swissbit®

Product fact sheet

Industrial SATA SSD 2.5"

X-500 Series

SATA II, high performance, high reliability
SLC NAND Flash



made in germany

X-500 Series – Industrial SATA Solid State Drive 2.5" 16GB to 512GB based on SLC NAND flash

1 Feature summary



- Form factor:
  - 2.5-inch SATA Solid State Drive (SSD)
  - 100.1mm x 69.85mm x 9.2mm
  - 7+15 pin (SATA+power) locking/latching SATA connector
- Interface:
  - SATA Rev 2.6 – 3Gbit/s (1.5Gbit/s compatible)
- Feature connector for
  - Secure erase and write protect input
  - Device activity and secure erase output (LED)
  - Ground pin
- Optional various secure erase/sanitize/purge methods (HW and SW triggered, simple erase also in standard SSD)
- Highly-integrated memory controller
  - SLC NAND Flash
  - Hardware BCH-code ECC (up to 40 Bit correction per 2 sectors)
  - Fix drive configuration
- Low-power CMOS technology
- 5.0V ± 10% power supply
- Low Power, less than 1 W (idle) / 3.5 W (operation) / 0.7 W slumber average current
- No mechanical noise
- Wear Leveling: active wear leveling of static and dynamic data
  The wear leveling assures that dynamic data as well as static data is balanced evenly across the memory. With that the maximum write endurance of the device is guaranteed.
- Mechanical robustness (MIL-STD810)
- High reliability
  - Best available SLC NAND Flash technology
  - Data retention 10 years
  - StaticDataRefresh and EarlyRetirement Technologies for data refresh
  - MTBF ≥ 2,000,000 hours
  - Number of connector insertions/removals: 500 on SATA back plane, 50 on SATA cable
- High performance
  - Up to 300MB/s burst transfer rate in SATA II – 3.0Gb/sec
  - Sustained Read / Write Performance: up to 240MB/s / 200MB/s
  - 4KB Read / Write IOPS: up to 14500 / 7000
  - Access time <0.2ms
  - TRIM and NCQ support
- Available densities
  - 16GB up to 512GB (SLC)
- S.M.A.R.T. with extended information
- HPA, security feature set, 48bit feature set
- Internal temperature sensor (current, minimum, maximum)
- Operation systems: Microsoft Windows8, 7, Vista, XP (all 32/64bit), Linux, Apple MacOS X, Embedded versions, RTOS
- Firmware update possible
- 2 Operating Temperature ranges
  - Commercial Temperature range 0 ... +70°C
  - Industrial Temperature range -40 ... +85°C
- Life Cycle Management
- Controlled BOM
- RoHS, China-RoHS, REACH compatible, WEEE, CE, FCC compliant

Table 1: System Performance

System Performance	16GB	512GB	Unit
Data transfer Rate (SATA burst)	3.0 (1.5)	3.0 (1.5)	Gbit/s
Sustained Read (typ. measured)	226	236	MB/s
Sustained Write (typ. measured)	142	220	
Random Read 4kB	14150	14300	IOPS
Random Write 4kB	4900	3800	

All values refer to Toshiba Flash chips (see part number) in UDMA5 mode (SATA 3.0Gbit/s) with Sequential write/read test (256 sectors multiple commands) and sequential and random write/read test (8 sectors multiple commands).Sustained Speed depends on flash type and number, file/cluster size, and burst speed.

Table 2: Current consumption(1) at 5V ± 10%

Current Consumption	16GB	512GB	Unit
Write (SATA-II/UDMA6)	330	420	mA
Read (SATA-II/UDMA6)	270	350	
Idle	155	175	
Partial/ Slumber	100/120	120/140	
Quick Erase / Sanitize	270/395	620/960	

1. All values are typical at 25° C and nominal supply voltage and refer to SATAII performance test random pattern.

Table 3: Environmental Specifications

Environmental Specifications	Operating	Non Operating
Temperature (commercial)	0 to 70°C	-55 to 95°C *)
Temperature (industrial)	-40 to 85°C	-55 to 95°C *)
Humidity (non-condensing)	85% RH 85°C, 1000 hrs (JEDEC JESD22, method A101-B)	

*) Storage Temperatures above 40°C can reduce the data retention

Table 4: Physical Dimensions

Physical Dimensions		Unit
Length	100.1±0.2	mm
Width	69.85±0.2	
Thickness	9.2±0.2	
Weight (typ.)	80	g

Table 5: SSD capacity specification

Density	Default cylinders	Default heads	Default sectors	Sectors drive	Total addressable Bytes	Remark
16GB	16'383*)	16	63	31'277'056	16'013'852'672	
32GB	16'383*)	16	63	62'586'880	32'044'482'560	
64GB	16'383*)	16	63	125'313'024	64'160'268'288	
128GB	16'383*)	16	63	250'626'048	128'320'536'576	
256GB	16'383*)	16	63	500'118'192	256'060'514'304	IDEMA value
512GB	16'383*)	16	63	1'000'215'216	512'110'190'592	IDEMA value

*) The CHS access is limited to about 8GB. Above 8GB, the drive must be addressed in LBA mode.

Table 6: System Reliability and Maintenance

MTBF (at 25°C)	> 2,000,000 hours
Data Reliability	< 1 Non-Recoverable Error per 10^{14} bits Read

(1) Dependent on final system qualification data.

For more information on Serial ATA Revision 2.6, please visit Serial ATA International Organization at www.serialata.org

Why Swissbit?

Swissbit strives to create innovative technologies for future market opportunities utilizing a highly skilled in-house product research and development team. Swissbit maintains a marketing edge by continuing to manufacture world-class high quality memory products and providing customers with both high value and low cost of ownership achieved through efficient processes and procedures.