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Spec No: 002-00379

Spec Title: AN200379 - eMMC Field Firmware Update (FFU)
Feature

Replaced by: NONE

eMMC Field Firmware Update (FFU) Feature

AN200379 provides information on how to utilize the Field Firmware Update (FFU) feature available in a Cypress eMMC memory device.

1 Introduction

This application note provides information on how to utilize the Field Firmware Update (FFU) feature available in a Cypress eMMC memory device. The FFU feature allows users to upload a new copy of the firmware to the eMMC through the MMC interface. After a successful upload, the new firmware will be automatically installed onto the eMMC device. The firmware file is provided by Cypress and may include updates or enhancements to the existing firmware on the eMMC device.

This document applies to the following Cypress devices:

- S4041XXX1B1 eMMC series

2 Uploading New Firmware using FFU Mode

Cypress eMMC products contain the Field Firmware Update (FFU) feature, which was introduced in the eMMC 5.0 specification. The Cypress implementation of the FFU feature does not support MODE_OPERATION_CODES (FFU_FEATURES[492] bit 0 is '0b').

Table 1. Relevant EXT_CSD Registers for Field Firmware Update

Field Name	Field ID	EXT_CSD Slice
Supported Modes	SUPPORTED_MODES	[493]
FFU Features	FFU_FEATURES	[492]
Operation Codes Timeout	OPERATION_CODE_TIMEOUT	[491]
FFU Argument	FFU_ARG	[490:487]
Number of FW Sectors Correctly Programmed	NUMBER_OF_FW_SECTORS_CORRECTLY_PROGR AMMED	[305:302]
Firmware Version	FIRMWARE_VERSION	[261:254]
FW Configuration	FW_CONFIG	[169]
Mode Configuration	MODE_CONFIG	[30]
Mode Operation Codes	MODE_OPERATION_CODES	[29]
FFU Status	FFU_STATUS	[26]

It is important to note the following when using FFU mode:

- In FFU mode
 - Write Operation: CMD25 argument must be set as '0000FFFFh' to write the binary FW file to the eMMC device.
 - Read Operation: Device will output undefined data.
 - Other commands: Undefined behavior.
 - Auto Background operations will be disabled in FFU mode.
- The firmware file contains a header with the file size information. The controller will use a checksum to determine if the full firmware file was transferred correctly or not.

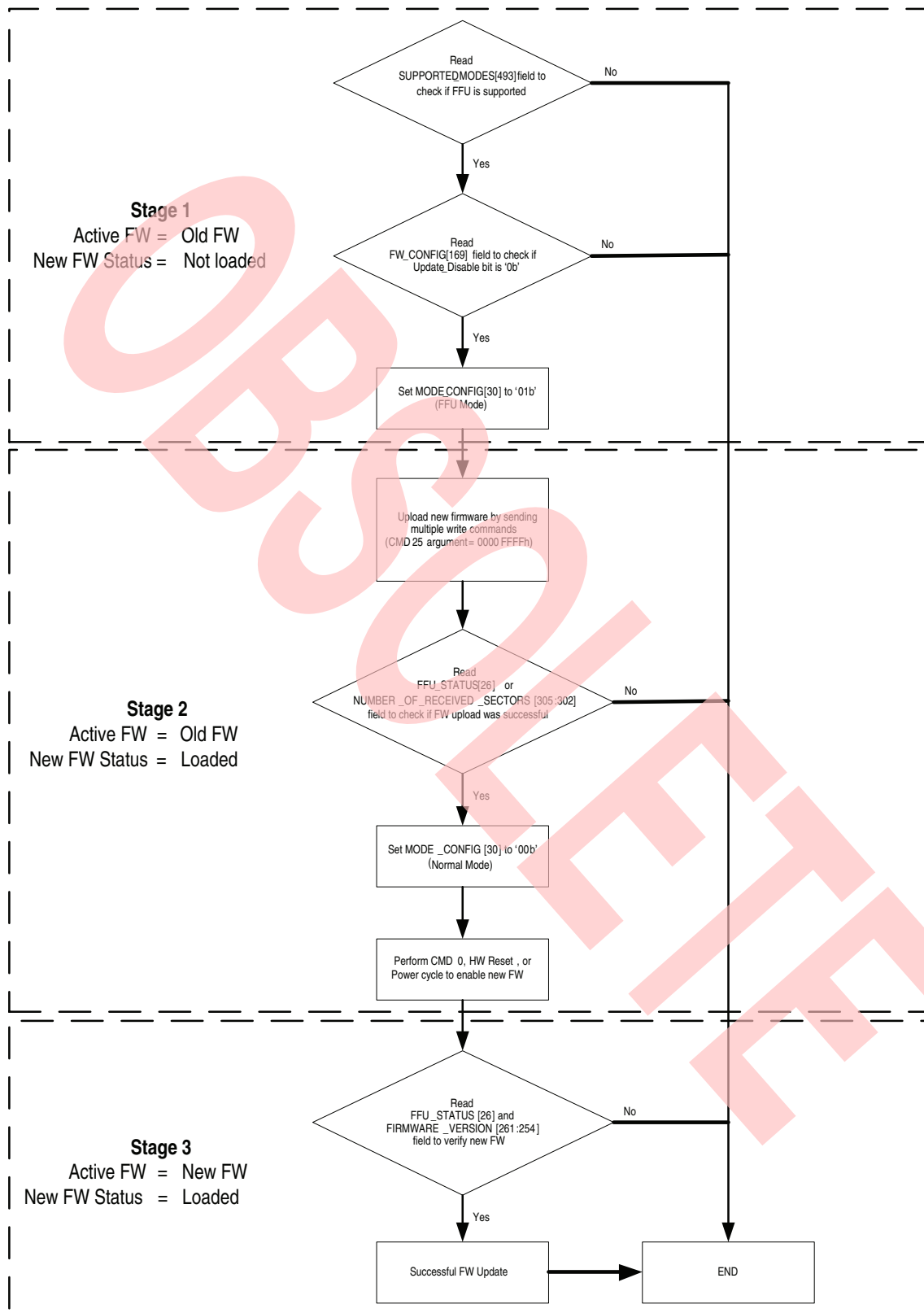
After finishing the transfer of the firmware, the host must power cycle, hardware reset, or issue a CMD0 to complete the process.

- If the Host switches from FFU mode to Normal mode before the FW upload is complete, then the NUMBER_OF_RECEIVED_SECTORS[305:302] field is set to 0 and the host must restart the firmware upload.
- The Host can check the FFU status in the FFU_STATUS [26] field. If an error occurs, the firmware upload will need to be restarted.

Table 2. FFU Status Codes

Value	Description
0x00	Success
0x10	General error (program error)
0x11	Firmware install error (e.g. host doesn't complete FFU flow, power cycle occurs during FFU flow)
0x12	Error in downloading firmware (e.g. write argument isn't 0x0000FFFF, firmware file header checksum error)
Others	Reserved

Figure 1 Field Firmware Update Procedure



Note: For any unsuccessful update, the Host must restart the FFU process from the beginning.

3**Conclusion**

This application note provides information on how to use the Field Firmware Update feature that is available in a Cypress e.MMC memory device. This feature provides users with the flexibility to update the e.MMC firmware without the need to remove it from the system. For any questions regarding this application note, please enter a support request on the Cypress web site:

[Cypress Customer Support Request Form](#)

or contact your Cypress representative.

OBsolete

Document History Page

Document Title: AN200379 - e.MMC Field Firmware Update (FFU) Feature

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Rev.	ECN No.	Orig. of Change	Submission Date	Description of Change
**	—	—	02/05/2014	Initial version
*A	5005450	MSWI	11/06/2015	Updated in Cypress template
*B	5868997	AESATMP8	08/31/2017	Updated logo and Copyright.
*C	6032532	MNAD	01/15/2018	This product is no longer supported and EOL'd. This spec to be Obsolete.

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