innodisk

CFexpress

4TE2 Series

Customer: ______________________

Customer Part Number: ______________________

Innodisk Part Number: ______________________

Innodisk Model Name: ______________________

Date: ______________________

Innodisk Approver	Customer Approver

Total Solution For
Industrial Flash Storage

Features:

- PCIe Gen3 x2, NVMe 1.4 SSD
- Kioxia 3D TLC NAND
- iPower Guard
- iData Guard
- Dynamic Thermal Management
- Hybrid Write Mode with SLC Cache Enable
- Support Write Protection (optional)

Performance:

- Sequential Read up to 1,750 MB/s
- Sequential Write up to 1,650 MB/s

Power Requirements:

Input Voltage:	3.3V± 5%
Max Operating Wattage (R/W):	3.4W
Idle Wattage:	1.2W

Reliability:

Capacity	**TBW (client)**	**DWPD**
128GB	107	0.91
256GB	223	0.93
512GB	260	0.54
1TB	545	0.57

Data Retention	1 Year
Warranty	3 Years

For warranty details, please refer to: https://www.innodisk.com/en/support_and_service/warranty

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REVISION HISTORY

Revision	**Description**	**Date**
V1.0	First Release	Apr., 2024
V1.1	Update Cylinders	Jun., 2025

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1. Product Overview

1.1 Introduction of Innodisk CFexpress 4TE2

Innodisk CFexpress 4TE2 adopts CFexpress Version 1.0 type B Form-Factor. With PCIe interface and 3D TLC NAND Flash, CFexpress 4TE2 supports PCIe Gen. 3 x2 and is compliant with NVMe 1.4, providing excellent top and sustained performance. Moreover, it adopts 3D TLC NAND Flash providing high endurance and reliability. With sophisticated error detection and correction (ECC) functions, the module can provide full End-to-end Data Path Protection that secures the data transmission between the host system and NAND Flash.

Innodisk CFexpress 4TE2 is a small and removable memory card providing low latency and extreme speed but with low power consumption. It is ideal for gaming, edge computing and professional digital recording.

***CAUTION* TRIM must be enabled.**

TRIM enables SSD's controller to skip invalid data instead of moving. It can free up significant amount of resources, extends the lifespan of SSD by reducing erase, and write cycles on the SSD. Innodisk's handling of garbage collection along with TRIM command improves write performance on SSDs.

1.2 Product View and Models

Innodisk CFexpress 4TE2 is available in follow capacities within 3D TLC flash ICs

CFexpress 4TE2 128GB
CFexpress 4TE2 256GB
CFexpress 4TE2 512GB
CFexpress 4TE2 1TB

Figure 1: Innodisk CFexpress 4TE2 (type B)

1.3 PCIe Interface

Innodisk CFexpress 4TE2 supports PCIe Gen.3 interface and compliant with NVMe 1.4. CFexpress 4TE2 can work under PCIe Gen. 1 and Gen. 2.

Most of operating systems includes NVMe in-box driver now. For more information about the driver support in each OS, please visit https://nvmexpress.org/drivers/.

2. Product Specifications

2.1 Capacity and Device Parameters

CFexpress 4TE2 device parameters are shown in Table 1.

Table 1: Device parameters

Capacity	Cylinders	Heads	Sectors	LBA	User Capacity(MB)
128GB	16383	16	63	234441648	111770
256GB				468862128	228919
512GB				937703088	457845
1TB				1875385008	915698

2.2 Performance

Burst Transfer Rate: 1GB/s

Table 2: Performance- 112 Layers 3D TLC

Capacity	Unit	128GB	256GB	512GB	1TB
Sequential* Read (Q8T1)	MB/s	1,350	1,750	1,750	1,750
Sequential* Write (Q8T1)		500	1,050	1,600	1,650
Sustained Sequential Read (Avg.)***		640	1,500	1,500	1,500
Sustained Sequential Write (Avg.)***		140	230	370	570
4KB Random** Read (Q32T16)	IOPS	116,000	227,000	435,000	445,000
4KB Random** Write (Q32T16)		132,000	263,000	360,000	376,000

Note: * Performance results are measured in Room Temperature with Out-of-Box devices and may vary depending on overall system setup. In addition, CFexpress 4TE2 series adopt hybrid mode which enables SLC cache followed by 3D TLC direct write to strike balance between burst performance and steady overall stability.

Note: ** Performance results are based on CrystalDiskMark 8.0.1 with file size 1000MB. Unit of 4KB item is IOPS.

Note: *** Performance results are based on AIDA 64 v5.98 with block size 1MB of Linear Read & Write Test Item.

2.3 Electrical Specifications

2.3.1 Power Requirement

Table 3: Innodisk CFexpress 4TE2 Power Requirement

Item	Symbol	Rating	Unit
Input voltage	V_{IN}	+3.3 DC +- 5%	V

2.3.2 Power Consumption

Table 4: Typical Power Consumption

Mode	Power Consumption (W)
Read	3.4
Write	3.2
Idle	1.2
Power-on Peak	6.5

Target: 1TB CFexpress 4TE2

Note: Current results may vary depending on system components and power circuit design. Please refer to the test report for other capacities.

2.4 Environmental Specifications

2.4.1 Temperature Ranges

Table 5: Temperature range for CFexpress 4TE2

Temperature	Range
Operating	Standard Grade: 0°C to +70°C
Storage	-40°C to +85°C

2.4.2 Humidity

Relative Humidity: 10-95%, non-condensing

2.4.3 Shock and Vibration

Table 6: Shock/Vibration Testing for CFexpress 4TE2

Reliability	Test Conditions	Reference Standards
Vibration	7 Hz to 2K Hz, 20G, 3 axes	IEC 60068-2-6
Mechanical Shock	Duration: 0.5ms, 1500 G, 3 axes	IEC 60068-2-27

2.4.4 Mean Time between Failures (MTBF)

Table 7 summarizes the MTBF prediction results for various CFexpress 4TE2 configurations. The analysis was performed using a RAM Commander™ failure rate prediction.

- **Failure Rate**: The total number of failures within an item population, divided by the total number of life units expended by that population, during a particular measurement interval under stated condition.
- **Mean Time between Failures (MTBF)**: A basic measure of reliability for repairable items: The mean number of life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Table 7: CFexpress 4TE2 MTBF

Product	Condition	MTBF (Hours)
Innodisk CFexpress 4TE2	Telcordia SR-332 GB, 25°C	>3,000,000

2.5 CE and FCC Compatibility

CFexpress 4TE2 conforms to CE and FCC requirements.

Table 8: CFexpress 4TE2 ESD

Reliability	Reference standards
Electrostatic Discharge (ESD)	EC 61000-4-2 ESD

2.6 RoHS Compliance

CFexpress 4TE2 is fully compliant with RoHS directive.

2.7 Reliability

Table 9: CFexpress 4TE2 TBW

Parameter	**Value**
Flash endurance	3,000 P/E cycles
Error Correct Code	Support(LDPC)
Data Retention	Under 40°C: 1 Year at NAND Life End

TBW* (Total Bytes Written) Unit: TB

Capacity	**Sequential workload**	**Client workload**
128GB	341	107
256GB	682	223
512GB	1364	260
1TB	2727	545

* Note:

1. Sequential: Mainly sequential write are estimated by PassMark Burnin Test v8.1 pro.
2. Client: Follow JESD218 Test method and JESD219A Workload, tested by ULINK. (The capacity lower than 64GB client workload is not specified in JEDEC219A, the values are estimated.)
3. Based on out-of-box performance.

2.8 Transfer Mode

CFexpress 4TE2 support following transfer mode:
PCIe Gen III: 2 GB/s
PCIe Gen II: 1 GB/s
PCIe Gen I: 500 MB/s

2.9 Pin Assignment

Innodisk CFexpress 4TE2 follows CFexpress 1.0 type B pinout define. See Table 10 for CFexpress 4TE2 pin assignment.

Table 10: Innodisk CFexpress 4TE2 Pin Assignment

Pin No.	Signal #	I/O
21	GND	
20	PETp0	I
19	PETn0	I
18	GND	
17	PERp0	O
16	PERn0	O
15	GND	
14	REFCLK+	I
13	REFCLK-	I
12	INS#	O
11	CLKREQ#	O
10	+3.3V	
9	PERST#	I
8	Reserved (Optional for SMBus data)	I
7	Reserved (Optional for SMBus CLK)	I
6	PETp1	I
5	PETn1	I
4	GND	
3	PERp1	O
2	PERn1	O
1	GND	

2.10 Mechanical Dimensions

CFexpress Type B

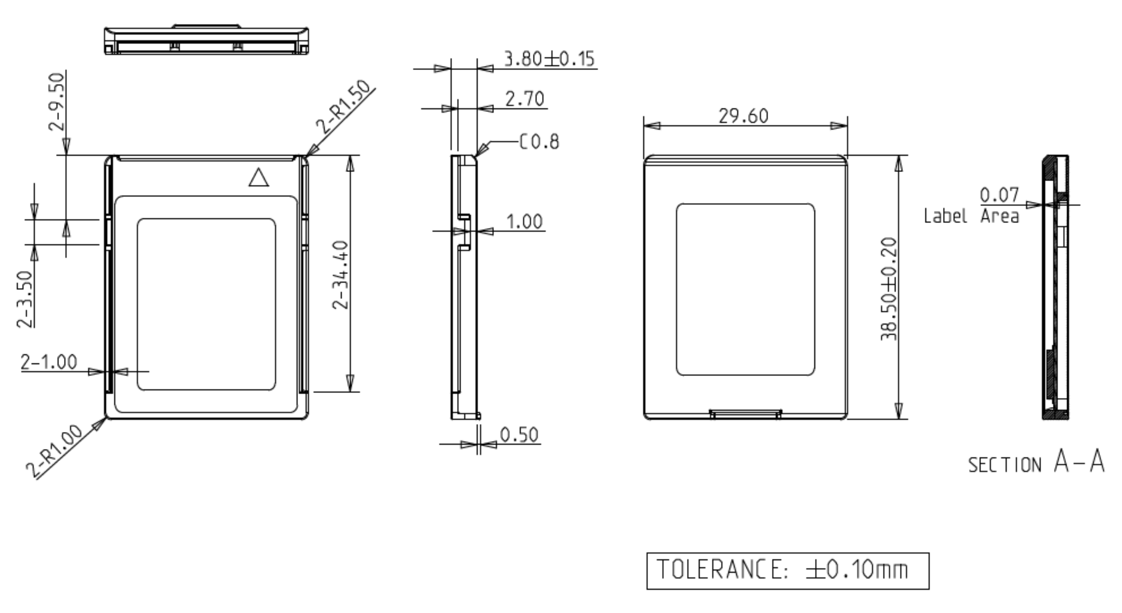

Figure 2: Innodisk CFexpress 4TE2 diagram

2.11 Assembly Weight

An Innodisk CFexpress 4TE2 within 3D TLC NAND flash ICs, 128GB’s weight is 14 grams approximately.

2.12 Seek Time

Innodisk CFexpress 4TE2 is not a magnetic rotating design. There is no seek or rotational latency required.

2.13 NAND Flash Memory

Innodisk CFexpress 4TE2 uses 3D TLC NAND flash memory, which is non-volatility, high reliability and high speed memory storage.

3. Theory of Operation

3.1 Overview

Figure 3 shows the operation of Innodisk CFexpress 4TE2 from the system level, including the major hardware blocks.

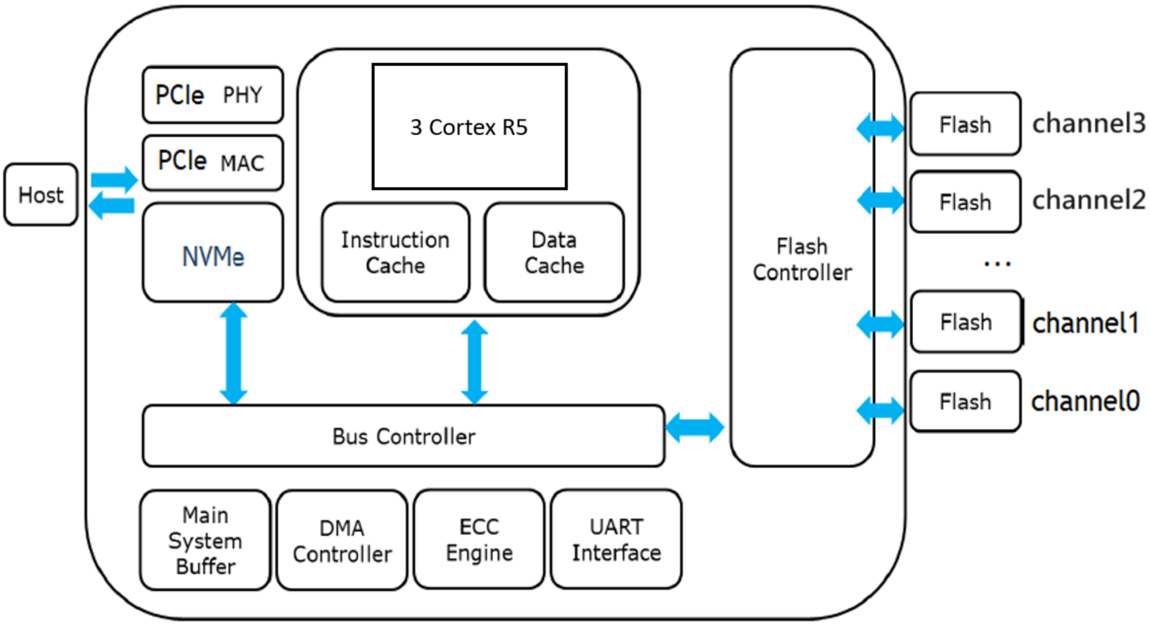

Figure 3: Innodisk CFexpress 4TE2 Block Diagram

Innodisk CFexpress 4TE2 integrates a PCIe Gen 3 x2 controller and NAND flash memories. Communication with the host occurs through the host interface, using the standard NVM protocol. Communication with the flash device(s) occurs through the flash interface.

3.2 PCIe Gen 3 x2 Controller

Innodisk CFexpress 4TE2 is designed with a PCIe Gen3 x2 controller which is compliant with NVMe 1.4, up to 64.0Gbps transfer speed. In addition, it is compliant with PCIe Gen1 and Gen2 specification. The controller supports up to four channels for flash interface.

3.3 Error Detection and Correction

Innodisk CFexpress 4TE2 is designed with hardware LDPC ECC engine with hard-decision and soft-decision decoding. Low-density parity-check (LDPC) codes have excellent error correcting performance close to the Shannon limit when decoded with the belief-propagation (BP) algorithm using soft-decision information.

3.4 Wear-Leveling

Flash memory can be erased within a limited number of times. This number is called the ***erase cycle limit*** or ***write endurance limit*** and is defined by the flash array vendor. The erase cycle limit applies to each individual erase block in the flash device.

Innodisk CFexpress 4TE2 uses a combination of two types of wear leveling- dynamic and static wear leveling- to distribute write cycling across an SSD and balance erase count of each block, thereby extending flash lifetime.

3.5 Bad Blocks Management

Bad Blocks are blocks that contain one or more invalid bits whose reliability are not guaranteed. The Bad Blocks may be presented while the SSD is shipped, or may develop during the life time of the SSD. When the Bad Blocks is detected, it will be flagged, and not be used anymore. The SSD implement Bad Blocks management, Bad Blocks replacement, Error Correct Code to avoid data error occurred. The functions will be enabled automatically to transfer data from Bad Blocks to spare blocks, and correct error bit.

3.6 Garbage Collection/TRIM

Garbage collection and TRIM technology is used to maintain data consistency and perform continual data cleansing on SSDs. It runs as a background process, freeing up valuable controller resources while sorting good data into available blocks, and deleting bad blocks. It also significantly reduces write operations to the drive, thereby increasing the SSD’s speed and lifespan.

3.7 End to End Data Path Protection

End-to-end Data Path Protection that secures the data transmission between host system and NAND Flash. In the transmission path, no matter in or out, all buffer and storage implement Error Code Correction that optimizes the data integrity in the whole transmission of SSD.

3.8 Thermal Management

CFexpress 4TE2 has built-in thermal sensor which can detect environment temperature of SSD. In the meantime, firmware will monitor the thermal sensor to prevent any failure of overheating. During extreme temperature, firmware will adjust the data transfer behavior to maintain the SSD’s reliable operation.

3.9 iData Guard

iData Guard is a comprehensive data protection mechanism that functions before and after a sudden power outage to the SSD. Low-power detection terminates data writing before an abnormal power-off, while table-remapping after power-on deletes corrupt data and maintains data integrity. iData Guard provides effective power cycling management, preventing data stored in flash from degrading with use.

4. Installation Requirements

4.1 CFexpress 4TE2 Insert Directions

When CFexpress card is inserted to the host slot, INS# is internally strapped to ground.

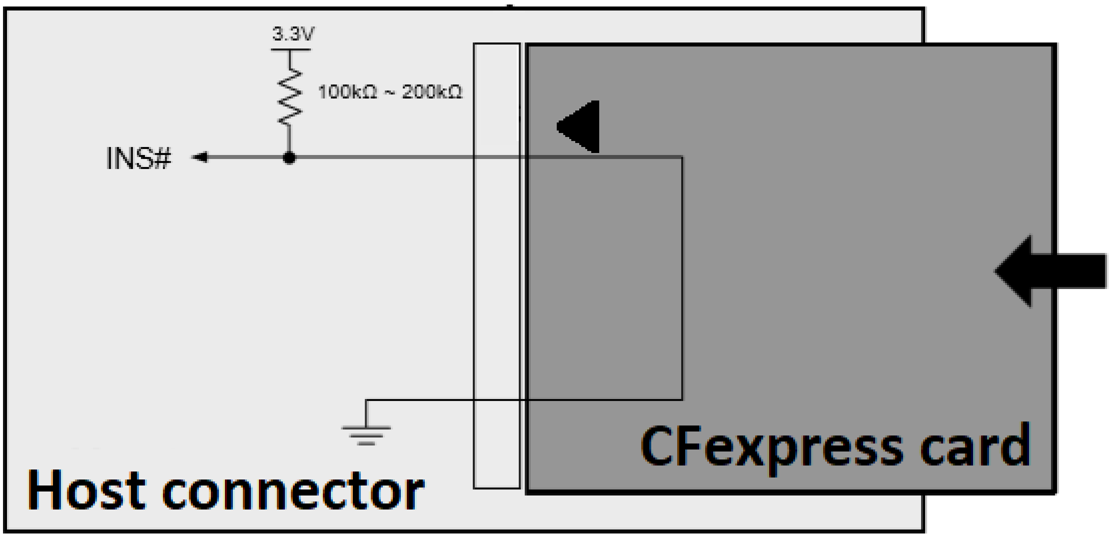

Figure 4: Signal Segment and Power Segment

4.2 Electrical Connections for CFexpress 4TE2

CFexpress 4TE2 is PCIe interface; it follows CFexpress 1.0 type B pin assignment. For pin define please refer to 2.9 Pin Assignment.

4.3 Device Drive

CFexpress 4TE2 is compliant with NVMe 1.4. To make sure NVMe storage devices can work in your system, both operation system and BIOS can support NVMe. Most of OS includes NVMe in-box driver now. For more information about the NVMe driver support in each OS, please visit the website https://nvmexpress.org/drivers/. For BIOS NVMe driver support please contact with your motherboard manufacturers.

4.4 Write Protection (Optional)

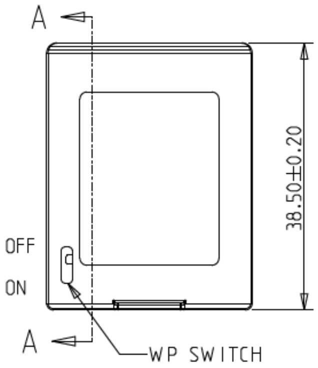

Figure 5: Write Protect Switch

Innodisk CFexpress 4TE2 within the write-protect function could prevent the device from modification and deletion. Write-protected data that is read only, that is, users could not write to it, edit it, append data to it, or delete it. When users would like to make sure that neither themselves nor others could modify or destroy the file, users could switch on write-protection. Thus, CFexpress 4TE2 could process write-protect mechanism and disable flash memory to be written-in any data. Only while the system power-off, users could switch on write-protection. Write-protection could not be switched-on, after OS booting.

5. SMART / Health Information

This log page is used to provide SMART and general health information. The information provided is over the life of the controller and is retained across power cycles. More details about Set Features command, please refer to NVM Express 1.4

5.1 Get Log Page (Log Identifier 02h)

CFexpress 4TE2 series SMART / Health Information Log are listed in following table.

Table 11: Get Log Page – SMART / Health Information Log

Bytes	**Description**
0	**Critical Warning:** This field indicates critical warnings for the state of the controller. Each bit corresponds to a critical warning type; multiple bits may be set to ‘1’. If a bit is cleared to ‘0’, then that critical warning does not apply. Critical warnings may result in an asynchronous event notification to the host. Bits in this field represent the state at the time the Get Log Page command is processed and may not reflect the state at the time a related asynchronous event notification, if any, occurs or occurred.

Bit	**Definition**
0	If set to ‘1’, then the available spare capacity has fallen below the threshold.
1	If set to ‘1’, then a temperature is: a) greater than or equal to an over temperature threshold. b) less than or equal to an under temperature threshold.
2	If set to ‘1’, then the NVM subsystem reliability has been degraded due to significant media related errors or any internal error that degrades NVM subsystem reliability.
3	If set to ‘1’, then all of the media has been placed in read only mode. The controller shall not set this bit to '1' if the read-only condition on the media is a result of a change in the write protection state of a namespace.
4	If set to ‘1’, then the volatile memory backup device has failed. This field is only valid if the controller has a volatile memory backup solution.
5	If set to ‘1’, then the Persistent Memory Region has become read-only or unreliable.
7:6	Reserved

<table>
<tr><td>1:2</td><td>Composite Temperature: Contains a value corresponding to a temperature in degrees Kelvin that represents the current composite temperature of the controller and namespace(s) associated with that controller. The manner in which this value is computed is implementation specific and may not represent the actual temperature of any physical point in the NVM subsystem. The value of this field may be used to trigger an asynchronous event.
Warning and critical overheating composite temperature threshold values are reported by the WCTEMP and CCTEMP fields in the Identify Controller data structure.</td></tr>
<tr><td>3</td><td>Available Spare: Contains a normalized percentage (0 to 100%) of the remaining spare capacity available.</td></tr>
<tr><td>4</td><td>Available Spare Threshold: When the Available Spare falls below the threshold indicated in this field, an asynchronous event completion may occur. The value is indicated as a normalized percentage (0 to 100%). The values 101 to 255 are reserved.</td></tr>
<tr><td>5</td><td>Percentage Used: Contains a vendor specific estimate of the percentage of NVM subsystem life used based on the actual usage and the manufacturer’s prediction of NVM life. A value of 100 indicates that the estimated endurance of the NVM in the NVM subsystem has been consumed, but may not indicate an NVM subsystem failure. The value is allowed to exceed 100. Percentages greater than 254 shall be represented as 255. This value shall be updated once per power-on hour (when the controller is not in a sleep state).
Refer to the JEDEC JESD218A standard for SSD device life and endurance measurement techniques.</td></tr>
<tr><td>6</td><td>Endurance Group Critical Warning Summary: This field indicates critical warnings for the state of Endurance Groups. Each bit corresponds to a critical warning type, multiple bits may be set to ‘1’. If a bit is cleared to ‘0’, then that critical warning does not apply to any Endurance Group. Critical warnings may result in an asynchronous event notification to the host. Bits in this field represent the current associated state and are not persistent.
If a bit is set to ‘1’ in one or more Endurance Groups, then the corresponding bit shall be set to ‘1’ in this field.
<table>
<tr><th>Bit</th><th>Definition</th></tr>
<tr><td>0</td><td>If set to ‘1’, then the available spare capacity of one or more Endurance Groups has fallen below the threshold.</td></tr>
<tr><td>1</td><td>Reserved</td></tr>
<tr><td>2</td><td>If set to ‘1’, then the reliability of one or more Endurance Groups has been degraded due to significant media related errors or any internal error that degrades NVM subsystem reliability.</td></tr>
<tr><td>3</td><td>If set to ‘1’, then the namespaces in one or more Endurance Groups have been placed in read only mode not as a result of a change in the write protection state of a namespace.</td></tr>
<tr><td>7:4</td><td>Reserved</td></tr>
</table></td></tr>
</table>

7:31	**Reserved**
32:47	**Data Units Read:** Contains the number of 512 byte data units the host has read from the controller as part of processing a SMART Data Units Read Command; this value does not include metadata. This value is reported in thousands (i.e., a value of 1 corresponds to 1,000 units of 512 bytes read) and is rounded up (e.g., one indicates that the number of 512 byte data units read is from 1 to 1,000, three indicates that the number of 512 byte data units read is from 2,001 to 3,000). Refer to the specific I/O Command Set specification for the list of SMART Data Units Read Commands that affect this field. A value of 0h in this field indicates that the number of SMART Data Units Read is not reported.
48:63	**Data Units Written:** Contains the number of 512 byte data units the host has written to the controller as part of processing a User Data Out Command; this value does not include metadata. This value is reported in thousands (i.e., a value of 1 corresponds to 1,000 units of 512 bytes written) and is rounded up (e.g., one indicates that the number of 512 byte data units written is from 1 to 1,000, three indicates that the number of 512 byte data units written is from 2,001 to 3,000). Refer to the specific I/O Command Set specification for the list of User Data Out Commands that affect this field. A value of 0h in this field indicates that the number of Data Units Written is not reported.
64:79	**Host Read Commands:** Contains the number of SMART Host Read Commands completed by the controller. Refer to the specific I/O Command Set specification for the list of SMART Host Read Commands that affect this field.
80:95	**Host Write Commands:** Contains the number of User Data Out Commands completed by the controller. Refer to the specific I/O Command Set specification for the list of User Data Out Commands that affect this field.
96:111	**Controller Busy Time:** Contains the amount of time the controller is busy with I/O commands. The controller is busy when there is a command outstanding to an I/O Queue (specifically, a command was issued via an I/O Submission Queue Tail doorbell write and the corresponding completion queue entry has not been posted yet to the associated I/O Completion Queue). This value is reported in minutes.
112:127	**Power Cycles:** Contains the number of power cycles.
128:143	**Power On Hours:** Contains the number of power-on hours. This may not include time that the controller was powered and in a non-operational power state.
144:159	**Unsafe Shutdowns:** Contains the number of unsafe shutdowns. This count is incremented when the controller does not report it is safe to power down prior to loss of main power.

160:175	**Media and Data Integrity Errors:** Contains the number of occurrences where the controller detected an unrecovered data integrity error. Errors such as uncorrectable ECC, CRC checksum failure, or LBA tag mismatch are included in this field. Errors introduced as a result of a Write Uncorrectable command (refer to the NVM Command Set Specification) may or may not be included in this field.
176:191	**Number of Error Information Log Entries:** Contains the number of Error Information log entries over the life of the controller.
192:195	**Warning Composite Temperature Time:** Contains the amount of time in minutes that the controller is operational and the Composite Temperature is greater than or equal to the Warning Composite Temperature Threshold (WCTEMP) field and less than the Critical Composite Temperature Threshold (CCTEMP) field in the Identify Controller data structure in Figure 275. If the value of the WCTEMP or CCTEMP field is 0h, then this field is always cleared to 0h regardless of the Composite Temperature value.
196:199	**Critical Composite Temperature Time:** Contains the amount of time in minutes that the controller is operational and the Composite Temperature is greater than or equal to the Critical Composite Temperature Threshold (CCTEMP) field in the Identify Controller data structure. If the value of the CCTEMP field is 0h, then this field is always cleared to 0h regardless of the Composite Temperature value.
200:201	**Temperature Sensor 1:** Contains the current temperature reported by the embedded thermal sensor in the controller.
202:203	**Temperature Sensor 2:** Contains the current temperature reported by the embedded thermal sensor in the NAND Flash (Channel #0 and CE #0).
204:205	**Temperature Sensor 3:** Contains the current temperature reported by the embedded thermal sensor in the NAND Flash (Channel #0 and CE #0).
206:207	**Temperature Sensor 4:** Contains the current temperature reported by the embedded thermal sensor in the NAND Flash (Last channel and CE #0).
208:209	**Temperature Sensor 5:** Contains the current temperature reported by temperature sensor 5.
210:211	**Temperature Sensor 6:** Contains the current temperature reported by temperature sensor 6.
212:213	**Temperature Sensor 7:** Contains the current temperature reported by temperature sensor 7.
214:215	**Temperature Sensor 8:** Contains the current temperature reported by temperature sensor 8.
216:219	**Thermal Management Temperature 1 Transition Count:** Contains the number of times the controller transitioned to lower power active power states or performed vendor specific thermal management actions while minimizing the impact on performance in order to attempt to reduce the Composite Temperature because of the host controlled thermal management feature.
220:223	**Thermal Management Temperature 2 Transition Count:** Contains the number of times the controller transitioned to lower power active power states or performed vendor specific thermal management actions regardless of the impact on performance (e.g., heavy throttling) in order to attempt to reduce the Composite Temperature because of the host controlled thermal management feature.

224:227	**Total Time For Thermal Management Temperature 1:** Contains the number of seconds that the controller had transitioned to lower power active power states or performed vendor specific thermal management actions while minimizing the impact on performance in order to attempt to reduce the Composite Temperature because of the host controlled thermal management feature.
228:231	**Total Time For Thermal Management Temperature 2:** Contains the number of seconds that the controller had transitioned to lower power active power states or performed vendor specific thermal management actions regardless of the impact on performance (e.g., heavy throttling) in order to attempt to reduce the Composite Temperature because of the host controlled thermal management feature.
232:337	**Reserved**
338:345	**Later Bad Count**
346:353	**Power-On hours Count**
354:361	**Drive Power Cycle Count**
362:369	**Total Bad Block Count**
370:377	**User Max Erase Count**
378:385	**User Avg Erase Count**
386:393	**Device Life**
394:401	**Spare Block Count**
402:409	**Program Fail Count**
410:417	**Erase Fail Count**
418:425	**Unexpected Power Loss Count**
426:433	**Temperature (Kelvin - K °K)**
434:441	**Flash ID**
442:449	**Later Bad Block Info (Read / Write / Erase)**
450:457	**Total LBAs Written (unit = 32MB)**
458:465	**Total LBAs Read (unit = 32MB)**

6. Part Number Rule

CODE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
	D	**E**	**C**	**F**	**X**	**-**	**0**	**1**	**T**	**D**	**F**	**1**	**K**	**C**	**A**	**Q**	**F**	**(W)**	**-**	**X**	**X**

Definition	
Code 1st (Disk)	**Code 14th (Operation Temperature)**
D : Disk	C: Standard Grade (0℃~ +70℃)
Code 2nd (Feature set)	
E : Embedded series	
Code 3rd ~5th (Form factor)	**Code 15th (Internal control)**
CFX: CFexpress (Type B)	A~Z: BGA PCB version.
Code 7th ~9th (Capacity)	**Code 16th (Channel of data transfer)**
A28: 128GB	D: Dual Channels
B56: 256GB	Q: Quad Channels
C12: 512GB	
01T: 1TB	**Code 17th (Flash Type)**
	F: Kioxia 3D TLC
Code 10th ~12th (Controller)	**Code 18th (Optional Function)**
DF1: PCIe 4TE2 series	W: H/W Write Protect function
Code 13th (Flash mode)	**Code 20th ~21st (Customize code)**
K: 112 layers 3D TLC	