



DEVELOPMENT GUIDE

# VIA VAB-820

Android BSP v5.0.9

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## Revision History

Version	Date	Remarks
1.00	12/20/2018	Initial release



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# 1. Introduction

This Development Guide explains how to setup the necessary build environment in order for users to customize the Android source code and create their own system image for the VIA VAB-820 board.

The VIA VAB-820 Android BSP v5.0.9 is developed based on the NXP android\_M6.0.1\_1.0.0-ga (Android 6.0 Marshmallow) and enables hardware features that are defined on the VIA VAB-820 board.

## 1.1 BSP Package Contents

There are four folders in the package as listed below.

Source code folder	Description
VAB-820_Android_source_code_patch.zip	Android source code patch files and Image building script files
Smart_ETK_v1.0_SourceCode.zip	Smart ETK demo program source code
Firmware folder	Description
Images_autoinstall_sd.zip	Android EVK system image and installation script files
Document folder	Description
VAB-820_Android_EVK_v5.0.9_Quick_Start_Guide_v1.00_20181220.pdf	Quick Start Guide
VAB-820_Android_BSP_v5.0.9_Development_Guide_v1.00_20181220.pdf	Development Guide
Smart_ETK_SDK_Programming_Guide_v1.00_20170811	Smart ETK SDK Programming Guide
Tools folder	Description
VAB-820_Smart_ETK_Demo_v1.0.apk	Smart ETK demo program
BluetoothSPPTest.apk	Bluetooth SPP testing program

VIA VAB-820 Android BSP contents

### 1.1.1 Source Code Folder Contents

**VAB-820\_Android\_source\_code\_patch.zip:** Includes Android 6.0.1 source code download script files, NXP Android patch file android\_M6.0.1\_1.0.0-ga\_core\_source.tar.gz, the VIA VAB-820 Android source code patch file and Image building script files.

**Smart\_ETK\_v1.0\_SourceCode.zip:** is the Smart ETK demo program source code.

### 1.1.2 Firmware Folder Contents

**Images\_autoinstall\_sd.zip:** The Android EVK system image and installation script files.

### 1.1.3 Document Folder Contents

**VAB-820\_Android\_EVK\_v5.0.9\_Quick\_Start\_Guide\_v1.00\_20181220.pdf:** The Quick Start Guide provides an overview of how to boot the Android EVK system image on the VIA VAB-820 board and configure the supported hardware functions in the build.

**VAB-820\_Android\_BSP\_v5.0.9\_Development\_Guide\_v1.00\_20181220pdf:** The Development Guide explains how to setup the necessary build environment in order for users to customize the Android source code and create their own system image for the VIA VAB-820 board.



**Smart\_ETK\_SDK\_Programming\_Guide\_v1 .00\_20170811.pdf:** The Programming Guide explains how to build the Smart ETK program and introduces a fully functional set of API for the different VIA boards or systems.

## 1.1.4 Tools Folder Contents

**VAB-820\_Smart\_ETK\_Demo\_v1.0.apk:** is the Smart ETK demo program.

**BluetoothSPPTest.apk:** is the Bluetooth SPP profile test program.

## 1.2 Version Information and Supported Features

- U-Boot version: 2015.04
- Kernel version: 3.14.52
- Evaluation image: Android Marshmallow 6.0
- Development based on NXP android\_M6.0.1\_1.0.0-ga (Android 6.0 Marshmallow)
- Supports SPI with eMMC boot
- Supports HDMI display
- Supports HDMI audio output
- Supports AUO LVDS capacitive touch panels (through USB interface)
  - AUO 10.4" G104XVN01.0 (1024×768)
  - AUO 7" G070VW01 (800×480)
- Supports Dual Display (Clone Mode)
- Supports CVBS & S-Video
- Supports COM1 DTE mode, COM2 TX/RX only
- Supports two FlexCAN TX/RX
- Supports Gigabit Ethernet
- Supports Line-in, Line-out, and Mic-in
- Supports VIA VNT9271 USB Wi-Fi dongle
- Supports VIA EMIO-1533 USB Wi-Fi module
- Supports VIA EMIO-1541 miniPCIe Wi-Fi module
- Supports VIA EMIO-2531 miniPCIe Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports VIA EMIO-5531 USB Wi-Fi & Bluetooth module
  - Supports Bluetooth A2DP and SPP profile
- Supports VIA EMIO-2550 miniPCIe Mobile Broadband module
- Supports Smart ETK v1.0: Watchdog timer, GPIO, UART, and FlexCAN
- Supports OTA (Over-The-Air technology)
- Supports shutdown option in Quick Settings
- Supports Ethernet configuration in Settings

## 2. Build Environment Setup

This section guides you through setting up the build environment for development. All instructions are based on using Ubuntu 14.04 LTS (64-bit).

To make sure that the build process completes successfully, we recommend at least 120GB of disk space and 15GB of 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 Android website at <https://source.android.com/setup/build/initializing>.

The OpenJDK 7 is not included in the Ubuntu 14.04 default installation. The first step is to add a new server manually by using the following commands:

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

To install the OpenJDK 7, use the following commands:

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

The following packages are required for the Android development environment. To install the required packages on the Ubuntu 14.04, use the following command:

```
$ sudo apt-get install git gnupg flex bison gperf build-essential zip curl zlib1g-dev libc6-dev libncurses5-dev x11proto-core-dev libx11-dev:i386 libreadline6-dev:i386 libgl1-mesa-glx:i386 libgl1-mesa-dev g++-multilib mingw32 tofrodos python-markdown libxml2-utils xsltproc zlib1g-dev:i386 uuid-dev liblzo2-dev libz-dev libc6-dev-i386 lib32z1 gcc g++ lzop u-boot-tools
```



## 3. Image Build

The section explains how to build the U-Boot binary and Android file system for the VIA VAB-820 board.

### 3.1 Extracting the VIA VAB-820 BSP

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

```
$ unzip VAB-820_Android_source_code_patch.zip
```

### 3.2 Downloading the Source Code of Android 6.0.1

Downloading the Android 6.0.1 source code to the BSP/src folder can take several hours depending on your internet connection.

**\*Note:** You need to set up a Git account before downloading the source code.

```
$ git config --global user.email you@example.com
$ git config --global user.name "Your Name"
```

Use the following commands to download the source code of Android 6.0.1:

```
$ cd Script
$ ./download_source_Android6.0.sh
```

### 3.3 Installing the Source Code Patch

Use the following command to install the NXP and VIA VAB-820 source code patch.

```
$ ./patch_fsl_via.sh
```

### 3.4 Building an Android Image

Use the following commands to build the Android image, the compiling process will take several hours.

```
$ cd ../src
$ source build/envsetup.sh
$ lunch vab820-userdebug
$ make -j8
```

After the compilation, the **src/out/target/product/vab820/** directory will contain the resulting binaries, as shown in the table below.

Binary	Description
u-boot.imx	U-Boot boot loader for iMX6Q
bspinst-vab820.img	BSP auto install image for iMX6Q
bspinst-vab820-6qp.img	BSP auto install image for iMX6QP
boot-vab820.img	Kernel for iMX6Q
boot-vab820-6qp.img	Kernel for iMX6QP
system.img	Android system image
recovery-vab820.img	Recovery image for iMX6Q
recovery-vab820-6qp.img	Recovery image for iMX6QP

Binary files generated



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