Longline

2.5” SSD

Solid State Drive

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 +/-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)

RANDOM READING : 90 000 IOPS
RANDOM WRITING : 80 000 IOPS

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

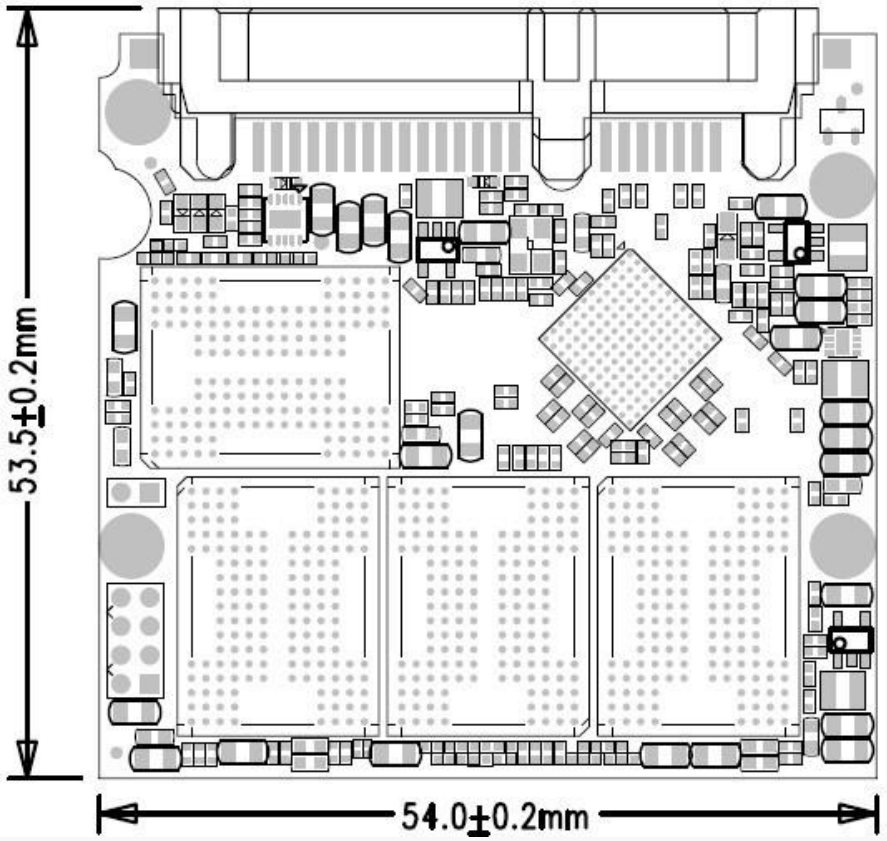

Figure 1: 2.5" SATAIII SSD Outline Drawing.

3.0 ELECTRICAL SPECIFICATIONS

Operating Voltage: V_{cc} = 5V ±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

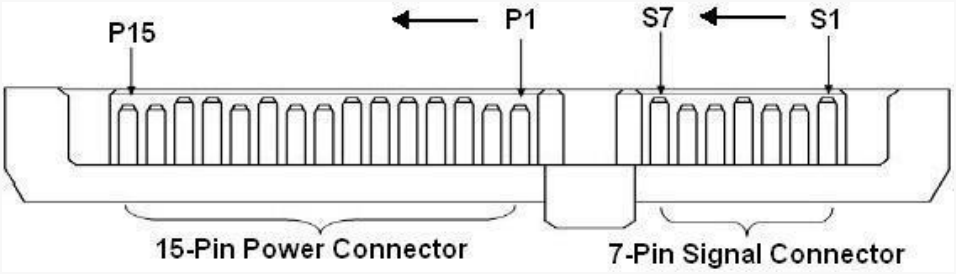

Figure 2: 7+15 Serial ATA port Interface Description

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					
		SC	SN	CY	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.