ANDROID APPLICATION: LAIRD TOOLKIT (HEART RATE FUNCTIONALITY)

Quick Start Guide ***v1.1***

INTRODUCTION

This guide demonstrates how to load a *smart*BASIC Heart Rate Sensor Service application (hrs.heart.rate.custom.sb) onto the BT900 development board and to view the data on an Android device supporting BT 4.0.

REQUIREMENTS

- PC running Windows XP or later
- UWTerminal 7.0.0 or later
- DVK-BT900 running firmware v9.1.2.0 or later
- hrs.heart.rate.custom.sb BT900 *smart*BASIC sample application which can be downloaded from GitHub: https://github.com/LairdCP/BT900-Applications
- USB A to mini B cable
- Android device running android 4.3 or higher with BT4.0
- Internet connection on Android device (to download the Laird Toolkit application from the Play Store)
- DVK_BT900 User Guide
- FTDI Drivers http://www.ftdichip.com/Drivers/VCP.htm (for some versions of Windows)

DEVELOPMENT KIT SETUP

To setup the BT900 development kit, follow these steps:

1. Configure the BT900 development kit to the following settings:
   - DC/USB power source switch (SW4) – USB
   - 1.8V/3.3V switch (CON17) – 3.3V

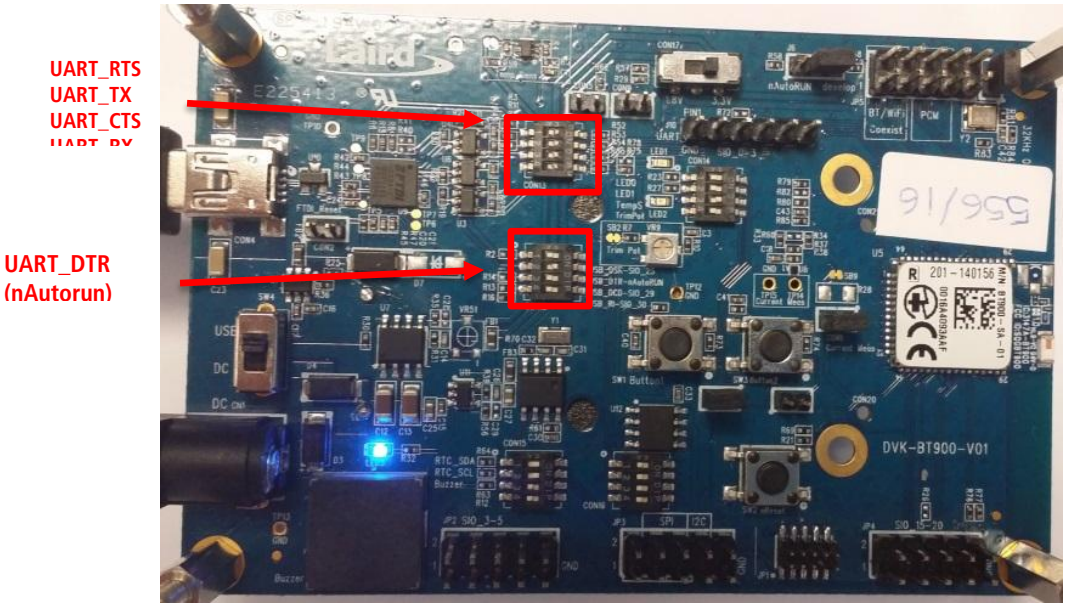

Figure 1: UART_TX/RX/CTS/RTS/DTR (nAutorun) is switched ON all other switched OFF

2. Connect one end of the mini USB cable to CON4 on the development board and the other end of the cable to your PC.
3. Follow the on-screen prompts. Depending on your version of Windows, you may need to install the FTDI drivers.
   When complete, the development board appears in the Windows device manager as a *USB Serial Port*. Make a note of the COM port number to use in step 5.
4. Extract UWTerminal to a selected folder and run the program (no installation is required).
5. Configure the COM port with the port number seen in device manager with the following settings:
   - Baudrate – 115200 (v9.1.2.0)
   - Parity – None
   - Stop Bits – 1
   - Data Bits – 8
   - Handshaking – CTS/RTS

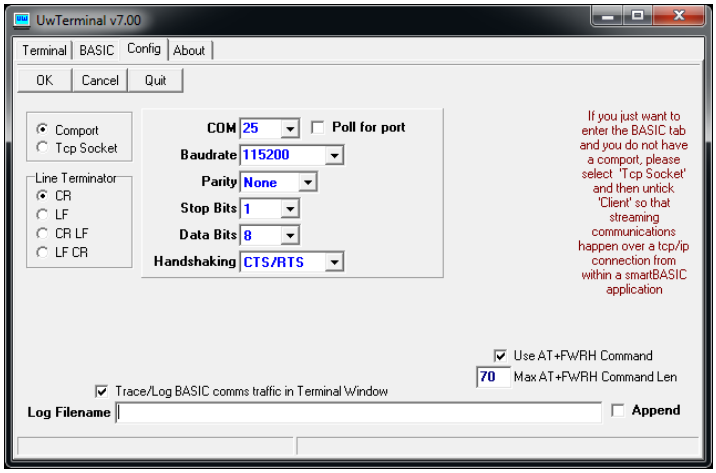

Figure 2: Comms Settings

6. Confirm you can communicate with the development board by typing ***at*** followed by a <carriage return>. The module responds with *00*.

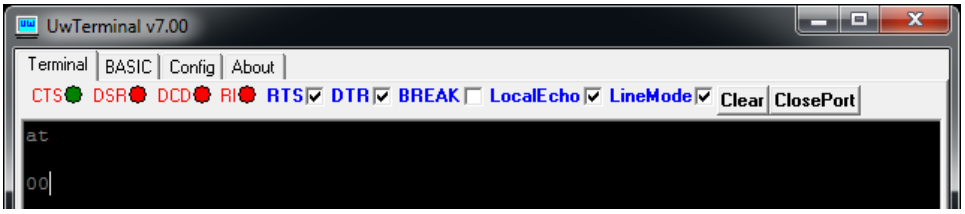

Figure 3: Comms OK

LOADING A *SMART*BASIC APPLICATION

Note: When swapping between profiles on the same device, it may be necessary to clear any existing pairings on the module and Android device. On the module, this can be done with the command **at+btd***; and on the Android device this can be done in Bluetooth settings by selecting **Unpair**.

To load a *smart*BASIC application, follow these steps:

1. Ensure the cross compiler is located in the same folder as UWTerminal. Its name is similar to XComp_BT900_95A0_197D, where *95A0_197D* indicates a hash key. You can obtain the hash key by sending the command **AT i 13** to the BT900 module. Each firmware version requires its corresponding cross compiler with a matching hash key.
2. To compile and load a *smart*BASIC application, right-click in the main UWTerminal window and select **XCompile + Load**.

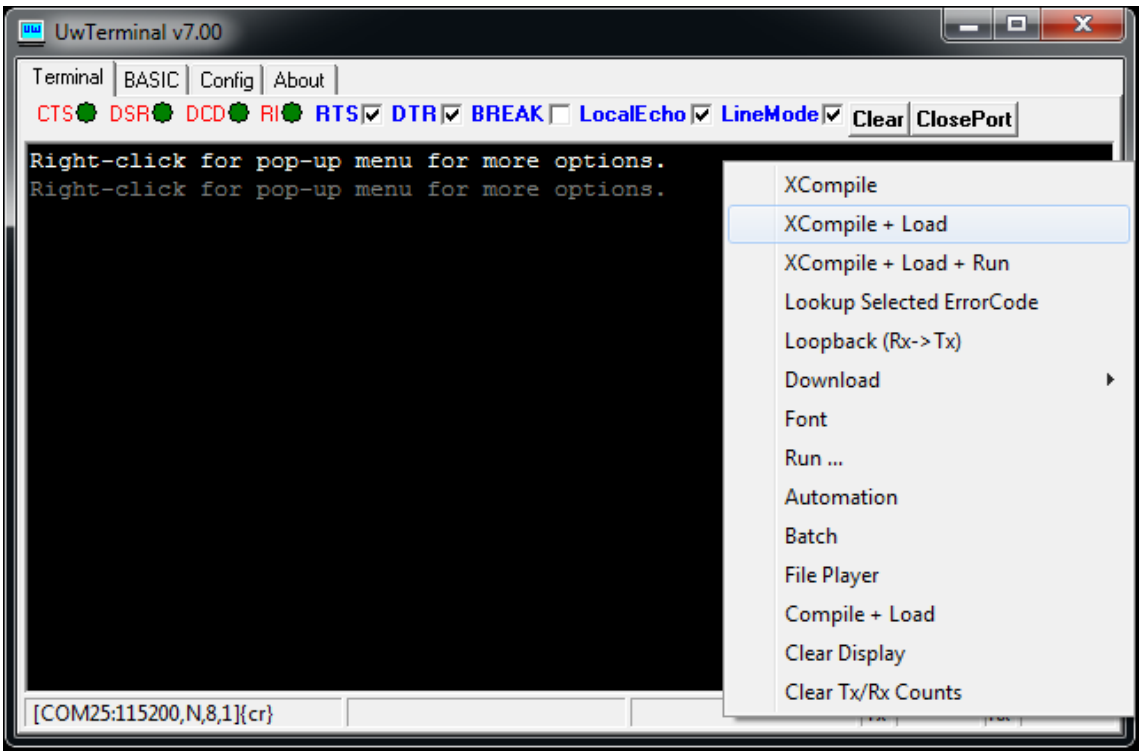

Figure 4: Right-click menu

3. Locate and open the *hrs.heart.rate.custom.sb* application located in the supplied *BT900-Applications-master* folder (downloaded from Github at: https://github.com/LairdCP/BT900-Applications). When the application is successfully compiled and loaded, the console displays **+++ DONE +++.**

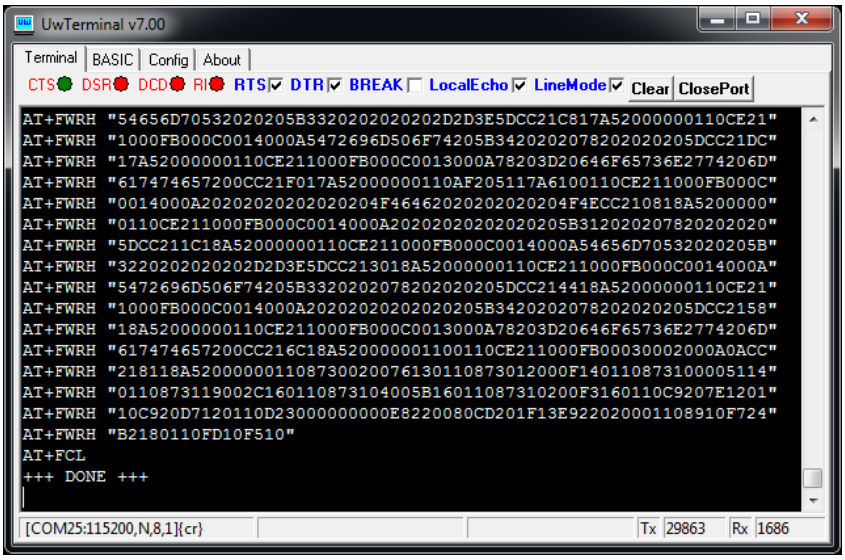

Figure 5: Compiled and loaded

4. If the correct version of cross compiler is not present, an error displays. Locate the correct version and place it in the same folder as UWTerminal.

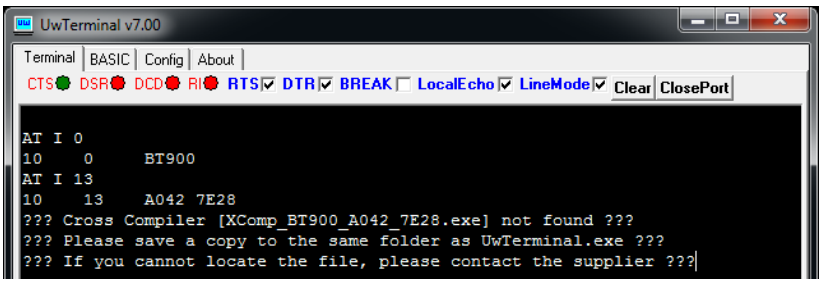

Figure 6: Cross Compiler Error

5. Confirm that the *hrs* application is loaded by using the command **at+dir**.

Note: All characters after the first '.' are truncated from the filename when smartBASIC applications are loaded into the BT900 module. Therefore, when hrs.heart.rate.custom.sb is copied to the device, its name becomes *hrs*.

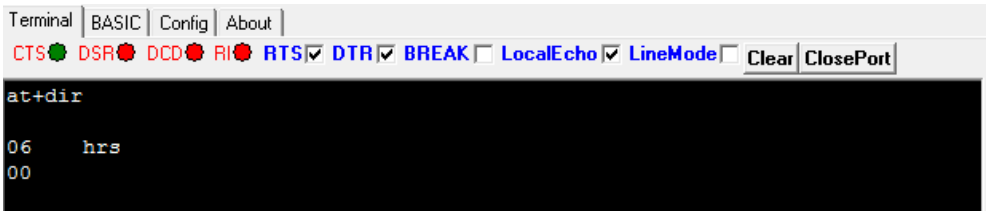

Figure 7: Directory showing hrs app loaded

ANDROID SETUP

For Android setup, follow these steps:

1. Install the Laird Toolkit from the Google Play Store and ensure Bluetooth is enabled in the device settings. The application download is labeled Laird Toolkit

Note: The Laird Toolkit is also valid for the following Laird BT4.0+LE module applications: Heart Rate, Blood Pressure, Proximity, Virtual Serial Port, Over-the-Air Downloads, and Batch Command Manager.

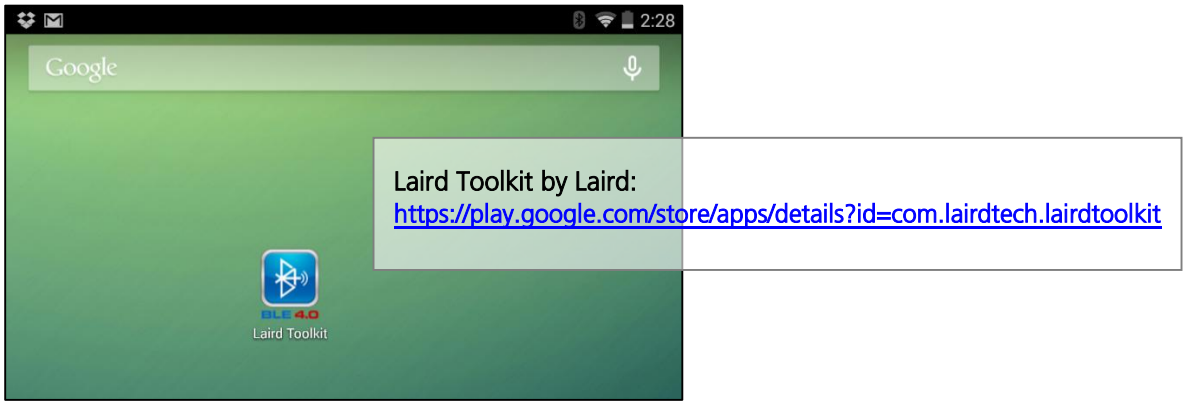

Figure 8: Laird Toolkit app installed

2. Once installed, run the Laird Toolkit application on your Android device.

3. Select **Heart Rate Measurement (HRM)**.
   Do not press **Connect** until the hrs application is running on the development board.

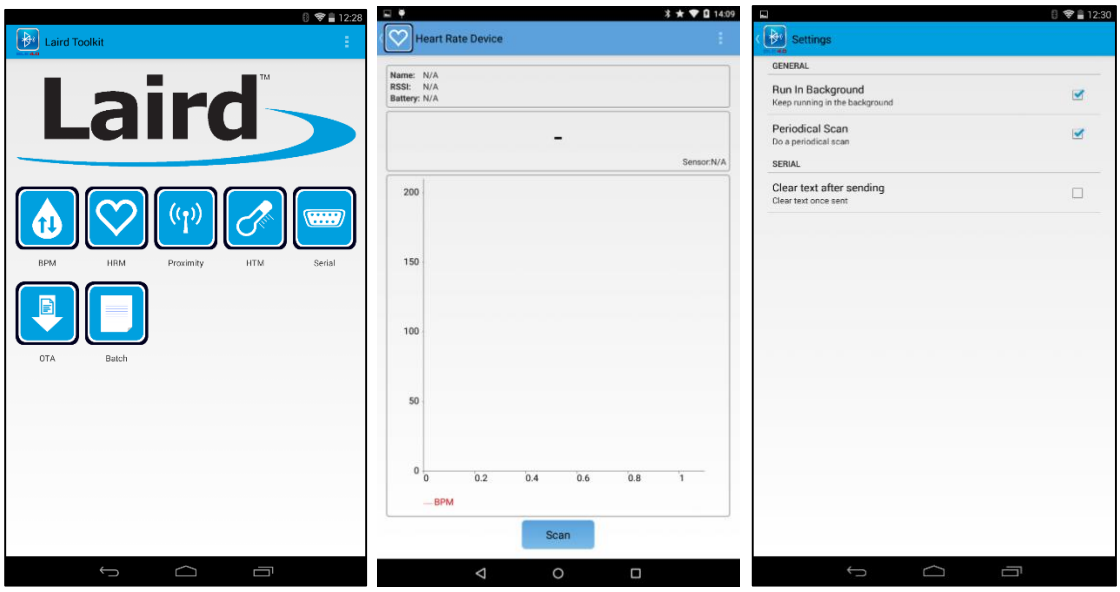

Figure 9: Laird Toolkit app - Intro screen, Heart Rate screen, and Settings screen

RUNNING HRS.HEART.RATE.CUSTOM.SB AND CONNECTING WITH THE ANDROID DEVICE

To run hrs.heart.rate.custom.sb and connect with the Android device, follow these steps:

1. From UWterminal's main window, type **hrs** followed by return to run the application. The module initialises, advertisements begin, and the log is printed to the console.

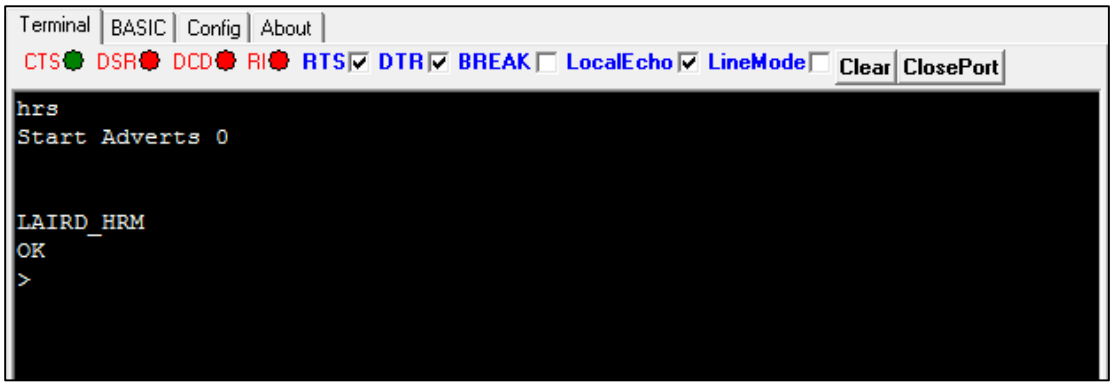

Figure 10: hrs.heart.rate.custom.sb running

2. Press **Connect** on the Android device.

> **Note:** If the module times out before you press Connect, press the reset button on the development board, allow the module to reset, and run the application again.

3. Due to known bugs in the Android BT4.0 BLE stack, descriptors are sometimes not written. Retry the module connection to resolve the issues.

4. Once you start a scan on the Android device, pick the module to which you wish to connect. Connection messages on the UWTerminal window (Figure 11 – right image) are displayed.

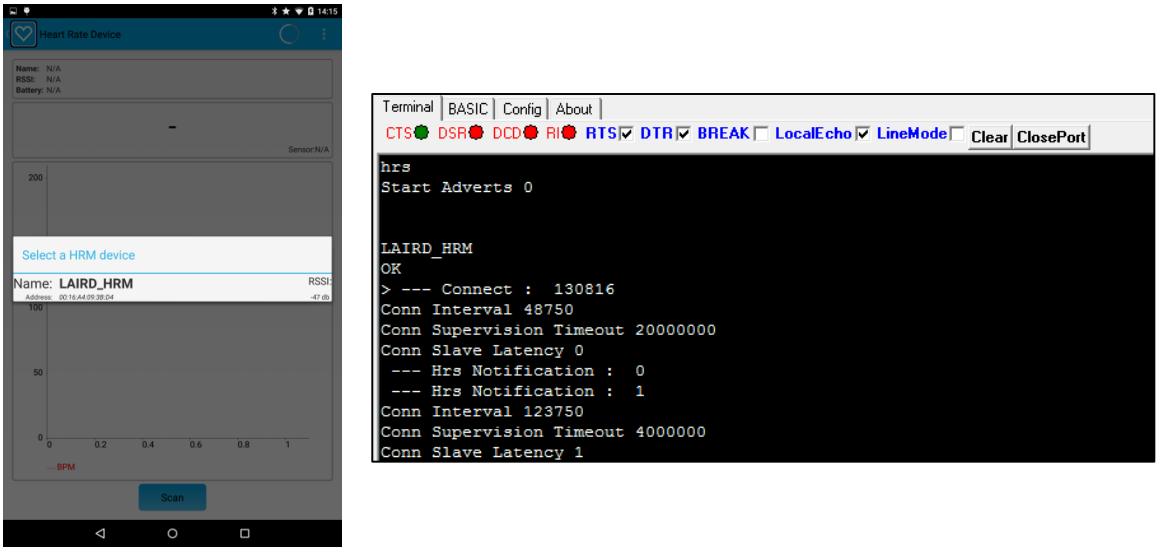

Figure 11: (Left) Android scanning for devices, (Right) Connection messages

5. To send data to the Laird Toolkit, you must first set the heart rate in UWterminal using **hr** followed by the heart rate (between 0 -255).
6. Type **send** to notify the Android device with the heart rate value that you have just set (Figure 12).

Figure 12: Type send

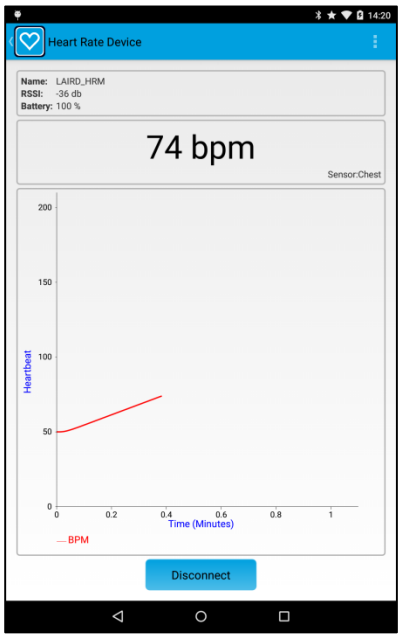

Figure 13: Active Heart Rate readings using Laird Toolkit app on Android device

REFERENCES

For more information on Heart Rate Profile, refer to the following documents:

- **hrs.heart.rate.custom.sb sample application** – The comments in this document contain further information on the use of the Heart Rate Service *smart*BASIC program and can be opened in a text editor.
- **Heart Rate Profile** – https://developer.bluetooth.org/TechnologyOverview/Pages/HRP.aspx

REVISION HISTORY

Revision	Date	Description	Approved By
1.0	26 Nov 2014	Initial Release	Jonathan Kaye
1.1	22 Jan 2015	Added Revision History	Sue White