Creating ANT+ Android Applications

D00001446 Rev 1.7.0

P +1 403.932.9292 F +1 403.932.4196

Copyright Information and Usage Notice

Table of Contents

1 Overview

The purpose of this document is to provide developers all the information (or the location of information) they will need to create applications which will run on the Android platform and make use of the ANT wireless functionality available on certain devices.

The list of manufacturers who are releasing phones with ANT support, and the number of phones with ANT support is constantly growing. Android Emulator support has arrived, allowing anyone with a PC and an ANT USB stick to develop ANT applications for Android. The ANT USB Service has also been newly released; this adds ANT support to any Android devices with USB Host mode enabled through the use of attached USB sticks.

More information on ANT and ANT+ can be found on the ANT Wireless website.

http://www.thisisant.com

2 Package contents

Along with this document, you should have received the following components.

2.1 ANT Library Packages

The library zipfiles contain the library .jar file and its documentation.

The ANTPluginLib Library defines the API to talk to the ANT+ profile plugins. See section 5 for more details.

The Android_ANTLib Library defines the API to use if you are not using the ANT+ profile plugins. See section 6 for more details.

2.2 ANT+ Plugin Sampler source code

This reference application (an Eclipse project) shows how to use the ANTPluginLib to connect to ANT+ sensors. Some of the sensors included in the sampler are heart rate monitor, stride based speed and distance monitor, and weight scale. It also shows how to properly handle the scenario where the ANT Radio Service and/or ANT USB Service have not been installed yet.

2.3 ANT Multichannel Proof source code

This reference application (an Eclipse project) shows how to use the Android_ANTLib to acquire channels and use them to make simple connections to other devices. It also shows how to properly handle the scenario where the ANT Radio Service and/or ANT USB Service have not been installed yet.

2.4 .APK's

The following APK's (Android application packages) are provided so that they can be installed on a phone without access to the Google Play store to test the ANT+ functionality.

- ANT+ Plugin Sampler Application

- ANT Multi-Channel Proof Application
- ANT+ Plugins
- ANT Radio Service
- ANT USB Service

3 Tools

3.1 Android SDK

All Android application development requires the Android SDK.

http://developer.android.com/sdk/installing.html

3.2 Eclipse

The Eclipse IDE is recommended for use with the demo app source, as it includes an Eclipse project configuration to get you up and running as quickly as possible.

http://www.eclipse.org/downloads/

The Android Development Tools (ADT) add-on is required for using Eclipse to develop Android applications. The demo app projects have been created for use with ADT revision 20, and it is strongly recommended you move to at least this version if you are behind.

http://developer.android.com/sdk/eclipse-adt.html

3.3 Android Developers Guide

Android application development has many differences from “typical” application development. Knowledge of the Android framework and the Android application lifecycle is essential before you start writing ANT+ Android applications. A good starting place is the “Android Developers Guide”.

http://developer.android.com/guide/index.html

3.4 ANT Message Protocol and Usage Document

The ANTLib provides an API for applications to control the ANT chip. This is done through a set of command messages, which are at a very low level. The ANT host control messaging is documented in the "ANT Message Protocol and Usage" document. This can be found in the Developer’s Zone at thisisant.com.

Direct link:
http://thisisant.com/images/Resources/PDF/1204662412_ant%20message%20protocol%20and%20usage.pdf

Almost all of the ANT API function calls correspond to a message described in section 9.5(ANT Message Details) of the ANT Message Protocol and Usage Document.

3.5 ANT+ Forums

The ANT+ Forums provide a place to ask questions regarding ANT development, and give details on common issues you may encounter. The FAQ post on Getting Started with Development of ANT+ Enabled Applications, in the ANT General Questions forum, is essential reading for all developers.

3.6 ANT Radio Service

All communication with the ANT hardware is achieved through the 'ANT Radio Service'. This application service acts as the proxy between any applications and the system they are running on. It is available from the Google Play store, and may be pre-installed on some devices.

3.7 ANT USB Service

If an android device supports USB host mode the ANT USB service will enable the use of ANT USB sticks on the device. This allows any applications built with ANTLib 3.2.1 or newer to access attached USB sticks. The ANT USB service is available on the Google Play store.

3.8 ANT Android Emulator Bridge

This tool can be used with the Android images that support ANT. The bridge allows an ANT USB stick that is connected to a PC running the bridge to be used by an emulator over the PC's loopback or Network interface. This allows ANT Android applications to be developed without the use of a physical android device. The Emulator bridge tool is available for download on the Android API page in the developer's zone at thisisant.com.

http://www.thisisant.com/pages/developer-zone/android-api

The downloadable package contains the documentation for the tool itself as well as download locations for the proper Android emulator images.

4 Features of the new ANT+ Plugin Architecture

- Android apps can receive data from the same ANT+ device concurrently using the same ANT+ plugin, so consumers can choose to run multiple apps

- ANT+ plugins enable apps to be developed to a simplified interface, without having worry about many of the implementation details of the ANT+ Device Profiles, easing the burden on app developers and speeding time to market

5 Using the ANT+ plugin Library

Applications must reference the antpluginlib.jar package in order to use the ANT+ Plugins.

Please refer to the Javadoc for a full description of the API and the ANT+ Plugin Sampler app for an example of how to use the API.

ANT+ plugins are event-based which means only data values which are requested by the app will be generated and sent by the plugin.

The following basic steps summarize what an application has to do to use the ANT+ plugin Library:

1) Create the Plug in Communicator (PCC)

- Use **requestAccess()** to create the PCC for type of device you want to communicate with

2) Subscribe to Events
    - Subscribe to events you wish to receive by creating an event receiver calling the subscribe function for the specific events you want to receive
3) Monitor the Device Connection State
4) Unsubscribe Events or Release the PCC
    - When you no longer wish to receive an event simply unsubscribe from it by passing null into the subscribe function for the event
    - If you are done with the device and wish to terminate your connection to it simply call **releaseAccess()** to release the PCC

6 Using the ANT Library

The android_antlib.jar is used by applications when they do not want to use ANT+ Plugins. Typically an application would want to do this if it wants to directly control an ANT channel for non-ANT+ implementations or if an official ANT+ plugin does not yet exist.

Applications must reference the android_antlib.jar package in order to use the ANT API.

Please refer to the Javadoc for a full description of the API and the MultichannelProof app for an example of how to use the API.

The following basic steps summarize what an application has to do to use the Library:

1) Check for ANT support on the Device
2) Bind to the ANT Radio Service
3) Get the ANT Channel Provider
4) Acquire Channel(s)
5) Configure Channel(s)
6) Use Channel(s)
7) Release the Channel(s) and Unbind

7 Use of ANT+ Logos and Certification

The ANT+ logos are used to inform consumers of an application's interoperability with ANT+ devices. Only certified applications are allowed to use the ANT+ name, logos or icons.

Before using any ANT+ branding, the application must complete the ANT+ certification process to ensure that it complies with the device profiles it implements. The process is similar to the certification process for ANT+ sensors and devices but is streamlined for applications. This process is further streamlined for applications that make use of the ANT+ plugins. For more details please visit: http://www.thisisant.com/developer/ant-plus/certification/ or contact certification@thisisant.com.

Once certification is complete the ANT+ logos can be used on both the application and promotional materials and on the Google Play or other website where the application is available. Logo files will be distributed upon certification.