Micron Embedded USB Reliability Status Reporting

Introduction

The Micron® embedded USB SSD provides commands that enable the host controller to determine the useful life remaining on the device and to retrieve Flash ID information. Bad block count, spare block count, erase count, and FlashIDBuf data can be obtained using these commands. To implement these, the user must have a method of sending SCSI commands.

Bad Block Reporting

Reading the bad block count requires two steps: 1) The READ FLASHID command retrieves information about the device; 2) The READ INFOBLOCK command uses data from the FLASHID, and then displays the bad block information. Depending on the density of the eUSB device, there will be one to four LUNs. Therefore, valid values for byte 0x6 are 0x0–0x3. The bad block count for each LUN is stored in addresses 0x100–0x101 (hex). For example, 00 12 represents a bad block count of 18.

Table 1: Bad Block Reporting Command Sequence

<table>
<thead>
<tr>
<th>Command</th>
<th>Byte 0x0</th>
<th>Byte 0x1</th>
<th>Byte 0x2</th>
<th>Byte 0x3</th>
<th>Byte 0x6</th>
<th>Byte 0xB</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ FLASHID (16 bytes)</td>
<td>0xF0</td>
<td>0x20</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0x01</td>
</tr>
<tr>
<td>READ INFOBLOCK (16 bytes)</td>
<td>0xF0</td>
<td>0x0A</td>
<td>0x03</td>
<td>ReadFlashIDBuf [0x180 + XX]</td>
<td>XX</td>
<td>0x01</td>
</tr>
</tbody>
</table>

Notes: 1. XX = 0x00 ReadFlashIDBuf [0x00]

Spare Block Reporting

Reading the spare block count consists of two steps: 1) The READ FLASHID command retrieves information about the device; 2) The READ INFOBLOCK command uses data from the FLASHID, and then displays the bad block information. Depending on the density of the eUSB device, there will be one to four LUNs. Therefore, valid values for byte 0x6 are 0x0–0x3. The DataBlock quantity is saved in address 0x112–0x113.

Spare Block Count is calculated as follows:

SpareBlock on this LUN = [1024 - 12(FW used)] - [Total BadBlock on this LUN] - [Total DataBlock on this LUN]
Erase Count Reporting

To obtain the erase count, the READ FLASH command is used. The READ FLASH command returns 1536 bytes of FlashBuf data. FlashBuf [0x7A, 0x7B] is the saved base count.

FlashBuf [0x200]–[0x5FF] is the saved BlockEraseCount. The TotalEraseCount of each block will be the sum of BaseCount and BlockEraseCount.

Rearranged Table 2: Spare Block Reporting Command Sequence

<table>
<thead>
<tr>
<th>Command</th>
<th>Byte 0x0</th>
<th>Byte 0x1</th>
<th>Byte 0x2</th>
<th>Byte 0x3</th>
<th>Byte 0x6</th>
<th>Byte 0xB</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ FLASHID (16 bytes)</td>
<td>0xF0</td>
<td>0x20</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>0x01</td>
</tr>
<tr>
<td>READ INFOBLOCK (16 bytes)</td>
<td>0xF0</td>
<td>0x0A</td>
<td>0x03</td>
<td>ReadFlashIDBuf [0x180 + XX]</td>
<td>XX</td>
<td>0x01</td>
</tr>
</tbody>
</table>

Notes: 1. XX = 0x00 ReadFlashIDBuf [0x00]

Rearranged Table 3: Erase Count Reporting Command Sequence

<table>
<thead>
<tr>
<th>Command</th>
<th>Byte 0x0</th>
<th>Byte 0x1</th>
<th>Byte 0x7</th>
<th>Byte 0xB</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ FLASH (16 bytes)</td>
<td>0xF0</td>
<td>0x2A</td>
<td>0xF1</td>
<td>0x03</td>
</tr>
</tbody>
</table>

READ FLASHID Command

The READ FLASHID command is used to obtain 512 bytes of FlashIDBuf data:

- FlashIDBuf [0x20-0x23] stores the first Flash ID number
- FlashIDBuf [0x28-0x2B] stores the second Flash ID number
- FlashIDBuf [0x30-0x33] stores the third Flash ID number
- FlashIDBuf [0x38-0x3B] stores the fourth Flash ID number
- FlashIDBuf [0x40-0x43] stores the fifth Flash ID number
- FlashIDBuf [0x48-0x4B] stores the sixth Flash ID number
- FlashIDBuf [0x50-0x53] stores the seventh Flash ID number
- FlashIDBuf [0x58-0x5B] stores the eighth Flash ID number

Rearranged Table 4: READ FLASHID Command Sequence

<table>
<thead>
<tr>
<th>Command</th>
<th>Byte 0x0</th>
<th>Byte 0x1</th>
<th>Byte 0xB</th>
</tr>
</thead>
<tbody>
<tr>
<td>READ FLASHID (16 bytes)</td>
<td>0xF0</td>
<td>0x20</td>
<td>0x01</td>
</tr>
</tbody>
</table>
Revison History

Rev. C .................................................................................................................. 09/12
• Updated descriptions for Introduction, Bad Block Reporting, Spare Block Reporting.
• Changed FlashBuf [0x7A, 0x7A] to FlashBuf [0x7A, 0x7B in Erase Count Reporting.

Rev. B .................................................................................................................. 11/10
• Changed ReadFlashIDBuf for byte 0x3 from [0x108 + XX] to [0x180 + XX].

Rev. A .................................................................................................................. 12/08
• Initial release.