QUICK START GUIDE

VIA VAB-3000

Android 12.0 EVK

1.01-05122023

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Revision History

Version	Date	Remarks
1.01	05/12/2023	Updated descriptions in section 3.1 for installing the optional development kit and logging into the debug console.
1.00	19/09/2023	Initial release

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1. Introduction

This Quick Start Guide provides an overview of how to boot the Android image for the VIA VAB-3000 board and configure the supported hardware functions in the build.

The VIA VAB-3000 Android 12.0 EVK is developed based on the MediaTek Android 12.0 BSP, and it enables the hardware features of the VIA VAB-3000 board.

1.1 EVK Package Contents

There are three folders in the package listed as below.

Firmware folder	Description
VIA_VAB-3000_Android_12.0_EVK.zip	Android evaluation image
Document folder	**Description**
VIA_VAB-3000_Android_12.0_EVK_Quick_Start_Guide.pdf	Quick Start Guide
Tool folder	**Description**
VIA_Android_USB_Driver.zip	VIA USB driver
PoseDetector_Image.apk	Sample test program

1.1.1 Firmware Folder Contents

VIA_VAB-3000_Android_12.0_EVK.zip: Contains the precompiled Android image for evaluating the VIA VAB-3000 board.

1.1.2 Document Folder Contents

VIA_VAB-3000_Android_12.0_EVK_Quick_Start_Guide.pdf: This Quick Start Guide provides an overview on how to boot the Android image for the VIA VAB-3000 board and configure the supported hardware functions in the build.

1.1.3 Tool Folder Contents

VIA_Android_USB_Driver.zip: The VIA driver for ADB-over-USB.

PoseDetector_Image.apk: A sample program to test MTK NeuroPilot AI APU hardware acceleration.

1.2 Version Information and Supported Features

- Kernel version: 5.10.101
- Evaluation image: Android 12.0
- Development based on MediaTek Android 12.0 BSP
- Supports eMMC boot
- Supports HDMI display
- Supports HDMI audio output
- Supports MIPI DSI capacitive touch panel
  - ShenZhen K&D 7" KD070D54-39NH-B018-A (1024x600)
  - Silead GSL1680 I2C touch
- Supports COM port as RS-232 mode (TX/RX)
- Supports 10/100Mbps Ethernet port
- Supports MediaTek MT6357 Line-out and Mic-in
- Supports MediaTek MT6631 Wi-Fi 802.11ac and Bluetooth 5.0
- Supports VIA EMIO-2573 (EC25) 4G LTE mobile broadband miniPCIe module
- Supports MIPI CSI IMX135 camera module
- Supports MediaTek NeuroPilot AI APU hardware acceleration

2. Image Installation

This section explains the setup requirements for installing the Android evaluation image on the VIA VAB-3000 board.

The precompiled images are provided in the "Firmware" folder.

2.1 Installing with the Fastboot Mode

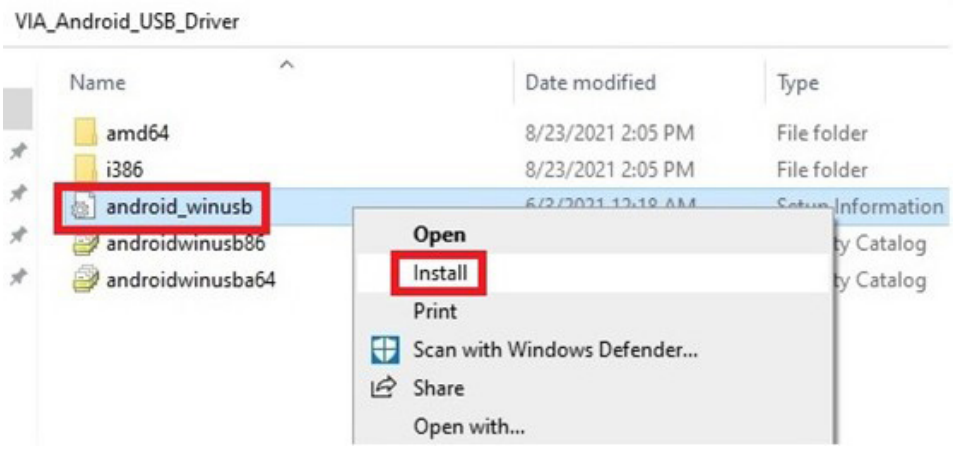
Follow the steps below to install Android EVK image:

Step 1

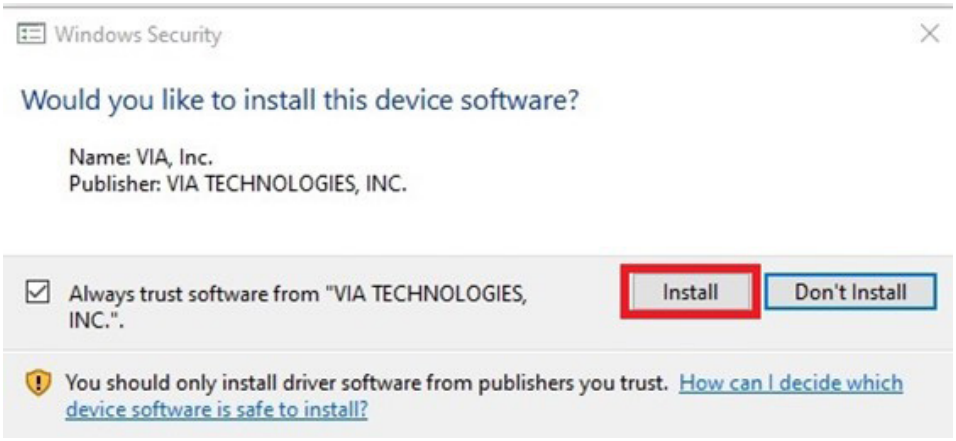
Prepare the "fastboot tool" and install the "VIA USB driver" into your Windows 10 host machine.

To get the "fastboot tool" for Windows, please refer to the "SDK Platform Tools release notes" chapter on the Android developer website https://developer.android.com/studio/releases/platform-tools.

To install the "VIA USB driver", right-click "android_winusb" and select "Install".



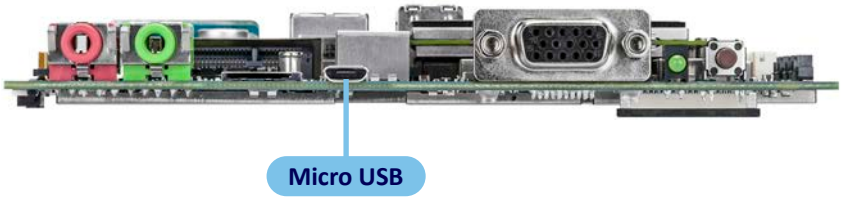
Then click "Install" when the installer opens.



When the installer finishes, it will show a confirmation message "The operation completed successfully".

Step 2

Connect the Windows 10 host machine and the VIA VAB-3000 board through the Micro USB 2.0 port using the Micro USB cable.



Micro USB 2.0 port diagram

Step 3

Plug in the AC-to-DC power adapter to power on the VIA VAB-3000 board.

If the EVK image is not installed, the VIA VAB-3000 board will stop at "fastboot: processing commands" as shown in the debug console below. Proceed to step 4 directly.

```
[4714] [USB] Unrecognized Speed 0
[4881] [USB] [INTR] Speed Change
[4881] [USB] HS is detected
[4882] [USB] [INTR] Reset
[5419] fastboot: processing commands
[5419] usb_read: remaining len 64, xfer len 64
```

Fastboot Mode

If the EVK image is already installed, use the following command to enter the Fastboot Mode on your Windows 10 host machine.

```
D:\platform-tools>adb shell reboot bootloader
```

Note:
After powering on the VIA VAB-3000 board, make sure the Windows 10 host machine detects it as an ADB device.

Step 4

Extract the VIA_VAB-3000_Android_12.0_EVK.zip file on your Windows 10 host machine.

To install the image, use the following command:

```
D:\VIA_VAB-3000_Android_12.0_EVK>set PATH=D:\platform-tools;%PATH%
D:\VIA_VAB-3000_Android_12.0_EVK>viaflash.exe --android
VIA: Operating system is Android12
VIA: installing preloader.img
VIA: installing GPT.img
VIA: erasing proinfo partition
VIA: erasing boot_para partition
VIA: installing cam_vpu1.img
VIA: installing cam_vpu2.img
VIA: installing cam_vpu3.img
VIA: erasing cam_vpu1_b partition
VIA: erasing cam_vpu2_b partition
VIA: erasing cam_vpu3_b partition
VIA: erasing nvram partition
VIA: installing protect1.img
VIA: installing protect2.img
VIA: installing persist.img
VIA: installing nvcfg.img
VIA: erasing seccfg partition
VIA: installing lk.img
VIA: erasing lk_b partition
VIA: installing boot.img
VIA: erasing boot_b partition
VIA: installing vendor_boot.img
VIA: erasing vendor_boot_b partition
VIA: erasing para partition
VIA: installing logo.bin
```

```
VIA: installing dtbo.img
VIA: erasing dtbo_b partition
VIA: erasing expdb partition
VIA: erasing frp partition
VIA: installing tee.img
VIA: erasing tee_b partition
VIA: erasing kb partition
VIA: erasing dkb partition
VIA: erasing metadata partition
VIA: installing nvdata.img
VIA: erasing md_udc partition
VIA: installing vbmeta.img
VIA: erasing vbmeta_b partition
VIA: installing vbmeta_system.img
VIA: erasing vbmeta_system_b partition
VIA: installing vbmeta_vendor.img
VIA: erasing vbmeta_vendor_b partition
VIA: installing super.img
VIA: installing userdata.img
VIA: rebooting target system

D:\VIA_VAB-3000_Android_12.0_EVK>
```

Step 5

Unplug the AC-to-DC power adapter to power off the VIA VAB-3000 board.

Step 6

Unplug the Micro USB cable, press the Power Button for 2 seconds and release it to power on the VIA VAB-3000 board.

When the boot process has completed, you will see the Android 12.0 desktop

.

3. Hardware Functions

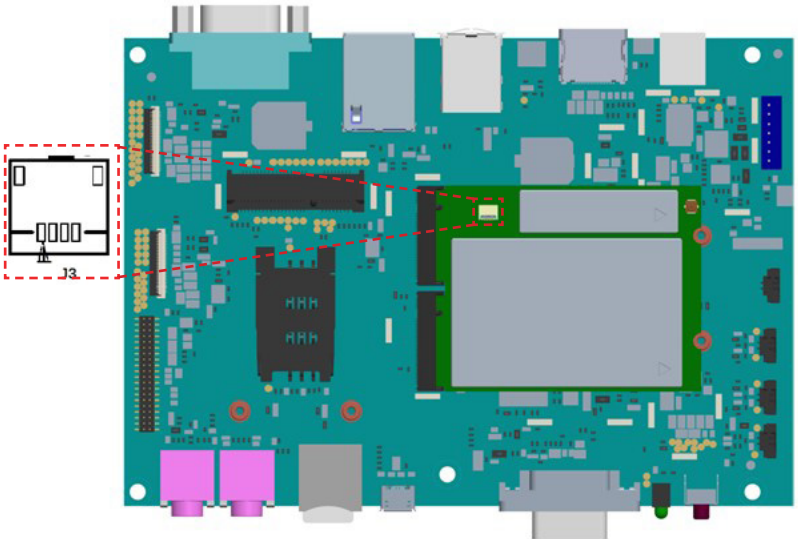
This section explains how to enable and test the hardware functions precompiled in the VIA VAB-3000 Android 12.0 EVK. The optional VIA VAB-3000 development kit and a serial port communication program such as PuTTY or Tera Term are required for the setup.

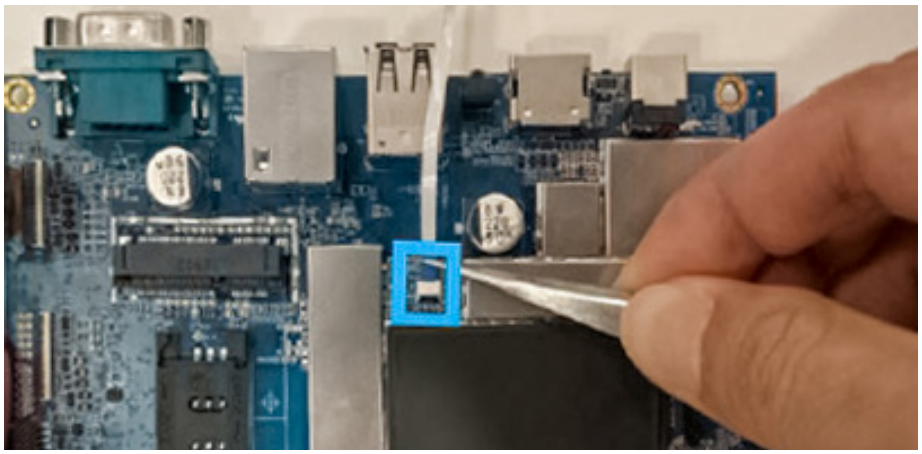
3.1 Using the Debug Console

Follow the steps below to use the debug console:

Step 1

Insert one plug connector of the 4-pin FFC cable (provided in the optional development kit) into the UART debug connector labeled 'J3' on the VIA VAB-3000 board, ensuring that the gold finger of the FFC cable faces down.





Step 2

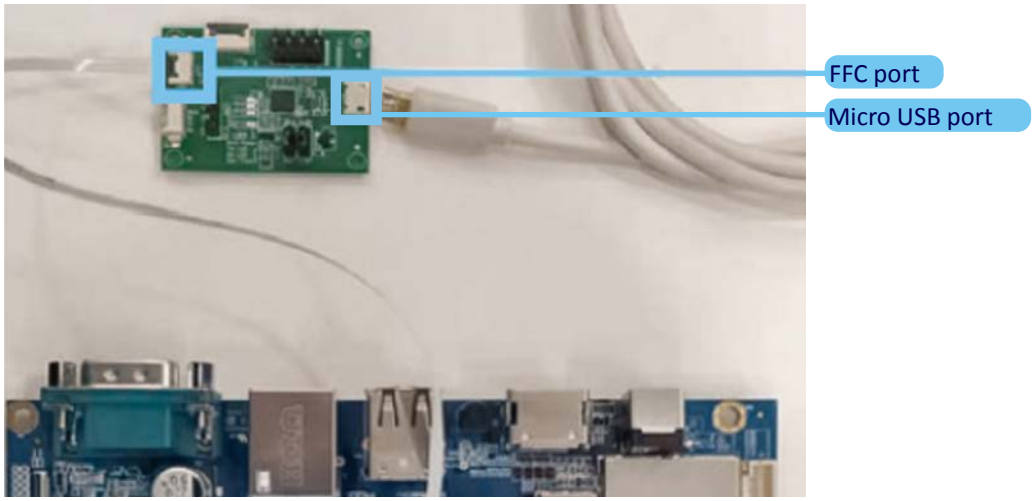
Insert the other plug connector of the 4-pin FFC cable into the 4-pin FFC port located on the USB to UART debug board (provided in the optional development kit), ensuring that the gold finger of the FFC cable faces down.

Step 3

Refer to Appendix section A.2.1 of the VIA VAB-3000 User Manual for instructions on setting the power jumpers on the USB to UART debug board.

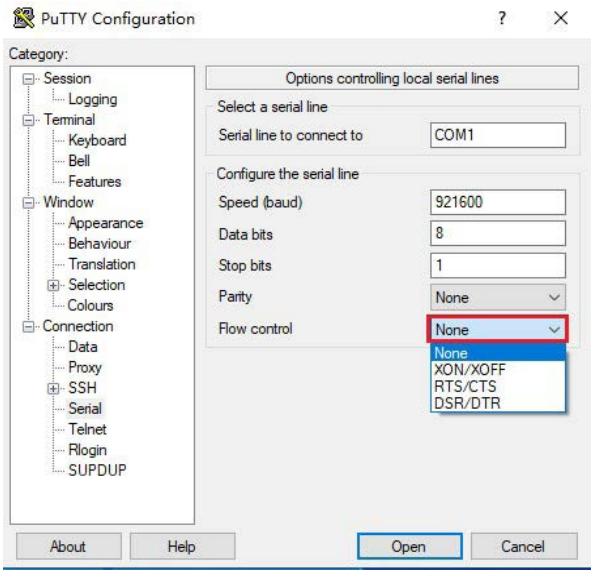
Step 4

Connect the Windows 10 host machine and the USB to UART debug board through the Micro USB 2.0 port using the Micro USB cable.



Step 5

Use PuTTY or Tera Term to connect and set the Baud Rate to "921600".



Step 6

Power on the VIA VAB-3000 board to initiate the boot process.

Step 7

When the VIA VAB-3000 board has completed booting, log in to the debug console.

3.2 Changing the Kernel Debug Level

To disable the kernel messages, modify the debug level using the following command:

```
console:/ # su
console:/ # echo 3 > /proc/sys/kernel/printk
```

3.3 Checking the BSP Version

To check the BSP version, use the following command:

```
console:/ # cat /proc/version
```

3.4 DVFS

To verify the DVFS (Dynamic Voltage Frequency Scaling) function and list all the supported features, use the following commands:

```
console:/ # ls -l /sys/devices/system/cpu/cpu0/cpufreq/
total 0
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 affected_cpus
-r-------- 1 root   root   4096 2022-02-24 18:16 cpuinfo_cur_freq
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 cpuinfo_max_freq
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 cpuinfo_min_freq
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 cpuinfo_transition_latency
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 related_cpus
-r--r--r-- 1 root   root   4096 2000-01-01 00:00 scaling_available_frequencies
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 scaling_available_governors
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 scaling_cur_freq
-r--r--r-- 1 root   root   4096 2022-02-24 18:16 scaling_driver
-rw-r--r-- 1 root   root   4096 2022-02-23 15:46 scaling_governor
-rw-rw---- 1 system system 4096 2000-01-01 00:00 scaling_max_freq
-rw-rw-r-- 1 system system 4096 2000-01-01 00:00 scaling_min_freq
-rw-r--r-- 1 root   root   4096 2022-02-24 18:16 scaling_setspeed
drwxr-xr-x 2 root   root      0 2022-02-24 18:16 schedutil
drwxr-xr-x 2 root   root      0 2000-01-01 00:00 stats
console:/ #
```

To check the supported and current CPU frequency, use the following commands:

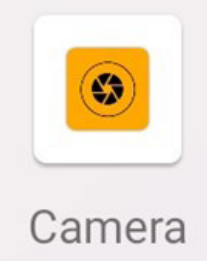
```
console:/ # cat /sys/devices/system/cpu/cpu0/cpufreq/scaling_available_frequencies
850000 918000 987000 1056000 1125000 1216000 1308000 1400000 1466000 1533000 1633000 1700000
1767000 1834000 1917000 2001000
console:/ # cat /sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_cur_freq
1633000
```

3.5 Display

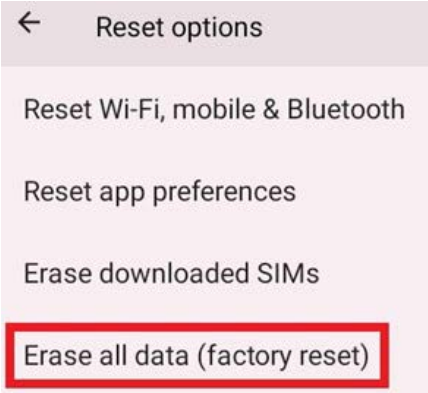
There is no need to set the display device. If you connect an HDMI display, HDMI output will be automatically enabled after booting. If you connect an LCD panel, LCD panel output will be automatically enabled after booting.

3.6 Camera

If a desired CSI camera module was connected correctly to the VIA VAB-3000 board before booting the VIA VAB-3000 board, a "Camera" APK can be found on the Android desktop. Click to open it and test the camera functions.



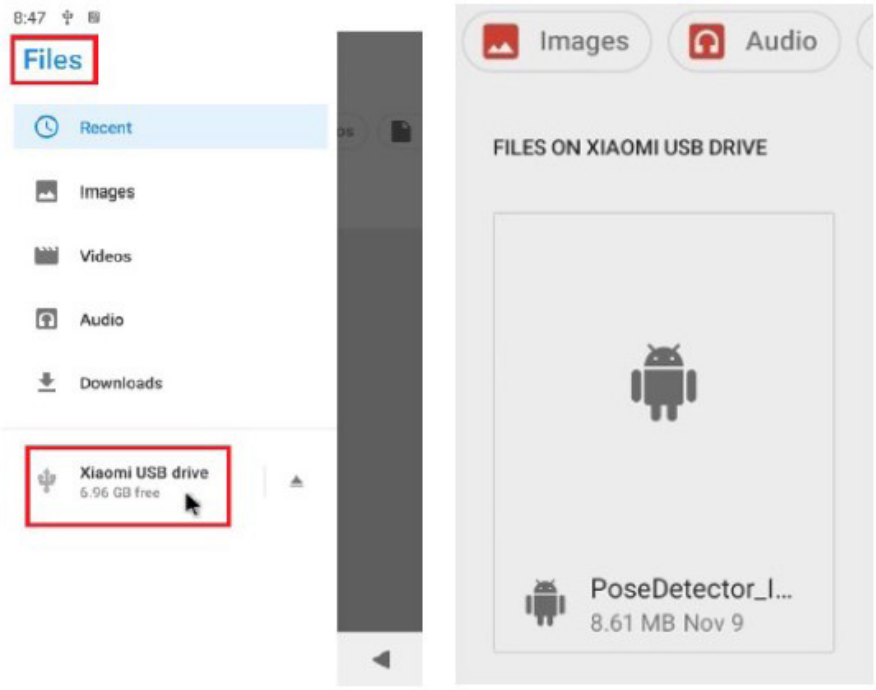
If the CSI camera module was connected correctly before booting the VIA VAB-3000 board, but there is no "Camera" APK on the Android desktop, navigate to "Settings > System > Reset options" and click "Erase all data (factory reset)" to reboot. The "Camera" APK will be generated after the system reboots.



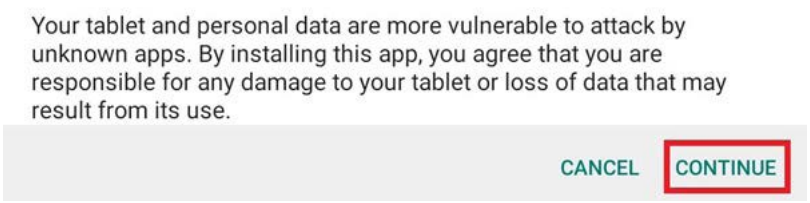
3.7 MTK NeuroPilot AI APU Hardware Acceleration

We recommend running the "PoseDetector_Image.apk" sample program for testing MTK NeuroPilot AI APU hardware acceleration. To install the program, follow the steps below:

1. Copy the "PoseDetector_Image.apk" file to a USB drive and connect the USB drive to the VIA VAB-3000 board.
2. Next, navigate to "Files" and click on the USB drive's name to find "PoseDetector_Image.apk" as shown below. Double-click the program



3. When the program opens, it will display a dialog box as shown below. Click "Continue" to confirm.



4. After installation, double-click "PoseDetector" to run the program.

5. Check the Pose Detection inference time on the bottom left corner of the program:
   - If the inference time is less than 200 ms, MTK NeuroPilot AI APU hardware acceleration is enabled and running correctly.
   - If the inference time is greater than 200 ms, MTK NeuroPilot AI APU hardware acceleration is disabled.

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