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WM_W800_QFLASH layout description

V1.1

WinnerMicro

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1 Introduction

1.1 Purpose of writing

This document is mainly used to explain the QFLASH layout in W800, so that readers can understand the current QFLASH layout of W800 Usage.

1.2 Intended readers

The applicable readers of this document include R&D personnel, testers, W800 engineering users, etc.

1.3 Definition of terms

Ordinal	term/abbreviation	Description/Definition
1	QFLASH	W800 internel Quad-SPI FLASH
2	IMG	IMAGE
3	RF	Radio Frequency
4	MAC	Media Access Control
5	SECBOOT	Second Boot
6	ROM	Read-Only Memory
7	UPD	Image Upgrade Area
8	MB	Mega Byte
9	KB	Kilo Exchange

1.4 References

none

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2 Layout of W800 QFLASH

Address space: 0x8000000-0x8XFFFFF, total (X+1)MB, X >= 1, for QFLASH of 2M and above.

2.1QFLASH layout larger than 2M

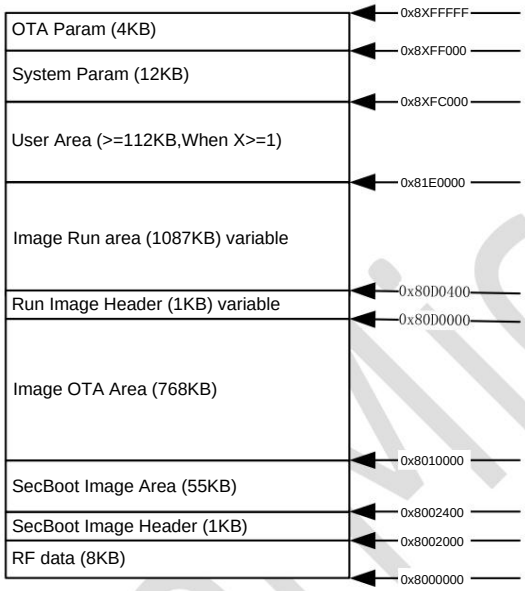


Figure 2-1 Upgrade Image to compressed format

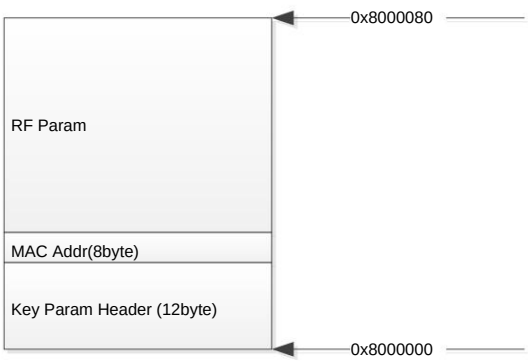
2.1.1 Physical layer parameter area

Address space: 0x8000000-0x8001FFF, 8KB in total

Parameter content:

System RF and MAC related parameters.

Parameter layout:



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Figure 2-3

2.1.2 SECBOOT parameter area

Address space: 0x8002000-0x80023FF, 1KB in total

Parameter content:

SECBOOT boot verification related information and boot address

Parameter layout:

field	describe
magic_no	magic word, fixed value 0xA0FFFF9F
img_attr	Img_Attr_TypeÿIMAGE Attribute
img_addr	The position of the Image area in the flash, the running position
img_len	The length in bytes of the Image area
img_header_addr	IMAGE header position in flash
upgrade_img_addr	upgrade area address, upgrade IMAGE header storage location in flash
org_checksum	crc32 result of Image area
upd_no	Upgrade version number, a larger value indicates a newer version; when the version number is 0xFFFFFFFF , any version number firmware can be upgraded
to see	Image version number, string
next	The location of the next image header in flash
hd_checksum	The crc32 value of the above field of Image header

IMAGE Attribute field description of W800:

field	Bit	describe

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img_type	4	0x0ÿSECBOOTÿ 0xE: ft test program; Other values: user defined
code_encrypt	1	0: The firmware is stored in plain text; 1: The firmware is encrypted and stored by the customer
pricey_sel	3	The chip has 8 sets of RSA private keys built-in to decrypt the secret key encrypted by the firmware, and the user can arbitrarily Select a group to use, the value range is 0~7
signature	1	0: IMAGE does not contain signature part; 1: IMAGE contains 128Bytes signature
zip_type	1	0: no compression; 1: image area part is a compressed file
reserved	1	reserved
erase_block_en	1	0: does not support 64KB block erase; 1: supports block erase
erase_always	1	0: Check whether the flash is all F before erasing the Sector or Block, and the Sector with all F Or Block does not perform erase operation; 1: Always erase first and then write

2.1.3 SECBOOT storage area

Address space: 0x8002400-0x800FFFF, 55KB in total

Parameter content:

SECBOOT IMAGE contents

Parameter layout:

Tiled SECBOOT IMAGE for encrypted files

2.1.4 Upgrade the IMG storage area

address space:

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0x8010000-0x80CFFFF, total 768KB

Parameter content:

OTA upgrade IMAGE file (can be secboot, User Image)

Parameter layout:

2.1.5 Run IMG parameter area

Address space: 0x80D0000-0x80D03FF, 1KB in total

Parameter content:

Relevant information and start address of IMAGE start-up verification in the running area

Parameter layout:

field	describe
magic_no	magic word, fixed value 0xA0FFFF9F
img_attr	Img_Attr_TypeÿIMAGE Attribute
img_addr	The position of the Image area in the flash, the running position
img_len	The length in bytes of the Image area
img_header_addr	IMAGE header position in flash
upgrade_img_addr	upgrade area address, upgrade IMAGE header storage location in flash
org_checksum	crc32 result of Image area
upd_no	Upgrade version number, a larger value indicates a newer version; when the version number is 0xFFFFFFFF , any version number firmware can be upgraded
to see	Image version number, string
next	The location of the next image header in flash

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The crc32 value of	the above field of hd_checksum Image header

2.1.6 Run the IMG storage area

address space:

0x80D0400-0x81DFFFF, 1087KB in total

Parameter content:

Tiled runtime IMAGE

Parameter layout:

2.1.7 User parameter area

Address space: 0x81E0000-0x8XFBFFF, total (X+1) MB – 1808KB, X >=1.

Parameter content:

It is used when the user stores custom parameters.

The size of the user available parameter area is related to the size of the user Image space

Parameter layout:

Custom

2.1.8 System parameter area

Address space: 0x8XFC000-0x8XFEFFF, a total of 12KB

Parameter content:

Relevant parameters required for system operation

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Parameter layout:

MAGIC Number:4Byte	
PARTITION_NUM:2Byte MODIFY_CNT:2Byte	
RESERVED:4Byte	
RESERVED:2Byte	Length: 2Byte (the size of the entire parameter, including the CRC value, is determined by the system parameters)
Data Content (determined by system parameters)	
CRC Value: 4byte (the value of the content before CRC)	

1) System parameter area 1 (0x8XFC000-0x8XFCFFF)

2) System parameter area 2 (0x8XFD000-0x8XFDFFF)

3) System parameter area 3 (0x8XFE000-0x8XFEFFF)

2.1.9 Upgrade the IMG parameter area

Address space: 0x8XFF000-0x8XFFFFF, 4KB in total

Parameter content:

OTA upgrade IMAGE verification information, used to distinguish whether OTA.

SECBOOT is rewritten after moving the OTA firmware.

Parameter layout:

2.2QFLASH less than 2M layout

For the different sizes mentioned above, the layout of QFlash will be different, take 1MB as an example as follows.

1) <2MB, the OTA upgrade scenario is not considered

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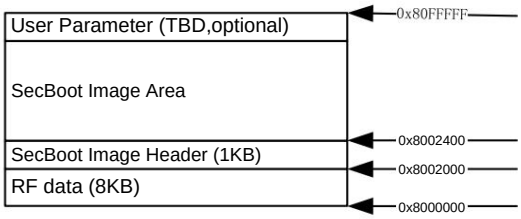


Figure 3-1

2) <2MB, consider the scenario of OTA upgrade

(1) If the QFlash space is sufficient, the layout is as follows:

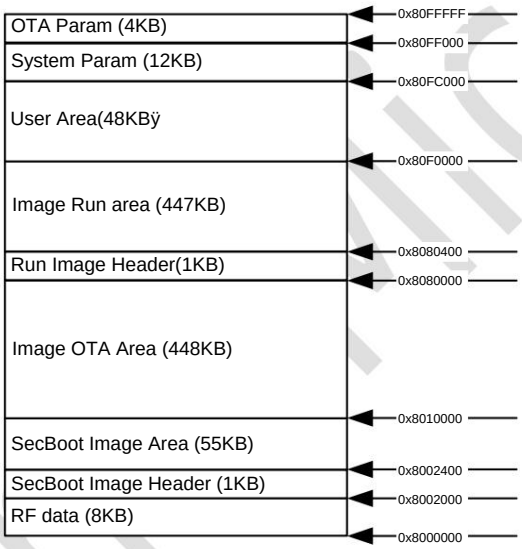


Figure 3-2

(2) If the QFlash space is not enough, the layout is as follows, part of the OTA area should be placed in the internal QFlash, and some

OTA and all user areas are placed on external storage devices:

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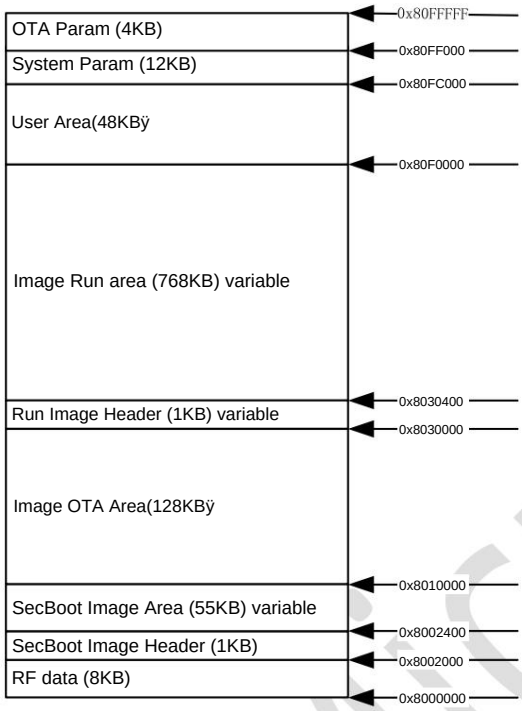


Figure 3-3

The following is the division for different Flash Sizes and basic function support.

SIZE	Function			Application Scenario
	Wi-Fi use	BL/BL	ORDER	
16KB	Basic transceiver function	Basic transceiver function does not support		
32KB	Basic transceiver function	Basic transceiver function does not support		
64KB	Basic transceiver function	Basic transceiver function does not support		
128KB	Basic transceiver function	Basic transceiver function does not support		
256KB	Basic transceiver function	Basic transceiver function does not support		
512KB	Wi-Fi All features uncertain		conditional support	
1MB	All Wi-Fi functions and basic functions are conditionally supported			
>=2MB	Wi-Fi All functions basic function support			

Note:

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Conditional support: the internal Flash is basically divided into code space, which can only be realized through external storage devices

Storage of OTA firmware.

Support: The internal storage space has already satisfied the operating area and the OTA area

Not supported: Internal storage space is not enough to support OTA related codes (Wi-Fi+OTA application, Bluetooth+OTA

application) running.

3 FAQ

3.1 Why is the layout division always divided in multiples of 64KB?

Considering that the implementation of QFlash is different, during the power-off process, if there is a write action of QFlash, it may be

An operation that destroys an entire sector.

3.2 Why always leave a part of the upgrade area in the internal Flash?

Because the ROM always assumes that the upgrade area of SECBOOT is in the internal QFlash.

In order to prevent SECBOOT upgrade, the OTA area must be reserved in the internal QFlash.

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