PL2303HXD/EA/RA USB-to-Serial Controllers
Android USB Host API Solution
Demo Application User's Manual
(1-Port, GPIO, Flow Control & Multi-Port)

Prolific Technology announced the first Android solution (with NO root permission needed) for connecting PL2303 USB-to-Serial devices to Android-powered devices with USB Host mode support (see Figure 1-1). Prolific has released the PL2303 Android USB Host API Java Library SDK for customers to develop their own Android application software to communicate with the PL2303 USB-to-Serial device. This User's Guide Manual illustrates how to install and run the Android demo apps included inside the SDK.

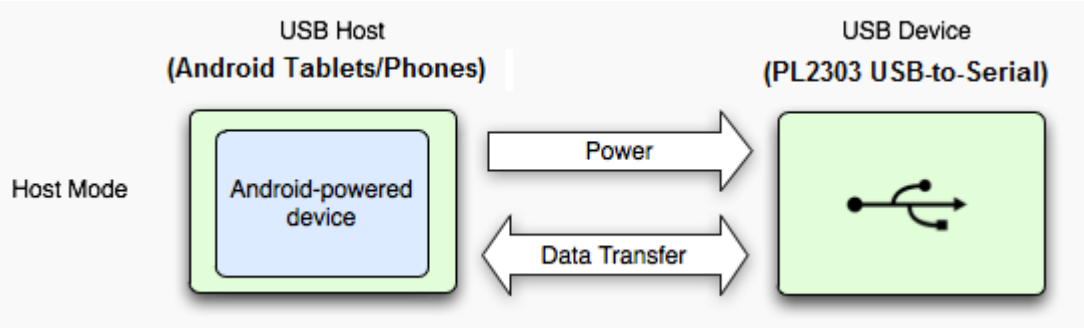


Figure 1-1: Android USB Host Mode

Minimum Requirements

- ✓ USB Device with PL2303HXD, PL2303EA, or PL2303RA controller chip:
  - USB to Serial Cables/Adapters/Converters
  - USB GPS or PND (Portable Navigation Device)
  - USB Interface Health/Medical/Fitness Devices
  - USB POS Devices
  - Other USB-to-Serial (UART/RS232) Interface Devices
  - **NOTE: PL2303HXA, PL2303XA, and PL2303TA are not supported**
- ✓ Micro USB Host OTG Cable may be needed for Android Phones
- ✓ Android-Powered Device (Tablet/Phones) with USB Host Mode and **USB Host API** Support
  - Android 3.2 and above OS versions (including Android 5.0)
  - NOTE: **Asus Transformer Pad TF300T** is used for Prolific development and test.
- ✓ Know-How in Java Programming and Android App Software Development

PL2303 Android Software Development Kit (SDK)

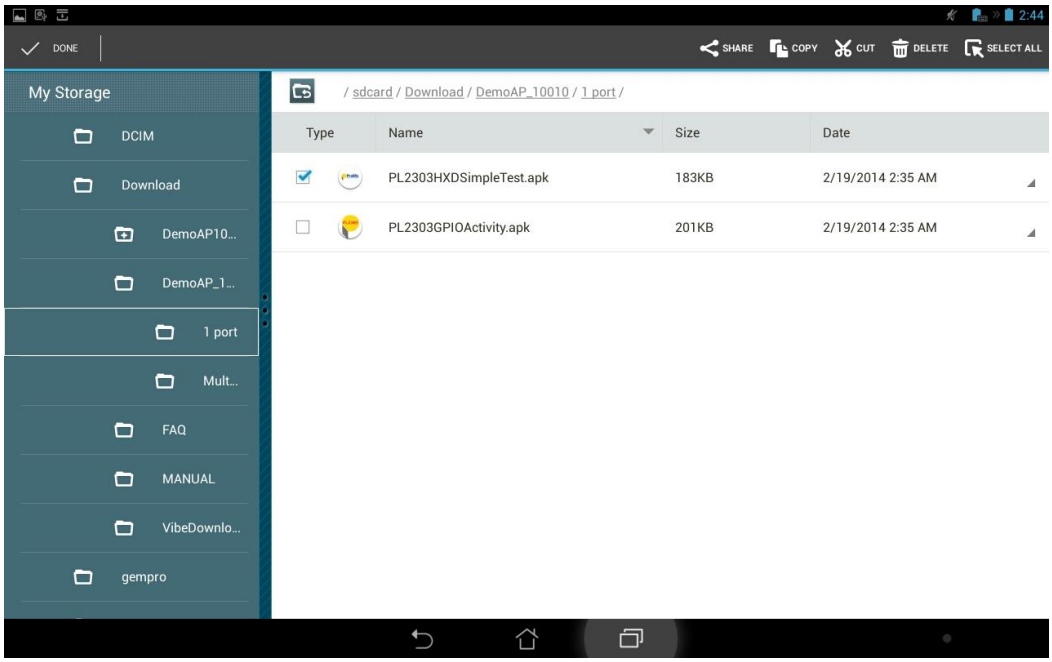
Prolific provides the following file package to help customers develop PL2303 Android Apps:

- ✓ **PL2303 Simple Test Android App Software** `(PL2303HXDSimpleTest.apk)`
  - This is demo application to detect PL2303 device in Android and do simple test.
- ✓ **PL2303 Modem Status Test Android App Software** `(PL2303HXDModemStatus.apk)`
  - This is demo application to control and test Modem Status (Flow Control pins) of PL2303 device.
- ✓ **PL2303 GPIO Test Android App Software** `(PL2303GPIO.apk)`
  - This is demo application to control and test GPIO pins of PL2303 device.
- ✓ **PL2303 Multi-Port Android App Software** `(PLUartMultiSimpleTest.apk)`
  - This is demo application for running multiple PL2303 devices.
- ✓ **PL2303 Android Demo Application User's Manual**
  - User Guide Manual for running the PL2303HXDSimpleTest, PL2303GPIOActivity, and PLUartMultiSimpleTest demo applications.
- ✓ **PL2303 Android Sample Source Codes**
  - Source codes for PL2303HXDSimpleTest.apk, PL2303GPIOActivity.apk, and PLUartMultiSimpleTest.apk.
- ✓ **PL2303 Android Java Driver Library** `(pl2303driver.jar / pl2303multilib.jar)`
  - PL2303 Android JAVA Driver library for single port and multi-port.
- ✓ **PL2303 Android App Development Reference Document**
  - Reference document for writing Android Application Software `(index.html)`

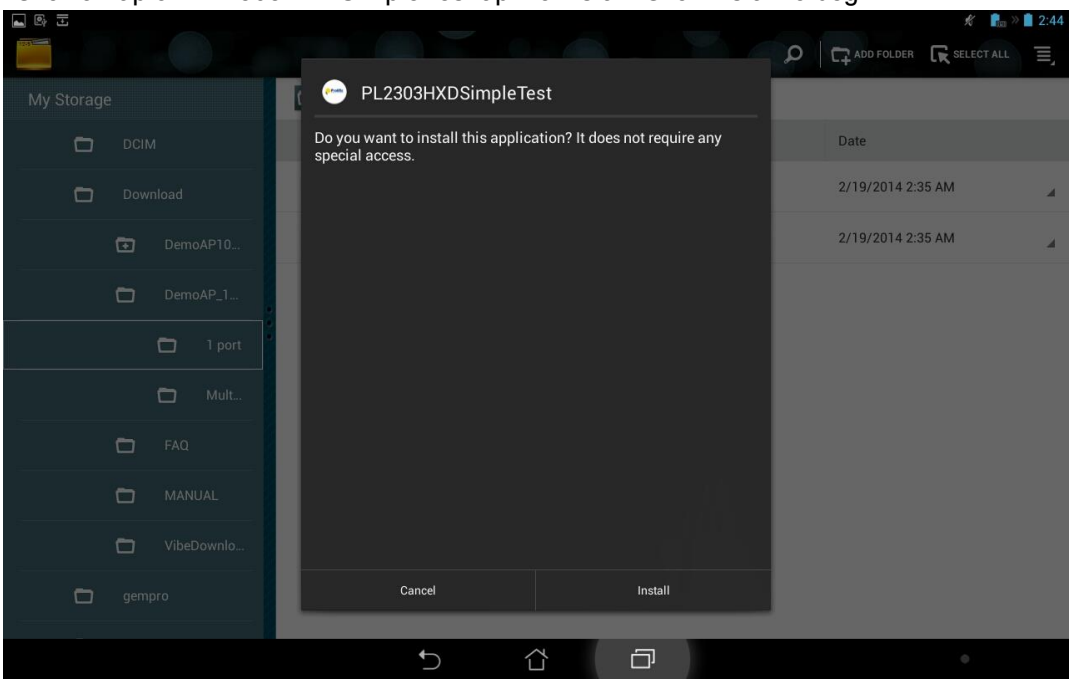
Demo App #1: PL2303HXDSimpleTest (For 1-Port Device)

This section describes how to install and run the PL2303HXDSimpleTest Android application using a single USB-to-Serial (RS232 DB9) cable:

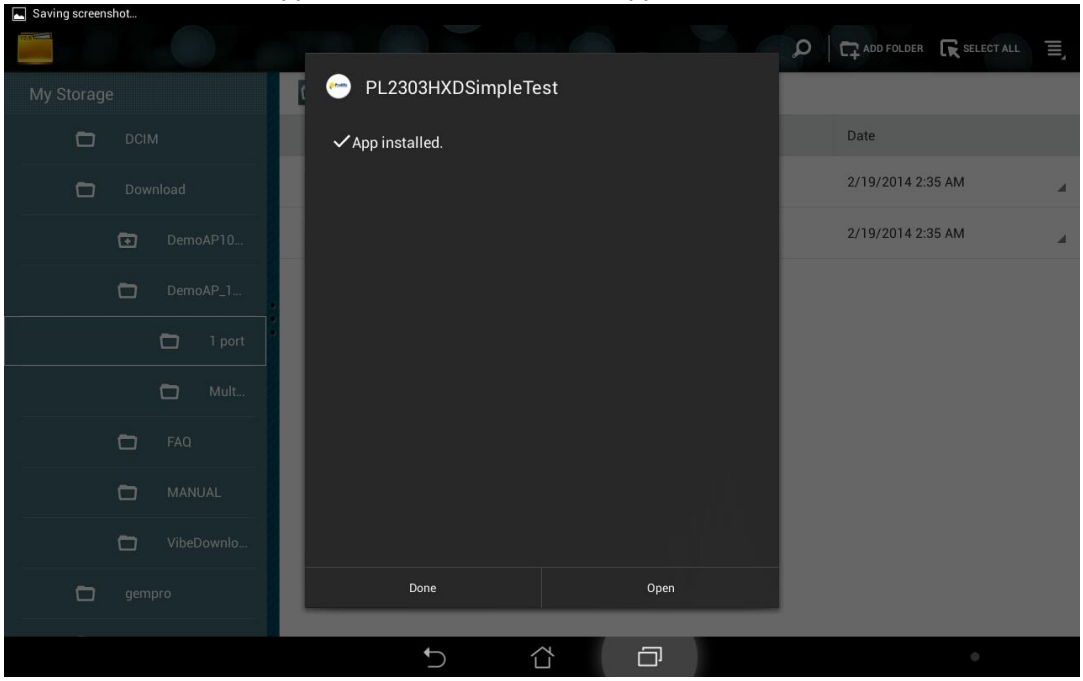
1. Power on your Android device (Android 3.2 and above) with USB Host API support. Only one PL2303HXD/EA/RA device is supported. Copy the demo app into the Android device folder.



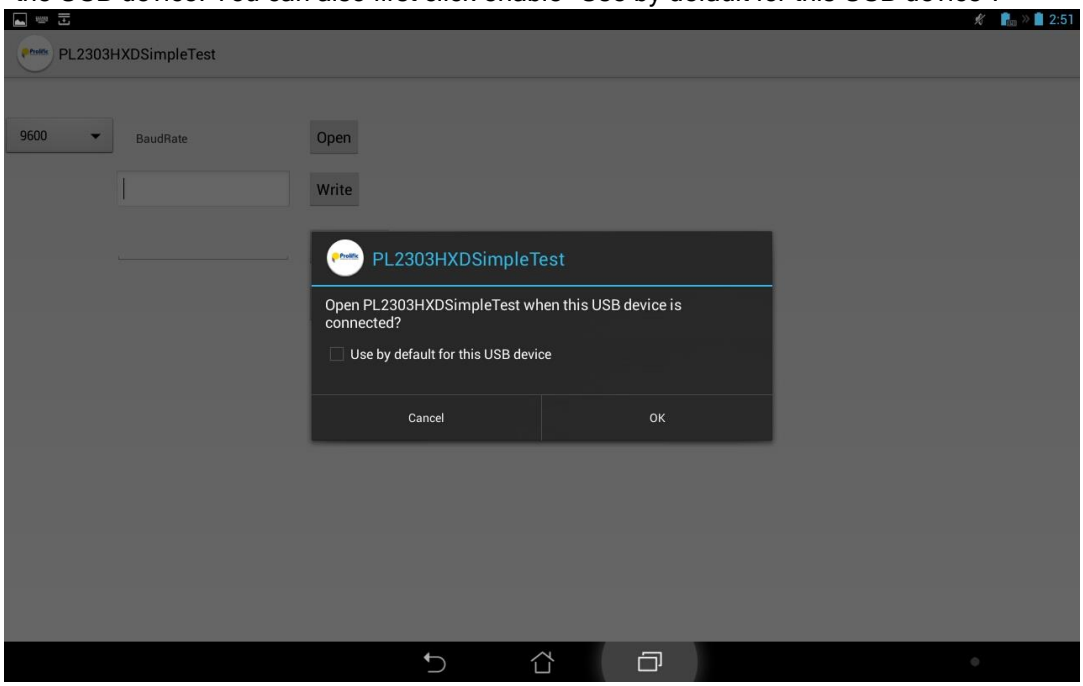
2. Click or tap on PL2303HXDSimpleTest.apk to install. Click Install to begin.



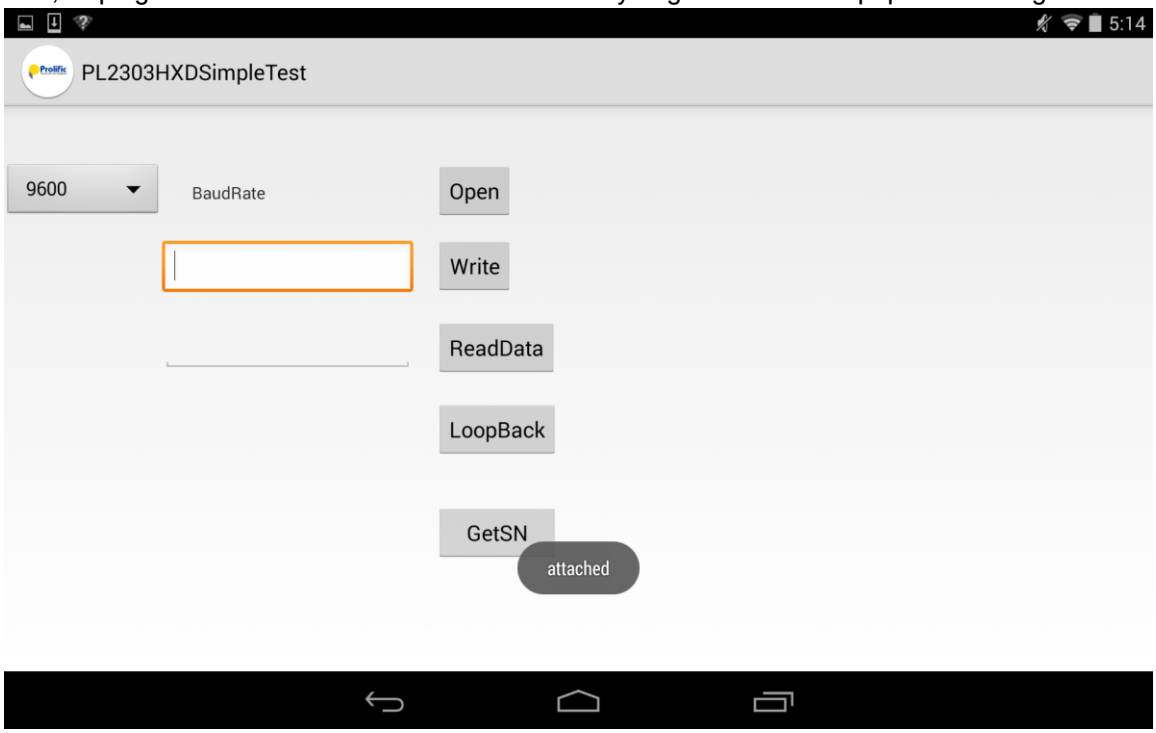
3. The PL2303 Android app will start to install. When Application is installed, click OPEN.



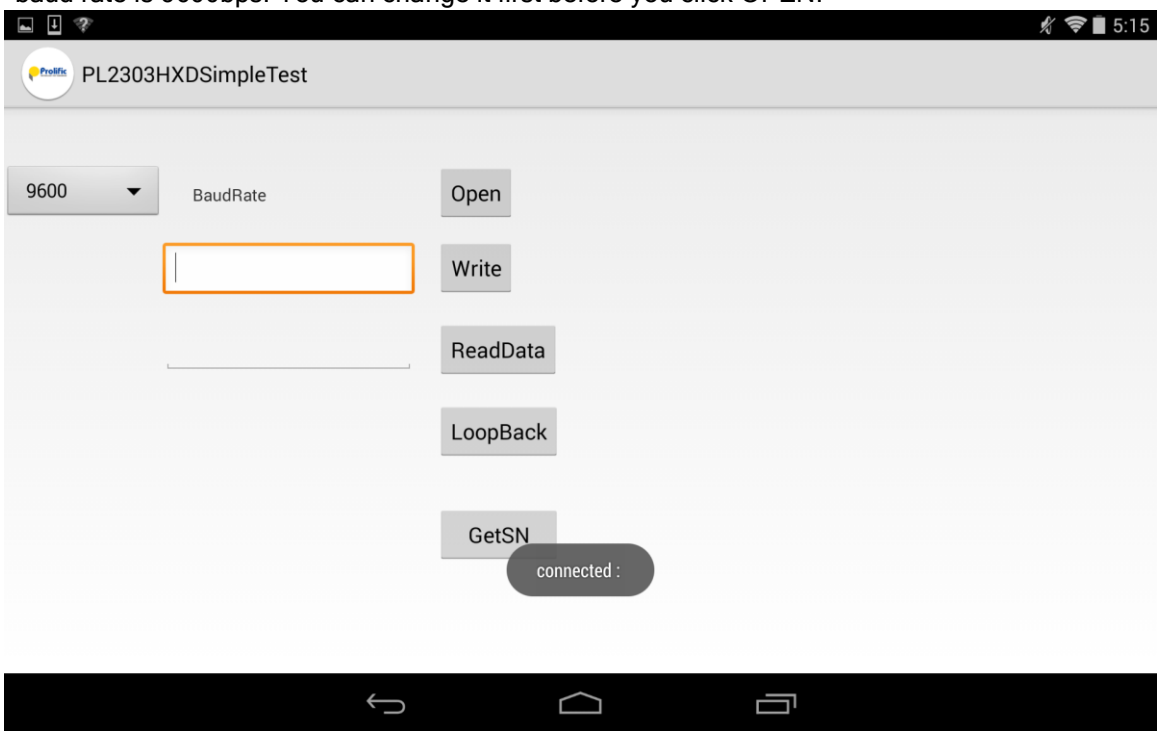
4. Plug in the PL2303 USB to Serial device. Click OK when prompted to allow the app to access the USB device. You can also first click enable "Use by default for this USB device".



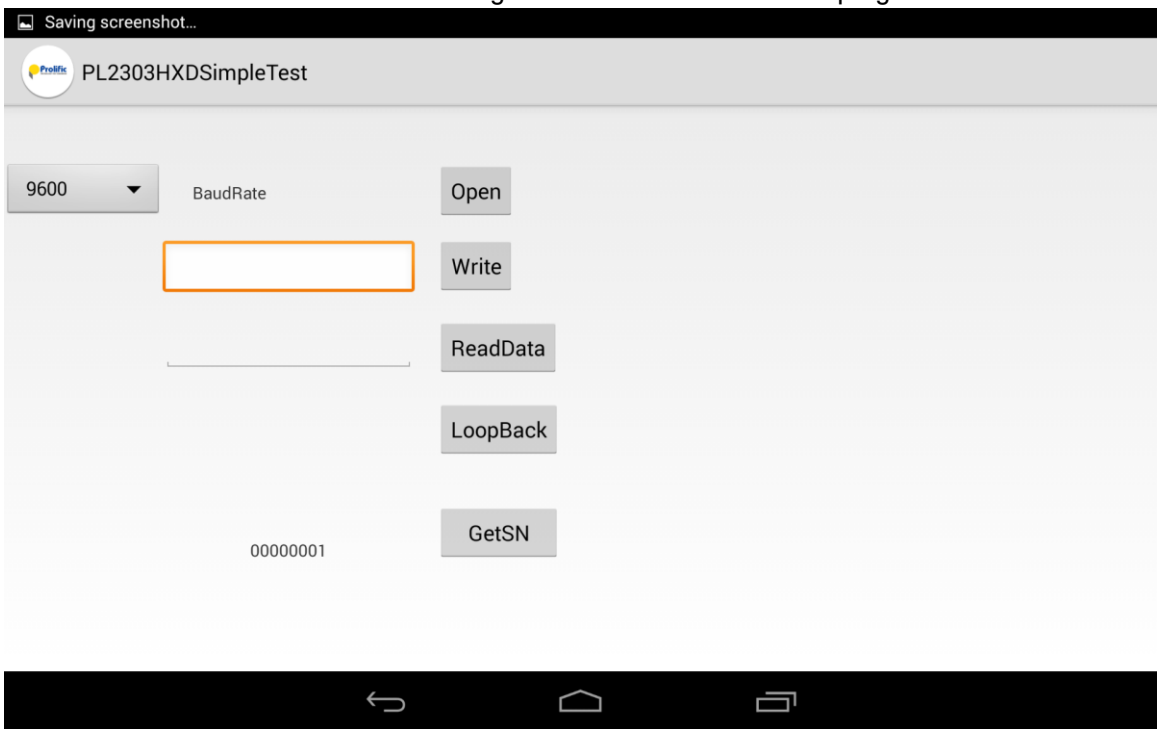
5. If the PL2303 USB device is detected, the app will pop out an attached status message below. If not, re-plug the device and click OPEN. Make sure you get an attached pop out message.



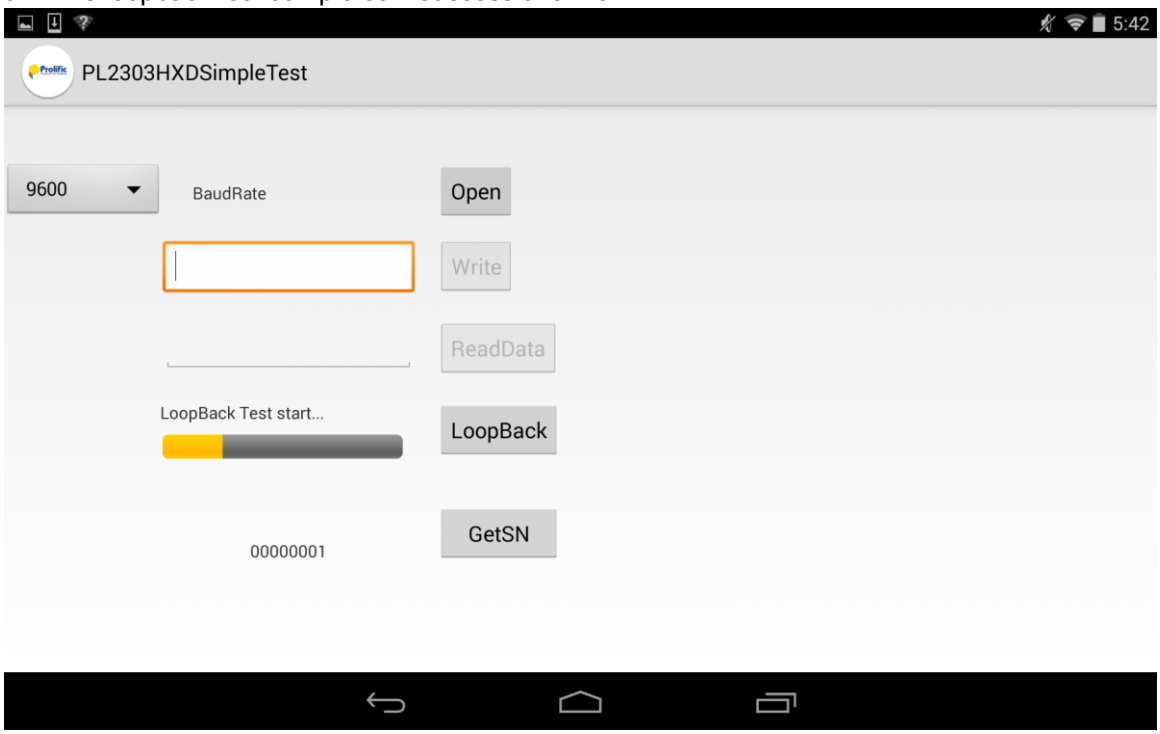
6. Click Open to open the port for use and you will see a connected pop up message. The default baud rate is 9600bps. You can change it first before you click OPEN.



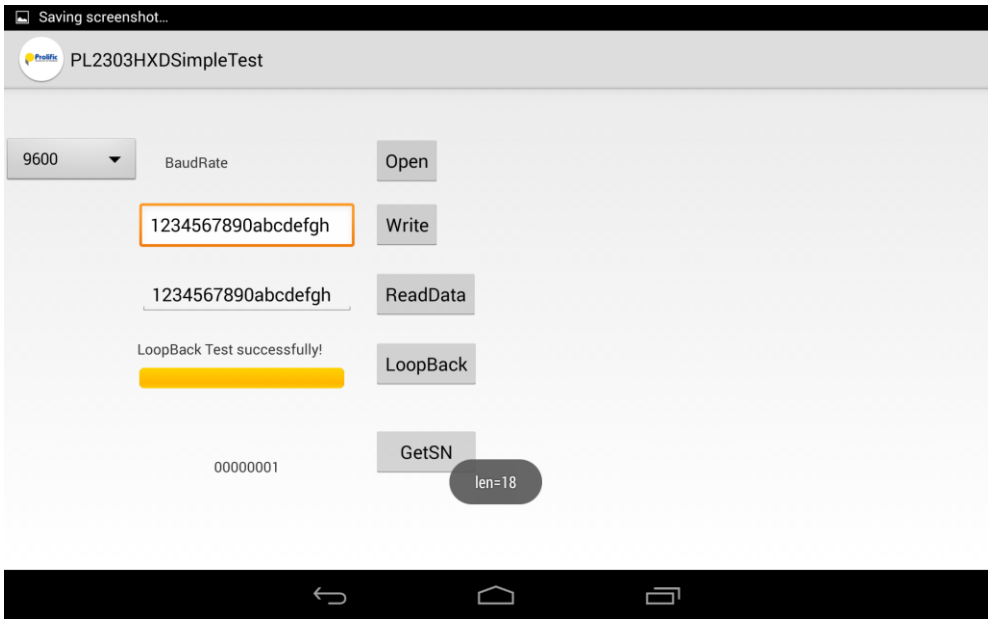
7. The PL2303HXDSimpleTest includes a "**GetSN**" button to read the Serial Number of PL2303 device. You can write Serial Number using OTPROM EEPROM Writer program for Windows.



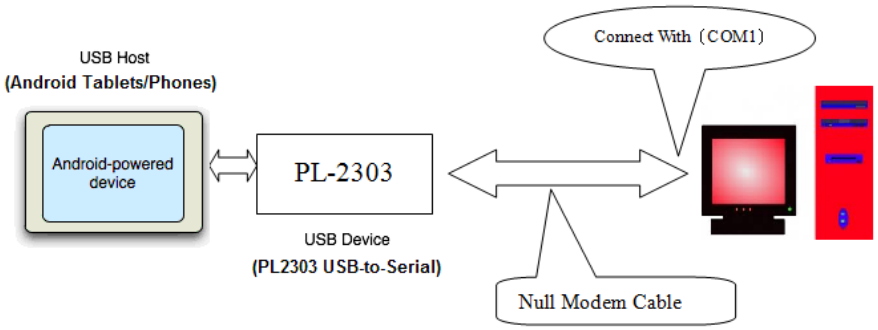
8. **Using Loopback Connector:** Plug a loopback connector (TX-RX pins short) to the USB-to-Serial RS232 cable. Set the desired baud rate settings. Click Open and **Loopback** button to run. Wait until the loopback test completes if successful or not.



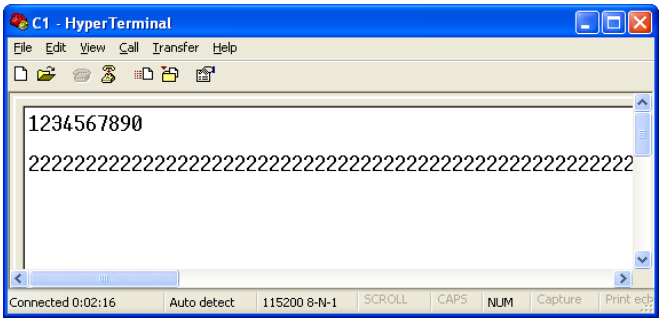
Another way is to type the keyboard on the Write box field and click Write button to send data (TX pin). Click ReadData button to read the data (RX pin) and check if the data are the same.



9. **Using Null Modem cable and Windows PC:** Plug a serial null modem cable to the PL2303 USB Serial cable and the other end to a RS232 COM port (or another PL2303 USB-Serial cable) of another computer. Run HyperTerminal or TeraTerm program on PC or other serial terminal program and open COM port.

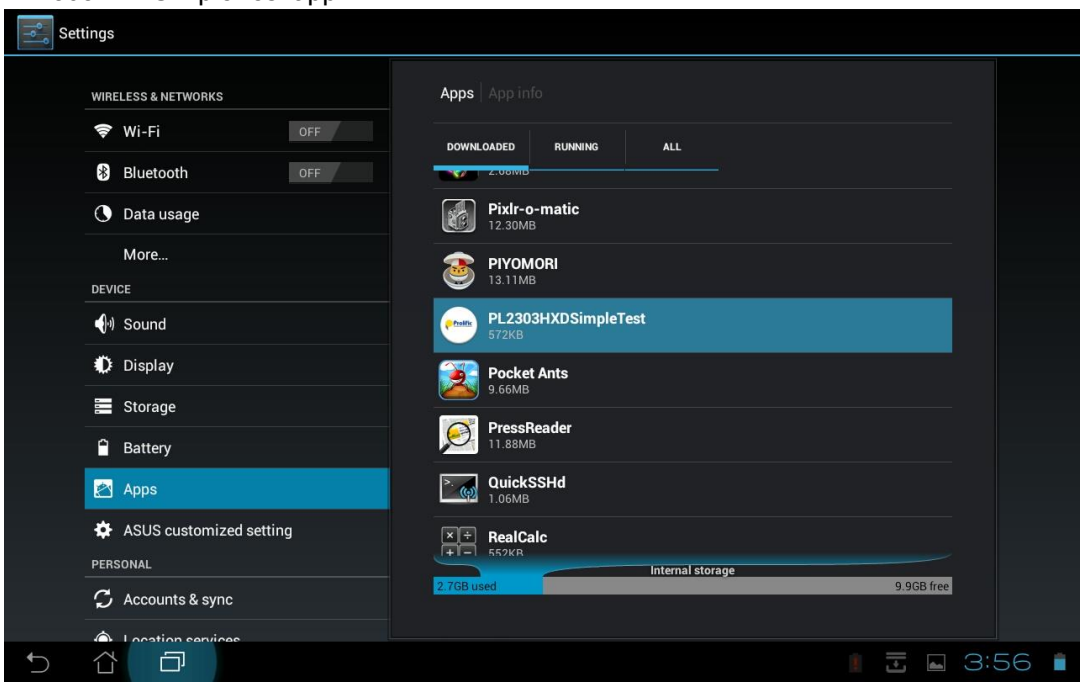


Enter keyboard on Write box field and click Write. Check PC terminal program if data received. Enter keyboard on terminal program and click ReadData button on Android app to receive data.

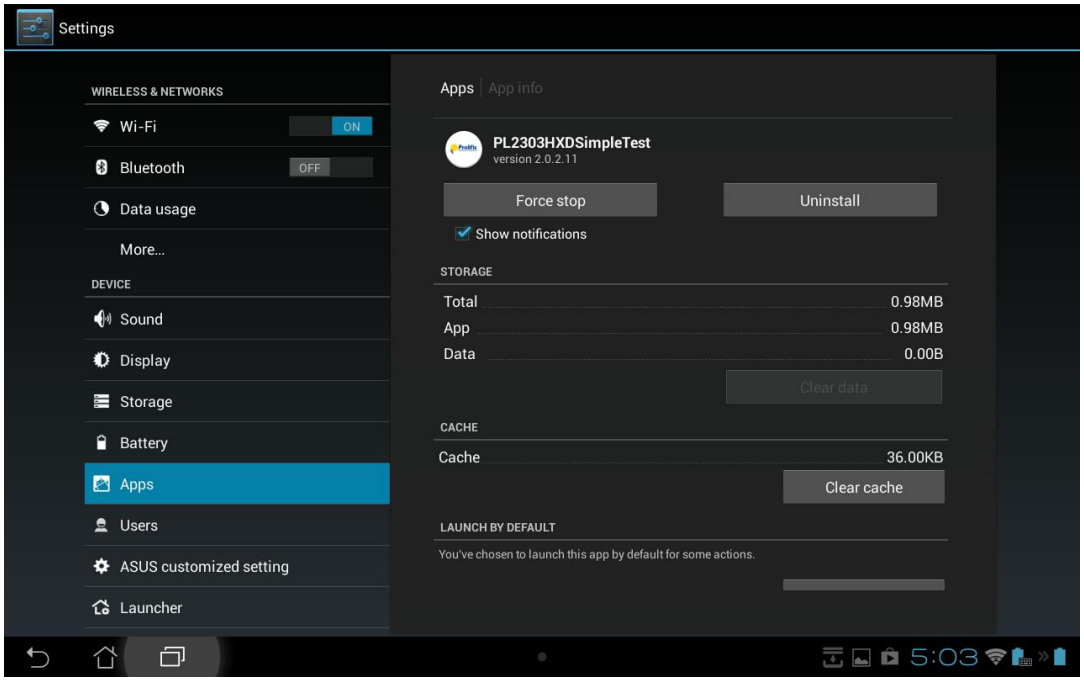


10. To run the Android app again, simply go to Apps folder and look for PL2303HXDSimpeTest app.

11. To uninstall the PL2303HXDSimpleTest Android app, go to Settings – Apps folder. Look for the PL2303HXDSimpleTest app.



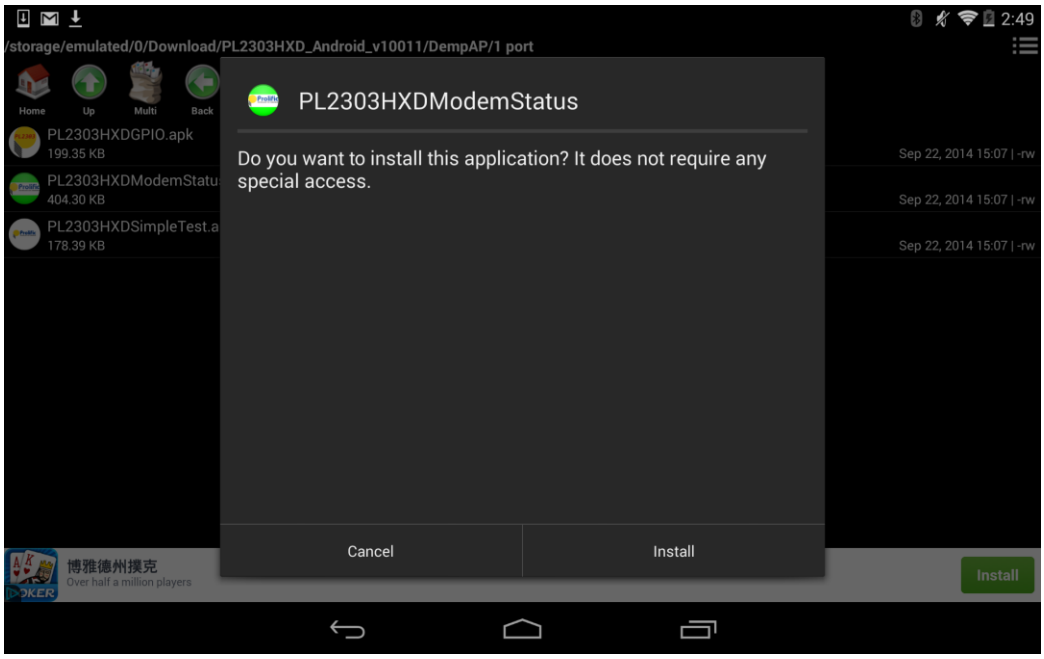
Click on the PL2303HXDSimpleTest program and click Uninstall button.



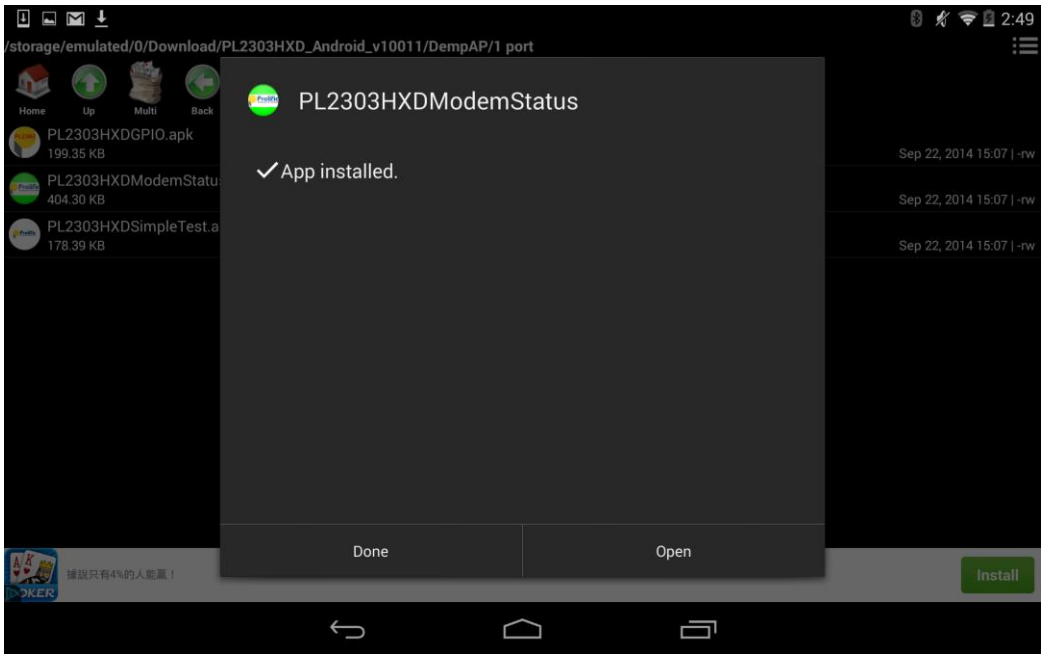
Demo App #2: PL2303HXD Modem Status

This section describes how to install and run the PL2303HXDModemStatus Android application for controlling the modem status (hardware flow control pins):

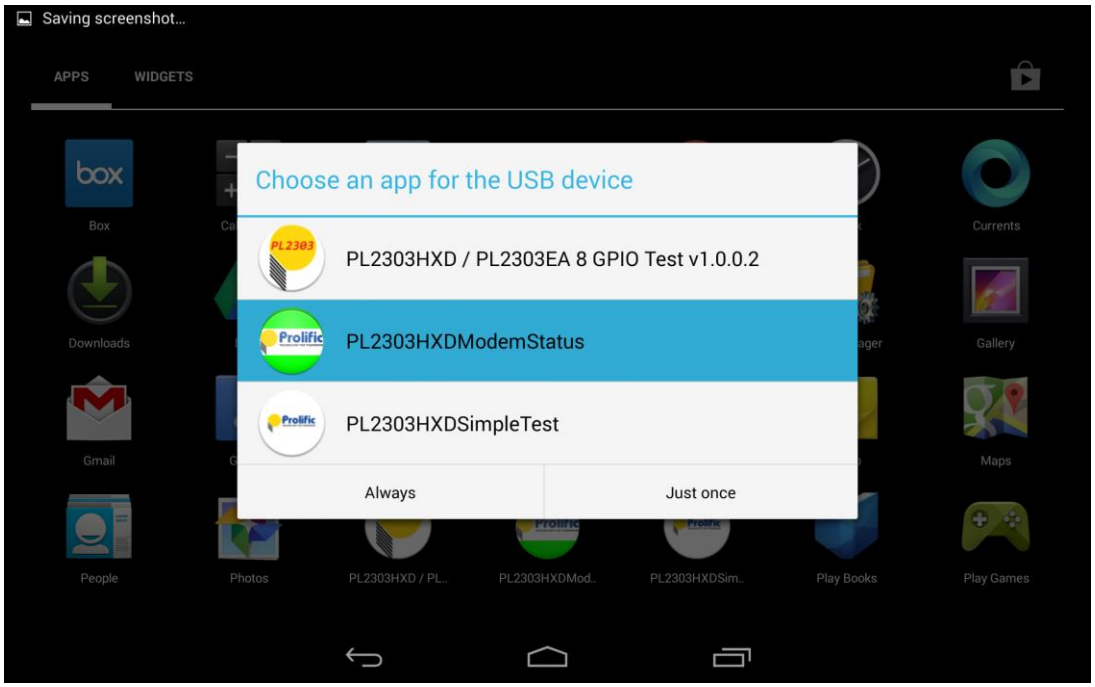
1. Copy the PL2303HXDModemStatus.apk demo app into the Android device folder. Double-click to run and click "Install".



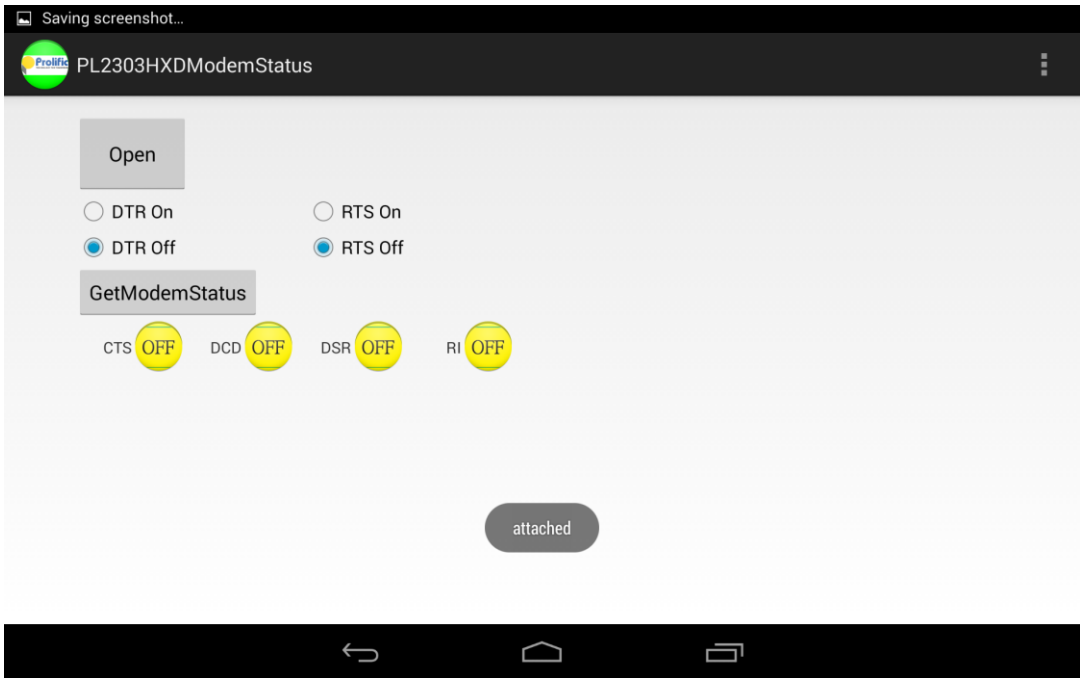
2. Wait until the App installation is complete. Click "Done" to close the program.



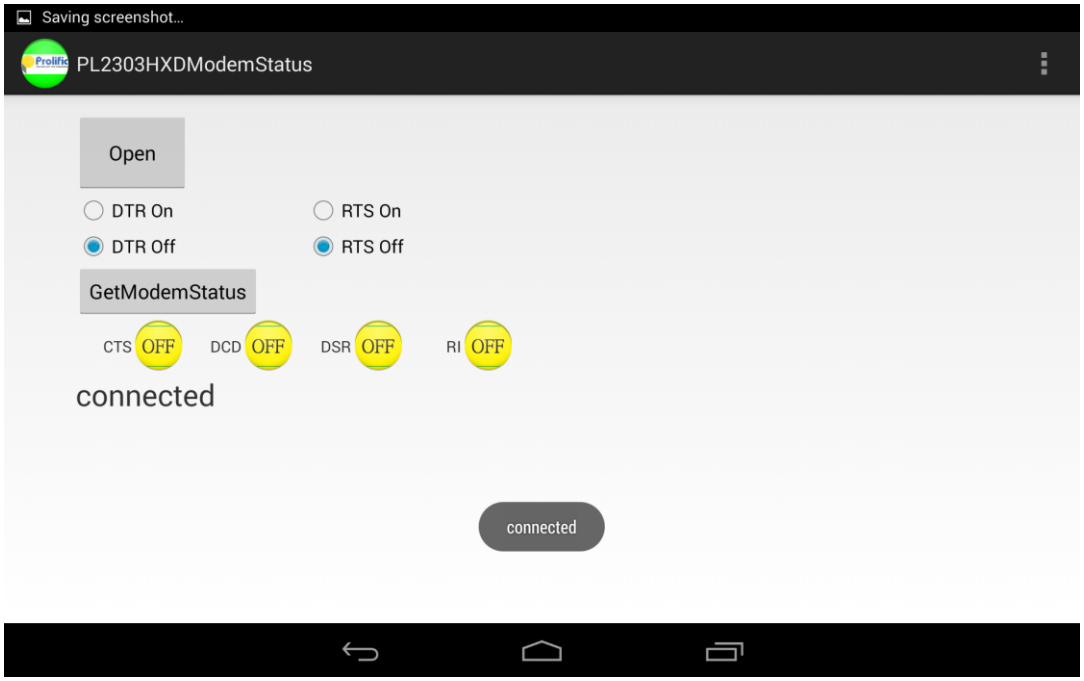
3. Plug the PL2303 serial cable to the Android host device USB port. If you also installed other Prolific demo App, click to choose PL2303HXDModemStatus app and click "Just once" so you can still choose what app to open next time.



4. The program will show "attached" to inform you PL2303 cable is detected.



5. Click "Open" to open and activate the serial port. To test the modem status pins or flow control pins, you first need to short DTR/DCD/DSR pins and RTS/CTS pins and also the RI pin to either the DTR or RTS pin. Using a loopback connector is an option to short the pins.

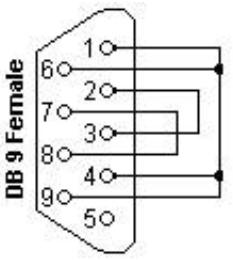


RS-232 Loopback Connections

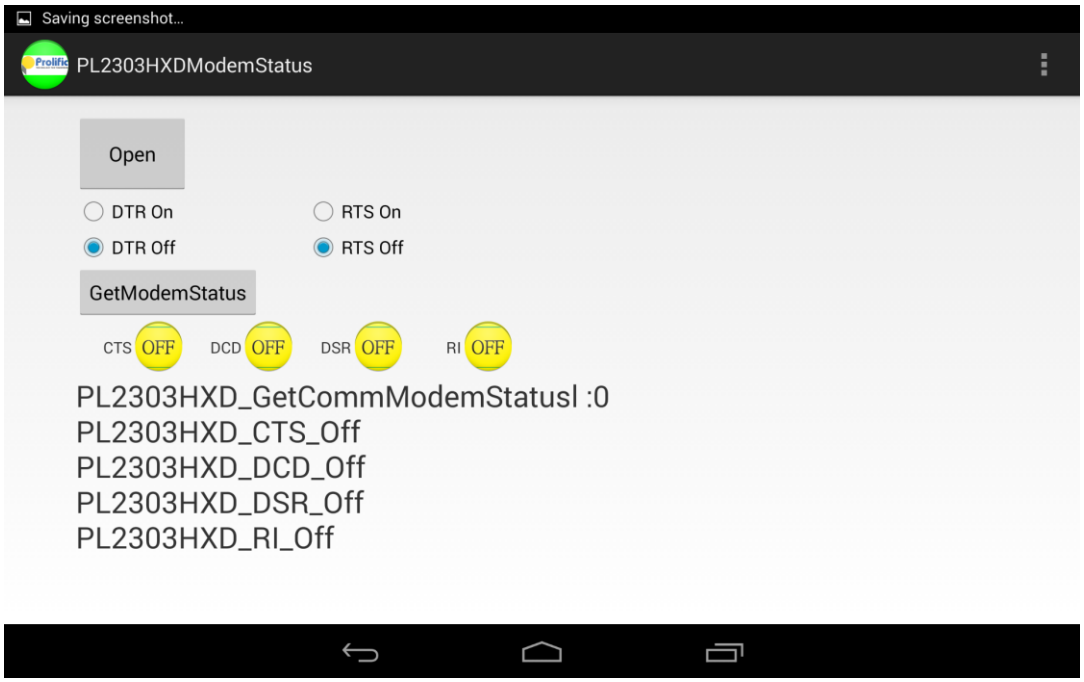
DTE (Computer) Loopback **DB9** Connections

Pin# DB9 RS-232 Signal Names		Signal Direction
#1 Carrier Detector (DCD)	CD	
#2 Receive Data (Rx)	RD	
#3 Transmit Data (Tx)	TD	
#4 Data Terminal Ready	DTR	
#5 Signal Ground/Common (SG)	GND	
#6 Data Set Ready	DSR	
#7 Request to Send	RTS	
#8 Clear to Send	CTS	
#9 Ring Indicator	RI	
Soldered to DB9 Metal - Shield	FGND	RI Option

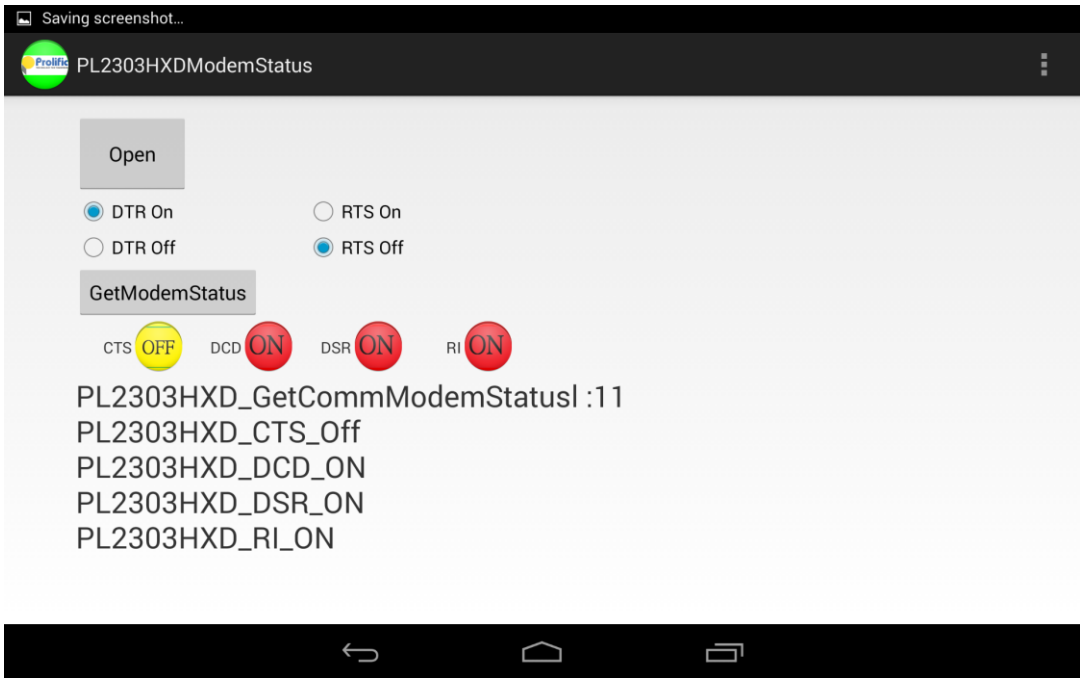
Note: CD & RI are inputs from Modem device - use DTR Connection



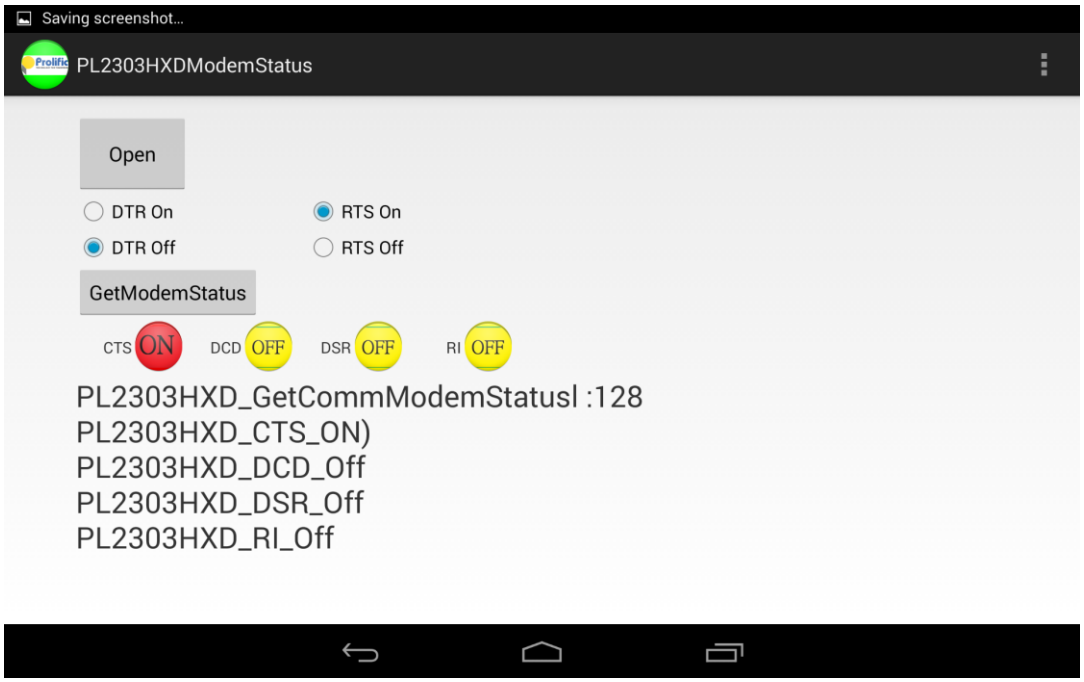
6. Click "GetModemStatus" to check the current status. It will show CTS, DCD, DSR, and RI as off.



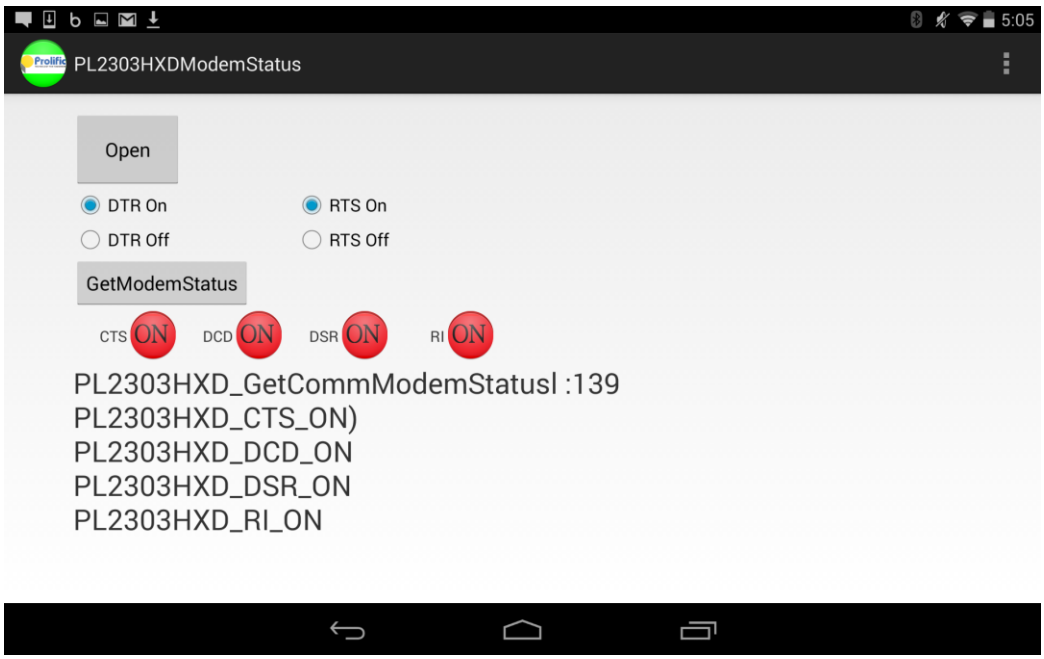
7. Click "DTR On" and "GetModemStatus" to activate DCD, DSR, and RI pins.



8. Click "RTS On" and "GetModemStatus" to activate CTS pin.



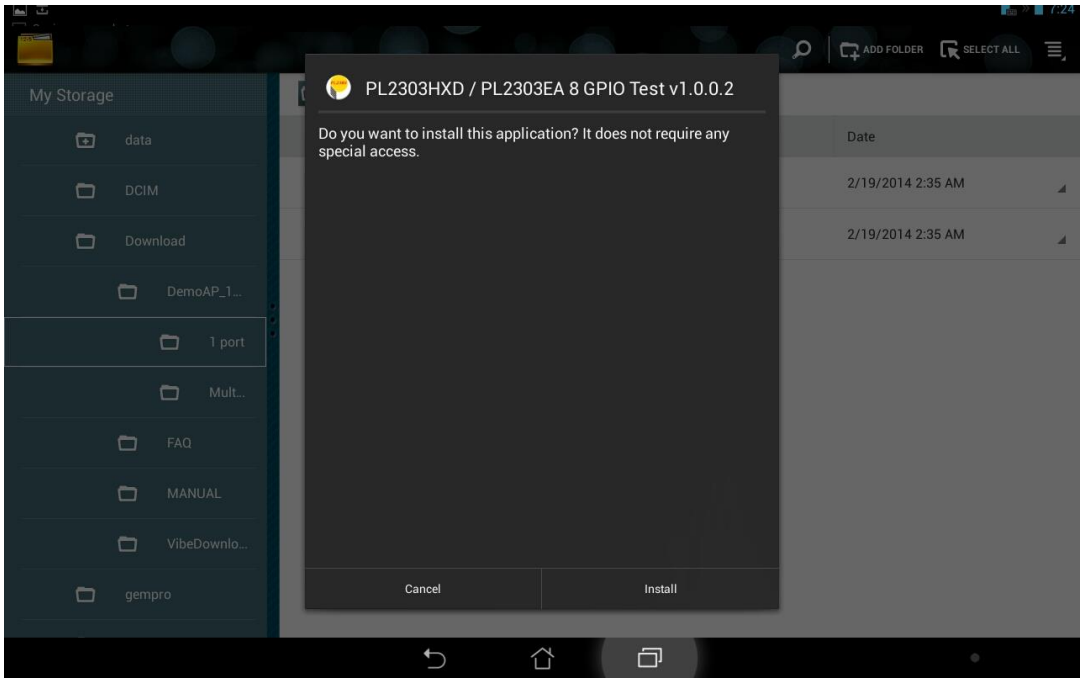
9. Click "DTR On" and "RTS On" and "GetModemStatus" to activate all pins.



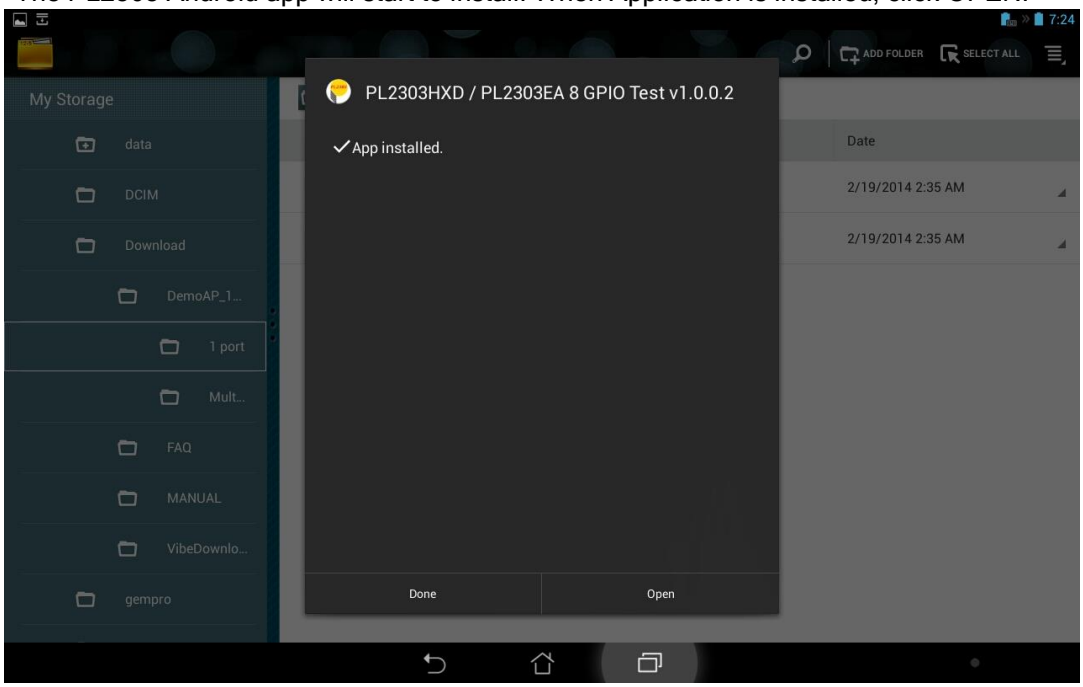
Demo App #3: PL2303HXDGPIO (For GPIO Control)

This section describes how to install and run the PL2303HXDGPIO Android application using a single PL2303HXD/EA USB-to-Serial (RS232 DB9) cable:

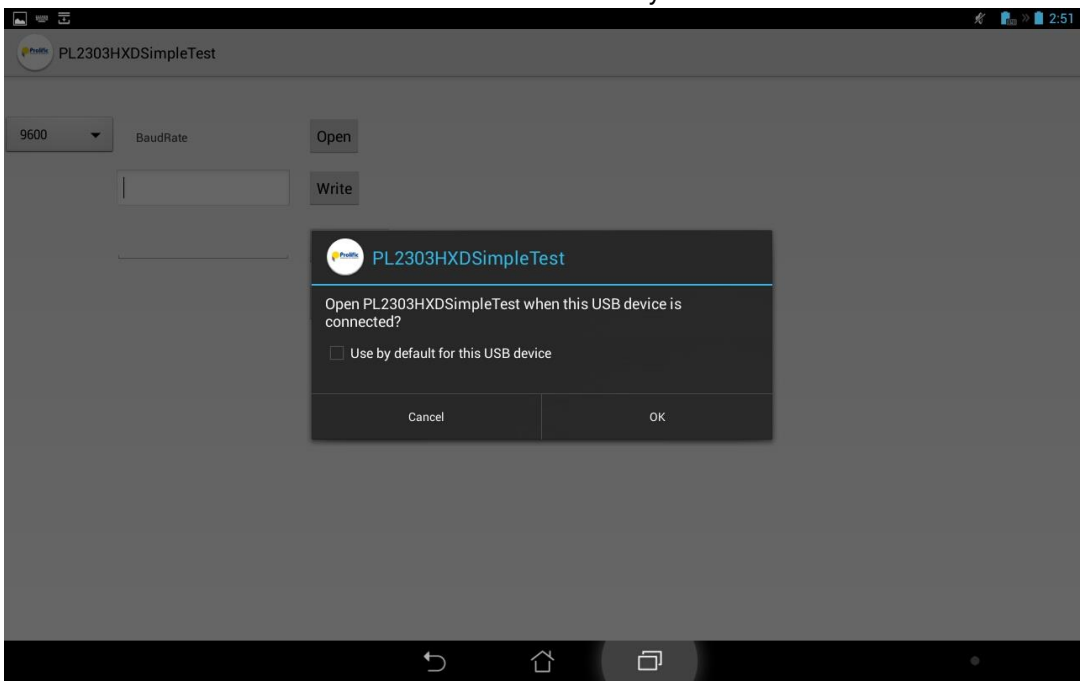
1. Copy the PL2303HXDGPIO.apk demo app into the Android device folder. Click or tap on PL2303HXDGPIO.apk (8 GPIO Test) to install. Click Install to begin.



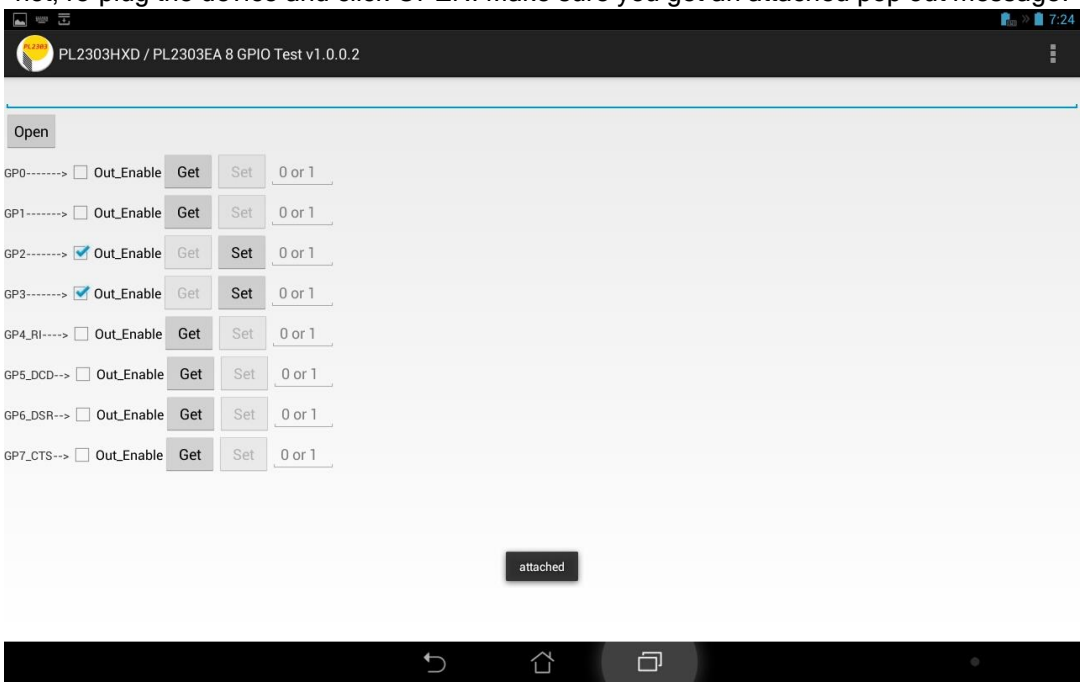
2. The PL2303 Android app will start to install. When Application is installed, click OPEN.



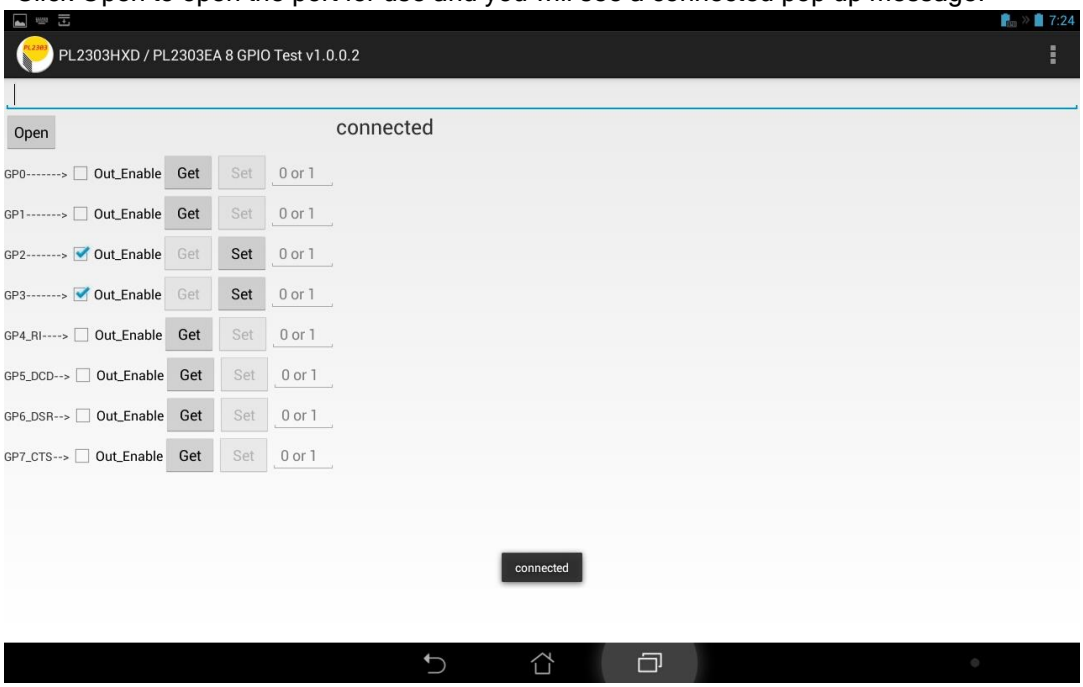
3. Plug in the PL2303 USB to Serial device. Click OK when prompted to allow the app to access the USB device. You can also first click enable "Use by default for this USB device".



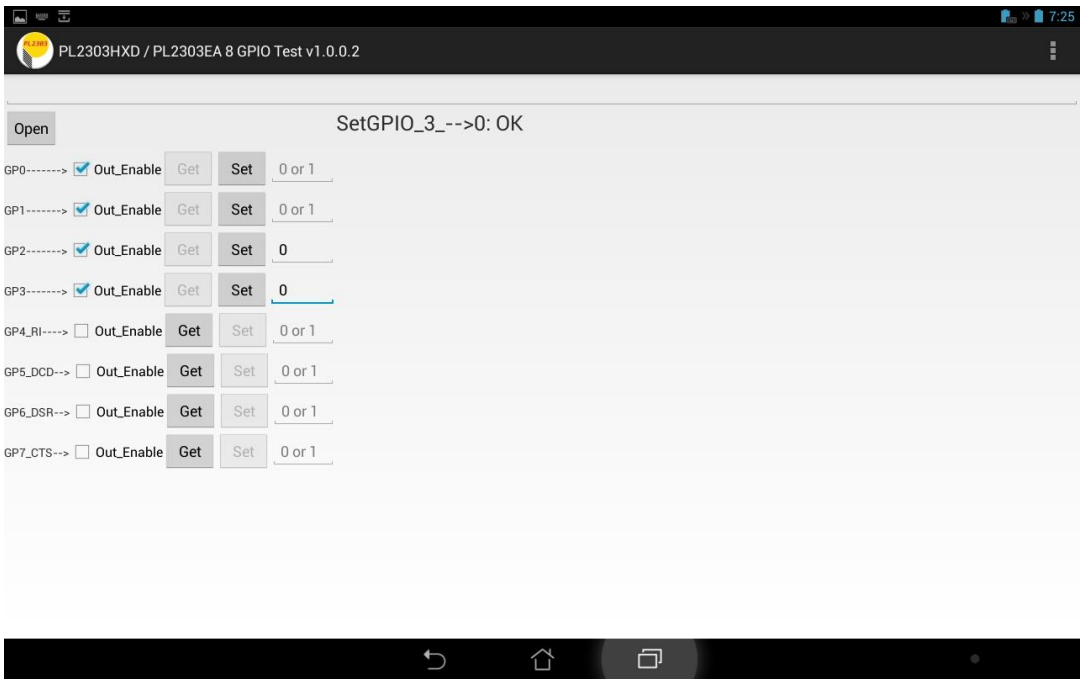
4. If the PL2303 USB device is detected, the app will pop out an attached status message below. If not, re-plug the device and click OPEN. Make sure you get an attached pop out message.



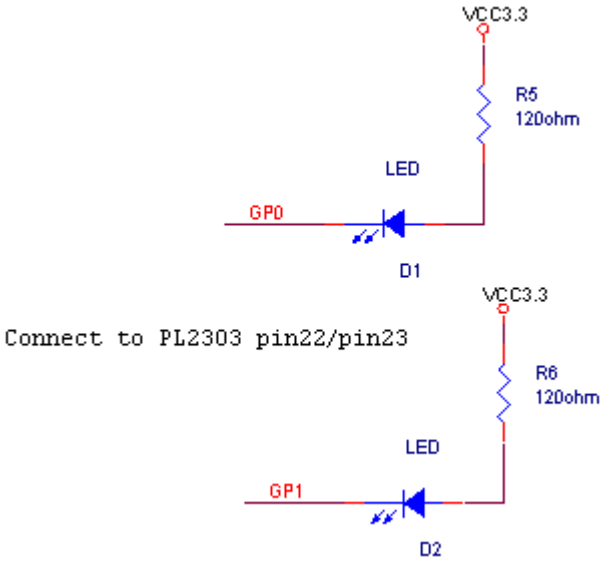
5. Click Open to open the port for use and you will see a connected pop up message.



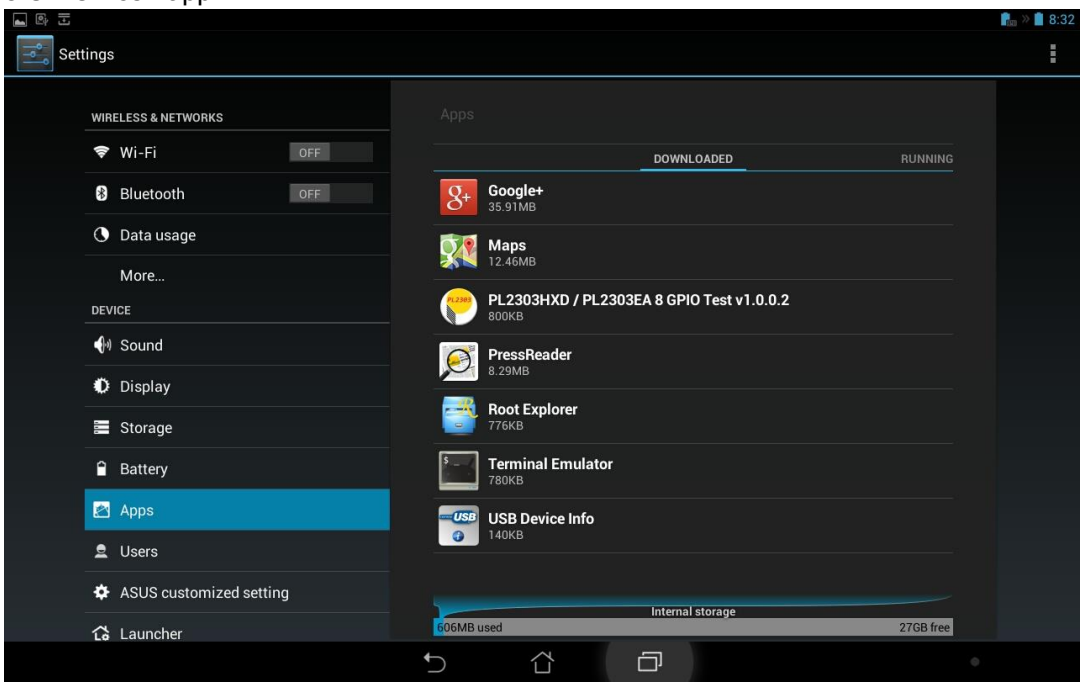
6. There are 8 GPIO settings provided in the menu which is the maximum GPIO supported by the PL2303HXD/EA chip (refer to datasheet). You can control each GPIO pin settings like Output Enable, Get and Set values (0 or 1). The PL2303HXD demo board has 4 GPIO test LEDs (GP0, GP1, GP2, GP3) which will turn on when GPIO is set to 0 and output enable. Refer to the sample source code inside the SDK.



Below is a simple schematic diagram on how to connect an LED to GP0 and GP1 pins (pin 22/23). For this schematic diagram, we simply set the GPIO output pins to "0" (low) in order to activate the LEDs.



7. To uninstall the Android app, go to Settings – Apps folder. Look for the "PL2303HXD / PL2303EA 8 GPIO Test" app.

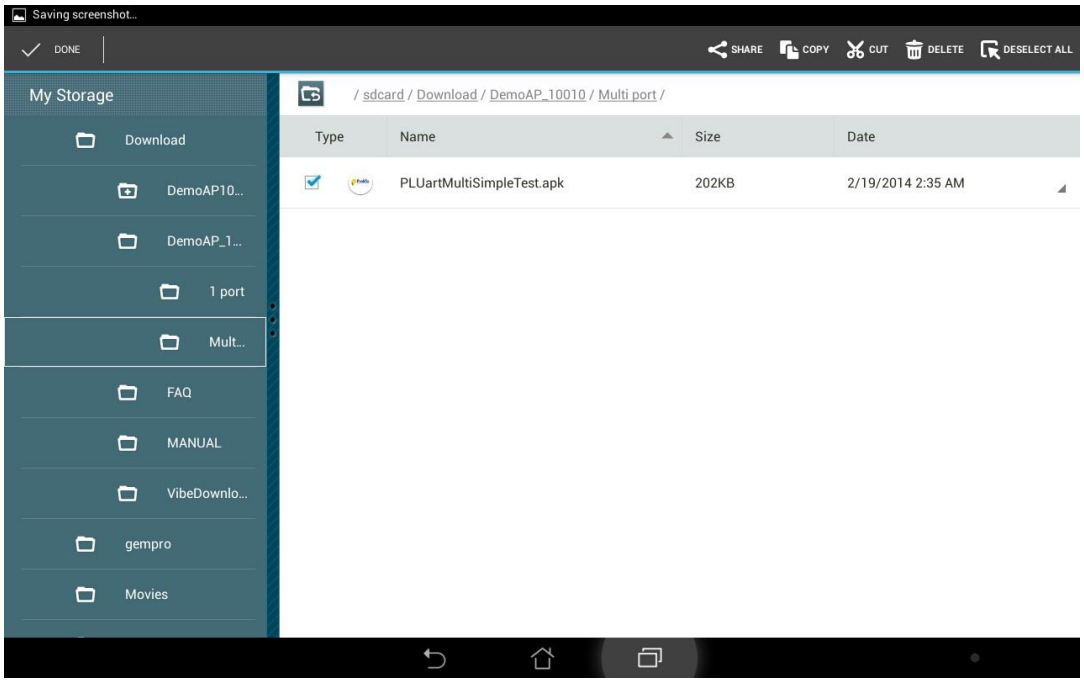


Click on the program and click Uninstall button.

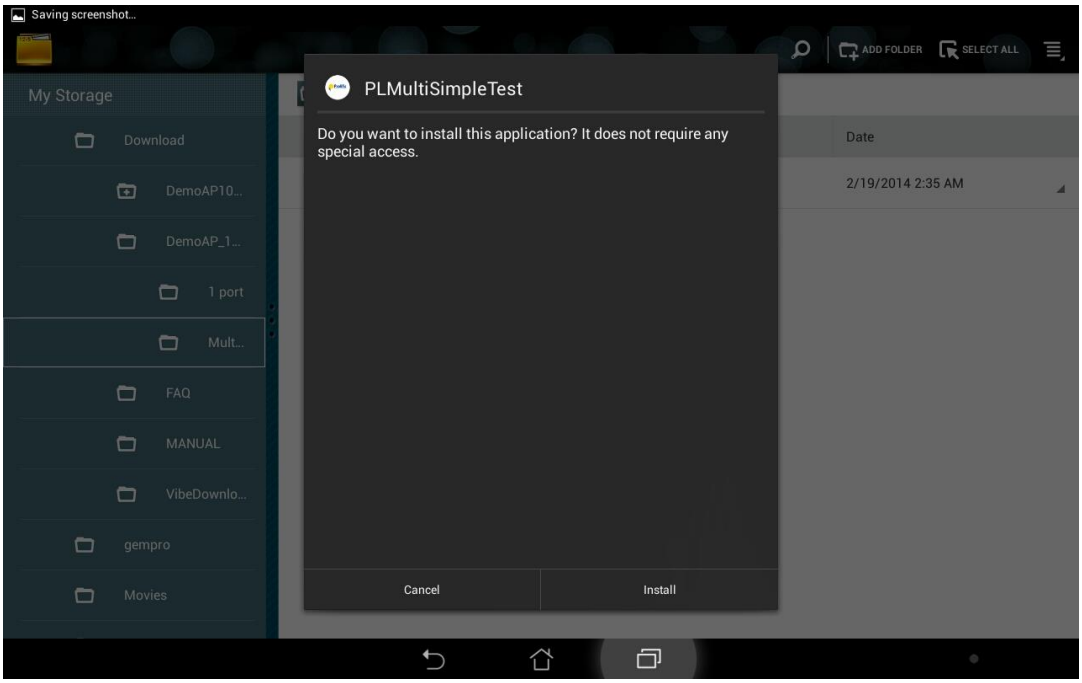
Demo App #4: PLUartMultiSimpleTest (For Multi-Port PL2303 Devices)

This section describes how to install and run the PLUartMultiSimpleTest Android application using up to ten (10) PL2303HXD/EA/RA USB-to-Serial (RS232 DB9) cables:

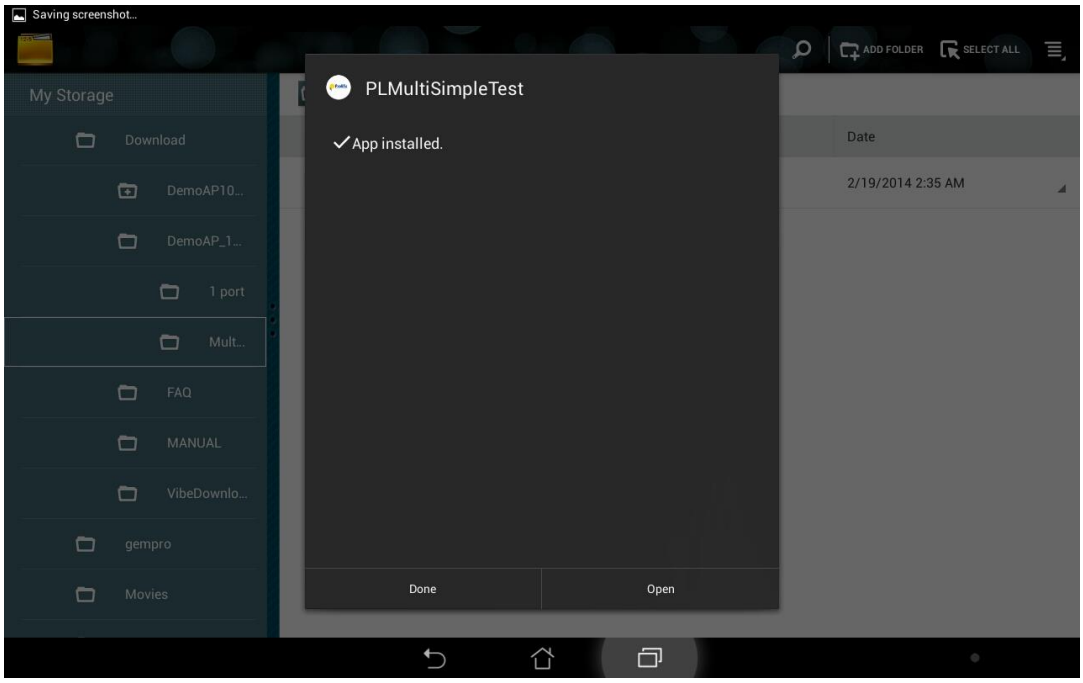
1. Copy the PLUartMultiSimpleTest.apk demo app into the Android device folder.



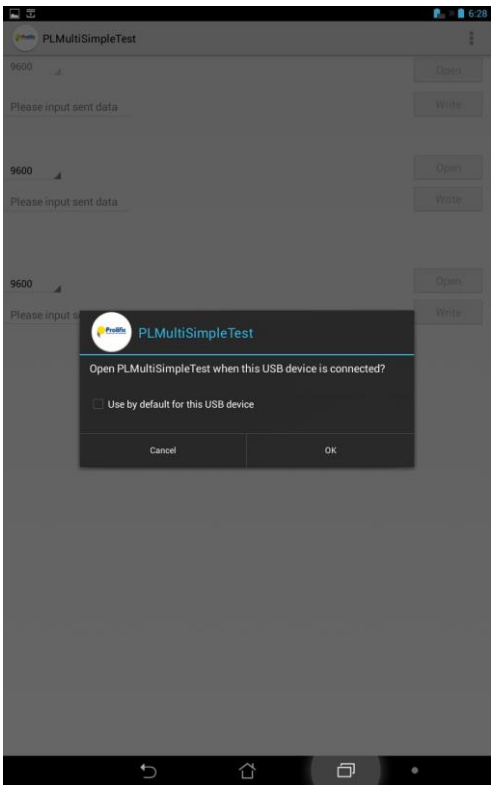
2. Click or tap on PLUartMultiSimpleTest.apk to install. Click Install to begin.

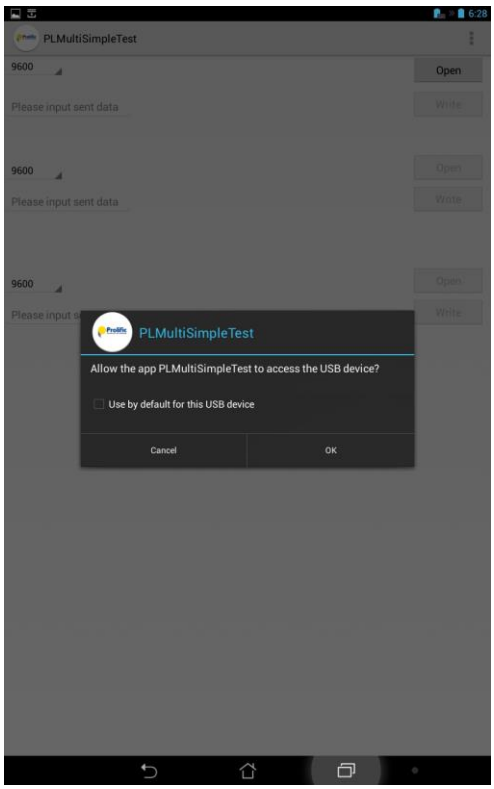


3. The PL2303 Android app will start to install. When Application is installed, click OPEN.

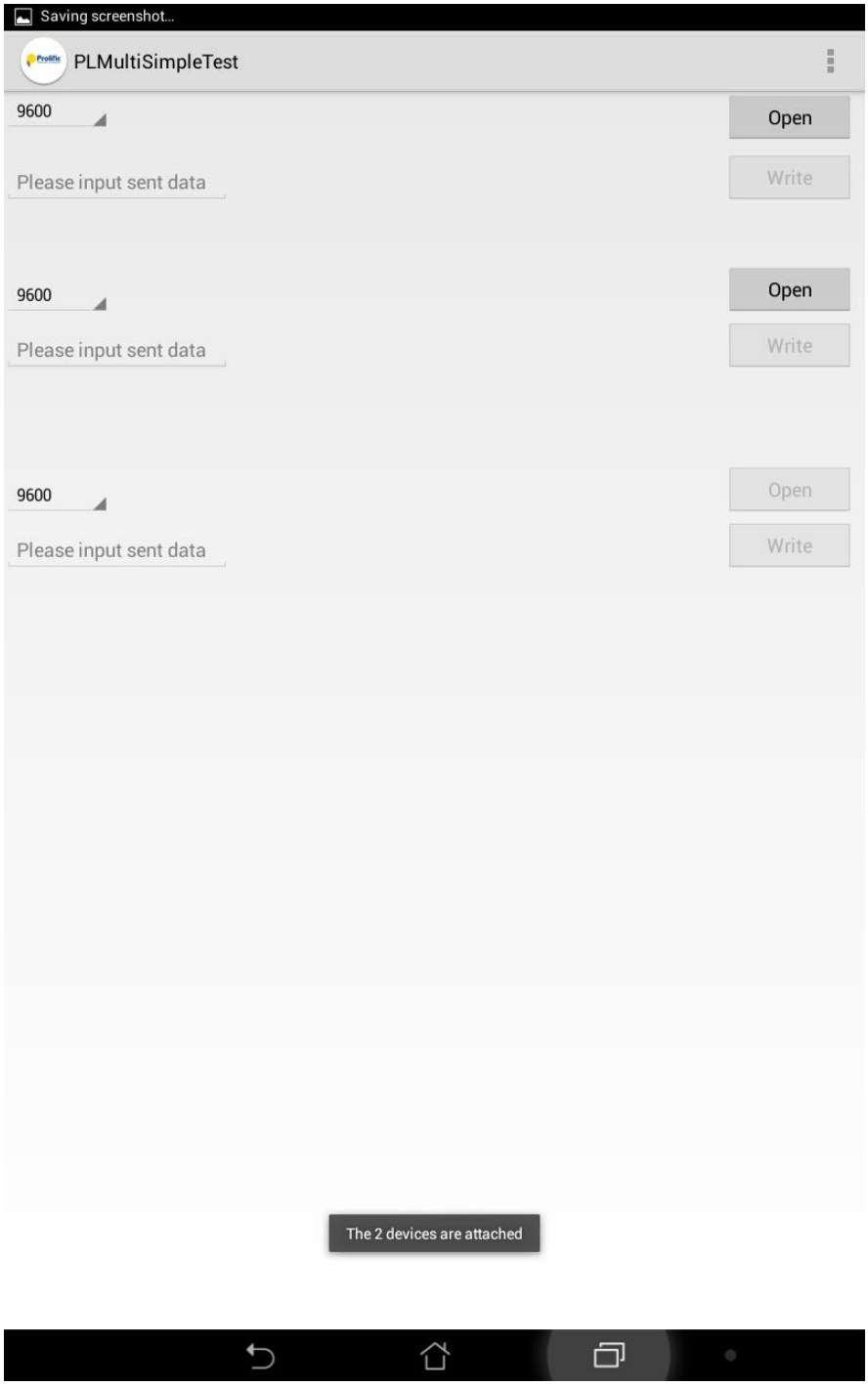


4. You will need to plug an external USB 2.0 hub first. Then plug in the first PL2303 device into the USB hub. Click enable "Use by default for this USB device". Then click OK when prompted to open and allow the app to access the USB device.

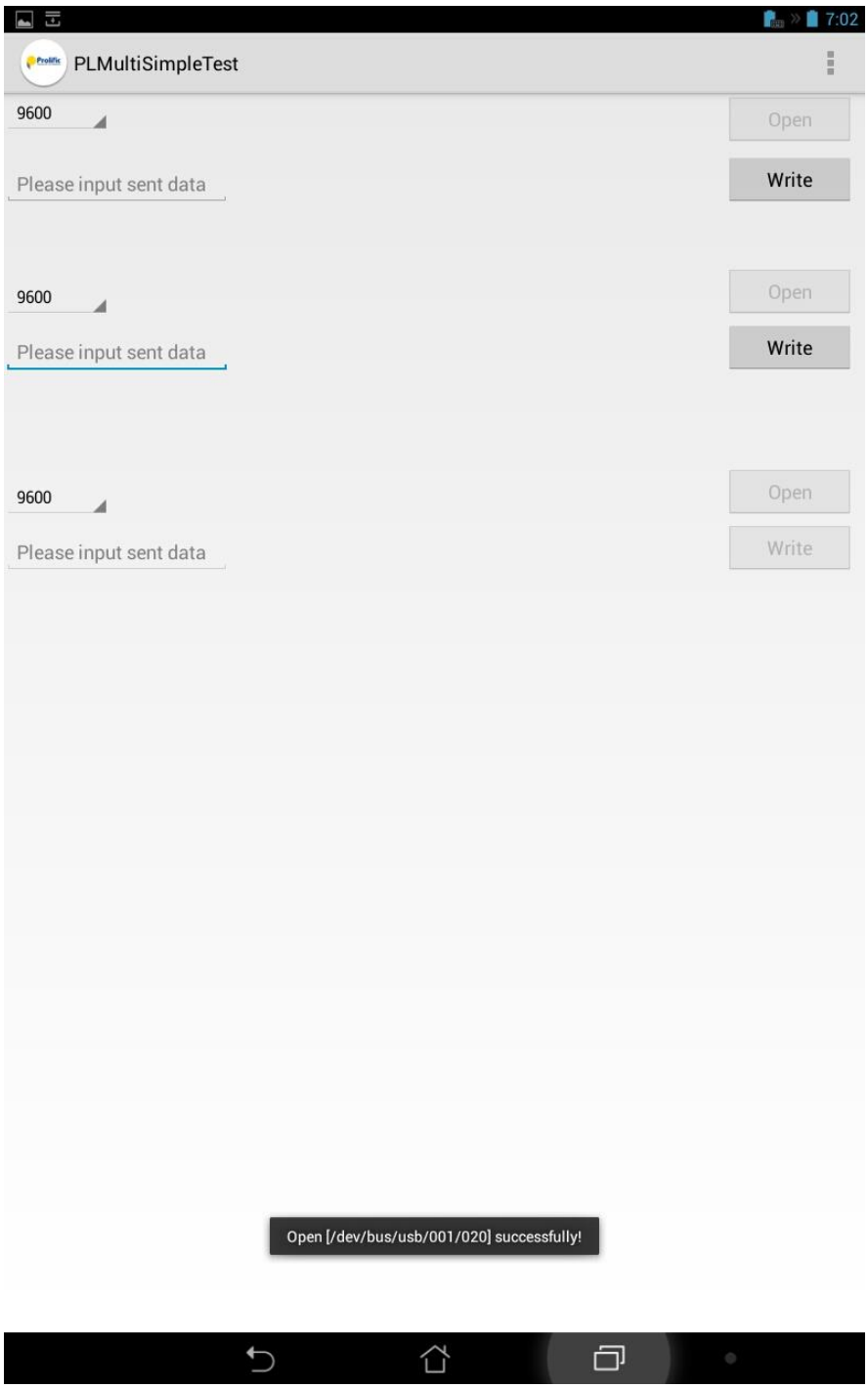




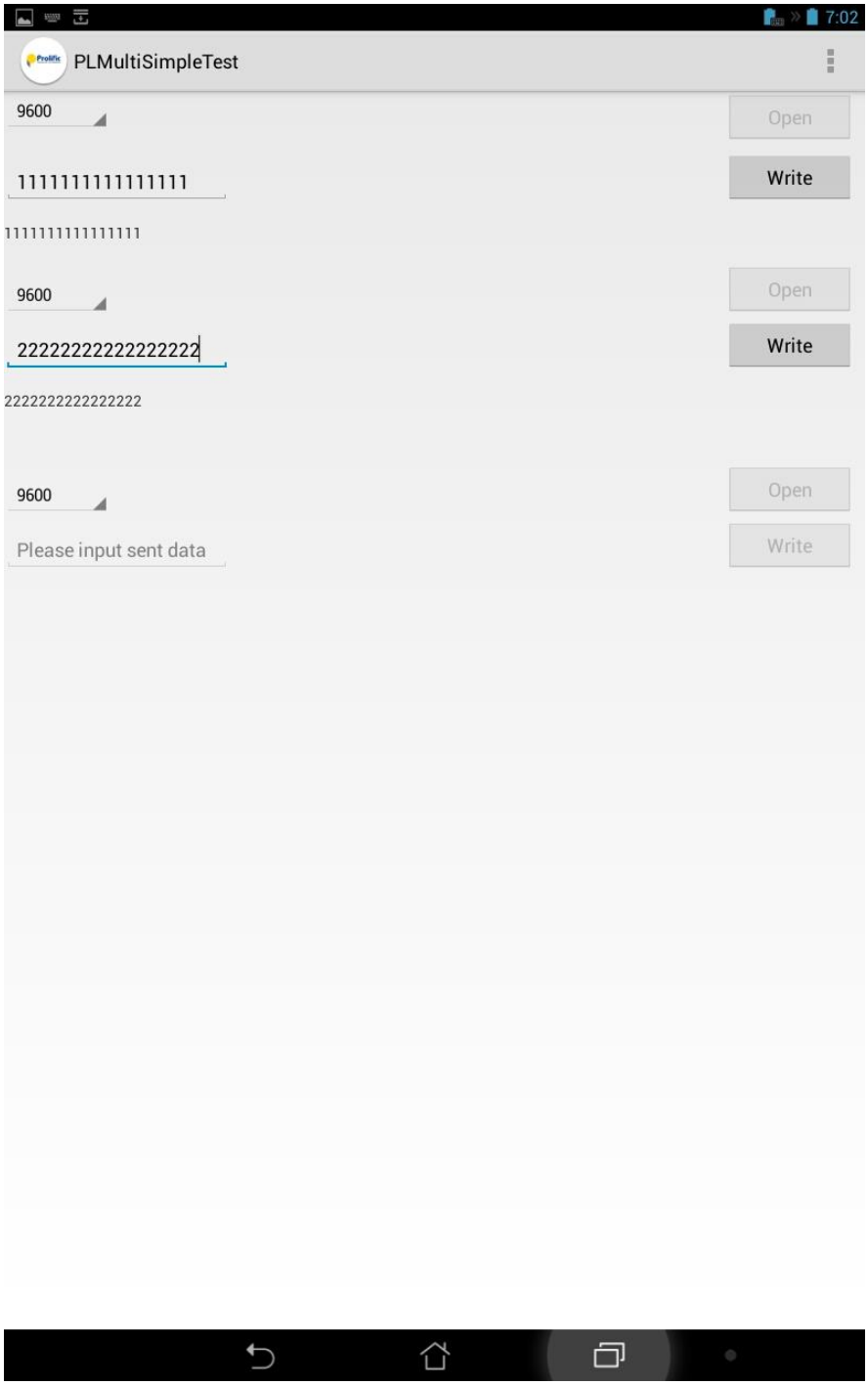
5. Plug the second PL2303 device, the app will pop out a message below saying the 2 devices are attached. If not, re-plug the PL2303 devices and click OPEN. Make sure to also plug a loopback connector (TX-RX pins short) to the PL2303 cable.



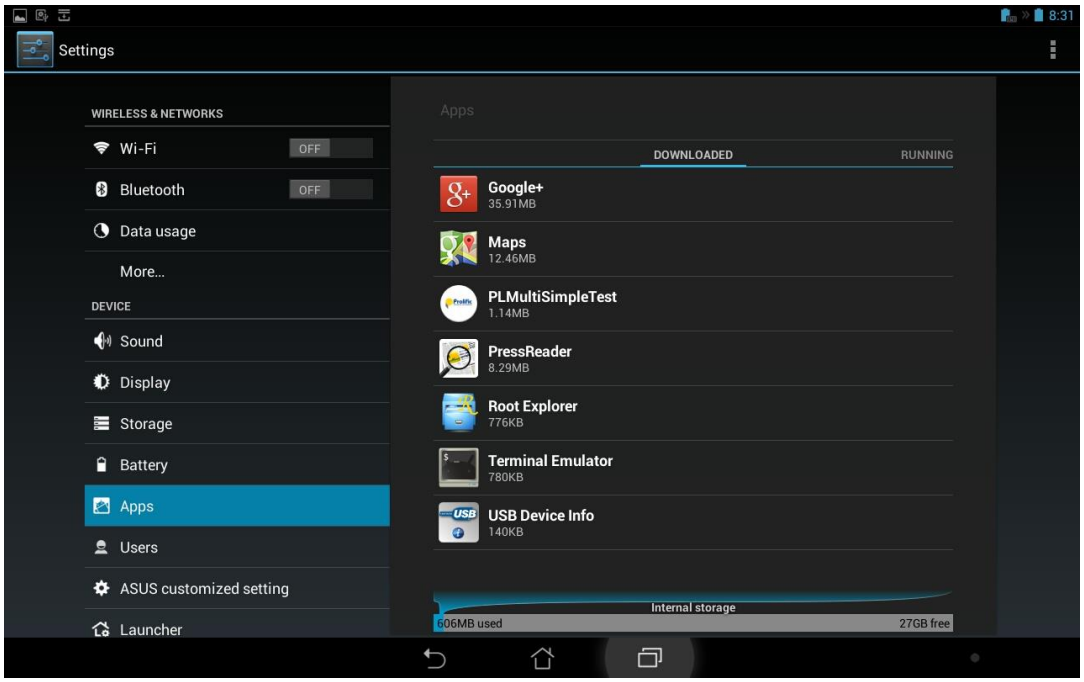
6. Click Open on each port to open the ports for use. A pop up message will show when successful.



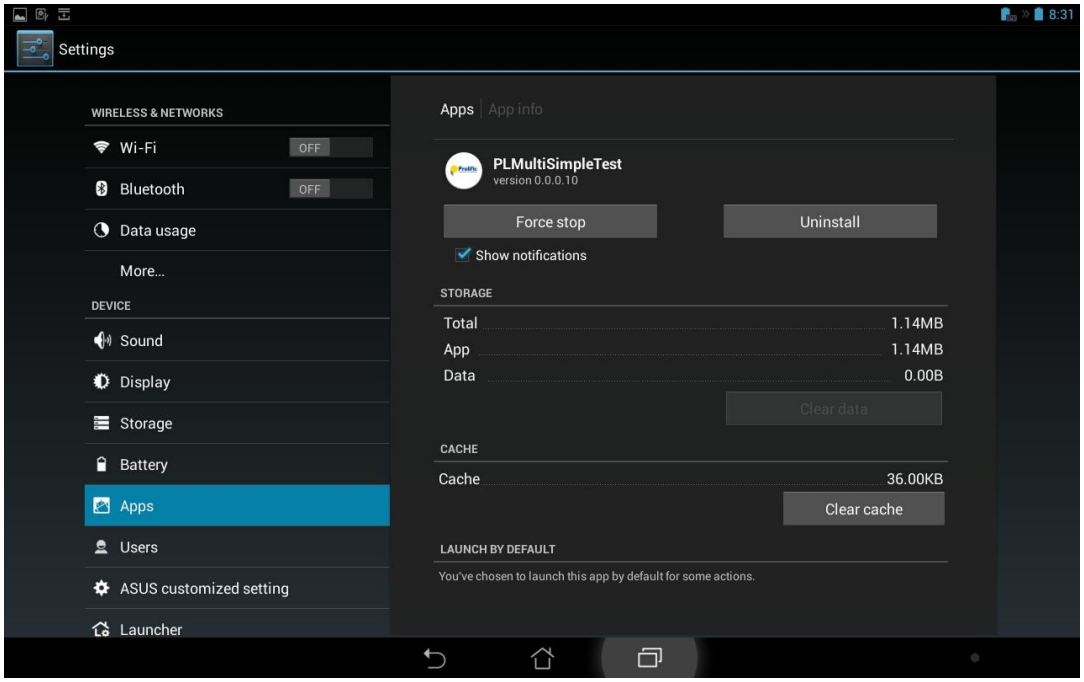
7. Set the baud rate, enter text on the space box and click the Write button. The text will then output below the space box. Refer to the sample source code on how to write your own Android App.



8. To uninstall the Android app, go to Settings – Apps folder. Look for the PLMultiSimpleTest app.



Click on the program and click Uninstall button.



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