



Longline

2.5" SSD

Solid State Drive



Longline 120GB 6G SSD SATA 2.5" UP TO 420/350 MB/s LNG120GBSSD

LNG SSD

LONGLINE SERIES

PRODUCT DATASHEET



1.0 PRODUCT DESCRIPTION

1.1 PRODUCT OVERVIEW

LONGLINE Solid State Disk (SSD) is a storage device that is based on semiconductors rather than rotating magnetic platters. Most SSDs, are based on NAND Flash chips because they are fast, highly reliable, widely available and are non-volatile.

LONGLINE SSDs are 100% compatible with standard hard disk drives, using both industry standard dimensions and a standard hard drive interface. While typical spinning HDDs are the weakest point when it comes to withstanding extremes, an SSD drive is an asset. Along with its durability and reliability, the SSD brings unparalleled performance.

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

1.2 PRODUCT FEATURES

- Capacity: 128GB,256GB,512GB,1TB,2TB
- Internal Cache
- Form Factor: 2.5" (HDD compatible)
- Supports 1-port 1.5/3.0/6.0Gbps SATA I/II/III interface.
- SMART feature set and 48-bit Address feature set
- Compatibility: Full SATA hard disk compatible
- Ultra-rugged and reliable
- High-speed performance
- Silent, no moving parts
- Data retention: JESD47 compliant
- Proprietary wear leveling algorithms
- 100% tested hardware and software
- Support Industrial Temperature Requirements(optional)

Operating Voltage Requirement: $V_{CC} = 5.0V \pm 5\%$

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: 54.00 ± 0.20 mm

Width: 53.40± 0.20 mm

Thickness: 5.70 ± 0.20 mm

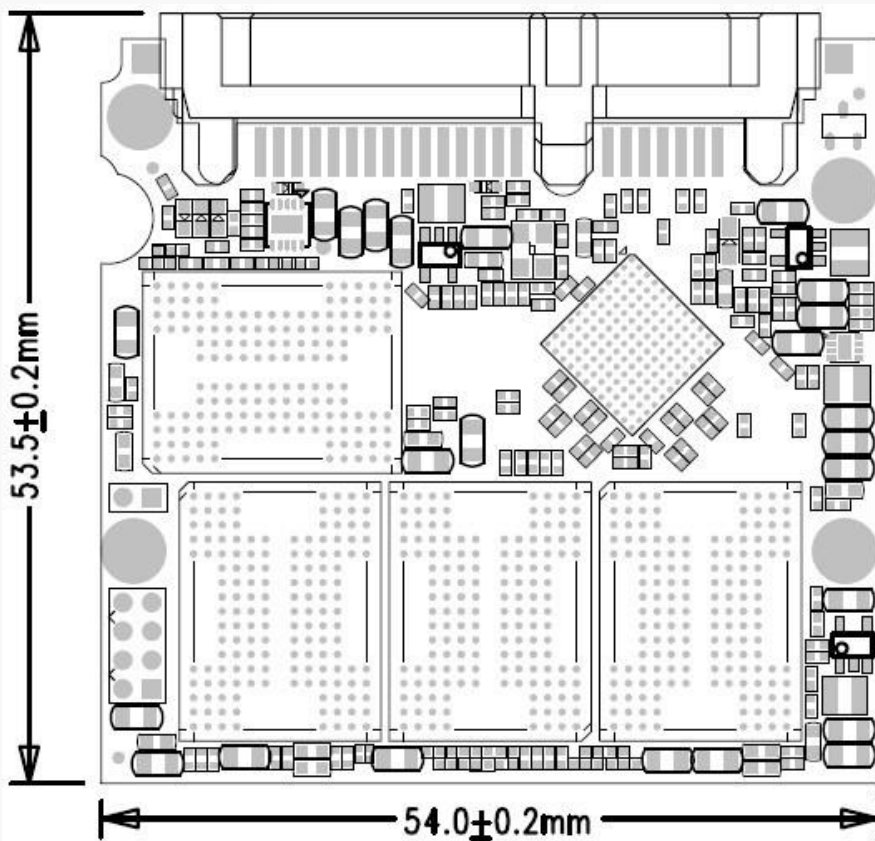


Figure 1: 2.5" SATAIII SSD Outline Drawing.



3.0 ELECTRICAL SPECIFICATIONS

Operating Voltage: $V_{cc} = 5V \pm 5\%$

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: 0.1 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

* 2.5" SATAIII SSD 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)—MB/s Up to | | | |
|-------------|--|------------|---------------|----------------|
| | 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

| Symbol | Rating | Value | Unit |
|-----------|---------------------|-------------|------|
| V_{IN} | Input Voltage | 5.0V +/- 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 |
| 120GB/128GB | 0.49 | 2.44 | 4.10 |
| 240GB/256GB | 0.53 | 2.58 | 4.28 |
| 480GB/512GB | 0.50 | 2.48 | 4.26 |
| 960GB/1TB | 0.51 | 2.80 | 4.26 |
| 1920GB/2TB | 0.51 | 2.81 | 4.28 |

3.3 TOTAL BYTES WRITTEN

Table 4: TBW and Daily Usage Guideline results

| Capacity | TBW | Daily Usage Guideline |
|--------------------|-------|-----------------------|
| 120GB/128GB | 50TB | 45GB/day |
| 240GB/256GB | 100TB | 90GB/day |
| 480GB/512GB | 200TB | 180GB/day |
| 960GB/1TB | 400TB | 360GB/day |
| 1920GB/2TB | 800TB | 720GB/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: Operation: 120,000f



5.0 QUALITY AND RELIABILITY SPECIFICATIONS

Data Retention: JESD47 compliant

Wear Leveling: Static and dynamic wear-leveling algorithm.

Bad Block Management: Failed Blocks of Flash will be replaced with new ones by the SSD.

ECC/EDC (Error Correction Code/Error Detection Code):

- Hardware LDPC ECC engine

MTBF: >1,000,000 hours

Power Cycle: 1000 times

Table 5: Power Cycle Test Configure

| Test Platform: Power Cycle Test Configure | | | | |
|---|-------------|------------|------------|-----------|
| Test Items | Total Times | PASS Times | Fail Times | Log Photo |
| Cycles | 1000 times | 1000 times | 0 times | |
| Random | 1000 times | 1000 times | 0 times | |

6.0 COMPLIANCE SPECIFICATIONS

All 2.5" SATAIII SSD are compliant with the following standards and regulations:

- RoHS
- CE
- FCC

7.0 PIN DESCRIPTIONS

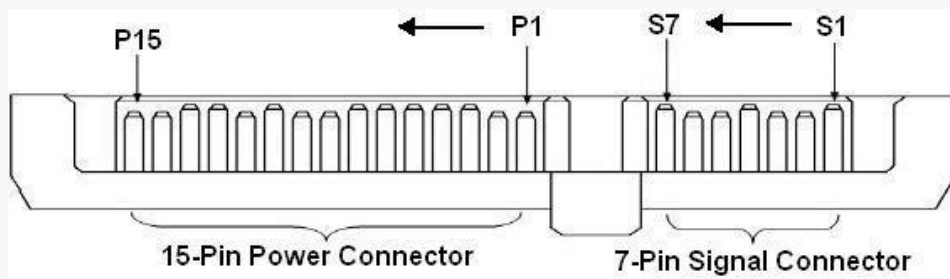


Figure 2: 7+15 Serial ATA port Interface Description



7.1 DATA PIN ASSIGNMENTS

Table 6: Data Pin Signal Assignment

| Pin | Signal Name | Description |
|-----|-------------|---------------------------------------|
| S1 | GND | 2nd mate |
| S2 | A+ | Differential Signal Pair for Receiver |
| S3 | A- | Differential Signal Pair for Receiver |
| S4 | GND | 2nd mate |
| S5 | B- | Differential Signal Pair for Receiver |
| S6 | B+ | Differential Signal Pair for Receiver |
| S7 | GND | 2nd mate |

7.2 CONFIGURATION DESCRIPTIONS

Table 7: Configuration Description

| Pin | Symbol | Description |
|-----|----------------------------|-------------|
| P1 | Not Used (3.3V) | N/A |
| P2 | Not Used (3.3V) | N/A |
| P3 | Not Used (3.3V P recharge) | |
| P4 | GND | 1st mate |
| P5 | GND | 2nd mate |
| P6 | GND | |
| P7 | 5V P recharge | 5V Power |
| P8 | 5V P recharge | 5V Power |
| P9 | 5V P recharge | |
| P10 | GND | |
| P11 | Reserved | |
| P12 | GND | |
| P13 | Not Used (12V P recharge) | N/A |
| P14 | Not Used(12V) | |
| P15 | Not Used(12V) | |

8.0 SUPPORTED ATA COMMAND SET

8.1 ATA COMMAND REGISTER

2.5" SATAIII SSD supports the command show in the following tables.



Table 8: ATA Command table

| Command Name | Code (Hex) | PARAMETERS USED | | | | | |
|------------------------------|------------|-----------------|----|--------|----|----|----|
| | | S C | SN | C Y | DR | HD | FT |
| CHECK PWER MODE | E5h | X | X | X | O | X | X |
| EXECUTE DIAGNOSTICS | 90h | X | X | X | O | X | X |
| FLUSH CACHE | E7h | X | X | X | O | O | X |
| IDENTIFY DEVICE | ECh | X | X | X | O | X | X |
| IDLE | E3h | O | X | X | O | X | X |
| IDLE IMMEDIATE | E1h | X | X | X | O | X | X |
| INITIALIZE DEVICE PARAMETERS | 91h | O | X | X | O | O | X |
| READ DMA | C8h | O | O | O | O | O | X |
| READ DMA EXT | 25h | O | O | O | O | O | X |
| READ FPDMA QUEUED | 60h | O | O | O | O | O | X |
| DEAD LOG DMA EXT | 47h | O | O | O | O | O | X |
| READ LOG EXT | 2Fh | O | O | O | O | O | X |
| READ MULTIPLE | C4h | O | O | O | O | O | X |
| READ SECTOR(S) | 20h or 21h | O | O | O | O | O | X |
| READ VERIFY SECTOR(S) | 40h or 41h | O | O | O | O | O | X |
| RECALIBRATE | 10h | X | X | X | O | X | X |
| SECURITY DIS ABLE PASSWORD | F6h | X | X | X | O | X | X |
| SECURITY ERASE PREPARE | F3h | X | X | X | O | X | X |
| SECURITY ERASE UNIT | F4h | X | X | X | O | X | X |
| SECURITY FREEZE LOCK | F5h | X | X | X | O | X | X |
| SECURITY SET PASSWORD | F1h | X | X | X | O | X | X |
| SECURITY UNLOCK | F2h | X | X | X | O | X | X |
| SEEK | 7Xh | X | X | O | O | O | X |
| SET FEATURES | EFh | O | X | X | O | X | O |
| SET MULTIPLE MODE | C6h | O | X | X | O | X | X |
| SLEEP | 7xh | X | X | O | O | O | X |
| SMART | B0h | X | X | O | O | X | O |
| STANDBY | E2h | X | X | X | O | X | X |
| STANDBY IMMEDIATE | E0h | X | X | X | O | X | X |
| WRITE DMA | CAh | O | O | O | O | O | X |
| WRITE DMA EXT | 35h | O | O | O | O | O | X |
| WRITE FPDMA QUEUED | 61h | O | O | O | O | O | X |
| WRITE LOG DMA EXT | 57h | O | O | O | O | O | X |
| WRITE LOG EXT | 3Fh | O | O | O | O | O | X |
| WRITE MULTIPLE | C5h | O | O | O | O | O | X |
| WRITE SECTOR(S) | 30h or 31h | O | O | O | O | O | X |

Note:

O = Valid, X = Don't care



SC = Sector Count

Register SN = Sector

Number Register

CY = Cylinder Low/High Register

DR = DEVICE SELECT Bit (DEVICE/HEAD

Register Bit 4) HD = HEAD SELECT Bit

(DEVICE/HEAD Register Bit 3-0)

FT = Features Register

Table 9: Features register value and settable operating mode

| Value | Function |
|-------|---|
| 02h | Enable write cache |
| 03h | Set transfer mode based on value in Sector Count register |
| 55h | Disable read look-ahead feature |
| 82h | Disable write cache |
| 90h | Disable use of SATA feature |
| AAh | Enable read look-ahead feature |



9.0 INSTALLATION

BEFORE GETTING STARTED

1. Back Up 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.