Main Menu" menu displays the Current Settings menu and allows the user to display, change or restore the default settings.

```

COM3 - PuTTY
===== Device Current Settings =====
=====
Comm setting:      115200,n,1 (Actual: 115168)
Local Device:     000A-4F-01288B (Brainboxes RS232 Adapter)
Discoverability:  On
Security Mode:    3 (High)
Encryption:       Disabled
PIN Code:         1234
Partner Device:   None
Client/Server:    Server (accepts incoming connections)
Class of Device:  Peripheral
Role Switch:      Off
Handshaking:      CTS/RTS (Local), DTR/DSR (over Bluetooth)
Connection scheme: Command Mode
Connect using:    Serial Port Profile
Low power mode:   Park mode: Disabled, Sniff mode: Disabled

Press '1' to display current settings
Press '2' to display default settings
Press '3' to save current settings as default
Press '4' to restore default settings
Press Esc to go back to menu

```

The first screen that displays shows the current state of the adapter’s settings.

If any settings have been modified by the user following the instructions above, then this list will differ from the default (factory) settings

Selecting option 2 from this menu shows the original factory settings for the product (if viewing for the first time). The one item that will be different for each individual product will be the local device setting. This setting is unique for each individual Bluetooth device in existence and cannot be changed.

Selecting option 3 from this “Settings” menu allows the current user settings to be used to update the “factory” settings, providing some level of protection from losing application configuration settings during a device reset when the reset button is activated.

A warning message will appear to ask the user to be sure that the default settings should be changed. This is not something you really want to do unless you’re sure you have the settings as you want them and are sure you can remember them, as there is no way back from here...

Selecting option 4 from the “Settings” menu above allows the user to restore the device to its default settings. Be sure to take a note of, or print these settings, as you will need to ensure that the next time you attempt to communicate with your Adapter you use these new settings. Remember that the original factory settings may have been updated using the previous menu.

1.13.7. Disabling Interactive Menu

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device

```

Some RS-232 devices (GPS devices for example) emit a continuous stream of data regardless of whether a cable is connected. When no Bluetooth connection exists, this data can actually appear as commands to the menu and change settings that render the Adapter inoperable. Disabling the menu, stops the Adapter being unwontedly re-configured in this manner.

Selecting option 5 from the main menu displays the following Disable Interactive menu.



Failure to enter “PROCEED” correctly will cause the menu option to abort and you will be able to continue navigating the menu in the normal fashion.

In some (but not all) instances you will see some “odd” characters displayed as shown above. This is normal behaviour and indicates the product is ready to receive its firmware upgrade commands from the supporting software.

At this point, you will no longer be able to interact with the menu, nor will you be able to use the product as advertised. ONLY the supporting software can restore this setting. Neither a power reset nor any combination of presses of the reset button will restore normal operation to the product. It is now permanently in a state to upgrade the firmware.

IMPORTANT, in order for the upgrade application to connect to your product and perform the upgrade, you must ensure you disconnect your terminal application from the COM port. In PuTTY, this is done by closing the application down.

Now run the “upgrade” application documented in section 7 (page 27) below for upgrading.

1.14. Command Interface

This interface has been developed primarily to support programming access to the configuration settings by an application such as our own configuration application, but can also offer a powerful human operated (e.g. via PuTTY) command driven interface in its own right. Additionally, the commands can be placed in a Text/script file and sent (e.g. by PuTTY) in one go to the adapter. The “scr” command is strongly recommended for use in this scenario.

The command interface protocol is quite straightforward. Each command (see table and descriptions below) must be sent over the COM port, followed by a Carriage return <CR>. This can be done in PuTTY just by typing each command and hitting the Enter key.

There are up to 3 ways each command can be used.

1. On its own. This acts as a “query” command.
E.g. cod<CR>
Returns the current device class
2. With an “=” and parameter(s). This acts as a “set” command
E.g. cset=9600,n,1<CR>
Sets the current settings to 9600 baud, No Parity and 1 Stop Bit
Not all commands support this function as they are query commands only
3. With a “?” which acts as a “help” command
E.g. svc?<CR>
Returns a description of the command syntax and allowable parameters

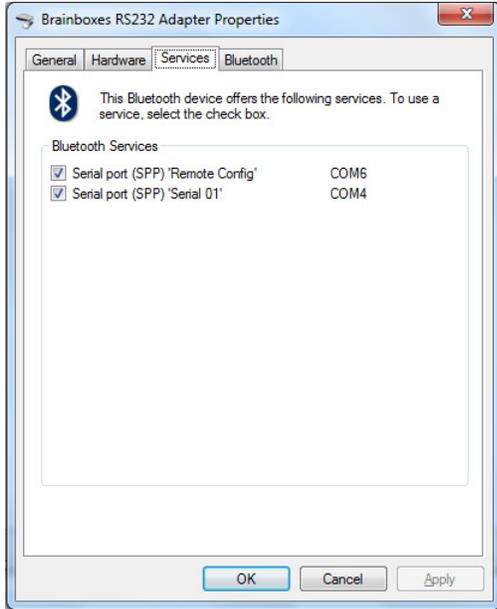
The command list summary is given below.

Command Name	Description	Command Name	Description
aset	Get all settings	padd	Partner Address
btset	Get current Bluetooth settings	pair	Pair
cnx	Manually connect to a found device	parkset	Park Settings
cod	Class Of Device	part	Partner
cset	Communication Settings	pin	PIN code
delpair	Delete the current pair	pnam	Partner Name
delpart	Delete the current Partner	prox	Set the proximity mode
dflt	Default settings	remcfg	Remote Configuration
disc	Discoverability	scr	Script Mode
enc	Encryption	sec	Security
find	Manually perform an inquiry	sniffset	Sniff Settings
help or ?	Help	switchrole	Switch Role On / Off
hsk	Handshaking	svc	Connect Using profile other than SPP
ladd	Local device address	svr	Server or Client
list	List the manually-found devices	upg	Prepare for upgrading
lowpwr	Low Power Mode	ver	F/W app version
lnam	Local device name	verb	Verbose
menu	Display Menu		

This information can be found using the help or ‘?’ command in PuTTY when your Adapter is attached to an available COM port.

Remote Configuration

One of the great features of Brainboxes RS-232 Bluetooth Adapters is the ability to be remotely configured. For example, a Bluetooth connection can be created from a second device and that second device can change the baud rate, local name or any of the settings of the adapter over the Bluetooth link.



This is achieved by the adapter presenting two services to connect to; one is the standard serial port service and the other is a remote configuration service. The latter is connected to, to enable the second device to access the adapter's configuration menu using PuTTY and thus make any changes. Changes to port settings such as baud rate, parity or stop bits do not affect the port settings of the second devices' PuTTY settings, so the adapter can be set to 115200, n, 1 and the PuTTY settings for the second device that is accessing the adapter's menu remotely can be set to any settings i.e. 9600, e, 2.

Currently the remote configuration feature is not accessible from the main configuration utility application and PuTTY or some other suitable terminal application should be used.

Also, upgrading of the adapter cannot be achieved using remote configuration because as soon as the adapter starts to upgrade, the Bluetooth connection is lost and there is no longer a way of communicating to the adapter remotely.

To use remote configuration from adapter to adapter use the command line "remcfg=xxxx-xx-xxxxxx" where the x's stand for the remote device's Bluetooth address.

Resetting the Product

The adapter has a "reset button" located on the top of the case as shown in section 2.1 above. This button performs 2 different functions.

A short press (less than 3 seconds) of the reset button causes any paired device information to be deleted. When the device is in low security mode, this will not have any effect on the devices operation, but whilst in high security mode, this will mean that another device can pair with adapter, or that the original device must expire its bond in order to reconnect.

A long press (more than 3 seconds) of the reset button causes all factory defaults to be restored. Care should be taken here to remember that these "factory" settings can actually be updated via the interactive menu and thus may not be the same as the

device was shipped with. The user should also remember that adapter is likely to need its parameters re-configuring to ensure communications can be re-established with either the local serial device, or remote Bluetooth device.

Long press

- Hold down the reset button for about 20 seconds with the power on
- Power cycle the device
- Access the device using baud 9600,n,1

Double tap

- Hold the button for about 3-5 seconds
- Repeat
- Access the device using baud 9600,n,1

Upgrading your device

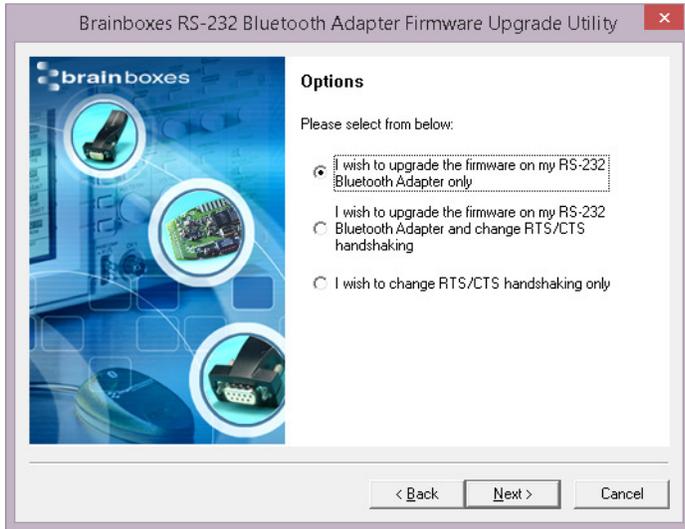
If you have installed the Configuration Utility already, the Upgrade application will also have installed and a shortcut will be placed onto your desktop. Otherwise browse the CD, navigate to the: **83CDBLUETOOTH3\Bluetooth Solutions 3.3\Software\BL-819\Configuration Utility** directory, and run the “Setup.exe” application. Follow the onscreen instructions to install the application. This will create an entry in your start menu as well as a desktop shortcut.

Run the application by selecting it from the “Start” menu or by running it from the shortcut on your desktop.



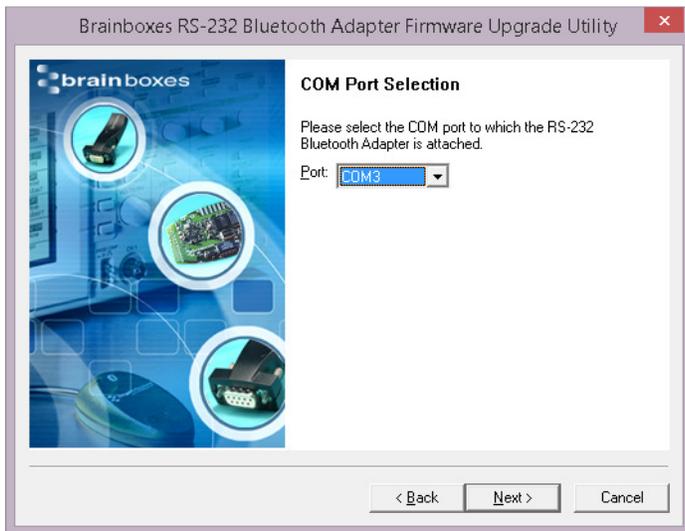
This is the first window which appears. The version of the application is displayed in the lower right corner of the screen.

Click “Next”



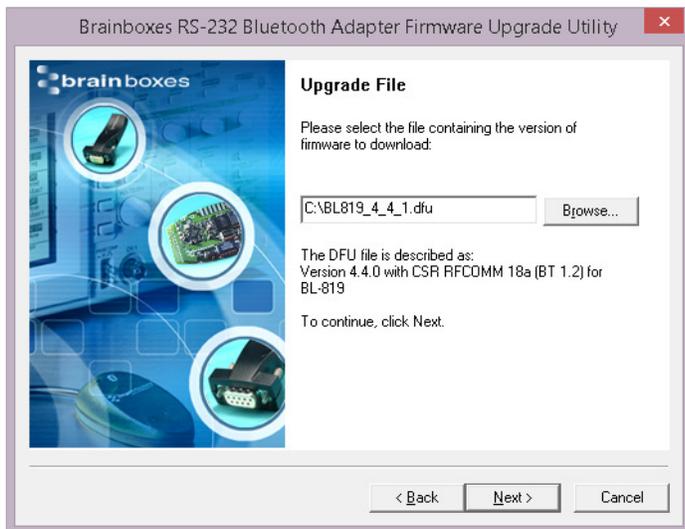
Three options are presented to the user with the choice of either just upgrading the firmware, upgrading the firmware and changing the RTS/CTS handshaking setting or just changing the RTS/CTS handshaking setting.

To simply upgrade the firmware, select the first option.



Select the COM port to which you have connected your product. (Remember to close the Configuration Utility or Hyper Terminal application if you still have either open)

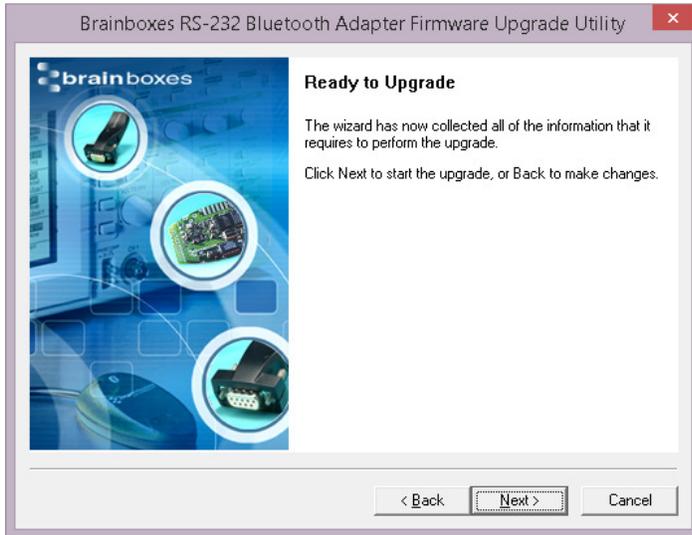
Then Click "Next".



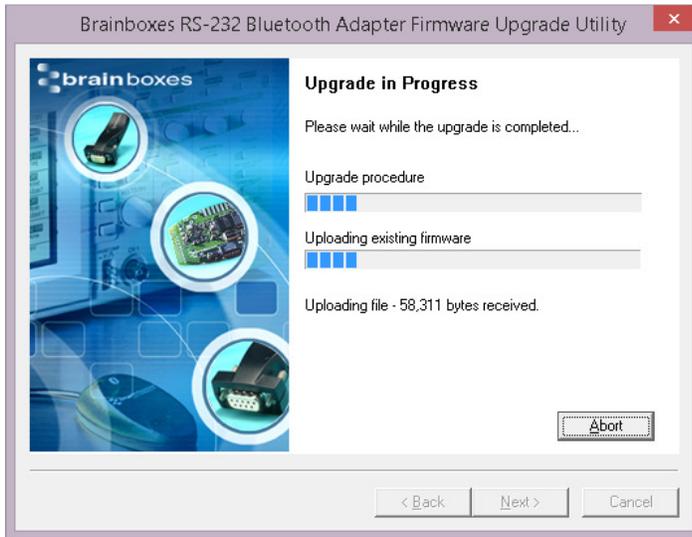
Point the upgrade wizard to the upgrade file you wish to use.

These upgrade files all have the extension .dfu and the latest version is available from the Brainboxes website.

NB The BL-819 and the BL-830 have their own distinctive version of firmware. Make sure that you are choosing the correct firmware for your device



Confirm you have made the correct selections by clicking “Next” to start the upgrade procedure.



Assuming you have selected the correct options, the wizard will detect the product connected to the selected port and begin the upgrade.

This may take a few minutes, as the wizard will automatically make a copy of the firmware currently on the device before uploading the new version.

A progress bar indicates how the procedure is going.



If everything went well the final screen should show indicating any further action that may be required.

Typically a power cycle of the device will be necessary before the upgrade completes.

Physically connecting to your RS-232 device

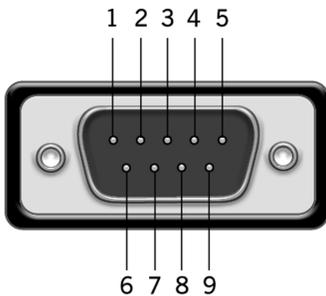
1.15. Configuring the communications parameters.

The adapters do not have the ability to auto-detect the communications parameters (e.g. baud rate) so they must be configured to match the data rate used in the application to which they are connected. Please refer to section 4.2.3 above, for details on how to do this.

It is possible, if a little confusing, to “pair” two adapters and have them physically connected to RS-232 devices which use totally different communications parameters.

1.16. Physically connecting your device to adapter via the RS-232 connector

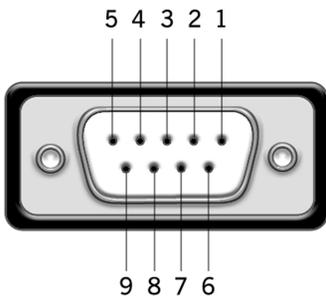
The adapter is supplied with a 9-pin D type connector, Male (DTE) for the BL-819 and Female (DCE) for the BL-830. The DTE (Data Terminal Equipment) configuration of the BL-819 has been chosen to allow for easy connection to DCE (Data Communication Equipment) RS-232 devices that would normally connect directly to the RS-232 port on a computer. Connector Pin-Outs for the BL-819 DTE are as follows:



Pin	Signal	Pin	Signal	Pin	Signal
1	N/C	4	DTR – N/C	7	RTS
2	RxD	5	Ground	8	CTS
3	TxD	6	DSR – N/C	9	N/C

As the RS-232 standard allows for many different cable configurations, your device may need an additional cable to work with the adapter, such as a “cross-over” or “null-modem” cable. Please refer to your device’s documentation for specific details.

For the BL-830 and the BL-819 fitted with the provided gender changer the Pin-Outs are:



Pin	Signal	Pin	Signal	Pin	Signal
1	N/C	4	DSR – N/C	7	CTS
2	TxD	5	Ground	8	RTS
3	RxD	6	DTR – N/C	9	Power on Pin 9*

The female connector is designed so that it can be plugged directly into a PC’s motherboard COM port. If you are connecting it directly to a different device you may need an additional cable, such as a “cross-over” or “null-modem” cable. Please refer to your device’s documentation for further details.

Connecting adapters over Bluetooth

There are 3 scenarios in which adapter can be connected via Bluetooth. This section details all 3 methods.

- a) Client/Server Pair: 2 adapters, configured to perform a “true” cable replacement.
- b) Client: adapter is the Bluetooth device which initiates the connection
- c) Server: Connecting TO adapter from a remote Bluetooth device (Factory Default)

Each of these 3 different scenarios can be configured in each of the 3 configuration methods previously described and are also documented herein.

1.17. Client/Server Pair: “Cable Replacement”

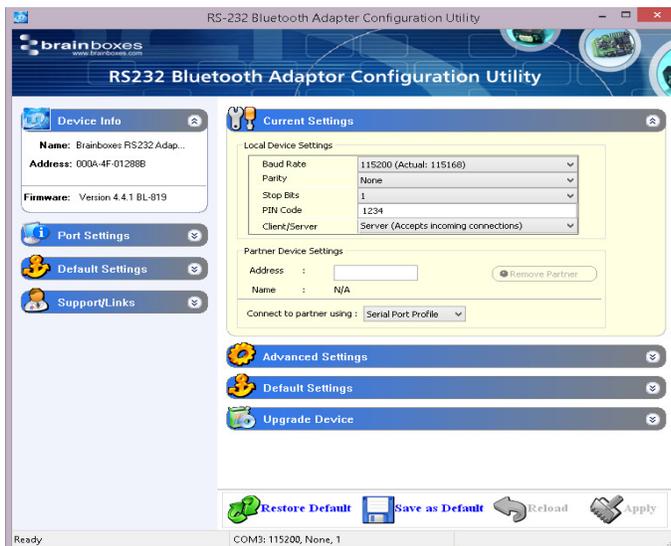
One of the strongest features of the adapter is that 2 of them can be configured to connect to each other and thus behave almost exactly as a cable. This configuration is very straightforward, does not require any Bluetooth software and is detailed below.

For adapter’s to connect as a pair, one of the devices needs to be configured as a client device, and one as a server. As the factory settings for adapter are “Server” it follows then that only 1 of the pair needs any alternate configuration from that supplied.

It is advisable that you first configure the communications settings (baud rate etc.) for each adapter so that they are suitable for the devices into which you are plugging them. When configuring a pair of adapter’s the Communications parameters of each Adapter do not have to match each other’s, only that of the devices into which they are connected.

Each adapter has a unique Bluetooth Address (BD_ADDR). This is printed on a label on the base of every product, but is also accessible from the “View Current Settings” menu detailed above. For our example here, we will use an adapter with a BD_ADDR of 000A-4F-00082D, which we’ll call the Server, and a second, with a BD_ADDR of 000A-4F-0013BB, which we’ll call the Client. We’ll leave all other settings for this example as factory defaults. As explained above we only need to change the settings of the Client device...

1.17.1. Configuration by Windows Application



Add the address of your remote device into the “Partner Device Settings” Section in the “Address” field.

Next Click the drop down arrow at the right of the “Client/Server” field in the “Local Device Settings” section and select the “Client” Option
Click “Apply”

1.17.2. Configuration by Menu

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====

Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device

```

Select option 2 from the “Main Menu” menu to display the Bluetooth settings menu shown below left.

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====

Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

===== Modify Bluetooth Settings =====
=====

Current Partner Device: None
Enter New Partner Address < Esc to skip>:

```

You should enter here the Bluetooth Address (BD_ADDR) of the remote (server) device you wish to pair (in our case this is 000A-4F-00082D) followed by ENTER.

This should be in the same format as indicated on the products label (NAP-UAP-LAP, for those of you who know)

```

COM3 - PuTTY
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====

Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

===== Modify Bluetooth Settings =====
=====

Current Partner Device: None
Enter New Partner Address < Esc to skip>:
Skip entering partner device..

Current role as Client/Server: Server (accepts incoming connections)
Enter New Role <Enter 's', 'c' or Esc to skip>:
Skip entering role..

Current PIN Code: 1234
Enter PIN < Esc to skip>:

```

Press “Esc” to skip this section

```

COM3 - PuTTY
=====
===== MAIN MENU =====
===== Version 4.4.1 BL-819 =====
=====
Key [1] - Modify Device Port Settings
Key [2] - Modify Bluetooth Settings
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

=====
===== Modify Bluetooth Settings =====
=====
Current Partner Device: None
Enter New Partner Address < Esc to skip>:
Skip entering partner device..

Current role as Client/Server: Server (accepts incoming connections)
Enter New Role <Enter 's', 'c' or Esc to skip>:

```

Press C to select the client option. This setting is stored immediately and is not discarded upon a reboot. In fact it requires a re-boot in order to activate it.

```

COM3 - PuTTY
Key [3] - Display/Restore Device Settings
Key [4] - Disable Interactive Menu
Key [5] - Prepare to Upgrade Device
2

=====
===== Modify Bluetooth Settings =====
=====
Current Partner Device: None
Enter New Partner Address < Esc to skip>:
Skip entering partner device..

Current role as Client/Server: Server (accepts incoming connections)
Enter New Role <Enter 's', 'c' or Esc to skip>:
Skip entering role..

Current PIN Code: 1234
Enter PIN < Esc to skip>:
Skip entering PIN..

Current Local Device Name: Brainboxes RS232 Adapter
Enter Local Device Name: < Esc to skip>:

```

Press "Esc" to skip this option

Re-boot (power cycle) your adapter. When the Client adapter is switched on, it will connect to the Server device you have entered in the menu above, assuming of course that the server device is also powered up. Remember of course that the factory shipped configuration of the adapters is "server" so only 1 device needs any modification in this respect

1.17.3. Configuration by Commands

Access the Adapter you wish to change to "Client" for command mode as documented above and send the following commands:

```
padd = 000A-4F-00082D<CR>
svr = 0<CR>
```

Now power cycle you're Adapter and it will attempt to connect to the server device.

1.18. Client: adapter is the Bluetooth device which initiates the connection

The instructions in the above section for creating a "cable replacement" connection should be followed to place the adapter into Client Mode in order to initiate a connection to a remote device substituting the address for that of the other device which you are trying to connect to.

Some remote devices do not allow connection to a Serial Port Profile, but may allow connection to DUN, LAN or FAX profiles. If this is the case, only the Windows Configuration UI or command mode can be used to change the behaviour of your Adapter in this respect. This option is documented above in the Adapter configuration section.

1.19. Server: Connecting to adapter from a remote Bluetooth device

Connecting to your adapter will vary depending on your application, but will usually consist of 3 Steps:

- 1 – Configuring the adapter’s communications parameters.
- 2 – Physically connecting adapter to your device.
- 3 – Connecting to adapter from a remote device via Bluetooth and transferring data.

There are many different scenarios whereby a connection can be made to an adapter and consequently its attached device. The application scenarios will also depend on what sort of device you have attached to the adapter.

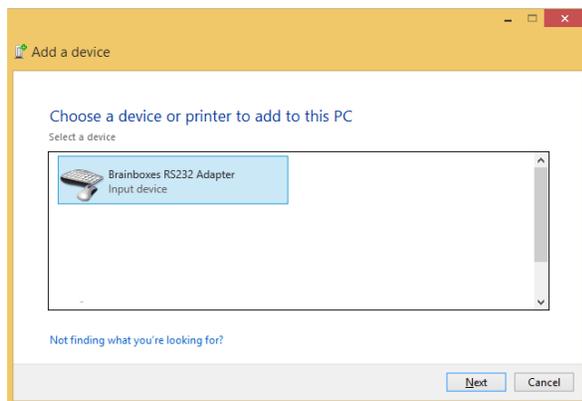
1.19.1. Configure and connect the adapter

Configure the communications and Bluetooth parameters of the Adapter as described in the above sections and physically connect it to your RS-232 device.

1.19.2. Bluetooth Enable your PC

Any PC based Bluetooth device could be used, but for this example we have used a Brainboxes USB adapter and Bluetooth software for Windows 8.1.

1.19.3. Discover the device

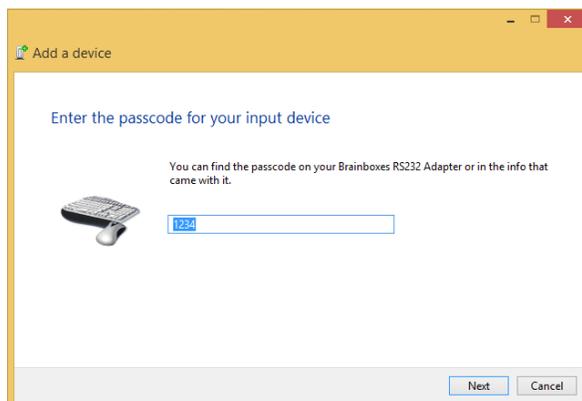


Open Control Panel and go to the Devices and Printers section. Select 'Add a device' and a window will appear which will automatically search for local Bluetooth devices.

Assuming that your adapter is switched on, in radio range and set to discoverable you should see it displayed (perhaps alongside other Bluetooth devices in range) in this window.

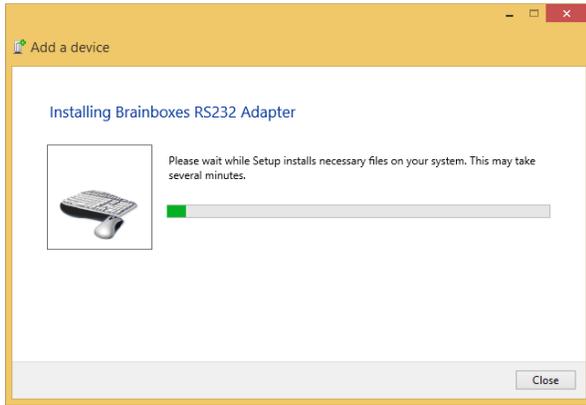
Double click on the Brainboxes adapter to begin the pairing process.

1.19.4. Secure the relationship

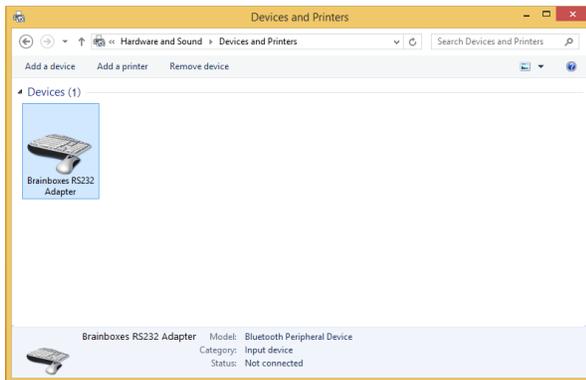


Once the adapter has been selected you will be asked to enter the pin code. The default pin code for the BL-819 and BL-830 adapters is: 1234

When you have entered the pin in the text field, press next.

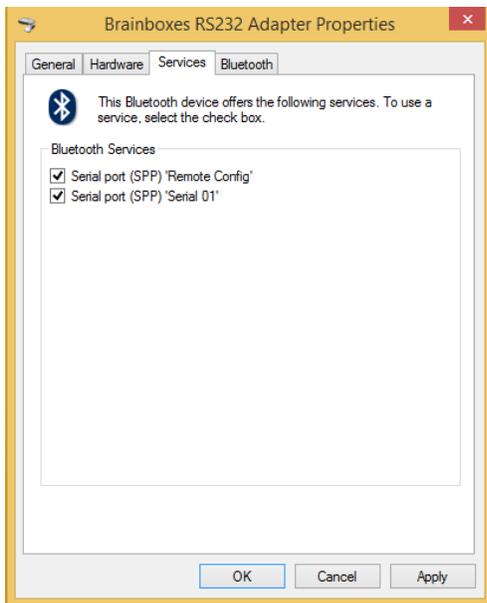


After the pin has been entered the computer and device will then begin to pair.



Once the adapter has been paired, it will be displayed here.

1.19.5. Connect to the Serial Port profile



Right-click the adapter, select properties and then go to the Services tab to view the Serial 01 and Remote Configuration ports for the BL-819/830.

1.19.6. Connect your application to the new COM port

In our initial testing at our labs, we use the PuTTY application included in Windows to open the new COM port. See documentation above for details of using the PuTTY application

11. Custom Factory Configuration

To help ease larger application rollouts by removing the need for customer re-configuration of each individual unit supplied, all the settings documented in this manual can be pre-configured to your specification at the factory. Please speak to your account manager/distributor for more details about this service.

12. Troubleshooting

In the rare occasion that you experience difficulties using this product, please read the following suggestions from the table below before contacting our support team.

Problem	Description	Solution
Data doesn't seem to be received by the product, but seems to be sent by it (e.g. data only travelling in one direction)	This is normally the result of the product being configured as requiring RTS/CTS handshaking, but being plugged into a device which does not support it.	Switch off the RTS/CTS handshaking by putting the device into upgrade mode and using the Upgrade Wizard
Interaction with the menu appears slow and unresponsive, but data does show eventually.	This is normal operation when the product is in Client mode. The product is using most of its processor cycles to try and find and connect to a remote device.	Reconfigure the product to Server mode whilst attempting to configure other options
Cannot interact with the menu	There are a number of scenarios where this might happen... <ol style="list-style-type: none"> 1. A Bluetooth connection is made 2. The Product has failed to initialise correctly (perhaps if the power adapter has been attached whilst switched on). 3. Incorrect communication parameters selection. 4. Incorrect Wiring configuration 	<ol style="list-style-type: none"> 1. No interaction with the menu is possible when a Bluetooth connection is present. Break the connection to restore access to the menu. 2. Switch the power off then on again. 3. Change the communication settings in your terminal application to match those of the devices settings. If you have forgotten or lost these settings, then the device can be restored to its factory settings by performing a long reset. 4. Check your devices wiring and handshake configuration requirements
Firmware upgrade (DFU Wizard) fails	<ol style="list-style-type: none"> 1. Product not connected 2. Product not configured for upgrade 	<ol style="list-style-type: none"> 1. Connect your Adapter to a suitable port on your PC and connect the power. 2. Follow instructions in above sections for preparing for upgrade
Can't connect to iPhone, iPad, iPod	Cannot establish a connection to an Apple product	Brainboxes Bluetooth products do not work with Apple products as Apple's products do not support the Serial Port Profile (SPP) needed for communication
I do not know what pins to connect my hardware to	Many users are unsure which pins of the BL device they are using are used to connect to their hardware	A picture of the BL pinouts is located here: http://www.brainboxes.com/product/items/bl-819 and in section 8 of this manual. The pins are the same for the BL-819/830/875.

13. Technical Specifications

Qualified Output Power:	> 0 dBm < +4.0 dBm @ 25 °C Receive sensitivity Single Slot = -83 dBm with 0.1% BER
-------------------------	--

13.1. Storage and Operating Environment

13.1.1. Storage

Temperature: -10°C to +60°C

Humidity: 8% to 95% non-condensing

13.1.2. Operational

Temperature : 0°C to +40°C

Humidity : 20% to 75% non-condensing

13.2. Power requirements

13.2.1. Input Voltage Requirements

The product was qualified using a fully rectified AC/DC power supply supplying 550mA @ 5V. To ensure your product performs within the regulatory requirements, it is recommended that you use the AC/DC adapter supplied... For your information only, the voltage range is given below. Minimum 5.0 V – Maximum 13.6 VDC **NOTE:** Power supplied through Pin 9 of the RS 232 connector does go through the regulator and has the same input requirements as the DC jack, +5.0 to 13.6 VDC.

13.3. Chipset

The chipset used in the BL-819/830 is the Bluecore BC02 BC212015B.

BlueCore2-External is a single chip radio and baseband IC for Bluetooth 2.4GHz systems. It is implemented in 0.18µm CMOS technology. When used with external flash containing the CSR Bluetooth software stack, it provides a fully compliant Bluetooth system for data and voice communications.

The Bluecore BC02 BC212015B chip has these features:

- Low power 1.8V operation
- Small footprint in 96-ball VFPGA and LGA packages (6x6mm 8x8mm and 10x10mm)
- Fully qualified Bluetooth component
- 0.18µm CMOS technology
- Full speed Bluetooth operation with full piconet support
- Support for 8Mbit external flash
- Minimum external components

14. Regulatory Approvals / Compliance

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

14.1. 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.

14.2. 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.

14.3. 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:

weerecovery@Brainboxes.com

14.4. 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.

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