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NVM Express® Engineering Change Notice (ECN)

ECN ID	**125**
Revision Date	**2024.11.11**
Corrected Spec Versions	**SLM Command Set Specification 1.0a** **Computational Programs Command Set Specification 1.0a** **Key Value Command Set Specification 1.1** **Zoned Namespace Command Set Specification 1.2**

Errata Author(s)

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Errata Overview

The Flush and Memory Fill commands have both been assigned combined opcode 00h. This ECN corrects the opcode for Memory Fill. All I/O commands defined in the Base Specification are added to the I/O command tables in the following command set specifications, to avoid future opcode collisions:

- SLM Command Set
- Computational Programs Command Set
- Key Value Command Set
- Zoned Namespace Command Set

Revision History

Revision Date	Change Description
2024.09.06	Initial draft
2024.06.07	Incorporated changes recommended by Mike Allison.
2024.09.11	Changes from 2024-09-11 Errata TG meeting. • Remove footnote 4 on Flush and Cancel commands. This footnote effectively double-specifies the use of the NSID field, which is described in the opcode figure in the Base Spec. • List Base Spec I/O commands in the same order as in Base. Ready for Member Review.
2024.11.11	Integrated

Description of Change for SLM Command Set Specification 1.0a:

Feature Enhancements/Required Changes:

- Change opcode of the Memory Fill command from 00h (which was already defined for the Flush command) to 04h.
    - Description of change.
        - Added all I/O commands defined in the Base Specification to the list of I/O commands. This is intended to prevent future duplicate assignment of opcodes.
        - Merged the Standard Command column into the Function column, to match the figure format in other specifications.
    - **New requirement / incompatible change**.
        - The opcode for the Memory Fill command has changed from 00h to 04h to remove the conflict with the Flush command.
    - References
        - ECN125

Description of Change for Computational Programs Command Set Specification 1.0a:

Feature Enhancements/Required Changes:

- Added all I/O commands defined in the Base Specification to the list of I/O commands This is intended to prevent future
    - Description of change.
        - Added all I/O commands defined in the Base Specification to the list of I/O commands. This is intended to prevent future duplicate assignment of opcodes.
        - Merged the Standard Command column into the Function column, to match the figure format in other specifications.
    - **New requirement / incompatible change**.
        - None
- References
    - ECN125

Description of Change for Key Value Command Set Specification 1.0a:

Feature Enhancements/Required Changes:

- Added all I/O commands defined in the Base Specification to the list of I/O commands. This is intended to prevent future
    - Description of change.
        - Added all I/O commands defined in the Base Specification to the list of I/O commands. This is intended to prevent future duplicate assignment of opcodes.
        - Deleted footnote 4 from Cancel command. This duplicated the footnote in the Base Specification.
    - **New requirement / incompatible change**.
        - None
- References
    - ECN125

Description of Change for Zoned Namespace Command Set Specification 1.0a:

Feature Enhancements/Required Changes:

- Added all I/O commands defined in the Base Specification to the list of I/O commands. This is intended to prevent future duplicate assignment of opcodes.
    - Description of change.
        - Added all I/O commands defined in the Base Specification to the list of I/O commands. This is intended to prevent future duplicate assignment of opcodes.
        - Deleted footnote 4 from Flush command and Cancel command. This duplicated the footnote in the Base Specification.
    - **New requirement / incompatible change**.
        - None
- References
    - ECN125

Markup Conventions:

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

Description of Change for the SLM Command Set Specification 1.0a:

3 I/O Commands for the Subsystem Local Memory Command Set

…

3.2 SLM Command Set Commands

This command set includes the commands listed in Figure 5. Commands are submitted as described in the NVM Express Base Specification.

Figure 5: Opcodes for SLM Command Set Commands

Opcode by Field			Combined Opcode[1]	Command[2]	Reference
~~(07)~~ ~~Standard Command~~	(0706:02) Function	(01:00) Data Transfer[3]			
Refer to the NVM Express Base Specification				Flush	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Register	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Report	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Acquire	NVM Express Base Specification
Refer to the NVM Express Base Specification				I/O Management Receive	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Release	NVM Express Base Specification
Refer to the NVM Express Base Specification				Cancel	NVM Express Base Specification
Refer to the NVM Express Base Specification				I/O Management Send	NVM Express Base Specification
~~0b~~	~~0000 00b~~	~~00b~~	~~00h~~	~~Memory Fill~~	~~3.2.2~~
~~0b~~	0000 00b	01b	01h	Memory Copy	3.2.1
~~0b~~	0000 00b	10b	02h	Memory Read	3.2.3
	0000 01b	00b	04h	Memory Fill	3.2.2
~~0b~~	0000 01b	01b	05h	Memory Write	3.2.4

Notes:
1. Opcodes not listed are defined in the NVM Express Base Specification.
2. All SLM Command Set commands use the Namespace Identifier (NSID) field. The value FFFFFFFFh is not supported in this field.
3. Indicates the data transfer direction of the command. All options to the command shall transfer data as specified or transfer no data. All commands, including vendor specific commands, shall follow this convention: 00b = no data transfer; 01b = host to controller; 10b = controller to host; 11b = bidirectional.

Description of Specification Changes for the Computational Programs Command Set Specification 1.0a:

3 I/O Commands for the Computational Programs Command Set

…

3.2 Computational Programs Command Set Commands

This I/O Command Set includes the commands listed in Figure 15. Section 3.2 describes the definition of each of the commands defined by this specification.

Figure 15: Opcodes for Computational Programs Command Set Commands

Opcode by Field			Combined Opcode[1]	Command[2]	Reference
~~(07)~~	(07~~06~~:02)	(01:00)			
~~Standard Command~~	Function	Data Transfer[3]			
Refer to the NVM Express Base Specification				Flush	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Register	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Report	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Acquire	NVM Express Base Specification
Refer to the NVM Express Base Specification				I/O Management Receive	NVM Express Base Specification
Refer to the NVM Express Base Specification				Reservation Release	NVM Express Base Specification
Refer to the NVM Express Base Specification				Cancel	NVM Express Base Specification
Refer to the NVM Express Base Specification				I/O Management Send	NVM Express Base Specification
~~0b~~	0000 00b	01b	01h	Execute Program	3.2.1

Notes:
1. Opcodes not listed are defined in the NVM Express Base Specification.
2. All Computational Programs Command Set commands use the NSID field. The value FFFFFFFFh is not supported in this field.
3. Indicates the data transfer direction of the command. All options to the command shall transfer data as specified or transfer no data. All commands, including vendor specific commands, shall follow this convention: 00b = no data transfer; 01b = host to controller; 10b = controller to host; 11b = bidirectional.

Description of Specification Changes for the Key Value Command Set Specification 1.0a:

3 I/O Commands for the Key Value Command Set

…

3.2 Key Value Command Set Commands

This I/O Command Set includes the commands listed in Figure 5. Section 3.2 describes the definition of each of the commands defined by this specification.

The Key Value Command Set includes the commands listed in Figure 5. Section 3.2 describes the definition for each of the commands defined by this specification. Commands are submitted as described in the NVM Express Base Specification.

Figure 5: Opcodes for Key Value Command Set Commands

Opcode by Field (07:02) Function	Opcode by Field (01:00) Data Transfer[3]	Combined Opcode[1]	Command[2]	Reference
Refer to the NVM Express Base Specification			Flush	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Register	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Report	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Acquire	NVM Express Base Specification
Refer to the NVM Express Base Specification			I/O Management Receive	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Release	NVM Express Base Specification
Refer to the NVM Express Base Specification			Cancel [4]	NVM Express Base Specification
Refer to the NVM Express Base Specification			I/O Management Send	NVM Express Base Specification
0000 00b	01b	01h	Store	3.2.5
0000 00b	10b	02h	Retrieve	3.2.3
0001 00b	00b	10h	Delete	3.2.1
0001 01b	00b	14h	Exist	3.2.4
0000 01b	10b	06h	List	3.2.2

Notes:
1. Opcodes not listed are defined in the NVM Express Base Specification.
2. All Key Value Command Set Commands use the Namespace Identifier (NSID) field. The value FFFFFFFFh is not supported in this field ~~unless footnote 4 in this figure indicates that a specific command does support that value.~~
3. Indicates the data transfer direction of the command. All options to the command shall transfer data as specified or transfer no data. All commands, including vendor specific commands, shall follow this convention: 00b = no data transfer; 01b = host to controller; 10b = controller to host; 11b = bidirectional.
4. ~~This command may support the use of the Namespace Identifier (NSID) field set to FFFFFFFFh.~~

Description of Specification Changes for the Zoned Namespace Command Set Specification 1.1

3 I/O Commands for the Zoned Namespace Command Set

…

3.2 Zoned Namespace Command Set Commands

This specification includes the commands listed in Figure 12. Section 3.3 describes the Zoned Namespace Command Set specific behavior for NVM Command Set I/O commands. Section 3.4 describes the commands defined by this specification. Commands are submitted as defined in the NVM Express Base Specification.

Figure 12: Opcodes for Zoned Namespace Command Set I/O Commands

Opcode by Field		Combined Opcode [1]	Command [2]	Reference
(07:02)	(01:00)			
Function	Data Transfer [3]			
NVM Express Base Specification I/O commands implemented by this specification				
Refer to the NVM Express Base Specification			Flush [4]	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Register	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Report	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Acquire	NVM Express Base Specification
Refer to the NVM Express Base Specification			I/O Management Receive	NVM Express Base Specification
Refer to the NVM Express Base Specification			Reservation Release	NVM Express Base Specification
Refer to the NVM Express Base Specification			Cancel [4]	NVM Express Base Specification
Refer to the NVM Express Base Specification			I/O Management Send	NVM Express Base Specification
NVM Command Set commands implemented by this specification				
…				

Notes:
1. Opcodes not listed are defined in the NVM Express Base Specification and in the NVM Command Set Specification.
2. All Zoned Namespace Command Set Commands use the Namespace Identifier (NSID) field. The value FFFFFFFFh is not supported in this field ~~unless footnote 4 in this figure indicates that a specific command does support that value~~.
3. Indicates the data transfer direction of the command. All options to the command shall transfer data as specified or transfer no data. All commands, including vendor specific commands, shall follow this convention: 00b = no data transfer; 01b = host to controller; 10b = controller to host; 11b = bidirectional.
4. ~~This command may support the use of the Namespace Identifier (NSID) field set to FFFFFFFFh.~~