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## **Generic MPF NFC iMX28 BBT User Manual**

This is a Multiple Partition format scheme. Any bad blocks within the first two partitions (FCB & DBBT) are ignored (up to “iMX FW Starting Block #”). The rest of partitions use “Skip bad block” method within each partition. Any bad block found within any of the partitions (3..16) will not cause relocation to the starting block of the follow up partitions.

### **Relevant User Options**

The following special features on the special features tab apply to this scheme. The default values might work in some cases but please make sure to set the right value according to your system.

Please note only the below special feature items are related to this scheme and ignore any others. If any of below items doesn't exist, please check whether the right version has been installed or contact Data I/O for support by submitting Device Support Request through this address: <http://www.dataio.com/support/dsr.asp>

**Bad Block Handling Type:** **Generic MPF NFC IMX28 BBT**, Default: None”

**Spare Area:** “**Disabled**, Default = Disabled”

**PartitionTable File:** YourPartitionTable.mbn file

**iMX FCB Copies** “**4**, Default = 4”

The data at page 0 of the binary image starting at offset 0x00 will be duplicated in the blocks 0 thru 3 of the NAND device.

**iMX DBBT Create?** “**Disabled**, Default = Disabled”

When this option is enabled, Discovered Bad Block Tables (DBBT) are added.

**iMX DBBT Copies (if enabled)** “**4**, Default = 4”

Four copies of DBBT table (including CRC and ECC) will be generated and programmed into the NAND device.

**iMX FW Starting Block #:** “**8**, Default = 8”

This FW starting block # has to be greater or equal to FCB & DBBT values.

**Image Preparation:** The binary image file consists of three separate areas including **FCB table**, **DBBT table**, and **Firmware (FW/User area)**. Padding of “FF” should be used between the different sections.

1. **FCB Table:** The FCB table (one copy) should be included in the binary image file at address offset of 0x00 and consists of:
  - a. 0x00: 12 bytes of “00”
  - b. 0x0C: 32-bit Check Sum of address 0x10 thru 0x20B (of FCB table)
  - c. 0x10 FCB’s Signature “46 43 42 20”

	00	01	02	03	04	05	06	07	08	09	0A	0B	0C	0D	0E	0F
00 0000:	00	00	00	00	00	00	00	00	00	00	00	00	FA	86	FE	FF
00 0010:	46	43	42	20	00	00	00	01	03	02	01	00	00	00	00	00
00 0020:	00	08	00	00	40	08	00	00	40	00	00	00	00	00	00	00
00 0030:	00	00	00	00	00	00	00	00	04	00	00	00	00	02	00	00
00 0040:	00	02	00	00	04	00	00	00	0A	00	00	00	03	00	00	00

- d. 0x20C: SEC-DED (5 bits/byte) ECC of FCB table (0xC ... 0x20B)

00 01F0:	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
00 0200:	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	09	0B	1A	06
00 0210:	10	1F	03	07	00	00	00	1C	0A	16	1C	00	00	00	00	00
00 0220:	00	19	00	00	15	19	00	00	15	00	00	00	00	00	00	00
00 0230:	00	00	00	00	00	00	00	00	13	00	00	00	00	16	00	00
00 0240:	00	16	00	00	13	00	00	00	0F	00	00	00	0A	00	00	00

**Note** – During the programming operation, the Data I/O’s programmer will recalculate and verify the Checksum & the ECC values. If the recalculated values do not match the FCB table contents, the image file will get rejected. TLWin will duplicate this FCB table (n) four times into blocks 0 thru 4.

2. **DBBT Table:** TLWin software will generate (n) four copies of DBBT table (& its BCH-ECC/Checksum) consisting of two separate sections. These tables will be added only if it is enabled by the Special Features options.

- a. **0x84000-page 0:** Blocks # 4 thru 7 will contain the signature and bad block counts. .

0010 7FF0:	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
0010 8000:	00	FF	FF	FF	FF	FF	FF	FF	FF	E0	FE	FF	FF	44	42	...
0010 8010:	42	54	00	00	00	01	01	00	00	00	01	00	00	00	00	BT
0010 8020:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	...
0010 8030:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	...
0010 81F0:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	...
0010 8200:	00	00	00	00	00	00	00	00	00	00	9D	F5	E3	3B	20	02
0010 8210:	CE	5D	72	AF	34	D9	AF	00	00	00	00	00	00	00	00	]r.4
0010 8220:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	...
0010 8230:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	...
0010 8240:	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	...

- b. **0x84000-page 4:** The bad block Counts and list of Discovered Bad Blocks are stored in page four of each programmed device.

```

0010 A100: 00 FF 00 00 00 00 01 00 .....
0010 A110: 00 00 4F 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....O...
0010 A120: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0010 A130: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
.....
0010 A300: 00 00 00 00 00 00 00 00 00 00 90 DA 3B 84 26 BE .....&
0010 A310: 4B 57 7A 72 72 02 02 00 00 00 00 00 00 00 00 00 00 KWr..
0010 A320: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
0010 A330: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 .....
.....

```

TLWin software will duplicate this DBBT table (n) four times into blocks 4 thru 7.

**NOTE** – The DBBT table header is generated by TLWin software and the user should not have added add it to the image file.

- 3. **FW & Other Binary Data:** The FW and other image data should start at address 0x10,000 (FW Starting Block #block # 8) and should not include any spare area or ECC data. TLWin will reformat these pages and add BCH8-13 ECC data.

```

000ffff0h: FF ; yyyyyyyyyyyy
00100000h: 27 05 19 56 F2 B8 9B C0 50 53 6E 11 00 33 CE 80 ; '..Vö_>ÄPsn.
00100010h: 80 00 80 00 80 00 80 00 CE 17 89 E3 05 02 02 00 ; €.€.€.€.î.â
00100020h: 4C 69 6E 75 78 2D 33 2E 32 2E 30 00 00 00 00 00 ; Linux-3.2.0.
00100030h: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ; .....
00100040h: 00 00 A0 E1 00 00 A0 E1 00 00 A0 E1 00 00 A0 E1 ; .. á.. á..
00100050h: 00 00 A0 E1 00 00 A0 E1 00 00 A0 E1 00 00 A0 E1 ; .. á.. á..
00100060h: 02 00 00 EA 18 28 6F 01 00 00 00 00 80 CE 33 00 ; ...ê.(o....
00100070h: 01 70 A0 E1 02 80 A0 E1 00 20 0F E1 03 00 12 E3 ; .p á.€ á.
.....

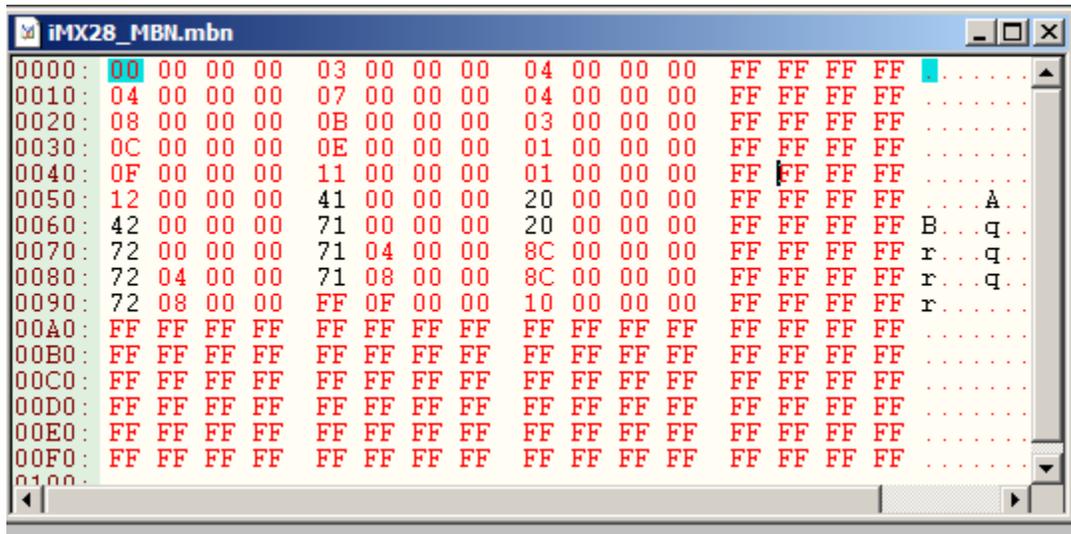
```

**Note** – TLWin software will rearrange each page (2048 KB) of data by adding 10 bytes of Meta bytes and 13 bytes of ECC per 512 bytes of data.

10 8000:	FF	27	05	19	56	F2	B8	.....									
10 8010:	9B	CU	50	53	5E	11	00	33	CE	80	80	00	80	00	80	00	...PSn...3.
10 8020:	80	00	CE	17	89	E3	09	02	02	00	4C	69	6E	75	78	2D	.....
10 8030:	33	2E	32	2E	30	00	00	00	00	00	00	00	00	00	00	00	3.2.0.....
10 8040:	00	00	00	00	00	00	00	00	00	00	00	00	A0	E1	00	00	.....
10 8050:	A0	E1	00	00	A0	E1	00	00	A0	E1	00	00	A0	E1	00	00	.....
10 8060:	A0	E1	00	00	A0	E1	00	00	A0	E1	02	00	00	EA	18	28	.....
10 8070:	6F	01	00	00	00	00	00	00	00	00	01	70	A0	E1	02	80	.....3
10 8080:	A0	E1	00	20	0F	E1	03	00	12	E3	01	00	00	1A	17	00	.....
10 8090:	A0	E3	56	34	12	EF	00	20	0F	E1	C0	20	82	E3	02	F0	...V4.....
10 80A0:	21	E1	00	00	00	00	00	00	00	00	84	47	9F	E5	55	00	!.....
10 80B0:	00	EB	4A	0F	8F	E2	4E	1C	90	E8	1C	D0	90	E5	01	00	...J...N..
10 80C0:	40	E0	00	60	86	E0	00	A0	8A	E0	00	90	DA	E5	01	E0	@.....
10 80D0:	DA	E5	0E	94	89	E1	02	E0	DA	E5	03	A0	DA	E5	0E	98	.....
10 80E0:	89	E1	0A	9C	89	E1	00	D0	8D	E0	01	A8	8D	E2	00	50	.....
10 80F0:	A0	E3	01	A9	8A	E2	0A	00	5A	E1	16	00	00	2A	09	A0	.....T
10 8100:	84	E0	50	90	8F	E2	09	00	5A	E1	12	00	00	9A	02	AB	...P...Z
10 8110:	8A	E2	FF	A0	CA	E3	6C	50	4F	E2	1F	50	C5	E3	05	90	.....1FO
10 8120:	46	E0	1F	90	89	E2	1F	90	C9	E3	05	60	89	E0	0A	90	F.....
10 8130:	89	E0	0F	5C	36	E9	05	00	56	E1	0F	5C	29	E9	FB	FF	...6...V
10 8140:	FF	8A	06	60	49	E0	06	D0	8D	E0	4E	01	00	EB	A4	00	...I.....
10 8150:	4F	E2	06	00	80	E0	00	F0	A0	E1	05	10	90	E1	0D	00	O.....
10 8160:	00	0A	00	B0	8B	E0	00	C0	8C	E0	00	20	82	E0	00	30	.....
10 8170:	83	E0	00	10	9B	E5	00	10	81	E0	02	00	51	E1	01	00	.....
10 8180:	53	21	05	10	81	80	04	10	8B	E4	0C	00	5B	E1	F7	FF	S!.....
10 8190:	FF	3A	05	20	82	E0	05	30	83	E0	00	00	A0	E3	04	00	...0.....
10 81A0:	82	E4	04	00	82	E4	04	00	82	E4	04	00	82	E4	03	00	.....
10 81B0:	52	E1	F9	FF	FF	3A	04	00	A0	E1	0D	10	A0	E1	01	28	R.....
10 81C0:	8D	E2	07	30	A0	E1	F0	01	00	EB	2E	01	00	EB	FD	00	...0.....
10 81D0:	00	EB	00	00	A0	E3	0B	01	00	00	00	00	A0	E1	04	F0	.....
10 81E0:	A0	E1	98	01	00	00	80	CE	33	00	A0	CE	33	00	80	CE	.....3
10 81F0:	33	00	3E	CE	33	00	3E	CE	33	00	A0	DE	33	00	A0	DE	3.>.3.P.3
10 8200:	33	00	00	F0	20	E3	00	F0	20	E3	C2	45	E4	20	7B	FC	3.....
10 8210:	DA	B6	4D	75	38	61	D1	08	30	A0	E3	80	00	00	EA	3F	...Mu8a...0
10 8220:	00	A0	E3	17	0F	06	EE	37	0F	06	EE	80	00	A0	E3	10	...7.....
10 8230:	0F	02	EE	30	0F	02	EE	10	0F	03	EE	03	09	A0	E3	30	...0.....

### Partition Table Format Partition.mbn

- A binary file of YourFile.MBN with fixed length of 256 bytes.
- Organization: 16 rows x 4 columns. Each table item is 32-bits, little endian byte ordering.
- Each row of the table describes configuration for one partition. Up to 16 partitions can be used.
- Partition configuration:
  - Start Adr:** address of start of partition in flash blocks. The programmer will set the file read pointer and the programmer write pointer to Start Adr. If Start Adr is 0xFFFFFFFF, skip to the next partition.
  - End Adr:** last valid block in the current partition. The last data block programmed must be equal to or less than **End Adr**, otherwise the programmer will reject the flash device.
  - Actual Data Length:** number of blocks of data to read from the input file and write to the flash in the current partition.
  - Note:** For optimal option, the following example should be used and the 3<sup>rd</sup> to the last partitions should be adjusted as needed.



**This document Version #: V2.0**

- (Added DBBT table support)

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## **Appendix**

You can get the file "Description of common NAND Special Features.pdf" from <http://ftp.dataio.com/FCNotes/BBM/>