MODEL500 SERIES

APPENDIX 1 eMMC Setup Manual

Revision Records

Sept. 29, 2016	Rev. 1
May 09,2018	Rev. 2
Sept. 26,2018	Rev. 3
Mar. 04,2019	Rev. 4
Apr. 08,2019	Rev. 5

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Foreword

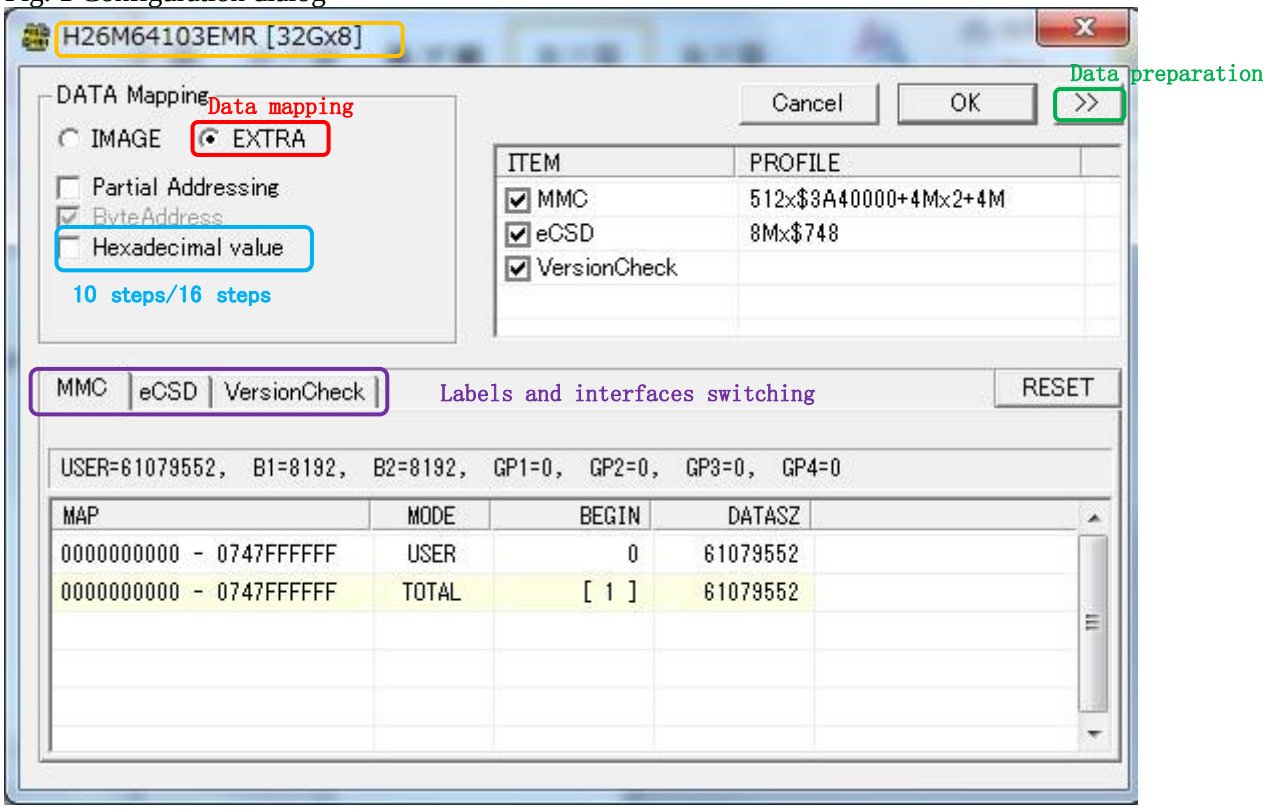
eMMC, relying on large data storage space, can conduct startup operation and data storage space allocation through a variety of settings. For more efficient data write-in, the device should be set properly.

The Manual presented the setting method for necessary items required at data write-in to eMMC.

1. Startup and close of configuration dialog

After selecting eMMC, start up the configuration dialog at (Access method) of the toolbar.

Fig. 1 Configuration dialog



DataMapping IMAGE:	All data
EXTRA:	Only applicable to write-in data (system default)
PartialAddressing:	Expresses partial address. It is not reflected herein.
Hexadecimal value:	Decimal/hexadecimal switching

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■ The following differences exist between IMAGE data and EXTRA data.

① IMAGE data
Refer to the data within all specified scopes and after COPY,
including the data not required to write in and blank data.

② EXTRA data
It is only composed by the data to be written in.
If the device memory is at the three districts to be written in and to be divided, IMAGE data form is composed of all data in the equipment, IMAGE data form is composed of all data of the equipment, and IMAGE data form is only composed of all data in the area to be written in.

If the device memory is at the three districts to be written in and to be divided, IMAGE data form is composed of all data in the equipment, IMAGE data form is composed of all data of the equipment, and EXTRA data form is only composed of all data in the area to be written in.

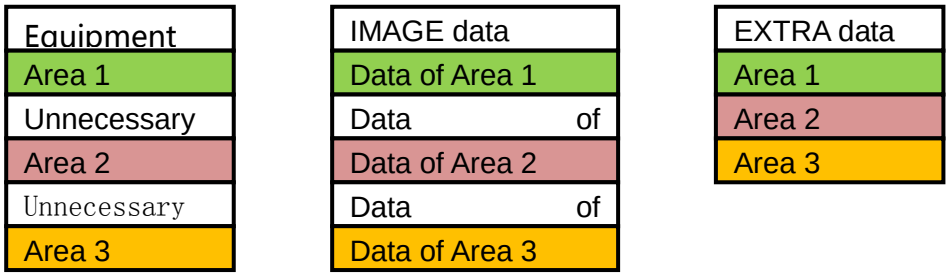
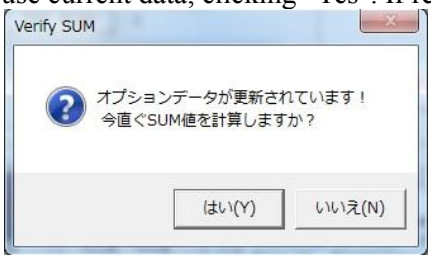


	IMAGE data	EXTRA data
Advantages	The data configuration shall match with the equipment.	The data can be decreased. Filesum shall be consistent with checksum.
Disadvantages	The data is bigger. Filesum may be inconsistent with checksum.	Configuration information is required.

Click OK at completing the setting.

※ Click OK to complete the setting. The settings will be reflected.
In addition, while performing data generation, data transmitting will be performed simultaneously.

If different data sizes are specified with current data size, SUM will re-calculate the inquiry dialog box. If use current data, clicking "Yes". If read the data later, click “No”.



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2. Write range setting (partitioning setup)

Select MMC label to enter scope setting (partitioning setup) interface.

The following memory blocks exist in eMMC.

- USER
- BOOT1
- BOOT2
- RPBM (※ Incompatible at present)

In Addition, the size of original state is 0. Divide memory blocks of USER area by setting. (※ Partition shall be performed through eCSD setting)

- GPP1
- GPP2
- GPP3
- GPP4

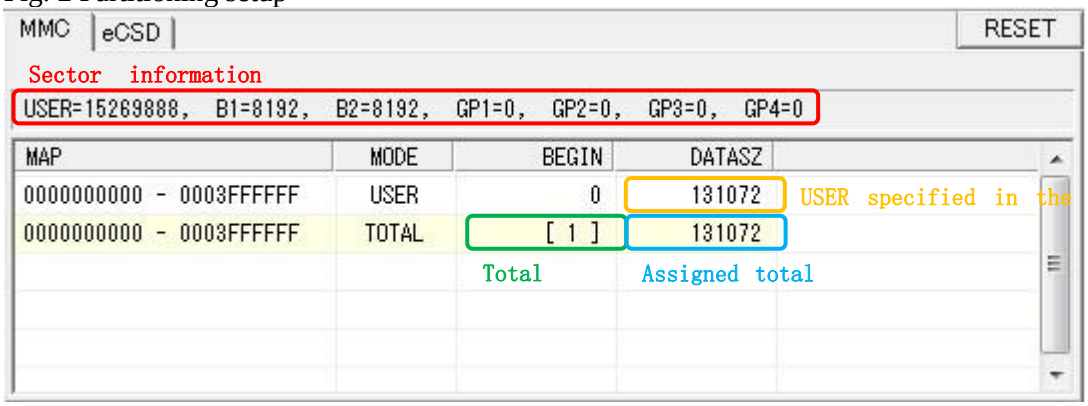
The above areas start from sector 0.

For the above areas, assign initial address to write in and testing areas. Assign data size with sector unit. (It is possible to set the scope setting as partition.)

The system default is specified as USER district.

MAP: Express the data with byte address. [Exclusive use]
MODE: Assign the areas to be written in.
BEGIN: Assign the initial address of write-in scope with section.
DATASZ: Specify the read-in data size with section size.

Fig. 2 Partitioning setup



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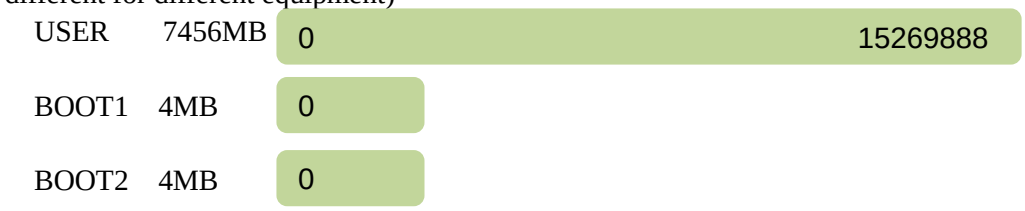
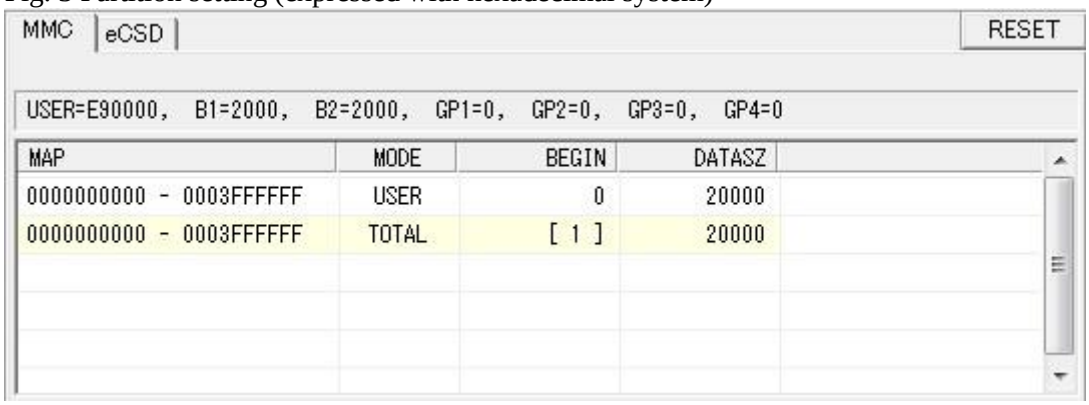
If express all areas of the equipment with sector, the following example will appear. (The size will be different for different equipment)



All areas start from sector 0.
Scope setting (partition) Assign the initial offset and size of each area with sector unit.
The scope setting (partition) shall be added through adding lines.
Scope setting can be specified under the status unrelated to sequence.
Perform multiple scopes setting within the same area (only limited to no-repeat)

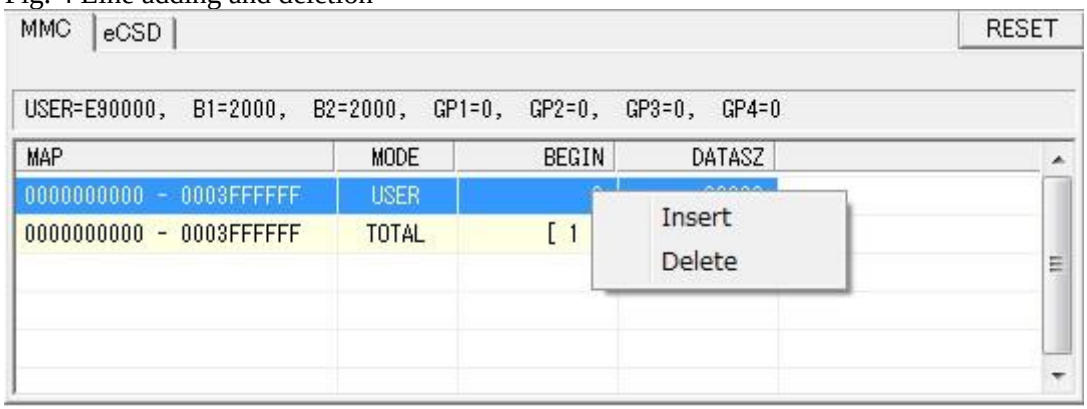
After showing Hexadecimal value option box, the value shall be expressed with hexadecimal system.

Fig. 3 Partition setting (expressed with hexadecimal system)



Add and delete lines through clicking the right key on the list.

Fig. 4 Line adding and deletion



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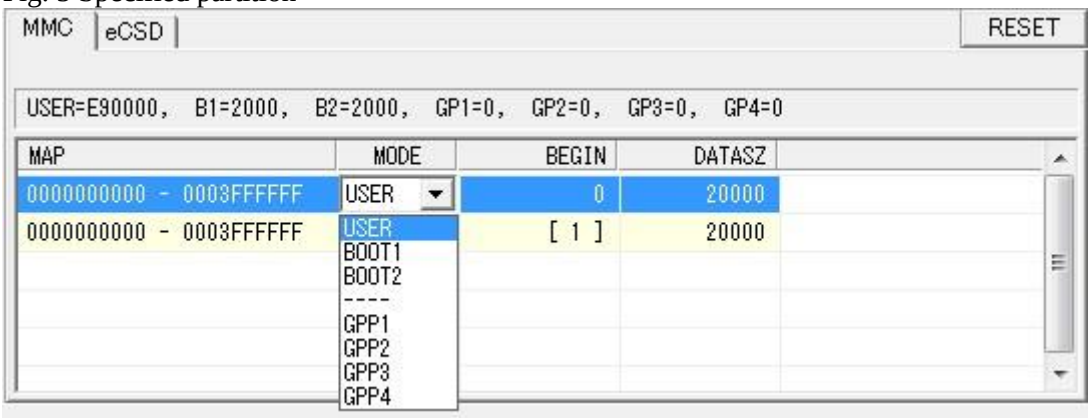
2. Write range setting (partitioning setup)

Assign partition in MODE. Select from the drop down list after double-click.

Fig. 5 Specified partition



While changing BEGIN/DATASZ, double click the mouse in the box to enter editing mode. Move the cursor to line I, and input the value.

Fig. 6 Value input

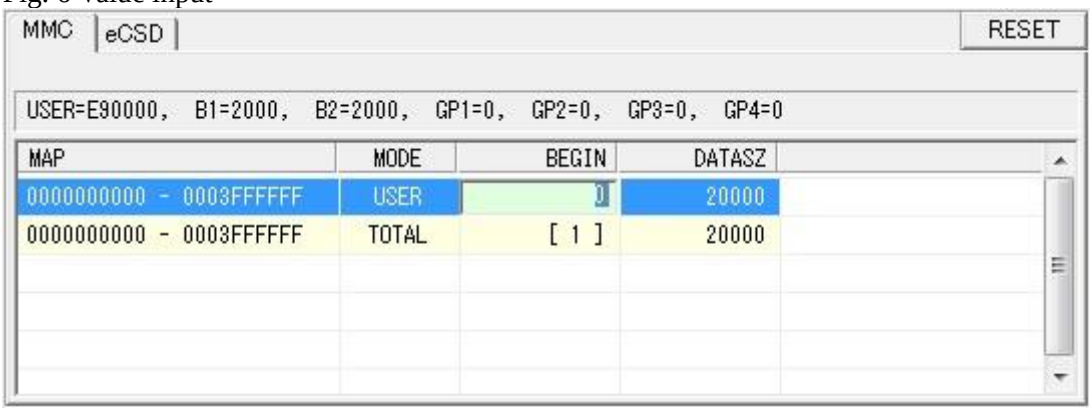
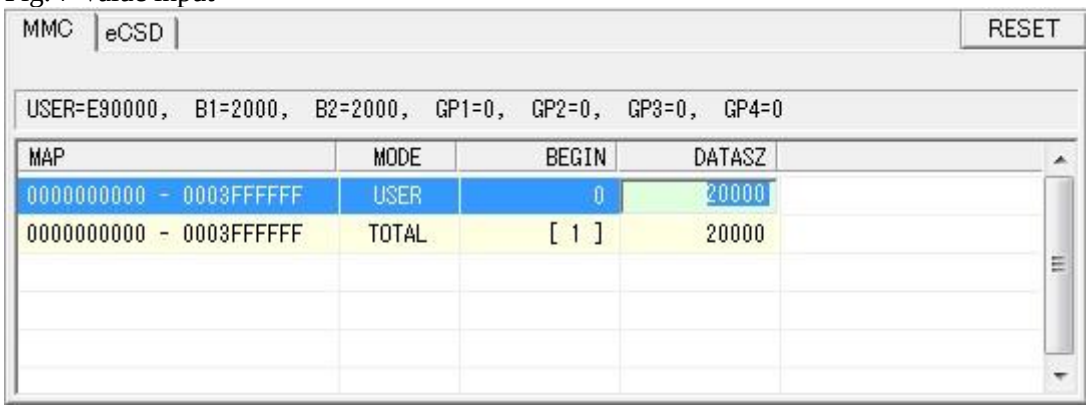


Fig. 7 Value input



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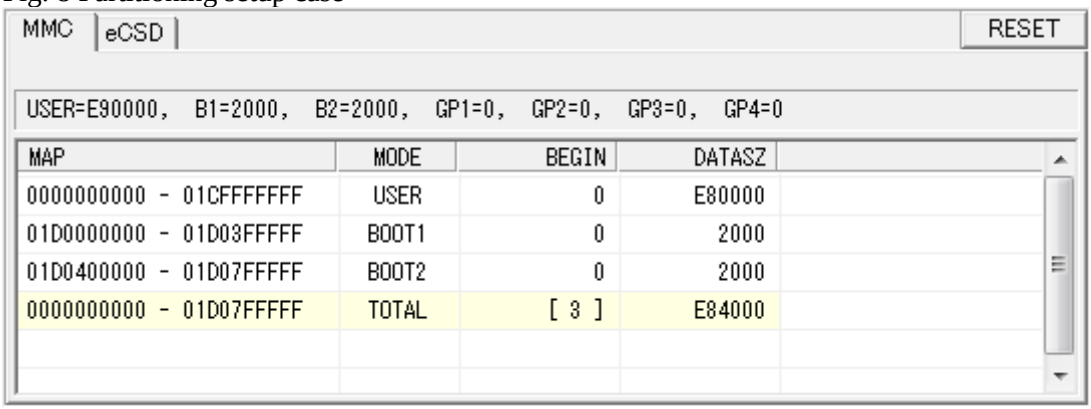
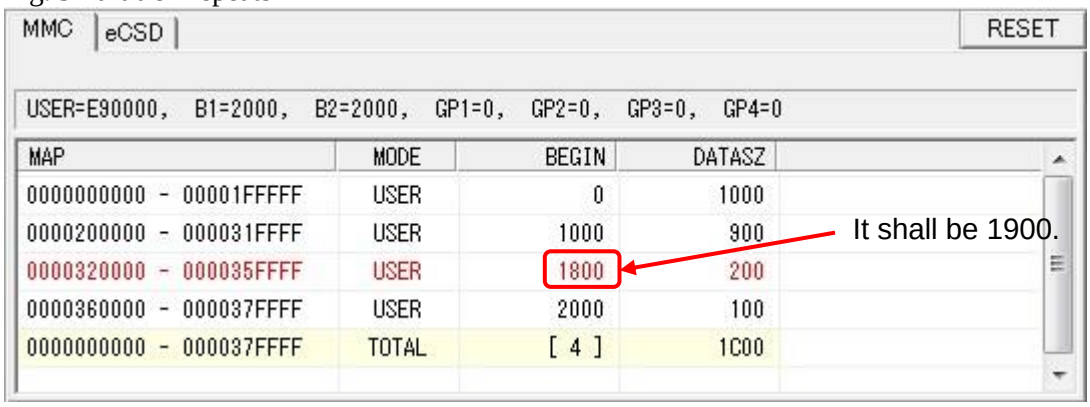
After adding all partitions, the following interface will be shown.

Fig. 8 Partitioning setup case



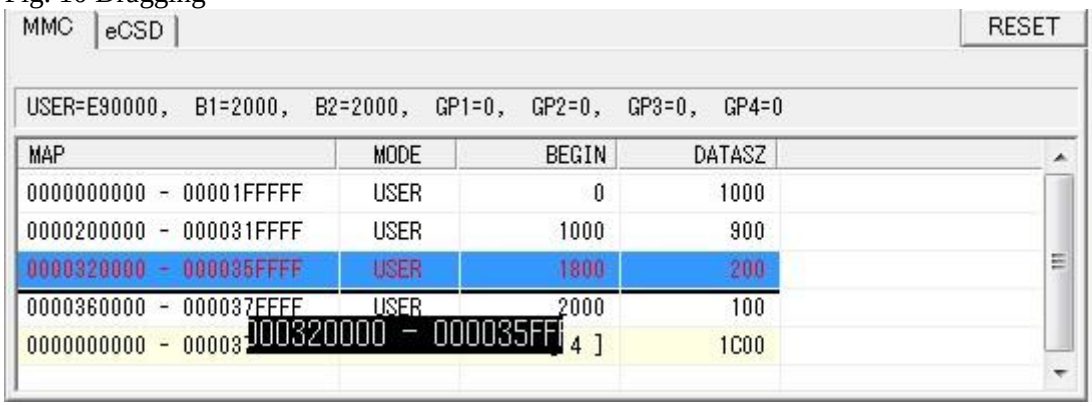
The setting range and repeated or assigned partitioning will become red.

Fig. 9 Partition repeats



Dragging and dropping can be performed. The selected parts can be dragged and moved to bold line part.

Fig. 10 Dragging



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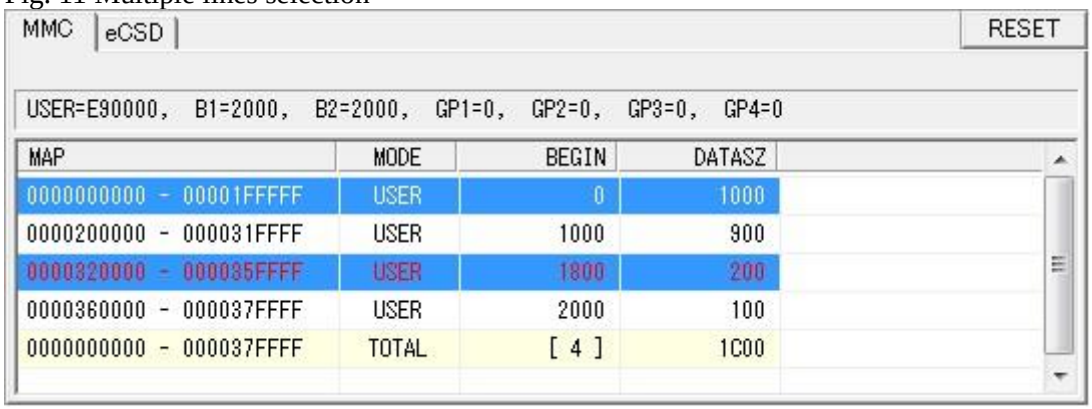
2. Write range setting (partitioning setup)

Multiple lines can be selected.
Continuous multiple lines can be selected by pressing SHIFT key. Press CTRL key to select multiple consecutive lines.
Adding, deletion and moving operation can be performed under selected state.

Fig. 11 Multiple lines selection



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3. eCSD setting

Select eCSD label to enter scope setting (partitioning setup) interface.

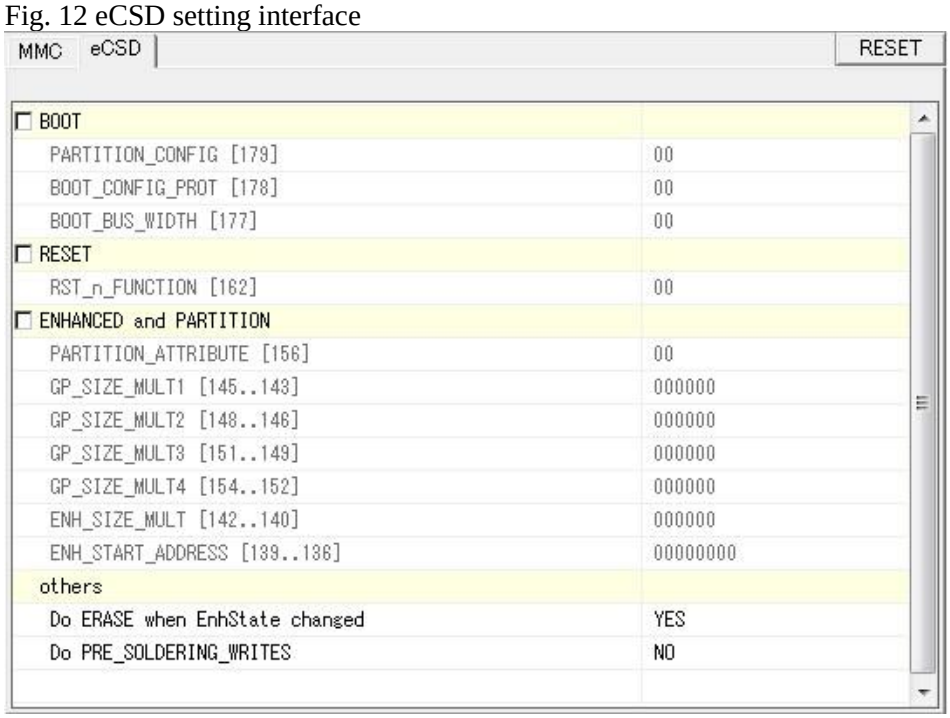
Click in the CheckBox to enable corresponding BOOT/RESET/EHNANCED and PARTITION items. Confirm and calibrate the values of the items.

Please refer to the specifications breakdown or equipment data sheet after JEDEC STANDERD JESD84-A441 related to running and setting value of all items. (※JEDEC homepage https://www.jedec.org/)

BOOT setting
Start up running setting group at specified power-on status.
RESET setting
Set the reset terminal of the equipment.
ENHANCEDandPARTITION setting
Assign the GPP blocks divided and enhanced (simulation SLC) setting.
Others setting

- Do ERASE when EnhState changed
  Specify whether delete partitions while modifying the enhanced settings and partition settings.
- Do PRE_SOLDERING_WRITES
  PSA(ProductStateAwareness) added after corresponding to eMMC v5.0.
  Specify corresponding modes in NO/AUTO/MANUAL.

Fig. 12 eCSD setting interface



Please note that
While perform equipment copy, the values of copy equipment is reflected. However, the click will not be reflected. Therefore, attention shall be paid.
Please confirm if it is clicked before write in.

3. eCSD setting

Set the following equipment as an example.

SEC_COUNT = E90000h(7456MB) HC_ERASE_GRP_SIZE = 8, HC_WP_GRP_SIZE=2, MAX_ENH_SIZ_MULT=1D2h Block size = HC_ERASE_GRP_SIZE x HC_WP_GRP_SIZE x 512KB = 8MB			
System default	USER	MLC	7456MB
	GPP1	0MB	
	GPP2	0MB	

Case 1 Change the whole area of USER to simulation SLC.

Setting	PARTITION_ATTRIBUTE=1 ENH_SIZE_MULT=FFFFFFh (ENH_SIZE_MULT = MAX_ENH_SIZ_MULT at operation) Or ENH_SIZE_MULT=1D2h		
After PROGRAM	USER	Simulation SLC	3728MB

Case 2 Change the part area of USER (1024MB/SLC) to simulation SLC.

Setting	PARTITION_ATTRIBUTE=1 ENH_SIZE_MULT=80h (1024MB/8MB=128)			
After PROGRAM	USER	Simulation SLC 1024MB	MLC 5408MB	6432MB

Case 3 Change 2048MB of the area of USER to MLC. Change the remaining to simulation SLC.

Setting	PARTITION_ATTRIBUTE=1 ENH_START_ADDRESS =400000h (2048MB/512B=4194304：sector address) ENH_SIZE_MULT=152h ((7456MB-2048MB)/2/8MB=338)			
After PROGRAM	USER	MLC 2048MB	Simulation SLC 5408MB/2=2704MB	4752MB

Case 4 Divide one part of USER area to GPP1(2048MB) and GPP2(1024MB)

Setting	PARTITION_ATTRIBUTE=0 GP_SIZE_MULT1=80h (2048MB/8MB/2=128) GP_SIZE_MULT2=40h (1024MB/8MB/2=64)			
After PROGRAM	USER	MLC		4384MB
	GPP1	MLC	2048MB	
	GPP2	MLC	1024MB	

Case 5 Divide one part of USER area to GPP1(1024MB/SLC) and GPP2(1024MB)

Setting	PARTITION_ATTRIBUTE=0 GP_SIZE_MULT1=80h (2048MB/8MB/2=128) GP_SIZE_MULT2=40h (1024MB/8MB/2=64)		
After PROGRAM	USER	MLC	4384MB
	GPP1	Simulation SLC	1024MB
	GPP2	MLC	1024MB

Please note that
The setting of ENHANCED and PARTITION is OneTime. It cannot be changed after setting.

4. Data generation

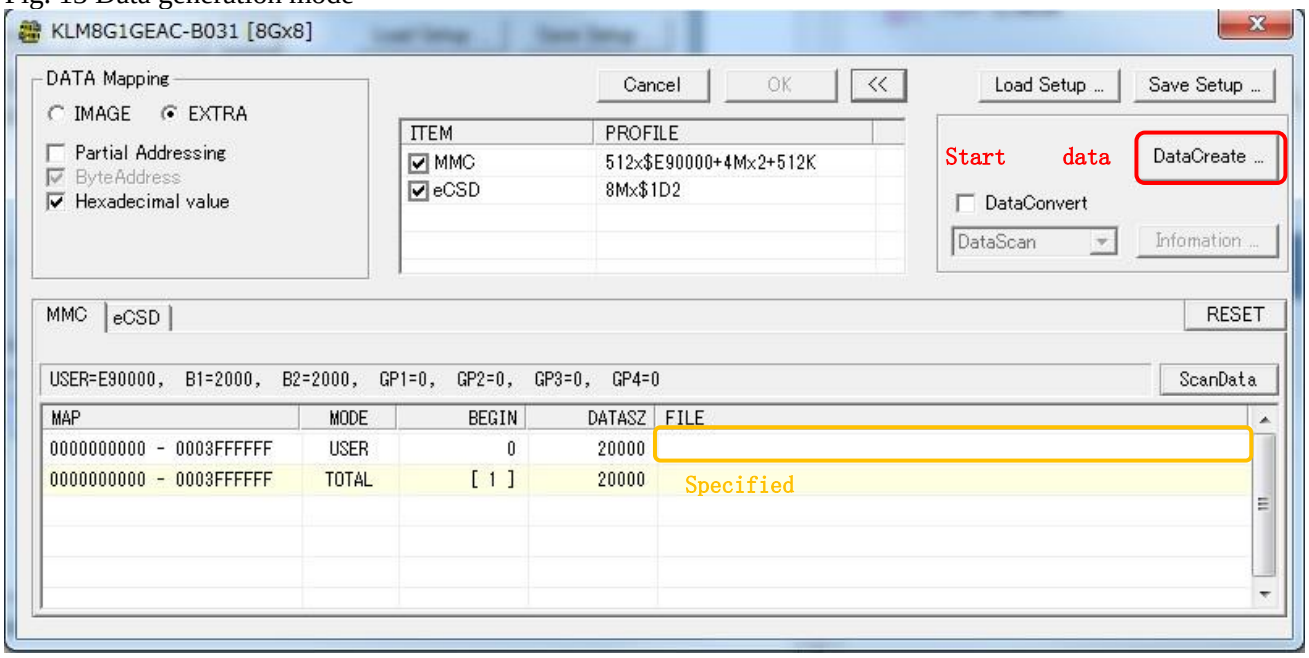
When specify files or constitute data through specified format in each partition, the data will be integrated. Therefore, model reconstruction data shall be generated.

Through clicking the [>>] key on the upper right of the dialog box, move it to data generation mode.

At the ending, please move to [<<] setting mode through key.

By clicking [<<] and [OK], transmit the generated data to the encoder.

Fig. 13 Data generation mode

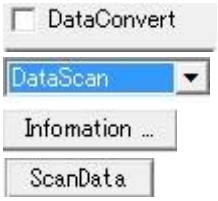


Return data generation mode to setting mode.
※The generated data of the data generation mode will be transmitted to encoder after completing.

Read setting (m5i document/text)

Save settings (m5i document/text)

Data generation



Startup data conversion at data generation

Conversion tools selection

Description of conversion tools selection

Scan the data and perform reconstruction tools for slightly consecutive blank value

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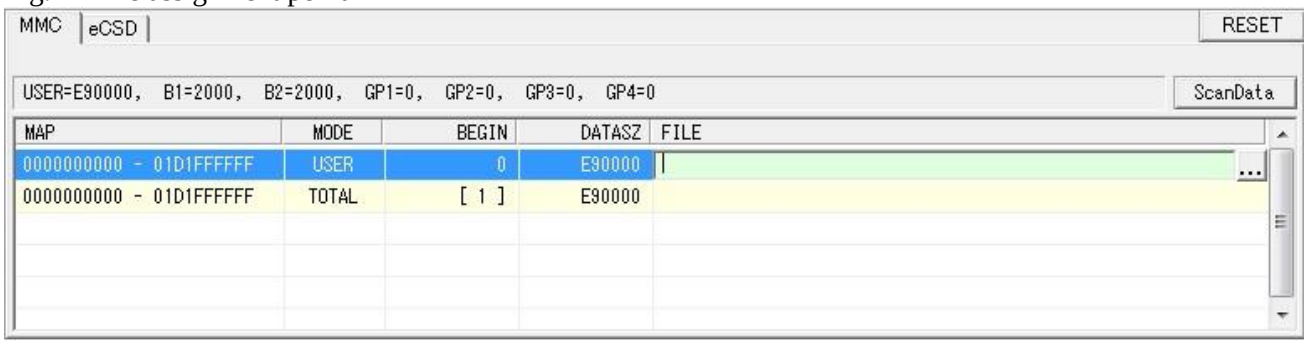
File assignment

Double click the mouse at document assigning point. Direct input area will display and select and input the file reference key.

Fig. 14 File assignment point

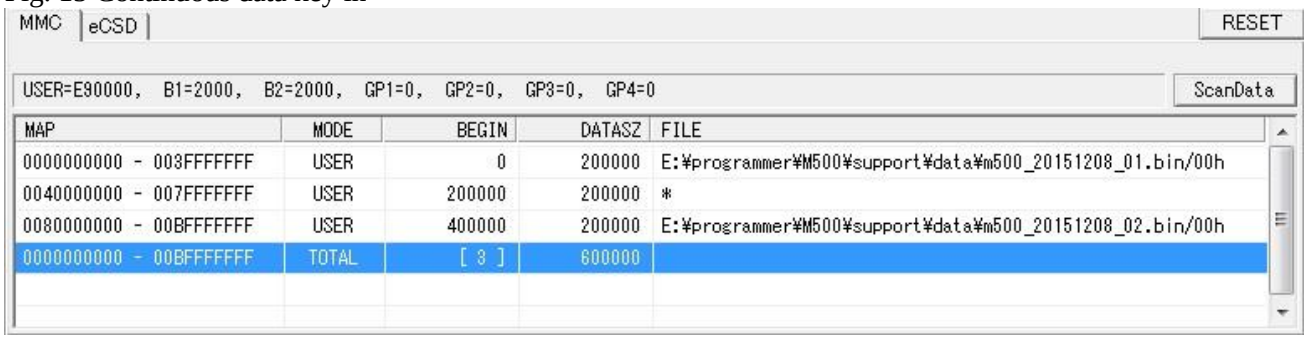


Key in drive into file name: folder name \ / file name/blank value (00h/FFh) [| offset (hex system)] Read the data of assigned size from the file at data generation. In addition, assign the file size. Fill up blank value after file data.

Consecutive data

Key in “*” at file specified position. The specified data can be continuously used. In addition, key in offset at the specified file point to use the data of any place of the file.

Fig. 15 Continuous data key in



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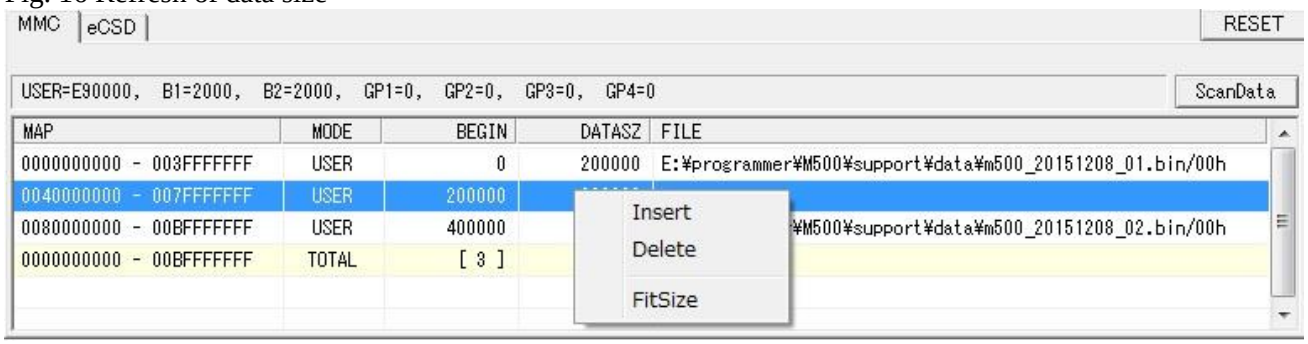
4. Data generation

Assign write in size from file assignment. While selecting FitSize at file assignment by clicking the right key, the partition of file size can be reflected on DATASZ.

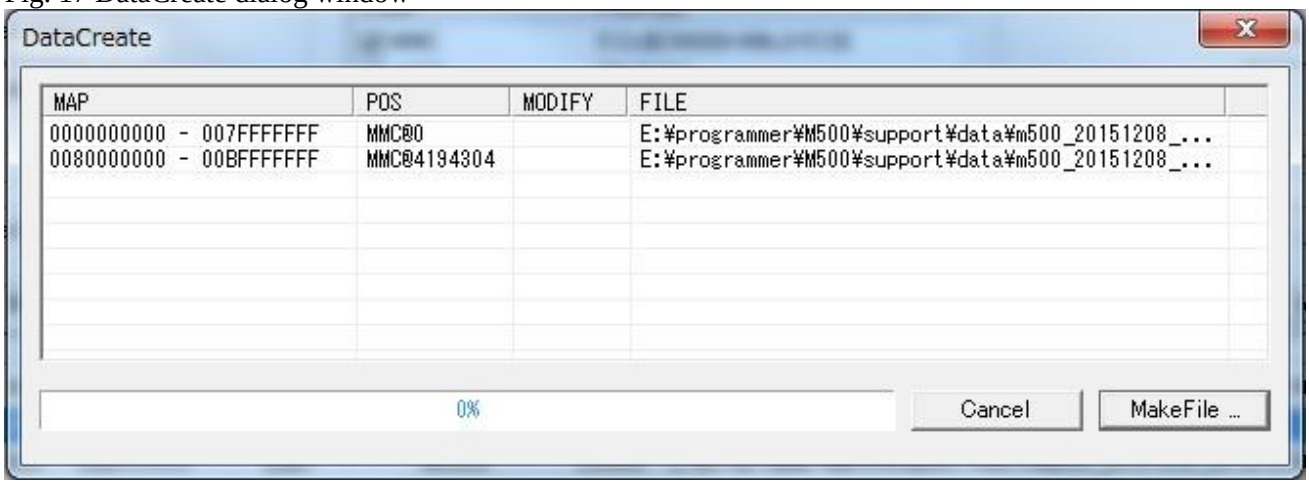
Fig. 16 Refresh of data size



After completing assignment of data files of each scope (partition), perform data generation. Click DataCreate ... key to start data generation.

After confirming the files, open the DataCreate dialog window, assign the files to be stored.

Fig. 17 DataCreate dialog window



At the ending, please click << key to move to setting mode.
Through << and OK to transmit the generated data to the encoder.
The document name registered in a universal encoder will be changed to the generated file name.

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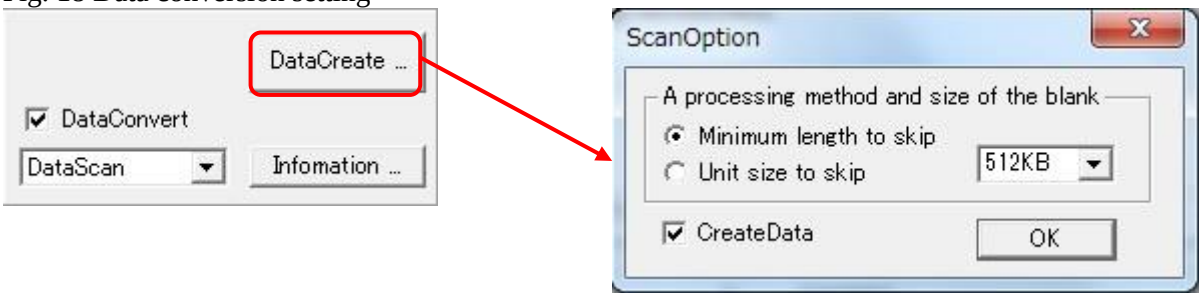
5. Data conversion

Support data conversion tools of specific functions at data generation.

Select data conversion tools through clicking DataConvert. Convert at data generation.

Fig. 18 Data conversion setting



A type of converter supported currently.

Name of the converter	Function
DataScan@MMC	Written scope optimization tool used by SD/MMC skip over the currently setting data and delete the consecutive blank area. Through reducing the write in range, it is aimed to shorten the write in time. There are two Skip over methods MinimunLength to Skip: Skip over the blank of specified size. UnitSize to Skip: Skip over the blank cell of specified unit.

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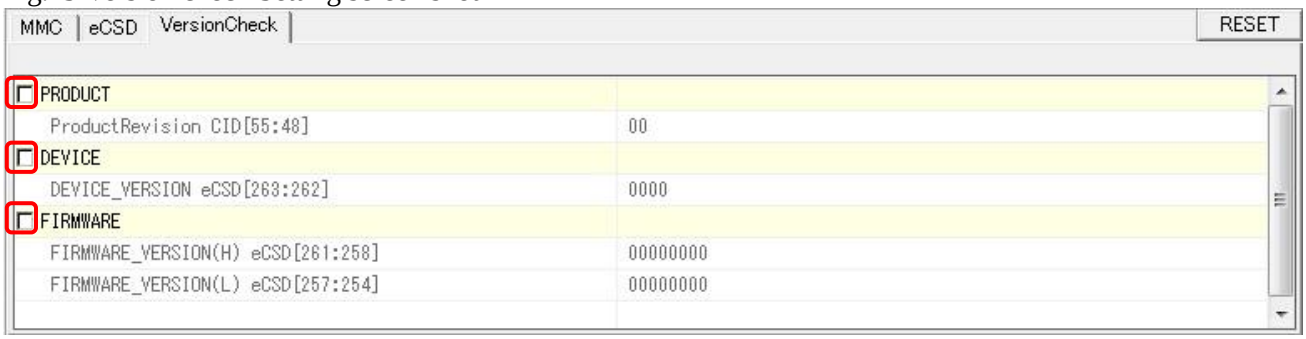
6. Version Check

Additional specific information of device can be cheked.

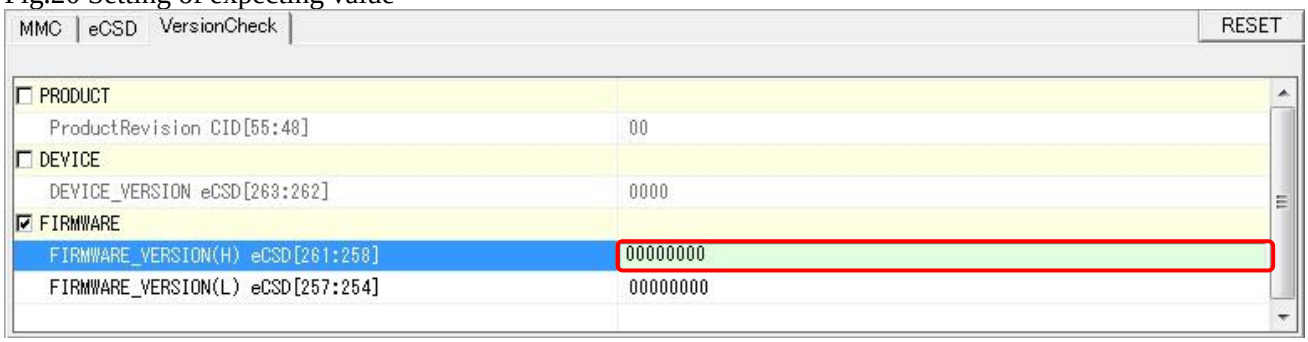
Fig.19 Version check Setting screen shot



Additional verification can be done to select with check box of left side of setting item.

- Product Revision
- DEVICE VERSION
- FIRMWARE VERSION

Fig.20 Setting of expecting value

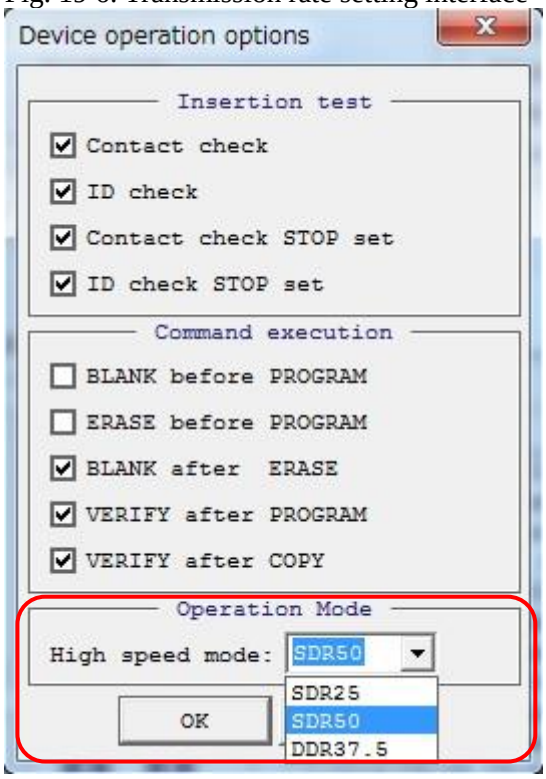


Expecting value can be edit in selected items.Click the column and input expecting value.
When contents of device is copied to buffer, these value is affected by device information.

7. Transmission rate setting

In order to improve the determination and calibration time of eMMC, multiple transmission rates are prepared. Set the most suitable according to different devices.

Fig. 19 6. Transmission rate setting interface



Select the most suitable transmission rates through Operation Mode of Device operation options interface, and confirm through clicking OK key.

Select the following transmission rates according to different devices.

- SDR25 transmission rate is 25MB/s.
- SDR50 transmission rate is 50MB/s.
- SDR75 transmission rate is 75MB/s.
- DDR37.5 transmission rate is 75MB/s.

Note:

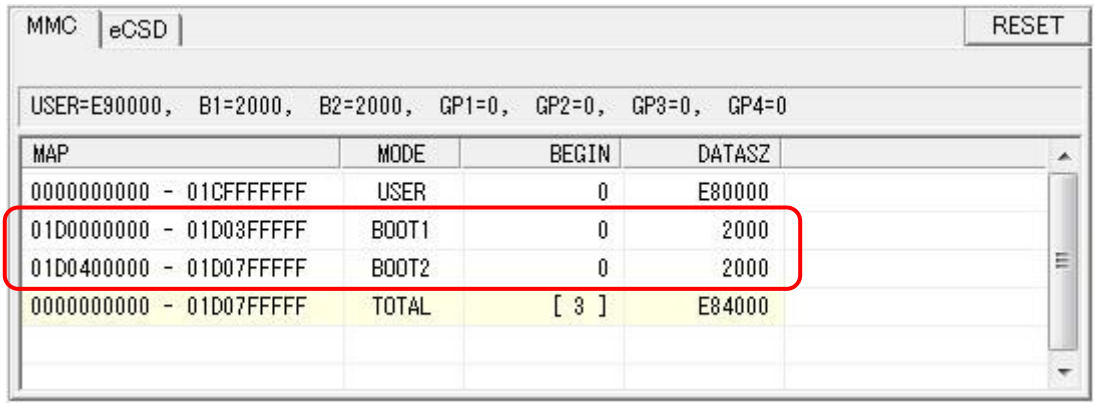
If the equipment still doesn't support after selecting high speed, the equipment shall run at an optional rate.

DDR37.5 parameter is for test purpose. Do not select it.

8. FAQ

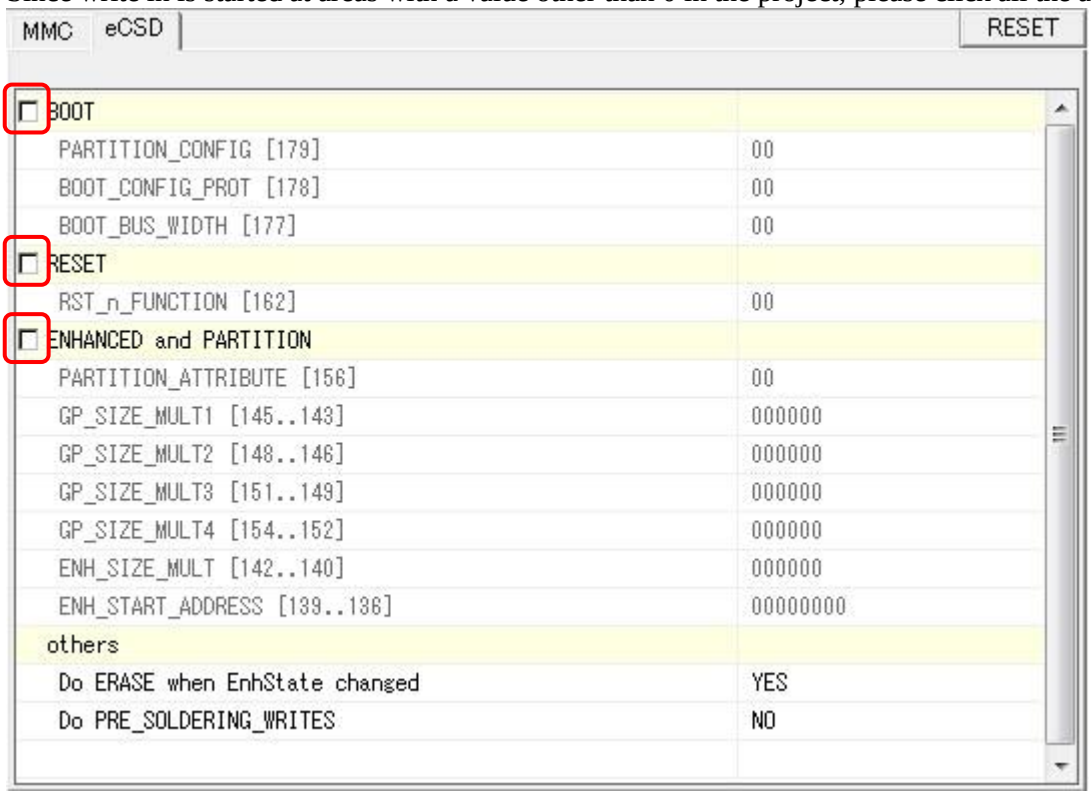
- BOOT cannot be copied and start up.

  The system default partitioning is USER. Please add BOOT area at partitioning setup before copying.



In addition, eCSD project only performs value duplication at duplication phase. Therefore, it cannot be directly reflected (display as gray).

Since write in is started at areas with a value other than 0 in the project, please click all the areas.



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Revision Records

Revision	Preparation date	Contents
Rev. 1	Sept. 29, 2016	Initial revision
Rev. 2	May 07,2018	Add note to Transfer rate setting. Add version check setting.
Rev. 3	Sept. 26, 2018	Modify company name
Rev. 4	Mar. 04,2019	Correct setup file name.
Rev. 5	Apr. 08,2019	Correct errors and add notice.