

ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Visit our website - *Click HERE*

InnoDisk FiD 1.8” SATA10000

InnoDisk FiD 1.8” SATA10000

Datasheet

Preliminary

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table of contents

REVISION HISTORY **4**

LIST OF TABLES **5**

LIST OF FIGURES **6**

1. PRODUCT OVERVIEW **7**

INTRODUCTION OF INNODISK FID 1.8” SATA 10000 7

PRODUCT VIEW 7

PRODUCT MODELS 7

MICRO SATA INTERFACE 7

1.8-INCH FORM FACTOR 8

CAPACITY 8

2. THEORY OF OPERATION **9**

OVERVIEW 9

SATA II CONTROLLER 9

ERROR DETECTION AND CORRECTION 9

WEAR-LEVELING 9

BAD BLOCKS MANAGEMENT 10

3. INSTALLATION REQUIREMENTS **11**

ELECTRICAL CONNECTIONS FOR FID 2.5 SATA 6000 11

DEVICE DRIVE 11

4. SPECIFICATIONS **12**

CE COMPATIBILITY 12

ROHS COMPLIANCE 12

ENVIRONMENTAL SPECIFICATIONS 12

Temperature Ranges *12*

Humidity *12*

Shock and Vibration *12*

Mean Time between Failures (MTBF) *12*

ENDURANCE 13

TRANSFER MODE 13

MICRO SATA PIN SIGNAL DEFINITION AND CONTACT MATING SEQUENCE 13

MECHANICAL DIMENSIONS 14

ASSEMBLY WEIGHT 15

PERFORMANCE 15

SEEK TIME 15

HOT PLUG 15

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NAND FLASH MEMORY 16
ELECTRICAL SPECIFICATIONS 16
Power Requirement *16*
Power Consumption *16*
DEVICE PARAMETERS 16
5. SUPPORTED ATA COMMANDS 18

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

REVISION HISTORY

Revision	Description	Date
Preliminary	First Released	6/2/2008

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

List of Tables

TABLE 1: SHOCK/VIBRATION TESTING FOR INNODISK FID 1.8” SATA 10000 12
TABLE 2: INNODISK FID 1.8” SATA 10000 MTBF 13
TABLE 3: INNODISK FID 1.8” SATA 10000 PIN ASSIGNMENT 13
TABLE 4: INNODISK FID 1.8” SATA 10000 POWER REQUIREMENT 16
TABLE 5: POWER CONSUMPTION 16
TABLE 6: DEVICE PARAMETERS 17
TABLE 7: ATA COMMANDS 18

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

List of Figures

FIGURE 1: INNODISK FID 1.8” SATA 10000 7
FIGURE 2: INNODISK FID 1.8” SATA 10000 BLOCK DIAGRAM 9
FIGURE 3: FID 1.8 SATA 10000 MECHANICAL DIMENSIONS 15

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

1. Product Overview

Introduction of InnoDisk FiD 1.8” SATA 10000

InnoDisk FiD 1.8” SATA 10000 products provide high capacity flash memory Solid State Drive (SSD) that electrically complies with Serial ATA (SATA) standard. InnoDisk FiD 1.8” SATA 10000 support SATA II standard (3.0GHz) with high performance. Sustain read is 120 MB per second, and sustain write is 70 MB per second. InnoDisk FiD 1.8” SATA 10000 uses standard 1.8-inch form factor with Micro SATA interface. InnoDisk FiD 1.8” SATA 10000 is designed for industrial field. The SSD have good performance, and have small latency time. It effectively reduces the booting time of operation system and the power consumption is less than hard disk drive (HDD). InnoDisk FiD 1.8” SATA 10000 can work in harsh environment. The SSD is vibration resistance, and can work in lower or higher temperature than HDD. InnoDisk FiD 1.8” SATA 10000 complies with ATA protocol, no additional drives are required, and the SSD can be configured as a boot device or data storage device.

Product View



Figure 1: InnoDisk FiD 1.8” SATA 10000

Product Models

InnoDisk FiD 1.8” SATA 10000 is available in capacities ranging from 8GB to 32GB, making the upgrade path simple and fast.

Micro SATA Interface

InnoDisk FiD 1.8” SATA 10000 support SATA II interface, and compliant with SATA I. SATA II interface can work with Serial Attached SCSI (SAS) host system, which is used in server computer. InnoDisk FiD 1.8” SATA 10000 is compliant with Serial ATA Gen 1 and Gen 2 specification (Gen2 supports 1.5Gbps /3.0Gbps data rate).

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Micro SATA connector uses a 7-pin signal segment and a 9-pin power segment.

1.8-inch form factor

Industry Micro Serial ATA 1.8-inch standard form factor design with metal material case is easy for installation. InnoDisk FiD 1.8” SATA 10000 SSD can easy install in laptop. InnoDisk FiD 1.8” SATA 10000 has a compact design 78.5mm (L) x 54mm (W) x 5mm (H).

Capacity

InnoDisk provides unformatted 8GB, 16GB and 32GB capacities for InnoDisk FiD 1.8” SATA 10000 product.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

2. Theory of operation

Overview

Figure 2 shows the operation of InnoDisk FiD 1.8" SATA 10000 from the system level, including the major hardware blocks.

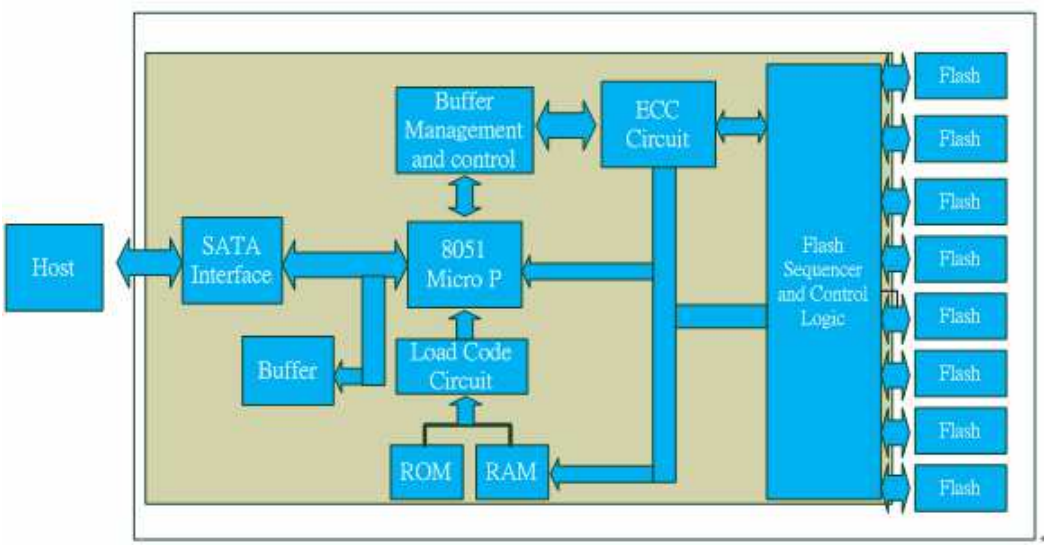


Figure 2: InnoDisk FiD 1.8" SATA 10000 Block Diagram

SATA II Controller

The SATA II bridge controller is 3.0 Gbps (Gen. 2), and support hot-plug. The Serial ATA physical, link and transport layers are compliant with Serial ATA Gen 1 and Gen 2 specification (Gen 2 supports 1.5Gbps/3.0Gbps data rate).
The SATA controller is equipped with 32KB of internal memory that is used for storing data. The internal memory can also be used as an intermediate memory for storing data blocks during a wear-leveling procedure. There are 40KB of internal memory is used for code. A 10KB internal boot ROM includes basic routines for accessing the flash memories and for loading the main code into the internal memory.

Error Detection and Correction

Highly sophisticated Error Correction Code algorithms are implemented. The ECC unit consists of the Parity Unit (parity-byte generation) and the Syndrome Unit (syndrome-byte computation). This unit implements an algorithm that can correct 6 bits per 512 bytes in an ECC block. Code-byte generation during write operations, as well as error detection during read operation, is implemented on the fly without any speed penalties.

Wear-Leveling

Flash memory can be erased within a limited number of times. This number is called the ***erase cycle limit*** or ***write endurance limit*** and is defined by the flash array vendor. The erase cycle limit applies to each individual erase block in the flash device.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

InnoDisk FiD 1.8” SATA 10000 uses a wear-leveling algorithm to ensure that consecutive writes of a specific sector are not written physically to the same page/block in the flash. This spreads flash media usage evenly across all pages, thereby extending flash lifetime.

Bad Blocks Management

Bad Blocks are blocks that contain one or more invalid bits whose reliability are not guaranteed. The Bad Blocks may be presented while the SSD is shipped, or may develop during the life time of the SSD. The Bad Blocks will not exceed more than 3% of the total device volume. When the Bad Blocks is detected, it will be flagged, and not be used anymore. The SSD implement Bad Blocks management, Bad Blocks replacement, Error Correct Code to avoid data error occurred. The functions will be enabled automatically to transfer data from Bad Blocks to spare blocks, and correct error bit.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

3. Installation Requirements

Electrical Connections for FiD 1.8 SATA 10000

A Serial ATA device may be either directly connected to a host or connected to a host through a cable. For connection via cable, the cable should be no longer than 1meter.

The SATA interface has a separate connector for the power supply. Please refer to the pin description for further details.

Device drive

No additional device drives are required. The InnoDisk FiD 1.8” SATA 10000 can be configured as a boot device.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

4. Specifications

CE Compatibility

InnoDisk FiD 1.8” SATA 10000 conforms to CE requirements.

RoHS Compliance

InnoDisk FiD 1.8” SATA 10000 is fully compliant with RoHS directive.

Environmental Specifications

Temperature Ranges

Operating Temperature Range:

- Standard Grade: -10°C to +70°C
- Industrial Grade: -40°C to +85°C

Storage Temperature Range:

- Standard Grade: -55°C to +95°C
- Industrial Grade: -55°C to +95°C

Humidity

Relative Humidity: 10-95%, non-condensing

Shock and Vibration

Table 1: Shock/Vibration Testing for InnoDisk FiD 1.8” SATA 10000

Reliability	Test Conditions	Reference Standards
Vibration	7 Hz to 2K Hz, 5 g, 3 axes	IEC 68-2-6
Mechanical Shock	Duration: 0.5ms, 1500 g, 3 axes	IEC 68-2-27
Drop Unit	From a height of 1.5 m	IEC 68-2-32

Mean Time between Failures (MTBF)

Table 4 summarizes the MTBF prediction results for various InnoDisk FiD 1.8” SATA 10000 configurations. The analysis was performed using a RAM Commander™ failure rate prediction.

- **Failure Rate**: The total number of failures within an item population, divided by the total number of life units expended by that population, during a particular measurement interval under stated condition.
- **Mean Time between Failures (MTBF)**: A basic measure of reliability for repairable items: The mean number of

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

life units during which all parts of the item perform within their specified limits, during a particular measurement interval under stated conditions.

Table 2: InnoDisk FiD 1.8” SATA 10000 MTBF

Product	Condition	MTBF (Hours)
InnoDisk FiD 1.8” SATA 10000	Telcordia SR-332 GB, 25°C	TBD

Endurance

Read Cycles: Unlimited Read Cycles.

Write /Erase Cycles: 2,000,000 Erase Cycles.

Data Retention: 10 years.

Wear-Leveling Algorithm: support.

Bad Blocks Management: Support

Error Correct Code: Support

Transfer Mode

InnoDisk FiD 1.8” SATA 10000 support following transfer mode:

PIO Mode: 0~4.

Ultra DMA: 0~5.

Serial ATA I: 1.5Gbps

Serial ATA II: 3.0Gbps

Micro SATA Pin signal definition and contact mating sequence

Table 3 details the pin name. types and contact order of the two internal micro SATA Plug options. A brief description is also included for signal, ground and power pins. There are total of 7 pins in the signal segment and 9 pins in the power segment.

Table 3: InnoDisk FiD 1.8” SATA 10000 Pin Assignment

Name	Type	Description	Cable Usage	Backplane
S1	GND			
S2	A+	Differential Signal Pair A		
S3	A-			
S4	GND			
S5	B-	Differential Signal Pair B		
S6	B+			
S7	GND			

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Key and Spacing separate signal and power segments				
P1	V33	3.3V Power	2nd Mate	3rd Mate
P2	V33	3.3V Power, Pre-charge	1st Mate	2nd Mate
P3	GND		1st Mate	1st Mate
P4	GND		1st Mate	1st Mate
P5	V5	5V Power, Pre-charge	1st Mate	2nd Mate
P6	V5	5V Power	2nd Mate	3rd Mate
P7	R	Reserved	2nd Mate	3rd Mate
Key	Key	Key	NC	NC
P8	Optional	Vendor Specific	2nd Mate	3rd Mate
P9	Optional	Vendor Specific	2nd Mate	3rd Mate

NOTE:

1. Although the mate order is shown, hot plugging is not supported when using the cable connector receptacle.
2. All mate sequences assume zero angular offset between connectors.
3. The signal segment and power segment may be separate.
4. The 5V supply voltage pins included to meet future requirements and may optionally be provided on the power segment receptacle. Future revisions of this specification may require 5V supply voltage be provided.
5. The corresponding pin to be mated with pin P7 in the power Internal Micro receptacle connector shall voltage be provided.
6. No connect on the host side.

Mechanical Dimensions

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

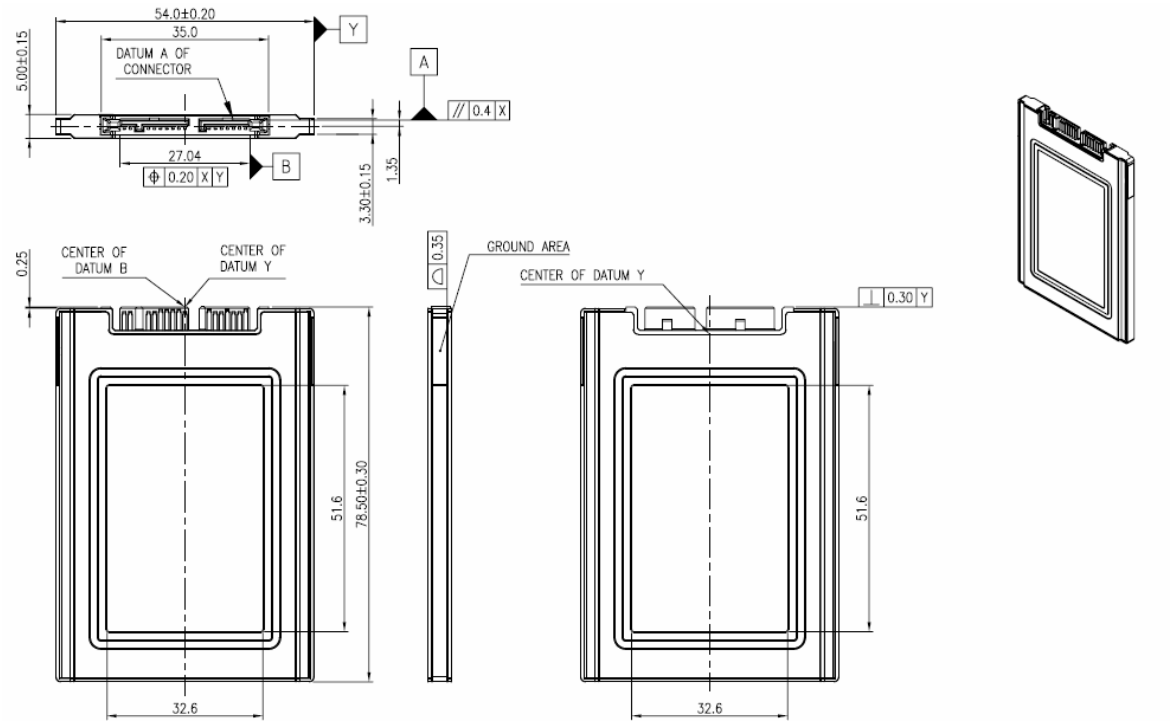


Figure 3: Fid 1.8 SATA 10000 mechanical dimensions

Assembly weight

An InnoDisk FiD 1.8” SATA 10000 32GB’s weight is 30 grams approx.

Performance

Burst Transfer Rate : 3Gbps

Sustained Read : 120MB/sec

Sustained Write : 70MB/sec

Average Latency : TBD

Seek Time

InnoDisk FiD 1.8” SATA 10000 is not a magnetic rotating design. There is no seek or rotational latency required.

Hot Plug

The SSD support hot plug function and can be removed or plugged-in during operation. User has to avoid hot plugging the SSD which is configured as boot device and installed operation system.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Surprise hot plug : The insertion of a SATA device into a backplane (combine signal and power) that has power present. The device powers up and initiates an OOB sequence.

Surprise hot removal: The removal of a SATA device from a powered backplane, without first being placed in a quiescent state.

NAND Flash Memory

InnoDisk FiD 1.8" SATA 10000 uses Single Level Cell (SLC) NAND flash memory, which is non-volatility, high reliability and high speed memory storage. There are only two statuses 0 or 1 of one cell. Read or Write data to flash memory for SSD is control by micro processor.

Electrical Specifications

Power Requirement

Table 4: InnoDisk FiD 1.8" SATA 10000 Power Requirement

Item	Symbol	Rating	Unit
DC Power Supply	V_{DD}	-0.3 ~ +5.5	V
Input voltage	V_{IN}	-0.3 ~ +5.5	V
Output voltage	V_{OUT}	-0.3 ~ +3.8	V
Operating Temperature	T_A	Standard: -10 ~ +70	°C
		Industrial: -40 ~ +85	°C
Storage Temperature	T_{ST}	Standard: -55 ~ +95	°C
		Industrial: -55 ~ +95	°C

Power Consumption

Table 5: Power Consumption

Mode	Power Consumption	Note
Read	1W	
Write	1.8W	
Idle	0.6W	

Device Parameters

FiD 1.8 SATA 10000 device parameters listed in Table 6.

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Table 6: Device parameters

Capacity	LBA	Cylinders	Heads	Sectors
8GB	TBD	TBD	16	63
16GB	29523968	16383	16	63
32GB	TBD	16383	16	63

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

5. Supported ATA Commands

InnoDisk FiD 1.8” SATA 10000 supports the commands listed in Table 7.

Table 7: ATA Commands

Command Name	Command Code	Argument	Support
Check Power Mode	E5H (98H)	28-bit	Yes
Execute Device Diagnostic	90H	28-bit	Yes
Format Track	(50H)		Yes
Identify Device	ECH	28-bit	Yes
Idle	E3H (97H)	28-bit	Yes
Idle immediate	E1H (95H)	28-bit	Yes
Initialize Device Parameters	(91H)		Yes
NOP	00H		Yes
Read Buffer	E4H	28-bit	Yes
Read Long Sector	(22H or 23H)		Yes
Read Multiple	C4H	28-bit	Yes
Read Sector(s)	20H or 21H	28-bit	Yes
Read Verify Sector	40H or 41H	28-bit	Yes
Read DMA	C8H	28-bit	Yes
Recalibrate	(1XH)		Yes
Seek	70H		Yes
Set Features	EFH	28-bit	Yes
Set Multiple Mode	C6H	28-bit	Yes
Set Sleep Mode	E6H (99H)	28-bit	Yes
Standby	E2H (96H)	28-bit	Yes
Standby Immediate	E0H (94H)	28-bit	Yes
Write Buffer	E8H	28-bit	Yes
Write Multiple	C5H	28-bit	Yes
Write Sector	30H	28-bit	Yes
Write DMA	CAH	28-bit	Yes
Write Verify	(3CH)		Yes
Security Set Password	F1H	28-bit	Yes
Security Unlock	F2H	28-bit	Yes
Security Erase Prepare	F3H	28-bit	Yes
Security Erase Unit	F4H	28-bit	Yes
Security Freeze Lock	F5H	28-bit	Yes
Security Disable Password	F6H	28-bit	Yes

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP