

SanDisk is Your Best Choice for Flash Data Storage

As the world's largest supplier of flash data storage products, SanDisk has a unique understanding of the industrial market. For over a decade, SanDisk has been designing, manufacturing and marketing robust, reliable, high-performance storage products for a wide variety of rigorous industrial applications. Simply put, SanDisk delivers solutions that work. Today. Tomorrow. And beyond. For more information, call 408-542-0595.

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SanDisk Industrial ATA Products



INDUSTRIAL GRADE AND
STANDARD GRADE –
CHOOSE THE RIGHT GRADE
FOR YOUR APPLICATION.

SanDisk, the world leader in flash data storage, offers two product lines of ATA cards allowing you to select the right grade of product for your Industrial application. These enhanced product lines of robust and reliable storage solutions designed specifically for today's rigorous industrial market applications include:

SanDisk CompactFlash® memory cards, SanDisk ATA industry standard PC Cards, and SanDisk FlashDrive, a 2.5" IDE disk drive-compatible replacement product.

All SanDisk industrial products are subject to rigorous qualification and stringent test processes to ensure the highest quality, reliability and compatibility. Plus, Industrial Grade products are backed by a comprehensive 7-year warranty.

Whether your industrial application requires operating systems storage, data logging, or redundancy for other less reliable storage, SanDisk has a proven flash storage solution to meet your particular needs. After all, we have more than 15 years of experience integrating solid-state solutions into the most demanding industrial environments.

Our business was founded serving industrial customers and we remain dedicated to delivering superior products into this market. SanDisk understands the industrial market—and what it takes to succeed in it.

Give your industrial applications the most reliable flash data storage solutions available. Give them SanDisk—the #1 name in flash data storage.



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Tough Applications Demand Tough Solutions

SanDisk Delivers Performance, Endurance and Reliability

Industry Leading Performance

SanDisk Industrial products deliver industry-leading read and write performance. This is achieved through new controller architecture and firmware optimized for Industrial applications. SanDisk recognizes that no two industrial applications access flash memory cards in exactly the same way, which is why SanDisk Industrial products are optimized to meet the requirements of a broad range of usage scenarios. The net benefit is substantial improvement in both read and write operations in a variety of customer applications. Of special importance is the enhanced small/random file access and faster operating system boot time offered by the Industrial Grade products.

Extreme Endurance

SanDisk's Industrial Grade product family delivers very high endurance levels due to enhanced error correcting capability. The Industrial Grade products support greater than 2,000,000 program erase cycles while Standard Grade offers 300,000 program erase cycles per physical block compared to industry standard products with 100,000 to 300,000 program/erase cycles. This industry leading endurance is based on superior error correcting capability and advanced wear leveling techniques in the Industrial Grade product family. The extended program/erase cycle specification is achieved while still meeting the standard specification for 10^{14} uncorrectable error reads over this extended number of cycles. The extreme endurance of SanDisk's Industrial Grade products provides a significantly reduced probability of errors in the field while extending product life.

Improved Reliability

Another key feature of the Industrial Grade product line is a substantial improvement in MTBF (mean time between failure). For the SanDisk Industrial Grade product family, the MTBF specification is improved by a factor of three and exceeds 3 million hours (the industry standard is 1 million hours MTBF). To further assure reliability leadership of SanDisk's Industrial Grade product line, SanDisk performs on-going reliability testing (ORT) as a continued measure of this reliability specification. The benefit to SanDisk's customers is a third fewer field failures than industry standard 1 million hour MTBF products resulting in lower cost of ownership.

Card Traceability

All SanDisk Industrial ATA products include card level traceability providing customers the ability to track specific cards or groups of cards from their origin through deployment in the field. Traceability gives customers valuable insight into which products go into specific sales orders, enabling improved field reliability management by product application. Using card unique serial numbers, customers can track where cards are used, and trace backward to identify product origin including assembly, inspection and test routes. They can also monitor warranty information and identify components within sales order by date.

CompactFlash

Weighing only half an ounce and as small as a matchbook, SanDisk's CompactFlash card's industry standard ATA compatible 50-pin cartridge can easily be designed in to virtually any application, making it the ideal solution for applications requiring very reliable, low power storage. CompactFlash is available in capacities ranging from 16MB to 2GB and is fully CFA compliant.

SanDisk created the CompactFlash memory card and is the global leader in the development of new flash data storage standards.



ATA PC Card

SanDisk PC Cards are the highest capacity industry-standard cards available in Type II form factor and provide interoperability across virtually all platforms. PC Cards are ideal for customers requiring high capacity, low power storage solutions. PC Cards range in capacity from 16MB to 8GB.



2.5" IDE Flash Drive

SanDisk Flash Drive is a drop in replacement for less reliable rotating media. With high performance and up to 8GB of storage, the Flash Drive is the ideal solution to easily and cost effectively upgrade your Industrial application to more reliable Flash storage.

All SanDisk Industrial Grade products offer these features:

- Industry leading performance
 - 10MB/sec sequential read speed
 - 9MB/sec sequential write speed
- Improved data integrity and reliability
 - powerful error correction
- Extreme endurance
 - 2,000,000 program / erase cycles per block
- Increased reliability
 - MTBF greater than 3 million hours
- Industry-leading 7-year warranty
- Enhanced durability
 - Robust RTV silicone for added strength and stability
- All product goes through a comprehensive industrial test flow

All SanDisk Standard Grade products offer these features:

- Exceptional performance
 - 10MB/sec sequential read speed
 - 3MB/sec sequential write speed
- Improved data integrity and reliability
 - powerful error correction
- High endurance
 - 300,000 program / erase cycles per block
- Increased reliability
 - MTBF greater than 1 million hours
- 1 year warranty
- Enhanced durability
 - Robust RTV silicone for added strength and stability
- All product goes through a comprehensive industrial test flow

CompactFlash

PC Card ATA Flash

2.5" FlashDrive

Interface	CompactFlash		PC Card ATA Flash		Interface	2.5" FlashDrive	
	Industrial Grade	Standard Grade	Industrial Grade	Standard Grade		Industrial Grade	Standard Grade
	PC Card ATA and True IDE Mode	PC Card ATA and True IDE Mode	PC Card ATA and True IDE Mode	True IDE Mode	IDE		
System Performance (Notes 1 & 2) Data Transfer Rate to/from Host Maximum Sustained Data Rate	16.0 MB/sec burst 10 MB/sec read 9 MB/sec write	16.0 MB/sec burst 10 MB/sec read 3 MB/sec write	16.0 MB/sec burst 10 MB/sec read 9 MB/sec write	16.0 MB/sec burst 10 MB/sec read 3 MB/sec write	16.0 MB/sec burst 10 MB/sec read 9 MB/sec write		
Power Requirements (Note 1) DC Input Voltage Commercial Extended	3.3V ± 10%, 5V ± 10% 3.3V ± 10%, 5V ± 10%	3.3V ± 10%, 5V ± 10% 3.3V ± 10%, 5V ± 10%	3.3V ± 10%, 5V ± 10% 3.3V ± 10%, 5V ± 10%	3.3V ± 10%, 5V ± 10% 3.3V ± 10%, 5V ± 10%	3.3V ± 10%, 5V ± 10% 3.3V ± 10%, 5V ± 10%		
Typical Power Dissipation (Notes 3 & 4) Sleep Read Write	600 µA (3.3V) 700 µA (5V) 40 mA RMS (3.3V) 45 mA RMS (5V) 55 mA RMS (3.3V) 60 mA RMS (5V)	600 µA (3.3V) 700 µA (5V) 40 mA RMS (3.3V) 45 mA RMS (5V) 55 mA RMS (3.3V) 60 mA RMS (5V)	600 µA (3.3V) 700 µA (5V) 40 mA RMS (3.3V) 45 mA RMS (5V) 55 mA RMS (3.3V) 60 mA RMS (5V)	600 µA (3.3V) 700 µA (5V) 40 mA RMS (3.3V) 45 mA RMS (5V) 55 mA RMS (3.3V) 60 mA RMS (5V)	600 µA (3.3V) 700 µA (5V) 40 mA RMS (3.3V) 45 mA RMS (5V) 55 mA RMS (3.3V) 60 mA RMS (5V)		
Environmental Specifications Temperature Operating Commercial Operating Extended Non-Operating Commercial Non-Operating Extended Humidity Operating Non-Operating Acoustic Noise (at 1 meter) Vibration Operating Non-Operating Shock Operating Non-Operating Altitude (relative to sea level) Operating/Non-Operating	0-70°C -40-85°C -25-85°C -50-100°C 8-95%, non-condensing 8-95%, non-condensing 0 dB 30 G peak to peak max. 30 G peak to peak max. 3,000 G max. 3,000 G max. 80,000 feet max.	0-70°C -40-85°C -25-85°C -50-100°C 8-95%, non-condensing 8-95%, non-condensing 0 dB 15 G peak to peak max. 15 G peak to peak max. 2,000 G max. 2,000 G max. 80,000 feet max.	0-70°C -40-85°C -25-85°C -50-100°C 8-95%, non-condensing 8-95%, non-condensing 0 dB 30 G peak to peak max. 30 G peak to peak max. 2,000 G max. 2,000 G max. 80,000 feet max.	0-70°C -40-85°C -25-85°C -50-100°C 8-95%, non-condensing 8-95%, non-condensing 0 dB 15 G peak to peak max. 15 G peak to peak max. 1,000 G max. 1,000 G max. 80,000 feet max.	0-70°C -40-85°C -25-85°C -50-100°C 8-95%, non-condensing 8-95%, non-condensing 0 dB 15 G peak to peak max. 15 G peak to peak max. 1,000 G max. 1,000 G max. 80,000 feet max.		
Reliability and Maintenance Endurance MTBF (Mean Time Between Failures) Preventive Maintenance Data Reliability	>2,000,000 program cycles per block >3,000,000 hours None <1 non-recoverable error in 10 ¹⁶ bits read	>300,000 program erase cycles per block >1,000,000 hours None <1 non-recoverable error in 10 ¹⁶ bits read	>2,000,000 program cycles per block >3,000,000 hours None <1 non-recoverable error in 10 ¹⁶ bits read	<1 non-recoverable error in 10 ¹⁶ bits read >1,000,000 hours None <1 non-recoverable error in 10 ¹⁶ bits read	<1 non-recoverable error in 10 ¹⁶ bits read >3,000,000 hours None <1 non-recoverable error in 10 ¹⁶ bits read		
Physical Specifications Length Width Thickness (Body) Weight	CompactFlash CF Adapter 1.433 in (36.4 mm) 3.370 in (85.6 mm) 1.685 in (42.8 mm) 2.126 in (54.0 mm) 0.130 in (3.30 mm) 0.1968 in (5.0 mm) 0.40 oz (11.4 g) 1.16 oz (33 g)	CompactFlash CF Adapter 1.433 in (36.4 mm) 3.370 in (85.6 mm) 1.685 in (42.8 mm) 2.126 in (54.0 mm) 0.130 in (3.30 mm) 0.1968 in (5.0 mm) 0.40 oz (11.4 g) 1.16 oz (33 g)	3.370 ± .008 in (85.6 ± 0.20 mm) 2.126 ± .004 in (54.0 ± 0.10 mm) .1968 in (5.0 mm max.) 1.52 oz (43 g) max.	3.370 ± .008 in (85.6 ± 0.20 mm) 2.126 ± .004 in (54.0 ± 0.10 mm) .1968 in (5.0 mm max.) 1.52 oz (43 g) max.	100.2 ± 0.51 mm 69.85 ± 0.51 mm 9.6 ± 5.0 mm 160 g max.		
Ordering Information Order Model # Where X: YY:	SDCFBX-YY-201-80 SDCF-03 CF Adapter I=Extended temp. Commercial temp. 32 16.0 MB 16 32.1 MB 64 64.2 MB 128 128.4 MB 256 256.9 MB 512 512.4 MB 1024 1024.9 MB 2048 2048.9 MB	SDCFBX-YY-201-00 SDCF-03 CF Adapter I=Extended temp. Commercial temp. 32 32.1 MB 64 64.2 MB 128 128.4 MB 256 256.9 MB 512 512.4 MB 1024 1024.9 MB 2048 2048.9 MB 4096 4097.8 MB	SDP3BX-YY-201-80 I=Extended temp. Commercial temp. 16 16.0 MB 512 512.4 MB 32 32.1 MB 1024 1024.9 MB 64 64.2 MB 2048 2048.9 MB 128 128.4 MB 4096 4097.8 MB 256 256.9 MB 512 512.4 MB 1024 1024.9 MB 2048 2048.9 MB 4096 4097.8 MB 8192 8195.6 MB	SDP3BX-YY-201-00 I=Extended temp. Commercial temp. 32 32.1 MB 64 64.2 MB 128 128.4 MB 256 256.9 MB 512 512.4 MB 1024 1024.9 MB 2048 2048.9 MB 4096 4097.8 MB 8192 8195.6 MB	SD25BX-YY-201-80 I=Extended temp. Commercial temp. 32 32.1 MB 1024 1024.9 MB 64 64.2 MB 2048 2048.9 MB 128 128.4 MB 4096 4097.8 MB 256 256.9 MB 512 512.5 MB		

Specifications subject to change without notice

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Interface	IDE
System Performance (Notes 1 & 2) Data Transfer Rate to/from Host Maximum Sustained Data Rate	16.0 MB/sec burst 10 MB/sec read 9 MB/sec write
Power Requirements (Note 1) DC Input Voltage Commercial Extended	3.3V ± 10%, 5V ± 10% 3.3V ± 10%, 5V ± 10%
Typical Power Dissipation (Notes 3 & 4) Sleep Read Write	600 µA (3.3V) 700 µA (5V) 40 mA RMS (3.3V) 45 mA RMS (5V) 55 mA RMS (3.3V) 60 mA RMS (5V)
Environmental Specifications Temperature Operating Commercial Operating Extended Non-Operating Commercial Non-Operating Extended Humidity Operating Non-Operating Acoustic Noise (at 1 meter) Vibration Operating Non-Operating Shock Operating Non-Operating Altitude (relative to sea level) Operating/Non-Operating	0-70°C -40-85°C -25-85°C -50-100°C 8-95%, non-condensing 8-95%, non-condensing 0 dB 15 G peak to peak max. 15 G peak to peak max. 1,000 G max. 1,000 G max. 80,000 feet max.
Reliability and Maintenance Endurance MTBF (Mean Time Between Failures) Preventive Maintenance Data Reliability	>2,000,000 program cycles per block >3,000,000 hours None <1 non-recoverable error in 10 ¹⁶ bits read
Physical Specifications Length Width Thickness (Body) Weight	100.2 ± 0.51 mm 69.85 ± 0.51 mm 9.6 ± 5.0 mm 160 g max.
Ordering Information Order Model # Where X: YY:	SD25BX-YY-201-80 I=Extended temp. Commercial temp. 32 32.1 MB 1024 1024.9 MB 64 64.2 MB 2048 2048.9 MB 128 128.4 MB 4096 4097.8 MB 256 256.9 MB 512 512.5 MB

Note 1: All values quoted are typical at ambient temperature and nominal supply voltage unless otherwise stated.

Note 2: All performance timing assumes the controller is in the default (i.e., fastest) mode.

Note 3: Sleep mode currently is specified under the condition that all card inputs are static CMOS levels and in a "Not Busy" operating state.

Note 4: The currents specified show the bounds of programmability of the product.

Testing, Testing and More Testing

SanDisk's stringent test process ensures outstanding quality and reliability

- Memory Test
- Controller Test
- Card Test
- On-going Reliability Test

Statistical-based quality control at all points of the manufacturing process, from memory through card test, assure only the highest quality products receive the SanDisk label. In addition, SanDisk designs all product components in-house so you can be assured of 100% compatibility in today's products and in the future.

Rigorous system tests guarantee high quality and 100% compatibility

- All products are tested to CFA and PCMCIA specifications
- Final QUAL reports available after 2000 hours of testing
- Compatibility testing performed against standard industrial environments
- Performance, reliability and MTBF analysis performed with all product revisions
- Statistical-based strict quality controls in place at all points of manufacturing, assembly, configuration and test
- All products are 100% tested rather than sampled
- Qualification and compatibility reports available on all products

SanDisk's Reliable Flash Data Storage is Ideal for a Wide Range of Industrial Markets

- Aerospace
- Automotive
- Avionics
- Data Collection
- Digital Imaging
- Embedded Computing
- Gaming
- GPS/Navigation
- Industrial Control
- In-Flight Entertainment
- Medical
- Military
- Networking
- Portable Communication
- POS Machines
- Telecom Infrastructure
(Switches, Base Stations)

