Application Note:

eMMC Detailed Settings in Dediware

V1.0



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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 Dediware and NuProg software. Get more information from JEDEC document (JESD84-B51).

The configure partitions of Enhanced Mode and General Purpose Partition



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) After checking, please refer to the following steps.

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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:

extCSD [Type:Registe	er]								16																									×
OUserArea	OE	Boot	1Are	a	C	B	ot2/	rea	- [() e	xtC	SD																						
	~			-		Buff	er .			~													Chip											
Address		+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+Δ	+B	+C	+D	+F	+F	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+Δ	+B	+C	+D	+F	+F	•
0×0000000000000000000000000000000000000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		00	00	00	00	00	00	00		
0x0000000000000000000000000000000000000	010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	EQ	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000000000000000000000000000	020	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x000000000000000000000000000000000000	030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	04	00	00	00	
0x000000000000000	040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-		00	00			B.c.a.s	00	00		
0x00000000000000	050	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00											
0x0000000000000	060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	N	Max	Er	nha	nce	ad /	Are	a S	ize		
0x0000000000000	070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00										J	
0x0000000000000	080	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-	and the second second	100.00		-	00	00	00	00	00	00	00	00	1	00	00	
0x00000000000000	090	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	1	~		-	di sere			00	00	00	00	00	00	00	D2	01	00	
0x00000000000000	0A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		See	cto	or C	ou	nt		05	00	20	00	00	00	00	00	00	00	
0x00000000000000	0B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00		10.000		19	e	00	00	02	00	00	00	00	00	00	00	00	
0x00000000000000	0C0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	00	02	00	7	OF	04						00	08	08	08	
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0x000000000000000	0E0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10	07	20	00	07	09	06	55		00	08	08	00	AA	99	44	
0x00000000000000	0F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	32	00	00	00	00	00	FF		00	00	00	00	00	08	00	
0x00000000000000	100	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	09	00	00	00	00	00	01	B1	01	04	01	01	01	01	00	00	
0x00000000000000	110	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x00000000000000	120	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x000000000000000000000000000000000000	130	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Buffer Checksum	0x000	00000	00															Cł	nip Ch	iecksu	m	0x0	00000	000										
Goto	0x 0	0000	000																															
	- 6	0000	000	=	-		00	00000	0	1																								
Save Memory From	Ux U	0000	000		Leng	th:0x	00	00020	U.																									
Next Different																																		
BYTE swap	1	WO	RD sv	vap		C	WOR	D swa	p																									

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.

Step4. 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:

General Purpose	size	General Purpose	size
Partition1		Partition3	
ExtCSD[145/ <mark>0x91</mark>]	size2	ExtCSD[151/ <mark>0x97</mark>]	size2
ExtCSD[144/ <mark>0x90</mark>]	size1	ExtCSD[150/ <mark>0x96</mark>]	size1
ExtCSD[143/ <mark>0x8f</mark>]	size0	ExtCSD[149/ <mark>0x95</mark>]	size0
General Purpose	size	General Purpose	size
Partition2		Partition4	
ExtCSD[148/0x94]	size2	ExtCSD[154/ <mark>0x9a</mark>]	size2
ExtCSD[147/ <mark>0x93</mark>]	size1	ExtCSD[153/ <mark>0x99</mark>]	size1
ExtCSD[146/0x92]	size0	ExtCSD[152/0x98]	size0

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.

Config		
Batc	h Option Bytes	
Config	Address	Value
MO	0xAF	0x1 setting in the beginning
	0x9C	0x1 est Enhanced attribute
	0x8F	0x1 🖘 set GPP1
	0x92	0x1 💼 set GPP2
Site :	0x95	0x1 est GPP3
Pass:	0x98	0x1 est GPP4
Fail:	0x8C	0xE9 est Enhanced User Data Area Size
N	0x9B	0x1 est to notify the device that has
		been completed

Note1 : All the steps have sequence, so please make sure the command is in order. Note2 : Please note that the Max Enhanced Area must be less than Enhanced General Partition Size + Enhanced user data area. Step5. After finishing the ExtCSD settings, please click **Batch** to set the batch operation if you would like to use them in the Production Mode:

Batch	otch Setting			
	Batch Operation		Operation Selected	
MCU	Blank check	>>	Erase chip Program chip Checksum verify	
	Start Mode Start from Handl	er v		
			捕墓朝取(い)	
			OK Cance	el

Step6. 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.

Step7.	After finishing programming in the Production Mode, you can switch back to the Engineering Mode
and use Re	ad IC for checking:

UserArea C	Boo	t1Are	ea	C	Bo	ot2A	rea		•	xtC	SD																					
					Buff	er															(Chip										
Address	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F
0x00000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
x0000000000000000000000000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	C0	AD	00	00	00	00	00	00	00	00	00	00	00
x000000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
x000000000000000030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0A	00	00	00
x0000000000000040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
x00000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
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x000000000000000070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
x0000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	00	00	00	00	00	00	00	E9	00	00	01
x00000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	01	00	00	01	00	00	01	01	D2	01	00
x000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	07	00	00	00	00	00	05	00	20	00	00	00	00	00	00	00
x00000000000000B	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	02	00	00	00	00	00	00	00	00
x00000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	00	02	00	17						22	22	00	08	08	08
x000000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	08	08	08	00	00	80			OF	10	14	08	08	02	01	01
x000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10	07	-20	00	-1	09	06	55	OF	00	08	08	00	AA	99	44
x000000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00						20	00	FF		00	00	00	00	00	08	00
x0000000000000000000000000000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	Se	ect	or	Co	un	t	21	B1	01	04	01	01	01	01	00	00
x00000000000000110	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	OC			0.	00	un		00	00	00	00	00	00	00	00	00	00
x0000000000000120	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-	-		-	-	00	00	00	00	00	00	00	00	00	00	00
x0000000000000130	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00
Buffer Checksum 0x0	00000	00															Ch	ip Ch	ecksu	m	0x0	0000	000									
	00000	000	_																													
Goto 0x	00000	0000																														
ave Memory From 0x	00000	0000		Leng	th:0x	00	00020	0																								
Next Different																																
				10.0	_																											

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: <u>http://www.dediprog.com/US</u>). After checking, please refer to the following steps.



Step1. 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.



Step2. 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.

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.

Step4. 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:

General Purpose	size	General Purpose	size
Partition1		Partition3	
ExtCSD[145/ <mark>0x91</mark>]	size2	ExtCSD[151/ <mark>0x97</mark>]	size2
ExtCSD[144/ <mark>0x90</mark>]	size1	ExtCSD[150/0x96]	size1
ExtCSD[143/ <mark>0x8f</mark>]	size0	ExtCSD[149/0x95]	size0
General Purpose	size	General Purpose	size
Partition2		Partition4	
ExtCSD[148/ <mark>0x94</mark>]	size2	ExtCSD[154/ <mark>0x9a</mark>]	size2
ExtCSD[147/0x93]	size1	ExtCSD[153/0x99]	size1
ExtCSD[146/0x92]	size0	ExtCSD[152/0x98]	size0

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.

ance Help	-		- 0
V PROJ PROJ Z Detect Load Dead Pri Save Pri Buffer Config	Batch Option Bytes		×
40 20 HPF 10 00 0	Batch Address	Value	Address:
👃 🍇 - 🌦 - 🐇 - 🐇 - 🥂	Oxaf	0x01 esting in the beginning	~
ReadIC Blank Erase Program Venify Auto Bate	h extCSD 0x9c	0x01 est Enhanced attribute	
	0x8f	0x01 set GPP1	Value
	0x92	0x01 set GPP2	value.
(Drog Master	exiCSD 0x95	0x01 est GPP3	0x
GA Ver: 30 Master	RPMB 0x98	0x01 set GPP4	
W Ver: 1.3.12 Pass: 0	0x8c	0xe9 est Enhanced User Data Area Size	
N: NUP00134 Fail: U IPIEL	0x9b	0x01 set to notify the device that has	ADD
N 0.0%	RPMB	been completed	
		been completed	DELETE
			RESET
inlafa			
ne: eMMC TD: 20.34.53.01.00.36.21.24		■ 装置剪取(V)	
nufact: Spansion ADP P/N1: N-EMMC-050-FBGA153-115130-020		OK	Cancel
e: 0x3a4c00200 ADP P/N2:		OK	Cancer
skage: BGA153 ADP P/N3:	Total: 0	1	

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.

Step5. After finishing the ExtCSD settings, please click **Batch** to set the batch operation, then use **Auto Batch** function to program.

Config				×
Batch B	atch Satting			
Batch	Batch Operation		Operation Selected	
ExtCSD ExtCSD RPMB	Blank check	>> <<	extCSD Erase chip Program chip Checksum verify	
			OK Cancel	

Step6. 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.



* Power recycle means it is required to take out the chip from the IC socket, and then put it back again.

xtCSD [Type:Registe	r]																																	×
🔿 UserArea	OE	Boot	1Are	ea	(Bo	ot2/	rea		OF	RPM	в		С	GP	PO		C) GI	PP1			00	SPP:	2		С	GP	P3		Г	• e:	xtCS	D
						Buff	fer															3	Chip											
Address		+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F	+0	+1	+2	+3	+4	+5	+6	+7	+8	+9	+A	+B	+C	+D	+E	+F	•
0x00000000000000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000	010	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	CO	AD	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000)20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000	030	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	0A	00	00	00	
0x0000000000000	040	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
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0x0000000000000	060	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000	070	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000	080	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	00	00	00	00	00	00	00	E9	00	00	01	
0x0000000000000	90	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	01	00	00	01	00	00	01	00	00	01	01	D2	01	00	
0x0000000000000	0A0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	07	00	00	00	00	00	05	00	20	00	00	00	00	00	00	00	
0x0000000000000)B0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	02	00	01	00	00	00	00	00	00	
0x0000000000000	000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	06	00	02	00	17		04				22	22	00	08	08	08	
0x0000000000000	DD0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	08	08	08	00	00	80			OF	10	14	08	08	02	01	01	
0x0000000000000	DE0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	10		20	00		09	06	55	OF	00	08	08	00	AA	99	44	
0x0000000000000	OFO	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-	-				00	00	FF	19	00	00	00	00	00	08	00	ſ
0x0000000000000	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	1	Se	cto	or (Int		01	B1	01	04	01	01	01	01	00	00	
0x000000000000	10	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	4	50	CU		.00			00	00	00	00	00	00	00	00	00	00	
0x0000000000000	20	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-			-	-	00	00	00	00	00	00	00	00	00	00	00	
0x0000000000000	130	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	-
Buffer Checksum	0x000	00000	00															Cł	nip Cł	hecksu	m	0x0	0000	000										
		0000	000																															
Goto	0x U	0000	000				_																											
Save Memory From	0x 0	0000	000		Leng	th:0x	00	00020	0																									
Next Different																																		
	1					-																												
BYTE swap		WO	RD sv	vap			WOR	D swa	p																									

Step7. 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.

Step8. 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

Date	Version	Changes
2017/08/04	1.0	Initial release.

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