

## NVM Express Technical Errata

|                            |                         |
|----------------------------|-------------------------|
| <b>Errata ID</b>           | <b>029</b>              |
| <b>Change Date</b>         | <b>6/5/2012</b>         |
| <b>Affected Spec Ver.</b>  | <b>NVM Express 1.0c</b> |
| <b>Corrected Spec Ver.</b> |                         |

### Submission info

| Name          | Company | Date     |
|---------------|---------|----------|
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A recommendation is added to the Compare and Write section to ensure data integrity is preserved. Specifically, hosts should issue Compare and Write commands for a size less than or equal to the atomic write unit. NVMe devices may choose to fail Compare and Write requests for sizes larger than an atomic write unit.

The single and multiple message MSI behavior inaccurately describes the message action when some bits, but not all bits, are cleared in the IS register. This erratum describes that a new message shall be sent in this case.

The Offset (OFST) field for the Firmware Image Download command is clarified to be the number of Dwords.

Corrections are made to section 5.12 to correctly identify Features that are optional vs mandatory.

Description of the specification technical flaw:

**Modify section 6.2.1 as shown below:**

The Compare and Write fused operation compares the contents of the logical block(s) specified in the Compare command to the data stored at the indicated LBA range. If the compare is successful, then the LBA range is updated with the data provided in the Write command. If the Compare operation is not successful, then the Write operation is aborted with a status of Command Aborted due to Failed Fused Command and the contents in the LBA range are not modified. If the Write operation is not successful, the Compare operation completion status is unaffected.

**Note:** To ensure the Compare and Write is an atomic operation in a multi-host environment, host software should ensure that the size of a Compare and Write fused operation is no larger than the atomic write unit size. Controllers may abort a Compare and Write fused operation that is larger than the atomic write unit size.

**Modify the table immediately preceding section 7.5.1.1 as shown below:**

| Status of IS Register  | Pin-based Action | MSI Action                               |
|--|------------------|--|
| All bits '0'<br><b>Note:</b> May be caused by corresponding bit(s) in the INTM register being set to '1', masking the corresponding interrupt.                         | Wire inactive    | No action                                |
| One or more bits set to '1'<br><b>Note:</b> May be caused by corresponding bit(s) in the INTM register being cleared to '0', unmasking the corresponding interrupt.    | Wire active      | New message sent                         |
| One or more bits set to '1', new bit gets set to '1'   | Wire active      | New message sent                         |
| One or more bits set to '1', some (but not all) bits in the IS register are cleared (i.e., host software acknowledges some of the associated completion queue entries) | Wire active      | <del>No action</del><br>New message sent |
| One or more bits set to '1', all bits in the IS register are cleared (i.e., host software acknowledges all associated completion queue entries)                        | Wire inactive    | No action                                |

**Modify Figure 50 as shown below:**

**Figure 50: Firmware Image Download – Command Dword 11**

| Bit   | Description   |
|-------|---|
| 31:00 | <b>Offset (OFST):</b> This field indicates <del>the number of Dwords offset from the start of the a 32-bit Dword offset of the</del> firmware image <del>portion</del> being downloaded to the controller. The offset is used to construct the complete firmware image when the firmware is downloaded in multiple pieces. The piece corresponding to the start of the firmware image shall have an Offset of 0h. |

**Modify the heading of section 5.12.1.12 as shown below:**

**5.12.1.12 Software Progress Marker (Feature Identifier 80h), (Optional) – NVM Command Set Specific**

**Modify Figure 73 as shown below:**

**Figure 73: Set Features – Feature Identifiers**

| Feature Identifier | O/M            | Persistent Across Power States | Uses Memory Buffer for Attributes | Description                      |
|--------------------|----------------|--------------------------------|-----------------------------------|----------------------------------|
| 00h                |                |                                |                                   | Reserved                         |
| 01h                | M              | No                             | No                                | Arbitration                      |
| 02h                | M              | No                             | No                                | Power Management                 |
| 03h                | <del>M</del> O | Yes                            | Yes                               | LBA Range Type                   |
| 04h                | M              | No                             | No                                | Temperature Threshold            |
| 05h                | M              | No                             | No                                | Error Recovery                   |
| 06h                | O              | No                             | No                                | Volatile Write Cache             |
| 07h                | M              | No                             | No                                | Number of Queues                 |
| 08h                | M              | No                             | No                                | Interrupt Coalescing             |
| 09h                | M              | No                             | No                                | Interrupt Vector Configuration   |
| 0Ah                | M              | No                             | No                                | Write Atomicity                  |
| 0Bh                | M              | No                             | No                                | Asynchronous Event Configuration |
| 0Ch – 7Fh          |                |                                |                                   | Reserved                         |
| 80h – BFh          |                |                                |                                   | Command Set Specific (Reserved)  |
| C0h – FFh          |                |                                |                                   | Vendor Specific                  |

O/M: O = Optional, M = Mandatory

## Disposition log

|           |                   |
|-----------|-------------------|
| 6/5/2012  | Erratum captured. |
| 7/16/2012 | Erratum ratified. |

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