



CV180X & CV181X SPINAND Programmer Burn-in User Guide

Version: 1.0.2

Release date: 2022-10-17

Copyright © 2020 CVITEK Co., Ltd. All rights reserved.

No part of this document may be reproduced or transmitted in any form or by any means without prior written consent of CVITEK Co., Ltd.

Contents

1	Disclaimer	2
2	Burn-in Procedure	3
2.1	Preparations Before Use	3
2.2	Partition Table	4
2.3	Burning Rule	5
2.3.1	FIP Partition	5
2.3.2	Other Partition	6

This document applies to the following list of processors

Processor	Description
CV181x	CV181x series processors includes CV1811H CV1811C CV1810C CV1812H
CV180x	The CV180x series processors includes CV1800B CV1800C CV1801B CV1801C

Revision History

Revision	Date	Description
1.0.0	2022/6/13	Initial version
1.0.1	2022/7/24	Simplify fip maker operations
1.0.2	2022/10/17	Change the processor name

1 Disclaimer



Terms and Conditions

The document and all information contained herein remain the CVITEK Co., Ltd' s ("CVITEK") confidential information, and should not disclose to any third party or use it in any way without CVITEK' s prior written consent. User shall be liable for any damage and loss caused by unauthority use and disclosure.

CVITEK reserves the right to make changes to information contained in this document at any time and without notice.

All information contained herein is provided in "AS IS" basis, without warranties of any kind, expressed or implied, including without limitation mercantability, non-infringement and fitness for a particular purpose. In no event shall CVITEK be liable for any third party' s software provided herein, User shall only seek remedy against such third party. CVITEK especially claims that CVITEK shall have no liable for CVITEK' s work result based on Customer' s specification or published shandard.

Contact Us

Address Building 1, Yard 9, FengHao East Road, Haidian District, Beijing, 100094, China

Building T10, UpperCoast Park, Huizhanwan, Zhancheng Community, Fuhai Street, Baoan District, Shenzhen, 518100, China

Phone +86-10-57590723 +86-10-57590724

Website <https://www.sophgo.com/>

Forum <https://developer.sophgo.com/forum/index.html>

2 Burn-in Procedure

2.1 Preparations Before Use

1. For details, see «CV181x Linux Development Environment User Guide»[1.2 How to Compile BSP]. Compile the following files:

```
fip.bin - bootloader + uboot
boot.spinand - Linux image
logo.jpg - boot logo (Optional)
rootfs.spinand - root file system
system.spinand - system partition (Optional)
cfg.spinand - encrypted ISP PQ partition (Optional)
```

fip.bin is obtained from the install/<board name> directory:

```
$ ls -al install/soc_cv1820_wevb_0005b_spinand
```

```
total 66588
drwxr-xr-x  8 alec alec   4096  16 22:28 ./
drwxr-xr-x 21 alec alec   4096  21 13:53 ../
-rw-rw-r--  1 alec alec 7134746 16 22:28 boot.spinand
-rw-rw-r--  1 alec alec 1966208 16 22:28 cfg.spinand
drwxrwxr-x  2 alec alec   4096  16 22:28 elf/
-rw-rw-r--  1 alec alec 385024  16 22:11 fip.bin
drwxr-xr-x  2 alec alec   4096  21 14:12 fip_pre/
-rw-r--r--  1 alec alec   660  16 22:28 partition_spinand.xml
drwxrwxr-x  2 alec alec   4096  16 22:28 rawimages/
drwxrwxr-x 18 alec alec   4096  16 22:28 rootfs/
-rw-rw-r--  1 alec alec 24510592 16 22:28 rootfs.spinand
drwxrwxr-x  2 alec alec   4096  16 22:28 system/
-rw-rw-r--  1 alec alec 1966208 16 22:28 system.spinand
drwxrwxr-x  3 alec alec   4096  16 22:28 tools/
-rw-rw-r--  1 alec alec 32172224 16 22:29 upgrade.zip
```

*.spinand is obtained from install/<board name>/rawimages:

```
$ ls -al install/soc_cv1820_wevb_0005b_spinand/rawimages
```

```
total 34748
drwxrwxr-x  2 alec alec   4096  16 22:28 ./
drwxr-xr-x  8 alec alec   4096  16 22:28 ../
-rw-rw-r--  1 alec alec 7134618 16 22:28 boot.spinand
-rw-rw-r--  1 alec alec 1966080 16 22:28 cfg.spinand
-rw-rw-r--  1 alec alec 24510464 16 22:28 rootfs.spinand
-rw-rw-r--  1 alec alec 1966080 16 22:28 system.spinand
```

Attention: Note: *.spinand in the rawimages subdirectory is the raw images used by the burner. The *.spinand in the directory on the upper level is a special format for the CVITEK SD card/USB update tool, and an additional 128 bytes header is added based on the bare image.

2. Enter the build/tools/common/spinand_tool/fip_maker, perform

```
make clean; make
```

3. Copy fip.bin to the directory. Run ./fip_maker {pagesize} {DID/MID} {input_path} {output_path}, where {pagesize} and {DID/MID} parameter values refer to spi nand particle datasheet settings.

Example:

```
./fip_maker 2048 0x71e5 ./fip.bin ./fip_out.bin
```

4. If there is no error, fip_out.bin will be generated. This fip_out.bin is the fip.bin file required for pre-burning.

After preparing the binary file through the above three steps, the burner can be pre-burned.

2.2 Partition Table

The Flash partition table of the CVITEK solution is defined in xml format. For details, see the «Flash Partition Tool Usage Guide» .

Flash partition is defined in XML format. We use boards/default/partition/partition_spinand_page_2k. XML as an example:

```
<physical_partition type="spinand">
  <partition label="fip" size_in_kb="2560" file="fip.bin"/>
  <partition label="BOOT" size_in_kb="8192" file="boot.spinand"/>
  <partition label="MISC" size_in_kb="384" file="logo.jpg" />
  <partition label="ENV" size_in_kb="128" file="" />
  <partition label="ROOTFS" size_in_kb="71680" file="rootfs.spinand" />
  <partition label="SYSTEM" size_in_kb="20480" file="system.spinand"
  ↪mountpoint="" type="ubifs" />
  <partition label="CFG" size_in_kb="4096" file="cfg.spinand" mountpoint="/
  ↪mnt/cfg" type="ubifs" />
  <partition label="DATA" file="" mountpoint="/mnt/data" type="ubifs" />
</physical_partition>
```

Take NAND flash with 2KB page size 128KB blocksize as an example: Based on the data in the xml file, the size of each partition is converted into the size of the block (formula: Number of blocks = partition size/single blocksize), as shown below:

Partition	Start block offset	Number of blocks	Binary files
FIP	0	20	fip.bin
BOOT	24	64	boot.spinand
MISC	Sequential (skip bad blocks)	3	logo.jpg
ENV	Sequential (skip bad blocks)	1	Null
ENV_BAK	Sequential (skip bad blocks)	1	Null
ROOTFS	Sequential (skip bad blocks)	560	rootfs.spinand
SYSTEM	Sequential (skip bad blocks)	160	system.spinand
CFG	Sequential (skip bad blocks)	32	cfg.spinand
DATA	Sequential (skip bad blocks)	Don' t Care	Null

2.3 Burning Rule

2.3.1 FIP Partition

The FIP partition consists of two parts: one is the processor-related Bootloader (no open source), and the other is u-boot.

The CVITEK compilation process will automatically package the two into a fip.bin. fip.bin is from block 0 to 19 according to Select a block according to the sequence, and write two copies in total.

The first copy will be written in block 0~9, and the second copy will be written in block 10~19, which are mutual backup.

Burning fip.bin itself into spinand will probably use 3~4 blocks. However, due to the characteristics of spinand, blocks may be damaged, so the remaining unused blocks are reserved for the repair mechanism.

To illustrate with an example, fip.bin is 640KB, and the block size is 128KB, so 5 blocks are needed to write a fip.bin:

Example 1:

If there are no bad blocks, burn the first fip.bin to block 0, 1, 2, 3, 4; burn the second fip.bin to block 9, 10, 11, 12, 13.

Example 2:

If block 4 and 11 are both bad blocks, please burn the first fip.bin to block 0, 1, 2, 3, 5; and burn the second fip.bin to block 9, 10, 12, 13, 14 .

2.3.2 Other Partition

According to the configuration of the partition table, burn in order, skip the bad block, skip to the next good block and then burn.