Android Application – Laird Toolkit (Heart Rate Functionality)

BT900 Development Kit

Application Note *v1.2*

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
- UWTerminalX https://github.com/LairdCP/UwTerminalX/releases
- 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

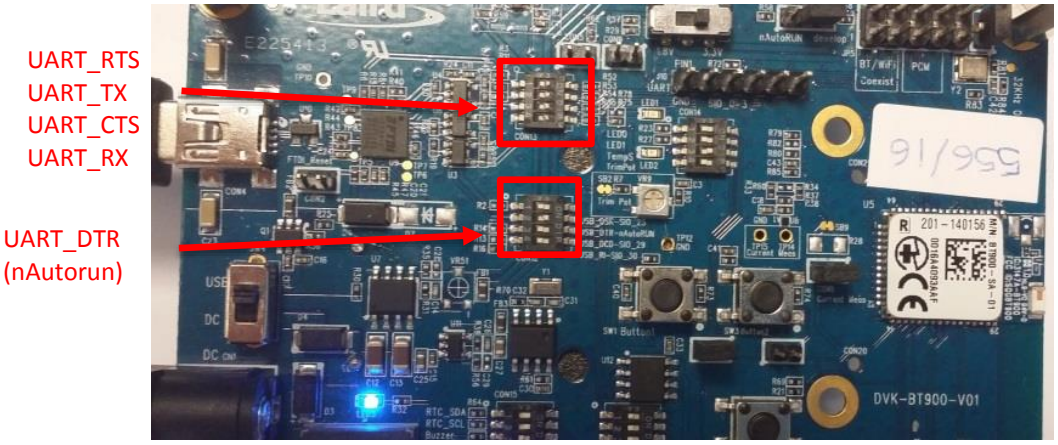

Figure 1: UART_TX/RX/CTS/RTS/DTR (nAutorun) is switched ON; all other are switched OFF

Americas: +1-800-492-2320
Europe: +44-1628-858-940
Hong Kong: +852 2923 0610

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.
4. 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.
5. Extract UWTerminalX to a selected folder and run the program
6. Select BT900 in the Device tab and confirm the proper port via the dropdown box:
   - Baudrate – 115200 (v9.1.2.0)
   - Parity – None
   - Stop Bits – 1
   - Data Bits – 8
   - Handshaking – CTS/RTS

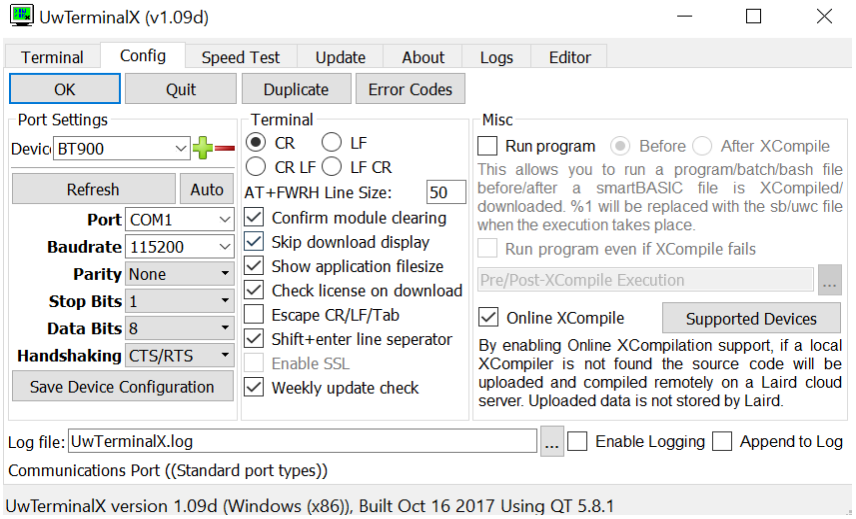

Figure 2: Comms Settings

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

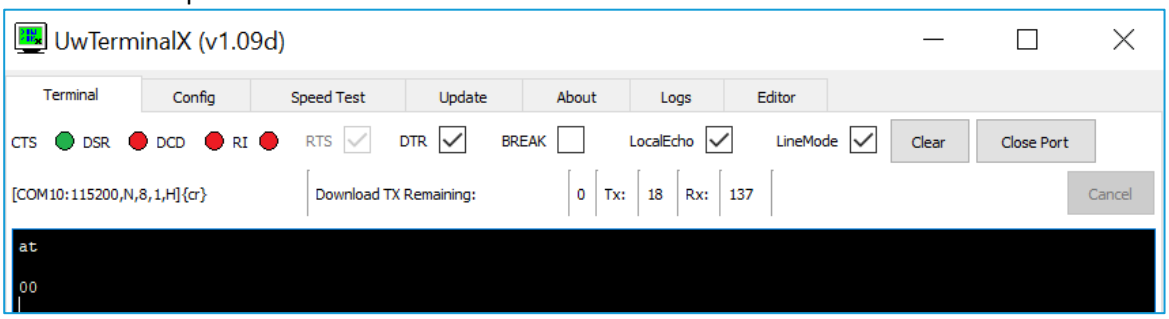

Figure 3: Comms OK

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. UwTerminalX uses an online Xcompiler but if an internet connection is not available, the XComp file can be found in the Firmware folder available for download from the BT900 product page. If XCompiling with this

method, the Xcomp file and UwTerminalX utility must be placed in the same smartBASIC sample application folder.

2. To compile and load a *smart* BASIC application, right-click in the main UWTerminalX window and select **XCompile + Load**.

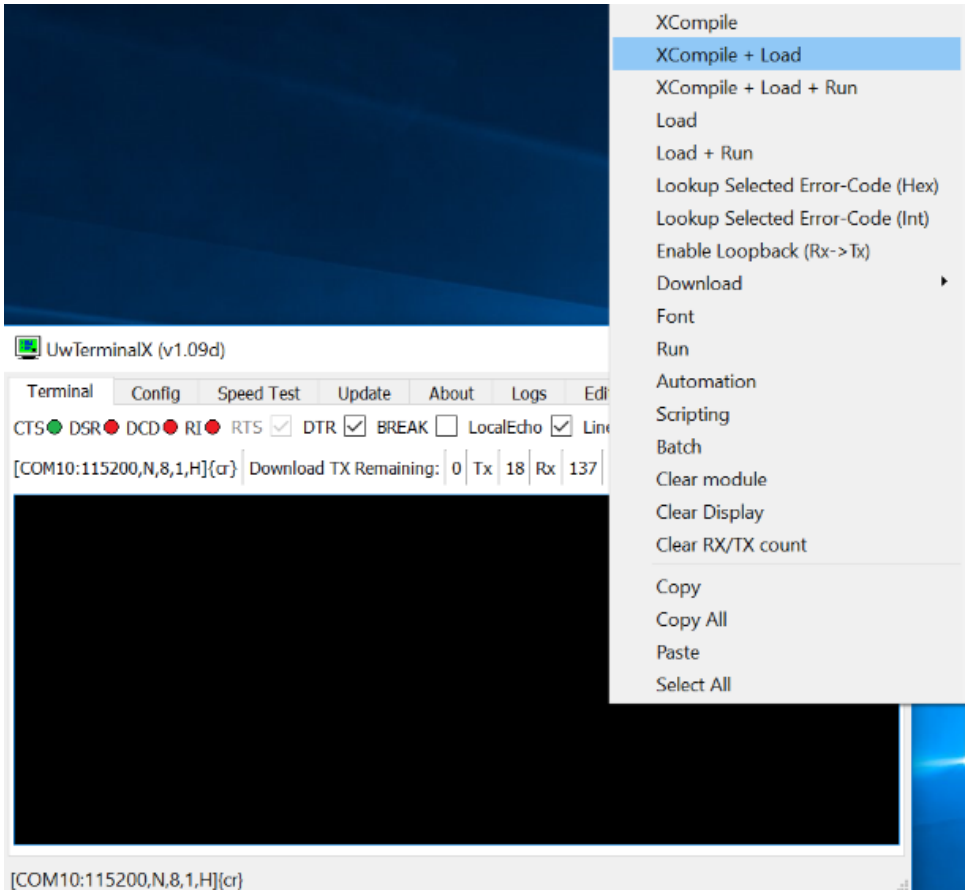

Figure 4: Right-click menu

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 **– Finished Downloading File --.**

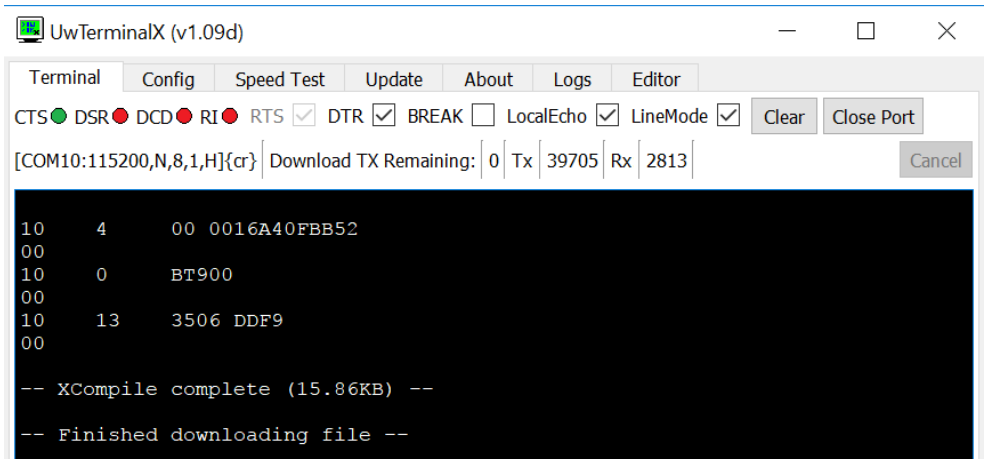

Figure 5: Compiled and loaded

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 UWTerminalX.
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*.

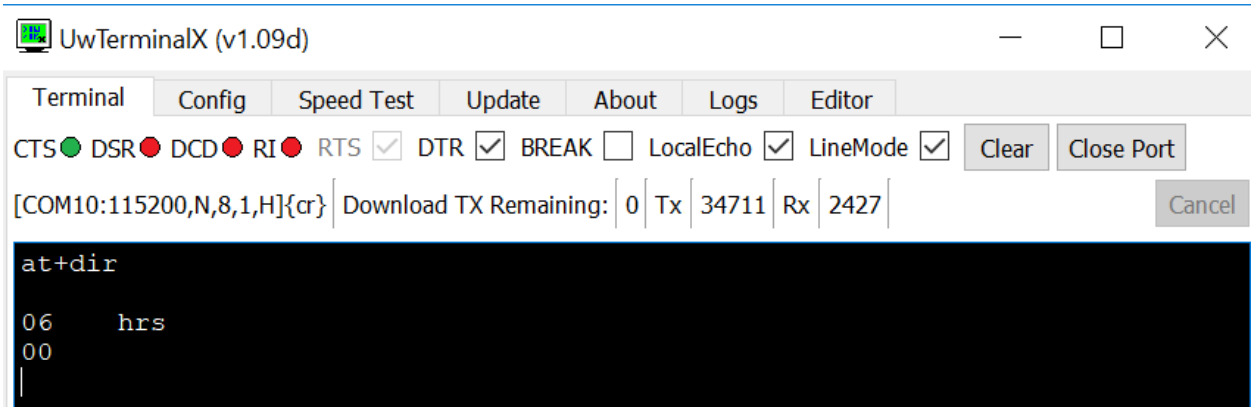

Figure 6: Directory showing hrs app loaded

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 download can be found here: https://play.google.com/store/apps/details?id=com.lairdtech.lairdtoolkit.

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.

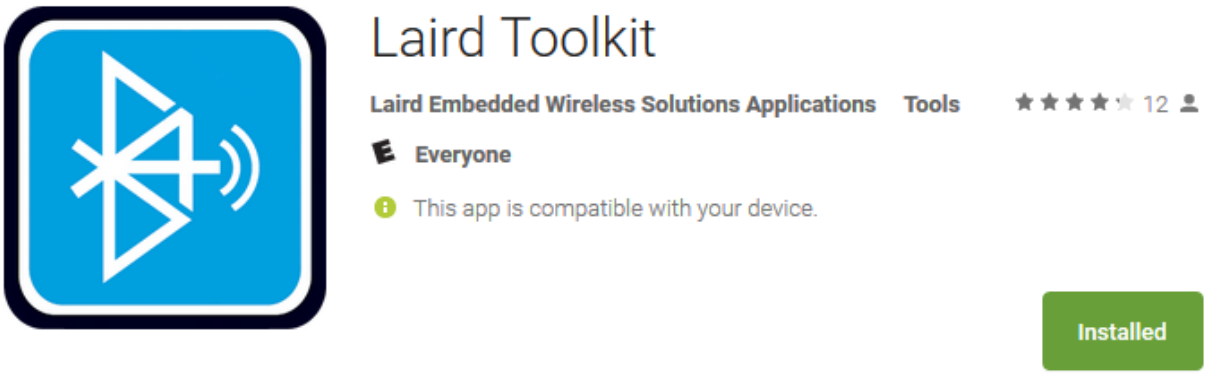

Figure 7: Laird Toolkit app installed

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.

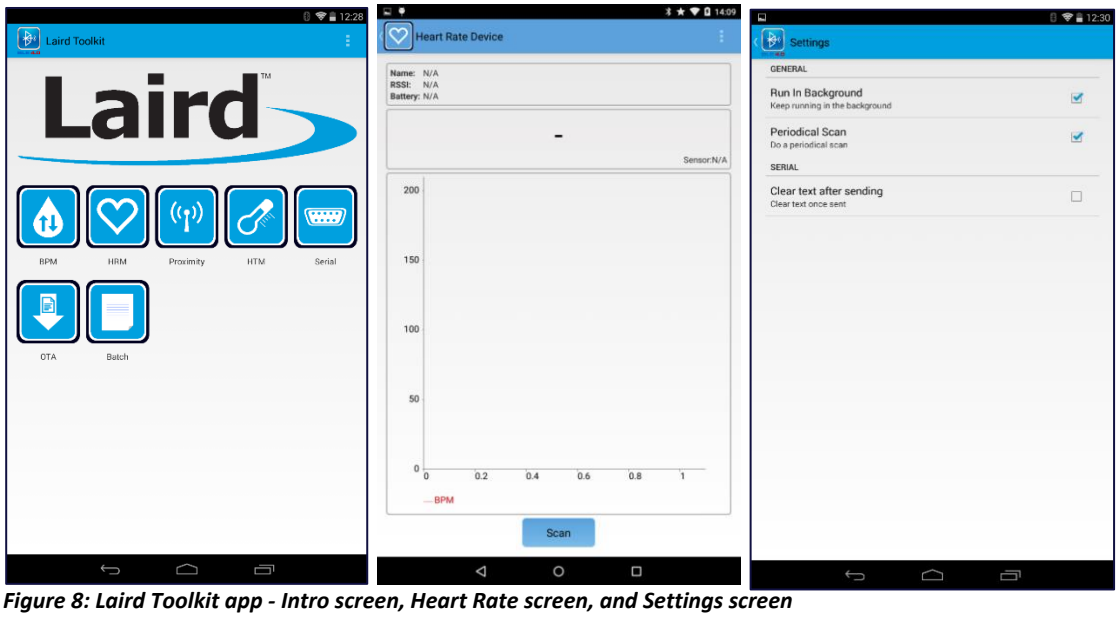

Figure 8: Laird Toolkit app - Intro screen, Heart Rate screen, and Settings screen

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 UWterminaXl'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.

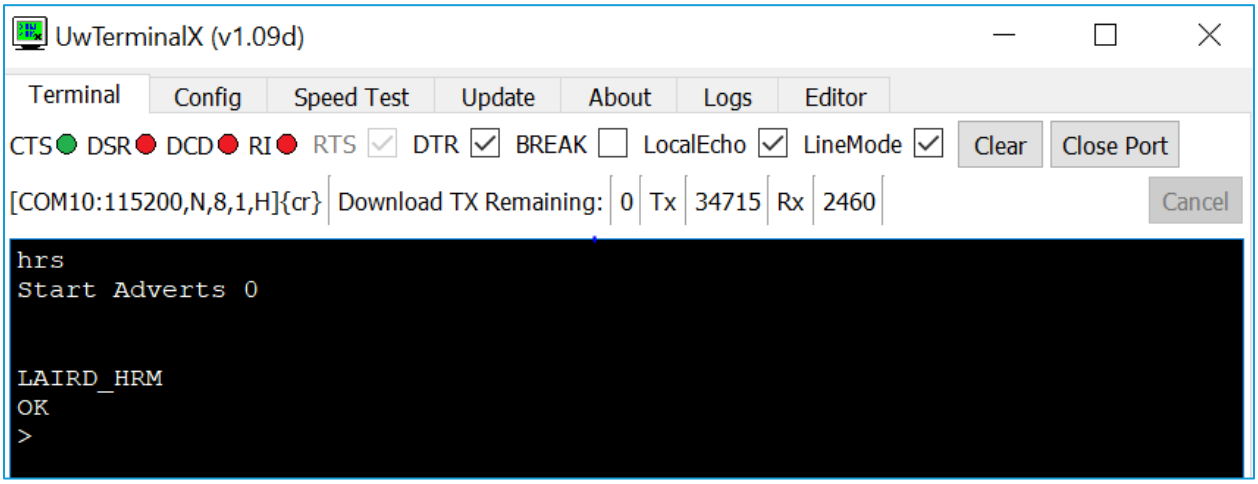

Figure 9: hrs.heart.rate.custom.sb running

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 UWTerminalX window (Figure – right image) are displayed.

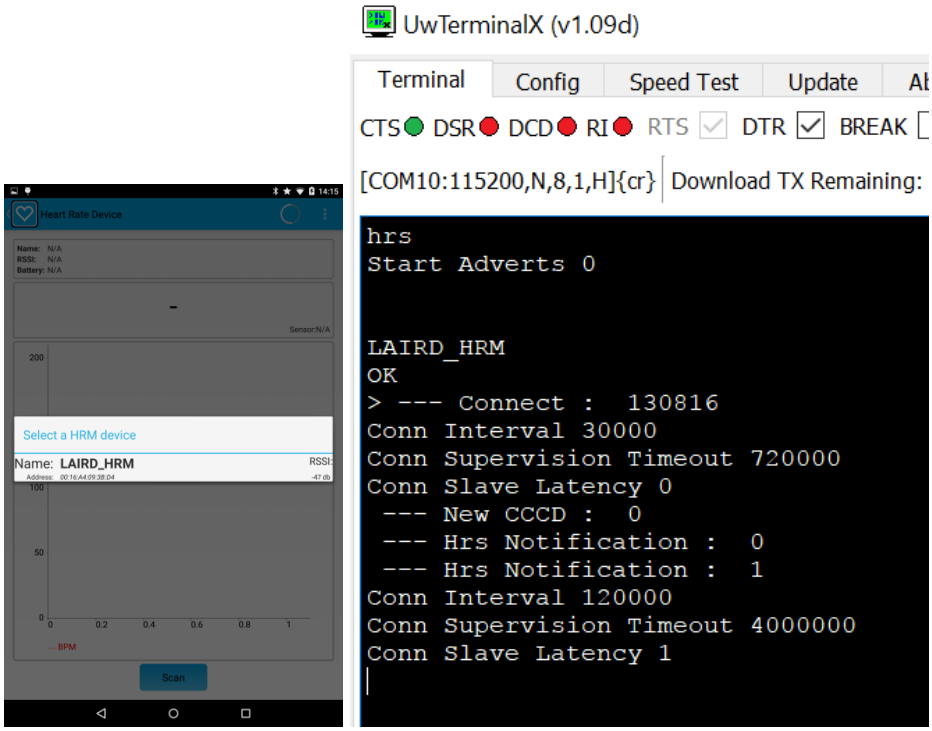

Figure 10: (Left) Android scanning for devices, (Right) Connection messages

5. To send data to the Laird Toolkit, you must first set the heart rate in UWterminalX 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).

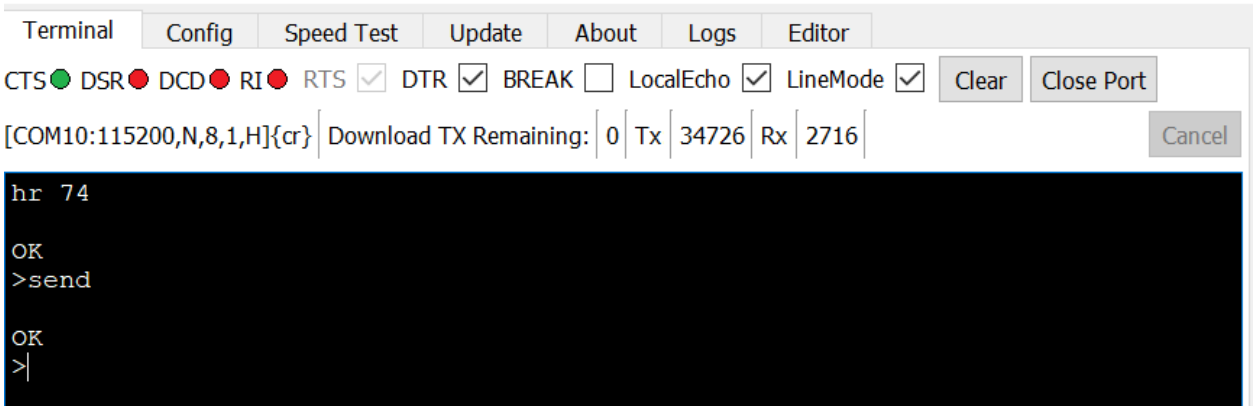

Figure 11: Type send

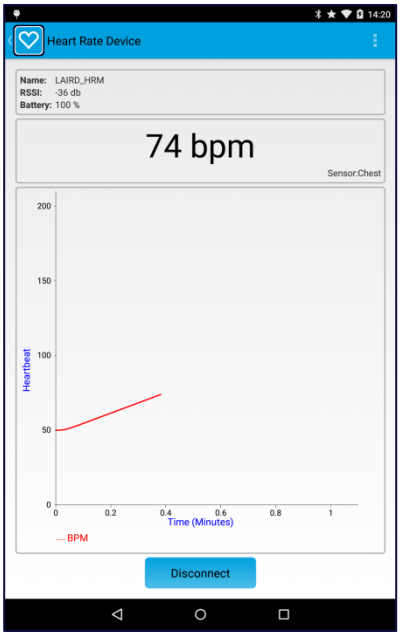

Figure 12: Active Heart Rate readings using Laird Toolkit app on Android device

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	Contributor(s)	Approved By
1.0	26 Nov 2014	Initial Release		Jonathan Kaye
1.1	22 Jan 2015	Added Revision History		Sue White
1.2	23 Jan 2018	Updated for UwTerminalX	Curtis Strong	Jonathan Kaye