AW-NM230NF-H

IEEE 802.11 b/g/n Wireless LAN and Bluetooth Combo M.2 1216 Module

User Guide

Document release	Date	Modification	Initials	Approved
Version 0.1	2015/03/10	Initial Version	Chao Lee	Amos Fu
Version 0.2	2015/8/3	Add pin definition , pin map	Chao Lee	Amos Fu

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1. WLAN Basic Test

**Must connect USB to PC

Driver Installation

DRIVER INSTALLATION (IN LINUX)

•First prepare the Broadcom's linux package, and put it in the "**home**"folder.

•Open the Terminal, enter the command: **sudo su** and **password**.

•Enter **cd /home/username/drivername/src/dhd/linux**

•Enter **make dhd-cdc-sdmmc-gpl** to generate the **dhd.ko** file in /home/username/ **drivername** /src/dhd/linux/dhd-cdc-sdmmc-gpl-**kernelversion**

•Enter

Insmod /(path of dhd.ko file)

firmware_path=/(path of firmware file) **nvram_path=/(path of nvram file)** to enable.

•Enter **rmmod dhd** to disable

Throughput Test

CONNECTING TO WIRELESS NETWORKS

The examples in the following sections illustrate how to connect to both infrastructure and ad hoc networks, including infrastructure networks that use no security, WEP security, and WPA/PSK and WPS2/PSK security.

SCANNING FOR WIRELESS NETWORKS

To force the dongle to scan

• Run **wl scan**.

To force the dongle to return the results of the scan

• Run **wl scanresults**.

Example results returned when an AP is found:

• SSID: "Eval4325"

• Mode: Managed: RSSI: -48 dBm noise: -105 dBm Channel: 1

• BSSID: 00:10:18:90:2E:C1 Capability: ESS ShortSlot

• Supported Rates: [1(b) 2(b) 5.5(b) 11(b) 18 24 36 54 6 9 12 48]

Example results returned when an ad hoc network is found:

• SSID: "ADHOC#1"

• Mode: Ad Hoc RSSI: -41 dBm noise: -105 dBm Channel: 1

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- BSSID: B2:51:28:6B:3C:A1 Capability: IBSS
- Supported Rates: [1(b) 2(b) 5.5(b) 11(b)]

CONNECTING TO AN INFRASTRUCTURE NETWORK WITH NO SECURITY (AP CONNECTION)

To connect to the network through an AP with SSID = Eval4325

Run **wl join Eval4325**.

CONNECTING TO AN INFRASTRUCTURE NETWORK WITH WEP SECURITY

To connect to the network that uses 12345 as the network key

- Run **wl join Eval4325 key 12345**.

CONNECTING TO AN INFRASTRUCTURE NETWORK WITH WPA-PSK/WPA2-PSK SECURITY

To specify TKIP or AES as the data encryption method

- Run **wl wsec 3/7**.

To enable the supplicant

- Run **wl sup_wpa 1**.

To specify the PSK passphrase (network key) to use

- Run **wl set_psk $passphrase**.

To connect to a network that uses WPA-PSK security

- Run **wl join Eval4325 imode bss amode wpapsk**.

To connect to a network that uses WPA2-PSK security

- Run **wl join Eval4325 imode bss amode wpa2psk**.

CONNECTING TO AN AD HOC NETWORK USING CHANNEL 1

To set the channel to channel 1

- Run **wl channel 1**.

To connect to the ad hoc network with SSID = 4325-ADHOC

- Run **wl join 4325-ADHOC imode ibss**.

MANAGING POWER CONSUMPTION

To disable Power Save (PS) mode (default)

- Run **wl PM 0**.

To enable legacy IEEE 802.11 Power Save (PS) mode

- Run **wl PM 1**.

To enable Fast IEEE 802.11 Power Save mode

- Run **wl PM 2**.

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Note:

- The STA automatically transitions to Legacy PS mode when no data is being sent or received.
- The STA automatically disables PS mode when data is being sent or received.

MEASURING WLAN THROUGHPUT

The throughput measurement shows the performance of the TCP/IP layer over the wireless link. To achieve the best results,

run the measurement test in a clean environment with as little interference as possible . The test can be run with the adapter

connected to either an Infrastructure network (see Fig. 2.2) or an ad hoc network (see Fig. 2.3). An AP that is known to be

in good working order should be used for the infrastructure mode test.

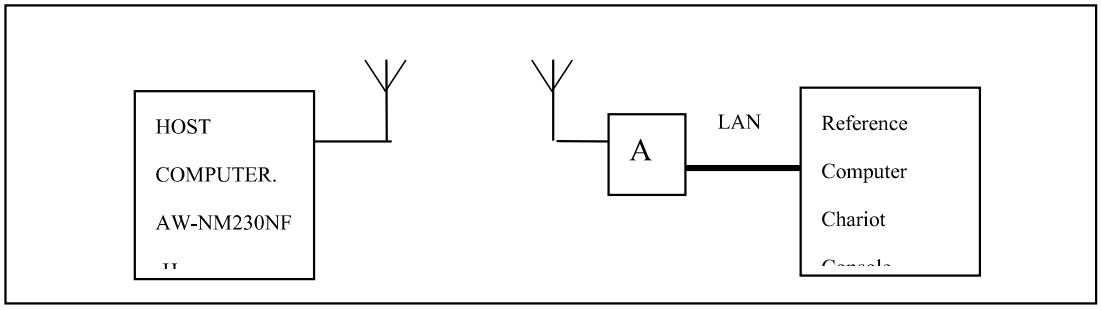

FIG. 2.2

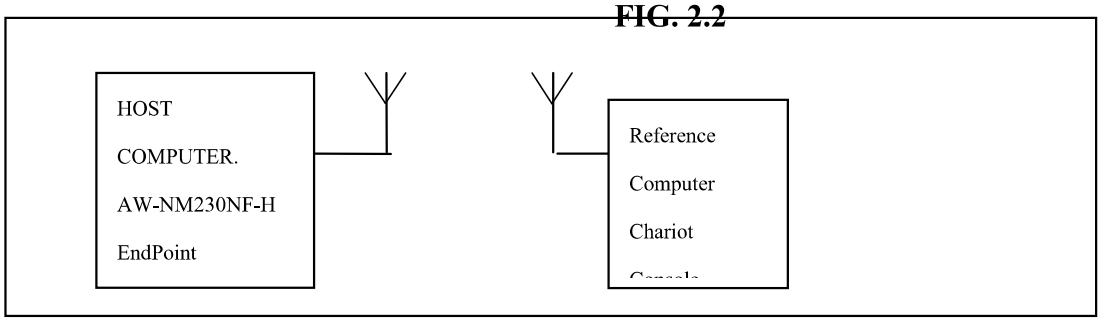

FIG. 2.3

MEASURING THROUGHPUT USING NETIQ CHARIOT

Test Procedure

1. Bring up the AW-NM230NF-H demo boar with the IP address set as 192.168.1.110.

2. Connect the reference computer with Chariot Console, which is assigned an IP address of 192.168.1.100, to the LAN

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port of the AP

3. Verify that communication exists between the reference computer and the AW-NM230NF-H demo board by pinging **192.168.1.100**

from the AW-NM230NF-H host console.

4. Set up Chariot.

a. On the host computer, activate EndPoint:

b. Using Chariot Console on the reference computer, create two pair groups (192.168.1.100 and 192.168.1.110) using the Chariot Throughput.scr script. Run the throughput test for a specified period of time and observe the results.

RF Tx/Rx Performance Test

CREATING A Tx TEST

(In Ubuntu linux 12.04)

1. Open the Terminal, enter the command: **sudo su** and **password**.

2. Enter

Insmod /(path of dhd.ko file)

firmware_path=/(path of firmware file) nvram_path=/(path of nvram file) to enable.

3. Enter the **wl ver** command to check the current WL driver version.

4. Run the following command set **(delay at least 700ms between each command)**:

11b rate:

./wl mpc 0
./wl country ALL
./wl up
./wl scansuppress 1
./wl band b
./wl channel **7**
./wl nrate -r **11**
./wl txpwr1 -o -q **68**
./wl phy_forcecal 1
./wl pkteng_start 00:11:22:33:44:55 tx **300 1500** 0

This will send continuous Tx Packets with 300 us packet interval,1500 byte packet length. Data rate =11Mbps ,Channel=7 and output power =17dBm(68/4=17 q means quarter).

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11g rate:

./wl mpc 0
./wl country ALL
./wl up
./wl scansuppress 1
./wl band b
./wl channel **7**
./wl nrate -r **54**
./wl txpwr1 -o -q **60**
./wl phy_forcecal 1
./wl pkteng_start 00:11:22:33:44:55 tx **300 1500** 0

This will send continuous Tx Packets with 300 us packet interval,1500 byte packet length. Data rate =54Mbps ,Channel=7 and output power =15dBm(60/4=15 q means quarter).

2.4G 11n 20 SISO rate:

./wl mpc 0
./wl country ALL
./wl up
./wl scansuppress 1
./wl band b
./wl channel **7**
./wl nrate -m **7**
./wl chanspec -c **7** -b 2 -w **20** -s 0
./wl txpwr1 -o -q **52**
./wl phy_forcecal 1
./wl pkteng_start 00:11:22:33:44:55 tx **300 1500** 0

This will send continuous Tx Packets with 300 us packet interval,1500 byte packet length. Data rate =MCS7, Bandwidth=20Mhz, Channel=7 and output power =13dBm(52/4=13 q means quarter).

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CREATING A Rx TEST

(In Ubuntu linux 12.04)

1. Open the Terminal, enter the command: **sudo su** and **password**.

2. Enter

Insmod /(path of dhd.ko file) firmware_path=/(path of firmware file) nvram_path=/(path of nvram file)

to enable.

3. Enter the **wl ver** command to check the current WL driver version.

4. Run the following command set

11b/g rate:

./wl mpc 0
./wl phy_watchdog 0
./wl country ALL
./wl band b
./wl channel **7**
./wl up
./wl phy_forcecal 1
./wl scansuppress 1
./wl rxchain 1
./wl reset_cnts
./wl counters

This will enter Channel 7 receive mode.

2.4G 11n 20 SISO rate:

./wl mpc 0
./wl phy_watchdog 0
./wl country ALL
./wl band b
./wl channel **7**
./wl up

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./wl phy_forcecal 1

./wl scansuppress 1

./wl rxchain 1

./wl reset_cnts

./wl counters

This will enter Channel 7 receive mode.

※.The default MAC address is 001122334455. Packets sent from Signal Generator **must** have the same MAC address as the DUT's MAC address (Runtime mac address can be overrode by using wl cur_etheraddr xx:xx:xx:xx:xx:xx .

※. Use "**./wl counters**" and find the received frame numbers in "**rxdfrmocast**".

※. The RX PER = [(Total lost packets at the receiver) / (Total sent packets from the Signal Generator)] x 100%.

Thus, PER =100% - [(**rxdfrmocast** numbers after sequence play) – (**rxdfrmocast** numbers before sequence play)] / (Total sent packets from the signal Generator) x 100%.

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2. Bluetooth Basic Test

*Must connect USB to PC

Download Mini-driver

1. Start Broadcom BlueTool.

2. On the **View** menu, click **Log Windows Details**.

3. On the **Transport** menu, click **HCI Control**.

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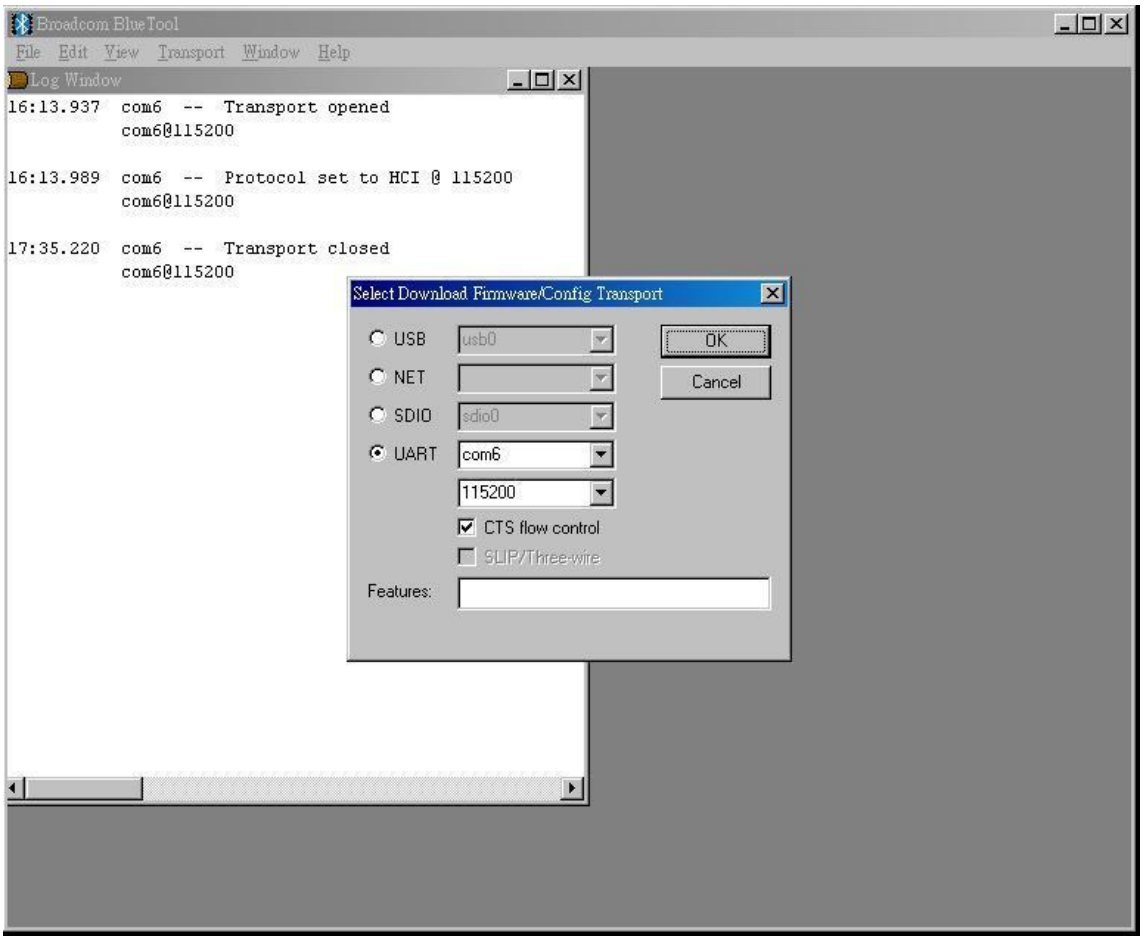

4. In Select HCI Control Window Transport:

a. Select **UART** as the type of transport.

b. In the COM port list, select **com6**.(check the port number in device manager)

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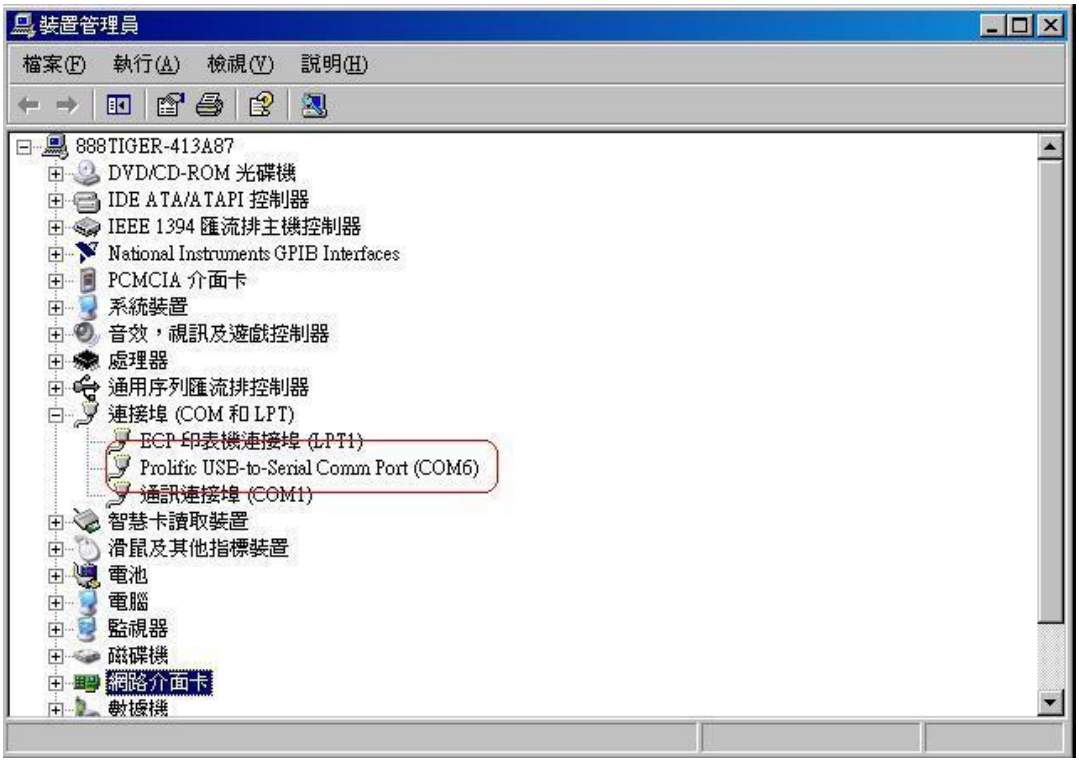
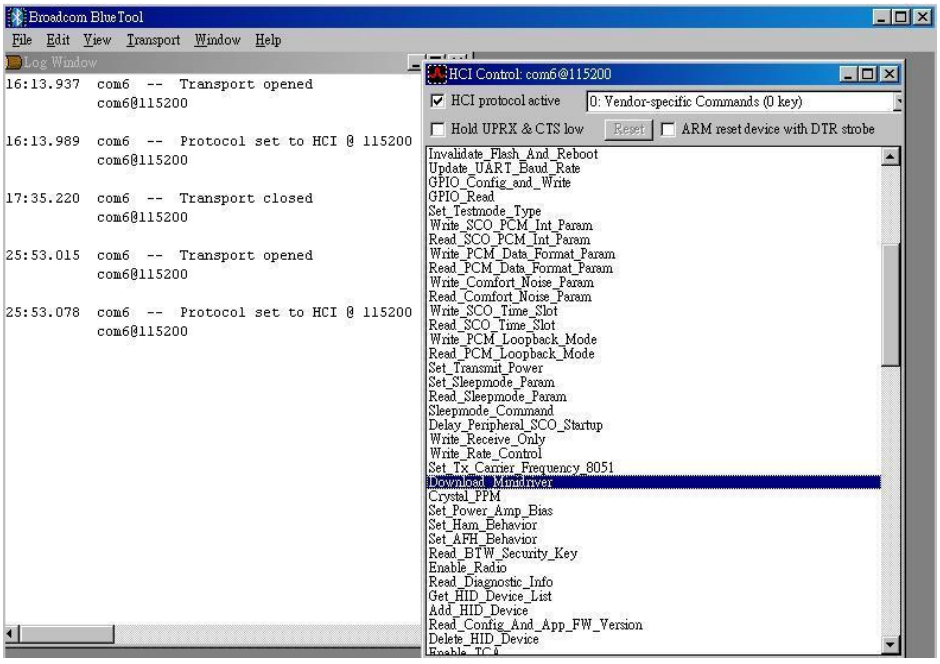


c. In the Baud list, type **115200**.

d. Select the **CTS flow control** check box.

e. Click **OK**.

5. In HCI Control, select the **HCI protocol active** check box



6. In the HCI Control commands list, select **0: Vendor-specific Commands (0 key)**, and then double-click **Download Minidriver**.

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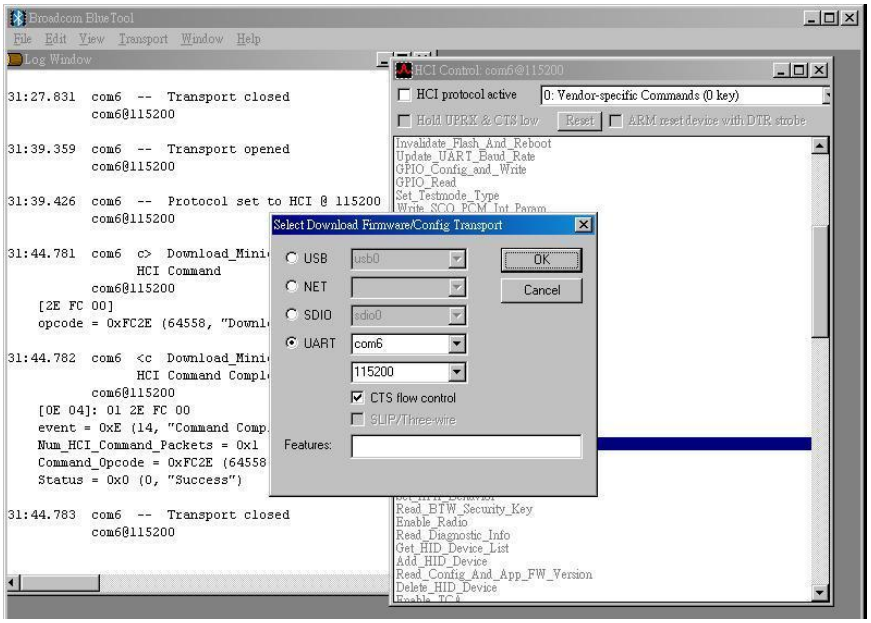
7. On the **Transport** menu, click **Download Firmware/Config**.

8. In **Select Download Firmware/Config Transport**:



a. Select **UART** as the type of transport.

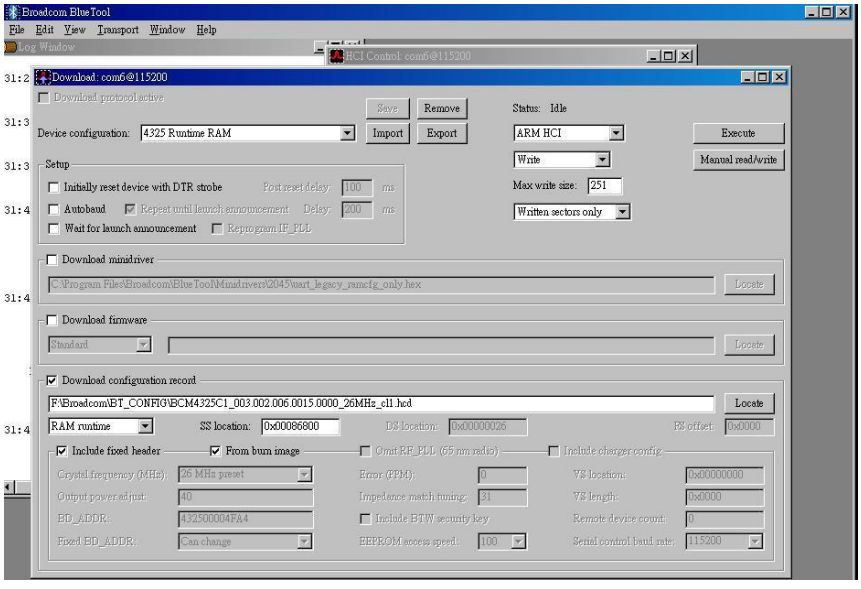
b. In the COM port list, select **com6**.

c. In the Baud list box, type **115200**.

d. Select the **CTS flow control** check box.

e. Click **OK**.

9. In **Download**, configure the settings to match those shown below



10. Click **Execute**.

11. Select the **HCI protocol active** check box

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Throughput Test

Bluetool contains a throughput test feature that can be used with two or more AW-NM230NF-H devices. Note that each device runs on a separate PC with BlueTool installed. This document will provide basic directions for setting-up and running this test.

The next step in setting-up the test is establishing a connection between the devices.

ESTABLISH A BLUETOOTH CONNECTION BETWEEN TWO USB DEVICES

SET UP THE SLAVE DEVICE FIRST

1. On the **Slave** side, start Bluetool from the Start Menu.
2. If the Log Window is not already open, select “View” and then select “Log Window”.Select “Transport” and then Select “HCI Control.” New window pop-up, select “UART” and enter com port number. Click “OK”.
3. Download mini driver (see 3.1)
4. In the “HCI Control” window, select “7.3 Host Controller & Baseband Commands” (Note: may be 4.3, depending on version)
5. Double Click the “Write Scan Enable” entry
6. Select “Inquiry and Page Scan Enabled” and click “OK”
7. Double Click “Set Event Filter”
8. Select “Connection Setup”
9. Select “Allow Connections from all devices”
10. Select “Do Auto accept the connection with role switch disabled”
11. Click “OK”
12. In the “HCI Control” window, select “0 Vendor-specific commands”.
13. Double Click the “Write_BD_ADDR” command
14. Enter 001122334455
15. In the “HCI Control” window,select”0 Vendor-specific commands”. Double Click ”Update UART Baud Rate”. Select 3000000 then click OK.

SET UP THE MASTER DEVICE, AND CREATE THE CONNECTION

1. On the **Master** side, start Bluetool.
2. Open the log window, if not already open, and open the UART HCI Transport.
3. Download mini driver (see 3.1)
4. In the “HCI Control” window, select “7.1 Link Control Commands” (Note: may be 4.5 depending on version)

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