



# Longline M.2 SSD Solid State Drive



Longline 240GB M.2 SSD 520/420 MB/s 2280 NGFF LNG500M8/240G

## LNG SSD LONGLINE SERIES PRODUCT DATASHEET



## 1.0 PRODUCT DESCRIPTION

### 1.1 PRODUCT OVERVIEW

The introduction of the LONGLINE M.2 SATA SSD is full consists of semiconductor devices using NAND flash memory which provide high reliability and high performance for a storage media. And opens up some very exciting possibilities for the Industrial and Commercial storage market. The SSD are substantially smaller, lighter weight and consume less power compared to hard drives, yet have sufficient storage space to load an O/S and serve as a bootable drive for embedded applications. Moreover, these devices have excellent resistance to shock, vibration, dust, temperature extremes and other environmental hazards.

LONGLINE M.2 SATA which features outstanding performance. Available in 128GB to 1TB capacities, this drives electrically complied with the SATA -II/SATA -III standards and is electrically compatible with a serial ATA disk drive.

Measuring 22.0mm x 80.0mm x 3.1mm, the SSD is very small in volume and Super Speed, it can match and satisfy different customer's demand. It can easily mount on notebook without any cable, and provides fast read and writes speed, high reliability it a perfect storage solution for the server and mobile environment.

### 1.2 TARGET APPLICATIONS

- Military and Aerospace
- Embedded / Industrial Systems
- Medical Industry
- Notebook
- Casino Gaming

### 1.3 PRODUCT FEATURES

- Capacity: 128GB, 256GB, 512GB, 1TB
- Form Factor: 80mm M.2 (80mm SATA B Key)
- Reliable QLC, TLC and MLC NAND type flash
- Electrically fully complied with the SATA -II/SATA -III standards
- Complied with the slot B primary key SSD SATA pin out
- Modules with the "B" and "M" key for ultimate performance SSD or cache
- Data retention: JESD47 compliant
- S.M.A.R.T. command transport (SCT) technology



- Enhanced endurance by dynamic/static wear-leveling
- Hardware LDPC ECC engine
- Data integrity under power-cycling
- Spec meet Next Generation Form Factor (NGFF -xx-B-M)
- 100% tested HW and SW

#### 1.4 SYSTEM REQUIREMENTS

**Operating Voltage Requirement:**  $V_{CC} = 3.3V \pm 5\%$

**Operating System:** Supported by all operating systems

**Interface:** SATA 6.0Gbps (SATA-III) or SATA 3.0Gbps (SATA-II) or SATA 1.5Gbps (SATA-I)

**Installation Requirements:**

- System Hardware which supports SATA -II/SATA -III standards
- System Hardware includes SATA socket or transfer board

### 2.0 PHYSICAL SPECIFICATIONS

#### 2.1 MECHANICAL SPECIFICATIONS

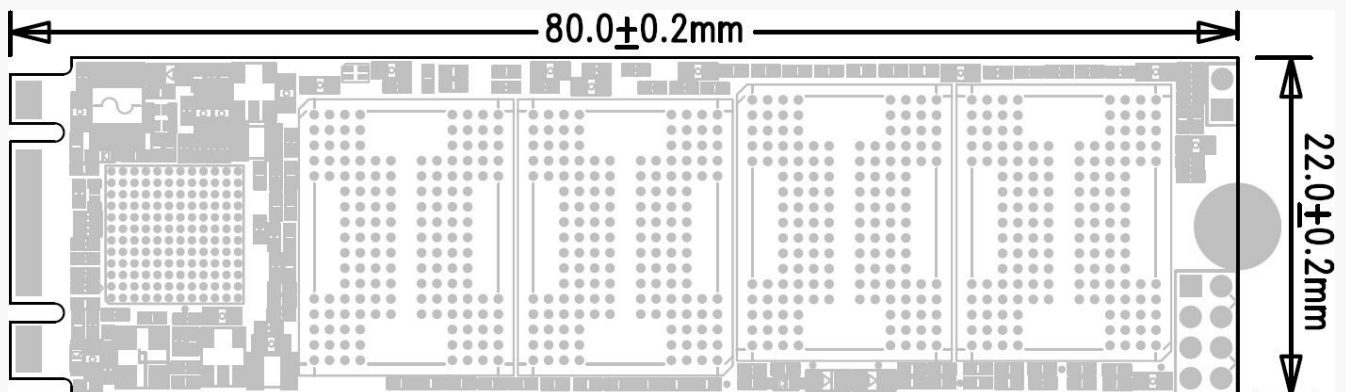
Length:  $80.0 \pm 0.2$  mm

Width:  $22.0 \pm 0.2$  mm

Thickness:  $2.20 \pm 0.15$

mm Weight: <7.0g

Figure 1:M.2 SATA Outline Drawing





### 3.0 ELECTRICAL SPECIFICATIONS

**Operating Voltage:**  $V_{CC} = 3.3V \pm 5\%$

**Modes:** SATA 6.0Gbps (SATA-III) or SATA 3.0Gbps (SATA-II) or SATA 1.5Gbps (SATA-I) standards

### 3.1 PERFORMANCE SPECIFICATIONS

**Access Time:** 0.2 ms

**Seek Time:** 0 ms

**Mount Time:** Dependent on system HW and SW

**Power on to Ready:** Dependent on system HW and SW

**Data Transfer Time:** Rated Data Transfer Speeds are maximums based on Crystal Disk Mark 6.0

\* SATA Port and the installation of an enhanced driver required for maximum speed

Table 1: Data Transfer Speed (R / W) up to

| Capacity    | Data Transfer Speed (R / W) |            |               |                |
|-------------|-----------------------------|------------|---------------|----------------|
|             | Seq. read                   | Seq. write | 4K Q32T1 read | 4K Q32T1 write |
| 120GB/128GB | 550                         | 500        | 220           | 210            |
| 240GB/256GB | 550                         | 500        | 220           | 210            |
| 480GB/512GB | 550                         | 500        | 230           | 210            |
| 960GB/1TB   | 550                         | 500        | 260           | 270            |

### 3.2 POWER AND TEMPERATURE CONDITIONS

Table 2: Absolute Maximum Ratings

| Symb ol   | Rating              | Value                  | Unit |
|-----------|---------------------|------------------------|------|
| $V_{IN}$  | Input Voltage       | -0.5 to $V_{CC} + 0.5$ | V    |
| $T_{STG}$ | Storage Temperature | -45 to 105             | °C   |
| $T_{OPR}$ | Commercial Grade    | 0 to +70               | °C   |
|           | Industrial Grade    | -40 to +85             | °C   |



Table 3: Power consumption

| Capacity             | Product status(W) |      |       |
|----------------------|-------------------|------|-------|
|                      | Idle              | Read | Write |
| <b>120GB/128GB B</b> | 0.52              | 2.44 | 3.18  |
| <b>240GB/256GB B</b> | 0.5               | 2.78 | 4.28  |
| <b>480GB/512GB B</b> | 0.47              | 2.48 | 4.26  |
| <b>960GB/1TB</b>     | 0.52              | 2.80 | 4.26  |

### 3.3 TOTAL BYTES WRITTEN

Table 4: TBW and Daily Usage Guideline results

| Capacity             | TBW   | Daily Usage Guideline |
|----------------------|-------|-----------------------|
| <b>120GB/128GB B</b> | 50TB  | 45GB/day              |
| <b>240GB/256GB B</b> | 100TB | 90GB/day              |
| <b>480GB/512GB B</b> | 200TB | 180GB/day             |
| <b>960GB/1TB</b>     | 400TB | 360GB/day             |

TBW: Total Bytes Written (TBW according to flash)

Definition and conditions of TBW are based on JEDEC

standard Daily usage guidelines value is calculated by

dividing TBW by 365\*3

## 4.0 ENVIRONMENTAL SPECIFICATIONS

### Operating Temperature:

Commercial Grade: 0°C to

+70°C Industrial Grade: -40°C

to +85°C **Humidity:** 5% to

~98% RH **Operating Shock:**

1500G **Operating Vibration:**

16G **Operating Altitude:**

TBD



## 5.0 QUALITY AND RELIABILITY SPECIFICATIONS

**Data Retention:** JESD47 compliant

**Wear Leveling:** Dynamic and static wear-leveling

**Bad Block Management:** Drive will self-identify bad blocks and remap physical to logical addresses to avoid bad blocks

**ECC/EDC (Error Correction Code/Error Detection Code):** Built in error detection and correction will correct physical bit errors in NAND. Drives use LDPC ECC

**MTBF:** >1,000,000 hours

## 6.0 COMPLIANCE SPECIFICATIONS

All SATA are compliant with the following standards and regulations:

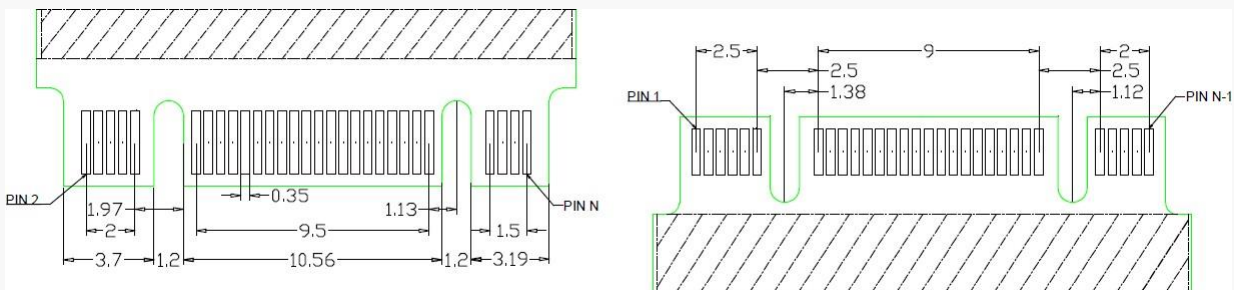
- RoHS
- CE
- FCC

## 7.0 PIN DESCRIPTIONS

### 7.1 SATA INTERFACE DRAWING

Interface Description (B Key and M Key)

Figure 2: SATA Interface Description





## 7.2 PIN SIGNALS ASSIGNMENTS

Table 5: Pin Assignment

| Pin | Signal Name | Description                        | Pin | Signal Name | Description                                     |
|-----|-------------|------------------------------------|-----|-------------|---|
| 1   | GND         | Return Current Path                | 2   | +3.3V       | 3.3V Power (Source)                             |
| 3   | GND         | Return Current Path                | 4   | +3.3V       | 3.3V Power (Source)                             |
| 5   | N/A         | Removed                            | 6   | N/A         | Reserved  |
| 7   | N/A         | Removed                            | 8   | N/A         | Reserved  |
| 9   | N/A         | Removed                            | 10  | DAS/DSS#    | Device Activity Signal/Disable Staggered Spinup |
| 11  | N/A         | Removed                            | 12  | Notch       | B Key   |
| 13  | Notch       | B Key                              | 14  | Notch       | B Key   |
| 15  | Notch       | B Key                              | 16  | Notch       | B Key   |
| 17  | Notch       | B Key                              | 18  | Notch       | B Key   |
| 19  | Notch       | B Key                              | 20  | N/A         | Reserved  |
| 21  | N/A         | Removed                            | 22  | N/A         | Reserved  |
| 23  | N/A         | Removed                            | 24  | N/A         | Reserved  |
| 25  | N/A         | Removed                            | 26  | N/A         | Reserved  |
| 27  | GND         | Return Current Path                | 28  | N/A         | Reserved  |
| 29  | N/A         | Reserved                           | 30  | N/A         | Reserved  |
| 31  | N/A         | Reserved                           | 32  | N/A         | Reserved  |
| 33  | GND         | Return Current Path                | 34  | N/A         | Reserved  |
| 35  | N/A         | Reserved                           | 36  | N/A         | Reserved  |
| 37  | N/A         | Reserved                           | 38  | DEVSLP      | Device Sleep                                    |
| 39  | GND         | Return Current Path                | 40  | N/A         | Reserved  |
| 41  | TX+         | SATA transmitter differential pair | 42  | N/A         | Reserved  |
| 43  | TX-         |                                    | 44  | N/A         | Reserved  |
| 45  | GND         | Return Current Path                | 46  | N/A         | Reserved  |
| 47  | RX-         | SATA receiver differential pair    | 48  | N/A         | Reserved  |
| 49  | RX+         |                                    | 50  | N/A         | Reserved  |
| 51  | GND         | Return Current Path                | 52  | N/A         | Reserved  |
| 53  | N/A         | Reserved                           | 54  | N/A         | Reserved  |
| 55  | N/A         | Reserved                           | 56  | MFG Data    | Reserved  |
| 57  | GND         | Return Current Path                | 58  | MFG Clock   | Reserved  |
| 59  | Notch       | M Key                              | 60  | Notch       | M Key   |
| 61  | Notch       | M Key                              | 62  | Notch       | M Key   |
| 63  | Notch       | M Key                              | 64  | Notch       | M Key   |
| 65  | Notch       | M Key                              | 66  | Notch       | M Key   |
| 67  | N/A         | Removed                            | 68  | SUSCLK      | Reserved  |
| 69  | GND         | Return Current Path                | 70  | +3.3V       | 3.3V Power (Source)                             |
| 71  | GND         | Return Current Path                | 72  | +3.3V       | 3.3V Power (Source)                             |
| 73  | GND         | Return Current Path                | 74  | +3.3V       | 3.3V Power (Source)                             |
| 75  | GND         | Return Current Path                |     |             |   |



## 8.0 SUPPORTED ATA COMMAND SET

### 8.1 ATA COMMAND REGISTER

SATA supports the command show in the following tables.

Table 6: Command Set

| Command Name                        | Code (Hex) | Protocol                  |
|-------------------------------------|------------|---------------------------|
| <b>General Feature Set</b>          |            |                           |
| Execute DeviceDiagnostic            | 90h        | Execute device diagnostic |
| Flush Cache                         | E7h        | Non-data                  |
| Identify Device                     | ECh        | PIO data-in               |
| Initialize DriveParameters          | 91h        | Non-data                  |
| Read DMA                            | C8h        | DMA                       |
| Read Log Ext                        | 2Fh        | PIO data-in               |
| Read Multiple                       | C4h        | PIO data-in               |
| Read Sector(s)                      | 20h        | PIO data-in               |
| Read Verify Sector(s)               | 40h or 41h | Non-data                  |
| Set Feature                         | EFh        | Non-data                  |
| Set Multiple Mode                   | C6h        | Non-data                  |
| Write DMA                           | CAh        | DMA                       |
| Write Multiple                      | C5h        | PIO data-out              |
| Write Sector(s)                     | 30h        | PIO data-out              |
| NOP                                 | 00h        | Non-data                  |
| Read Buffer                         | E4h        | PIO data-in               |
| Write Buffer                        | E8h        | PIO data-out              |
| <b>Power Management Feature Set</b> |            |                           |
| Check Power Mode                    | E5h or 98h | Non-data                  |
| Idle                                | E3h or 97h | Non-data                  |
| Idle Immediate                      | E1h or 95h | Non-data                  |
| Sleep                               | E6h or 99h | Non-data                  |
| Standby                             | E2h or 96h | Non-data                  |
| Standby Immediate                   | E0h or 94h | Non-data                  |
| <b>Security Mode Feature Set</b>    |            |                           |
| Security Set Password               | F1h        | PIO data-out              |
| Security Unlock                     | F2h        | PIO data-out              |
| Security Erase Prepare              | F3h        | Non-data                  |
| Security Erase Unit                 | F4h        | PIO data-out              |
| Security Freeze Lock                | F5h        | Non-data                  |
| Security DisablePassword            | F6h        | PIO data-out              |
| <b>SMART Feature Set</b>            |            |                           |





| Command Name                           | Code (Hex) | Protocol     |
|--|------------|--------------|
| SMART Disable Operations               | B0h        | Non-data     |
| SMART Enable/Disable Autosave          | B0h        | Non-data     |
| SMART Enable Operations                | B0h        | Non-data     |
| SMART Execute OFF-LINE Immediate       | B0h        | Non-data     |
| SMART Read Log                         | B0h        | PIO data-in  |
| SMART Read Data                        | B0h        | PIO data-in  |
| SMART Read Threshold                   | B0h        | PIO data-in  |
| SMART Return Status                    | B0h        | Non-data     |
| SMART Save Attribute Values            | B0h        | Non-data     |
| SMART Write Log                        | B0h        | PIO data-out |
| <b>Host Protected Area Feature Set</b> |            |              |
| Read Native Max Address                | F8h        | Non-data     |
| Set Max Address                        | F9h        | Non-data     |
| Set Max Set Password                   | F9h        | PIO data-out |
| Set Max Lock                           | F9h        | Non-data     |
| Set Max Freeze Lock                    | F9h        | Non-data     |
| Set Max Unlock                         | F9h        | PIO data-out |
| <b>48-bit Address Feature Set</b>      |            |              |
| Flush Cache Ext                        | EAh        | Non-data     |
| Read Sector(s) Ext                     | 24h        | PIO data-out |
| Read DMA Ext                           | 25h        | DMA          |
| Read Multiple Ext                      | 29h        | PIO data-out |
| Read Native Max Address Ext            | 27h        | Non-data     |
| Read Verify Sector(s) Ext              | 42h        | Non-data     |
| Set Max Address Ext                    | 37h        | Non-data     |
| Write DMA Ext                          | 35h        | DMA          |
| Write Multiple Ext                     | 39h        | PIO data-out |
| Write Sector(s) Ext                    | 34h        | PIO data-out |
| <b>NCQ Feature Set</b>                 |            |              |
| Read FPDMA Queued                      | 60h        | DMA Queued   |
| Write FPDMA Queued                     | 61h        | DMA Queued   |
| <b>Others</b>                          |            |              |
| Data Set Management                    | 06h        | DMA          |
| Seek                                   | 70h        | Non-data     |



Table 7: Set Features Register Values

| Value | Command                    | Value | Command                  |
|-------|----------------------------|-------|--------------------------|
| D0h   | Read Data                  | D5h   | Read Log                 |
| D1h   | Read Attribute Threshold   | D6h   | Write Log                |
| D2h   | Enable/Disable Autosave    | D8h   | Enable SMART Operations  |
| D3h   | Save Attribute Values      | D9h   | Disable SMART Operations |
| D4h   | Execute OFF-LINE Immediate | DAh   | Return Status            |

Note: If the reserved size is below the threshold, the status can be read from the Cylinder Register using the Return Status command (DAh).

## 8.2 IDENTIFY DEVICE COMMAND INFORMATION

Table 8: Identify Device Command Definition Abbreviation Decoder

| Parameter | Definition   |
|-----------|--|
| F/V       | Fixed/Variable Content   |
| F         | Content (byte) is fixed and does not change.   |
| V         | Content (byte) is variable and may change depending on the state of the device or the commands executed by the device. |
| X         | Content (byte) is vendor specific and may be fixed or variable.  |

Table 9: Identify Device Table Information

| Word  | Value | F/V | Description   |
|-------|-------|-----|---|
| 0     | 044Ah | F   | General configuration                                       |
| 1     | XXXXh | X   | Default number of cylinders                                 |
| 2     | 0000h | V   | Reserved  |
| 3     | 00XXh | X   | Default number of heads                                     |
| 4     | 0000h | X   | Obsolete  |
| 5     | 0240h | X   | Obsolete  |
| 6     | XXXXh | F   | Default number of sectors per track                         |
| 7-8   | XXXXh | V   | Number of sectors per card<br>(Word 7 = MSW, Word 8 = LSW)  |
| 9     | 0000h | X   | Obsolete  |
| 10-19 | XXXXh | F   | Serial number in ASCII (Right justified)                    |
| 20    | 0002h | X   | Obsolete  |
| 21    | 0002h | X   | Obsolete  |
| 22    | 0000h | X   | Obsolete  |
| 23-26 | XXXXh | F   | Firmware revision in ASCII<br>Big Ending Byte Order in Word |
| 27-46 | XXXXh | F   | Model number in ASCII (Left justified)                      |



| Word  | Value | F/V | Description  |
|-------|-------|-----|--|
|       |       |     | Big Ending Byte Order in Word  |
| 47    | 8001h | F   | Maximum number of sectors on Read/Write Multiple command   |
| 48    | 0000h | F   | Reserved   |
| 49    | 0300h | F   | Capabilities   |
| 50    | 4000h | F   | Capabilities   |
| 51    | 0200h | F   | PIO data transfer cycle timing mode  |
| 52    | 0000h | X   | Obsolete   |
| 53    | 0007h | F   | Field validity   |
| 54    | XXXXh | X   | Current numbers of cylinders   |
| 55    | XXXXh | X   | Current numbers of heads   |
| 56    | XXXXh | X   | Current sectors per track  |
| 57-58 | XXXXh | X   | Current capacity in sectors (LBAs)<br>(Word 57 = LSW, Word 58 = MSW)   |
| 59    | 0101h | F   | Multiple sector setting  |
| 60-61 | XXXXh | F   | Total number of user addressable logical sectors for 28-bit commands<br>(D Word)   |
| 62    | 0000h | X   | Reserved   |
| 63    | 0207h | F   | Multiword DMA transfer<br>Supports MDMA mode 0, 1 and 2  |
| 64    | 0003h | F   | Advanced PIO modes supported   |
| 65    | 0078h | F   | Minimum Multiword DMA transfer cycle time per word   |
| 66    | 0078h | F   | Recommended Multiword DMA transfer cycle time  |
| 67    | 0078h | F   | Minimum PIO transfer cycle time without flow control   |
| 68    | 0078h | F   | Minimum PIO transfer cycle time with LORDY flow control  |
| 69    | 4000h | F   | Additional supported   |
| 70-74 | 0000h | F   | Reserved   |
| 75    | 001Fh | F   | Queue depth  |
| 76    | 030Eh | F   | Serial ATA capabilities <ul style="list-style-type: none"> <li>• Supports Serial ATA Gen3</li> <li>• Supports Serial ATA Gen2</li> <li>• Supports Serial ATA Gen1</li> <li>• Supports Phy event counters log</li> <li>• Supports receipt of host-initiated power management requests</li> <li>• Supports Native Command Queuing</li> </ul> |
| 77    | 0080h | F   | Serial ATA additional capability <ul style="list-style-type: none"> <li>• DevSleep to ReducedPwrState</li> </ul>   |
| 78    | 0148h | F   | Serial ATA features supported <ul style="list-style-type: none"> <li>• Supports Device Sleep</li> <li>• Supports</li> <li>• Software settings preservation</li> <li>• Device supports initiating power management</li> </ul>   |



| Word    | Value | F/V | Description  |
|---------|-------|-----|--|
| 79      | 0040h | V   | Reserved   |
| 80      | 03FCh | F   | Major version number (ACS-2)   |
| 81      | 0000h | F   | Minor version number   |
| 82      | 702Bh | F   | Command sets supported 0   |
| 83      | 7500h | F   | Command sets supported 1   |
| 84      | 4002h | F   | Command sets supported 2   |
| 85-87   | XXXXh | V   | Command set/feature enabled  |
| 88      | 007Fh | V   | Ultra DMA mode supported and selected                                |
| 89      | 0003h | F   | Time required for a Normal Erase mode Security Erase Unit command    |
| 90      | 0001h | F   | Time required for an Enhanced Erase mode Security Erase Unit command |
| 91      | 0000h | V   | Current advanced power management value                              |
| 92      | FFFEh | V   | Master password identifier   |
| 93-99   | 0000h | V   | Reserved   |
| 100-103 | XXXXh | V   | Maximum user LBA for 48-bit address feature set                      |
| 104     | 0000h | V   | Reserved   |
| 105     | 0100h | F   | Maximum number of 512-byte blocks per Data Set Management command    |
| 106-127 | 0000h | V   | Reserved   |
| 128     | 0009h | V   | Security status  |
| 129-159 | XXXXh | X   | Vendor specific  |
| 160     | 0000h | F   | CFA power mode   |
| 161     | 0000h | X   | Reserved   |
| 162     | 0000h | F   | Key management schemes supported                                     |
| 163     | 0000h | F   | CF Advanced True IDE Timing mode capability and setting              |
| 164-168 | 0000h | V   | Reserved   |
| 169     | 0001h | F   | Data Set Management supported  |
| 170-216 | XXXXh | V   | Reserved   |
| 217     | 0001h | F   | Non-rotating media (SSD)   |
| 218-221 | 0000h | X   | Reserved   |
| 222     | 107Fh | F   | Transport major revision (SATA Rev 3.1)                              |
| 223-254 | 0000h | X   | Reserved   |
| 255     | XXXXh | X   | Integrity word   |



### 8.3 SUPPORTED IDENTIFY DEVICE COMMAND INFORMATION DEFINITIONS

Table 10: SMART Data Vendor-specific Attributes

| Attribute ID(Hex) | Raw Attribute Value |     |    |     |     |    | Attribute Name                             |
|-------------------|---------------------|-----|----|-----|-----|----|--|
| 01                | MSB                 | 00  | 00 | 00  | 00  | 00 | Read error rate                            |
| 05                | LSB                 | MSB | 00 | 00  | 00  | 00 | Reallocated sectors count                  |
| 09                | LSB                 |     |    | MSB | 00  | 00 | Reserved                                   |
| 0C                | LSB                 |     |    | MSB | 00  | 00 | Power cycle count                          |
| A0                | LSB                 |     |    | MSB | 00  | 00 | Uncorrectable sector count when read/write |
| A1                | LSB                 | MSB | 00 | 00  | 00  | 00 | Number of valid spare block                |
| A2                | LSB                 | MSB | 00 | 00  | 00  | 00 | Number of cache data block                 |
| A3                | LSB                 | MSB | 00 | 00  | 00  | 00 | Number of initial invalid block            |
| A4                | LSB                 |     |    | MSB | 00  | 00 | Total erase count                          |
| A5                | LSB                 |     |    | MSB | 00  | 00 | Maximum erase count                        |
| A6                | LSB                 |     |    | MSB | 00  | 00 | Minimum erase count                        |
| A7                | LSB                 |     |    | MSB | 00  | 00 | Average erase count                        |
| C0                | LSB                 |     |    |     | MSB | 00 | Power-off retract count                    |
| C2                | MSB                 | 00  | 00 | 00  | 00  | 00 | Controlled temperature                     |
| C3                | LSB                 |     |    | MSB | 00  | 00 | Hardware ECC recovered                     |
| C4                | LSB                 |     |    | MSB | 00  | 00 | Reallocation event count                   |
| C7                | LSB                 | MSB | 00 | 00  | 00  | 00 | UltraDMA CRC error count                   |
| F1                | LSB                 |     |    | MSB | 00  | 00 | Total LBAs written (each write unit=32MB)  |
| F2                | LSB                 |     |    | MSB | 00  | 00 | Total LBAs read (each read unit=32MB)      |



## 9.0 INSTALLATION

### BEFORE GETTING STARTED

1. BackUp Your Data

### VISUAL INSPECTION

1. Before unpacking and handling the SSD, discharge the static electricity by touching the metal chassis of your computer or by using an anti-static wrist strap
2. Inspect the box and device for the following
  - a. Box is damaged or water-stained
  - b. Any damage to the SSD

### HANDLING THE SSD

1. Be cautious when unpacking, installing, and handling the SSD drive. Misuse of the SSD voids all warranty. Follow the succeeding instructions when managing the SSD
2. Follow all ESD precautions
3. Always operate the SSD within environmental conditions
4. Never switch DC power to the drive by plugging an electrically live source cable into the drive's power connector

### INSTALLATION

#### *System Requirements*

To install the SSD in your computer, ensure that you have the following items:

1. Mounting Screws (If needed)

#### *Install the SSD*

Follow these steps to install the SSD

1. Power down the PC
2. Remove the computer system outside cover
3. Insert the SSD to the connector on motherboard
4. Replace the PC cover
5. Power on the PC



6. A BIOS sign-on message appears and displays a key sequence to enter the BIOS setup. Set up the BIOS to recognize the SSD.
7. Installation is Complete

### **USING THE SSD IN A MS-DOS OS**

The SSD is already partitioned and formatted by NTFS, so if you want to install MS-DOS O/S on the SSD, it should be re-partitioned and re-formatted. After installing the SSD, it must be installed as a disk drive under DOS. Run the DOS commands as listed below and follow the instructions displayed for each command.

1. Run the DOS FDISK program to partition the SSD
2. Verify that the partition is active and ready for formatting
3. Run the DOS FORMAT command to high-level format the SSD

### **USING THE SSD IN A WINDOWS OS**

No modifications need to be made to use the SSD in a Windows OS platform

### **USING THE SSD IN A LINUX O/S**

Port driver is needed to be made to use the SSD in Linux OS platforms.

### **USING THE SSD IN OTHER O/S**

Port driver is needed to be made to use the SSD in other OS platforms.