# Team Industrial SATAIII M.2 2260 SSD

## 1. INTRODUCTION

### 1.1 General Description

Team's M6Q56 M.2 2260 SATA Drive delivers all the advantages of Flash Disk technology with the Serial ATA I/II/III interface and is fully compliant with the standard Next Generation Form Factor (NGFF) called M.2 Card Format, which is generated by Intel. The M.2 2260 SATA Drive is designed to operate at a maximum operating frequency of 200MHz with 30MHz external crystal. Its capacity could provide a wide range up to 512GB. Moreover, it can reach up to 550MB/s read as well as 460MB/s write high performance based on Toshiba NAND flash (with 32MB SDR enabled and measured by CrystalDiskMark v5.0). The power consumption of the M.2 2260 is much lower than traditional Hard Drives, making it the best embedded solution for new platforms.

### 1.2 Block Diagram
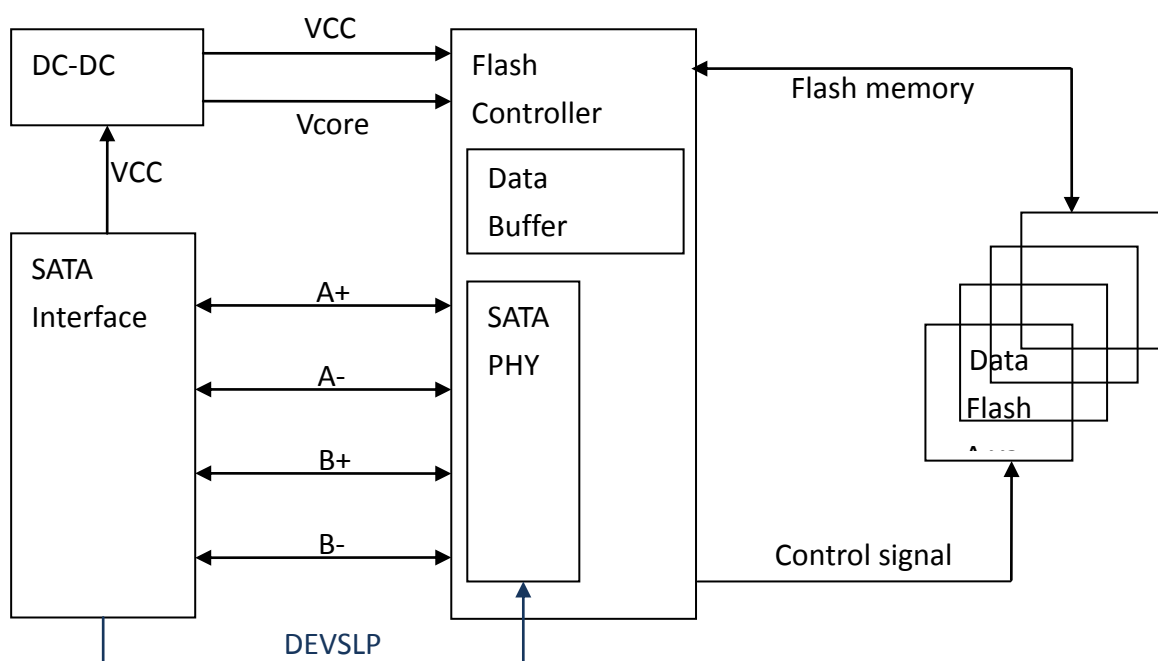
## 2. PRODUCT SPECIFICATIONS

● Capacity:
  ➢ MLC: From 32GB up to 512GB(Support 48-bit addressing mode)
● Electrical/Physical Interface:
  ■ SATA Interface
  ➢ Compliant with SATA Revision 3.2
  ➢ Compatible with SATA 1.5Gbps, 3Gbps and 6Gbps interface
  ➢ Support power management
  ➢ Support expanded register for SATA protocol 48 bits addressing mode
  ➢ Embedded BIST function for SATA PHY for low cost mass production
● Built-in 2-channel NAND flash interface controller
  ■ Compliant with Toggle 1.0 and Toggle 2.0 NAND Flash interface
  ■ Compliant with ONFI 4.0 interface:
  ➢ SDR up to mode 5
  ➢ NV-DDR up to mode 5
  ➢ NV-DDR2 up to mode 7
  ➢ NV-DDR3 up to mode 8
● Supported NAND Flash:
  ■ Support up to 16 Flash Chip Enables (CE) within single design
  ■ Toshiba 15nm/3D-NAND MLC and TLC
  ■ Support all types of SLC/MLC/TLC/3D-NAND, 8KB/page and 16K/page NAND flash
  ■ Support ONFI 2.3, ONFI 3.0, ONFI 3.2 and ONFI 4.0 interface: 2 channels at maximum
● ECC Scheme
  ■ Applies the LDPC (Low Density Parity Check) of ECC algorithm
● UART Function
● GPIO
● Support SMART and TRIM commands

● Performance

| Capacity | Flash Structure | Flash Type | Sequential | |
|---|---|---|---|---|
| | | | Read | Write |
| **32GB** | 32GB x 1 | BGA, 15nm | 550 | 160 |
| **64GB** | 32GB x 2 | BGA, 15nm | 550 | 310 |
| **128GB** | 64GB x 2 | BGA, 15nm | 550 | 460 |
| **256GB** | 64GB x 4 | BGA, 15nm | 550 | 460 |
| **512GB** | 128GB x 4 | BGA, 15nm | 550 | 460 |

Note:

1. The performance was estimated based on Toshiba NAND flash.

2. Performance may differ according to flash configuration and platform.

3. The table above is for reference only.

● TBW (Terabytes Written)

| Capacity | Flash Structure | TBW |
|---|---|---|
| **32GB** | 32GB x 1 | 13 |
| **64GB** | 32GB x 2 | 30 |
| **128GB** | 64GB x 2 | 87 |
| **256GB** | 64GB x 4 | 198 |
| **512GB** | 128GB x4 | 544 |

Note:

1. Samples were built using Toshiba NAND flash.

2. TBW may differ according to flash configuration and platform.

3. The endurance of SSD could be estimated based on user behavior, NAND endurance cycles, and write amplification factor. It is not guaranteed by flash vendor.

## Overview

- **Capacity**
  - MLC: 32GB up to 512GB

- **SATA Interface**
  - SATA Revision 3.2
  - SATA 1.5Gbps, 3Gbps, and 6Gbps interface

- **Flash Interface**
  - Flash Type: MLC

- **Performance**
  - Read: up to 550 MB/s
  - Write: up to 460 MB/s

- **Power Consumption**
  - Active mode: < 1740mW
  - Idle mode: < 265mw

- **TBW (Terabyte Written)**
  - 544TBW for 512GB

- **MTBF**
  - More than 2,000,000 hours

- **Advanced Flash Management**
  - Static and Dynamic Wear Leveling
  - Bad Block Management
  - TRIM
  - SMART
  - Over-Provision

- **Low Power Management**
  - DEVSLP Mode (Optional)
  - DIPM/HIPM Mode

- **Temperature Range**
  - Operation(Standard): 0 ~ 70℃
    Storage: -40℃ ~ 85℃

- **RoHS compliant**

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# 3. ENVIRONMENTAL SPECIFICATIONS

## 3.1 Environmental Conditions

### 3.1.1 Temperature and Humidity

● Storage Temperature Range:
  ➢ -40℃ ~ 85℃

● Operation Temperature Range:
  ➢ Standard Grade: 0℃ ~ 70℃

● Humidity:
  Standard Grade: RH 90% under 40℃ (in operational)

● **High Temperature Test Condition:**

|  | **Temperature** | **Humidity** | **Test Time** |
|---|---|---|---|
| **Operation (Standard Grade)** | 70℃ | 0% RH | 72 hours |
| **Storage (Standard Grade)** | 85℃ | 0% RH | 72 hours |

Result: No any abnormality is detected.

● **Low Temperature Test Condition:**

|  | **Temperature** | **Humidity** | **Test Time** |
|---|---|---|---|
| **Operation (Standard Grade)** | 0℃ | 0% RH | 72 hours |
| **Storage (Standard Grade)** | -40℃ | 0% RH | 72 hours |

Result: No any abnormality is detected.

● **High Humidity Test Condition:**

|  | **Temperature** | **Humidity** | **Test Time** |
|---|---|---|---|
| **Operation (Standard Grade)** | 40℃ | 90% RH | 4 hours |
| **Storage (Standard Grade)** | 40℃ | 93% RH | 72 hours |

Result: No any abnormality is detected.

● **Temperature Cycle Test:**

|  | **Temperature** | **Test Time** | **Cycle** |
|---|---|---|---|
| **Operation (Standard Grade)** | 0℃ | 30min | 10 Cycle |
|  | 70℃ | 30min |  |
| **Storage (Standard Grade)** | -40℃ | 30min | 10 Cycle |
|  | 85℃ | 30min |  |

Result: No any abnormality is detected.

### 3.1.2 Shock:

● **Shock Specification.**

|  | Acceleration Force | Half Sin Pulse Duration |
|---|---|---|
| **Non-Operational** | 1500G | 0.5ms |

Result: No any abnormality is detected when power on.

### 3.1.3 Vibration:

● **Vibration Specification**

|  | Condition | | Vibration |
|---|---|---|---|
|  | **Frequency/Displacement** | **Frequency/Acceleration** | **Orientation** |
| **Non-Operational** | 20Hz~80Hz/1.52mm | 80Hz~2000Hz/20G | X, Y, Z axis/60 min for each |

Result: No any abnormality is detected when power on.

### 3.1.4 Drop:

● **Drop Specification**

|  | Height of Drop | Number of Drop |
|---|---|---|
| **Non-Operational** | 80cm free fall | 6 face of each unit, 2 times |

Result: No any abnormality is detected when power on.

### 3.1.5 Bending:

● **Bending Specification**

|  | Force | Action |
|---|---|---|
| **Non-Operational** | $\geq$ 20N | Hold 1min/5times |

Result: No any abnormality is detected when power on.

### 3.1.6 Electrostatic Discharge (ESD):

● **Contact ESD Specification**

| Device | Condition | Temperature | Relative Humidity | +/- 4KV | Result |
|---|---|---|---|---|---|
| M.2 | 512GB | 24.0℃ | 49% (RH) | Device functions are affected, but EUT will be back to its normal or operational state automatically. | PASS |

## 3.2    MTBF

MTBF, an acronym for Mean Time Between Failures, is a measure of a device's reliability. It value represents the average time between a repair and the next failure. The measure is typically in units of hours. The higher the MTBF value, the higher the reliability of the device. The predicted result of Team M.2 is more than 2,000,000 hours.

## 3.3    Certification & Compliance

- RoHS
- SATA III (SATA Rev. 3.2)
- Up to ATA/ATAPI-8 (Including S.M.A.R.T)

# 4. ELECTRICAL SPECIFICATIONS

## 4.1 Supply Voltage

● Supply Voltage of M.2

| Parameter | Rating |
|---|---|
| Operating Voltage | 3.3V ± 5% |

## 4.2 Power Consumption

● Power Consumption of M.2

| Capacity | Flash Structure | Flash Type | Read | Write | Partial | Slumber | Idle | DEVSLP |
|---|---|---|---|---|---|---|---|---|
| 32GB | 32GB x 1 | BGA, 15nm | 1000 | 1200 | 12 | 7 | 255 | 4.9 |
| 64GB | 32GB x 2 | BGA, 15nm | 1040 | 1215 | 12 | 7 | 257 | 4.9 |
| 128GB | 64GB x 2 | BGA, 15nm | 1065 | 1480 | 12 | 7 | 255 | 4.9 |
| 256GB | 64GB x 4 | BGA, 15nm | 1165 | 1535 | 12 | 7 | 260 | 4.9 |
| 512GB | 128GB x 4 | BGA, 15nm | 1425 | 1740 | 14 | 10 | 260 | 4.9 |

Unit: mW

Note:

1. The average value of power consumption is achieved based on 100% conversion efficiency.

2. The measured power voltage is 3.3V.

3. Samples were built using Toshiba NAND flash and measured under normal temperature.

4. Sequential R/W is measured while testing 4000MB sequential R/W 5 times by CyrstalDiskMark.

5. Power Consumption may differ according to flash configuration, SDR configuration, and platform.

## 5. INTERFACE

### 5.1 Pin Assignment and Descriptions

● Pin Assignment and Description of M.2

| Pin | Segment | Pin Definition |
|-----|---------|----------------|
| 1 | CONFIG_3=GND | Ground |
| 2 | 3.3V | Supply pin |
| 3 | GND | Ground |
| 4 | 3.3V | Supply pin |
| 5 | N/C | No Connect |
| 6 | N/C | No Connect |
| 7 | N/C | No Connect |
| 8 | N/C | No Connect |
| 9 | N/C or GND | No Connect or Ground (N/C for Socket 2, and GND for Socket 3) |
| 10 | DAS/DSS# (O)(OD) | Status indicators via LED devices that will be provided by the system Active Low. A pulled-up LED with series current limiting resistor should allow for 9mA when On. |
| 11 | N/C | No Connect |
| 12 | Module Key | |
| 13 | Module Key | |
| 14 | Module Key | |
| 15 | Module Key | |
| 16 | Module Key | |
| 17 | Module Key | |
| 18 | Module Key | |
| 19 | Module Key | |
| 20 | N/C | No Connect |
| 21 | CONFIG_0=GND | Ground |
| 22 | N/C | No Connect |
| 23 | N/C | No Connect |
| 24 | N/C | No Connect |
| 25 | N/C | No Connect |
| 26 | N/C | No Connect |
| 27 | GND | Ground |
| 28 | N/C | No Connect |

| 29 | N/C | No Connect |
|---|---|---|
| 30 | N/C | No Connect |
| 31 | N/C | No Connect |
| 32 | N/C | No Connect |
| 33 | GND | Ground |
| 34 | N/C | No Connect |
| 35 | N/C | No Connect |
| 36 | N/C | No Connect |
| 37 | N/C | No Connect |
| 38 | DEVSLP(I) (0/3.3V) | Device Sleep, Input. When driven high the host is informing the SSD to enter a low power state |
| 39 | GND | Ground |
| 40 | N/C | No Connect |
| 41 | SATA-B+ | SATA differential signals in the SATA specification |
| 42 | N/C | No Connect |
| 43 | SATA-B- | SATA differential signals in the SATA specification |
| 44 | N/C | No Connect |
| 45 | GND | Ground |
| 46 | N/C | No Connect |
| 47 | SATA-A- | SATA differential signals in the SATA specification |
| 48 | N/C | No Connect |
| 49 | SATA-A+ | SATA differential signals in the SATA specification |
| 50 | N/C | No Connect |
| 51 | GND | Ground |
| 52 | N/C | No Connect |
| 53 | N/C | No Connect |
| 54 | N/C | No Connect |
| 55 | N/C | No Connect |
| 56 | Reserved for MFG Data | Manufacturing Data line. Used for SSD manufacturing only. Not used in normal operation. Pins should be left N/C in platform Socket |
| 57 | GND | Ground |
| 58 | Reserved for MFG Clock | Manufacturing Clock line. Used for SSD manufacturing only. Not used in normal operation. Pins should be left N/C in |

| | | |
|---|---|---|
| | | platform Socket |
| **59** | Module Key | |
| **60** | Module Key | |
| **61** | Module Key | |
| **62** | Module Key | |
| **63** | Module Key | |
| **64** | Module Key | |
| **65** | Module Key | |
| **66** | Module Key | |
| **67** | N/C | No Connect |
| **68** | SUSCLK(I)(0/3.3V) | 32 KHz clock supply input that is provided by PCH to reduce power and cost for the module. |
| **69** | CONFIG_1=GND | Defines module type |
| **70** | 3.3V | Supply pin |
| **71** | GND | Ground |
| **72** | 3.3V | Supply pin |
| **73** | GND | Ground |
| **74** | 3.3V | Supply pin |
| **75** | CONFIG_2=GND | Ground |

# 6. SUPPORTED COMMANDS

## 6.1 ATA Command List

| Op-Code | Command Description | Op-Code | | Command Description |
|---|---|---|---|---|
| 00h | NOP | 60h | | Read FPDMA Queued |
| 06h | Data Set Management | 61h | | Write FPDMA Queued |
| 10h | Recalibrate | 70h | | Seek |
| 20h | Read Sectors | 90h | | Execute Device Diagnostic |
| 21h | Read Sectors without Retry | 91h | | Initialize Device Parameters |
| 24h | Read Sectors EXT | 92h | | Download Microcode |
| 25h | Read DMA EXT | 93h | | Download Microcode DMA |
| 27h | Read Native Max Address EXT | B0h | | SMART |
| 29h | Read Multiple EXT | B0h | D0h | SMART READ DATA |
| 2Fh | Read Log EXT | B0h | D1h | SMART READ DATA ATTRIBUTE THRESHOLD |
| 30h | Write Sectors | B0h | D2h | SMART ENABLE/DISABLE ATTRIBUTE AUTOSAVE |
| 31h | Write Sectors without Retry | B0h | D3h | SMART SAVE ATTRIBUTE VALUES |
| 34h | Write Sectors EXT | B0h | D4h | SMART EXECUTE OFF-LINE IMMEDIATE |
| 35h | Write DMA EXT | B0h | D5h | SMART READ LOG |
| 37h | Set Native Max Address EXT | B0h | D6h | SMART WRITE LOG |
| 39h | Write Multiple EXT | B0h | D8h | SMART ENABLE OPERATIONS |
| 3Dh | Write DMA FUA EXT | B0h | D9h | SMART DISABLE OPERATIONS |
| 3Fh | Write Long EXT | B0h | DAh | SMART RETURN STATUS |
| 40h | Read Verify Sectors | B0h | DBh | SMART ENABLE/DISABLE AUTOMATIC OFF-LINE |
| 41h | Read Verify Sectors without Retry | B1h | | DEVICE CONFIGURATION OVERLAY |
| 42h | Read Verify Sectors EXT | B1h | C0h | DEVICE CONFIGURATION RESTORE |
| 45h | Write Uncorrectable EXT | B1h | C1h | DEVICE CONFIGURATION FREEZE LOCK |
| 47h | Read Log DMA EXT | B1h | C2h | DEVICE CONFIGURATION |

| | | | | | IDENTIFY |
|---|---|---|---|---|---|
| 57h | | Write Log DMA EXT | B1h | C3h | DEVICE CONFIGURATION SET |
| B1h | C4h | DEVICE CONFIGURATION IDENTIFY DMA | ECh | | Identify Device |
| B1h | C5h | DEVICE CONFIGURATION SET DMA | EFh | | Set Features |
| C4h | | Read Multiple | EFh | 02h | Enable 8-bit PIO transfer mode |
| C5h | | Write Multiple | EFh | 03h | Set transfer mode based on value in Count field |
| C6h | | Set Multiple Mode | EFh | 05h | Enable advanced power management |
| C8h | | Read DMA | EFh | 10h | Enable use of Serial ATA feature |
| C9h | | Read DMA without Retry | EFh | 10h | 02h | Enable DMA Setup FIS Auto-Activate optimization |
| CAh | | Write DMA | EFh | 10h | 03h | Enable Device-initiated interface power state (DIPM) transitions |
| CBh | | Write DMA without Retry | EFh | 10h | 06h | Enable Software Settings Preservation (SSP) |
| CEh | | Write Multiple FUA EXT | EFh | 10h | 07h | Enable Device Automatic Partial to Slumber transitions |
| E0h | | Standby Immediate | EFh | 10h | 09h | Enable Device Sleep |
| E1h | | Idle Immediate | EFh | 55h | Disable read look-ahead feature |
| E2h | | Standby | EFh | 66h | Disable reverting to power-on defaults |
| E3h | | Idle | EFh | 82h | Disable write cache |
| E4h | | Read Buffer | EFh | 85h | Disable advanced power management |
| E5h | | Check Power Mode | EFh | 90h | Disable use of Serial ATA feature set |
| E6h | | Sleep | EFh | 90h | 02h | Disable DMA Setup FIS Auto-Activate optimization |
| E7h | | Flush Cache | EFh | 90h | 03h | Disable Device-initiated interface power state (DIPM) transitions |
| E8h | | Write Buffer | EFh | 90h | 06h | Disable Software Settings Preservation (SSP) |
| E9h | | Read Buffer DMA | EFh | 90h | 07h | Disable Device Automatic Partial |

| | | | | | |
|---|---|---|---|---|---|
| | | to Slumber transitions | | | |
| EAh | | Flush Cache EXT | EFh | 90h | 09h | Disable Device Sleep |
| EBh | | Write Buffer DMA | EFh | AAh | | Enable read look-ahead feature |
| EFh | CCh | Enable reverting to power-on defaults | F4h | | | Security Erase Unit |
| F1h | | Security Set Password | F5h | | | Security Freeze Lock |
| F2h | | Security Unlock | F6h | | | Security Disable Password |
| F3h | | Security Erase Prepare | F8h | | | Read Native Max Address |

## 6.2   Identify Device Data

The following table details the sector data returned by the IDENTIFY DEVICE command.

| Word | F:Fixed V:Variable X:Both | Default Value | Description |
|---|---|---|---|
| 0 | F | 0040h | General configuration bit-significant information |
| 1 | X | *1 | Obsolete – Number of logical cylinders |
| 2 | V | C837 | Specific configuration |
| 3 | X | 0010h | Obsolete – Number of logical heads (16) |
| 4-5 | X | 00000000h | Retired |
| 6 | X | 003Fh | Obsolete – Number of logical sectors per logical track (63) |
| 7-8 | V | 00000000h | Reserved for assignment by the Compact Flash Association |
| 9 | X | 0000h | Retired |
| 10-19 | F | Varies | Serial number (20 ASCII characters) |
| 20-21 | X | 0000h | Retired |
| 22 | X | 0000h | Obsolete |
| 23-26 | F | Varies | Firmware revision (8 ASCII characters) |
| 27-46 | F | Varies | Model number (xxxxxxxx) |
| 47 | F | 8010h | 7:0- Maximum number of sectors transferred per interrupt on MULTIPLE commands |
| 48 | F | 4000h | Trusted Computing feature set options(not support) |

| 49 | F | 2F00h | Capabilities |
|---|---|---|---|
| 50 | F | 4000h | Capabilities |
| 51-52 | X | 00000000h | Obsolete |
| 53 | F | 0007h | Words 88 and 70:64 valid |
| 54 | X | *1 | Obsolete – Number of logical cylinders |
| 55 | X | 0010h | Obsolete – Number of logical heads (16) |
| 56 | X | 003Fh | Obsolete – Number of logical sectors per track (63) |
| 57-58 | X | *2 | Obsolete – Current capacity in sectors |
| 59 | F | 0110h | Number of sectors transferred per interrupt on MULTIPLE commands |
| 60-61 | F | *3 | Maximum number of sector ( 28bit LBA mode) |
| 62 | X | 0000h | Obsolete |
| 63 | F | 0407h | Multi-word DMA modes supported/selected |
| 64 | F | 0003h | PIO modes supported |
| 65 | F | 0078h | Minimum Multiword DMA transfer cycle time per word |
| 66 | F | 0078h | Manufacturer's recommended Multiword DMA transfer cycle time |
| 67 | F | 0078h | Minimum PIO transfer cycle time without flow |
| 68 | F | 0078h | Minimum PIO transfer cycle time with IORDY flow control |
| 69 | F | 0100h | Additional Supported (support download microcode |
| 70 | F | 0000h | Reserved |
| 71-74 | F | 0000000000000000h | Reserved for the IDENTIFY PACKET DEVICE command |
| 75 | F | 001Fh | Queue depth |
| 76 | F | 670eh | Serial SATA capabilities |
| 77 | F | 0084h | Serial ATA Additional Capabilities |
| 78 | F | 014Ch | Serial ATA features supported |
| 79 | V | 0040h | Serial ATA features enabled |
| 80 | F | 07F8h | Major Version Number |

| | | | |
|---|---|---|---|
| **81** | F | 0000h | Minor Version Number |
| **82** | F | 346bh | Command set supported |
| **83** | F | 7d09h | Command set supported |
| **84** | F | 6063h | Command set/feature supported extension |
| **85** | V | 3469h | Command set/feature enabled |
| **86** | V | bc01h | Command set/feature enabled |
| **87** | V | 6063h | Command set/feature default |
| **88** | V | 003Fh | Ultra DMA Modes |
| **89** | F | 0001h | Time required for security erase unit completion |
| **90** | F | 001Eh | Time required for Enhanced security erase |
| **91** | V | 0000h | Current advanced power management value |
| **92** | V | FFFEh | Master Password Revision Code |
| **93** | F | 0000h | Hardware reset result. The contents of the bits (12:0) of this word can be changed only during the execution of hardware reset. |
| **94** | V | 0000h | Vendor's recommended and actual acoustic management value |
| **95** | F | 0000h | Stream Minimum Request Size |
| **96** | V | 0000h | Streaming Transfer Time – DMA |
| **97** | V | 0000h | Streaming Access Latency – DMA and PIO |
| **98-99** | F | 0000h | Streaming Performance Granularity |
| **100-103** | V | *4 | Maximum user LBA for 48 bit Address feature set |
| **104** | V | 0000h | Streaming Transfer Time – PIO |
| **105** | F | 0008h | Maximum number of 512-byte blocks per DATA SET MANAGEMENT command |
| **106** | F | 4000h | Physical sector size/Logical sector size |
| **107** | F | 0000h | Inter-seek delay for ISO-7779 acoustic testing in microseconds |
| **108-111** | F | 0000000000000000h | Unique ID |

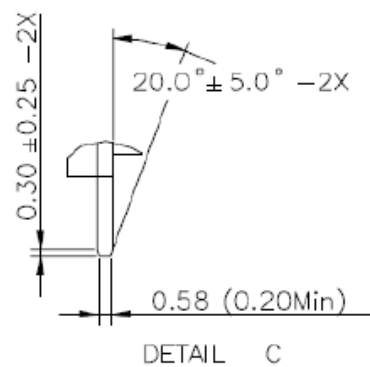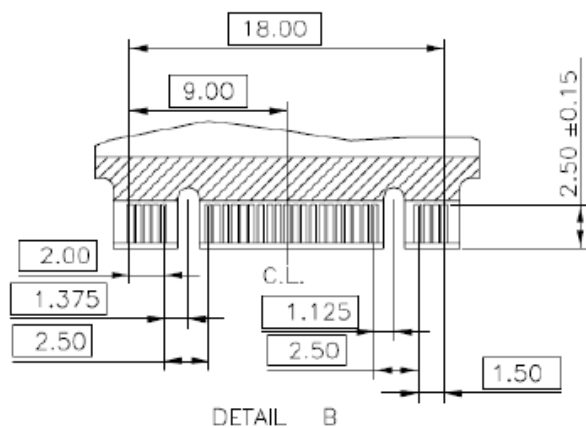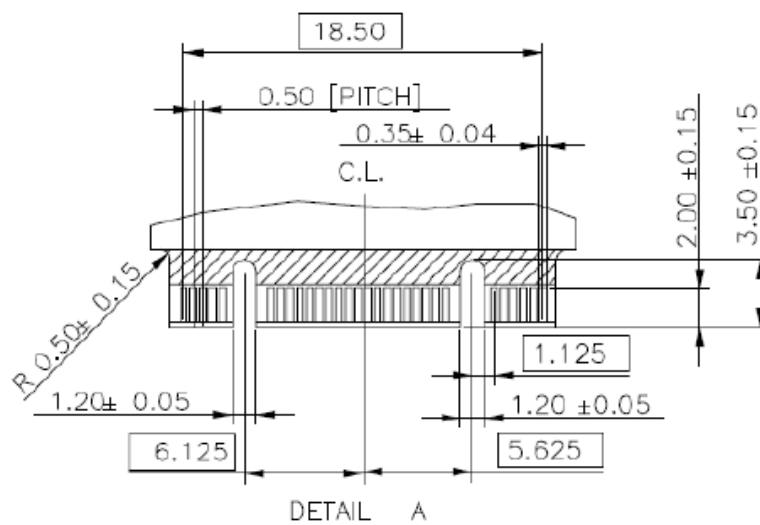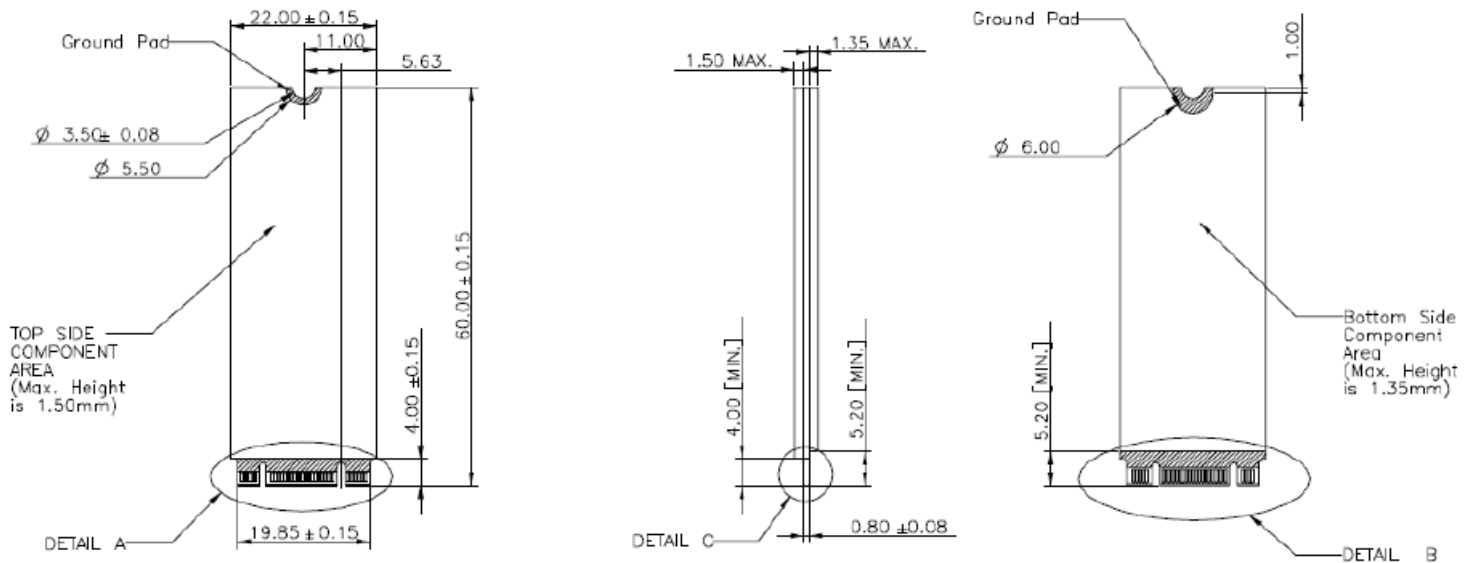| 112-115 | F | 0000000000000000h | Reserved |
|---|---|---|---|
| 116 | V | 0000h | Reserved |
| 117-118 | F | 00000000h | Words per logical Sector |
| 119 | F | 4014h | Supported settings |
| 120 | F | 4014h | Command set/Feature Enabled/Supported |
| 121-126 | F | 0h | Reserved |
| 127 | F | 0h | Removable Media Status Notification feature set support |
| 128 | V | 0021h | Security status |
| 129-140 | X | 0h | Vendor specific |
| 141 | X | 0001h | Vendor specific |
| 142-159 | X | 0h | Vendor specific |
| 160 | F | 0h | Compact Flash Association (CFA) power mode 1 |
| 161-167 | X | 0h | Reserved for assignment by the CFA |
| 168 | F | 3h 2.5 inch<br>4h 1.8 inch<br>5h Less than 1.8inch | Device Nominal Form Factor |
| 169 | F | 0001h | DATA SET MANAGEMENT command is |
| 170-173 | F | 0h | Additional Product Identifier |
| 174-175 | | 0h | Reserve |
| 176-205 | V | 0h | Current media serial number |
| 206 | F | 0h | SCT Command Transport |
| 207-208 | F | 0h | Reserved |
| 209 | F | 4000h | Alignment of logical blocks within a physical block |
| 210-211 | V | 0000h | Write-Read-Verify Sector Count Mode 3 (not support) |
| 212-213 | F | 0000h | Write-Read-Verify Sector Count Mode 2 (not support) |
| 214-216 | | 0000h | NV Cache relate (not support) |
| 217 | F | 0001h | Non-rotating media device |
| 218 | F | 0h | Reserved |
| 219 | F | 0h | NV Cache relate (not support) |
| 220 | V | 0h | Write read verify feature set current |

| | | | mode |
|---|---|---|---|
| **221** | | 0h | Reserved |
| **222** | F | 107Fh | Transport major version number |
| **223** | F | 0h | Transport minor version number |
| **224-229** | | 0h | reserved |
| **230-233** | | 0h | Extend number of user addressable sectors |
| **234** | | 0001h | Minimum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode |
| **235** | | 0080h | Maximum number of 512-byte data blocks per DOWNLOAD MICROCODE command for mode |
| **236-254** | F | 0h | Reserved |
| **255** | X | XXA5h XX is variable | Integrity word (Checksum and Signature) |

● List of Device Identification for Each Capacity

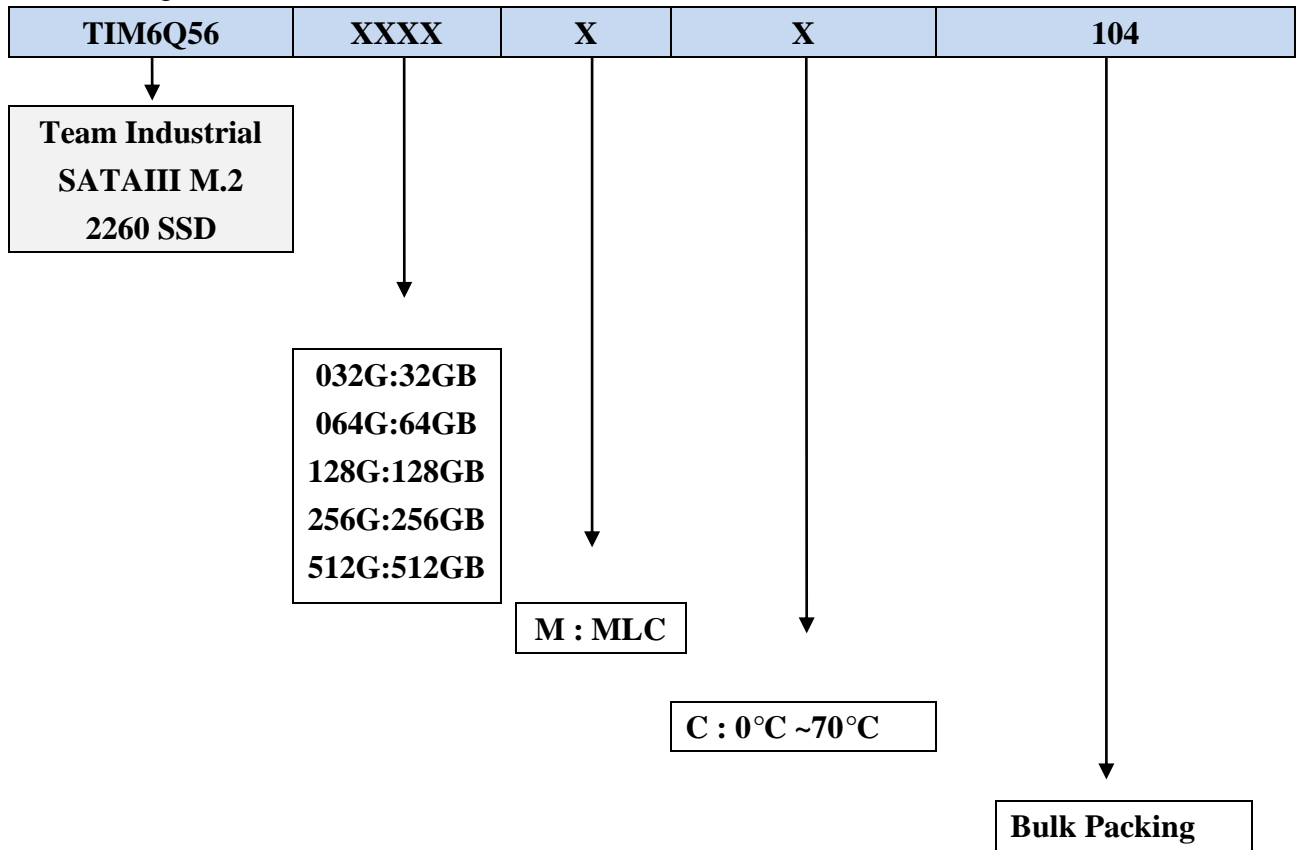| Capacity (GB) | *1 (Word 1/Word 54) | *2 (Word 57 - 58) | *3 (Word 60 - 61) | *4 (Word 100 - 103) |
|---|---|---|---|---|
| **32** | 3FFFh | FBFC10h | 3BA2EB0h | 3BA2EB0h |
| **64** | 3FFFh | FBFC10h | 7740AB0h | 7740AB0h |
| **128** | 3FFFh | FBFC10h | EE7C2B0H | EE7C2B0H |
| **256** | 3FFFh | FBFC10h | FFFFFFFh | 1DCF32B0h |
| **512** | 3FFFh | FBFC10h | FFFFFFFh | 3B9E12B0h |

## 7. PHYSICAL DIMENSION

● **Dimension: 60mm(L) x 22mm(W) x 3.75mm(H)**

## 8. PRODUCT ORDERING NUMBER

The ordering number rule is as below:

| TIM6Q56 | XXXX | X | X | 104 |
|---------|------|---|---|-----|

**Team Industrial SATAIII M.2 2260 SSD**

**032G:32GB**
**064G:64GB**
**128G:128GB**
**256G:256GB**
**512G:512GB**

**M : MLC**

**C : 0°C ~70°C**

**Bulk Packing**

The products list is as below:

| Capacity | Product Ordering Number |
|----------|-------------------------|
| **32GB** | TIM6Q56032GMC104 |
| **64GB** | TIM6Q56064GMC104 |
| **128GB** | TIM6Q56128GMC104 |
| **256GB** | TIM6Q56256GMC104 |
| **512GB** | TIM6Q56512GMC104 |

## 9. REVISION HISTORIES

| Version | Revision Description | Date | Issued By | Authorized By |
|---------|---------------------|------|-----------|---------------|
| A01 | Initial Release | 2017/12/14 | Jerry.Chien | Tommy.Hua |
| | | | | |