Application Note:

eMMC Detailed Settings in Dediware

V1.0
Description

This application note illustrates the setting of extCSD in eMMC. This note will introduce how to set Enhanced Mode and General Purpose Partition in Dedware and NuProg software. Get more information from JEDEC document (JESD84-B51).

The configure partitions of Enhanced Mode and General Purpose Partition

1. **The host wants to configure the device partitioning.**
   - Yes → PARTITIONING_EN=1
   - No → Partitioning feature not supported

2. **PARTITIONING_EN=1**
   - Yes → Does the Host want to set ENH attribute to partitions?
   - No → PARTITIONING_SETTING_COMPLETED
     (To notify the device that the host has completed partitioning configuration)

3. **Does the Host want to set ENH attribute to partitions?**
   - Yes → ENH_ATTRIBUTE=1
   - No → PARTITIONING_SETTING_COMPLETED

4. **ENH_ATTRIBUTE=1**
   - Yes → Set: Number of General Purpose Partition, General Purpose Partition size and Enhanced Mode. Enhanced User Data Area size, start address and enhanced attribute.
   - No → PARTITIONING_SETTING_COMPLETED
     (To notify the device that the host has completed partitioning configuration)

5. **PARTITIONING_SETTING_COMPLETED**
   - Power cycle
   - Possible change in size parameters or User Data Area
   - Partitions correctly configured

Set: Number of General Purpose Partition, General Purpose Partition size.

Set: Number of General Purpose Partition, General Purpose Partition size and Enhanced Mode. Enhanced User Data Area size, start address and enhanced attribute.
The flowchart shows the steps to set the Enhanced Attribute and General Purpose Partition size. Further settings; please see **Chapter 1 and 2.** **Chapter 1** tells the setting steps for user who uses ProgMaster series or StarProg-F/U; for NuProg-E/F8 series users, please refer to the **Chapter 2.**

**Chapter 1: Set the Enhanced Attribute in Dediware**

**Preparation:**

**Chapter 1** is for ProgMaster series and StarProg-F/U, before launching the Dediware software, please make sure the software and the firmware are the latest version (Please check on the DediProg website: [http://www.dediprog.com/US](http://www.dediprog.com/US)) After checking, please refer to the following steps.

**Step1.** Please start **Dediware** and use **Select** function in the Engineering Mode to choose the correct IC part number. For this demonstration, we will use Spansion S40410161B1B1W010 to set Enhanced Mode and General Purpose Partitions.

**Step2.** Use **Read ID** function to check whether the ID is correct, and check the Max Enhanced Area Size in the extCSD in **Read IC** function:

As the screenshot above, you can check the size in 0x9D to 0x9F (framed in blue), in this example, we will set the max Enhanced size to 0x01D2. The Sector Counts (0xD4 to 0xD7) will change after finishing the Enhanced setting.

**Step3.** Please use **Load function** to Load the Programming file. If the programming file is not loaded, then the programming functions (Program and Verify) will not be available.
Step 4. Please click on the **Config** function and set Enhanced and General Purpose Partition command:

1. **High-density erase group definition (0xaf)**: This is the first value that you need to set, since Dediware will use this value to determine whether the user needs to write 0x01 to the extCSD. Once the power has been restarted, the default register will be “0”.

2. **Partitions attribute (0x9c)**: This command is for telling the chip that it needs to set Enhanced Attribute in user data area or General Purpose Partition. The default is 0x00.

3. **General Purpose Partition Size (0x8f to 0x9a)**: This command is for generating General Purpose Partition 1 to General Purpose Partition 4, if you are not going to use General Purpose Partition, please skip this step. The setting of each size is shown as below:

<table>
<thead>
<tr>
<th>General Purpose Partition1</th>
<th>size</th>
<th>General Purpose Partition3</th>
<th>size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExtCSD[145/0x91]</td>
<td>size2</td>
<td>ExtCSD[151/0x97]</td>
<td>size2</td>
</tr>
<tr>
<td>ExtCSD[144/0x90]</td>
<td>size1</td>
<td>ExtCSD[150/0x96]</td>
<td>size1</td>
</tr>
<tr>
<td>ExtCSD[143/0x8f]</td>
<td>size0</td>
<td>ExtCSD[149/0x95]</td>
<td>size0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>General Purpose Partition2</th>
<th>size</th>
<th>General Purpose Partition4</th>
<th>size</th>
</tr>
</thead>
<tbody>
<tr>
<td>ExtCSD[148/0x94]</td>
<td>size2</td>
<td>ExtCSD[154/0x9a]</td>
<td>size2</td>
</tr>
<tr>
<td>ExtCSD[147/0x93]</td>
<td>size1</td>
<td>ExtCSD[153/0x99]</td>
<td>size1</td>
</tr>
<tr>
<td>ExtCSD[146/0x92]</td>
<td>size0</td>
<td>ExtCSD[152/0x98]</td>
<td>size0</td>
</tr>
</tbody>
</table>

4. **Enhanced User Data Area Size (0x8c to 0x8e)**: This register defines enhanced user data area size.

5. **Enhanced User Data Area Start Address (0x88 to 0x8b)**: Set the enhanced start address, if you want to start from the beginning, then you do not need to set this value.

6. **Partitioning Setting (0x9b)**: The register is set to notify the device that the definition of parameters has been completed and the device can start its internal configuration activity.

**Note 1**: All the steps have sequence, so please make sure the command is in order.

**Note 2**: Please note that the Max Enhanced Area must be less than Enhanced General Partition Size + Enhanced user data area.
Step 5. After finishing the ExtCSD settings, please click **Batch** to set the batch operation if you would like to use them in the Production Mode:

Step 6. Please use **SavePrj** to generate the project, and switch to **Production Mode** to execute the project that you just saved. If you only want to remain in the Engineering Mode, please use program and verify function, and must do **power recycle*** after verification has finished.

* Power recycle means it is required to take out the chip from the IC socket, and then put it back again.
Step 7. After finishing programming in the Production Mode, you can switch back to the Engineering Mode and use **Read IC** for checking:

You can see the General Purpose Partitions and the Enhanced Attribute have been written (framed in blue), and the Sector Count (0xD7 to 0xD7) will reduce.

**Note:**
1. ProgMaster series and StarProg-F/U series only support creating General Purpose Partition, but not supporting Read/Write in the General Purpose Partitions.
2. StarProg-F/U does not support Production Mode for eMMC.
3. ProgMaster supports eMMC Enhanced Mode setting and write images at the same time, but please note that the firmware version has to be 2.1.79 or above.
Chapter 2: Set the Enhanced Attribute in NuProg_eMMC

Preparation:

Chapter 2 is for NuProg-E and NuProg-F8 series, before launching the software, please make sure the software and the firmware are the latest version (Please check on the DediProg website: http://www.dediprog.com/US). After checking, please refer to the following steps.

Step 1. Please start NuProg_eMMC, the software will auto detect the correct IC part number. For this demonstration, we will use Spansion S40410161B1B1W010 to set Enhanced Mode and General Purpose Partitions.

Step 2. Use Read IC function to check the Max Enhanced Area Size in extCSD:

As the screenshot above, user can check the size in 0x9D to 0x9F (framed in blue), in this example, we will set the max Enhanced size to 0x01D2. The Sector Counts (0xD4 to 0xD7) will change after finishing the Enhanced setting.

Step 3. Please use Load function to Load the Programming file. If the programming file is not loaded, then the programming functions (Program and Verify) will not be available.

Step 4. Please click on the Config function and set Enhanced and General Purpose Partition command:

1. High-density erase group definition (0xaf): This is the first value that you should set, since Dediware will use this value to determine whether the user needs to write 0x01 to the extCSD. Once the power has been restarted, the default register will be “0”.
2. Partitions attribute(0x9c): This command is for telling the chip that it needs to set Enhanced Attribute in user data area or General Purpose Partition. The default is 0x00.

3. General Purpose Partition Size(0x8f to 0x9a): This command is for generating General Purpose Partition 1 to General Purpose Partition 4, if you are not going to use General Purpose Partition, please skip this step. The setting of size is shown as below:

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4. Enhanced User Data Area Size(0x8c to 0x8e): This register defines enhanced user data area size.

5. Enhanced User Data Area Start Address(0x88 to 0x8b): Set the enhanced start address, if you would like to start from the beginning, then you do not need to set this value.

6. Partitioning Setting(0x9b): The register is set to notify the device that the definition of parameters has been completed and the device can start its internal configuration activity.

Note 1: All the steps have sequence, so please make sure the command is in order.

Note 2: Please note that Max Enhanced Area must be less than Enhanced General Partition Size+ Enhanced user data area.
Step 5. After finishing the ExtCSD settings, please click **Batch** to set the batch operation, then use **Auto Batch** function to program.

Step 6. Please use **Auto Batch** function to program the extCSD and the programming file. If you only want to use a single part function, please use **program** and **verify** function, and must do a **power recycle*** after verification has finished.

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* Power recycle means it is required to take out the chip from the IC socket, and then put it back again.
Step 7. After finish programming, you can use **Read IC** for checking:

You can see the General Purpose Partitions and Enhanced Attribute have been written (framed in blue), and the Sector Count (0xD7 to 0xD7) will reduce.

Step 8. If you need to use **copy function**, please also complete step 1 to step 7, and only use **copy function** to scan the master chip, please refer to the NuProg-E/F8 User Manual.
Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Version</th>
<th>Changes</th>
</tr>
</thead>
<tbody>
<tr>
<td>2017/08/04</td>
<td>1.0</td>
<td>Initial release.</td>
</tr>
</tbody>
</table>

DediProg Technology Co., Ltd

Taiwan Headquarter  TEL: 886-2-2790-7932  FAX: 886-2-2790-7916
4F., No.7, Ln. 143, Xinming Rd., Neihu Dist., Taipei City 114, Taiwan

China Office  TEL: 86-21-5160-0157
Room 518, Building 66, Lane1333, Xinlong Road, Vanke Hongqiao CBD.Min Hang District, Shanghai, P.R.C. 201101

U. S. Office  TEL: 1-909-274-8860
209 E Baseline RD, Suite E208 #8, Tempe, AZ, 85283, USA

Technical Support: support@dediprog.com  Sales Support: sales@dediprog.com

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