



**LEGAL NOTICE:**

© **Copyright 2008 to 2022 NVM Express®, Inc. ALL RIGHTS RESERVED.**

This Technical Proposal is proprietary to the NVM Express, Inc. (also referred to as “Company”) and/or its successors and assigns.

**NOTICE TO USERS WHO ARE NVM EXPRESS, INC. MEMBERS:** Members of NVM Express, Inc. have the right to use and implement this Technical Proposal subject, however, to the Member’s continued compliance with the Company’s Intellectual Property Policy and Bylaws and the Member’s Participation Agreement.

**NOTICE TO NON-MEMBERS OF NVM EXPRESS, INC.:** If you are not a Member of NVM Express, Inc. and you have obtained a copy of this document, you only have a right to review this document or make reference to or cite this document. Any such references or citations to this document must acknowledge NVM Express, Inc. copyright ownership of this document. The proper copyright citation or reference is as follows: “© 2008 to 2022 NVM Express, Inc. ALL RIGHTS RESERVED.” When making any such citations or references to this document you are not permitted to revise, alter, modify, make any derivatives of, or otherwise amend the referenced portion of this document in any way without the prior express written permission of NVM Express, Inc. Nothing contained in this document shall be deemed as granting you any kind of license to implement or use this document or the specification described therein, or any of its contents, either expressly or impliedly, or to any intellectual property owned or controlled by NVM Express, Inc., including, without limitation, any trademarks of NVM Express, Inc.

**LEGAL DISCLAIMER:**

THIS DOCUMENT AND THE INFORMATION CONTAINED HEREIN IS PROVIDED ON AN “AS IS” BASIS. TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, NVM EXPRESS, INC. (ALONG WITH THE CONTRIBUTORS TO THIS DOCUMENT) HEREBY DISCLAIM ALL REPRESENTATIONS, WARRANTIES AND/OR COVENANTS, EITHER EXPRESS OR IMPLIED, STATUTORY OR AT COMMON LAW, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, VALIDITY, AND/OR NONINFRINGEMENT.

All product names, trademarks, registered trademarks, and/or servicemarks may be claimed as the property of their respective owners.

The NVM Express® design mark is a registered trademark of NVM Express, Inc.

NVM Express  
c/o VTM, Inc.  
3855 SW 153<sup>rd</sup> Drive  
Beaverton, OR 97003  
USA  
info@nvmexpress.org

Technical input submitted to NVM Express® is subject to the terms of the NVM Express® Participant’s agreement. Copyright © 2008 to 2022 NVM Express, Inc.

## NVM Express® Technical Proposal (TP)

<b>Technical Proposal ID</b>	<b>TP4135 NVMe Specification Version Reporting</b>
<b>Revision Date</b>	<b>2022.07.26</b>
<b>Builds on Specification(s)</b>	<b>NVM Express® Base Specification Revision 2.0b</b> <b>NVM Express® NVM Command Set Specification Revision 1.0b</b> <b>NVM Express® Key Value Command Set Specification Revision 1.0b</b> <b>NVM Express® Zoned Namespace Command Set Specification Revision 1.1b</b> <b>NVM Express® Management Interface Specification 1.2b</b>
<b>References</b>	

### Technical Proposal Author(s)

<b>Name</b>	<b>Company</b>
Yoni Shternhell	Western Digital
Paul Suhler	KIOXIA

### Technical Proposal Overview

This technical proposal provides a means for the host to retrieve the versions of NVMe specifications which are implemented by the controller, in particular, the I/O command set specifications and the NVMe Management Interface Specification.

### Revision History

<b>Revision Date</b>	<b>Change Description</b>
2022.03.18	<ul style="list-style-type: none"> <li>• Initial revision</li> <li>• Changes for all specifications in the NVMe 2.0 family.</li> </ul>
2022.03.18a	<ul style="list-style-type: none"> <li>• Corrected SPECID values in changes to PCIe and RDMA transport specs.</li> <li>• Removed non-NVMe styles from style gallery.</li> </ul>
2022.03.18b	<ul style="list-style-type: none"> <li>• Change the structure of the log to have 1 byte to each specification and add the MI spec version reporting</li> </ul>
2022.03.24	<ul style="list-style-type: none"> <li>• Corrected erroneous versions of ratified specs.</li> <li>• Removed the Supported Specification Log Page.</li> <li>• Added the Command Set Support Vector as a new Extended Attribute of the Discovery log page.</li> <li>• Adopted a convention of major and minor version fields each being one byte containing an integer, and the Tertiary Version being one byte containing an ASCII letter. This does not change the existing Tertiary Version field in the Version property.</li> <li>• Added Base Letter Version field to the to the Identify Controller Data Structure, I/O Command Set Independent CNS 01h)</li> </ul>

Revision Date	Change Description
	<ul style="list-style-type: none"> <li>Added a list of Supported Transport Specification Descriptors to the Identify Controller Data Structure, I/O Command Set Independent CNS 01h).</li> <li>Added supported specification version fields to the I/O Command Set Specific Identify Controller data structures (CNS 06h). This is a new structure in the KV Command Set spec.</li> <li>Added a section specifying the Supported Transport Specification Descriptor to each I/O command set spec.</li> <li>Added a figure to the NVMe MI spec defining the field in the Identify Controller data structure (CNS 01h) which is reserved for the Management Interface. This figure contains the major, minor, and tertiary versions of the MI spec.</li> </ul>
2022.04.20	<ul style="list-style-type: none"> <li>Deleted change to Discovery log page, per 2022-03-24 Technical WG meeting.</li> <li>Added questions for directions to be given by the 2022-04-14 Technical WG meeting.</li> <li>Replaced list of transport spec version descriptors with one transport specification descriptor per transport type (i.e., PCIe, RDMA, TCP, FC-NVMe). Moved descriptions of descriptors for PCIe, RDMA, and TCP to the separate transport specs.</li> <li>Modified changes for the NVMe-MI specification, to report the MI letter version in the NVM Subsystem Information data structure.</li> <li>Corrected headings in the changes for the KV Command Set Spec.</li> </ul>
2022.04.21	<p>Changes from 2022-04-21 meeting of Technical WG:</p> <ul style="list-style-type: none"> <li>Do not define letter version fields.</li> <li>Do not define transport spec version reporting.</li> <li>The above two items removed all changes to the Base Spec and to all transport specs.</li> <li>Added an I/O command set version field for I/O command specs. This field has three bytes (major, minor, tertiary).</li> <li>Added a tertiary version field for the NVMe-MI spec.</li> <li>Added comments for Phase 3 questions.</li> <li>Accepted all changes.</li> </ul>
2022.04.26	<p>Changes from 2022-04-25 meeting of the NVMe-MI TG:</p> <ul style="list-style-type: none"> <li>Revise existing MI fields to align with other specifications.</li> </ul>
<b>Phase 3</b>	
2022.05.09	<ul style="list-style-type: none"> <li>Change "valid versions" to "published versions" and list all of those in the version tables.</li> <li>Clarified notes to indicate in which data structure the version letter is not reported, per NVMe-MI TG meeting of 2022-05-09.</li> </ul>
<b>Member Review</b>	
2022.05.12	<p>Revision for Member Review.</p> <p>Changes from 2022-05-09 Meeting of the NVMe-MI TG and the 2022-05-12 meeting of the Technical WG:</p> <ul style="list-style-type: none"> <li>Removed redundant sentences stating that version letters are not reported.</li> <li>Modified figures showing version field values for each spec version (FigNVM, FigKV, FigZNS, FigMI). <ul style="list-style-type: none"> <li>Removed lettered versions from Specification Versions column.</li> <li>Added lettered versions to Note 1 as examples.</li> </ul> </li> </ul>
2022.05.16	<p>Second revision for Member Review.</p> <p>Changes from 2022-05-16 meeting of the NVMe-MI TG:</p> <ul style="list-style-type: none"> <li>Removed addition of the Tertiary field to NVMe-MI specification Figure 94.</li> <li>Reworded descriptions of NVMe-MI Major and Minor fields in Figure 94.</li> <li>Reworded e.g. list of specs in Note 1 to Figure FigMI.</li> </ul>

Revision Date	Change Description
2022.05.20	Third revision for Member Review. <ul style="list-style-type: none"> <li>• Base Spec 3.1.3.1:               <ul style="list-style-type: none"> <li>○ Defined Version Descriptor for use in multiple specs.</li> <li>○ Defined Version property to use Version Descriptor.</li> <li>○ Added table showing reset values of Version Descriptor fields.</li> <li>○ Deleted sections 3.1.3.1.x.</li> </ul> </li> <li>• In I/O command set specs, changed the IOCSVER field to use the Version Descriptor.</li> <li>• Removed Tertiary field from Figure FigM1.</li> <li>• Updated description for changes document for NVMe-MI.</li> </ul>
2022-05-26	Fourth revision for Member Review. <ul style="list-style-type: none"> <li>• Renamed Version Descriptor to Specification Version Descriptor.</li> <li>• Modified description of the Specification Version Descriptor.</li> </ul>
2022-07-20	Integrated
2022-07-26	Updated per editorial comments from Mike Allison and Paul Suhler

## **Description for Changes Document for NVM Express® Base Specification 2.0b**

New Features/Feature Enhancements/Required Changes:

- Added the Specification Version Descriptor for use in multiple specifications.
- Re-defined the Version property to use the Specification Version Descriptor.
- References:
  - TP4135

## **Description for Changes Document for NVM Express® NVM Command Set Specification 1.0b**

New Features/Feature Enhancements/Required Changes:

- Added the Version (VER) field to the I/O Command Set Specific Identify Controller data structure for the NVM Command Set.
- References:
  - TP4135

## **Description for Changes Document for NVM Express® Key Value Command Set Specification 1.0b**

New Features/Feature Enhancements/Required Changes:

- Added the I/O Command Set Specific Identify Controller data structure for the Key Value Command Set. The contents are the Version (VER) field.
- References:
  - TP4135

## **Description for Changes Document for NVM Express® Zoned Namespace Specification 1.1b**

New Features/Feature Enhancements/Required Changes:

- Added the Version (VER) field to the I/O Command Set Specific Identify Controller data structure for the Zoned Namespace Command Set.
- References:
  - TP4135

## **Description for Changes Document for NVM Express® Management Interface Specification 1.2b**

New Features/Feature Enhancements/Required Changes:

- Aligned the descriptions of the version number fields with those in other specifications in the NVM Express Library of Specifications.
- References:
  - TP4135

### **Markup Conventions:**

Black:	Unchanged (however, hot links are removed)
<del>Red Strikethrough:</del>	Deleted
Blue:	New
Blue Highlighted:	TBD values, anchors, and links to be inserted in new text.
<Green Bracketed>:	Notes to editor

# Description of Specification Changes for NVM Express® Base Specification 2.0b

## 3 NVM Express Architecture

### 3.1 NVM Controller Architecture

...

#### 3.1.3 Controller Properties

...

##### 3.1.3.2 Offset 8h: VS – Version

This property is Read Only (RO) and indicates the ~~major, minor, and tertiary~~ version of ~~the NVM Express base~~ this specification that the controller ~~implementation~~ supports, as defined in [Figure FigVer1](#). ~~Valid versions of the specification are: 1.0, 1.1, 1.2, 1.2.1, 1.3, 1.4, and 2.0.~~

**Figure FigVer1: Specification Version Descriptor**

Bits	Description
31:16	<b>Major Version (MJR):</b> An integer value indicating the major version number of this specification which is supported by the controller.
15:08	<b>Minor Version (MNR):</b> An integer value indicating the minor version number of this specification which is supported by the controller.
07:00	<b>Tertiary Version (TER):</b> An integer value indicating the tertiary version number of this specification which is supported by the controller. If this field is cleared to 0h, then this specification does not have a tertiary version number.

The reset value for each field is described in [Figure FigVer2](#):

**Figure FigVer2: NVM Express Base Specification Version Property Reset Values**

Specification Versions <sup>1</sup>	MJR Field	MNR Field	TER Field
1.0	1h	0h	0h
1.1	1h	1h	0h
1.2	1h	2h	0h
1.2.1	1h	2h	1h
1.3	1h	3h	0h
1.4	1h	4h	0h
2.0	2h	0h	0h

Notes:  
1. The specification version listed includes lettered versions (e.g., 1.4 includes 1.4, 1.4a through 1.4c, etc.).

< **Note to Editor:** Sections 3.1.3.2.1 through 3.1.3.2.7 are deleted. >

### 3.1.3.2.1 — VS Value for 1.0 Compliant Controllers

Figure 1: VS Value for 1.0 Compliant Controllers

Bits	Type	Reset	Description
31:16	RO	1h	Major Version Number (MJR): Indicates the major version is “1”.
15:08	RO	0h	Minor Version Number (MNR): Indicates the minor version is “0”.
07:00	RO	0h	Reserved

### 3.1.3.2.2 — VS Value for 1.1 Compliant Controllers

Figure 2: VS Value for 1.1 Compliant Controllers

Bits	Type	Reset	Description
31:16	RO	1h	Major Version Number (MJR): Indicates the major version is “1”.
15:08	RO	1h	Minor Version Number (MNR): Indicates the minor version is “1”.
07:00	RO	0h	Reserved

### 3.1.3.2.3 — VS Value for 1.2 Compliant Controllers

Figure 3: VS Value for 1.2 Compliant Controllers

Bits	Type	Reset	Description
31:16	RO	1h	Major Version Number (MJR): Indicates the major version is “1”.
15:08	RO	2h	Minor Version Number (MNR): Indicates the minor version is “2”.
07:00	RO	0h	Reserved

### 3.1.3.2.4 — VS Value for 1.2.1 Compliant Controllers

Figure 4: VS Value for 1.2.1 Compliant Controllers

Bits	Type	Reset	Description
31:16	RO	1h	Major Version Number (MJR): Indicates the major version is “1”.
15:08	RO	2h	Minor Version Number (MNR): Indicates the minor version is “2”.
07:00	RO	1h	Tertiary Version Number (TER): Indicates the tertiary version is “1”.

### 3.1.3.2.5 — VS Value for 1.3 Compliant Controllers

Figure 5: VS Value for 1.3 Compliant Controllers

Bits	Type	Reset	Description
31:16	RO	1h	Major Version Number (MJR): Indicates the major version is “1”.
15:08	RO	3h	Minor Version Number (MNR): Indicates the minor version is “3”.
07:00	RO	0h	Tertiary Version Number (TER): Indicates the tertiary version is “0”.

### 3.1.3.2.6 — VS Value for 1.4 Compliant Controllers

Figure 6: VS Value for 1.4 Compliant Controllers

Bits	Type	Reset	Description
31:16	RO	1h	Major Version Number (MJR): Indicates the major version is “1”.
15:08	RO	4h	Minor Version Number (MNR): Indicates the minor version is “4”.
07:00	RO	0h	Tertiary Version Number (TER): Indicates the tertiary version is “0”.

### 3.1.3.2.7 — VS Value for 2.0 Compliant Controllers

**Figure 7: VS Value for 2.0 Compliant Controllers**

<b>Bits</b>	<b>Type</b>	<b>Reset</b>	<b>Description</b>
31:16	RO	2h	<b>Major Version Number (MJR):</b> Indicates the major version is "2".
15:08	RO	0h	<b>Minor Version Number (MNR):</b> Indicates the minor version is "0".
07:00	RO	0h	<b>Tertiary Version Number (TER):</b> Indicates the tertiary version is "0".

**3.1.3.3 Offset Ch: INTMS – Interrupt Mask Set**

...

# Description of NVM Express® NVM Command Set Specification 1.0b changes

## 4 Admin Commands for the NVM Command Set

...

### 4.1 Admin Command behavior for the NVM Command Set

...

#### 4.1.5 Identify command

...

##### 4.1.5.4 I/O Command Set Specific Identify Controller Data Structure (CNS 06h, CSI 00h)

Figure defines the I/O Command Set Specific Identify Controller data structure for the NVM Command Set.

**Figure 102: I/O Command Set Specific Identity Controller Data Structure for the NVM Command Set**

Bytes	O/M <sup>1</sup>	Description
...		
23:20	M	<b>Version (VER):</b> This field contains a Specification Version Descriptor (refer to the NVM Express Base Specification) indicating the version of this specification supported by the controller, as defined in <a href="#">Figure FigNVM</a> .
4095: <del>1624</del>	M	Reserved
NOTES:		
1. O/M definition: O = Optional, M = Mandatory.		

...

Published versions of this specification and the values that shall be reported by compliant controllers are defined in [Figure FigNVM](#).

**Figure FigNVM: NVM Command Set Specification Version Descriptor Field Values**

Specification Versions <sup>1</sup>	MJR Field	MNR Field	TER Field
1.0	1h	0h	0h
Notes:			
1. The specification version listed includes lettered versions (e.g., 1.0 includes 1.0, 1.0a, 1.0b, etc.).			

...

# Description of NVM Express® Key Value Command Set specification 1.0b changes

## 4 Admin Commands for the Key Value Command Set

...

### 4.1 Admin Command behavior for the Key Value Command Set

...

#### 4.1.5 Identify command

...

##### 4.1.5.2 I/O Command Set Specific Identify Controller Data Structure (CNS 06h, CSI 01h)

~~The Key Value Command Set does not have an Identify I/O Command Set specific Controller data structure (i.e., CNS 06h). The controller shall return a zero filled data structure for this CNS value.~~

Figure FigKV1 defines the I/O Command Set Specific Identify Controller data structure for the Key Value Command Set.

**Figure FigKV1: I/O Command Set Specific Identify Controller Data Structure for the Key Value Command Set**

Bytes	O/M <sup>1</sup>	Description
03:00	M	<b>Version (VER):</b> This field contains a Specification Version Descriptor (refer to the NVM Express Base Specification) indicating the version of this specification supported by the controller, as defined in Figure FigKV2.
4095:04		Reserved
Notes: 1. O/M definition: O = Optional, M = Mandatory.		

Published versions of this specification and the values that shall be reported by compliant controllers are defined in Figure FigKV2.

**Figure FigKV2: Key Value Command Set Specification Version Descriptor Field Values**

Specification Versions <sup>1</sup>	MJR Field	MNR Field	TER Field
1.0	1h	0h	0h
Notes: 1. The specification version listed includes lettered versions (e.g., 1.0 includes 1.0, 1.0a, 1.0b, etc.).			

...

# Description of NVM Express® Zoned Namespace Command Set specification 1.1b changes

## 4 Admin Commands for the Zoned Namespace Command Set

...

### 4.1 Admin Command behavior for the Zoned Namespace Command Set

...

#### 4.1.5 Identify command

...

##### 4.1.5.2 I/O Command Set Specific Identify Controller Data Structure (CNS 06h, CSI 02h)

Figure 50 defines the I/O Command Set specific Identify Controller data structure for the Zoned Namespace Command Set.

**Figure 50: I/O Command Set Specific Identify Controller Data Structure for the Zoned Namespace Command Set**

Bytes	O/M <sup>1</sup>	Description
...		
35:32	M	<b>Version (VER):</b> This field contains a Specification Version Descriptor (refer to the NVM Express Base Specification) indicating the version of this specification supported by the controller, as defined in <a href="#">Figure FigZNS</a> .
4095: <del>04</del> 36		Reserved
NOTES:		
1. O/M definition: O = Optional, M = Mandatory.		
2. Mandatory for controllers that support the Zone Append command.		

Published versions of this specification and the values that shall be reported by compliant controllers are defined in [Figure FigZNS](#).

**Figure FigZNS: Zoned Namespace Command Set Specification Version Descriptor Field Values**

Specification Versions <sup>1</sup>	MJR Field	MNR Field	TER Field
1.0	1h	0h	0h
1.1	1h	1h	0h
Notes:			
1. The specification version listed includes lettered versions (e.g., 1.1 includes 1.1, 1.1a, 1.1b, etc.).			

...

# Description of NVM Express® Management Interface Specification 1.2b changes

## 5 Management Interface Command Set

...

### 5.7 Read NVMe-MI Data Structure

...

**Figure 94: NVM Subsystem Information Data Structure**

Bytes	Description
00	<b>Number of Ports (NUMP):</b> This field indicates the maximum number of ports of any type supported by the NVM Subsystem. This is a 0's based value. The value of FFh is not supported because a port identifier of 256 is not able to be reported (refer to section <b>Error! Reference source not found.</b> ).
01	<b>NVMe-MI Major Version Number (MJR):</b> <del>This field shall be set to 1h to indicate the major version number of this specification.</del> An integer value indicating the major version number of this specification supported by the NVM Subsystem, as defined in Figure FigMI.
02	<b>NVMe-MI Minor Version Number (MNR):</b> <del>This field shall be set to 2h to indicate the minor version number of this specification.</del> An integer value indicating the minor version number of this specification supported by the NVM Subsystem, as defined in Figure FigMI.
31:03	Reserved

...

Published versions of this specification and the values that shall be reported by compliant implementations are defined in [Figure FigMI](#).

**Figure FigMI: Version Number Field Values**

Specification Versions <sup>1</sup>	MJR Field	MNR Field
1.0	1h	0h
1.1	1h	1h
1.2	1h	2h

Notes:  
1. The specification version listed includes lettered versions (e.g., 1.0 includes 1.0 and 1.0a, 1.1 includes 1.1 and 1.1a through 1.1d, etc.).

...