

Android Application – Laird Toolkit (Blood Pressure Functionality) BT900 Development Kit

Quick Start Guide

v1.2

INTRODUCTION

This guide demonstrates how to load a *smartBASIC* Blood Pressure Sensor Service application (bps.blood.pressure.custom.sb) onto the BT900 development board and to view the data on an Android device that supports 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
- **bps.blood.pressure.custom.sb** – BT900 *smartBASIC* 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 PlayStore)
- 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

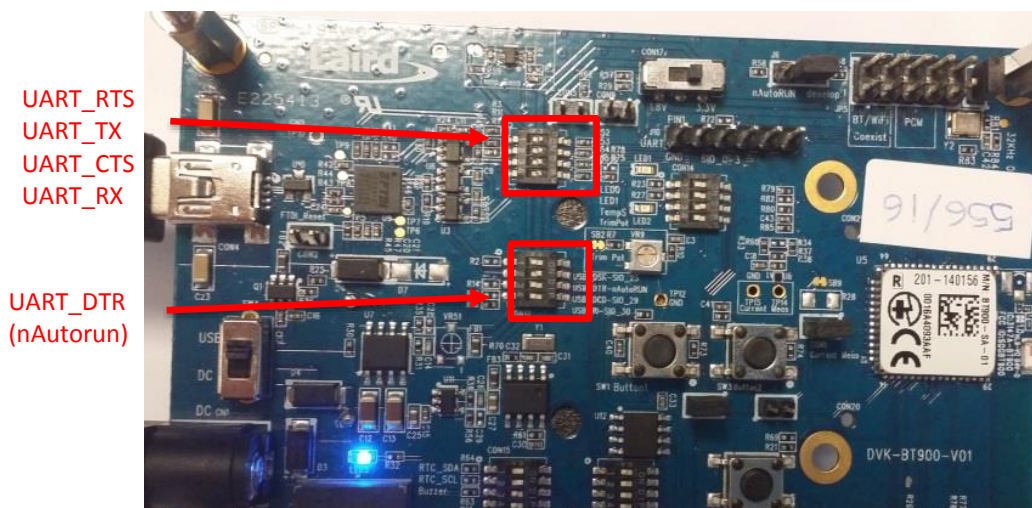


Figure 1: UART_TX/RX/CTS/RTS/DTR (nAutorun) is switched ON all other switched OFF

- Connect one end of the mini USB cable to CON4 on the development board and the other end of the cable to your PC.
- 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.

- Extract UWTerminal to a selected folder and run the program (no installation is required).
- 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

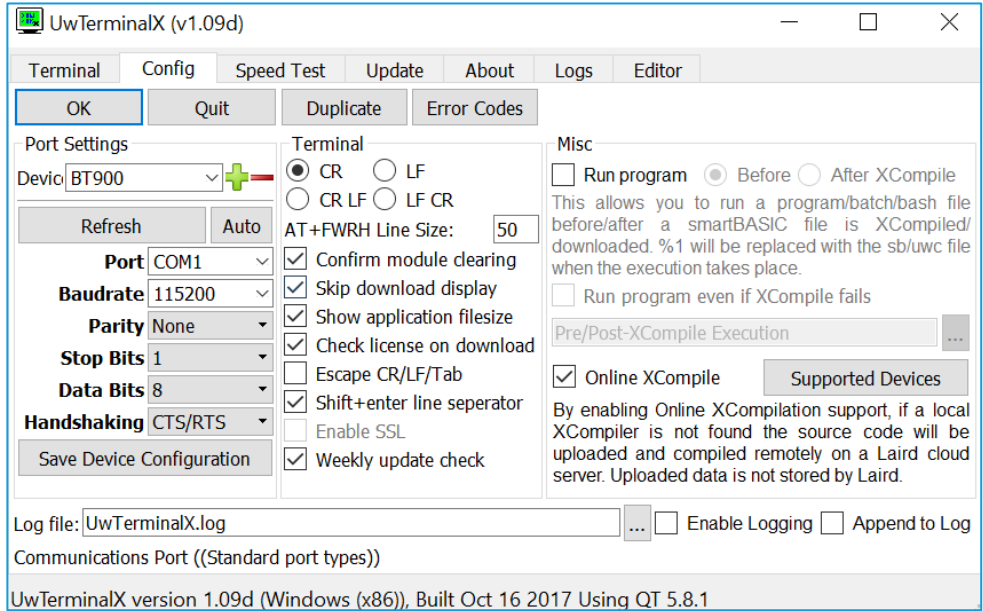


Figure 2: Comms settings

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

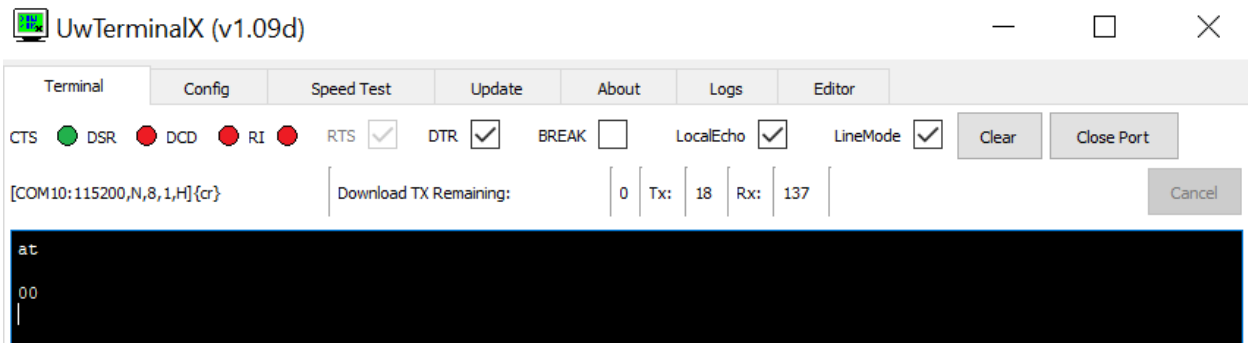


Figure 3: Comms OK

LOADING A SMARTBASIC 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 *smartBASIC* 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 *smartBASIC* application, right-click in the main UWTerminalX window and select **XCompile + Load**.

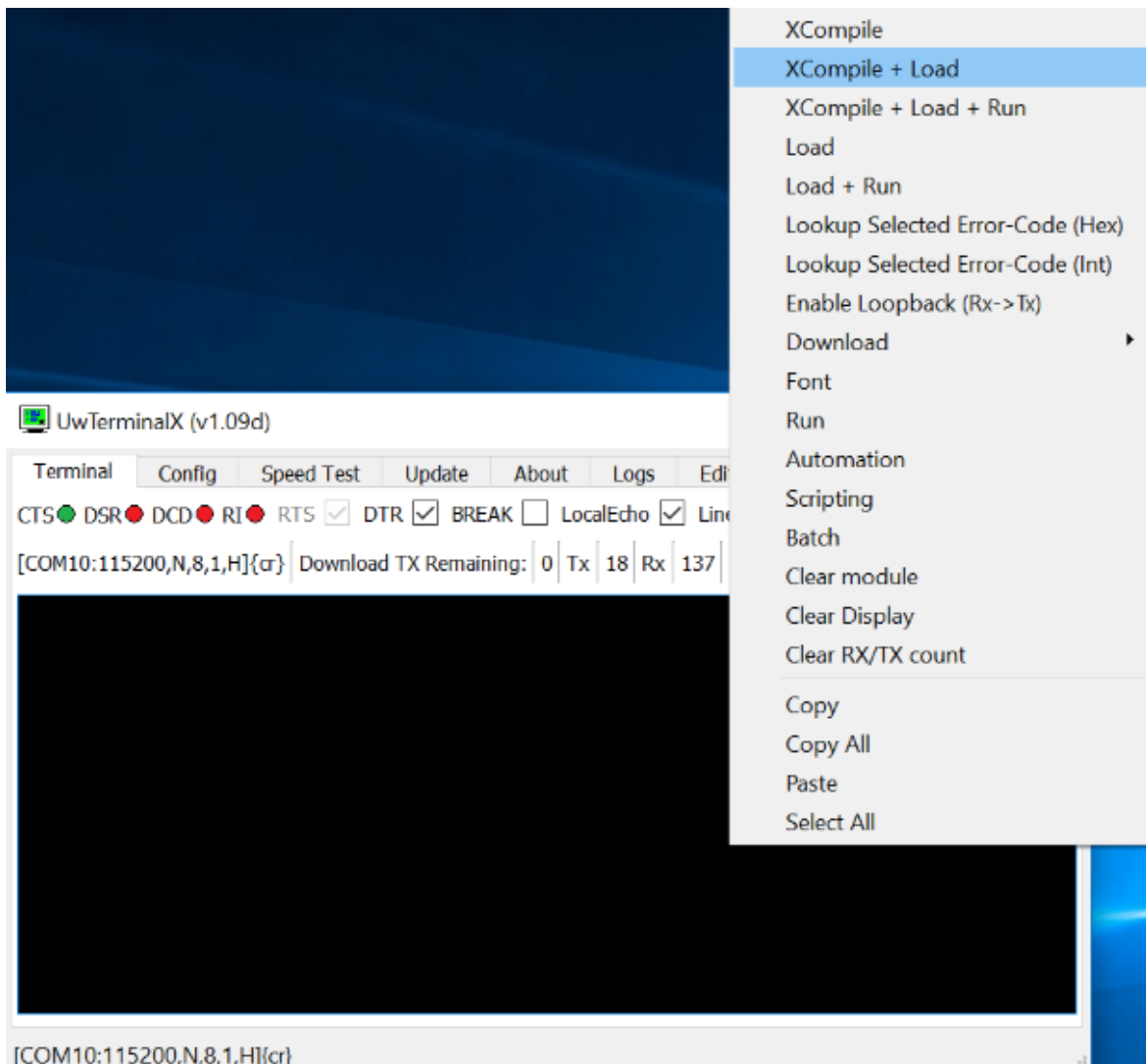


Figure 4: Right-click menu

3. Locate and open the *bps.blood.pressure.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 --**.

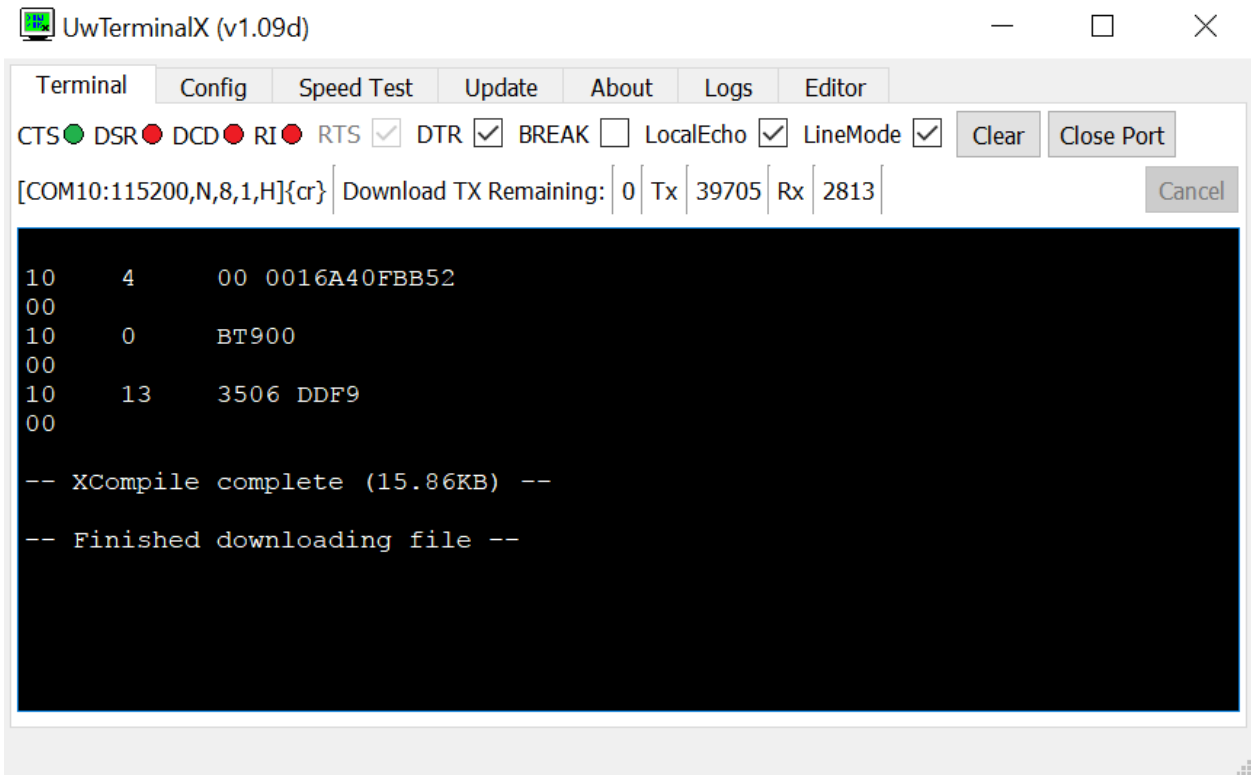


Figure 5: Compiled and loaded

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 *bps* 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 *bps.blood.pressure.custom.sb* is copied to the device, its name becomes *bps*.

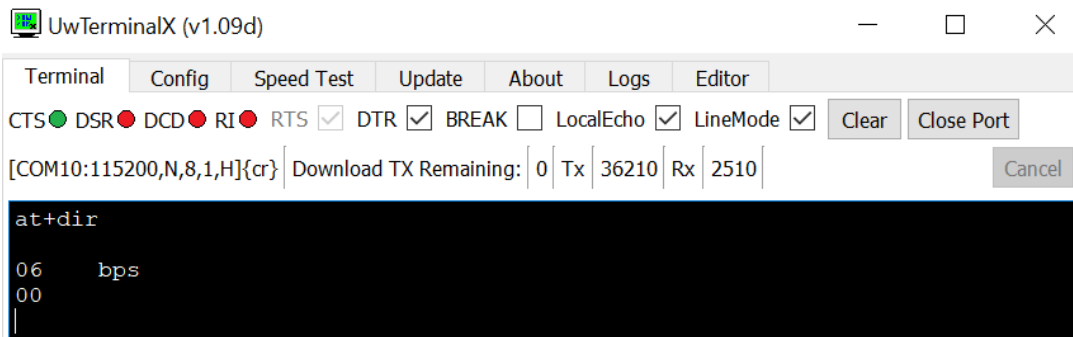


Figure 6: Directory showing *bps* app loaded

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: Health Thermometer, Heart Rate, Blood Pressure, Proximity, Virtual Serial Port, Over-the-Air Downloads, and Batch Command Manager.

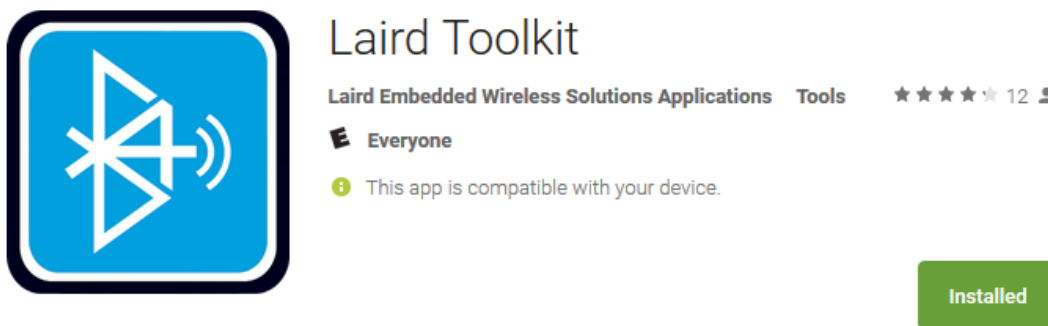


Figure 7: Laird Toolkit app installed

2. Once installed, run the Laird Toolkit application on your Android device.
3. Select **Blood Pressure Measurement (BPM)**.

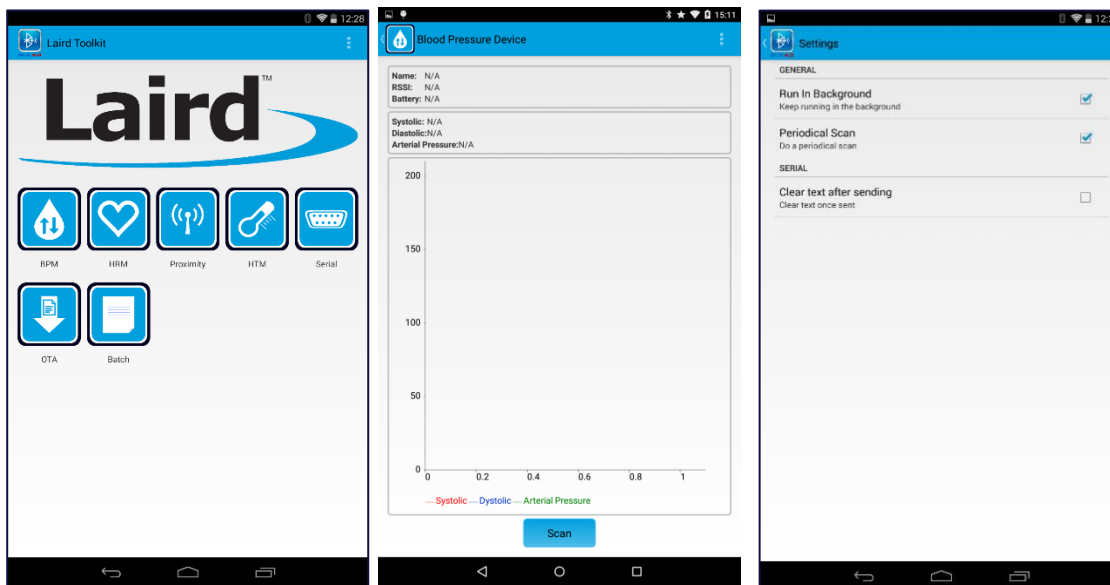


Figure 8: Laird Toolkit app - Intro screen, Blood Pressure screen, and Settings screen

RUNNING *bps.blood.pressure.custom.sb* AND CONNECTING WITH THE ANDROID DEVICE

To run *bps.blood.pressure.custom.sb* and connect with the Android device, follow these steps:

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

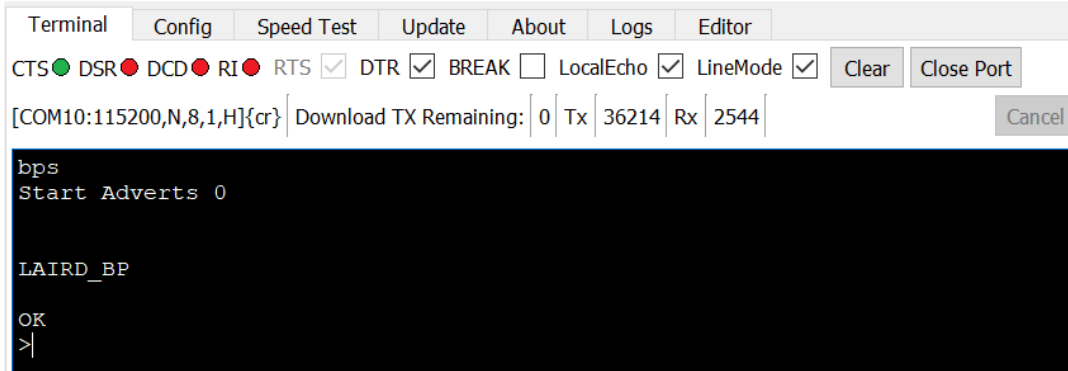


Figure 9: *bps.blood.pressure.custom.sb* running

2. Press **Scan** 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 re-run the application.

3. Because of known bugs in the Android BT4.0 BLE stack, descriptors are sometimes not written. Retry the module connection to resolve the issue.
4. Once you start a scan on the Android device, pick the module to which you wish to connect and connection messages on the UWTerminalX window (Figure 10 – right image) should be displayed.

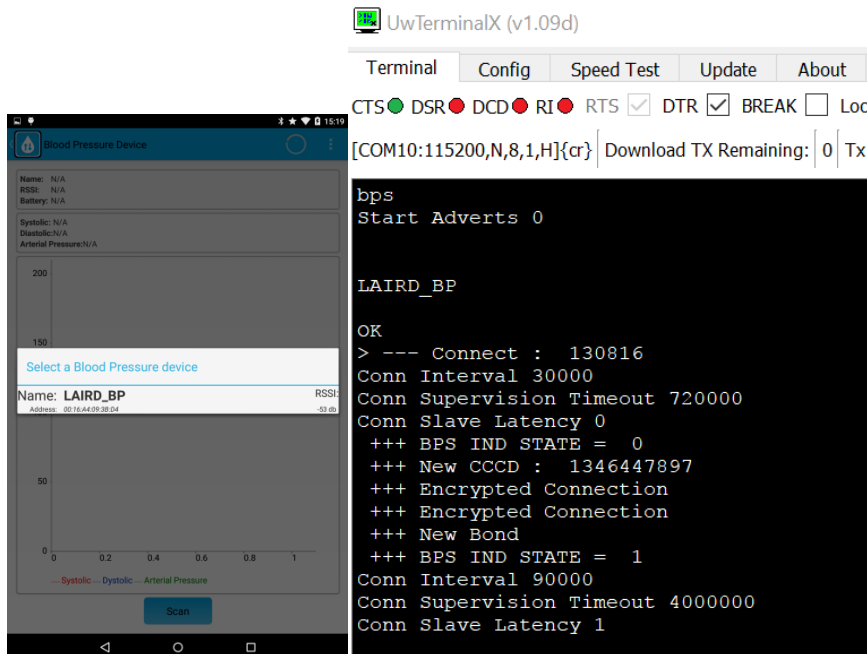


Figure 10: (Left) android scanning for devices, (Right) Connection messages

- 5. To send data to the Laird Toolkit, you must first set the blood pressure values in UWterminal using **hr**, **mp**, and **dp** followed by the value (between 0-255).
- 6. Type **send** to send the indication to the Android device with the values that you previously set (Figure 11: Type send).

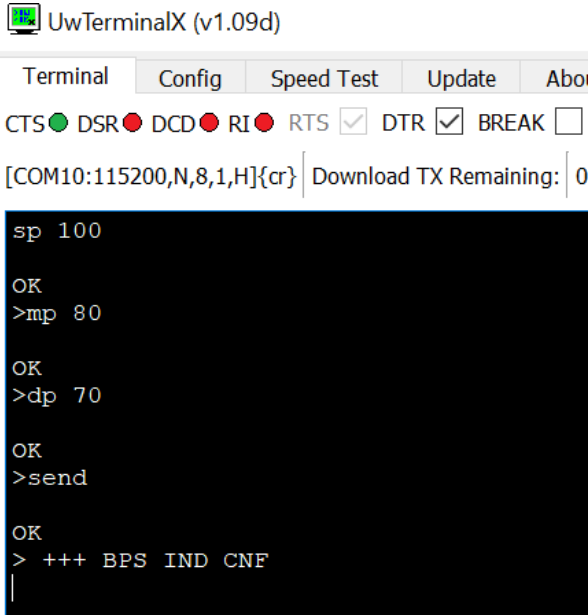


Figure 11: Type send

Active blood pressure readings display with the Laird Toolkit app on the Android device (Figure 12: Active blood pressure readings using Laird Toolkit app on Android device).

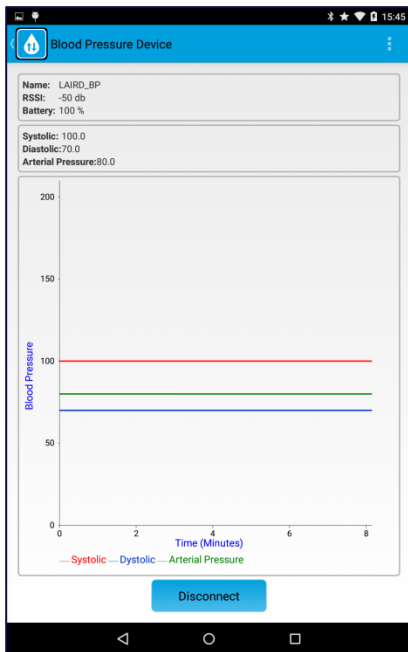


Figure 12: Active blood pressure readings using Laird Toolkit app on Android device

REFERENCES

For more information on Blood Pressure Profile, refer to the following documents:

- **bps.blood.pressure.custom.sb sample application** – The comments in this document contain further information on the use of the Blood Pressure Service *smart*BASIC program and can be opened in a text editor.
- **Blood Pressure Profile** – <https://developer.bluetooth.org/TechnologyOverview/Pages/BLS.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