

EVALUATION GUIDE

ALTA DS 2

Android BSP 3.0

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Revision History

Version	Date	Remarks
1.00	2015/7/22	Initial external release
1.01	2015/7/24	Added OTA steps
1.02	2015/7/31	Updated back page
1.03	2015/8/25	Added section 4.1 Setting Split/Clone Mode through S3 PCD Editor
1.04	2015/10/12	Removed ARTiGO A900/VAB-1000 in the document
1.05	2015/10/22	Modified typo

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1. Introduction

1.1. Overview

The purpose of this Evaluation Guide is to help you get started with Android Evaluation Kit (EVK) for **ALTA DS 2 platform**.

This covers the topics such as:

- Creating your booting media and flash a new Android firmware / OS image onto your system
- Modifying the boot parameters to fit the case you use

1.2. Package Content

The ALTA DS 2 Android Evaluation Kit can be downloaded from the VIA Embedded website, it contains the following components:

EVK (Evaluation Kit): The binary package includes eloader, U-Boot, Kernel, Android and firmware installation package.

EVK	
FirmwareInstall	Firmware installer used to upgrade the firmware for the target device. Including the below binary files under bspinst folder: <ul style="list-style-type: none"> ● Eloader: Primary boot loader used to initialize the hardware. ● U-Boot: Second boot loader used to initialize the hardware and boot from the operation system. ● Kernel: Linux kernel used to provide system program services and manage hardware and software resources. ● Android: A mobile operating system based on the Linux kernel and developed by Google.

Tools	
	 SmartETK
	 OTA
	 S3PCDEditor

Table 1 EVK content

Document: Includes the Evaluation Guide and any other documents required for the development.

Document
Evaluation Guide
Android Smart ETK SDK Programming Guide

Table 2 Document content

2. Making Android System Booting Media

This chapter describes how to install the firmware for ALTA DS 2. Users could follow the procedure described in section 2.1 below for installing the firmware provided by the EVK software package.

2.1. Requirements

- Linux development computer
- SD storage card
- EVK package
 - Elite1000 Android4.4.2 EVK*.tgz (Support ext4 SD)
 - Elite1000 Android4.4.2 FirmwareInstall vfat bspinst*.tgz (Support vfat SD)

**Note:**

1. To get more installation process about the vfat EVK installation package, please refer to Appendix B.

2.2. EVK Installation Package

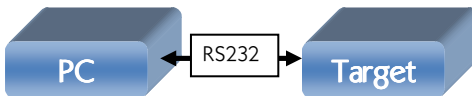
The up-to-date firmware is included in the latest EVK package which could be downloaded from VIA Embedded Website. Users can follow the steps to install the firmware package which is supported in ext4 formatted SD storage card for evaluation from EVK without building the BSP directly.

Step 1: Prepare a SD storage card with ext4 formatted.

Step 2: Copy firmware package from /EVK/FirmwareInstall/*.* to SD storage card root directory. Users can check content in the SD storage card when finish copying the files.

```
#The mount path of SD storage for this example is /mnt/tmp1
user@ubuntu:~$ ls /mnt/tmp1
bspinst _EXT4_SD_CARD_ONLY_ scriptcmd
```

Step 3: The recommend connection of debug port between device and Linux host computer is shown in Figure 1 . The target device for this example is ALTA DS 2.



```
#Setting in Terminal AP, ex:Putty

Baud Rate: 115200
Data: 8 bit
Parity: none
Stop: 1 bit
Flow control: none
```

Figure 1 Debug port connection and setting

The U-Boot will wait 3 seconds to stop booting after powering on by pressing any key. When booting is stopped, that prompt sign will show up on terminal screen. Users can skip to access U-Boot setting if nothing needs to be changed.

```

#The booting message for this example is ALTA DS 2

eloder-32.00.01 start up!
board_id:73a1
cpu_freq: 1G
mclk: 667M

Product Version:unspecified
Update List (Commit):unspecified

U-Boot 32.01.00-elite1000 (May 21 2015 - 11:38:29)

Board: ELITE1000 EVM
I2C: ready
No support HDMI-IN u-boot, Only reserve 8MB for secure boot
DRAM: 2 GiB
MMC: S3Graphics Elite SD/MMC: 0, S3Graphics Elite SD/MMC: 1, S3Graphics
Elite SD/MMC: 2
connected devices = 0x8000
Bios connect devices is 0x8000.
IGA1 device is 0x8000
IGA2 device is 0x0
Output for IGA1 is: 0x8000
SD/MMC: Select 400KHz as clock rate
mask data:4
elite_mci_command: waiting for status update
mask data:4
elite_mci_command: waiting for status update
SD/MMC: Select 400KHz as clock rate
SD/MMC: Select 50MHz as clock rate
Loading boot logo BMP file w/ 502x302 from eMMC
set mode on IGA[0]->DP5(Preferred Mode) [OK]
    source mode: 1920x1200, 32 bit
    scaler size: 1920x1200
    dest mode: 1920x1200@6000
Elite PCIe port 0: pp->base 0 0xd80b0000
RP before 0x250 0x20000007
RP middle 0x250 0x20000003
RP after 0x250 0x20000003
Elite PCIe port 1: pp->base 1 0xd80c0000
RP before 0x250 0x20000006
RP middle 0x250 0x20000002
RP after 0x250 0x20000002
Set 0 norm base address d80b1018 base c0000000, size 00001000
Set 1 perf base address d80b1020 base c0100000, size 00004000
In: serial
Out: serial
Err: serial
press any key to abort fastboot!
0
Device is locked
lba_size = 512
lba_start partition_size name
=====
34 4194304( 4M) bootlogo
    
```

```

    8226      524288(   512K)  deviceinfo
    9250      2097152(    2M)  devicetree
   13346     16777216(   16M)  misc
   46114     33554432(   32M)  recovery
   111650    33554432(   32M)  boot
   177186    536870912(  512M)  system
   1225762    536870912(  512M)  cache
   2274338    2744630272( 2617M)  userdata
=====
info partition magic 0x0 invalid, assuming none
No existing device info found.
Setting serial number from constant (no dieid info)
fastboot serial_number = 00123ABCDEF
Returning key pressed false
boot_method is 1

fbt_preboot: request for a normal boot
Net:   REALTEK RTL8168 @ 0xc0000000
MCFG:  RTL8168G/8111G (0020)
RTL8168
Hit any key to stop autoboot:  3
    
```

#To type "pri" to print out current U-Boot parameter or type "boot" to boot up directly

```

S3 # pri
androidno=030a3d8408e49475
baudrate=115200
bootargs=console=ttyS1,115200n8 root=/dev/mmcblk0p1
rootflags=errors=remount-ro,commit=0 rootfstype=
ext4 rw init=/init rootdelay=1 androidboot.serialno=030a3d8408e49475
bootargs_default=console=ttyS1,115200n8 root=/dev/mmcblk0p1
bootargs_emmc=setenv bootargs ${kernelargs}
androidboot.serialno=${androidno} root=/dev/mmcblk0p9 ro
otwait rootflags=errors=remount-ro,commit=0 rootfstype=ext4 rw ${mtdparts}
init=/init rw
bootargs_mmc=setenv bootargs ${kernelargs}
androidboot.serialno=${androidno} root=/dev/mmcblk0p1 ro
otwait rootflags=errors=remount-ro,commit=0 rootfstype=ext4 rw ${mtdparts}
init=/init rw
bootargs_nand=setenv bootargs ${kernelargs}
androidboot.serialno=${androidno} root=/dev/mtdblock15 r
ootfstype=yaffs2 init=/init rw
bootcmd=emmc format;run bootargs_mmc; ext4load mmc 0:1 0x0 scriptcmd; if
iminfo 0x0; then source 0;
else run bootcmd_mmc; fi
bootcmd_default=run bootargs_mmc; ext4load mmc 0:1 0x0 scriptcmd; if
iminfo 0x0; then source 0; else
run bootcmd_mmc; fi
bootcmd_emmc=run bootargs_emmc && ext4load mmc 2:9 0x6000000 elite1000-
emmc.dtb; ext4load mmc 2:9 0x
2800000 uImage; if iminfo 0x2800000; then bootm 0x2800000 - 0x6000000;
else run bootcmd_nand; fi
bootcmd_mmc=run bootargs_mmc && ext4load mmc 0:1 0x6000000
bspinst/elite1000-emmc.dtb; ext4load mmc
    
```

```

0:1 0x2800000 bspinst/uImage; if iminfo 0x2800000; then bootm 0x2800000 -
0x6000000; else run bootcm
d_emmc; fi
bootcmd_nand=run bootargs_nand; setenv bootcmd "booti boot"; boot;
bootdelay=3
bootdir=/boot
bootfile=uImage
ethact=RTL8168
ethaddr=00:1a:32:b0:12:63
fastboot_unlocked=0
fdt_high=0xffffffff
fdtaddr=0x10000000
fdtfile=undefined
filesize=dc2
initrd_high=0xffffffff
kernelargs=console=ttys1,115200n8 rootdelay=1
loadaddr=0x80200000
mtdids=nand0=nand
mtdparts=mtdparts=nand:4M(secureboot),4M(secureos),4M(audiofirmware),2M(ub
oot_env),4M(uboot),4M(boot
_logo),4M(nvram),12M(devicetree),32M(otaloader),32M(iploader),16M(device_i
nfo),16M(misc),16M(boot),1
6M(recovery),384M(system),32M(package),384M(cache),-(data)
nand_setup=ext4load mmc 0:1 0x2000000 bspinst/boot_script.uimg; source
0x2000000
other_env=ext4load mmc 0:1 0x1000 bspinst/other_env.uimg; source 0x1000;
rdaddr=0x81000000
setup_bootloader=ext4load mmc 0:1 0x1000 bspinst/bootloader_setup.uimg;
source 0x1000;
setup_emmc=ext4load mmc 0:1 0x1000 bspinst/bootloader_setup.uimg; source
0x1000; ext4load mmc 0:1 0x
1000 bspinst/uboot_emmc_setup.uimg; source 0x1000;
setup_img=ext4load mmc 0:1 0x1000 bspinst/img_setup.uimg; source 0x1000;
setup_nand=ext4load mmc 0:1 0x1000 bspinst/bootloader_setup.uimg; source
0x1000; ext4load mmc 0:1 0x
1000 bspinst/uboot_nand_setup.uimg; source 0x1000;
stderr=serial
stdin=serial
stdout=serial

Environment size: 2791/65531 bytes
S3 # boot
    
```

Step 4: Insert the SD storage card to the target device and power it on. The installation will be executed automatically as shown in Figure 2~Figure 3.

Step 5: Remove the SD storage card when the message “Please remove installation media” pops up, as shown in Figure 4. The device will reboot automatically and boot up Android.

```
VIA Android BSP Installation
Elite1000_Android4.4.2_v3.0.7_150624
-----

ELoader Version : 0.02.00
U-Boot Version : 0.05.00
Kernel Version : 0.06.00
Base File System Version : 0.07.00
Reference Sample Code Version : 0.01.00
OtherInfo : S3G Version : 62.02.01a.01

██████████ 40 %
installing system.img

Warnings! Please don't power off! Please wait...
```

Figure 2 Installation progressing

```
VIA Android BSP Installation
Elite1000_Android4.4.2_v3.0.7_150624
-----

ELoader Version : 0.02.00
U-Boot Version : 0.05.00
Kernel Version : 0.06.00
Base File System Version : 0.07.00
Reference Sample Code Version : 0.01.00
OtherInfo : S3G Version : 62.02.01a.01

██████████ 100 %
Please remove installation media!

Warnings! Please don't power off! Please wait...
```

Figure 3 Finish Installing and message pops up

```
VIA Android BSP Installation
Elite1000_Android4.4.2_v3.0.7_150624

-----

ELoader Version : 0.02.00
U-Boot Version : 0.05.00
Kernel Version : 0.06.00
Base File System Version : 0.07.00
Reference Sample Code Version : 0.01.00
OtherInfo : S3G Version : 62.02.01a.01

[Progress bar] 100 %

System will reboot in 2 seconds

Warnings! Please don't power off! Please wait...
```

Figure 4 Finish installing and reboot count down procedure

2.3. Updating the Firmware Package

For information on updating the firmware package, please refer to the ALTA DS 2 Android Development Guide! It is available from the ALTA DS 2 product page on the VIA Embedded website, it is also included in the ALTA DS 2 Android Board Support Package (BSP).

3. Functionality

ALTA DS 2 is designed with enhanced features including UART and Watchdog Timer support. These Functions can be controlled by Smart ETK Tool under Android Environment. For more details about Smart ETK, please refer to **Android Smart ETK SDK Programming Guide.pdf** in the **"Document"** Folder and install the same APK from **/EVK/Tools/SmartETK** for evaluation directly.

4. Platform Specific Setting

4.1. Setting Split/Clone Mode through S3 PCD Editor

The supported ALTA DS 2 device is listed below.

- ALTA DS 2 2GB RAM SKU

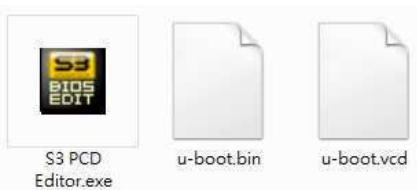
To enable the Split/Clone Mode Support in ALTA DS 2, VIA provides an Editor Tool to enable HDMI2 output.

4.1.1. Preparation

The S3 PCD Editor Tool was located in the "TestTool" Folder and named as "S3 PCD Editor.exe". It is a Windows-Based Execution File and needs to be used under Windows OS. To use the S3 PCD Editor, the following items need to be prepared for S3 PCD Editor Reference:

1. Target U-Boot Binary File
2. The "u-boot.vcd" file which corresponds to Target U-Boot Binary
3. S3 PCD Editor.exe

Items (1) and (2) will be generated in the root folder of U-Boot Source Code after compiling the U-Boot. Please refer to "Build U-Boot" section for more details.



4.1.2. Setting Strategy

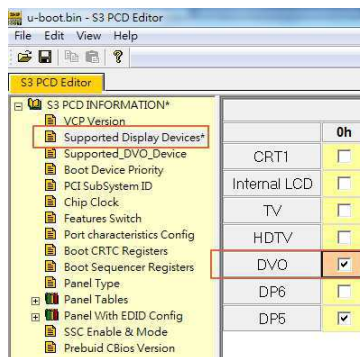
Follow the steps:

1. Execute the "S3 PCD Editor.exe" and open the "u-boot.bin" of the Target U-Boot Binary.

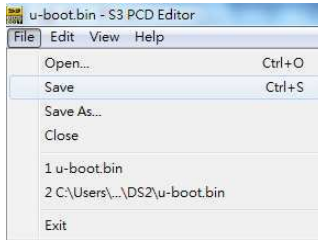


Make sure the corresponding "u-boot.vcd" is located in the same folder.

2. Select the "Supported Display Devices" Menu and enable the "DVO" to support HDMI 2 output.

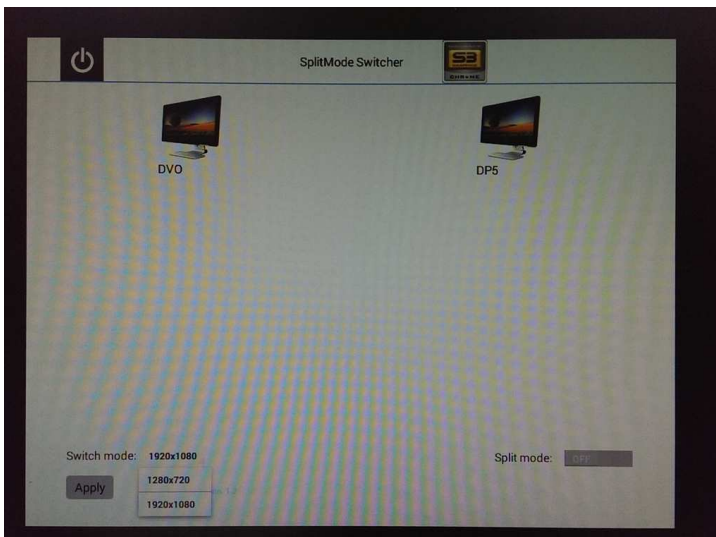


3. Be sure to "Save" the Setting after exiting the S3 PCD Editor.



4. Copy the modified u-boot.bin to the /bspinst/u-boot.bin to update U-Boot. Please refer to Chapter 4 for more details.
5. To set Split/Clone Mode under Android OS:

Setting->Display



Reboot is required in order to apply Mode switch.

Appendix A. Definitions

Android	Android is a trademark of Google Inc.
ARM	ARM is a trademark of ARM Inc.
BSP	Board Support Package
HDMI	High Definition Multimedia Interface
SD	Secure Digital Multimedia Card
Micro SD	Micro Size Secure Digital Multimedia Card
Elite E1000	SoC Chipset Name
VIA	VIA Technologies, Inc.

Appendix B. EVK Installation Package through vfat SD

B.1. Requirements

- Linux development computer
- SD storage card
- EVK package
 - Elite1000 Android4.4.2 FirmwareInstall vfat bspinst*.tgz (Support vfat SD)

B.2. EVK Installation Package

Step 1: Prepare a SD storage card with vfat formatted.

Step 2: Copy firmware package from /EVK/FirmwareInstall_vfat_bspinst/*.* to SD storage card root directory.

Step 3: Connect debug port between device and Linux host computer.

Step 4: Insert the SD storage card to the target device and power it on. Press any key to access the U-Boot setting.

Step 5: Modify U-Boot parameter

```
# Modify U-Boot parameter to set fat booting.
setenv bootcmd 'emmc format;run bootargs_mmc; fatload mmc 0:1 0x0
scriptcmd; if iminfo 0x0; then source 0; else run bootcmd_mmc; fi'
setenv bootcmd_default 'run bootargs_mmc; fatload mmc 0:1 0x0 scriptcmd;
if iminfo 0x0; then source 0; else run bootcmd_mmc; fi'
setenv bootcmd_mmc 'run bootargs_mmc && fatload mmc 0:1 0x6000000
bspinst/elite1000-emmc.dtb; fatload mmc 0:1 0x2800000 bspinst/uImage; if
iminfo 0x2800000; then bootm 0x2800000 - 0x6000000; else run bootcmd_emmc;
```

```

fi'
setenv nand_setup 'fatload mmc 0:1 0x2000000 bspinst/boot_script.uimg;
source 0x2000000'
setenv setup_bootloader 'fatload mmc 0:1 0x1000
bspinst/bootloader_setup.uimg; source 0x1000; '
setenv setup_emmc 'fatload mmc 0:1 0x1000 bspinst/bootloader_setup.uimg;
source 0x1000; fatload mmc 0:1 0x1000 bspinst/uboot_emmc_setup.uimg;
source 0x1000; '
setenv setup_nand 'fatload mmc 0:1 0x1000 bspinst/bootloader_setup.uimg;
source 0x1000; fatload mmc 0:1 0x1000 bspinst/uboot_nand_setup.uimg;
source 0x1000; '
setenv setup_img 'fatload mmc 0:1 0x1000 bspinst/img_setup.uimg; source
0x1000; '
setenv setup_bootloader 'fatload mmc 0:1 0x1000
bspinst/bootloader_setup.uimg\; source 0x1000\; '
setenv bootcmd_mmc 'run bootargs_mmc && fatload mmc 0:1 0x6000000
bspinst/elite1000-emmc.dtb\; fatload mmc 0:1 0x2800000 bspinst/uImage\;
bootm 0x2800000 - 0x6000000\; '
    
```

```

# Boot up after setting.
boot
    
```

Step 6: Installation will be executed automatically.

Step 7: Remove the SD storage card when the message “Please remove installation media” is shown. The device will reboot automatically and bootup Android.

Appendix C. Troubleshooting

C.1. Fail to update the Firmware automatically

If it cannot be updated automatically after powering on, users can type the command below in U-Boot to update the firmware manually.

```
ext4load mmc 0:1 0 scriptcmd; source 0
(please press any key on normal boot)
press any key to abort fastboot!
fbt_preboot: request for a normal boot
Hit any key to stop autoboot: 0
```

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