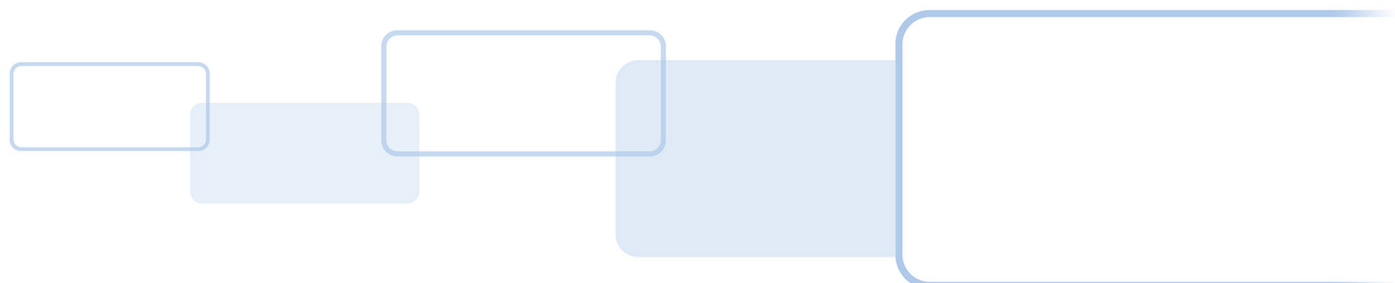


LUMIDIGM[®] M21X ANDROID SDK

SOURCE CODE EXAMPLE

PLT-04564, Rev. A.0
September 2019



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Revision history

Date	Description	Revision
September 2019	Initial release.	A.0

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1 Introduction

This document provides general information about the HID Global® Android BioSDKExample source code example. The example demonstrates Android application development with the HID Global Android Bio SDK. Details are provided for Linux Ubuntu 18.04.2 LTS and Windows 10 x64 operating systems.

2 System requirements

2.1 Linux Ubuntu 18.04.2 LTS x86_64 (64-bit)

- 64-bit distribution capable of running 32-bit applications.
- GNU C Library (glibc) 2.19 or later.
- 3 GB RAM minimum, 8 GB RAM recommended (plus 1 GB for the Android Emulator).
- 2 GB of available disk space minimum, 4 GB recommended (500 MB for IDE, plus 1.5 GB for Android SDK and emulator system image).
- 1280 × 800 minimum screen resolution.

2.2 Microsoft Windows 10 x64

- 3 GB RAM minimum, 8 GB RAM recommended (plus 1 GB for the Android Emulator).
- 2 GB of available disk space minimum, 4 GB recommended (500 MB for IDE, plus 1.5 GB for Android SDK and emulator system image).
- 1280 × 800 minimum screen resolution.

2.3 Android Studio 3.4

- JRE 1.8.0_152 amd64.
- OpenJDK 64-bit Server VM by JetBrains s.r.o.
- Minimum SDK version: 21 (Android 5 “Lollipop”).
- Minimum target SDK version: 28 (Android 9 “Pie”).
- Gradle 4.6.

3 Installation

1. Ensure Android Studio 3.4 is installed. Follow the Android Studio installation instructions for your operating system, available from <https://developer.android.com/studio/install>.
2. Download and unzip the required file to an appropriate folder on your computer:
 - For Ubuntu, use **AndroidBioSDK_v1.0.0.tar.gz**.
 - For Windows, use **AndroidBioSDK_v1.0.0.zip**.

4 Project structure

The AndroidBioSDK_v1.0.0.tar.gz or .zip contains:

Folder	Description
BioSDKExample	Android Studio project.
docs	Folder containing important documents, including this document.
docs/javadoc	Javadoc for the HID Global Android Bio SDK.

The project structure is typical of most Android Studio app projects. The HID Global Android SDK file, biosdk-1.0.0_xxxx.aar (where xxxx represents the build version) is located in the folder BioSDKExample/app/src/main/libs. The biosdk-1.0.0_xxxx.aar is included as a dependency in the BioSDKExample/app/build.gradle file, in the dependencies section, with the line:

```
implementation fileTree(dir: '../libs/bin', include: ['*.aar', '*.jar'], excludes: [])
```

Various SDK components are referenced in Java source files with import statements:

```
import com.hidglobal.biosdk. *** component to reference *** ;
```

The biosdk-1.0.0_xxxx.aar is the file that the integrator references in their Android project, in the same way as the BioSDKExample-1.0.0 source code example.

5 Build the BioSDKExample app

1. Open Android Studio.
2. Open an existing Android Studio project:
 - a. Navigate to the folder where you unzipped AndroidBioSDK_v1.0.0.
 - b. Select the BioSDKExample folder.
 - c. Wait while Android Studio opens the project and Gradle synchronizes.
3. Select **Build > Make Project** or **Build > Make Module 'app'**.

Note: You may be prompted to install missing Android Studio SDK packages. Click through the license agreements to install the packages.

4. Deploy the app to the Android device.

Note: If the HID Global M21XApp is installed on the Android device, you must uninstall the M21XApp before deploying the BioSDKExample onto the Android device. This is because both apps have USB intent filters for the VID/PID of the M21x fingerprint sensor, and the two apps would compete for the M21x.

Ensure your device has the developer options enabled. Refer to:

<https://developer.android.com/studio/debug/dev-options.html> and <https://developer.android.com/studio/run/device#setting-up>

On Android 4.1 and lower, the **Developer options** screen is available by default.

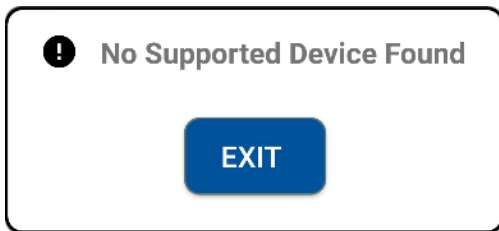
On Android 4.2 and higher, it must be enabled:

- a. Open the Settings app.
- b. On Android 8.0 or higher, tap **System**.

- c. Scroll to the bottom and tap **About phone**.
 - d. Scroll to the bottom and tap **Build number** seven times.
 - e. Return to the previous screen and tap **Developer options** near the bottom.
 - f. At the top of **Developer options**, toggle **OFF** to **ON**.
 - g. Enable **USB debugging**.
5. Connect the Android device to your computer.
 6. In Android Studio, select **Run > Run 'app'**.
 7. Select the Android device and click **OK**.

Note: You may be prompted to install Android Studio SDK Platform components for your device.

The BioSDKExample will start and display a dialog stating that no supported device has been found. This is expected, as the M21x sensor is not yet connected to the Android device.

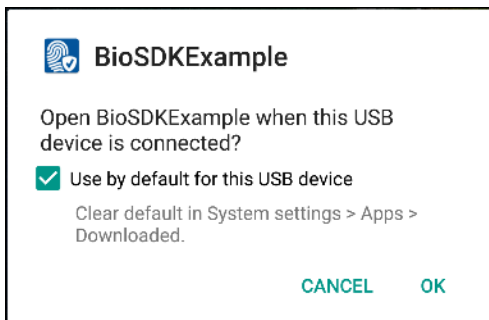


8. Tap **EXIT** to close the app.
9. Disconnect the Android device from the computer.

6 Run the BioSDKExample app

6.1 Start the app

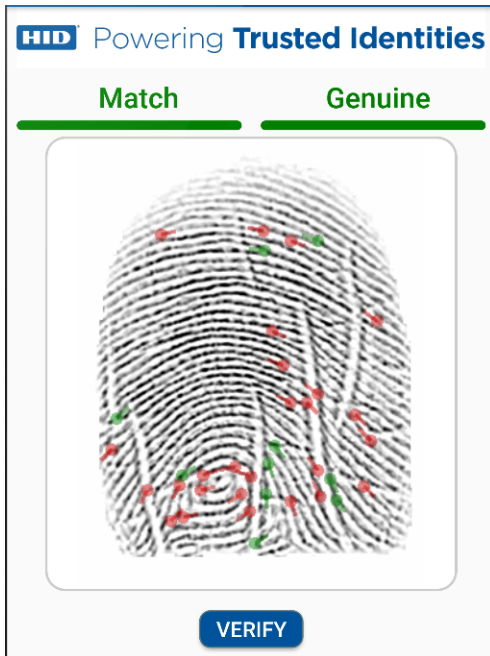
1. Connect an HID Global M21x fingerprint sensor to the Android device, using an appropriate USB 2.0 adapter. The app will open automatically.
2. When the app opens, you are prompted three times to open the BioSDKExample when this USB device (M21x sensor) is connected, and to allow the BioSDKExample to access the USB device. For each of the three prompts, select “Use by default for this USB device” and tap **OK**. Now, whenever the M21x sensor is plugged into this Android device, the BioSDKExample will open automatically without any prompts.



3. After the application completes initialization, the enrollment screen is displayed.

6.2 Enrollment

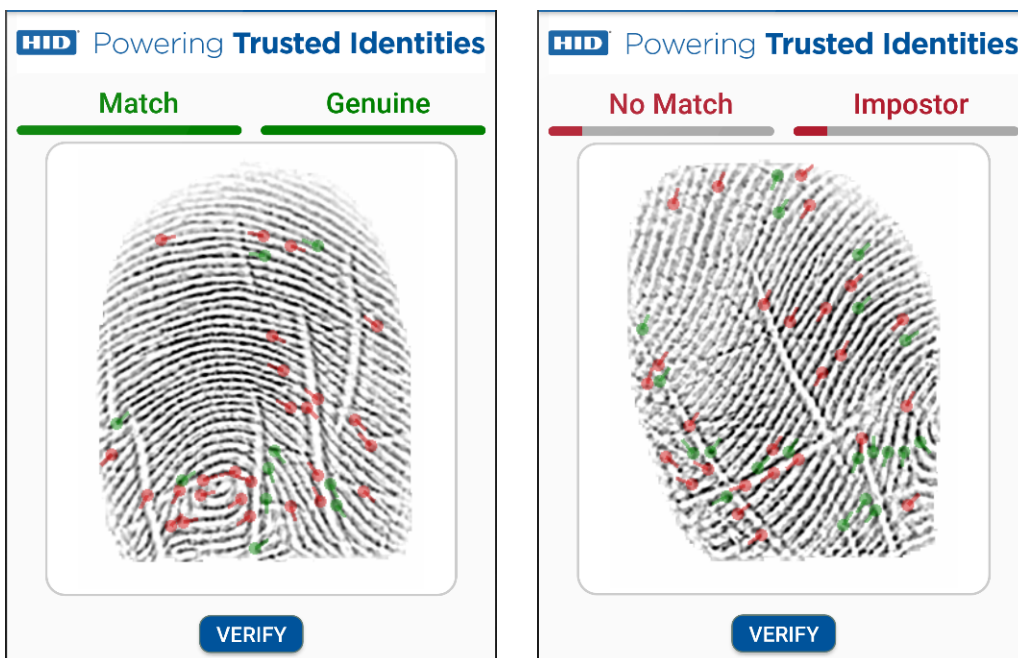
1. Tap **ENROLL**.
 - The M21x sensor lights up blue.
 - You are prompted to put your finger down, and the **ENROLL** button changes to **CANCEL**.
 - If you want to cancel the enrollment capture, click **CANCEL**.
2. Put a finger down on the sensor.
 - The M21x flashes quickly as it captures the fingerprint image.
 - The fingerprint image with minutiae is displayed on the screen in the image view. Additionally, the fingerprint image's PAD (Presentation Attack Detection) result is displayed above the image in a progress bar. Depending on the score returned from the SDK based on the PAD security level, the bar will be either:
 - Green, with the text "Genuine".
 - Red, with the text "Impostor".



Note: The enrolled fingerprint template is never saved on the device.

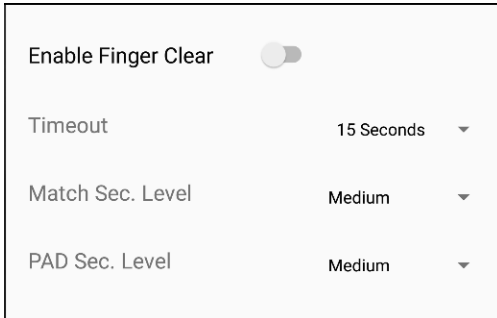
6.3 Verification

1. On the navigation menu displayed at the bottom of the app, tap **Verify**.
2. Tap **VERIFY**.
 - The M21x sensor lights up blue.
 - You are prompted to put your finger down, and the **VERIFY** button changes to **CANCEL**.
 - If you want to cancel the verification capture, click **CANCEL**.
3. Place the previously enrolled finger on the sensor.
 - The M21x flashes quickly as it captures the fingerprint image.
 - The fingerprint image is displayed on the screen in the image view. A measure of how closely the captured fingerprint matches the enrollment fingerprint is displayed by the left progress bar. Depending on the match result based on the match security level, the bar is either:
 - Green, with the text “Match” if the finger matches with high confidence.
 - Red, with the text “No Match” if the finger does not match.
 - The fingerprint image’s PAD (Presentation Attack Detection) result is displayed by the right progress bar. Depending on the score returned from the SDK based on the PAD security level, the bar is either:
 - Green, with the text “Genuine”.
 - Red, with the text “Impostor”.



6.4 Settings

On the navigation menu displayed at the bottom of the app, tap **Settings**.



Enable Finger Clear	<input type="checkbox"/>
Timeout	15 Seconds ▼
Match Sec. Level	Medium ▼
PAD Sec. Level	Medium ▼

The default settings are:

- Enable Finger Clear Not selected (off)
- Timeout 15 seconds
- Match Sec. Level Medium
- PAD Sec. Level Medium

6.4.1 Enable Finger Clear

When Enable Finger Clear is selected, enrollment and verification captures will call *Wait for finger clear* on the sensor after the capture completes. While *Wait for finger clear* is running, the M21x sensor will light up again in finger detect mode. If a finger is still on the sensor, the app will display “Lift Finger”. When you lift your finger, *Wait for finger clear* stops. As best practice when using biometric sensors, during enrollment of a fingerprint that incorporates two or three captures, it is ideal to force the person to lift their finger and then place it down for subsequent enrollment fingerprint captures.

6.4.2 Timeout

You can select the fingerprint capture timeout period (in seconds). When you perform a capture, the sensor will timeout after the selected period if no finger has been placed on the sensor or no successful capture has taken place. Infinite means that the capture will never timeout.

6.4.3 Match Sec. Level

You can set the Match Security Level to Convenience, Medium, or High.

6.4.4 PAD Sec. Level

You can set the PAD Security Level to Convenience, Medium, or High.

Note: These settings are not stored, so when the app starts again they return to their defaults.

