QUICK START GUIDE

VIA ARTiGO A950

Android 10.0 EVK

1.00-03022023

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Revision History

Version	Date	Remarks
1.00	03/02/2023	Initial release

Table of Contents

1. Introduction

This Quick Start Guide provides an overview of how to boot the Android image for the VIA ARTiGO A950 and configure the supported hardware functions in the build.

The VIA ARTiGO A950 Android 10.0 EVK is developed based on the MediaTek Android 10.0 BSP, and it enables the hardware features of the VIA ARTiGO A950.

1.1 EVK Package Contents

There are three folders in the package listed as below.

Firmware folder	Description
VIA_ARTiGO_A950_Android_10.0_EVK.zip	Android evaluation image
Document folder	**Description**
VIA_ARTiGO_A950_Android_10.0_EVK_Quick_Start_Guide.pdf	Quick Start Guide
Tool folder	**Description**
VIA_Android_USB_Driver.zip	VIA USB driver
PoseDetector_Image.apk	A sample test program

1.1.1 Firmware Folder Contents

VIA_ARTiGO_A950_Android_10.0_EVK.zip: Contains the precompiled Android image for evaluating the VIA ARTiGO A950.

1.1.2 Document Folder Contents

VIA_ARTiGO_A950_Android_10.0_EVK_Quick_Start_Guide.pdf: This Quick Start Guide provides an overview on how to boot the Android image for the VIA ARTiGO A950 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: 4.14.141
- Evaluation image: Android 10.0
- Development based on MediaTek Android 10.0 BSP
- Supports eMMC boot
- Supports HDMI display
- Supports HDMI audio output
- Supports two 10/100Mbps Ethernet ports
- Supports MediaTek MT6358 Headphone and Mic-in
- Supports MediaTek MT7668 Wi-Fi 802.11ac and Bluetooth 5.0
- Supports VIA EMIO-2574 (SIM7600JC-H) 4G LTE mobile broadband miniPCIe module
- Supports MediaTek NeuroPilot AI APU hardware acceleration

2. Image Installation

This section explains the setup procedures for booting from the eMMC.

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

2.1 Installing with the Fastboot Mode

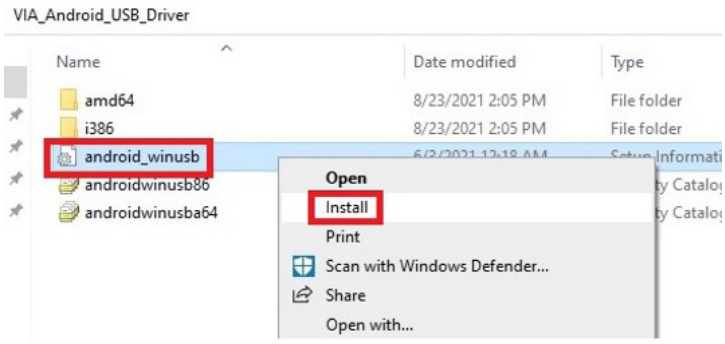
Follow the steps below to install the Android EVK image:

Step 1

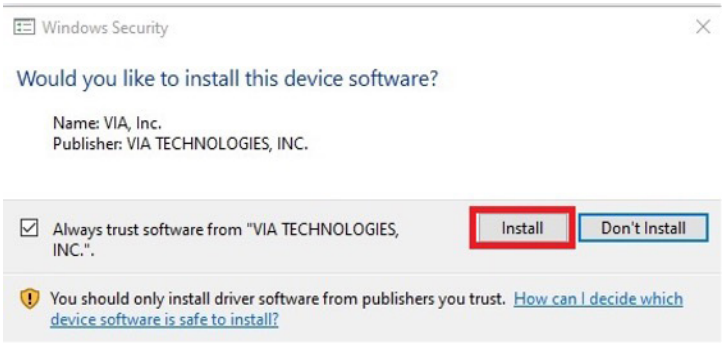
Prepare the "fastboot tool" and install the "VIA Android USB driver" on your Windows 10 host machine.

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 Android USB driver", right-click "android_winusb" and select "Install".



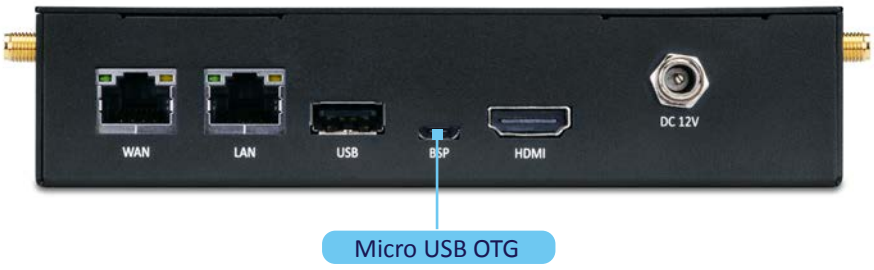
Then click "Install" when the installer opens.



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 ARTiGO A950 through the Micro USB 2.0 port using the Micro USB cable.

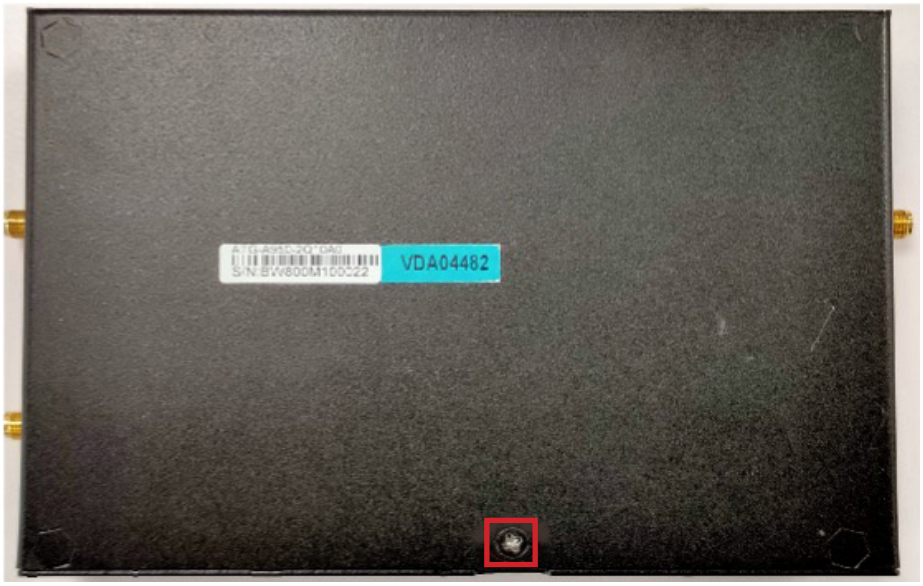


Micro USB 2.0 port diagram

Step 3

Power off the VIA ARTiGO A950 and dissemble the system chassis by removing the 4 screws located on the top panel and 1 screw located on the bottom panel.

Top panel



Bottom panel

Step 4

Set the two OS image jumpers (J7 and J5) on the board to the Download mode as shown in the diagram below.

OS image jumpers diagram

J5 and J7 Settings	Pin 1	Pin 2	Pin 3
Normal mode (default)	Open	Short	Short
Download mode	Short	Short	Open

OS image jumper settings

Step 5

Plug in the AC-to-DC power adapter to power on the VIA ARTiGO A950.

The VIA ARTiGO A950 will stop at "fastboot: processing commands" as shown in the debug console below.

Fastboot Mode

Note:
Make sure the Windows 10 host machine detects the VIA ARTiGO A950 as an ADB device.

If the EVK image is already installed, skip directly to Step 7.

Step 6

Extract the VIA_ARTiGO_A950_Android_10.0_EVK.zip file on your Windows 10 host machine.

To install the image, use the following command:

```
D:\VIA_ARTiGO_A950_Android_10.0_EVK>set PATH=D:\platform-tools;%PATH%
D:\VIA_ARTiGO_A950_Android_10.0_EVK>viaflash.exe
++++++++++++++++++++++++++++++++++++++++++++++++++++

        VIAFlash version v1.0.0
    (built: Mar 16 2022 18:03:28 UTC)

++++++++++++++++++++++++++++++++++++++++++++++++++++
    To let this tool work well, please
    ensure the system is at fastboot mode!

  If yes, please press any key to continue.
++++++++++++++++++++++++++++++++++++++++++++++++++++
>> Image OS is "Android"

++++++++++++++++++++++++++++++++++++++++++++++++++++
  MBR                          : OK
```

```
  preloader_tb8788p1_64_wifi.bin : OK
  logo.bin                       : OK
  vbmeta.img                     : OK
  vbmeta_system.img              : OK
  vbmeta_vendor.img              : OK
  md1img.img                     : OK
  spmfw.img                      : OK
  scp.img                        : OK
  sspm.img                       : OK
  cam_vpu1.img                   : OK
  cam_vpu2.img                   : OK
  cam_vpu3.img                   : OK
  lk.img                         : OK
  boot.img                       : OK
  dtbo.img                       : OK
  tee.img                        : OK
  super.img                      : OK
  userdata.img                   : OK
++++++++++++++++++++++++++++++++++++++++++++++++++
==========================================
  Start to flash images --> Android
==========================================
Sending 'preloader_a' (255 KB)                     OKAY [  0.032s]
Writing 'preloader_a'                              OKAY [  0.014s]
Finished. Total time: 0.071s

Erasing 'pgpt'                                     OKAY [  0.014s]
Finished. Total time: 0.024s

Sending 'pgpt' (17 KB)                             OKAY [  0.026s]
Writing 'pgpt'                                     OKAY [  0.007s]
Finished. Total time: 0.051s

Sending 'logo' (2801 KB)                           OKAY [  0.090s]
Writing 'logo'                                     OKAY [  0.074s]
Finished. Total time: 0.194s

Sending 'vbmeta_a' (4 KB)                          OKAY [  0.026s]
Writing 'vbmeta_a'                                 OKAY [  0.006s]
Finished. Total time: 0.052s

Sending 'vbmeta_system_a' (4 KB)                   OKAY [  0.025s]
Writing 'vbmeta_system_a'                          OKAY [  0.006s]
Finished. Total time: 0.053s

Sending 'vbmeta_vendor_a' (4 KB)                   OKAY [  0.025s]
Writing 'vbmeta_vendor_a'                          OKAY [  0.006s]
Finished. Total time: 0.054s

Sending 'md1img_a' (0 KB)                          OKAY [  0.026s]
Writing 'md1img_a'                                 OKAY [  0.006s]
Finished. Total time: 0.051s

Sending 'spmfw_a' (47 KB)                          OKAY [  0.027s]
Writing 'spmfw_a'                                  OKAY [  0.008s]
Finished. Total time: 0.055s

Sending 'scp_a' (608 KB)                           OKAY [  0.038s]
Writing 'scp_a'                                    OKAY [  0.022s]
Finished. Total time: 0.088s

Sending 'sspm_a' (480 KB)                          OKAY [  0.036s]
Writing 'sspm_a'                                   OKAY [  0.019s]
Finished. Total time: 0.077s

Sending 'cam_vpu1_a' (1610 KB)                     OKAY [  0.059s]
Writing 'cam_vpu1_a'                               OKAY [  0.044s]
Finished. Total time: 0.126s

Sending 'cam_vpu2_a' (9887 KB)                     OKAY [  0.242s]
Writing 'cam_vpu2_a'                               OKAY [  0.220s]
```

```
Finished. Total time: 0.492s

Sending 'cam_vpu3_a' (135 KB)                      OKAY [  0.028s]
Writing 'cam_vpu3_a'                               OKAY [  0.012s]
Finished. Total time: 0.062s

Sending 'lk_a' (774 KB)                            OKAY [  0.041s]
Writing 'lk_a'                                     OKAY [  0.026s]
Finished. Total time: 0.091s

Sending 'dtbo_a' (8192 KB)                         OKAY [  0.200s]
Writing 'dtbo_a'                                   OKAY [  0.186s]
Finished. Total time: 0.410s

Sending 'tee_a' (139 KB)                           OKAY [  0.028s]
Writing 'tee_a'                                    OKAY [  0.011s]
Finished. Total time: 0.062s

Sending 'userdata' (860 KB)                        OKAY [  0.043s]
Writing 'userdata'                                 OKAY [  0.157s]
Finished. Total time: 0.225s

------------------------------------------------
  Platform will be rebooted and continue soon,
  please wait for flash completed
------------------------------------------------
Rebooting into bootloader                          OKAY [  0.004s]
Finished. Total time: 0.006s

< waiting for any device >
Sending 'boot_a' (33792 KB)                        OKAY [  0.905s]
Writing 'boot_a'                                   OKAY [  0.750s]
Finished. Total time: 1.723s

------------------------------------------------
  Platform will be rebooted and continue soon,
  please wait for flash completed
------------------------------------------------
Rebooting into bootloader                          OKAY [  0.003s]
Finished. Total time: 0.006s

< waiting for any device >
Sending sparse 'super' 1/12 (131068 KB)            OKAY [  3.209s]
Writing 'super'                                    OKAY [  3.036s]
Sending sparse 'super' 2/12 (128270 KB)            OKAY [  2.956s]
Writing 'super'                                    OKAY [  4.464s]
Sending sparse 'super' 3/12 (127597 KB)            OKAY [  2.943s]
Writing 'super'                                    OKAY [  3.553s]
Sending sparse 'super' 4/12 (131068 KB)            OKAY [  3.046s]
Writing 'super'                                    OKAY [  3.092s]
Sending sparse 'super' 5/12 (131068 KB)            OKAY [  2.929s]
Writing 'super'                                    OKAY [  2.916s]
Sending sparse 'super' 6/12 (131071 KB)            OKAY [  3.183s]
Writing 'super'                                    OKAY [ 11.019s]
Sending sparse 'super' 7/12 (131068 KB)            OKAY [  2.979s]
Writing 'super'                                    OKAY [  3.179s]
Sending sparse 'super' 8/12 (125124 KB)            OKAY [  2.920s]
Writing 'super'                                    OKAY [  2.940s]
Sending sparse 'super' 9/12 (118861 KB)            OKAY [  2.806s]
Writing 'super'                                    OKAY [  3.327s]
Sending sparse 'super' 10/12 (125744 KB)           OKAY [  2.847s]
Writing 'super'                                    OKAY [  2.995s]
Sending sparse 'super' 11/12 (131068 KB)           OKAY [  3.032s]
Writing 'super'                                    OKAY [  3.103s]
Sending sparse 'super' 12/12 (73272 KB)            OKAY [  1.712s]
Writing 'super'                                    OKAY [  1.783s]
Finished. Total time: 80.451s

============================================
Finished. Re-Starting system ...
Rebooting                                          OKAY [  0.003s]
```

```
Finished. Total time: 0.006s

D:\VIA_ARTiGO_A950_Android_10.0_EVK>
```

Step 7

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

```
E:\platform-tools>adb reboot bootloader
```

Step 8

Unplug the AC-to-DC power adapter to power off the VIA ARTiGO A950 and set the two OS image jumpers (J7 and J5) back to the Normal mode setting as shown in the diagram below.

OS image jumpers diagram

Step 9

Unplug the Micro USB cable, press the Power Button for 2 seconds, then release it to power on the VIA ARTiGO A950.

When the boot process has completed, you will see the Android 10.0 desktop.

3. Hardware Functions

This section explains how to enable and test the hardware functions precompiled in the Android 10.0 EVK.

3.1 Enabling ADB Debugging

Follow the steps below to enable ADB debugging:

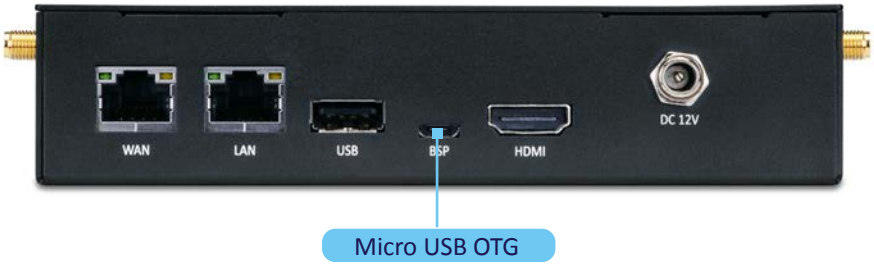
Step 1

Set the two OS image jumpers (J7 and J5) on the board to the Download mode as shown in the diagram below.

OS image jumpers diagram

Step 2

Connect the Windows 10 host machine and the VIA ARTiGO A950 through the Micro USB 2.0 port using the Micro USB cable.



Micro USB 2.0 port diagram

Step 3

Power on the VIA ARTiGO A950 to initiate the boot process.

Step 4

When the VIA ARTiGO A950 has completed booting, use the following command to open ADB debugging.

```
E:\platform-tools>adb shell
```

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 2020-04-06 06:34 affected_cpus
-r-------- 1 root root 4096 2020-04-06 06:34 cpuinfo_cur_freq
-r--r--r-- 1 root root 4096 2020-04-06 06:34 cpuinfo_max_freq
-r--r--r-- 1 root root 4096 2020-04-06 06:34 cpuinfo_min_freq
-r--r--r-- 1 root root 4096 2020-04-06 06:34 cpuinfo_transition_latency
-r--r--r-- 1 root root 4096 2020-04-06 06:34 related_cpus
-r--r--r-- 1 root root 4096 2020-04-06 06:34 scaling_available_frequencies
-r--r--r-- 1 root root 4096 2020-04-06 06:34 scaling_available_governors
-r--r--r-- 1 root root 4096 2020-04-06 06:34 scaling_cur_freq
-r--r--r-- 1 root root 4096 2020-04-06 06:34 scaling_driver
-rw-rw---- 1 system system 4096 2010-01-01 00:00 scaling_governor
-rw-rw---- 1 system system 4096 2010-01-01 00:00 scaling_max_freq
-rw-rw-r-- 1 system system 4096 2010-01-01 00:00 scaling_min_freq
-rw-r--r-- 1 root root 4096 2020-04-06 06:34 scaling_setspeed
console:/ #
```

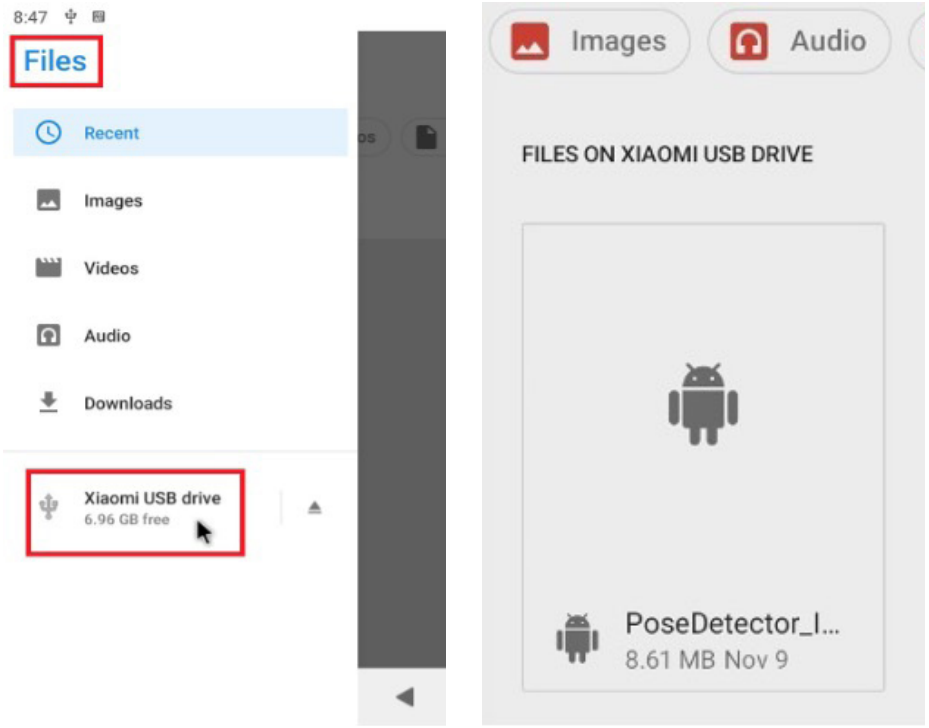
To check the supported and current CPU frequency, use the following commands:

```
:~# cat /sys/devices/system/cpu/cpu0/cpufreq/scaling_available_frequencies
1989000 1924000 1846000 1781000 1716000 1677000 1625000 1586000 1508000 1417000 1326000
1248000 1131000 1014000 910000 793000
:~# cat /sys/devices/system/cpu/cpu0/cpufreq/cpuinfo_cur_freq
793000
```

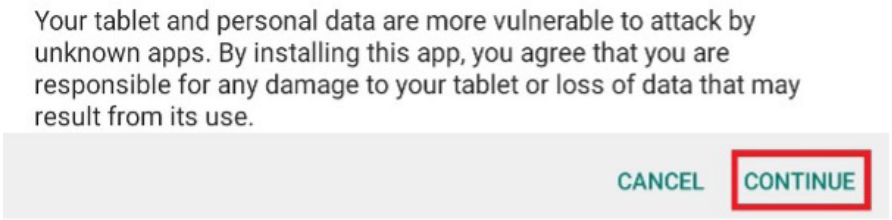
3.5 MTK NeuroPilot AI APU Hardware Acceleration

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 ARTiGO A950 system.
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.



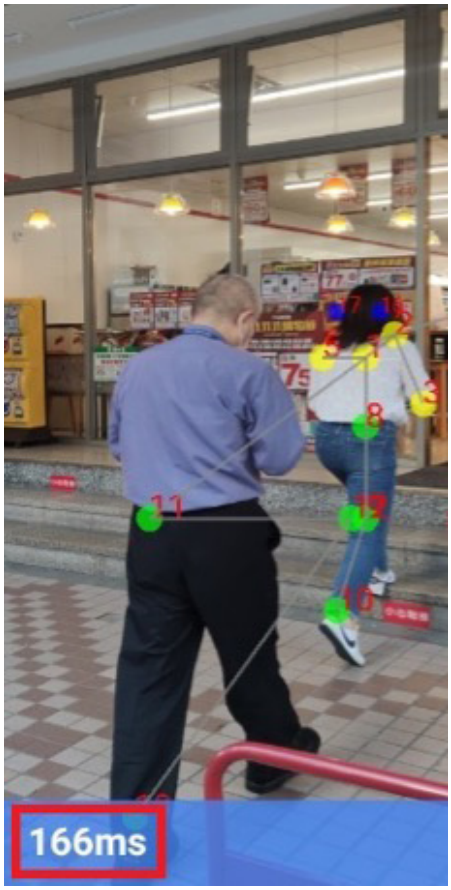
3. When the program opens, it will display a dialog box as shown below. Click "Continue" to confirm.



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

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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