

e-MMC Special Features via TL –SEP 2017

When creating a job in Data I/O's TaskLink, the Special Features tab may list new options for e-MMC devices. This document explains relevant and recent options.

The default values might work in some cases. Make sure to set the values according to your system and device.

For other TaskLink device notes, please refer to <http://ftp.dataio.com/FCNotes/Footnote/>

Relevant Customer Options

SDMP: multi-partition header Default: *Auto Check*

Auto Check	Auto checks if image includes header. Recommended option.
Has Multi-partition header	The programming image must contain multi-partition header.
NO Multi-partition header	The programming image only targets the user-area partition; no configuration programming. (Standard programming operation when no configuration is required.)

SDMP: multi-partition function Default: *Auto Check*

Auto Check	Auto check if image includes header. Recommended option.
Disable	Disables multi-partition function regardless of a header configuration files.
Enable	The programming image must contain a multi-partition function.
Remapping	Only used for remapping the file format.

SDMP: super-partition function Default: *Auto Check*

Auto Check	Auto checks if image includes header. Not recommended at this time. If creating a load device job, please select <i>Enable</i> . If creating a programming device job, please select <i>Disable</i> .
Disable	Disables the multi-partition header regardless of a header configuration files.
Enable	The programming image must contain a super-partition function.

Required Sector Num (SD part) Default: *<Number of Sectors of the device>*

Use this option to disable some sectors during programming/reading. The value should be less than or equal to the maximum sector table number. **Decimal value.**

Verify Option –for FlashCORE III only– Default: *Verify data file*

Verify CRC only	Verifies the image CRC only.
Verify data file	Verifies the full image data.

Smart Whole Chip Read –above 2G device only– Default: *<Enable> Boolean value*

This is a smart read method for e-MMC devices. If the function is enabled, the programmer will skip blank areas (all bytes are blank state) that are larger than 32 MBs, and read back the image without the skipped blank areas. However it may include blank blocks smaller than 32MBs.

NOTE: The function only supports devices above 2 GB.

NOTE: For more details, please refer to

http://ftp.dataio.com/FCNotes/Footnote/Smart_Whole_Chip_Read_User_Manual.pdf

Check device PRV Default: *<Disable> Boolean value*

This is a switch to enable PRV (product revision) check function.
Please define the expected PRV value in “**Product Version (PRV)**” setting.

NOTE: if the “Check device PRV” exists, but there is no Product Version (PRV) value, then an exception gets thrown when the algorithm runs.

Product Version (PRV) Default: *<0> Hexadecimal value*

This setting to define the expected PRV value.

NOTE: The feature is only available when “Check device PRV” is set to <Enable>.

Partitions

Boot Partition #0 Data Size(block) Default: *<0> Decimal value*

This is a boot partition capacity.

FORMULA: If Boot Partition capacity = n bytes then set it to = $(n/512)$ Blocks

EXAMPLE 1:

If you want a target boot partition size of 128 KB then $(128 \times 1024)/512 = 256$ blocks.

EXAMPLE 2:

If you want a target boot partition size of 2 MB then $(2 \times 1024 \times 1024)/512 = 4096$ blocks.

Boot Partition #1 Data Size(block) Default: *<0> Decimal value*

This is a boot partition capacity.

FORMULA: If Boot Partition capacity = n bytes then set it to = $(n/512)$ Blocks

For examples see *Boot Partition #0 Data Size(block)* above.

General Purpose Partition #0 Data Size(block) Default *<0> Hexadecimal value*

General Purpose Partition #1 Data Size(block) Default *<0> Hexadecimal value*

General Purpose Partition #2 Data Size(block) Default *<0> Hexadecimal value*

General Purpose Partition #3 Data Size(block) Default *<0> Hexadecimal value*

These are general purpose partitions size for programming/reading.

User Partition #0 Data Start(block) Default: *<0> Hexadecimal value*

This is a user partition start address for reading.

FORMULA: The address at which to start reading is = $(0xABCDEF\text{GH}/0x200)$.

Example:

To start reading at the 25th sector, the address of the 25th sector = 0xC80000 bytes.
Data start = 0xC80000 / 0x200 bytes = 0x6400

User Partition #0 Data Size(block)

Default: <0> Hexadecimal value

This is a user partition size for reading.

FORMULA: If the device has multiple partitions, then this parameter is calculated as [Address of last sector Programmed – (1MB Header + n bytes Boot Partition Data Size)]/512 bytes. (Hint– To work in a Hex value; 512 bytes = 200 hex).

Example 1:

If the last sector programmed = 20th sector, and you want a Boot Partition = 2 MB, then
User Partition #0 Data Size(block) =
[0xA80000 – (0x100000 + 0x200000)]/0x200 = 0x3C00

Example 2:

If the last sector programmed = 20th sector, and you want a Boot Partition = 0 MB, then
User Partition #0 Data Size(block) =
[0xA80000 – (0x100000 + 0)]/0x200 = 0x4C00

Boot Partition Size Change Enable –Samsung moviNAND only– Default: *Disable*

Enable/Disable the ability to change boot partition capacity of capable devices.

Changed Boot Partition Size –Samsung moviNAND only–

Default: <0> Decimal value

This is the parameter for boot area size change. (Refer to spec for capable devices.)

FORMULA: If Boot Partition capacity = 128k * n bytes then set it to = n
For examples n = 1 indicate Boot Partition capacity = 128k bytes.

RPMB Partition Size Change Enable: –Samsung moviNAND only–

Default: *Disable*

Enable/Disable the ability to change RPMB partition capacity.

Changed RPMB Partition Size –Samsung moviNAND only–

Default: <0> Decimal value

This is the parameter for RPMB area size change. (Refer to spec for capable devices.)

FORMULA: If RPMB Partition capacity = 128k * n bytes then set it to = n
For examples see *Changed Boot Partition Size* above.

Program Boot Area in Single Block Mode

Default: No

An alternative Method to program the Boot (may be required in some cases).

PSA

Product State Awareness

Default: <Disable> Boolean value

Latest MLC NAND device (under 20nm process) has weak point in soldering. If we solder the device containing master image data, then data get corrupted. To support off-board programming, PSA was introduced. Setting to <Enable> will enable PSA function.

NOTE: The function only supports on devices that JEDEC/MMC standard version since 5.0 compliant.

NOTE: For more details, please refer to

http://ftp.dataio.com/FCNotes/Footnote/PSA_User_Manual.pdf

Data I/O Application Note

Product State Awareness Mode Default: *selected by system*

Selected by system	The algorithm will check which mode this device support, if support both, auto mode is selected.
Manual mode	Customer can specify Manual mode by this special feature.
Auto mode	Customer can specify Auto mode by this special feature.

PSA state after programming for manual mode Default: *PRE_SOLDERINF_POST_WRITES*

PRE_SOLDERING_POST_WRITES	Standard eMMC protocol will set PSA state to PRE_SOLDERING_POST_WRITES (ECSD[133]).This value represents a state in which the device is in production and the host completed to load the content to the device. The host sets the device to this state after content was loaded and just before soldering. Once transferred to this state the host should not write content to the device.
NORMAL	This value represents a state in which the device is the field and the device uses “regular” operations. Micron request the option to set PSA state to NORMAL after off-line programming for some devices.

Special Notes

NOTE: Partition information one block indicates 512 Bytes according to e-MMC4.4 spec.

USER CASE 1: Multiple Partition File Format (Necessary options only)

SDMP: multi-partition header
SDMP: multi-partition function
Boot Partition #0 Data Size(block)
Boot Partition #1 Data Size(block)
General Purpose Partition #0 Data Size(block)
General Purpose Partition #1 Data Size(block)
General Purpose Partition #2 Data Size(block)
General Purpose Partition #3 Data Size(block)

USER CASE 2: Super Partition File Format (Necessary options only)

SDMP: multi-partition header
SDMP: multi-partition function
SDMP: super-partition function

HINT: Check whether the value required are Hexadecimal or Decimal units.

Revision History

- V1.0 Nov 24, 2011
Created doc
- V1.1 Dec 26, 2011
Added comment about "Verify Option".
- V1.2 Feb 26, 2012
Added specific special feature for moviNAND.
- V1.3 Feb 29, 2012
Added specific special feature for moviNAND.
- V1.4 May 21, 2012
Added examples. Replaced *moviNAND* with '*capable devices*.'
- V1.5 Aug 28, 2012
Corrected 'User Partition #0 Data Start(block)'
- V1.6 Dec 18, 2012
Added 2 options (Smart Whole Chip Read and Check Device PRV) and defined the PRV value.
- V1.7 MAR 21, 2013
Fixed formula description of Boot/RPMB changed size.
- V1.8 MAY 10, 2013
Allow modify RPMB size along.
Add two user cases.
- V1.9 AUG 28, 2013
Highlight smart read feature do not support on below 2G devices.

- V2.0 SEP 21, 2017
Fixed Verify Option default value in FlashCORE III
Added comment about PSA function

Appendix

For file "Super Partition Organization.PDF" see <http://ftp.dataio.com/FCNotes/Footnote/>