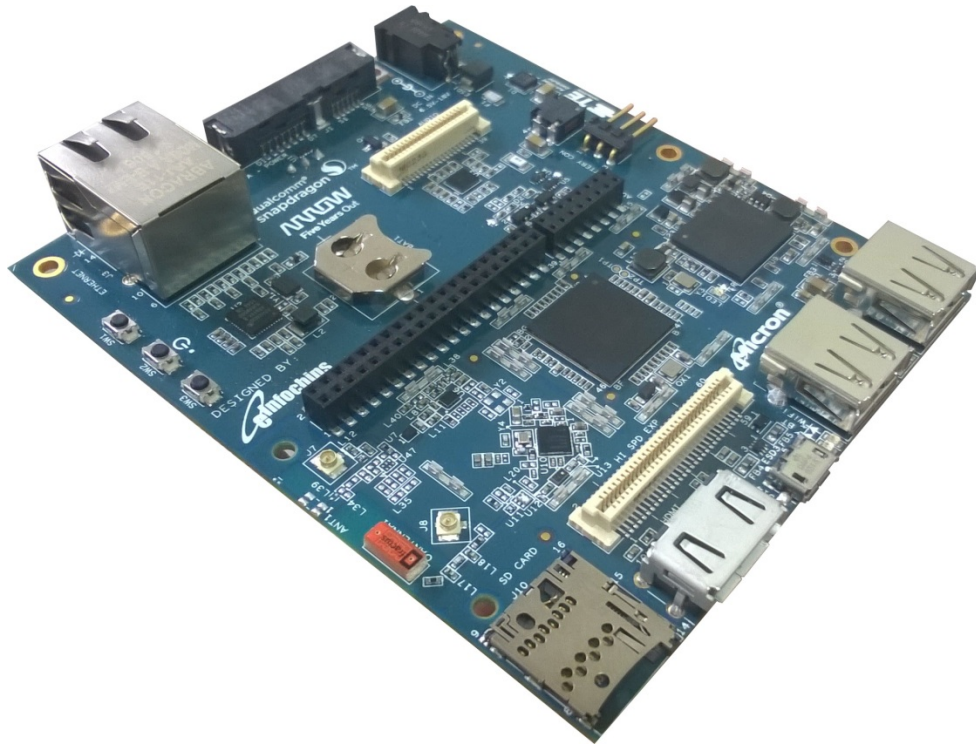


SD 600eval

Android User Guide



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1 Android on the SD 600eval Board

1.1 Known limitations

- HSIC interface based USB Hub on mezzanine card is not hot pluggable
- SD card on Mezzanine card is not hot pluggable

1.1.1 Boot-phase status indicators

For trouble shooting during the boot-phase of the Android operating system, the 4 User-LED's on the board (LED1-4) have the following meaning:

LED	Status	Description
LED1	ON	Indicates Android OS is booted and board is power up and running
LED2	OFF	User Configurable
LED3	OFF	User Configurable
LED4	OFF	User Configurable

Table 1: LED Status

2 Installing Android

Installing the image from a Host computer via USB cable and fastboot is supported with this release.

2.1 Installing from Host-pc

See below for instruction on how to install Fastboot on Host PC.

2.1.1 Installation prerequisites

Fastboot: This method requires the fastboot tool to be installed on the Host PC. Fastboot is a tool that communicates with the bootloader of the SD 600eval board and allows user to flash images onto the board.

See below for instruction on how to install Fastboot on Host PC.

2.1.2 Install fastboot on Host PC:

Download and install the fastboot tool on Host PC:

On Windows Host:

Flashing Android from Host PC requires **ADB** and **fastboot** driver preinstalled in Host system.

Instructions to install ADB and fastboot drivers on host system can be found in [Appendix 1: Installing ADB and Fastboot Drivers on Windows](#).

On Linux Host (Ubuntu/Debian):

Refer section [Appendix 2: Installing ADB and Fastboot Drivers on Linux](#).

2.1.3 Installation overview

In order to install Android from a Host PC just follow these simple steps:

- Step 1.** Download the Release from <https://eragon.einfochips.com/>
- Step 2.** Bring the board into fastboot-mode
- Step 3.** Start the fastboot tool on the HostPC
- Step 4.** Flash the Bootloader Image
- Step 5.** Flash the remaining images
- Step 6.** Reboot and enjoy

The following chapters describe each step in more detail:

Step1: Download the Release

Release Name	Link
SD_600eval-bootloaders-eMMC-v1.0.zip	https://eragon.einfochips.com/
SD_600eval-android_binaries-v1.0.zip	https://eragon.einfochips.com/

Step2: Bring the board into fastboot-mode

- Ensure the boot switches are set to 0001 (please refer the figure below)

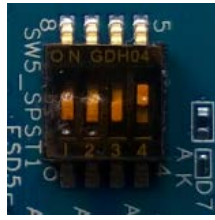


Figure 1: fastboot switch configuration for SD 600eval board

- Connect the Micro-USB cable to the board
- Connect the power supply to the board

Step3: Start the fastboot tool on the HostPC

Start the fastboot application on the host PC and execute the following fastboot command. User will see board listed:

```
fastboot devices
```

Note: If user run Fastboot from a Linux Host PC user might have to run it with sudo privileges.

For example:

```
sudo fastboot devices
```

Step4: Flash the bootloader-image

Bootloaders are present in “SD_600eval-bootloaders-eMMC-v1.0.zip” archive.

To flash the bootloaders extract archive and switch to directory to “SD_600eval-bootloaders-eMMC-v1.0” and check for script flash_bootloaders.bat to be used in Windows or flash-bootloaders.sh to be used in Linux.

On Windows

Open command prompt and enter into bootloaders directory and run script as below

```
cd SD_600eval-bootloaders-eMMC-v1.0
flash_bootloaders.bat
```

On Linux

```
cd SD_600eval-bootloaders-eMMC-v1.0
sh flash-bootloaders.sh
```

This flash-bootloaders.sh will execute following commands sequentially.

```
sudo fastboot erase modem
sudo fastboot erase sbl1
sudo fastboot erase sbl2
sudo fastboot erase sbl3
sudo fastboot erase rpm
sudo fastboot erase tz
sudo fastboot erase aboot

sudo fastboot flash modem NON-HLOS.bin
sudo fastboot flash sbl1 sbl1.mbn
sudo fastboot flash sbl2 sbl2.mbn
```

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```
sudo fastboot flash sbl3 sbl3.mbn
sudo fastboot flash rpm rpm.mbn
sudo fastboot flash tz tz.mbn
sudo fastboot flash about emmc_appsboot.mbn
```

Step5: Flash Android on 600eval Board

Android release binaries are present in “**SD_600eval-android_binaries-v1.0.zip**” archive. To flash the Android, extract archive and switch directory to SD_600eval-android_binaries-v1.0.

On Windows

Open command prompt and enter into binaries directory and run script as below

```
cd SD_600eval-android_binaries-v1.0
flash-images.bat
```

On Linux

```
cd SD_600eval-android_binaries-v1.0
sh flash-images.sh
```

The flash-images.sh will executes following commands sequentially.

```
sudo fastboot erase boot
sudo fastboot erase recovery
sudo fastboot erase cache
sudo fastboot erase persist
sudo fastboot erase system
sudo fastboot erase userdata

sudo fastboot flash boot boot.img
sudo fastboot flash recovery recovery.img
sudo fastboot flash cache cache.img
sudo fastboot flash persist persist.img
sudo fastboot flash system system.img
sudo fastboot flash userdata userdata.img
sudo fastboot reboot
```

Step6: Reboot and enjoy!

Once the download of the images is complete, follow these steps:

- Unplug the board from the power supply
- Disconnect the USB cable
- Reset the boot switches back to 0000
- Connect the board to the power supply

After the reboot user will see Android startup. Android will optimize its applications on first boot up. Thus first android boot takes 4 to 5 minutes.

3 Recovering SD 600eval with the rescue image

Use this method if the previous method failed and user were not able to reach the board via the fastboot tool. (fastboot devices command not listing device.)

3.1 Installation overview

To recover the SD 600eval board from the rescue-image follows these steps:

- Step 1.** Download the Rescue image
- Step 2.** Copy the rescue image on a SD-card
- Step 3.** Boot the board from the SD-card

The following chapter describes each step in detail:

Rescue image for SD_600eval is present in “SD_600eval-rescue_image-v1.0.zip” archive.

Step1: Download the Rescue image

Release Name	Link
SD_600eval-rescue_image-v1.0.zip	https://eragon.einfochips.com/

- Extract the archive after download complete

Step 2. Copy the rescue image on a SD-card

On Windows:

- Download the Win32DiskImager tool from [here](#)
- Start the DiskImager tool with administrator rights
- Under **Image file** select the path to the rescue-image
- Under **Device** choose the drive letter under which the SD-card was detected
- Click **Write** -> This will write the image onto the micro SD-card

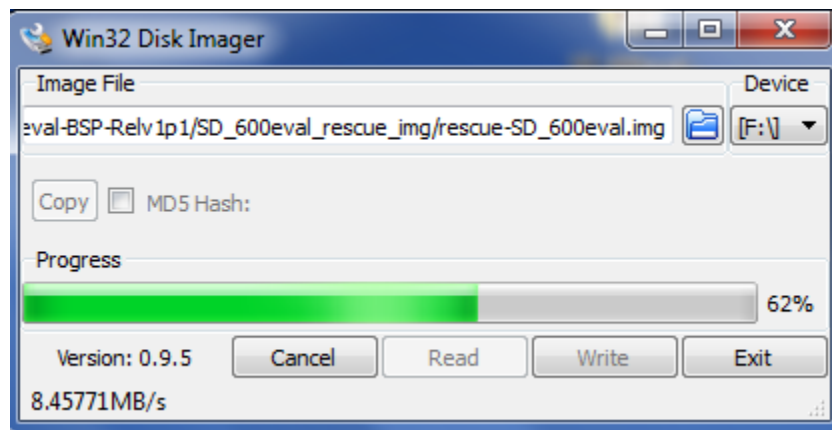


Figure 2: Disk Image Writer

On Linux:

Execute the following commands:


```
cd SD_600eval-rescue_image-v1.0
sudo dd if=rescue-SD_600eval.img of=/dev/sxx bs=2M
sync
```

Where sxx is the device name

Warning: Do not override your hard drive. In most cases, sxx will be mmcblk0 or sdx where x depends on the number of fixed disks in your system. User can determine the SD-cards device name by using the following command:

```
sudo fdisk -l
```

Alternatively user can also use following command to determine the SD-card device name:

```
dmesg | tail
```

Step2: Boot the board from the SD-card

- Put the SD card into SD 600eval board
- Set the boot switches to 0100 (SD card boot) as shown in below figure

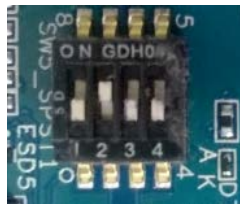


Figure 3: SD boot configurations for SD 600eval board

- Plug in the power cable -> the board will start in fastboot mode and user will be able to reach the board from host via the fastboot tool

Once board is into fastboot mode, follow the “**Step 4**” from [Installation overview](#) to flash the bootloader and Android binaries.

4 Running Android

While it would go beyond the scope of this user guide to go into all aspects of running android, in this chapter we will go over some of the most common use cases relevant to get started with the board.

4.1 Setting up WIFI

On the Home screen click the Apps drawer icon:

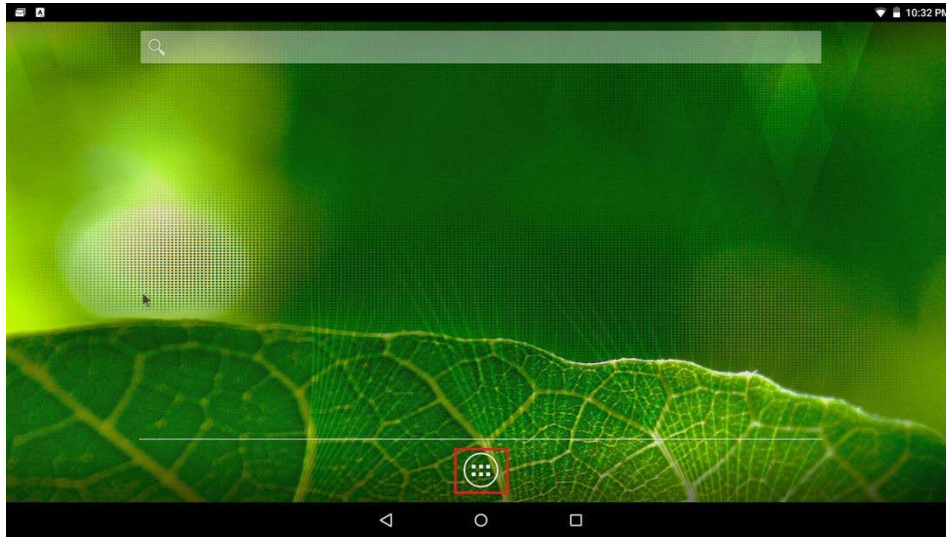


Figure 4: Android home screen

In the Apps drawer click the Settings app.

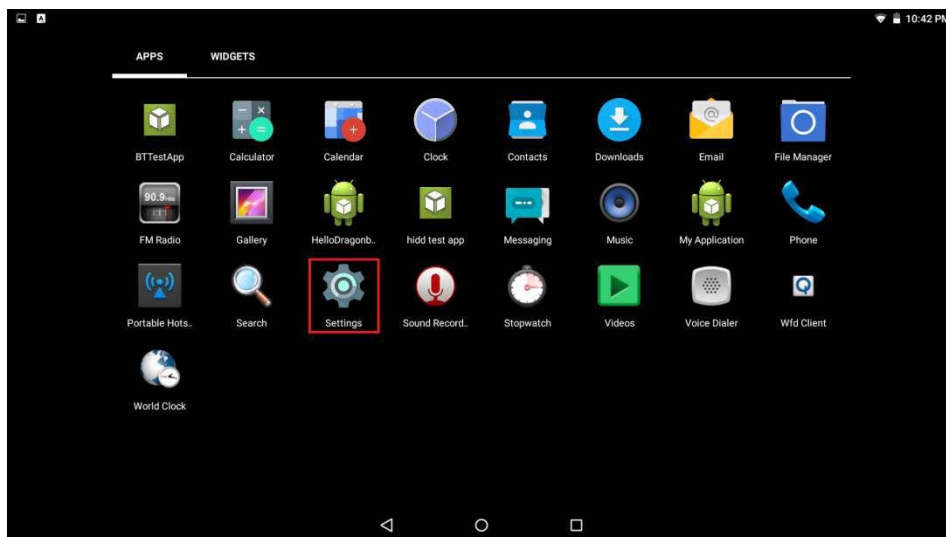


Figure 5: Settings icon in Android

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In the settings app click Wi-Fi:

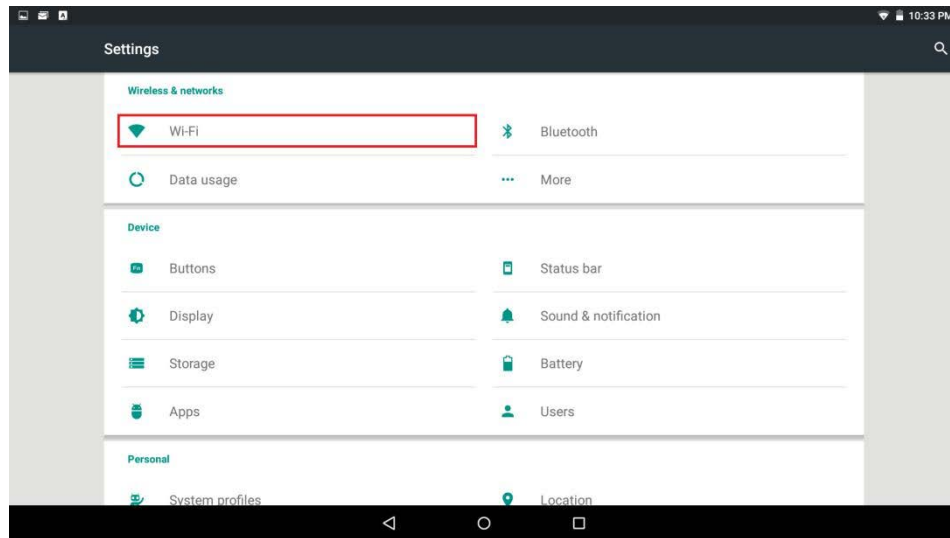


Figure 6: Wi-Fi option in Android settings

Turn Wi-Fi ON by clicking the switch on the right side:

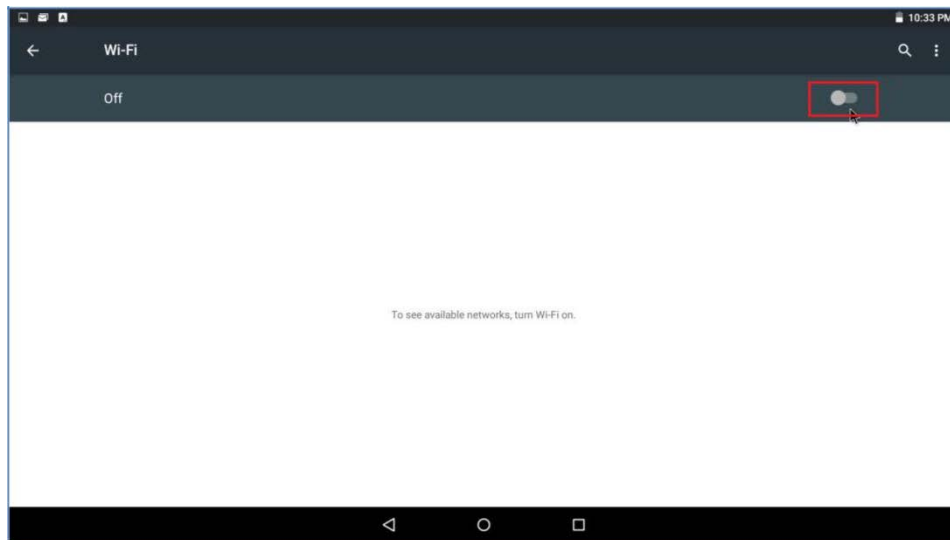


Figure 7: Toggle Wi-Fi in Android

After a few seconds user will see a list of available networks. Choose the network user would like to connect to and provide the network's password. Then click Connect.

If the connection was successful a Wi-Fi symbol should appear in Android's status bar.



Figure 8: Wi-Fi icon on Android status bar

4.2 Side-loading apps

Since the SD 600eval board does not come with the google app-store pre-installed any additional applications that user want to install, need to be installed through a process called app-side-loading.

Before user continue one need the applications installer package (*.apk file).

Step 1. Enable Security settings:

Before user can side-load any apps onto Android user need to allow the installation of third party apps in the system security settings: In the system settings under security Enable “Installation from unknown sources” (**goto settings -> security -> enable “Unknown sources”**).

Step 2. Connect the board to a host PC: (Host PC must have ADB drivers installed)

Kindly refer Appendix for more information about ADB driver setup on windows Host PC.

For example, application name is myApp.apk. To install myApp.apk on 600eval board, ensure all boot-switches are set the OFF position and the board is powered up.

Plug in the micro-USB cable and connect the board to the Host PC.

Step 3. Install the applications installer package using ADB commands:

```
adb install myApp.apk
```

5 Android Development Environment

The following picture depicts the typical development setup for the SD 600eval:

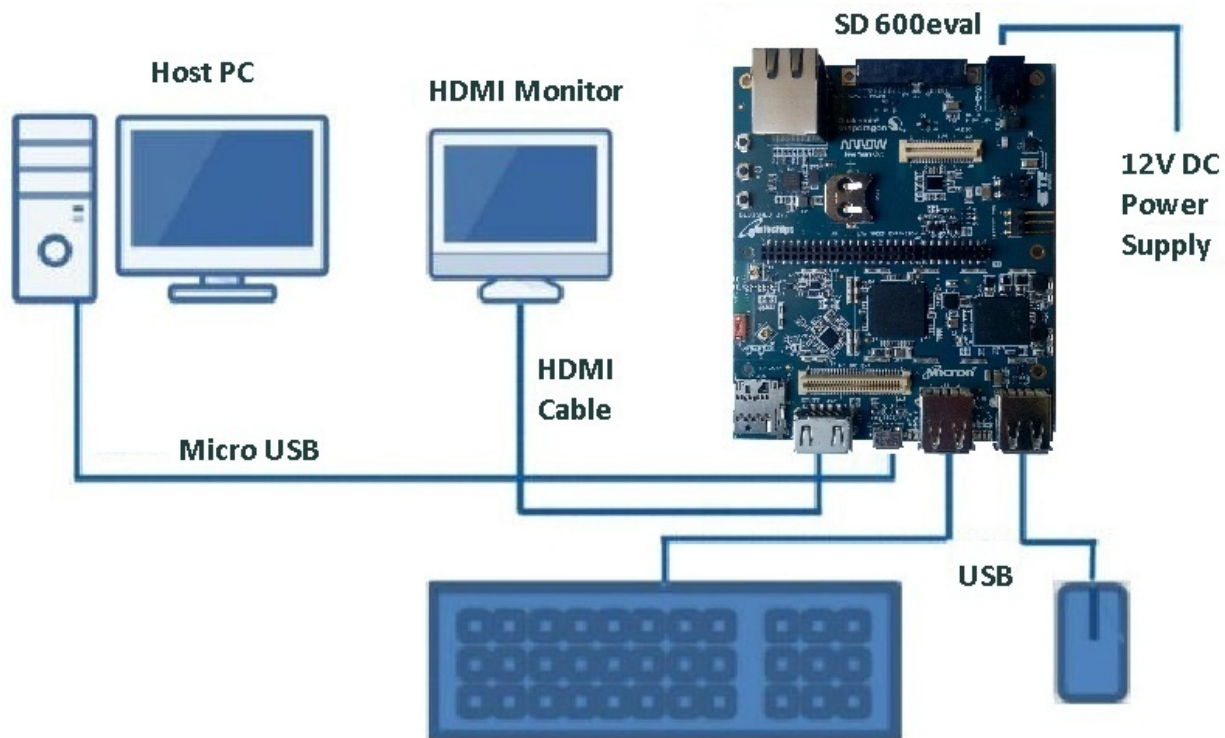


Figure 9: Android Development Setup

5.1 Android Studio

Android Studio is the official Integrated Development Environment (IDE) for developing applications on the Android platform. It is available for Windows, Mac OS X and Linux. Android Studio replaced Eclipse Android Development Tools

(ADT) as Google's primary IDE for Android development.

5.1.1 Installing Android Studio

User can download Android Studio from the Android developer website:
<https://developer.android.com/sdk/index.html#Other>

Once downloaded execute the setup and follow the on-screen instructions.

5.2 ADB Android Debug Bridge

Android Debug Bridge (adb) is a command line tool that is used to communicate with an Android emulator instance or connected Android-powered device. As such it creates the connection between Android studio and the device.

5.2.1 Installing ADB Drivers

The latest ADB USB drivers can be downloaded from the following Google Website:

<http://developer.android.com/sdk/win-usb.html> or refer section [Appendix 1 : Installing ADB Drivers On Windows](#).

In order for the driver to recognize the board, the driver's INF file (android_winusb.inf) located in the driver directory (<download directory>\usb_driver) has to be modified as follows:

Note: Supplied file “SD_600eval-Production-Relv1p0/adb-setup/Windows/usb_driver/android_winusb.inf” already have changes.

Please add the following lines behind the [Google.NTx86] and [Google.NTamd64] section of the INF file:

```
[Google.NTx86]
;SD 600eval
%SingleAdbInterface%      = USB_Install, USB\VID_05C6&PID_9025
%CompositeAdbInterface%   = USB_Install, USB\VID_05C6&PID_9025&MI_01
%SingleAdbInterface%      = USB_Install,USB\VID_05C6&PID_9026
%CompositeAdbInterface%   = USB_Install, USB\VID_05C6&PID_9026&MI_01
%SingleBootLoaderInterface% = USB_Install, USB\VID_18D1&PID_D00D

[Google.NTamd64]
;SD 600eval
%SingleAdbInterface%      = USB_Install, USB\VID_05C6&PID_9025
%CompositeAdbInterface%   = USB_Install, USB\VID_05C6&PID_9025&MI_01
%SingleAdbInterface%      = USB_Install,USB\VID_05C6&PID_9026
%CompositeAdbInterface%   = USB_Install, USB\VID_05C6&PID_9026&MI_01
%SingleBootLoaderInterface% = USB_Install, USB\VID_18D1&PID_D00D
```

6 Example1: HelloWorld application

With Android studio installed, we can now develop our first Android HelloWorld application for the SD 600eval.

6.1 Start Android Studio

From the Windows : Start-menu select: **start-> All Programs-> Android Studio-> Android Studio**

From the Linux : Click on the Icon of Android studio from application launcher. (Following steps Describes Android Studio environment on Linux platform)

If User starts Android for the first time greeting screen will appear with the following dialog:

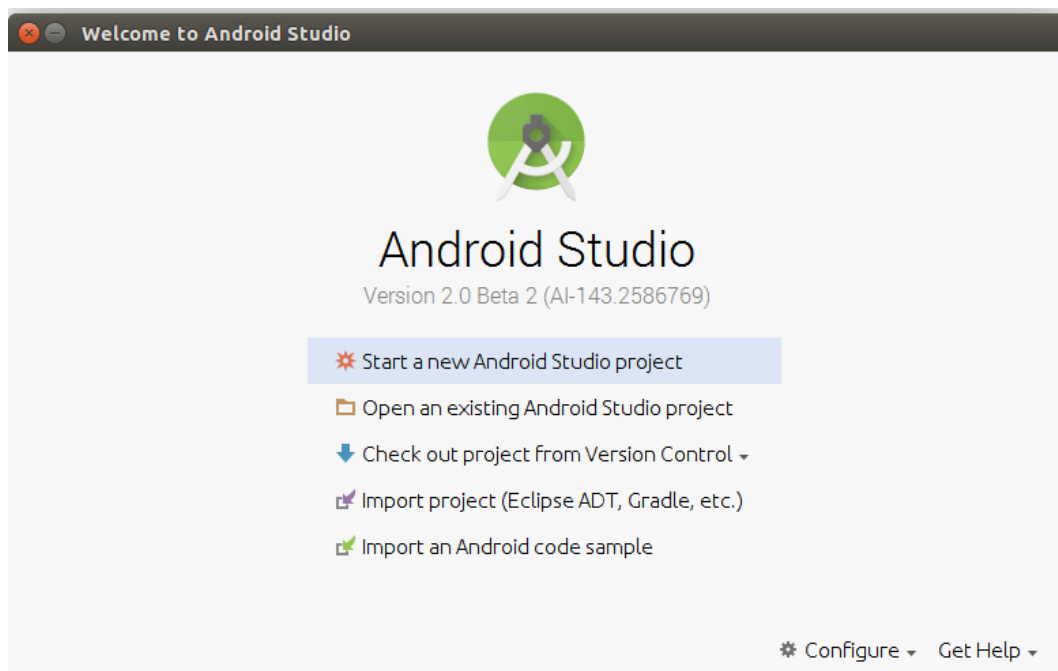


Figure 10: Android Studio Welcome Screen

6.2 Create a new Project

Create a new project by selecting “Start a new Android Studio project”

In the new Project dialog give the new project the name “**HelloSD600eval**” and click **Next**.

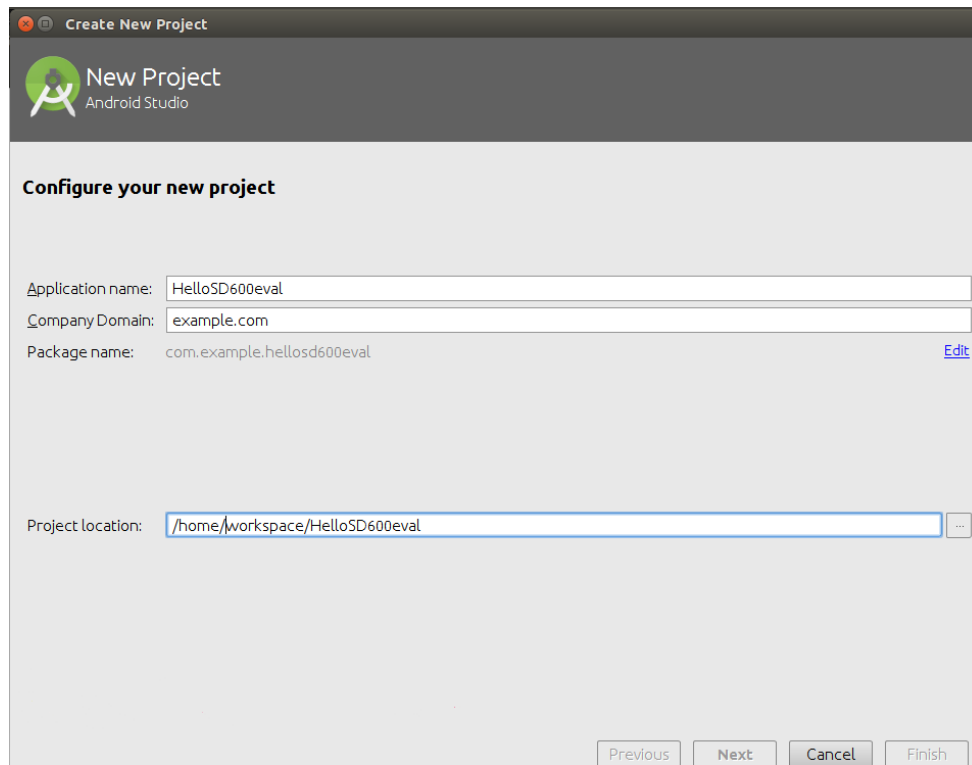


Figure 11: Android Studio New Project

In the following dialog select the supported SDK: API 21 Android 5.0 (Lollipop) and click Next

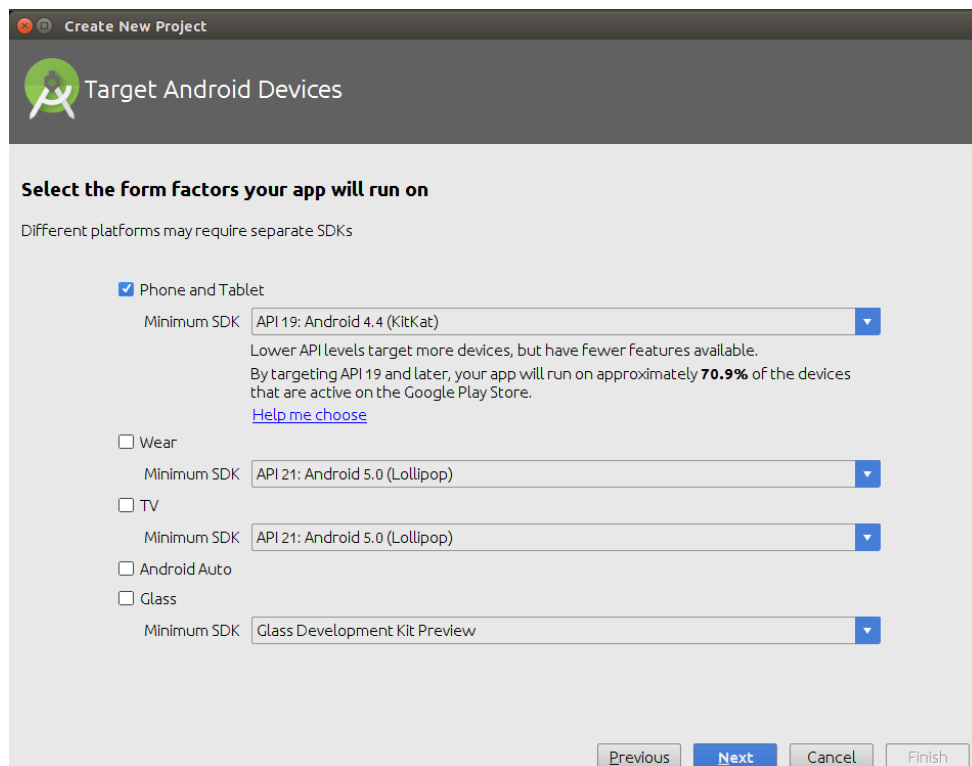


Figure 12: Android Studio New Project Screen

In the following screen choose the “Empty activity” then click Next

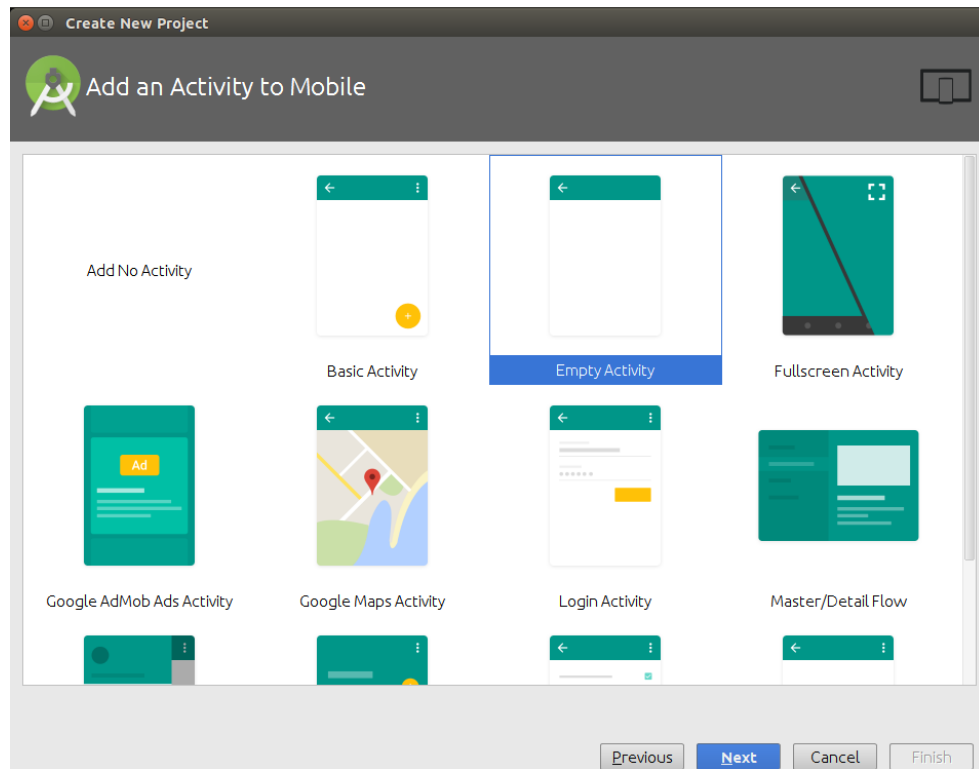


Figure 13: Android Studio Activity Screen

Leave the settings in the following screen unchanged and click Finish

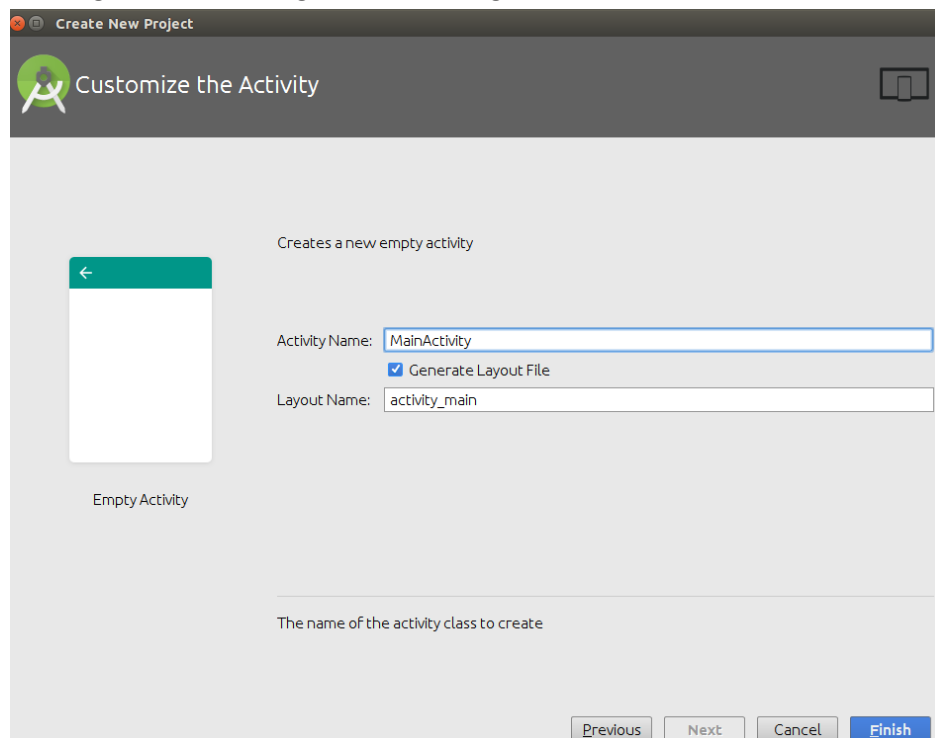


Figure 14: Android Studio Activity Screen 2

Once user click finish the project wizard will create the new project:

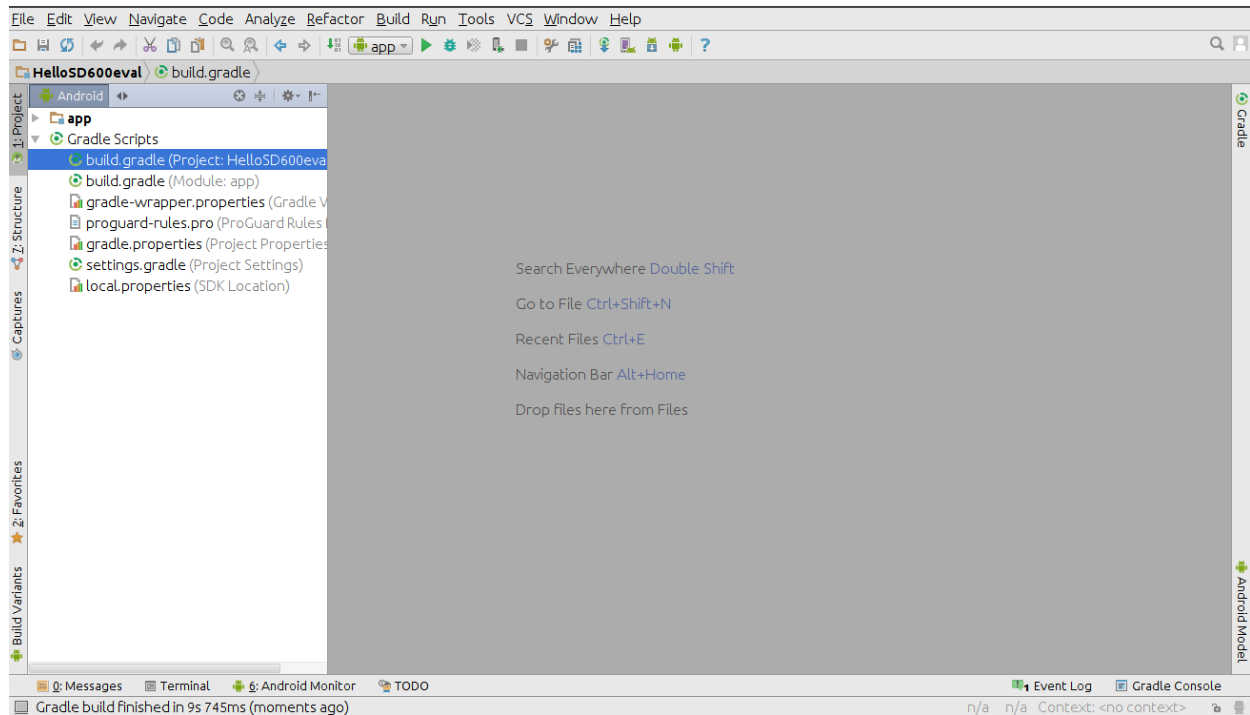


Figure 15: Android Studio New Project created

6.3 Implement application

The project template contains a basic!!!. Hello World Android application that will run on the board.
Feel free to change the default “!!!Hello World!!!” message to “!!! Hello SD 600eval

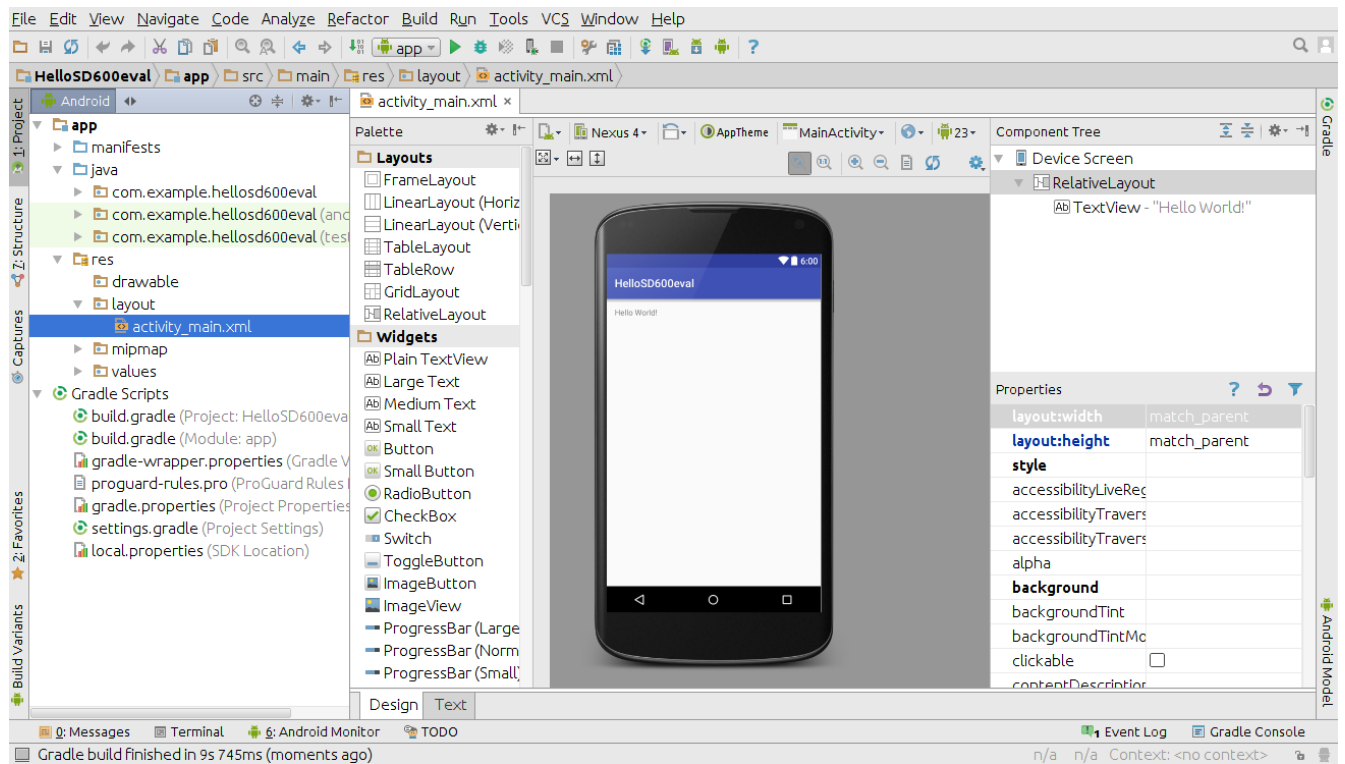


Figure 16: Android Studio adding changes in project

6.4 Build the application

To Build the application select **Build** -> **Make Project** from the menu

6.5 Run the application

You are now ready to run your application on the DragonBoard.

Connect the DragonBoard via the micro-USB connector to your Host development machine.

To Run the application select **Run** -> **Run** from the menu.

This will pop up the “**Choose Device**” dialog:

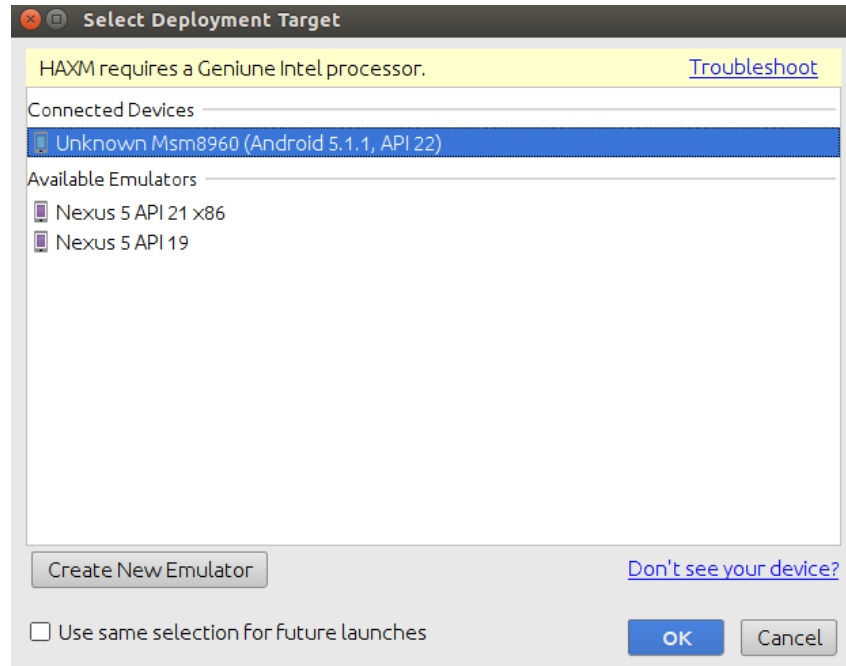


Figure 17: Android Application execution

Select your device and select OK.

User should now see the application start up on device.

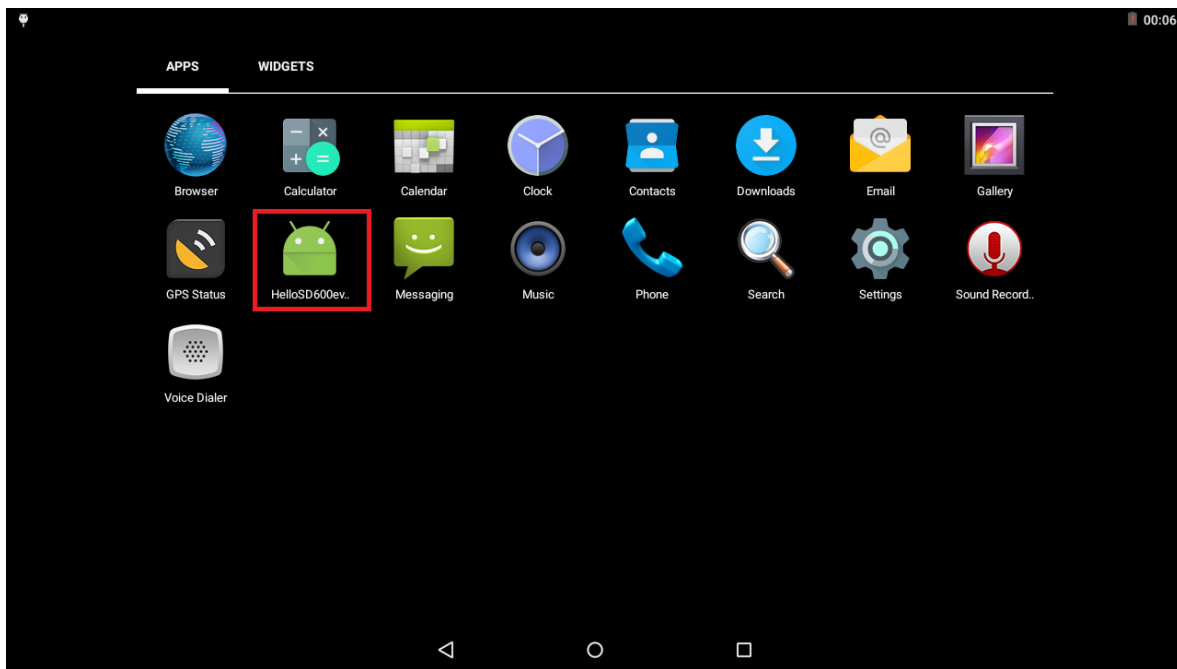


Figure 18: Android Application Launcher

Appendix 1: Installing ADB and Fastboot Drivers on Windows

Method we are providing here is a third party procedure; please follow [this](#) link to directly refer the setup guide.

Steps to install ADB Driver:

1. Download adb-setup from [here](#)
2. Double click adb-setup-1.4.3.exe

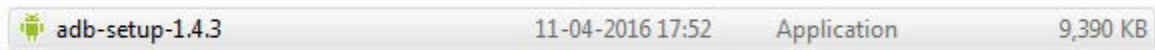


Figure 19: ADB Windows Setup file

3. Press “Yes” when if asked for administrator permission.
4. Follow the instructions given.
 - a. Do you want to install ADB and Fastboot? -> Type “Y” and Press “ENTER” key.
 - b. Install ADB system-wide -> Type “Y” and Press “ENTER” key.
 - c. Do you want to install device driver? -> Type “Y” and Press “ENTER” key.
 - d. Welcome to Device Driver Installation Wizard --> Click “Next”.
 - e. Would you like to install this device driver software? ->Click “Install”
 - f. Completing the Device Driver Installation Wizard -> Click “Finish”

Steps to Update ADB Driver:

- If you are not able to detect device in terminal, you have to update ADB driver on PC.
 - Follow below mentioned steps to update ADB driver.
1. Go to Start, right click on Computer and choose Properties
 2. On the left side there will be an option for Device Manager, click on that.

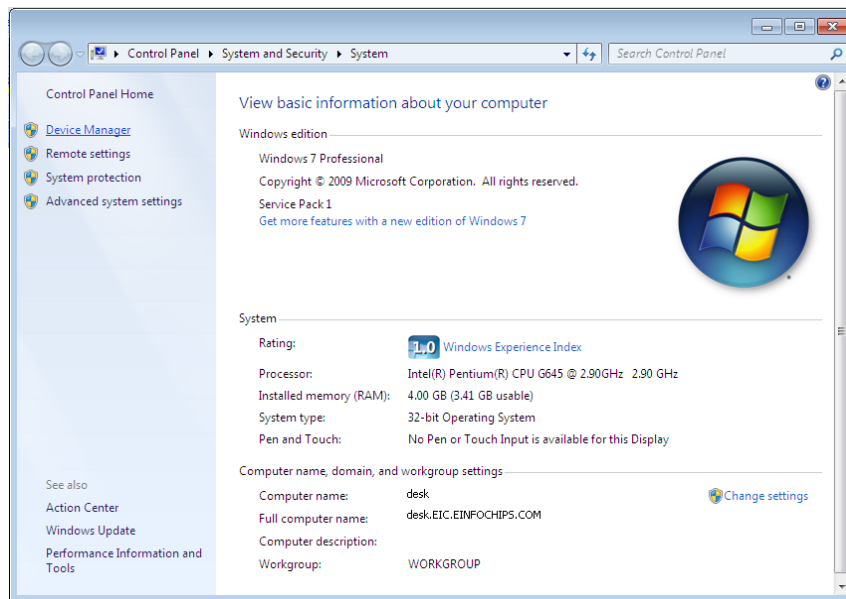


Figure 20: System Properties on Window OS

3. Under other devices you will find android with yellow triangles In Other devices,

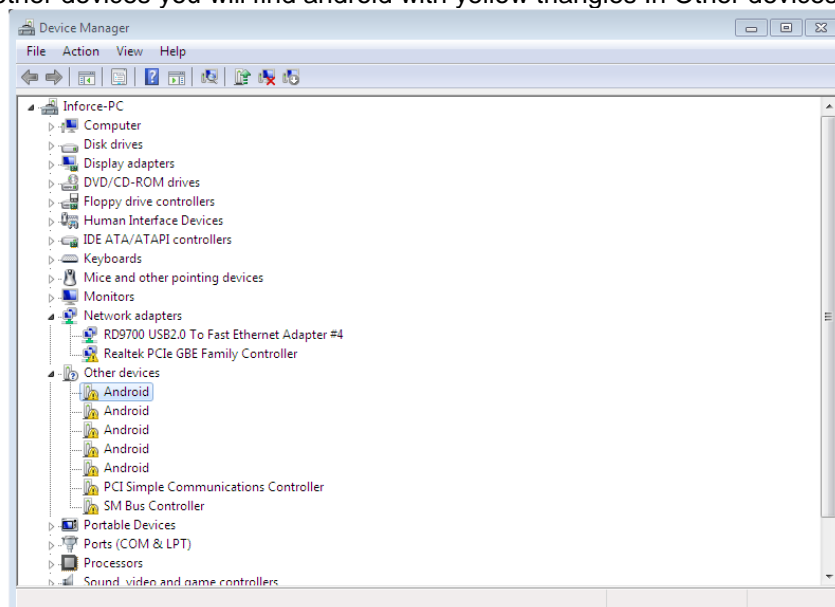


Figure 21: Device Manager on Windows OS

4. Right click on that and choose Update Driver Software -> Browse my computer for driver software.

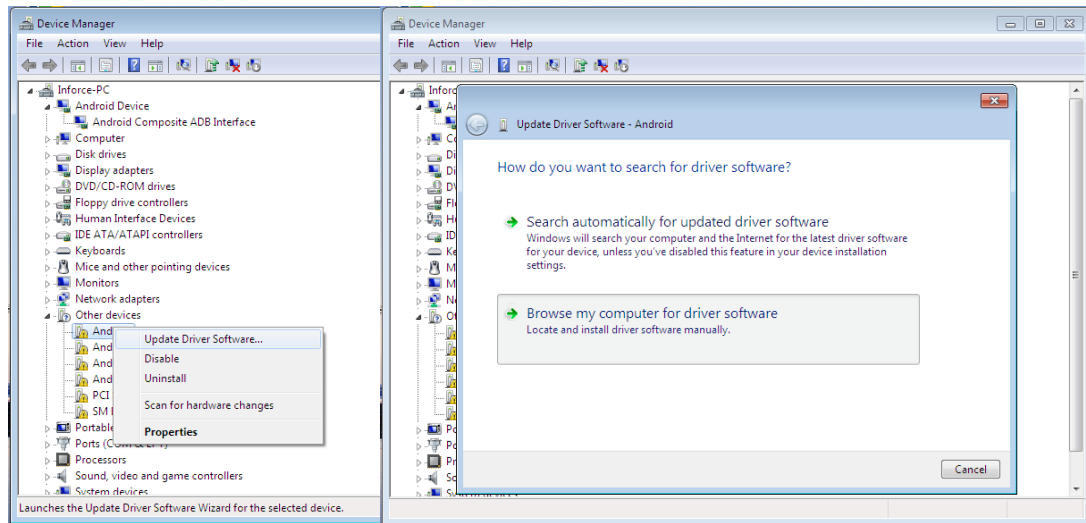


Figure 22: Update Driver Dialog Box 1 on Windows OS

5. Choose usb_driver folder which is present in the extracted package folder.
At **SD_600eval-Production-Relv1p0** -> **adb-setup** -> **Windows** -> **usb_driver**

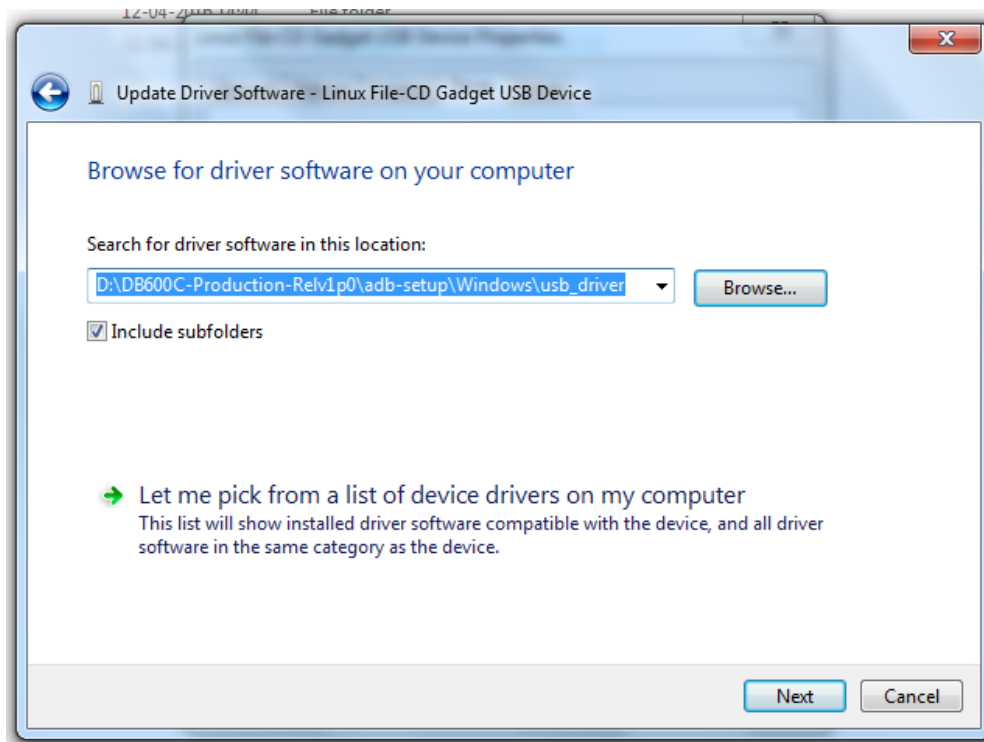


Figure 23: Update Driver Dialog Box 2 on Windows OS

6. Let it install driver from folder.

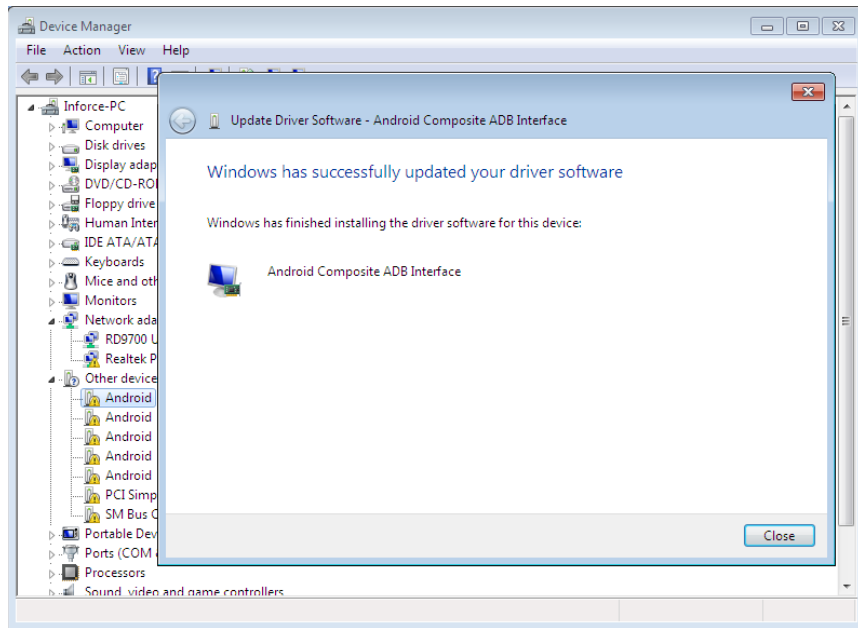


Figure 24: Update Driver Dialog Box 3 on Windows OS

Appendix 2: Installing ADB and Fastboot Drivers on Linux

Steps to install ADB and Fastboot Driver:

1. Install the android tools and libudev from apt-get on Linux machine.

```
$ sudo apt-get install android-tools-adb android-tools-adbd android-tools-fastboot android-tools-fsutils udev libudev1
```

2. Now create a file inside directory on Ubuntu machine

```
$ sudo vi /etc/udev/rules.d/51-android.rules
```

3. And paste the below lines inside it for fastboot and adb tools.

```
#Fastboot low-level bootloader for SD 600eval Board
SUBSYSTEM=="usb", SYSFS{idVendor}=="18d1", SYSFS{idProduct}=="d00d", MODE="0777", GROUP="adm"
# adb composite interface device 9025 for 600eval Board
SUBSYSTEM=="usb", SYSFS{idVendor}=="05C6", SYSFS{idProduct}=="9025", MODE="0777", GROUP="adm"
SUBSYSTEM=="usb", ATTRS{idVendor}=="05c6", MODE="0666"
# adb composite interface device 9025 for 600eval Board
SUBSYSTEM=="usb", SYSFS{idVendor}=="05C6", SYSFS{idProduct}=="9039", MODE="0777", GROUP="adm"
SUBSYSTEM=="usb", ATTRS{idVendor}=="18d1", MODE="0666"
SUBSYSTEM=="usb", ATTRS{idVendor}=="05c6", MODE="0666"
```

4. Save the file in vi using “Esc :wq”. Now restart udev service to take effect.

```
$ sudo service udev restart
```

5. To verify that the device drivers are installed properly, we can use adb for checking.

- Boot your 600eval board (Android should be there in 600eval board).
- Connect Micro USB cable to board and PC.
- Open a shell terminal on the PC and run the following command:

```
$ adb devices
```

6. You will see the following message displayed if the above process is successful:

```
List of devices attached (Example)
1234567DEF device
```