



# DKAN0009A

## Free2move Bluetooth Wireless UART Firmware Tutorial

12 March 2007

### Introduction

This application note demonstrates how to implement a wireless connection between a PC and a Free2move Bluetooth module using the Serial Port Profile (SPP). This demonstration uses a Free2move Bluetooth module flashed with their Wireless UART firmware. A wireless link is established between two HyperTerminal serial communication sessions running on the PC. An industry standard USB Bluetooth dongle and the associated drivers are installed on a Windows XP based PC to add Bluetooth connectivity. Free2move's Bluetooth configuration software was also installed on the PC (see Appendix A for web link to the download and installation instructions). Additional Bluetooth profiles (headset, human interface, advanced audio, etc.) are not covered in this application note.

### Application

#### Setup

Turn on the PC, and connect the 5VDC power supply and serial cable to the Free2move Bluetooth evaluation board as shown in Figure 1. The green Power LED should light.

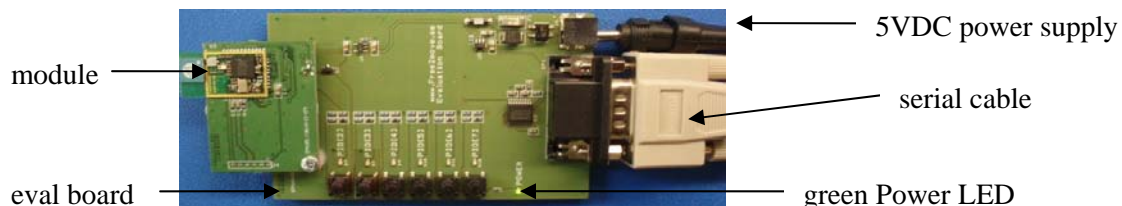
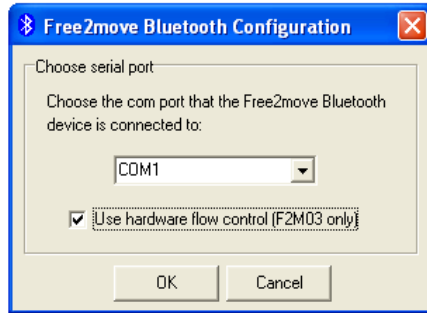


Figure 1. Free2move Evaluation Board

#### Configuration

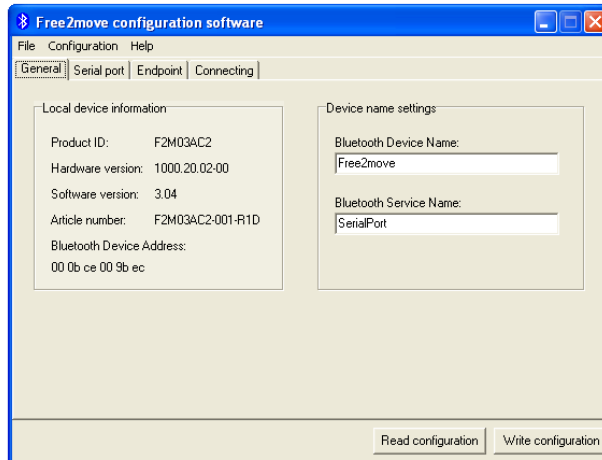
Run the Free2move configuration software to configure the Free2move Bluetooth module's SPP firmware. If the Free2move configuration software has not been installed, refer to Appendix A. Choose the PC COM port connected to the evaluation board (COM1 for this example). If the Free2move module is type F2M03, check box "Use hardware flow control," and select OK.



**Figure 2. Serial Port Configuration**

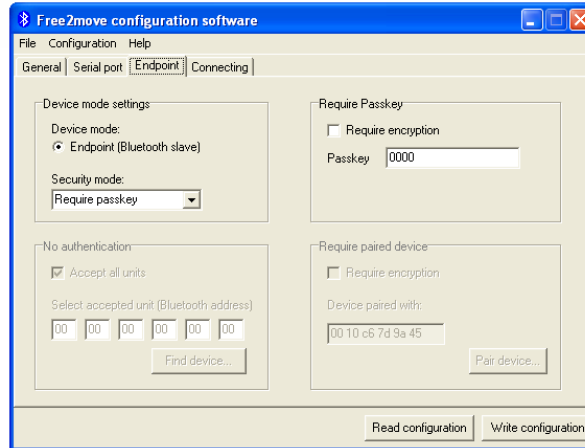
(Screen shots illustrated in this application note are typical and can vary depending on the end user’s PC and the Bluetooth device/software installed and used.)

When the PC communicates successfully to the Free2move evaluation board, the Product ID and Bluetooth Device Address (unique to each Bluetooth device) are displayed in “Local device information” under the “General” tab.



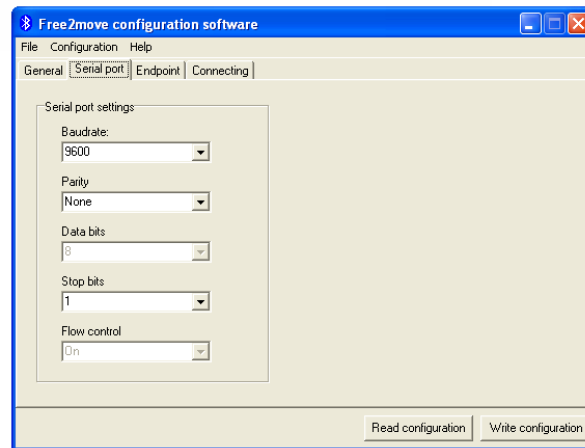
**Figure 3. Local Device Information**

Configure the Bluetooth module as an endpoint to enable the SPP wireless connection. Select the “Endpoint” tab, select “Require passkey” as the Security mode, and enter “0000” in the “Passkey” box. A passkey provides additional security.



**Figure 4. Endpoint Configuration**

Select the “Serial port” tab to check the serial port settings. Record the serial port settings for future use (9600, None, 8, 1, On for this example). To program the configuration into the Bluetooth module’s flash memory, click “Write configuration.” When complete, close the Free2move configuration software window. Toggle the evaluation board power to boot with the updated configuration.



**Figure 5. Serial Port Configuration**

## Pairing

Pairing is the process that allows communication between Bluetooth devices. The Bluetooth enabled PC must search for the Free2move module and pair with it. Double click the Bluetooth icon in the tool bar to show “My Bluetooth Places” or an equivalent window.



**Figure 6. Bluetooth Icon**

“My Bluetooth Places” may list several or no devices, depending on any previous devices paired with the PC. In this example, the Free2move module is shown, which indicates the PC paired with it previously. Select “Bluetooth Setup Wizard.”

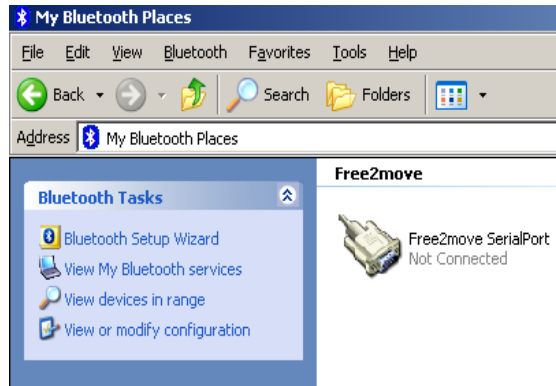


Figure 7. My Bluetooth Places

Select the “I want to find a specific Bluetooth device...” option, and click “Next” to start the search.



Figure 8. Bluetooth Setup Wizard

Depending on the number of active Bluetooth devices in range, several devices may be shown in the dialogue box. Select the Free2move icon, and click “Next.” The PC attempts to initiate a Bluetooth connection with the Free2move module. A dialogue box may ask for a PIN number to pair the PC with the Free2move module. If asked, enter “0000” as the passkey, and select “Initiate pairing.”

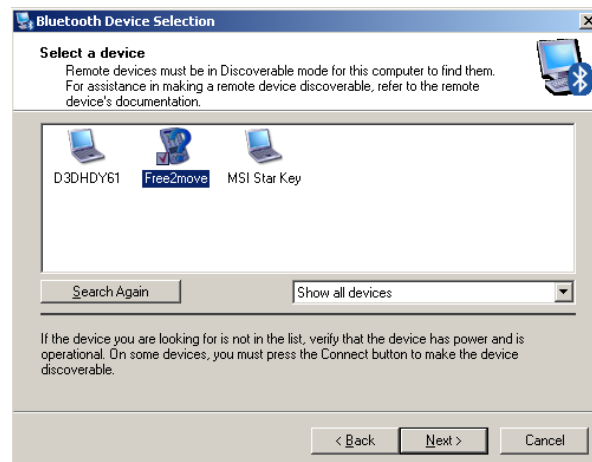
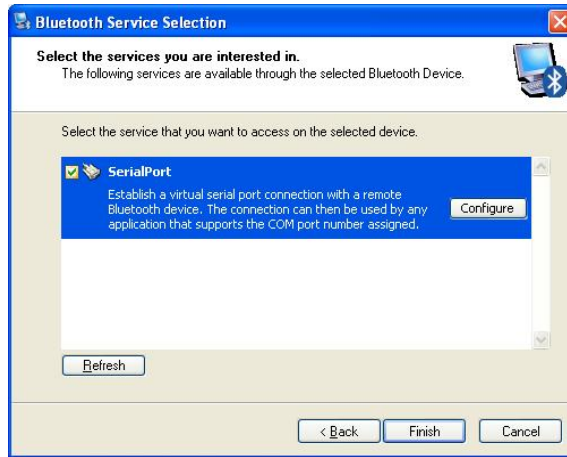


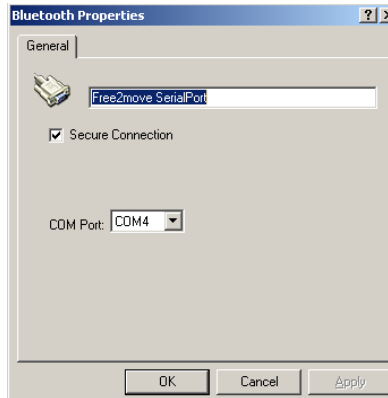
Figure 9. Bluetooth Device Selection

Select the “SerialPort” check box, and then press “Configure” to select the SPP.



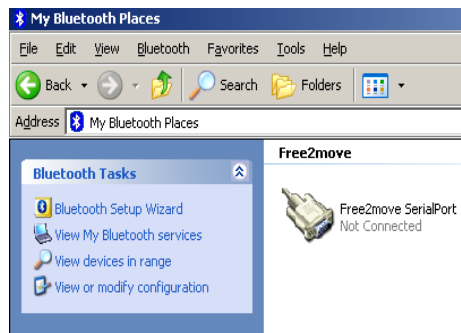
**Figure 10. Bluetooth Service Selection**

Record the COM port number listed in “Bluetooth Properties,” and click “OK.” In this example, COM4 is used.



**Figure 11. Serial Port Settings**

“My Bluetooth Places” shows the Free2move SerialPort icon as “Not Connected.”



**Figure 12. Not Connected**

Double click the Free2move SerialPort icon to establish the connection.

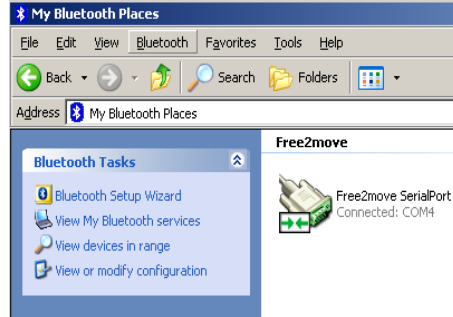


Figure 13. Connected

A red LED on the Free2move evaluation board indicates that a Bluetooth serial connection is established. The serial connection may timeout and break if it is not connected to a HyperTerminal session within several minutes. If the red LED turns off, double click the Free2move SerialPort icon to re-establish the connection.

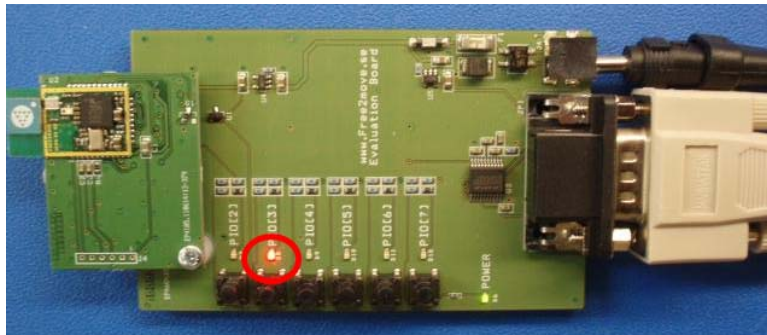


Figure 14. Serial Connection Indication

## Demonstration

Two HyperTerminal sessions are used to demonstrate communication between the PC's physical serial port and the Bluetooth serial port created with the Free2move Bluetooth module. The Bluetooth serial port HyperTerminal session is named "blue."

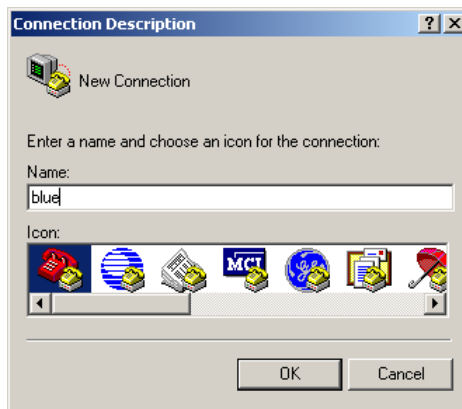
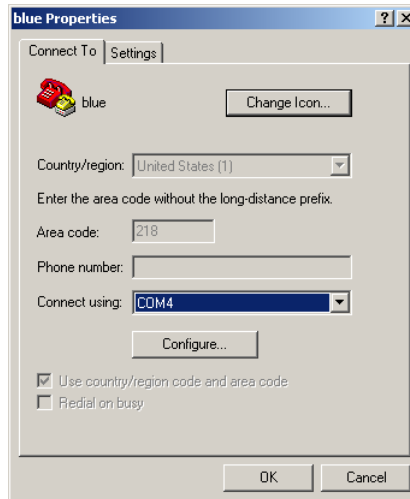


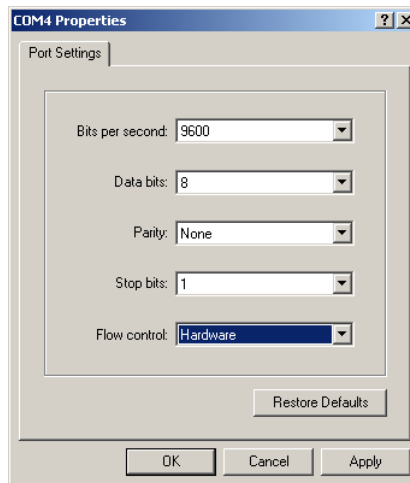
Figure 15. "blue"

Establish a connection using the COM port number recorded above, and click "OK."



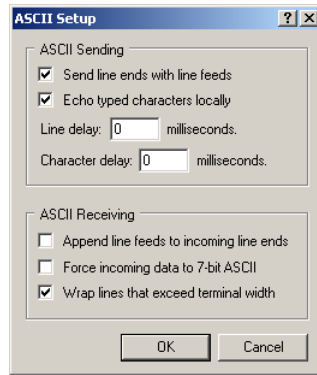
**Figure 16. COM Selection**

Configure the port settings to match those recorded previously, and click “OK.” (Note: Flow Control “On” in Free2move’s software is Flow Control “Hardware” in HyperTerminal.)



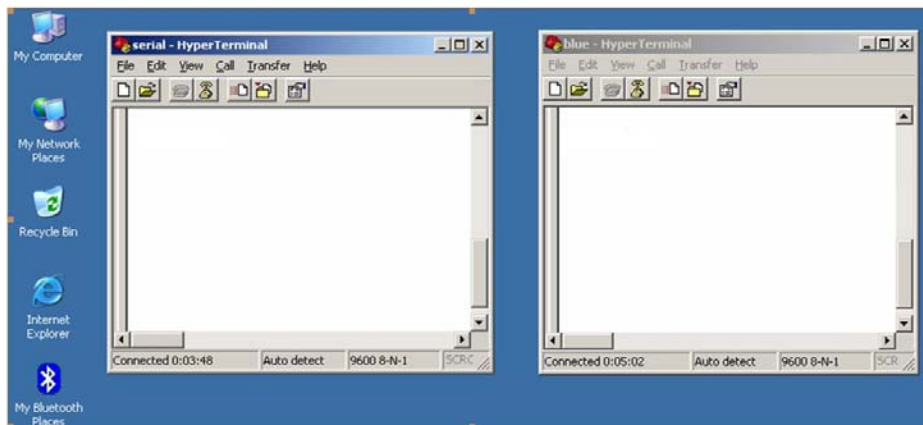
**Figure 17. COM Port Properties**

Modify the properties of the HyperTerminal session by selecting “Properties” from the “File” menu. In the Properties dialogue box, select the “Settings” tab followed by “ASCII Setup...” Set up as shown in Figure 18.



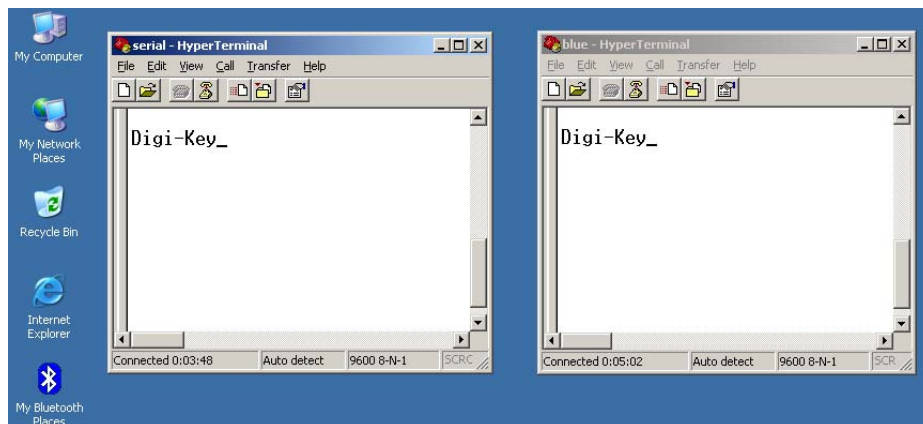
**Figure 18. ASCII Setup**

Start a second HyperTerminal session using the PC's physical COM port. Repeat the steps used to create "blue" to make a new connection called "serial." Configure the port settings to match the "blue" connection.



**Figure 19. Two HyperTerminal Windows**

Test the wireless connection by selecting one of the HyperTerminal sessions and typing characters on the PC's keyboard. The characters appear in both HyperTerminal sessions (keystrokes are echoed locally and transmitted to the other COM port).



**Figure 20. Communications Test**

## Conclusion

This application note explains how to set up, configure, and demonstrate wireless serial connectivity using the Bluetooth SPP between two HyperTerminal sessions on a single PC. One of the HyperTerminal sessions connects to the PC's physical serial port. The other session connects to the Bluetooth SPP created with the Free2move Bluetooth module.

## Additional Information

A Free2move F2M03CA module is used in this demonstration. Additional models are available from Free2move in different form factors and ranges. The Free2move F2M03AC2 datasheet and Wireless UART user manual are available from Digi-Key and Free2move.

A MSI Star Key USB Bluetooth dongle was installed on a Windows XP based desktop PC in this demonstration. Variations in the Bluetooth setup screens depend on the specific USB Bluetooth dongle and platform. For other Bluetooth platforms, refer to the device's user manual for SPP setup information.

## Disclaimer

This document is for informational use only and is subject to change without prior notice. Digi-Key makes no commitment to update or keep current the information contained herein. Digi-Key does not guarantee or warrant that any information provided is accurate, complete, or correct and disclaims any and all liability associated with the use of the information contained herein. The use of this information and Digi-Key's liability is subject to Digi-Key's standard Terms & Conditions which can be found at [www.digi-key.com](http://www.digi-key.com) by clicking on the Terms & Conditions link at the bottom of the web page.

No license, whether express, implied, arising by estoppel or otherwise is granted under any intellectual property or other rights of Digi-Key or others.

## Trademarks

DIGI-KEY® is a registered trademark of Digi-Key Corporation. All other trademarks, service marks and product names contained herein are the sole property of their respective owner and their use is for informational purposes only and does not imply any endorsement, recommendation, sponsorship or approval by the trademark owner of the contents.

## Copyright

**Use of this document is limited to customer's internal business use for the evaluation and purchase of products. No permission is granted to the user to copy, print, store, distribute, transmit, display in public or modify the content of this document in any way for any other purpose.**

© Copyright 2009 Digi-Key Corporation. All rights reserved.