FAW VDC MPU SOP OF Programming
MPU 烧写指导书

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

Contents

1 说明 Introduction 3
1.1 目的 Purpose of this document 3
1.2 版本 Reversion history 3
1.3 缩略语 Abbreviations 3
1.4 参考文档 3
2 镜像烧写与运行 4
2.1 环境准备 4
2.2 硬件外部连接示意 4
2.3 镜像写入 SD 卡与启动 5
2.3.1 刷写包 6
2.3.2 ubuntu 环境 7
2.3.3 SD 卡启动模式跳线 7
2.4 镜像自 SD 卡/以太网写入 eMMC 与启动 7
2.4.1 eMMC 刷写脚本配置 7
2.4.2 刷写与启动 8
2.4.3 eMMC 启动模式跳线 9

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

1 说明 Introduction

1.1 目的 Purpose of this document

烧写与运行 VDC 项目相关，特别是 MPU：821，TDA4 等。

1.2 版本 Reversion history

Revision	Date	Description	Author
V1.0	2022-03-30	First relese.	Zhang Junmin
V1.1	2022-05-28	针对 A3，调整刷新文件	蒋巍泉
V1.2	2022-06-01	添加 硬件外部连接示意	蒋巍泉
V1.3	2022-06-29	添加 写入 Emmc 和从 eMMC 启动 调整 第 2 章部分小节顺序	李宁
V1.4	2022-07-09	修改：tda4_A/B 合并在同一个刷写包，分别用不同脚本分区和刷写	李宁
V1.5	2022-08-31	针对 B1，调整刷新文件，增加 821	付雪涛，李宁
V1.6	2022-09-26	更新 tda4 及 821 刷写包架构；新增以太网刷写流程;	付雪涛，李宁，魏嘉琪

1.3 缩略语 Abbreviations

Abbreviation	Description
AOS	Atelier OS
SOP	Standard Operation Procedure

1.4 参考文档

ID	Item
1.	演示视频：刷写 SD 卡.wmv， 联电 udoc： FAW_VDC/SW/docs/SOP_MPU_Prog_刷写

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

2 镜像烧写与运行

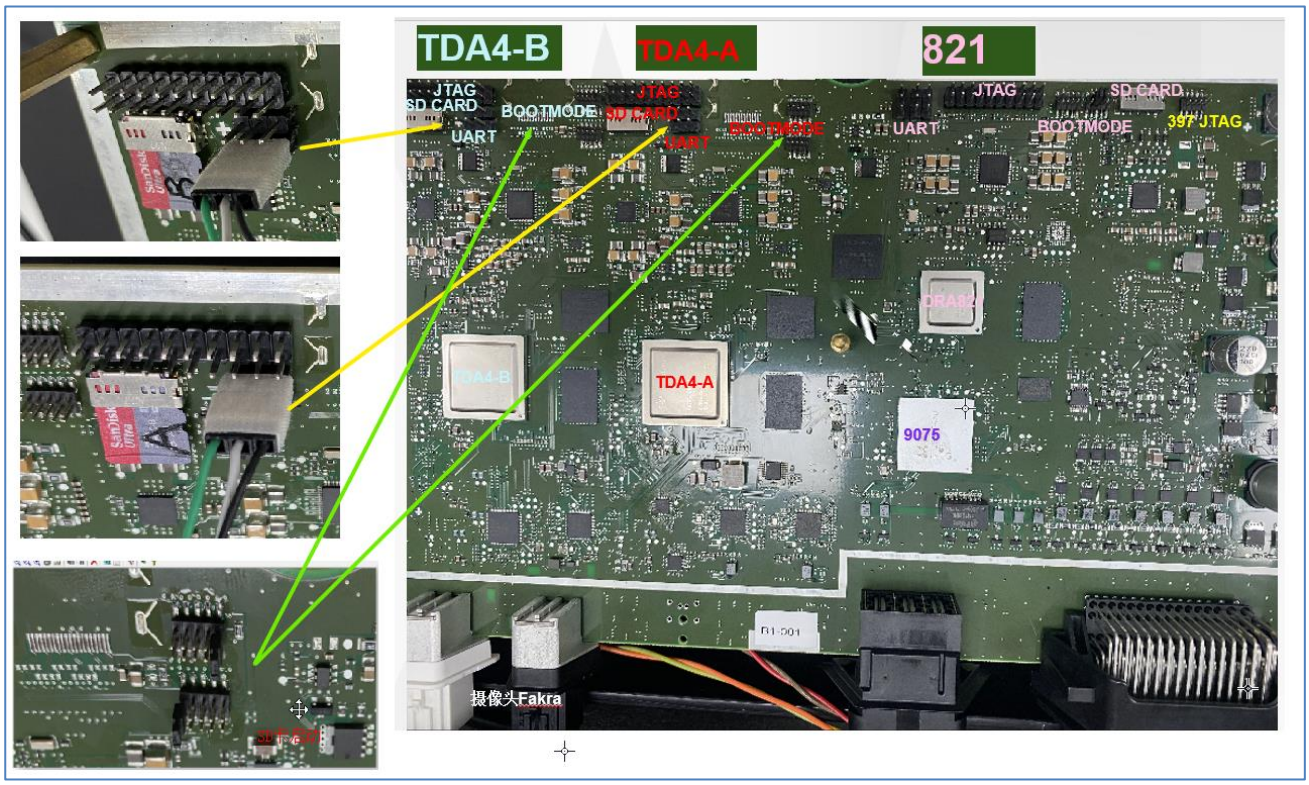
2.1 环境准备

1. Linux 主机，或者虚拟机（virtual box）安装 Linux，推荐 ubuntu 20.04LTS；
2. sudo 账号或 su（root）账号权限与密码
3. 参考演示视频：刷写 SD 卡.wmv

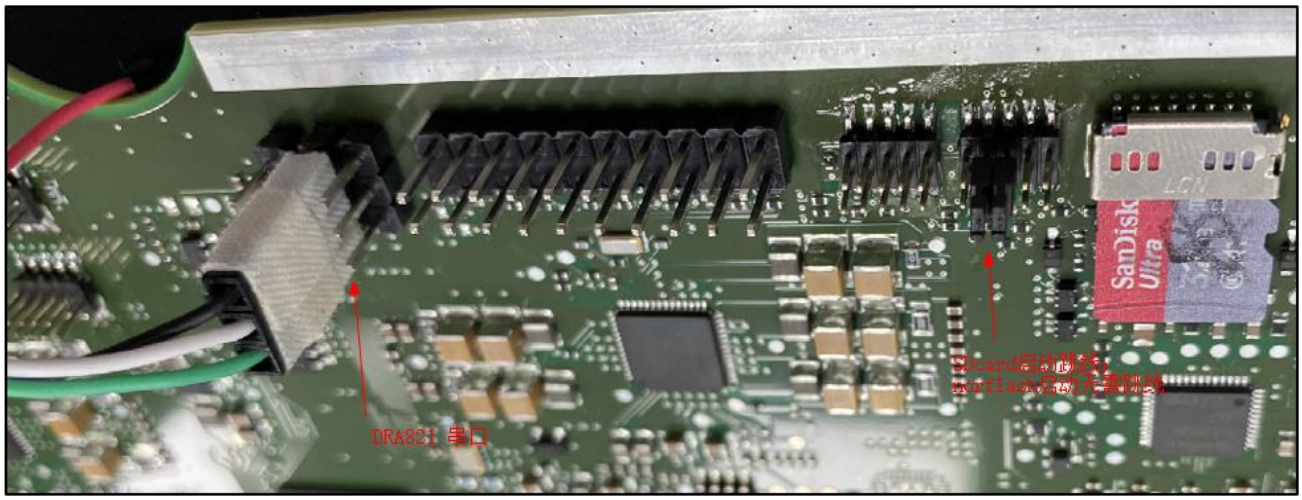
2.2 硬件外部连接示意

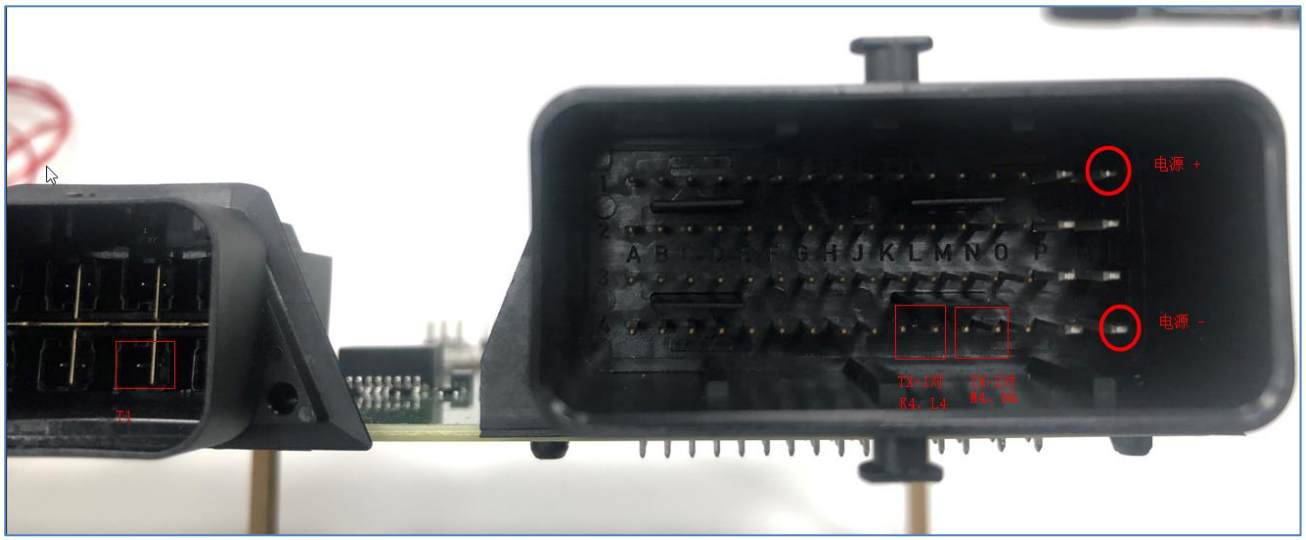
黄色线条：tda4 a 和 tda4 b 串口线

绿色线条：tda4 a 和 tda4 b 跳线部分，图中是 sdcard 卡启动模式跳线样例；eMMC 启动无需跳线冒



© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.





2.3 镜像写入 SD 卡与启动

注意：

- 原卡数据会被擦除；
- 目前 VDC 上有两颗 TDA4，前视 TDA4 命名为 TDA4_A， 环视为 TDA4_B；所以刷写文件和刷写脚本也分为 a,b

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

2.3.1 刷写包

(image 目录：内含刷写脚本，boot 和 rootfs 分区压缩包，TDA4 和 DRA821 分开，如下图：)

```
user@user-uaes:~/soft/project/faw_vdc/flash/2022-09-30-TDA4_image$ tree -L 3
.
├── boot
│   ├── sysfw.itb
│   ├── tiboot3.bin
│   ├── tispl.bin
│   └── u-boot.img
├── make_sd_a.sh/make_sd_b.sh
├── readme.docx
├── rootfs
│   ├── a_rootfs.cpio.gz
│   └── b_rootfs.cpio.gz
└── sd_flash_emmc_image
    ├── sysfw.itb
    ├── tda4a_rootfs.ext4.gz
    ├── tda4b_rootfs.ext4.gz
    ├── tda4_kernel.bin
    ├── tiboot3.bin
    ├── tispl.bin
    └── u-boot.img
```

注：*tda4a_rootfs.ext4.gz*，*tda4b_rootfs.ext4.gz*，*tda4_kernel.bin* 三个文件由 tda4_aos 仓编译得到，可通过 tda4_X_flash_kernel_app_from_pc.bat 脚本单独刷写至 eMMC 中(详见"2.4.1 eMMC 刷写脚本配置")

针对 B1 样交付，比较大的变动是上面黄色 highlight 部分是 sdcard 系统，后续不再更新。sdcard 启动仅作烧录 emmc 使用，往 emmc 中烧录的文件请按照/sd_flash_emmc_image 的文件目录存放。

```
user@user-uaes:~/ti_soc/faw_vdc/image/2022-09-30-DRA821-image$
.
├── boot_821
│   ├── tiboot3.bin
│   ├── tispl.bin
│   ├── u-boot.img
├── rootfs
│   └── 821_rootfs.cpio.gz
└── make_sd_821.sh
└── sd_flash_emmc_image
    ├── dra821_kernel.bin
    └── dra821_rootfs.ext4.gz
```

针对 B1 样交付，比较大的变动是上面黄色 highlight 部分，该部分为 sdcard 系统，后续不再更新。sdcard 启动仅作烧录 emmc 使用，往 emmc 中烧录的文件请按照/sd_flash_emmc_image 的文件目录存放。

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

2.3.2 ubuntu 环境

1. chmod +x make_sd.sh （一般不需要，如果无执行权限才需要，仅执行一次）
2. sudo ./make_sd.sh --device /dev/sdx （x 为实际 sd 卡设备，一般为 sdb，sdc，sdd 等）
3. 输入回车或 Y 确认后，开始自动完成分区，格式化，刷写，持续时间几分钟不等。

注意：直到看到提示 log：completed! 刷写成功 才能拔卡，完成本次烧写。

```
sudo ./make_sd.sh --device /dev/sde
-- Main device is: /dev/sda1
************************************************************
*          THIS WILL DELETE ALL THE DATA ON /dev/sde          *
*                                                             *
*          WARNING! Make sure your computer does not go       *
*                   in to idle mode while this script is      *
*                   running. The script will complete,        *
*                   but your SD card may be corrupted.        *
*          确认是 SD 卡，数据将清理，按回车确认                  *
*          Press <ENTER> to confirm....                       *
************************************************************
…

completed! 刷写成功
```

2.3.3 SD 卡启动模式跳线

如‘2.2 硬件外部连接示意’图，插上 SD，和相关模式的启动跳线，接上 UART 线，上电运行。

2.4 镜像自 SD 卡/以太网写入 eMMC 与启动

2.4.1 eMMC 刷写脚本配置

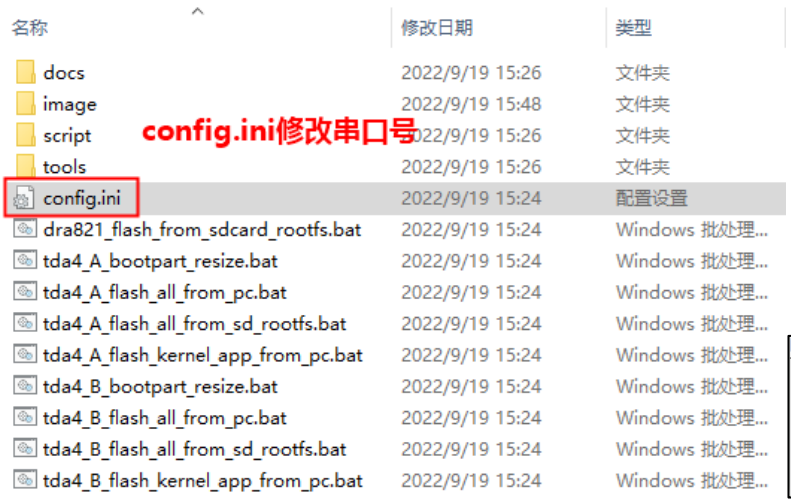
刷写工具：

- dra821_flash_from_sdcard_rootfs.bat：从 SD 卡刷写 rootfs 至 dra821 的 eMMC
- tda4_A_flash_all_from_sd_rootfs.bat：从 SD 卡刷写 rootfs 至 tda4_A 的 eMMC
- tda4_A_flash_all_from_pc.bat：将/image 下的所有文件刷写至 tda4_A 的 eMMC
- tda4_A_flash_kernel_app_from_pc.bat：将/image 下的 tda4a_rootfs.ext4.gz，tda4_kernel.bin 刷写至 tda4_A 的 eMMC

tda4_B 的相关脚本与上述 tda4_A 脚本原理一致

使用前，需修改串口号等配置，在配置文件 config.ini 中修改。

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

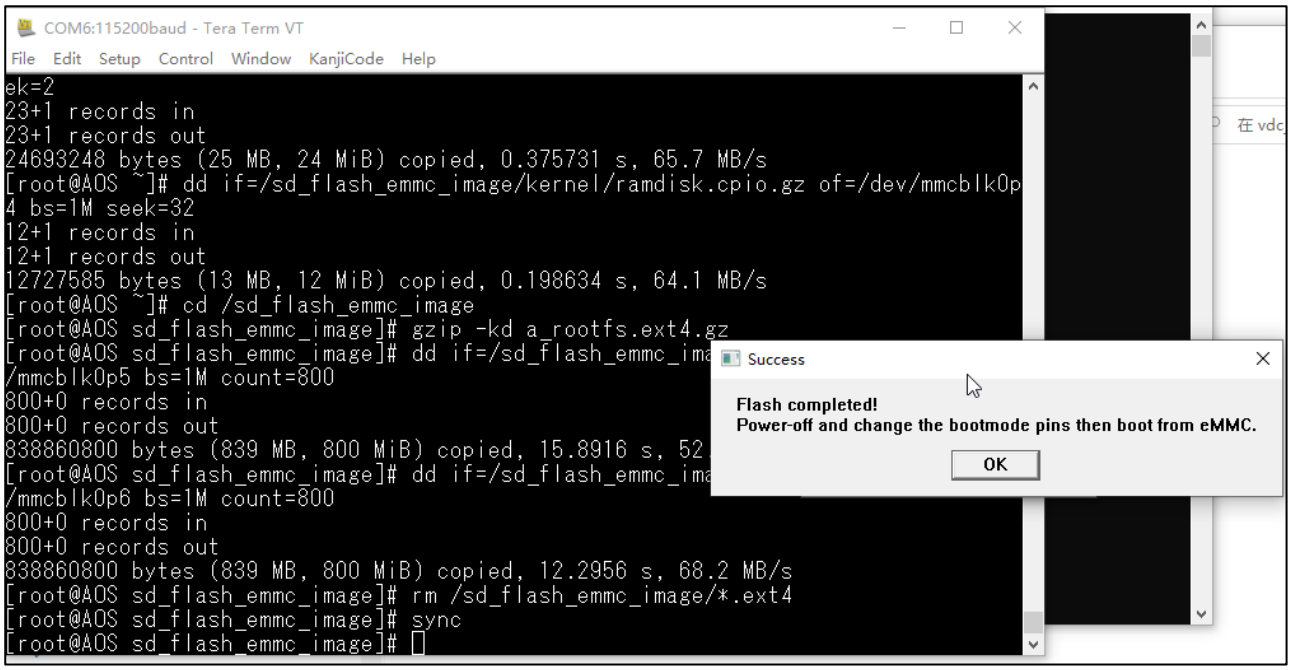


2.4.2 刷写与启动

一、SDcard 刷写：

操作步骤：对 tda4_A 和 tda4_B，需要分别做一次。

1. 插入做好镜像的 SD 卡，跳线到 SD 卡启动模式（参考‘2.2 硬件外部连接示意’）。
2. tda4_A(B)_flash_from_uboot.bat， dra821_flash_from_sdcard_rootfs.bat
   a) 双击运行脚本
   b) 板子上电
   c) 刷写完，弹窗后，点击 OK
   d) 下电
   e) 拔掉 SD 卡，拔掉 2 个跳线冒
   f) 板子上电，可以看到串口启动 log



从 log 判断从 eMMC 启动

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.

```
U-Boot SPL 2021.01-gd2bdf760 (Jun 30 2022 - 13:37:00 +0800)
Model: Texas Instruments K3 J721E SoC
SYSFW ABI: 3.1 (firmware rev 0x0015 '21.5.0--v2021.05 (Terrific Llam')
Trying to boot from MMC1        MMC1 = eMMC启动  MMC2 = SD卡启动
init_env from device 17 not supported!
Starting ATF on ARM64 core...


U-Boot SPL 2021.01-gd2bdf760 (Jun 30 2022 - 13:38:18 +0800)
Model: Texas Instruments K3 J721E SoC
SYSFW ABI: 3.1 (firmware rev 0x0015 '21.5.0--v2021.05 (Terrific Llam')
Trying to boot from MMC1


U-Boot 2021.01-gd2bdf760 (Jun 30 2022 - 13:38:18 +0800), Build: jenkins-MPU_VDC-faw_vdc_mpu_tda4_uboot-10

SoC:   J721E SR2.0
Model: Texas Instruments K3 J721E SoC
DRAM:  2 GiB
Flash: 0 Bytes
MMC:   sdhci@4f80000: 0, sdhci@4fb0000: 1
In:    serial@2810000
Out:   serial@2810000
Err:   serial@2810000
```

二、以太网刷写：

操作步骤：对 tda4_A 和 tda4_B，需要分别做一次。

1. 使用双绞线接入 vdc 的 K4L4，M4N4（参见 2.2 硬件外部连接示意）；
2. vdc 上电；
3. 待 kernel 启动后登入查看板子 ip 地址，将 pc 网段更改至 vdc 的网段一致，ping 通即可
   如：板子为 172.20.3.11，则将 pc 网口 ip 改为 172.20.3.99
4. 在 vdc_flash_tool/ 下创建 image/ 目录，将刷写所需的 sysfw.itb, tiboot3.bin, tispl.bin, u-boot.img tda4a_rootfs.ext4.gz，tda4b_rootfs.ext4.gz，tda4_kernel.bin 文件放置在 image/中；
5. 执行 vdc_flash_tool/下的 tda4_A_flash_all_from_pc.bat 或 tda4_A_flash_kernel_app_from_pc.bat 开始进行刷写；
6. 刷写完毕，提示 Flash completed！

2.4.3 eMMC 启动模式跳线

参考‘2.2 硬件外部连接示意’

© United Automotive Electronic Systems Co. Ltd reserves all rights even in the event of industrial property rights. We reserve all rights of disposal, such as copying and passing to third parties.