



## U-BOOT 移植应用开发指南

Version: 0.0.0.1  
Release date: 2022-06-01

© 2018-2022 Crystal Vision Intelligence Inc.

This document contains information that is proprietary to Crystal Vision Intelligence Inc.

Unauthorized reproduction or disclosure of this information in whole or in part is strictly prohibited.

## 法律声明

---

This data sheet contains information that is confidential to Crystal Vision Intelligence Inc. Unauthorized use or disclosure of the information contained herein is prohibited. You may be held responsible for any loss or damages suffered by Crystal Vision Intelligence Inc. for your unauthorized disclosure hereof, in whole or in part.

Information herein is subject to change without noticed. Crystal Vision Intelligence Inc. does not assume any responsibility for any use of, or reliance on, the information contained herein.

THIS DATA SHEET AND ALL INFORMATION CONTAINED HEREIN IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, WHETHER EXPRESS, IMPLIED, STATUTORY, OR OTHERWISE. CRYSTAL VISION INTELLIGENC INC. SPECIFICALLY DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY, NON-INFRINGEMENT, AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER DOES CRYSTAL VISION INTELLIGENC INC. PROVIDE ANY WARRANTY WHATSOEVER WITH RESPECT TO THE SOFTWARE OF ANY THIRD PARTY WHICH MAY BE USED BY, INCORPORATED IN, OR SUPPLIED WITH THIS DATA SHEET, AND USER AGREES TO LOOK ONLY TO SUCH THIRD PARTY FOR ANY WARRANTY CLAIM RELATING THERETO. CRYSTAL VISION INTELLIGENC INC. SHALL ALSO NOT BE RESPONSIBLE FOR ANY CRYSTAL VISION INTELLIGENC DELIBERABLES MADE TO USER' S SPECIFICATION OR TO CONFORM TO A PARTICULAR STANDARD OR OPEN FORUM.

## 目录

法律声明.....	1
1. 功能概述.....	错误!未定义书签。
1.1. 目的.....	错误!未定义书签。
1.2. U-boot 目錄結構 .....	错误!未定义书签。
2. U-boot 移植 .....	错误!未定义书签。
2.1. U-boot 硬體環境 .....	错误!未定义书签。
2.2. 管腳配置(Pinmux) .....	7
2.3. 編譯 U-boot .....	错误!未定义书签。
3. U-boot 燒錄更新 .....	错误!未定义书签。
3.1. 概述.....	错误!未定义书签。
3.2. 通過 bootrom 工具燒錄 U-boot.....	错误!未定义书签。
3.3. Flash 的 U-boot 燒錄更新 .....	错误!未定义书签。
3.3.1 SPI NOR Flash 燒錄更新.....	错误!未定义书签。
3.3.2 SPI NAND Flash 燒錄更新 .....	9
3.3.3 eMMC 燒錄更新 .....	9

## 版本记录

版本	日期	修订说明	修订人
0.0.0.1	2022/06/01	初稿	蔡明育

# 1. 功能概述

## 1.1. 目的

cv180x/cv181x 列芯片在主板上 Bootloader 采用 U-boot-2021.10。当配置的不

同外围芯片的(亦即开发版和公版上相异), 需要修改 U-boot 相关程序代码, 主

要包括缓存器(registers), 系统配置档(configuration)和驱动程序(drivers)。

## 1.2. U-boot 目录结构

下表列出常用修改目录和档案

目录名	描述
arch	CPU 芯片开发相关程序代码。
arch/arm/dts or arch/riscv/dts	<p>Linux/uboot 共享 DTS 配置文件。</p> <p>DTS 实际档案存放路径(非在 u-boot folder 底下)为  <code>sdk_source/build/boards/\${CHIP_ARCH}/\${BOARD}/dts_riscv(riscv)/\${BOARD}.dts (for cv180x)</code></p> <p>ex: cv180x/cv181x 芯片系列 EVB board 名称为  <code>cv1800b_wevb_0008a_spinor</code>  <code>sdk_source/build/boards/cv180x/cv1800b_wevb_0008a_spinor</code>  <code>/</code>  <code>dts_arm/\${BOARD}.dts</code></p>
configs	<p>uboot config 配置文件。</p> <p>configs 实际档案存放路径为  <code>sdk_source/build/boards/\${CHIP_ARCH}/\${BOARD}/u-boot/cvitek_\${BOARD}_defconfig</code></p> <p>defconfig : uboot 原生或新增 configuration</p> <p>ex: cv180x/cv181x 芯片系列 EVB board 名称为  <code>cv1800b_wevb_0008a_spinor</code>  <code>sdk_source/build/boards/cv180x/cv1800b_wevb_0008a_spinor</code>  <code>/</code>  <code>u-boot/cvitek_cv1800b_wevb_0008a_spinor_defconfig</code></p>
Board	<p>各家 SOC 芯片厂商开发版相关程序代码, EVB 开机之后需要配置的板端设定。</p> <p>cvitek.h : 设定 GPIO definition 和不同 EVB 相异处  cvi_board_init.c: 控制 EVB 板段 I/O, PINMUX 外围芯片设置</p> <p>board.c/cvitek.h 实际档案存放路径为  <code>sdk_source/build/boards/\${CHIP_ARCH}/\${BOARD}/u-boot/cvi_board_init.c</code></p>

	<code>sdk_source/build/boards/\${CHIP_ARCH}/\${BOARD}/u-boot/cvitek.h</code>  ex: cv180x/cv181x () 芯片系列 EVB board 名称为 cv1800b_wevb_0008a_spinor <code>sdk_source/build/boards/cv180x/cv1800b_wevb_0008a_spinor</code> <code>/</code> <code>u-boot/cvi_board_init.c</code> <code>sdk_source/build/boards/cv180x/cv1800b_wevb_0008a_spinor</code> <code>/</code> <code>u-boot/cvitek.h</code>
Include	Header files
Include/configs	cv180x-asic.h/cv181x-asic.h 设定 boot command/configuration.
cmd	Uboot console 指令实作程序代码
drivers	Ethernet, usb, storage 等相关驱动程序

## 2. U-boot 移植

### 2.1. U-boot 硬件环境

cv180x/cv181x 开发板上的外围芯片包括 DDR、eMMC、SPI NAND

Flash 和 SPI NOR Flash, 所有型号

请参阅 CV1823A\_25A\_26A 硬件设计用户指南 V1.0.

### 2.2. 管脚配置(Pinmux)

针对不同的 EVB 和不一样的外围装置, 可以在 cvi\_board\_init.c 做好初始化设定。

```
$ cat build/boards/cv180x/cv1800b_wevb_0008a_spinor/u-boot/cvi_board_init.c
int cvi_board_init(void)
{
    PINMUX_CONFIG(PAD_MIPIRX1P, IIC1_SDA);
    PINMUX_CONFIG(PAD_MIPIRX0N, IIC1_SCL);
    PINMUX_CONFIG(PAD_MIPIRX1N, XGPIOC_8);
    PINMUX_CONFIG(PAD_MIPIRX0P, CAM_MCLK0);
    return 0;
}
```

### 2.3. 编译 U-boot

编译 U-boot 操作如下:

- 读取编译环境变量(以 cv1800b\_wevb\_0008a\_spinor 为例)

```
$ source build/cvisetup.sh
-----
Usage:
(1) menuconfig - Use menu to configure your board.
    ex: $ menuconfig

(2) defconfig $CHIP_ARCH - List EVB boards($BOARD) by CHIP_ARCH.
    ** cv183x ** -> ['cv1829', 'cv1832', 'cv1835', 'cv1838', 'cv9520',
'cv7581']
    ** cv182x ** -> ['cv1820', 'cv1821', 'cv1822', 'cv1823', 'cv1825',
'cv1826', 'cv7327', 'cv7357']
    ** cv181x ** -> ['cv181x', 'cv1823a', 'cv1821a', 'cv1820a',
'cv1811h', 'cv1811c', 'cv1810c', 'cv1812h']
```



```
** cv180x ** -> ['cv180x', 'cv1800b', 'cv1800c', 'cv1801b',  
'cv1801c']  
ex: $ defconfig cv183x  
  
(3) defconfig $BOARD - Choose EVB board settings.  
ex: $ defconfig cv1835_wevb_0002a  
ex: $ defconfig cv1826_wevb_0005a_spinand  
ex: $ defconfig cv181x_fpga_c906  
-----  
-
```

- 选定 EVB cv1800b\_wevb\_0008a\_spinor

```
$ defconfig cv1800b_wevb_0008a_spinor  
Run defconfig function  
Loaded configuration  
'/workspace/build/boards/cv180x/cv1800b_wevb_0008a_spinor/cv1800b_wevb_0008a_spinor_defconfig'  
No change to configuration in '.config'  
Loaded configuration '.config'  
==== Environment Variables =====  
PROJECT: cv1800b_wevb_0008a_spinor, DDR_CFG=ddr2_1333_x16  
CHIP_ARCH: cv180x, DEBUG=0  
SDK_VERSION: musl_riscv64, RPC=0  
ATF options: ATF_KEY_SEL=default, BL32=1  
Linux source folder: linux_5.10, Uboot source folder: u-boot-2021.10  
CROSS_COMPILE_PREFIX: riscv64-unknown-linux-musl-  
ENABLE_BOOTLOGO: 0  
Flash layout xml: /workspace/build/boards/cv180x/  
cv1800b_wevb_0008a_spinor/partition/partition_spinor.xml  
Sensor tuning bin: gcore_gc4653  
Output path: /workspace/master/install/soc_cv1800b_wevb_0008a_spinor
```

- 编译 U-boot

```
$ build_uboot  
[TARGET] u-boot-dts  
.....  
[TARGET] u-boot-build  
.....
```

- 取得 fip.bin(内含 bootloader+uboot)

```
$ ls install/cv1800b_wevb_0008a_spinor/fip.bin  
install/cv1800b_wevb_0008a_spinor/fip.bin
```

由于原生 u-boot 编译出 u-boot.bin 无法直接刻录到 FLASH 中。我们采取

ARM Trusted Firmware Design 中的 Firmware Image Package (FIP)方式, 将

uboot.bin 封装在 FIP.bin 里面

## 3. U-boot 刻录更新

### 3.1. 概述

U-boot 刻录更新会需要刻录整个 fip.bin(bootloader + uboot), 而 bootloader

内带有不一样的 DDR 初始化参数, 在选定 EVB 时可以透过 SDK menuconfig 配置

请参阅 SDK 編譯及使用說明\_V1.0 – 1.4.2.2.docx 透过 menuconfig 设定

### 3.2. 通过 bootrom 工具刻录 U-boot

请参阅 Cvitek 裸烧与非裸烧升级使用手册\_v1.2.1.docx

### 3.3. Flash 的 U-boot 刻录更新

#### 3.3.1 SPI NOR Flash 刻录更新

请参阅 Cvitek 裸烧与非裸烧升级使用手册\_v1.2.1.docx

#### 3.3.2 SPI NAND Flash 刻录更新

请参阅 Cvitek 裸烧与非裸烧升级使用手册\_v1.2.1.docx

#### 3.3.3 eMMC 刻录更新

请参阅 Cvitek 裸烧与非裸烧升级使用手册\_v1.2.1.docx