

# FFD™ 2.5" IDE

## Top Reliability, Solid-State ATA Flash Disk



### Technology Overview

M-Systems' Fast Flash Disk (FFD) 2.5" IDE disk is a state-of-the-art solid-state disk based on NAND flash technology, containing no moving parts.

The outstanding reliability of the FFD 2.5" IDE is achieved by M-Systems' TrueFFS® technology that provides full disk emulation, enhanced endurance with dynamic wear-leveling and bad-block mapping-out flash management.

Due to its unique design, the FFD 2.5" IDE eliminates seek time, latency and other electro-mechanical delays inherent in conventional disk drives. The FFD 2.5" IDE burst read/write rate is 16.7 MBytes/sec. It supports both DMA 0-2 and PIO 0-4 transfer modes. Higher performance & capacity is available with FFD 2.5" IDE Plus.

The FFD 2.5" IDE is fully compatible with the ATA-III interface and has the same mechanical dimensions of traditional mechanical disks. It is a drop-in replacement for rotating disks where top reliability is required.



### Applications

FFD 2.5" IDE provides an ideal storage solution for mission-critical applications that must operate under harsh environmental conditions.

M-Systems' family of FFDs has been used since 1997 as a mass storage solutions for data recorders, moving maps, sonar, radar, fire control systems, black boxes, data acquisition systems, C4ISR and rugged laptops and servers in air force, navy and army installations worldwide.

FFD 2.5" IDE is used in telecommunication systems within optical and ATM switches, IP gateways, wireless base stations and core routers, providing NEBS level 3 compliance, top reliability and a maintenance-free solution.

FFD 2.5" IDE top reliability and high MTBF (>1,000,000 hours) enable it to be used in Factory Automation (FA) systems, Point Of Sales (POS) systems, assembly and robot controllers, and within manufacturing and medical systems.

FFD 2.5" IDE provides the most reliable solution without compromising speed, capacity, data integrity, or portability, making it an ideal solution for demanding applications operating under harsh environmental condition.

### IDE / SCSI Product Line

M-Systems' IDE / SCSI product line offers complete solutions for customers who require rugged and high-performance solid-state flash disks. M-Systems' IDE / SCSI product offering includes IDE/ATA, Narrow SCSI and Ultra-Wide SCSI interfaces in 1.8", 2.5" and 3.5" form factors:

- FFD 2.5" IDE
- FFD 2.5" IDE Plus
- IDE 3000 2.5"
- IDE 3000 3.5"
- IDE 3000 1.8"
- FFD 2.5" SCSI
- FFD 3.5" SCSI
- FFD 3.5" Ultra -Narrow SCSI
- FFD 3.5" Ultra-Wide SCSI
- 6U VME, 6U and 3U Compact PCI and PMC

### Main Features

- 128MB to 4.0GB disk capacity
- 2.5" standard form factor
- Case height options
  - 8.0 mm
  - 12.0 mm
  - 17.0 mm
- ATA-III interface
- DMA 0-2 and PIO 0-4 transfer modes
- 16.7 MBytes/sec burst Read/Write
- 3.6-3.2 MBytes/sec sustained Read
- 2.0 MBytes/sec sustained Write
- 127 sectors per transfer in multiple read/write command
- Quick security erase in 10 seconds
- TrueFFS® technology
- >5,000,000 Write/erase cycles
- Enhanced disk endurance by dynamic "Wear-Leveling"
- SMART (Self-Monitoring, Analysis and Reporting Technology)
- Bad-block mapping-out algorithm
- Ensures data integrity under unstable power conditions
- No moving parts
- MIL-STD 810F compliant
- NEBS Level 3 compliant
- 1500G operating shock
- 16.3G RMS operating random vibration
- -40°C to +85°C operating temperature
- -55°C to +95°C storage temperature
- 80,000 feet operating altitude
- 5-year warranty

## FFD 2.5" IDE Specifications

### Disk Capacity

Unformatted (MBytes): 128, 256, 384, 512, 768, 1024, 1280, 1536, 1792, 2048, 2304, 2560, 2816, 3072, 3328, 3584, 3840, 4096. *Higher capacities up to 21GB with faster sustained r/w of 8MB/s are available with FFD 2.5" IDE Plus.*

### IDE Compatibility

Industry Standard ATA-III; ANSI X3T10/2008D

### Performance

Burst Read/Write: 16.7 MBytes/sec

DMA-2 transfer mode

Sustained Read: 3.6 MBytes/sec

Sustained Write: 2.0 MBytes/sec

PIO-4 transfer mode

Sustained Read: 3.2 MBytes/sec

Sustained Write: 2.0 MBytes/sec

Access time: <0.1ms

### Physical

Form factor: 2.5"

Mounting: Industry standard

Case dimensions (mm)

17.0mm height: 100.2(L) X 69.8(W) X 17.0(H)

12.0mm height: 100.2(L) X 69.8(W) X 12.0(H)

8.0mm height: 100.2(L) X 69.8(W) X 8.0(H)

Weight: 0.2Kg for 4096 MB unit

### Environmental

Operating temperature

Commercial: 0°C to +70°C

Enhanced: -25°C to +75°C

Extended: -40°C to +85°C

Storage temperature: -55°C to +95°C

Humidity: 5% to 95% relative, non-condensing

Operating altitude: Up to 80,000 feet

Operating shock: 1,500G (half sine 0.5ms), MIL-STD-810F

Operating vibration: 16.3G RMS (random, 20Hz to 2000Hz; 3 vibration axes), MIL-STD-810F

### Power

Input voltage: 5VDC  $\pm$ 5%

Power consumption for 1GB unit

Read/Write mode: 500mA (2.50 Watt)

Standby mode: 200mA (1.00 Watt)

Power-down mode: 120mA (0.60 Watt)

### Compliance

CE, UL, FCC Part 15 Class B, EN 55022 Class B, EN 50082-1, IEC 61000-4, MIL-STD-810F



### Reliability

MTBF: 5,882,699 hours MTBF for 128MB unit  
2,857,224 hours MTBF for 512MB unit  
2,381,009 hours MTBF for 1024MB unit  
based on British-Telecom-HRD5, GB, 25°C  
On the fly hardware and software-embedded  
EDC/ECC based on 48-bit Reed Solomon  
Algorithm  
BER (Bit Error Rate) <10<sup>-20</sup>

### Reliability features

Built-in power-up self-test (BIT)

Manual and automatic self-diagnostics

TrueFFS<sup>®</sup> Bad Block Mapping-out (BBM) management

Data integrity under Power-Cycling

SMART (Self-Monitoring, Analysis and Reporting Technology)

Remote monitoring of disk endurance and reliability

### Endurance

Read unlimited

>5,000,000 Write/Erase cycles

TrueFFS<sup>®</sup> Dynamic "Wear-Leveling"

Garbage collection process

>10 years data retention

### User Interface & Configuration

Interface: 8-bit

Master/Slave mode: Jumper-selectable

ATA transfer modes: PIO 0-4 and DMA 0-2

Firmware upgrade: Field upgrade capability

Format: Factory low-level format

Drivers: None required

### Quick Security Erase

Entire disk erase: 10 sec (typical)

### Warranty

5 years (longer warranty period can be supported)

### Customization

PCB conformal coating

Customizing case dimensions

Higher disk capacities

Hardware interrupt quick security erase

Read/write rate customization

Manufactured available in the USA & for FMF

### Contact Us

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### Ordering Information

FFD-250-IDE-CCCC-T-HXX

CCCCC: Unformatted capacity (MB) 128 to 4096

T: Temperature range

Blank – Commercial: 0°C to +70°C

N – Enhanced: -25°C to +75°C

X – Extended: -40°C to +85°C

H: Height

Blank – 17.0mm; H12 – 12.0mm; H8 – 8.0mm



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