

WM_W60X_Firmware Generation Guide

V1.1

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1 Introduction

1.1 Purpose

This document describes the W60X firmware's format, storage address and image generation.

1.2 Readers

For W60X SDK developers and application project developers.

1.3 Abbreviations and Acronyms

No.	Abbreviation/Acronym	Explain/Definition
1	OTA	Over-The-Air
2	QFLASH	Quad-SPI FLASH
3	IMG	IMAGE
4	UPD	Upgrade
5	SECBOOT	Second Boot, relative to ROM
6	ROM	Read-Only Memory

1.4 References

None

2 IMAGE Address in QFLASH

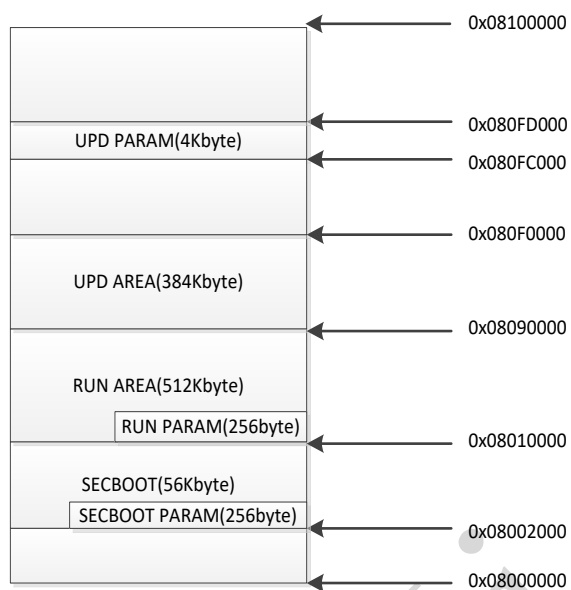


图 2-1

2.1 SECBOOT Parameter Space

Address Space: 0x8002000-0x80020FF, total 256Bytes

Parameters Arrangement:

MAGIC Number:4byte	
Image Type:2byte	reserved:2byte
Image address (SECBOOT start address) :4byte	
Image Length:4byte	
Original Image checksum:4byte	
reserved:4byte	
reserved:4byte	
reserved:4byte	
reserved:4byte	
Version Number:16byte	
Header Checksum:4byte	

2.2 SECBOOT Space

Address Space: 0x8002100-0x8009FFF, total 58Kbyte -256 byte

2.3 Running IMG Parameters Space

Address Space: 0x8010000-0x80100FF, total 256byte

Parameters Arrangement:

MAGIC Number:4byte	
Image Type:2byte	Zip Type:2byte
Run-time Image address:4byte	
Run-time Image Length:4byte	
Run-time Image checksum:4byte	
Upgrade image address:4byte	
Upgrade Image Length:4byte	
Upgrade Image Checksum:4byte	
Image Update Number (One of choice to start IMAGE) : 4byte	
Version Number:16byte	
Header Checksum:4byte	

2.4 Running IMG Space

Address Space: 0x8010100-0x808FFFF, total 512Kbyte-256byte

2.5 Update IMG Space

Address Space: 0x8090000-0x80EFFFF, total 384Kbyte

2.6 Update IMG Parameter Space

Address Space: 0x80FC000-0x80FCFFF, total 4Kbyte

3 IMAGE Type

3.1 secboot.img (uncompressed format)

W60X's second boot code



Figure 3-1

3.2 WM_W600_GZ.img (compressed format)

Note: GZ compression format is supported by default, with the max size 384KByte. Corresponding running IMAGE size is 512KByte.

Figure 3-2 is the format of W60X compressed firmware which can be updated through SECBOOT or OTA.

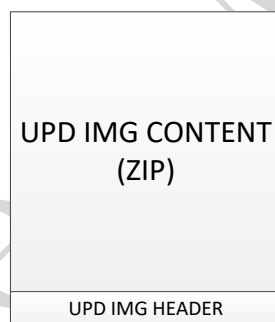


Figure 3-2

3.3 WM_W600_SEC.img (uncompressed format)

Note: **Not recommended to use.**

Figure 3-3 is the format of W60X uncompressed firmware which can be updated through SECBOOT or OTA.

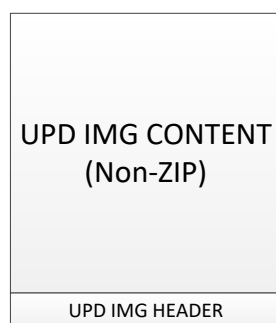


Figure 3-3

3.4 WM_W600.FLS (uncompressed format)

*.FLS is W60X's firmware which updated by ROM. It integrates IMG header, SECBOOT header, SECBOOT area, running IMG header and running IMG content.



Figure 3-4

4 Update mode for different IMAGE files

IMAGE Type	Support ROM update	Support SECBOOT update	Support OTA update
WM_W600_SEC.img	×	√	√
WM_W600_GZ.img	×	√	√
WM_W600.FLS	√	×	×

5 IMAGE file generation tools

5.1 IMAGE generation tools under Windows

(1) makeimg.exe [PARAM1] [PARAM2] [PARAM3] [PARAM4] [PARAM5] [PARAM6] [PARAM7] [PARAM8]

Parameter description:

[PARAM1]: input file, compressed or uncompressed bin file

[PARAM2]: output file, target file's name

[PARAM3]: image type: 0: image file; 2: secboot file

[PARAM4]: compressed type, 0: uncompressed; 1: compressed

[PARAM5]: version number

[PARAM6]: saving space for update (offset relative to QFLASH base address)

[PARAM7]: running space (offset relative to QFLASH base address)

[PARAM8]: original bin file, just for compressed format

(2) wm_gzip.exe [PARAM1]

Parameter Description:

[PARAM1]: the file's name which should be compressed, the generated file is .gz format

Example:


```
wm_gzip.exe "..\Bin\WM_W600.bin"
```

```
makeimg.exe "..\Bin\WM_W600.bin.gz" "..\Bin\WM_W600_GZ.img" 0 1 "..\Bin\version.txt" 90000 10100 "..\Bin\WM_W600.bin"
```

```
makeimg.exe "..\Bin\WM_W600.bin" "..\Bin\WM_W600_SEC.img" 0 0 "..\Bin\version.txt" 90000 10100
```

Execute above 3 instructions to generate the target files: WM_W600.bin.gz , WM_W600_GZ.img 和 WM_W600_SEC.img

(3) makeimg_all.exe [PARAM1] [PARAM2] [PARAM3]

Parameter Description:

[PARAM1]: SECBOOT file

[PARAM2]: user's file placed in QFLASH

[PARAM3]: output target file

Example:

```
makeimg.exe "..\Bin\WM_W600.bin" "..\Bin\WM_W600.img" 0 0 "..\Bin\version.txt" 90000 10100
```

```
makeimg_all.exe "..\Bin\secboot.img" "..\Bin\WM_W600.img" "..\Bin\WM_W600.FLS"
```

Execute above 2 instructions to generate the target file: WM_W600.FLS

5.2 Generation tools under GCC

(1) makeimg [PARAM1] [PARAM2] [PARAM3] [PARAM4] [PARAM5] [PARAM6] [PARAM7] [PARAM8]

(2) makeimg_all [PARAM1] [PARAM2] [PARAM3]

6 FAQ

6.1 Can user adjust the W60X's IMAGE firmware space?

Answer:

Relative to ROM, besides 2 fixed spaces (key parameter space and SECBOOT parameter space), all the other space can be redefined.

Relative to SECBOOT, besides 2 fixed spaces (running IMG parameter space and update IMG parameter space), all the other space can be redefined.

Users can refer to current QFLASH arrangement as W60X's default arrangement.

6.2 Which kind of file should user use to write to W60X for the first time?

Answer:

WM_W600.FLS should be used for the first time writing.

6.3 How to update WM_W600.FLS into W60X?

Answer:

User should destroy the SECBOOT space or IMAGE space before update WM_W600.FLS.

There are 3 situations:

- (1) If there is no any firmware, the W60X will run from ROM directly after poweron reset.
- (2) If there is SECBOOT in QFLASH but no user IMAGE, W60X should jump to CCC print mode by SECBOOT and input hex character “21 06 00 c7 7c 3f 00 00 00”, and then W60X can start up from ROM.
- (3) When W60X is running in user IMAGE space, following commands should be executed in order to jump to ROM space:

AT+&FLSW=8002000,0

AT+Z

6.4 Is there size limitation for WM_W600_SEC.img?

Answer:

Based on QFLASH arrangement, if

- (1) running IMAGE space size is 512KByte-256Byte
- (2) update IMAGE space size is 384KByte
- (3) user's space size is 48KByte

then

both WM_W600_SEC.img size and WM_W600_GZ.img size can not exceed than 384KByte, and the source file's size of WM_W600_GZ.img should be less than (512KByte-256Byte).

6.5 How to adjust IMAGE space of W60X?

Answer:

Following items should be modified when user want to adjust IMAGE space and user space:

- (1) Modify the relevant MACRO definition of W60X SDK QFLASH
- (2) Modify the parameters of IMAGE generation tools (running start address should be same with code compiling link start address, update start address should be same with new definition update start address).

<WM_W60X_Parameter Space Guide> has introduced the detailed adjusting rules of user parameter space.