

Myung SSD  
3.5 Inch SATA II (3Gbps)

# S400 Product Specification

Sep / 2012  
Rev. 0.1



**MYUNG INFO.TECH.**  
Myung Information Technologies Co., Ltd.

## Table of Contents

|                                       |    |
|---------------------------------------|----|
| <b>1. Revision History</b>            | 3  |
| <b>2. General Description</b>         | 4  |
| <b>3. Features</b>                    | 4  |
| <b>4. Block Diagram</b>               | 5  |
| <b>5. Specifications</b>              | 6  |
| <b>6. Reliability Characteristics</b> | 9  |
| <b>7. SATA Connector Descriptions</b> | 10 |
| 7-1 Connector locations               | 10 |
| 7-2 SATA Pin out Data                 | 10 |
| 7-3 SATA Pin out Power                | 11 |
| <b>8. Supports ATA Command</b>        | 12 |
| <b>9. SMART Command Support</b>       | 14 |
| 9-1 SMART Subcommand Sets             | 14 |
| 9-2 SMART Data Structure (READ (D0h)) | 15 |
| <b>10. Identify Device Parameters</b> | 16 |
| <b>11. Mechanical Specifications</b>  | 18 |
| <b>12. Ordering Information</b>       | 19 |
| <b>13. Contact</b>                    | 20 |

## 1. Revision History

| Revision | Date         | Description     | Remark      |
|----------|--------------|-----------------|-------------|
| 0.1      | Sep 18, 2012 | - Initial issue | Preliminary |

## 2. General Description

Since Myung SSD is composed of semiconductor chips, it is resistive on a external shock and does not produce any heat or noise. Since it does not have any moving parts, it is designed to minimize total electricity consumption. It is strongly resistive on dusts and other small particles. We are adopting latest technology of wear-leveling and which increased endurance of our product. Embedded error correction code(ECC) engine of the products also guaranty integrity of data stored on the SSD. Myung SSD has an exceeding reading and writing speed and it is fully compatible with other storage devices in a gaming systems, laptops and PCs.

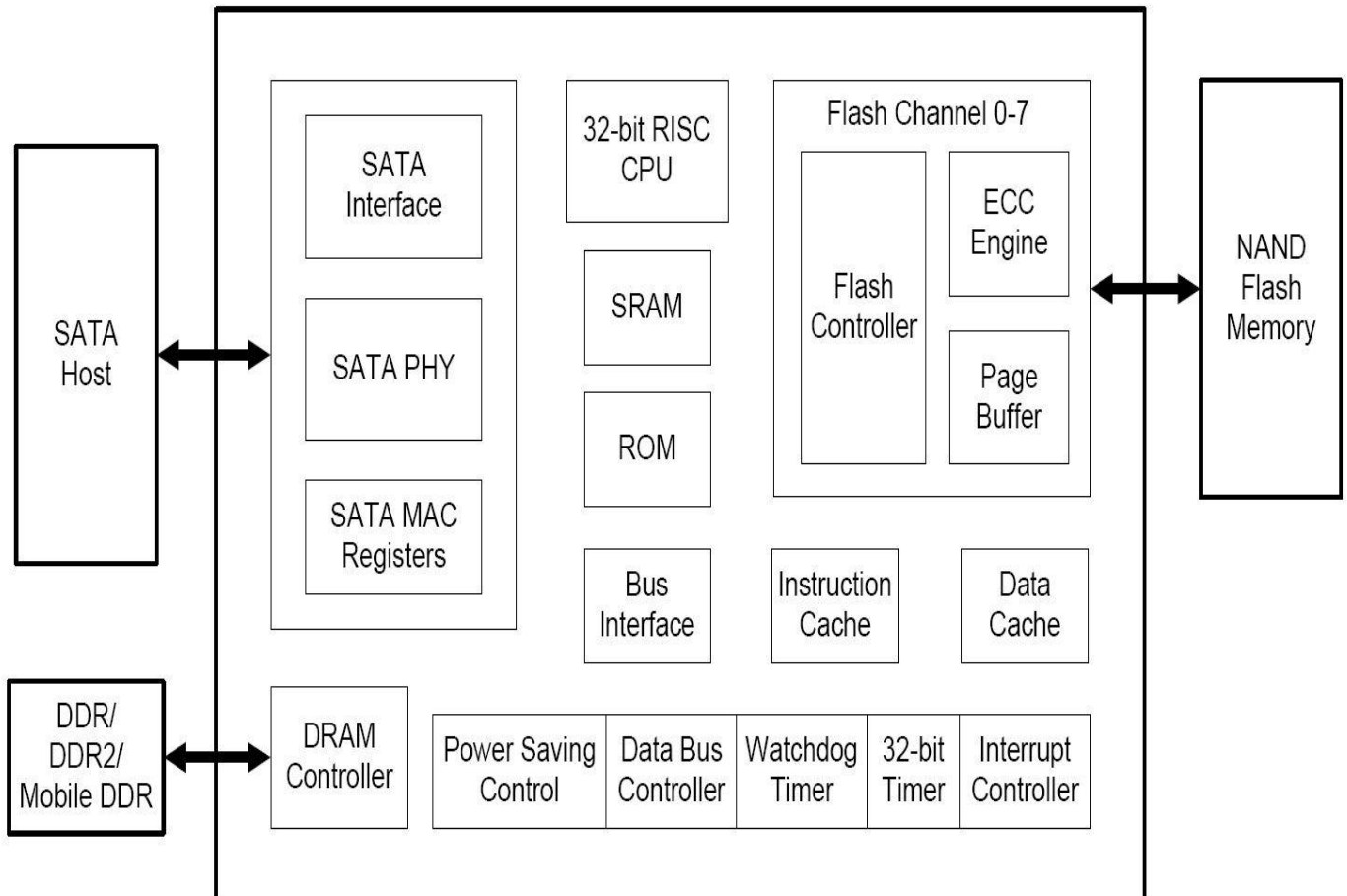
## 3. Features

- SATA 1.5 Gbps / 3.0 Gbps interface rate
- Compliant with Serial ATA Revision 2.6 specification
- Supports Native Command Queuing up to 32 commands
- Supports TRIM Command based on ATA-8
- Supports partial and slumber mode
- Supports PIO Mode 0~4
- Supports Multi-Word DMA Mode 0~2
- Supports Ultra DMA Mode up to 6
- Uses NAND flash memory
  - Multi Level Cell (MLC)
- Enhanced hardware BCH ECC engine
  - 12/24/40-bit per 1KB
- Supports Software/hardware write protect option
- Flash Management Features
  - Bad block management
  - wear-leveling algorithm

### **3. Features**

- Power Management Features
  - Early weak block retirement option
- Data shaping for higher data reliability
- SMART Features
- Security Features
  - Multiple data security zones
- Storage Capacity
  - 32GB / 64GB / 128 GB / 256GB / 512GB
- Temperature
  - Commercial : 0°C ~ 70°C
  - Industrial : - 40°C ~ 85°C
- Ordering Information
  - S400-032G : SATA 32GB
  - S400-064G : SATA 64GB
  - S400-128G : SATA 128GB
  - S400-256G : SATA 256GB
  - S400-512G : SATA 512GB

## 4. Block Diagram



## 5. Specification

### Mechanical Specifications

|                        |                                |       |
|------------------------|--------------------------------|-------|
| <b>Form Factor</b>     | 3.5 Inch                       |       |
| <b>Dimensions (mm)</b> | Length                         | 146   |
|                        | Width                          | 101.4 |
|                        | Height                         | 14    |
| <b>Connector</b>       | SATA 7+15 pins combo connector |       |

### Weight of Capacities

|                 |              |              |               |               |               |
|-----------------|--------------|--------------|---------------|---------------|---------------|
| <b>Capacity</b> | <b>32 GB</b> | <b>64 GB</b> | <b>128 GB</b> | <b>256 GB</b> | <b>512 GB</b> |
| <b>Weight</b>   | 226 g        | 230 g        | 230 g         | 230 g         | 230 g         |

### Electrical Specifications

| Parameter            | Symbol | MIN | TYP | MAX  | UNIT |
|----------------------|--------|-----|-----|------|------|
| <b>Voltage Input</b> | VCC    | 4.0 | 5.0 | 5.25 | V    |

### Power Consumption

| Capacity | Idle (typical) | Active (typical) |
|----------|----------------|------------------|
| 32 GB    | Max 130mA      | Max 320mA        |
| 64 GB    |                |                  |
| 128 GB   |                |                  |
| 256 GB   |                |                  |
| 512 GB   |                |                  |

**User Addressable Sectors**

| Capacity | Total User Addressable Sectors |
|----------|--------------------------------|
| 32 GB    | 61,865,984                     |
| 64 GB    | 123,731,968                    |
| 128 GB   | 247,463,936                    |
| 256 GB   | 494,927,872                    |
| 512 GB   | 989,855,744                    |

**Performance of Capacities**

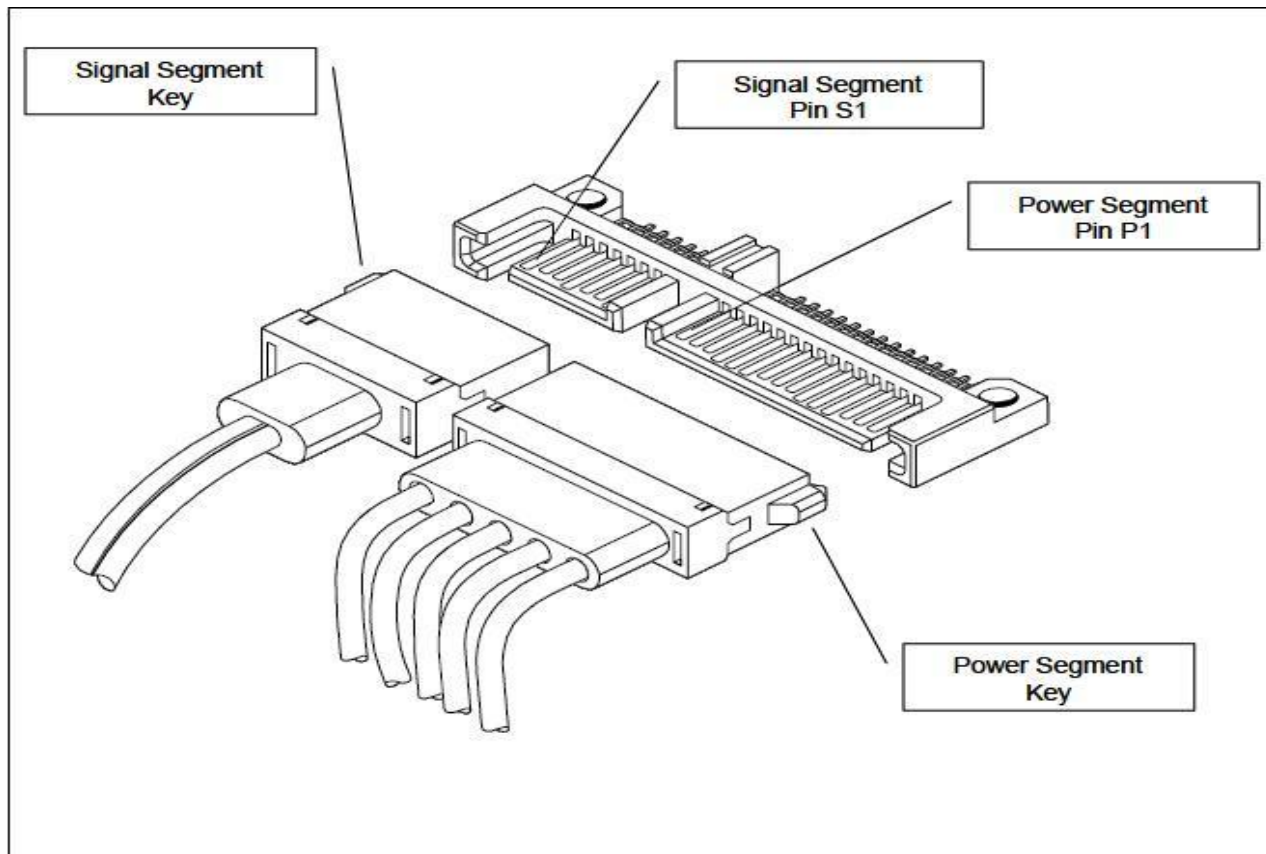
| Model Number | Capacity | Sequential Read | Sequential Write | Memory Type |
|--------------|----------|-----------------|------------------|-------------|
| S400-032G    | 32 GB    | 200 MB/s        | 60 MB/s          | MLC         |
| S400-064G    | 64 GB    | 200 MB/s        | 120 MB/s         | MLC         |
| S400-128G    | 128 GB   | 260 MB/s        | 150 MB/s         | MLC         |
| S400-256G    | 256 GB   | 260 MB/s        | 150 MB/s         | MLC         |
| S400-512G    | 512 GB   | 260 MB/s        | 150 MB/s         | MLC         |

## 6. Reliability Characteristics

| Temperature                 |                |
|-----------------------------|----------------|
| Operating (Commercial type) | 0°C ~ 70°C     |
| Operating (Industrial type) | -40°C ~ 85°C   |
| Non-operation               | - 40°C ~ 95 °C |
| Humidity                    |                |
| Operating                   | 60°C, 93%R.H   |
| Altitude                    |                |
| Non-Operating               | 80,000 feet    |
| Random Vibration            |                |
| Non-Operating               | 15Hz ~ 2,000Hz |
| Shock                       |                |
| Non-Operating               | 1,500g / 0.5ms |

## 7. SATA Connector Descriptions

### 7-1 Connector locations



### 7-2 SATA Pin out Data

| Segment        | Pin No. | Signal Name | Signal Description                  |
|----------------|---------|-------------|-------------------------------------|
| Signal segment | S1      | GND         | 2nd mate                            |
|                | S2      | A+          | Differential signal pair A From phy |
|                | S3      | A-          |                                     |
|                | S4      | GND         | 2nd mate                            |
|                | S5      | B-          | Differential signal pair B From phy |
|                | S6      | B+          |                                     |
|                | S7      | GND         | 2nd mate                            |

### 7-3 SATA Pin out Power

|                      |     |          |                                  |
|----------------------|-----|----------|----------------------------------|
| <b>Power segment</b> | P1  | V33      | 3.3V POWER (Not used)            |
|                      | P2  | V33      | 3.3V POWER (Not used)            |
|                      | P3  | V33      | 3.3V power, pre-charge, 2nd mate |
|                      | P4  | GND      | 1st mate                         |
|                      | P5  | GND      | 2nd mate                         |
|                      | P6  | GND      | 2nd mate                         |
|                      | P7  | V5       | 5V power, pre-charge, 2nd mate   |
|                      | P8  | V5       | 5V POWER                         |
|                      | P9  | V5       | 5V POWER                         |
|                      | P10 | GND      | 2nd mate                         |
|                      | P11 | Reserved | -                                |
|                      | P12 | GND      | 1st mate                         |
|                      | P13 | V12      | 12V power, pre-charged, 2nd mate |
|                      | P14 | V12      | 12V (Not used)                   |
|                      | P15 | V12      | 12V (Not used)                   |

► Note

- All pins are in a single row, with a 1.27 mm (.050") pitch.
- There are total of 7pins in the signal segment and 15pins in the power segment.

## 8. Supports ATA Command

| COMMAND NAME                         | COMMAND CODE (HEX) |
|--------------------------------------|--------------------|
| <b>General Feature Set</b>           |                    |
| 1. Execute Drive Diagnostic          | 90h                |
| 2. Flush Cache                       | E7h                |
| 3. Identify Device                   | ECh                |
| 4. Read DMA                          | C8h                |
| 5. Read Multiple                     | C4h                |
| 6. Read Sector(s)                    | 20h                |
| 7. Read Verify Sector(s)             | 40h/41h            |
| 8. Set Feature                       | EFh                |
| 9. Set Multiple Mode                 | C6h                |
| 10. Write DMA                        | CAh                |
| 11. Write Multiple                   | C5h                |
| 12. Write Sector(s)                  | 30h                |
| 13. NOP                              | 00h                |
| 14. Read Buffer                      | E4h                |
| 15. Write Buffer                     | E8h                |
| <b>Power Management Feature Set</b>  |                    |
| 16. Check Power Mode                 | E5h/98h            |
| 17. Idle                             | E3h/97h            |
| 18. Idle Immediate                   | E1h/95h            |
| 19. Sleep                            | E6h/99h            |
| 20. Standby                          | E2h/96h            |
| 21. Standby Immediate                | E0h/94h            |
| <b>Security Mode Feature Set</b>     |                    |
| 22. Security Set Password            | F1h                |
| 23. Security Unlock                  | F2h                |
| 24. Security Erase Prepare           | F3h                |
| 25. Security Erase Unit              | F4h                |
| 26. Security Freeze Lock             | F5h                |
| 27. Security Disable Password        | F6h                |
| <b>SMART Feature Set</b>             |                    |
| 28. SMART Disable Operations         | B0h                |
| 29. SMART Enable/Disable Auto save   | B0h                |
| 30. SMART Enable Operations          | B0h                |
| 31. SMART Return Status              | B0h                |
| 32. SMART Execute Off-Line Immediate | B0h                |
| 33. SMART Read Data                  | B0h                |

| COMMAND NAME                           |  | COMMAND CODE (HEX) |
|----------------------------------------|--|--------------------|
| <b>Host Protected Area Feature Set</b> |  |                    |
| 34. Read Native Max Address            |  | F8h                |
| 35. Set Max Address                    |  | F9h                |
| 36. Set Max Set Password               |  | F9h                |
| 37. Set Max Lock                       |  | F9h                |
| 38. Set Max Freeze Lock                |  | F9h                |
| 39. Set Max Unlock                     |  | F9h                |
| <b>48-bit Address Feature Set</b>      |  |                    |
| 40. Flush Cache Ext                    |  | EAh                |
| 41. Read Sector(s)                     |  | 24h                |
| 42. Read DMA Ext                       |  | 25h                |
| 43. Read Multiple Ext                  |  | 29h                |
| 44. Read Native Max Address Ext        |  | 27h                |
| 45. Read Verify Sector(s) Ext          |  | 42h                |
| 46. Set Max Address Ext                |  | 37h                |
| 47. Write DMA Ext                      |  | 35h                |
| 48. Write DMA FUA Ext                  |  | 3Dh                |
| 49. Write Multiple Ext                 |  | 39h                |
| 50. Write Multiple FUA Ext             |  | CEh                |
| 51. Write Sector(s) Ext                |  | 34h                |
| <b>NCQ Feature Set</b>                 |  |                    |
| 52. Read FPDMA Queued                  |  | 60h                |
| 53. Write FPDMA Queued                 |  | 61h                |

## 9. SMART Command

### 9-1 SMART subcommand sets

In order to select a subcommand the host must write the subcommand code to the device's Features Register before issuing the SMART Function Set command. The subcommands are listed below.

| Command                          | Command Code (Hex) |
|----------------------------------|--------------------|
| SMART Read Data                  | D0h                |
| SMART Read Attribute Threshold   | D1h                |
| SMART Enable/Disable Auto save   | D2h                |
| SMART Save Attribute Values      | D3h                |
| SMART Execute OFF-LINE Immediate | D4h                |
| Reserved                         | D5h                |
| Reserved                         | D6h                |
| SMART Enable Operations          | D8h                |
| SMART Disable Operations         | D9h                |
| SMART Return Status              | DAh                |

## 9-2 SMART Data Structure (READ DATA (D0h))

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

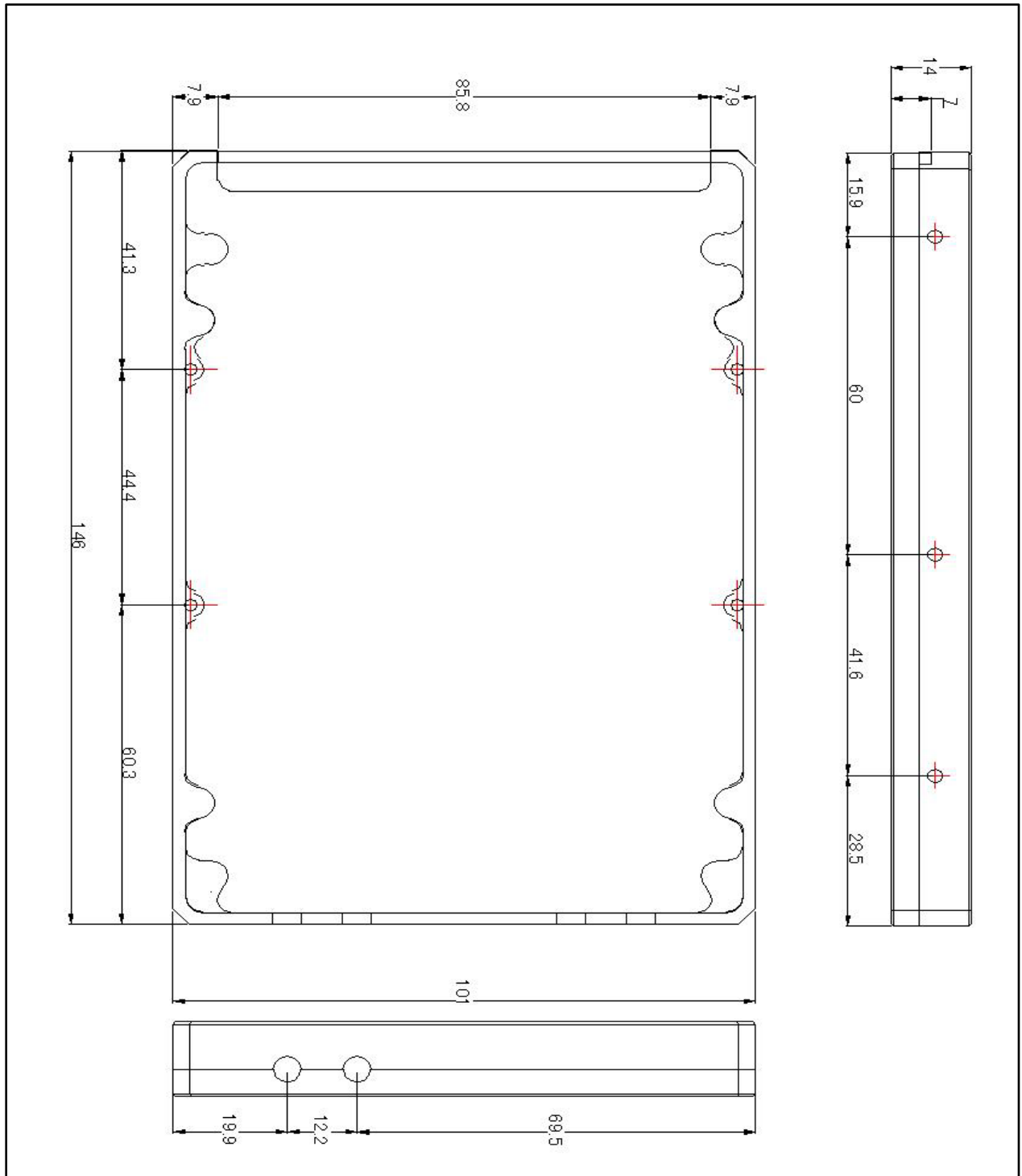
| Byte      | Description                                                                    |
|-----------|--------------------------------------------------------------------------------|
| 0 ~1      | Revision code                                                                  |
| 2~361     | Vendor Specific                                                                |
| 362       | Off-line data collection status                                                |
| 363       | Self-test execution status byte                                                |
| 364 ~ 365 | Total time in seconds to complete off-line data collection activity            |
| 366       | Vendor Specific                                                                |
| 367       | Off-line data collection capability                                            |
| 368 ~ 369 | SMART capability                                                               |
| 370       | Error logging capability<br>7-1 Reserved<br>0 1=Device error logging supported |
| 371       | Vendor Specific                                                                |
| 372       | Short self-test routine recommended polling time (in minutes)                  |
| 373       | Extended self-test routine recommended polling time (in minutes)               |
| 374       | Conveyance self-test routine recommended polling time (in minutes)             |
| 375 ~ 385 | Reserved                                                                       |
| 386 ~ 395 | Firmware Version / Date Code                                                   |
| 396 ~ 397 | Number of initial invalid block (396 = MSB, 397 = LSB)                         |
| 398 ~ 399 | Reserved                                                                       |
| 407 ~ 415 | Vendor Specific                                                                |
| 416       | Reserved                                                                       |
| 418 ~ 419 | Number of spare block                                                          |
| 420 ~ 445 | Reserved                                                                       |
| 511       | Data structure checksum                                                        |

## 10. Identify Device Parameters

| Word    | Value | Description                                                 |
|---------|-------|-------------------------------------------------------------|
| 0       | 044Ah | General configuration                                       |
| 1       | XXXXh | Default number of cylinders                                 |
| 2       | 0000h | Reserved                                                    |
| 3       | 00XXh | Default number of heads                                     |
| 4       | 0000h | Obsolete                                                    |
| 5       | 0240h | Obsolete                                                    |
| 6       | XXXXh | Default number of sectors per track                         |
| 7 ~ 8   | XXXXh | Number of sectors per card (Word7=MSW, Word8=LSW)           |
| 9       | 0000h | Obsolete                                                    |
| 10 ~ 19 | XXXXh | Serial number in ASCII (Right justified)                    |
| 20      | 0002h | Obsolete                                                    |
| 21      | 0002h | Obsolete                                                    |
| 22      | 0000h | Obsolete                                                    |
| 23 ~ 26 | XXXXh | Firmware revision in ASCII (Big Endian Byte Order in Word)  |
| 27 ~ 46 | XXXXh | Model number in ASCII (Big Endian Byte Order in Word)       |
| 47      | 8001h | Maximum number of sectors on Read/Write Multiple command    |
| 48      | 0000h | Reserved                                                    |
| 49      | 0F00h | Capabilities                                                |
| 50      | 4000h | Capabilities                                                |
| 51      | 0200h | PIO data transfer cycle timing mode                         |
| 52      | 0000h | Obsolete                                                    |
| 53      | 0007h | Field validity                                              |
| 54      | XXXXh | Current number of cylinders                                 |
| 55      | XXXXh | Current number of heads                                     |
| 56      | XXXXh | Current sectors per track                                   |
| 57 ~ 58 | XXXXh | Current capacity in sectors (LBAs) (Word57=LSW, Word58=MSW) |
| 59      | 0100h | Multiple sector setting                                     |
| 60 ~ 61 | XXXXh | Total number of sectors addressable in LBA Mode             |
| 62      | 0000h | Reserved                                                    |
| 63      | 0007h | Multi-word DMA transfer                                     |
| 64      | 0003h | Advanced PIO modes supported                                |

|           |        |                                                                                   |
|-----------|--------|-----------------------------------------------------------------------------------|
| 65        | 0078h  | Minimum Multiword DMA transfer cycle time per word                                |
| 66        | 0078h  | Recommended Multiword DMA transfer cycle time                                     |
| 67        | 0078h  | Minimum PIO transfer cycle time without flow control                              |
| 68        | 0078h  | Minimum PIO transfer cycle time with IORDY flow control                           |
| 69 ~ 74   | 0000h  | Reserved                                                                          |
| 75        | 001Fh  | Queue depth                                                                       |
| 76        | 00060h | Serial ATA capabilities<br>- Support Serial ATA Gen1<br>- Support Serial ATA Gen2 |
| 77        | 0000h  | Reserved                                                                          |
| 78        | 0008h  | Device supports initiating interface power management                             |
| 79        | 000h   | Reserved                                                                          |
| 80        | 0080h  | Major Version Number (ATAPI-7)                                                    |
| 81        | 0000h  | Minor Version Number                                                              |
| 82        | 742Bh  | Command sets supported 0                                                          |
| 83        | 5500h  | Command sets supported 1                                                          |
| 84        | 4002h  | Command sets supported 2                                                          |
| 85 ~ 87   | XXXXh  | Command sets / feature Enabled                                                    |
| 88        | 007Fh  | Ultra DMA mode supported and selected                                             |
| 89        | 0003h  | Time required for Security erase unit completion                                  |
| 90        | 0000h  | Time required for Enhanced security erase unit completion                         |
| 91        | 0000h  | Current Advanced power management value                                           |
| 92        | FFFEh  | Master Password Revision Code                                                     |
| 93 ~ 99   | 0000h  | Reserved                                                                          |
| 100 ~ 103 | XXXXh  | Maximum user LBA for 48-bit Address feature set                                   |
| 104 ~ 127 | 0000h  | Reserved                                                                          |
| 128       | 0001h  | Security status                                                                   |
| 129 ~ 159 | 0000h  | Vendor unique bytes                                                               |
| 160       | 0000h  | Power requirement description                                                     |
| 161       | 0000h  | Reserved                                                                          |
| 162       | 0000h  | Key management schemes supported                                                  |
| 163       | 0000h  | CF Advanced True IDE Timing Mode Capability and Setting                           |
| 164 ~ 216 | 0000h  | Reserved                                                                          |
| 217       | 0100h  | Non-rotating media (SSD)                                                          |
| 218 ~ 255 | 0000h  | Reserved                                                                          |

## 11. Mechanical Specifications



➤Note : All Dimensions are in Millimeters.

## 12. Ordering Information

**S   400   -   128G**

**1                      2                                      3**

### 1. Series Type

| Series Type | Content              |
|-------------|----------------------|
| S           | Myung SSD 'S' Series |

### 2. Form factor

| Form factor | Content       |
|-------------|---------------|
| 400         | 3.5 inch SATA |

### 3. Capacity

| Capacity | Content   |
|----------|-----------|
| 032G     | 32 Gbyte  |
| 064G     | 64 Gbyte  |
| 128G     | 128 Gbyte |
| 256G     | 256 Gbyte |
| 512G     | 512 Gbyte |

## 13. Contact

Myung Information Technologies Co., Ltd.

Headquarters : 82-43-218-8400

644-5 Gakri Ochang Cheongwon Chungbuk Korea

Customer service : 82-2-3273-9700

82-2-1577-1377

102 Terminal Electronic Market 40-696 Hangangro 3Ga Yongsangu Seoul Korea

Home page : <http://www.myung.co.kr>

<http://www.my-ssd.com>

# Thanks you.

