PCIe 2280 M.2 SSD

MTE710T-I

Datasheet

Products	Product Description
TS2TMTE710T-I	M.2 2280, PCIe Gen4x4, M-Key, 3D TLC BiCS5, PE: 3K, Wide Temp.
TS1TMTE710T-I	
TS512GMTE710T-I	**Datasheet version**
TS256GMTE710T-I	1.3

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Revision History

Revision No.	History	Released Date	Editor by
1.0	First version (WD BICS5)	2022/01/21	TSD
1.1	Modified the speed of 512G	2022/01/24	TSD
1.2	Modified PCI Express specification version	2022/05/11	TSD
1.3	Add anti-sulfur resistor in Hardware Feature and 5.2 Function Explanations Add the M.2 SSD Screw Selection Suggestion in 7.1 SSD Installation Update performance information (TBW)	2022/07/27	TSD

Transcend MTE710T-I Features

Part Name	Capacity
TS2TMTE710T-I	2TB
TS1TMTE710T-I	1TB
TS512GMTE710T-I	512GB
TS256GMTE710T-I	256GB

FEATURES

- PCI Express Gen4 x 4, NVMe
- 3D TLC NAND Flash
- M.2 PCIe 2280 M Key
- DDR4 DRAM cache
- Global wear-leveling function
- Enhance Bad block management
- Power shield function
- LDPC ECC (Error correction code) functionality
- NVM command support
- Advanced Garbage Collection
- Internal RAID Engine
- Supports S.M.A.R.T. Function
- PCB Gold Finger 30u"
- Dynamic Thermal Throttling (Default)
- Self-encrypting drives(SED) with AES-256 (Optional)
- Corner Bond (Controller / DRAM chip)
- Anti-sulfur resistor

PERFORMANCE[1)]

- Data Transfer Rate
  - Sequential Read — Up to 3800 MB/s
  - Sequential Write — Up to 3200 MB/s

RELIABILITY[1)]

- TBW
  - 2TB — 4,480TB
  - 1TB — 2,240TB
  - 512GB — 1,120TB
  - 256GB — 560TB
- UBER — 10^{-15}
- DWPD — 1.99 DWPD
- MTBF — 3,000,000 hours
- Data Retention — 1 year
- Warranty — 3 years

ENVIRONMENTAL SPECIFICATIONS[1)]

- Temperature
  - Operating — -40°C to 85°C
  - Non-operating — -55°C to 85°C
- Humidity(non-condensing) — 5%~95%
- Shock — 1500G, 0.5ms
- Vibration — 20G, 7~2000Hz

POWER REQUIREMENTS[1)]

- Supply voltage / Tolerance — 3.3V±5%
- Active (max) — 4.6W
- Idle (max) — 1.6W

PHYSICAL DIMENSION

- Width — 22.00±0.15mm
- Length — 80.00±0.15mm
- Height(max) — 3.58mm
- Weight — Up to 9g

Note:

1) For detail information, please refer to document content.

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1. Introduction

1.1 General Feature Information

Hardware Feature

- PCI Express Gen4 x 4, NVMe
- Controller SM2267
- 3D TLC NAND Flash
- Temperature operation from -40°C to 85°C
- M.2 PCIe 2280 M Key
- Embedded DDR4 DRAM cache
- Power shield function
- PCB Gold Finger 30u”
- TCG-Opal function (Optional)
- Corner bond (Controller / DRAM chip)
- Anti-sulfur resistor

Firmware Feature

- Global wear-leveling function
- Early Move function
- Read Retry function
- Enhance Bad block management function
- LDPC ECC(Error Correction Code) function
- NVM Command function
- Advanced Garbage Collection function
- StaticDataRefresh function
- Dynamic Thermal Throttling (Default)
- Internal RAID Engine
- S.M.A.R.T. function
- AES-256 function (Optional)

Software Feature

- Transcend Scope Pro
- Transcend Control Center
- Transcend One Touch Recovery

1.2 Product List

Form Factor	Part Name	Capacity
2280-D2-M	TS2TMTE710T-I	2TB
	TS1TMTE710T-I	1TB
	TS512GMTE710T-I	512GB
	TS256GMTE710T-I	256GB

1.3 Ordering Information

T S	X X X	G	M T E	7 1 0 T	-	I
1	2	3	4	5		6

1 – Transcend
2 – SSD Density
3 – G: Gigabyte; T: Terabyte
4 – M.2 PCIe device
5 – 2280 form factor with 3D TLC NAND flash
Corner bond (Controller, DRAM)
Anti-sulfur resistor
PCB Gold Finger 30u”
6 – Wide temperature operation

2. Product Specifications

2.1 Interface and Compliance

- Compatible with PCI Express specification Rev. 4.0
- Compatible with NVM Express specification Rev. 1.4
- NVM command support
- RoHS Compliance
- CE, UKCA, FCC and BSMI Compliance

2.2 Drive Capacity

[Table 1] User Capacity and Addressable Sectors

	256GB	512GB	1TB	2TB
User-Addressable Sectors	500,118,192	1,000,215,216	2,000,409,264	4,000,797,360
Byte per Sector	512 Byte			

2.3 System Performance

[Table 2] Sequential Read / Write Performance

Read / Write	256GB	512GB	1TB	2TB
Sequential Read	3200 MB/s	3800 MB/s	3800 MB/s	3800 MB/s
Sequential Write	1700 MB/s	2100 MB/s	3200 MB/s	3200 MB/s

Note: Maximum transfer speed recorded

1) 25°C, test on Gigabyte X570 UD, 4GB, Windows®10 64bit Professional, benchmark utility CrystalDiskMark (version 6.0.2), copied file 1000MB.

2) The recorded performance is obtained while the SSD is not operated as an OS disk Physical Specification.

[Table 3] Random Read / Write Performance

Read / Write	256GB	512GB	1TB	2TB
Random Read IOPS	97K	180K	350K	350K
Random Write IOPS	400K	430K	470K	430K

Note: Maximum transfer speed recorded

1) 25°C, test on Gigabyte X570 UD, 4GB, Windows®10 Professional, benchmark utility IOmeter 1.1.0 with 4K file size and queue depth of 32, unit IOPs

2) The recorded performance is obtained while the SSD is not operated as an OS disk Physical Specification.

2.4 Supply Voltage

[Table 4] Supply Voltage

Item	Requirements
Allowable voltage	3.3V±5%
Allowable noise / ripple	100 mV p-p or less

2.5 System Power Consumption

[Table 5] Power Consumption

Read / Write	256GB	512GB	1TB	2TB
Active Write (Max.)[1)]	3.1W	4.3W	4.6W	5.6W
Active Read (Max.)[1)]	2.9W	3.8W	4.4W	4.9W
Idle	1.5W	1.5W	1.6W	1.6W

Note:

1) The power consumption is measured under SSD operation at maximum performance. The value is affected by system operation performance and workload.

2.6 Environment Specifications

Table 6] Environment Specification

Features	Operating[1)]	Non-Operating[2)]
Temperature	-40°C to 85°C	-55°C to 85°C
Temperature Gradient	60°C/Hr	60°C/Hr
Humidity	5% to 95%, non-condensing	
Shock	1500G, duration 0.5 ms, 3 axis[3)]	
Vibration	20G, 7~2000Hz, 3 axis[4)]	

Note:

1) The operating specification is regarded as Ambient Temperature. Extended grade (-20°C to +75°C) and Industrial grade (-40°C to +85°C) indicate the temperature conditions for testing devices on programmable temperature and humidity chamber room.

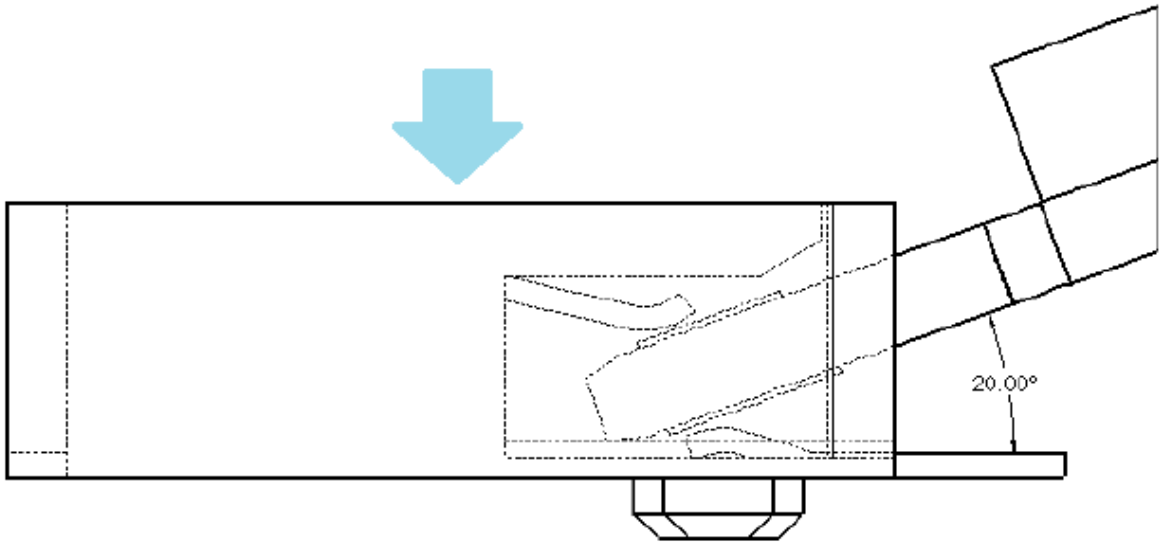
2) The non-operating specification is regarded as storage specification.

3) Refer IEC 68-2-27 standard.

4) Refer IEC 68-2-6 standard.

Recommended Measurement Point

Recommended temperature measurement point is in the center of the connector inserted by the device. Sufficient airflow is recommended for proper operation on heavier workloads within the device operating temperature.



2.7 System Reliability

[Table 7] Telcordia SR332 issue 4 MTBF Specifications

Parameter	256GB	512GB	1TB	2TB
MTBF	3,000,000 hours			

Note:

1) The calculation is based on 25°C.

[Table 8] UBER Specifications

Parameter	256GB	512GB	1TB	2TB
UBER	10^{-15}			

Note:

1) Uncorrectable Bit Error Rate (UBER) is a metric for the rate of occurrence of data errors, equal to the number of data errors per bits read as specified in the JESD218 document of JEDEC standard. For the client application, JEDEC recommends that UBER shall be below 10^{-15}.

[Table 9] TBW (Terabytes Written) Specifications

Parameter	256GB	512GB	1TB	2TB
TBW	560 TB	1,120 TB	2,240 TB	4,480 TB

Note:

1) TBW specification follows JESD219A Client workload.

[Table 10] Drive Write Per Day (DWPD) Specifications

Parameter	256GB	512GB	1TB	2TB
DWPD[1)]	1.99 (3 Years)			

Note:

1) DWPD is based on [Table 13] Warranty year to calculate.

[Table 11] Data Retention Specifications

Parameter	256GB	512GB	1TB	2TB
Data Retention	1 year			

Note:

1) Data retention was measured by assuming that SSD reaches the maximum rated endurance at 30°C under power-off state.

2) The data retention is defined in JESD218 Requirements for standard classes of SSDs.

[Table 12] Power On to Ready

Parameter	256GB	512GB	1TB	2TB
Setup time	8.96 s			

Note:

1) Tested by using Drive Master and power on to ready with proper shutdown condition.

[Table 13] Warranty

Parameter	256GB	512GB	1TB	2TB
Warranty	3 years limited			

[Table 14] Regulations

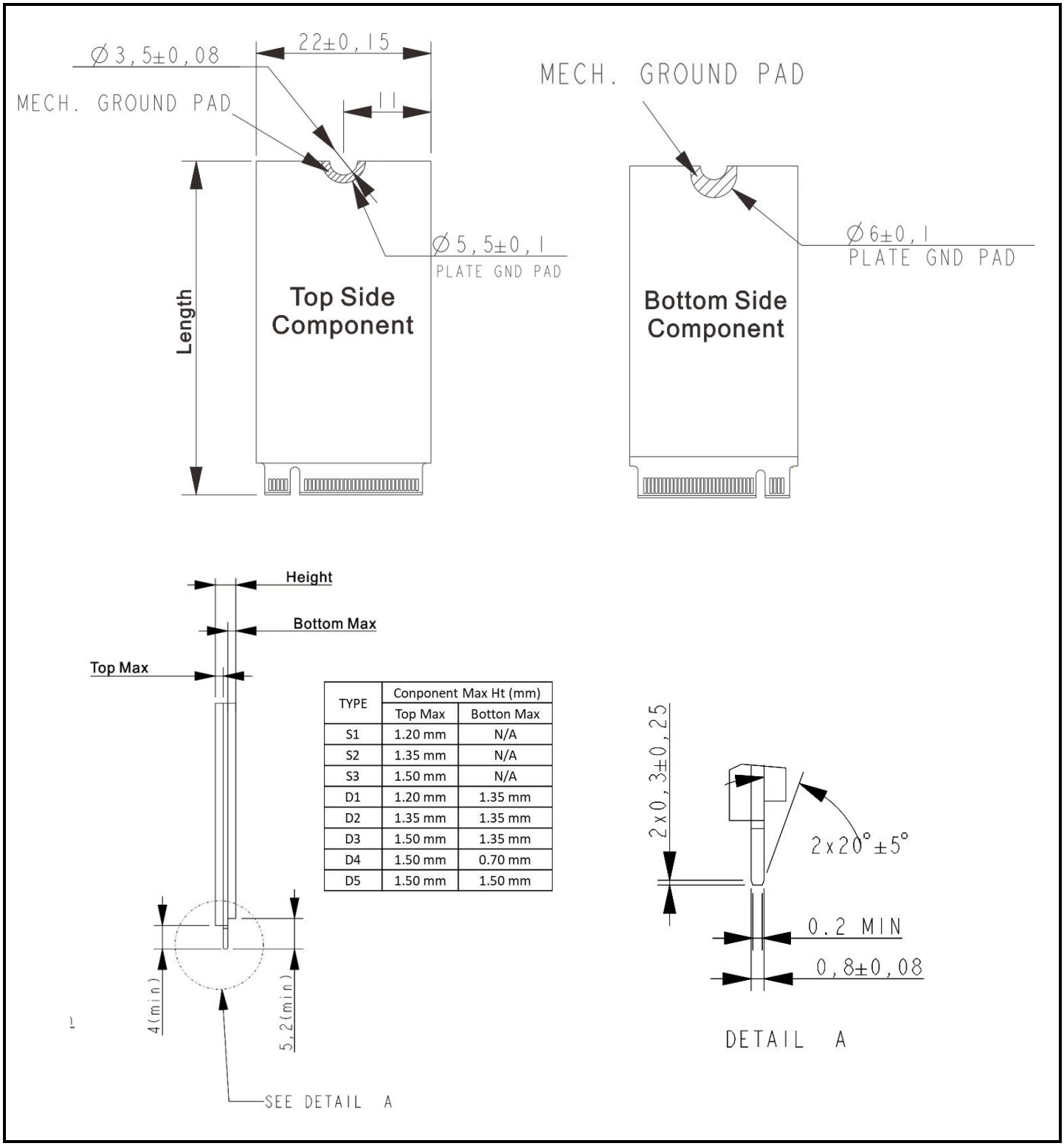
Parameter	256GB	512GB	1TB	2TB
Compliance	CE, UKCA, FCC and BSMI			

3. Mechanical Specification

The figure below illustrates the Transcend M.2 Type 2280-D2-M Solid State Drive.

[Table 15] Physical Dimensions and Weight

Model	Height (mm)	Width (mm)	Length (mm)	Weight (gram)
256GB/512GB/1TB/2TB	Max 3.58	22.00±0.15	80.00±0.15	Max 9g



TYPE	Conponent Max Ht (mm)	
	Top Max	Botton Max
S1	1.20 mm	N/A
S2	1.35 mm	N/A
S3	1.50 mm	N/A
D1	1.20 mm	1.35 mm
D2	1.35 mm	1.35 mm
D3	1.50 mm	1.35 mm
D4	1.50 mm	0.70 mm
D5	1.50 mm	1.50 mm

4. Pin Assignments

4.1 Pin Assignments

[Table 16] Pin Assignments

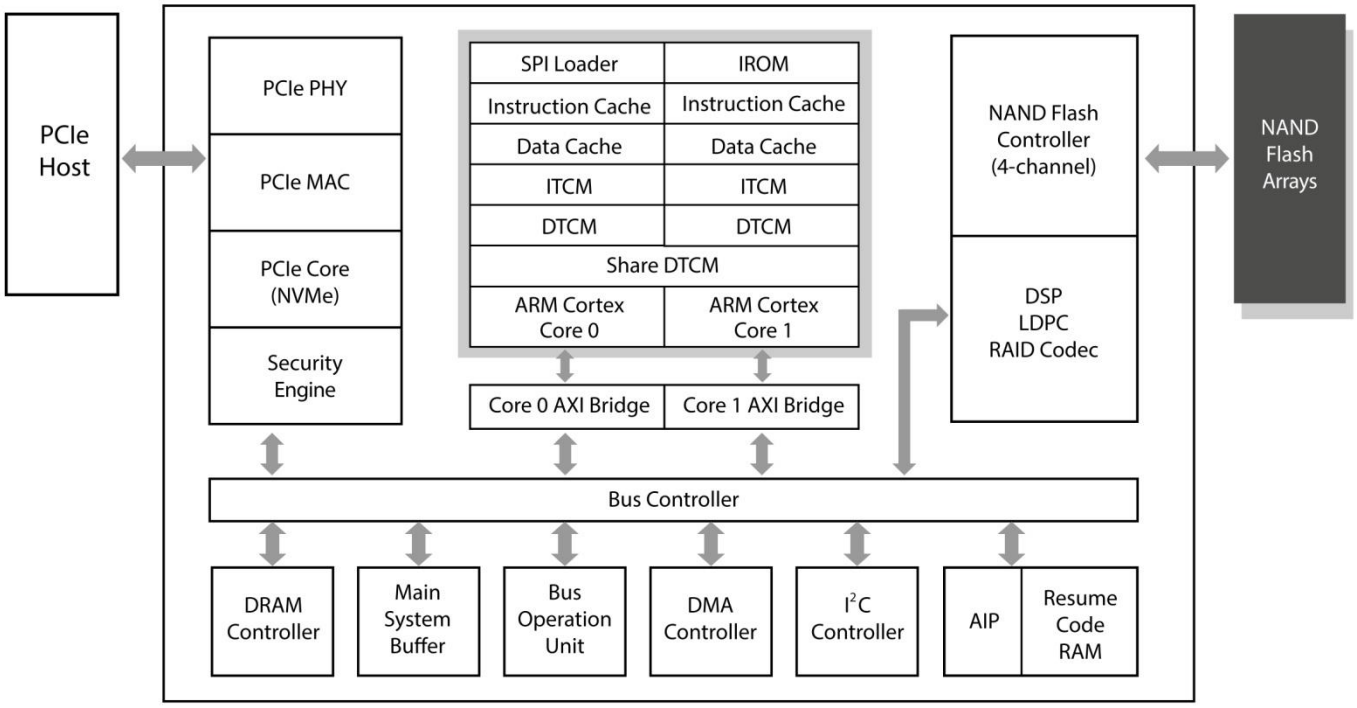
Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name	Pin No.	Pin Name
01	GND	02	3.3V	39	GND	40	NC
03	GND	04	3.3V	41	PETn0	42	NC
05	PETn3	06	NC	43	PETp0	44	NC
07	PETp3	08	NC	45	GND	46	NC
09	GND	10	LED1	47	PERn0	48	NC
11	PERn3	12	3.3V	49	PERp0	50	PERST#
13	PERp3	14	3.3V	51	GND	52	CLKREQ#
15	GND	16	3.3V	53	REFCLKN	54	NC
17	PETn2	18	3.3V	55	REFCLKP	56	NC
19	PETp2	20	NC	57	GND	58	NC
21	GND	22	NC	59	NOTCH	60	NOTCH
23	PERn2	24	NC	61	NOTCH	62	NOTCH
25	PERp2	26	NC	63	NOTCH	64	NOTCH
27	GND	28	NC	65	NOTCH	66	NOTCH
29	PETn1	30	NC	67	NC	68	NC
31	PETp1	32	NC	69	NC	70	3.3V
33	GND	34	NC	71	GND	72	3.3V
35	PERn1	36	NC	73	GND	74	3.3V
37	PERp1	38	NC	75	GND		

Note:

1) NC. Do not connect.

5. Block Diagram and Function Explanations

5.1 Block Diagram



5.2 Function Explanations

5.2.1 Global Wear Leveling Function

Global wear leveling ensures that every block has an even erase count. This helps to extend the life expectancy of an SSD.

There are three main processes in global wear leveling:

(1) Record the block erase count and save this in the wear-leveling table.

(2) Find the static-block and save this in the wear-leveling pointer.

(3) Check the erase count when a block is pulled from the pool of spare blocks. If the block erase count is larger than WEARCNT, then swap the static-block and the over-count-block.

5.2.2 Bad Block Management Function

When the flash encounters ECC fail, program fail or erase fail, the controller will mark the block as a bad block. This will prevent the usage of bad blocks which may result in data loss in the future.

5.2.3 Enhanced S.M.A.R.T. function

Transcend SSD supports S.M.A.R.T. command (Self-Monitoring, Analysis, and Reporting Technology) that allows users to read the health information of the SSD. Transcend also define some innovated S.M.A.R.T. features which allows the user to evaluate the status of the SSD in a much more efficient way.

5.2.4 StaticDataRefresh Technology

Normally, ECC engine corrections are taken place without affecting the host normal operations. As time passes by, the number of error bits accumulated in the read transaction exceeds the correcting capability of the ECC engine, resulting in corrupted data being sent to the host. In order to prevent such occurrence, the controller monitors the error bit levels at each read operation; when it reaches the preset threshold value, the controller automatically performs data refresh to “restore” the correct charge levels in the cell. This implementation practically restores the data to its original, error-free state, and hence lengthening data life.

5.2.5 PS(Power shield) Function

Power Shield (PS) is a basic technology supported by all Transcend's embedded SSDs to prevent internal NAND flash data loss in event of a sudden power outage. The internal voltage detection circuit (VDT) of the controller monitors the external power supply. When the external voltage drops from 5V to 4V or from 3.3V to 2.7V, the VDT activates the PS detection mechanism. When a sudden power outage occurs, the internal power shield circuit would trigger the PS function so that the controller will stop accepting new write commands. The write operation is terminated to ensure that the firmware and the data in the NAND flash are undamaged.

When the external voltage drops to a certain level, the internal voltage detection circuit (VDT) of the controller activates the PS mechanism. The SSD controller then stops accepting new write commands from the host, ensuring the integrity of existing data for the NAND flash.

The PS function ensures the safety of the data which has already been written into the flash before sudden power outage.

5.2.6 AES-256 Function(Optional)

Defined by the National Institute of Standards and Technology (NIST) under the Federal Information Processing Standards Publication 197 (FIPS PUB 197), the Advanced Encryption Standard (AES) specifies a FIPS-approved cryptographic algorithm that can be used to protect electronic data.

Transcend Information’s SSDs, equipped with hardware-based AES-256 encryption, offer superior data protection and performance compared to competing offerings that utilize software-based or firmware-based encryption. With hardware-based encryption, all data are encrypted before being stored in NAND Flash. After the encrypted data has been written into the flash, it becomes virtually impossible to decrypt the data without the original key. Performance is also improved as compared to software-based solutions, since hardware-based encryption does not require system resources to perform the encryption/decryption process.

5.2.7 TCG-Opal Function(Optional)

Opal is a comprehensive set of guidelines. The target audience includes manufacturers of storage devices, software vendors, system integrators, and academia. These specifications cover the manufacture of storage devices, system setup, management, and use; they allow for password protection and hierarchical storage management, while preventing data from being stolen or tampered with.

They are self-encrypting devices: Data encryption is performed on the device, without need to pass

through the host. The encryption key is also stored on the device (commonly AES is utilized).
(1) Features boot authentication:
When the user starts the device, the shadow MBR will conduct a pre-boot identification; where the user is cleared, the normal boot process will begin and connections to the devices are to be made.
(2) Sector specific permissions:
The device manager may create a logical block address (LBA) range and assign different permissions for each LBA range. Only users with the correct key for a particular LBA range may perform permitted actions. Where drive locations are password-protected, only users with the correct key will be authorized entry.

5.2.8 RAID engine

RAID engine technology stores data parity information in a specific area. The parity information can restore damaged data back which can enhance data reliability.

5.2.9 Dynamic Thermal Throttling (Default)

For PCIe SSD applications, when operation temperature increases, system CLK will decrease to protect the SSD and controller with dynamic thermal throttling algorithm. The read/write speeds of the SSD will change at different temperature levels in order to extend its lifespan.

5.2.10 Transcend Scope Pro

Transcend's Scope Pro is a convenient software package that helps users monitor and manage SSD status via an intuitive interface. It offers various useful features, including drive information and S.M.A.R.T. status monitoring, diagnostic scan, secure erase, health indication, system clone, and monitoring. For more information, please refer the website link. **https://us.transcend-info.com/Embedded/Essay-20**

5.2.11 Early Move Function

Early move detects and corrects potential data errors. If error bits in a block reach upper limit, then the data should be moved to another block and the original block should be erased.

5.2.12 Read Retry Function

Read retry is designed for flash memory to adjust the read reference voltage and eliminate the read error.

5.2.13 Corner Bond (Controller / DRAM chip)

Corner bond is used as a stress relieving agent, evenly distributing the expansion and contraction effects. By spreading stresses throughout the chip and PCB interface with a mechanical bond, less stress is concentrated on the solder joints, increasing device reliability.

5.2.14 ASPM (Active-State Power Management)

Active-state power management (ASPM) is a power management mechanism for PCI Express devices to garner power savings while otherwise in a fully active state. It can save the power of the PCI Express subsystem by reducing the power state of the PCIe connection when the PCIe device is not in use. ASPM will control the power status at both ends of the connection, and even when the device at one end is still at full power, it can still save the power of the connection.

While ASPM brings a reduction in power consumption, it can also result in increased latency as the serial bus needs to be 'woken up' from low-power mode, possibly reconfigured and the host-to-device link re-established. This is known as ASPM exit latency.

PCIe defines five power modes, including normal operation to complete shutdown mode: L0: Normal operation; L0s: Link Standby; L1: Link is idle; L2: Only auxiliary power is enabled; L3: Turn off the power and the device shuts down. Currently, the ASPM function supports two low-power modes; L0s and L1 modes.

[Table 19] Power Management Mechanism

NVMe Power State	PCIe Link State	Power	Exit Latency
PS0	L0/ L0S/ L1	5W	No
PS1	L0/ L0S/ L1	3W	<1mS
PS2	L0/ L0S/ L1	1.5W	<1mS
PS3	L1/ L1.1/ L1.2	100mW	5-10mS
PS4	L1.2	2-5mW	<100ms

Note: 1) Both NVMe Power State and PCIe Link State can be set in MP Tool.

Note: 2) L1.1 and L1.2 are sub-states of L1.

- L1.1 function turns off the PLL, receiver and transmitter.
- L1.2 function turns off the PLL, receiver, transmitter, and common mode keepers.

Note: 3) Default settings are disabled.

5.2.15 Anti-sulfur resistor

To prevent sulfurization, resistors should be made sulfur-resistant. Transcend`s anti-sulfur approach is to cover and therefore isolate the electrode, thus preventing hydrogen sulfide from coming into contact with the silver. Atmospheric sulfur is on the rise due to increasing levels of pollution, and the applications for anti-sulfur components are increasing. Transcend's anti-sulfur SSD modules all meet level G2 of ISA Standard S71.04-2013 and ASTM B809-95 standard, suitable for the Industrial Revolution 4.0, the Internet of Things, and the Internet of Vehicles, where the use of anti-sulfur technology is highly required.

5.2.16 Other Functions

Transcend SSD embedded a lot of cutting-edge technology. Should you have any technical request, please contact the local support team or send us an e-mail.

6 Technology Term Explanations

6.1 TBW

Terabytes Written (TBW) directly measures how much you can write cumulatively into the drive over its lifetime. Essentially, it just includes the multiplication conducted above in the measurement itself.
For example, if your drive is rated for 365 TBW, that means you can write 365 TB into it before a replacement is required.
If its warranty period is 5 years, that works out to 365 TB ÷ (5 years × 365 days/year) = 200 GB of writes per day. If your drive was 200 GB in size, that's equivalent to 1 DWPD. Correspondingly, if your drive was rated for 3.65 PBW = 3,650 TBW, that works out to 2 TB of writes per day, or 10 DWPD.
As you can see, if you know the drive's size and warranty period, you can always calculate TBW from DWPD and vice-versa with simple multiplications or divisions. The two measurements are very similar.

6.2 DWPD

Drive Writes Per Day (DWPD) measures how many times you could overwrite the drive's entire size each day of its life. For example, suppose your drive is 200 GB and its warranty period is 5 years. If its DWPD is 1, that means you can write 200 GB (its size, one time) into it every single day for the next five years.
If you multiply that out, that's 200 GB per day × 365 days/year × 5 years = 365 TB of cumulative writes before you may need to replace it.
If the DWPD is 10 instead of 1, that means you can write 10 × 200 GB = 2 TB (its size, ten times) into it every day. Correspondingly, that's 3,650 TB = 3.65 PB of cumulative writes over 5 years.

6.3 MTBF – Telcordia SR-332

MTBF (mean time between failures) is a measure of how reliable a hardware product or component is. For most components, the measurement is typically in thousands or even tens of thousands of hours between failures. For example, a SSD may have a mean time between failures of 200,000 hours. A desired MTBF can be used as a quantifiable objective when designing a new product. The MTBF figure can be developed as the result of intensive testing, based on actual product experience, or predicted by analyzing known factors. The manufacturer may provide it as an index of a product's or component's reliability and, in some cases, to give customers an idea of how much service to plan for. In Transcend MTBF data, we use Telcordia SR-332 Issue 4 method to do estimated calculation.

7 Installation Requirements

7.1 Card Insertion

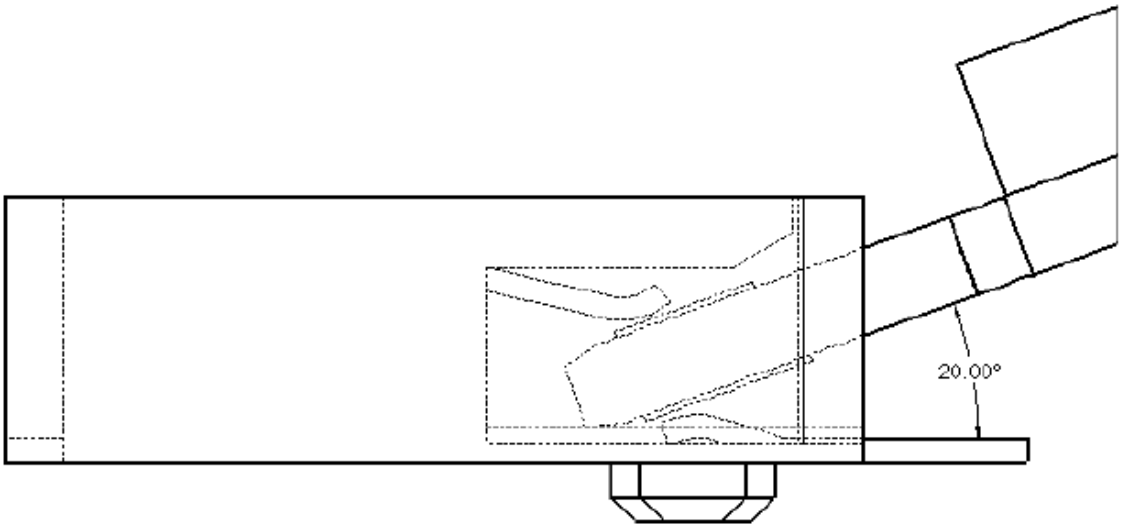
Angles insertion is allowable and preferred; the intention is to minimize the insertion/extraction force.

- Minimum of angle of insertion is 5°

Minimum two step insertion is desirable; the intention is to minimize the insertion/extraction force.

M.2 Screw Selection Suggestion: (Reference Only)

- Please refer chapter 3: Mechanical Specification
- M2 or M3 screw matching stand-off.
- Screw head diameter: not exceed 5mm
- Tightening Torques: 0.8 kgf
- Please refer to the specifications of the locked object for its torque and screw length, since the specifications of the copper pillars of the locked object are different.



8 Command Descriptions

8.1 Support Admin Command Register

The Admin command set is the commands that are submitted to the Admin Submission Queues. The detailed specifications are described in NVM Express specification document.
[Table 17] Command Table

Command Name	Code (Hex)
Delete I/O Submission Queue	00h
Create I/O Submission Queue	01h
Get Log Page	02h
Delete I/O Completion Queue	04h
Create I/O Completion Queue	05h
Identify	06h
Abort	08h
Set Features	09h
Get Features	0Ah
Asynchronous Event Request	0Ch
Namespace Management	0Dh
Firmware Commit	10h
Firmware Image Download	11h
Namespace Attachment	15h
Keep Alive	18h
I/O Command Set Specific	80h – BFh
Vendor Specific	C0h – FFh

8.2 SMART / Health Log Page

[Table 18] SMART Data information

<table>
<tr><th>BYTE</th><th>Description</th><th>Default Value</th></tr>
<tr><td>0</td><td>Critical Warning
<table>
<tr><th>Bits</th><th>Description</th></tr>
<tr><td>07:05</td><td>Reserved</td></tr>
<tr><td>04</td><td>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.</td></tr>
<tr><td>03</td><td>If set to‘1’, then the media has been placed in read only mode.</td></tr>
<tr><td>02</td><td>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.</td></tr>
<tr><td>01</td><td>If set to‘1’, then a temperature is above an over temperature threshold or below an under temperature threshold.</td></tr>
<tr><td>00</td><td>If set to‘1’, then the available spare has fallen below the threshold.</td></tr>
</table></td><td>0</td></tr>
<tr><td>2:1</td><td>Composite Temperature</td><td>Current temperature</td></tr>
<tr><td>3</td><td>Available Spare</td><td>100</td></tr>
<tr><td>4</td><td>Available Spare Threshold</td><td>10</td></tr>
<tr><td>5</td><td>Percentage Used</td><td>0</td></tr>
<tr><td>31:6</td><td>Reserved</td><td>-</td></tr>
<tr><td>47:32</td><td>Data Units Read</td><td>0</td></tr>
<tr><td>63:48</td><td>Data Units Written</td><td>0</td></tr>
<tr><td>79:64</td><td>Host Read Commands</td><td>0</td></tr>
<tr><td>95:80</td><td>Host Write Commands</td><td>0</td></tr>
<tr><td>111:96</td><td>Controller Busy Time</td><td>0</td></tr>
<tr><td>127:112</td><td>Power Cycles</td><td>0</td></tr>
<tr><td>143:128</td><td>Power On Hours</td><td>0</td></tr>
<tr><td>159:144</td><td>Unsafe Shutdowns</td><td>0</td></tr>
<tr><td>175:160</td><td>Media and Data Integrity Errors</td><td>0</td></tr>
<tr><td>191:176</td><td>Number of Error Information Log Entries</td><td>0</td></tr>
<tr><td>195:192</td><td>Warning Composite Temperature Time</td><td>0</td></tr>
<tr><td>199:196</td><td>Critical Composite Temperature Time</td><td>0</td></tr>
</table>

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