



DEVELOPMENT GUIDE

VAB-630

Android BSP v1.0.3



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## Revision History

Version	Date	Remarks
1.00	08/11/2017	Initial release



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# 1. Introduction

This Development Guide explains how to build an Android system image for the VAB-630 board in order to begin evaluating the platform.

The VAB-630 Android BPS v1.0.3 is developed based on WM8980\_android\_5.0\_v0.2.0 and it enables hardware features that are defined on the VAB-630 board.

## 1.1. BSP Package Contents

There are four folders in the package as listed below.

Source Code folder	Description
VAB-630_Android_source_code.zip	Android Source Code, kernel source code and U-Boot source code
Smart_ETK_v1.0.3_SourceCode.zip	Smart ETK demo program source code.
Firmware folder	Description
VAB-630_Android_EVK_v1.0.3.zip	Android EVK system image and installation script files.
Document folder	Description
VAB-630_Android_BSP_v1.0.3_Development_Guide_v1.01_20170811.pdf	Development guide
VAB630_Android_EVK_v1.0.3_Quick_Start_Guide_v1.00_20170811.pdf	Quick start guide
VAB-630_SmartETK_SDK_v1.0.3_Programming_Guide_v1.00_20170811.pdf	SmartETK demo guide
Tools folder	Description
SmartETK_SDK_Sample.apk	SmartETK demo program
BluetoothSPPTTest.apk	Bluetooth SPP profile demo program
arm_201103_gcc4.5.2.tgz	Toolchain

VAB-630 Android BSP contents

### 1.1.1. Source Code Folder Contents

**VAB-630\_Android\_source\_code.zip:** Includes WonderMedia Android 5.0 patch file WM8980\_android\_5.0\_v0.2.0.tgz, the VAB-630 Android source code patch file and Image building script files.

**Smart\_ETK\_v1.0.3\_SourceCode.zip:** Smart ETK demo program source code.

### 1.1.2. Firmware Folder Contents

**VAB-630\_Android\_EVK\_v1.0.3.zip:** The Android EVK system image and installation script files.

### 1.1.3. Document Folder Contents

**VAB-630\_Android\_BSP\_v1.0.3\_Development\_Guide\_v1.00\_20170811.pdf:** This Development Guide explains how to build an Android system image for the VAB-630 board in order to begin evaluating the platform.

**VAB-630\_Android\_EVK\_v1.0.3\_Quick\_Start\_Guide\_v1.00\_20170811.pdf:** The Quick Start Guide provides an overview on how to boot the Android EVK system image in the VAB-630 board and configure the supported hardware functions in the build.

**VAB-630\_SmartETK\_SDK\_v1.0.3\_Programming\_Guide\_v1.00\_20170811.pdf:** The Smart ETK Programming Guide explains how to utilize the Smart ETK APIs for your program development.

### 1.1.4. Tools Folder Contents

**SmartETK\_SDK\_Sample.apk:** is the Smart ETK demo program.

**BluetoothSPPTest.apk:** is the demo program of the Bluetooth SPP profile.

**arm\_201103\_gcc4.5.2.tar.gz:** is a toolchain, which is a set of software development tools for building images for the VAB-630 board.

## 1.2. Version Information and Supported Features

- U-Boot version: 1.1.4
- Kernel version: 3.4.5
- Evaluation image: Android Lollipop 5.0
- Development based on WM8980 Android\_5.0\_v0.2.0
- Supports SPI with eMMC boot
- Supports HDMI or LVDS display
- Supports HDMI audio output
- Supports ONation capacitive touch panel (through USB interface)
  - ONation 10.1" LVDS Panel VIA1001 OT101RBWDLT-00 (1280×800)
- Supports Debug UART connector
- Supports Line-out and Mic-in
- Supports Micro USB 2.0 OTG port
- Supports 10/100Mbps Ethernet
- Supports EMIO-5531 USB Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2531 miniPCIe Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports EMIO-2550 miniPCIe Mobile Broadband module
- Supports Smart ETK v1.0.3 : GPIO, UART and Watchdog timer

## 2. Build Environment Setup

This section guides you through setting up the build environment for development on the host machine. All instructions are based on Ubuntu14.04 LTS x64 operating system.

To make sure that the build process completes successfully, we recommend at least 120GB of disk space and 15GB combined memory and swap space on the host machine.

### 2.1. Configuring Linux Host Machine

The following packages are required for the Android development environment. The required packages can be installed using the commands below. To get more information, please visit the Google Android website at

<http://source.android.com/source/initializing.html>.

Extract the `arm_201103_gcc4.5.2.tgz` file to `/usr/local/arm/` (If this folder does not exist in the system, please create it manually).

```
$ sudo tar -xzvf arm_201103_gcc4.5.2.tar.gz -C /usr/local/arm/
```

The cross compiler will be found in the `/usr/local/arm/arm_201103_gcc4.5.2/` directory.

Add the toolchain path in `.bashrc` file.

```
$ vi .bashrc
export PATH=/usr/local/arm/arm_201103_gcc4.5.2/mybin/:$PATH
```

OpenJDK 7 is not included in the Ubuntu LTS x64 default installation. The first step is to add a new server manually by using the following command:

```
$ sudo add-apt-repository ppa:webupd8team/java
$ sudo apt-get update
```

To install the OpenJDK 7, use the following command:

```
$ sudo apt-get install openjdk-7-jre
$ sudo apt-get install openjdk-7-jdk
```

To verify the JAVA version, use the following command:

```
$ java -version
java version "1.7.0_121"
OpenJDK Runtime Environment (IcedTea 2.6.8) (7u12-2.6.8-1ubuntu0.14.04.1)
OpenJDK 64-Bit Server VM (build 24.121-b00, mixed mode)
```

Please refer to the Google Android website for establishing the build environment:

```
sudo apt-get install git-core gnupg flex bison gperf build-essential zip curl zlib1g-dev
gcc-multilib g++-multilib libc6-dev-i386 lib32ncurses5-dev x11proto-core-dev libx11-dev
lib32z-dev ccache libgl1-mesa-dev libxml2-utils xsltproc unzip u-boot-tools
```



## 3. Image Build

This section explains how to build the U-Boot binary and Android file system for the VAB-630.

### 3.1. Extracting the VAB-630 BSP

The VAB-630\_Android\_source\_code.zip includes android-5.0.0\_r2.tar.gz, Kernel\_3.4.5.tar.gz and u-boot-1.1.4.tar.gz

Use the following command to extract the contents of the BSP.

```
$ unzip VAB-630_Android_source_code.zip
```

### 3.2. Building the U-Boot Binary

This section describes how to build the U-Boot image from the source code.

Extract the U-Boot source.

```
$ tar -xzvf u-boot-1.1.4.tar.gz
```

Type the following command in order to use the default configurations.

```
$ cd /u-boot-1.1.4
$ make wmt_config
```

Build the U-boot image with the ARM cross compiler.

```
$ make -j8 zuboot
```

When the process is completed, the **zuboot.bin** file will be stored in the **u-boot-1.1.4** directory.

### 3.3. Building the Android File System

This section describes how to build the Android file system.

To begin, extract the kernel source and android file system source.

```
$ tar -xzvf Kernel_3.4.5.tar.gz
$ tar -xzvf android-5.0.0_r2.tar.gz
```

Type the following command to use the default configurations and compile the kernel.

```
$ cd /Kernel_3.4.5
$ make vab630_defconfig
$ make clean
$ make -j8 ubin
```

When the compilation process is completed, the resulting **uzImage.bin** file will be stored in the root folder of the kernel source folder.

Copy the **uzImage.bin** file into the Android folder for kernel update.

```
$ cp /uzImage.bin android-5.0.0_r2/device/wmt/vab630/uzImage.bin
```

Type the following commands to build the Android file system.

```
$ cd /android-5.0.0_r2
$ source build/envsetup.sh
$ lunch "aosp_vab630-userdebug"
$ make -j8
$ make -j8 otapackage
```

After the compilation, the /u-boot-1.1.4/ and android 5.0.0\_r2/out/target/product/vab630/ directory will contain the resulting binary files, as shown in the table below.

Binary files	Description
zuboot.bin	U-Boot boot loader
boot.img	Kernel for VAB-630
recovery.img	Recovery image for VAB-630
aosp_vab630-ota-*.zip	Android system image

Binary files generated

In order to install the Android system on the VAB-630 board, please follow the commands below on how to copy the binary files into the VAB-630\_Android\_EVK\_V1.0.3 folder.

First, change these file names from zuboot.bin and aosp\_vab630-ota-\*.zip to u-boot.bin and vab630-ota.zip.

```
$ cd /u-boot-1.1.4
$ mv zuboot.bin u-boot.bin
$ cd /android-5.0.0_r2/out/target/product/vab630
$ mv aosp_vab630-ota-*.zip vab630-ota.zip
```

Next, extract the package from the VAB-630\_Android\_EVK\_V1.0.3.zip.

```
$ unzip VAB-630_Android_EVK_V1.0.3.zip
```

Then copy u-boot.bin, boot.img, recovery.img and vab630-ota.zip files into the VAB-630\_Android\_EVK\_V1.0.3 folder.

```
$ cd /u-boot-1.1.4
$ cp -f u-boot.bin VAB-630_Android_EVK_v1.0.3/bspinst/u-boot.bin
$ cd /android-5.0.0_r2/out/target/product/vab630
$ cp -f boot.img VAB-630_Android_EVK_v1.0.3/bspinst/boot.img
$ cp -f recovery.img VAB-630_Android_EVK_v1.0.3/bspinst/recovery.img
$ cp -f vab630-ota.zip VAB-630_Android_EVK_v1.0.3/bspinst/packages/vab630-ota.zip
```



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