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NVM Express™ Technical Proposal for New Feature

Technical Proposal ID	**TP 4113a**
Change Date	**7/13/2023**
Builds on Specification	**NVMe Base Specification 2.0**
References Ratified TPs	

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Technical Proposal Overview

The error information log lacks the command opcode for log entries that refer to host commands. Each entry in the Error Information log page indicates the queue id and the command id, but not the opcode. Having the opcode in the entry would help in debug efforts when host-side information is not available (such as debugging solely from device telemetry).

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Revision History

Revision Date	Change Description
04/15/2021	Initial creation.
06/04/2021	Added info for how to distinguish Admin cmds from I/O cmds, and editorial cleanup.
12/06/2021	Integrated
1/6/2022	Updated the dates for 2022 and updated legal notice to not refer to NVMe Base Specification 1.4.
5/31/2023	Removed that bytes 30-31 are reserved and defined at the same time.

Editor's Note:
BLACK text indicates unchanged text;
RED underscore text indicates new text;
RED strikethru text indicates deleted text;
BLUE text indicates copied or moved text;
GREEN text indicates editor notes.

Incompatible Changes:

None

Description of Specification Changes

Editor's note: Define the contents of an existing reserved field

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6.16.1.2 Error Information (Log Identifier 01h)

This log page is used to describe extended error information for a command that completed with error or report an error that is not specific to a particular command. Extended error information is provided when the More (M) bit is set to '1' in the Status Field for the completion queue entry associated with the command that completed with error or as part of an asynchronous event with an Error status type. This log page is global to the controller.

This error log may return the last *n* errors. If host software specifies a data transfer of the size of *n* error logs, then the error logs for the most recent *n* errors are returned. The ordering of the entries is based on the time when the error occurred, with the most recent error being returned as the first log entry.

Each entry in the log page returned is defined in Figure 205. The log page is a set of 64-byte entries; the maximum number of entries supported is indicated in the ELPE field in the Identify Controller data structure (refer to Figure 274). If the log page is full when a new entry is generated, the controller should insert the new entry into the log and discard the oldest entry.

The controller should clear this log page by removing all entries on power cycle and Controller Level Reset.

Figure 205: Get Log Page – Error Information Log Entry (Log Identifier 01h)

<table>
<tr><th>Bytes</th><th>Description</th></tr>
<tr><td>07:00</td><td>Error Count: This is a 64-bit incrementing error count, indicating a unique identifier for this error. The error count starts at 1h, is incremented for each unique error log entry, and is retained across power off conditions. A value of 0h indicates an invalid entry; this value is used when there are lost entries or when there are fewer errors than the maximum number of entries the controller supports.</td></tr>
<tr><td>09:08</td><td>Submission Queue ID: This field indicates the Submission Queue Identifier of the command that the error information is associated with. If the error is not specific to a particular command, then this field shall be set to FFFFh.</td></tr>
<tr><td>11:10</td><td>Command ID: This field indicates the Command Identifier of the command that the error is associated with. If the error is not specific to a particular command, then this field shall be set to FFFFh.</td></tr>
<tr><td>13:12</td><td>
<table>
<tr><th>Bits</th><th>Description</th></tr>
<tr><td>15:1</td><td>Status Field: This field indicates the Status Field for the command that completed. If the error is not specific to a particular command, then this field reports the most applicable status value.</td></tr>
<tr><td>0</td><td>Phase Tag: This field may indicate the Phase Tag posted for the command.</td></tr>
</table>
</td></tr>
<tr><td>15:14</td><td>Parameter Error Location: This field indicates the byte and bit of the command parameter that the error is associated with, if applicable. If the parameter spans multiple bytes or bits, then the location indicates the first byte and bit of the parameter.
<table>
<tr><th>Bits</th><th>Description</th></tr>
<tr><td>15:11</td><td>Reserved</td></tr>
<tr><td>10:08</td><td>Bit in command that contained the error. Valid values are 0 to 7.</td></tr>
<tr><td>07:00</td><td>Byte in command that contained the error. Valid values are 0 to 63.</td></tr>
</table>
If the error is not specific to a particular command, then this field shall be set to FFFFh.</td></tr>
<tr><td>23:16</td><td>LBA: This field indicates I/O Command Set specific data about the error condition, if applicable. The description is described in the applicable I/O Command Set specification.

NOTE: This field applies to all User Data. The original name has been retained for historical continuity.</td></tr>
<tr><td>27:24</td><td>Namespace: This field indicates the NSID of the namespace that the error is associated with, if applicable.</td></tr>
</table>

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Figure 205: Get Log Page – Error Information Log Entry (Log Identifier 01h)

<table>
<tr><th>Bytes</th><th>Description</th></tr>
<tr><td>28</td><td>Vendor Specific Information Available: If there is additional vendor specific error information available, this field provides the log page identifier associated with that page. A value of 0h indicates that no additional information is available. Valid values are in the range of 80h to FFh.</td></tr>
<tr><td>29</td><td>Transport Type (TRTYPE): This field indicates the Transport Type of the transport associated with the error. The values in this field are the same as the TRTYPE values in the Discovery Log Page Entry (refer to section 5.16.1.21). If the error is not transport related, this field shall be cleared to 0h. If the error is transport related, this field shall be set to the type of the transport as defined in the TRTYPE field within Figure 263.</td></tr>
<tr><td>30</td><td>Command Set Indicator (CSI): This field contains command set indicator for the command that the error is associated with. This field is valid if the Log Page Version field is greater than or equal to 1h.</td></tr>
<tr><td>31</td><td>Opcode: This field contains opcode for the command that the error is associated with. This field is valid if the Log Page Version field is greater than or equal to 1h.

This field, the CSI field, and the Submission Queue ID field uniquely indicate the command and the command set.</td></tr>
<tr><td>39:32</td><td>Command Specific Information: This field contains command specific information. If used, the command definition specifies the information returned.</td></tr>
<tr><td>41:40</td><td>Transport Type Specific Information: This field indicates additional transport type specific error information. If multiple errors exist, then this field indicates additional information about the first error. This field is transport type dependent (refer to TRTYPE) as follows:
<table>
<tr><th>Transport Type</th><th>Description</th></tr>
<tr><td>All others</td><td>Reserved</td></tr>
<tr><td>3h</td><td>This field indicates, the offset, in bytes, from the start of the Transport Header to the start of the field that is in error. If multiple errors exist, then this field indicates the lowest offset that is in error.</td></tr>
</table></td></tr>
<tr><td>62:42</td><td>Reserved</td></tr>
<tr><td>63</td><td><s>Reserved</s> Log Page Version: This field shall be set to 1h.</td></tr>
</table>

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