

# FFD™ 2.5" IDE Plus

## Plus Performance, Density and Security Solid-State ATA Flash Disk

### Technology Overview

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

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

Due to its unique design, the FFD 2.5" IDE Plus eliminates seek time, latency and other electro-mechanical delays inherent in conventional disk drives. The FFD 2.5" IDE Plus sustained read rate is 8.2 MB/s and sustained write is 8.0-9.8 MB/s at DMA-2 transfer mode, supporting both DMA 0-2 and PIO 0-4 transfer modes.

The FFD 2.5" IDE Plus is fully compatible with the ATA-3 interface and has the same mechanical dimensions and mounting holes as traditional mechanical disks. It is a true drop-in replacement for rotating ATA disks where top reliability is required.

### Applications

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

M-Systems' family of FFDs has been providing rugged, mass-storage solutions to an expansive range of industries since 1997. In air force, navy and army installations, it has been field-tested inside data recorders, moving maps, sonar, radar, fire control systems, black boxes, data acquisition systems, C4ISR, telemetry systems, rugged laptops and servers.

In telecommunication systems, the FFD product line is used 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 Plus top reliability and high MTBF enable it also to be used in Factory Automation (FA) systems, Point Of Sale (POS) systems, assembly and robot controllers, and within manufacturing and medical systems.

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

### 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 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, 3U and 6U Compact PCI and PCM flash disks



### Main Features

- 256MB to 21.5GB disk capacity
- 2.5" standard form factor
- Case height from 8.5 mm to 34.2 mm
- DMA 0-2 and PIO 0-4 transfer modes
- 16.7 MBytes/sec burst read/write rate
- 8.2 MBytes/sec sustained read rate (DMA2)
- 8.0 - 9.2 MBytes/sec sustained write rate (DMA2)
- Quick security erase in 6-120 seconds
- Sanitize confidential data, complies with NISPOM DoD 5220.22-M, NSA 130-2, Air Force AFSSI 5020, Army 380-19 and Navy NAVSO P-5239-26
- TrueFFS® technology
- More than 5,000,000 write/erase cycles
- Enhanced disk endurance with dynamic wear-leveling
- SMART (Self-Monitoring, Analysis and Reporting Technology)
- Bad-block mapping-out algorithm
- Guaranteed data integrity under unstable power conditions (no DRAM as data cache buffer)
- No moving parts
- MIL-STD 810F compliant
- NEBS Level-3 compliant
- 1500 G operating shock
- 16.3 G RMS operating random vibration
- -40°C to +85°C operating temperature
- -55°C to +95°C storage temperature
- 80,000 ft operating altitude
- 5-year warranty

## FFD 2.5" IDE Plus Specifications

### Disk Capacity

Unformatted (MBytes): 256, 512, 1024, 1536, 2048, 3072, 4096, 5120, 6144, 7168, 8192, 9216, 10240, 11264, 12288, 13312, 14336, 15360, 16384, 17408, 18432, 19456, 20480, 21504

### IDE Compatibility

ANSI-X3.298-1997 (ATA-3); ANSI-X3.279-1996 (ATA-2)

### Performance

Burst Read/Write: 16.7 MB/sec

DMA-2 transfer mode:

Sustained read: 8.2 MB/sec (up to 13 MB/s with customized software)

Sustained write: 8.0 - 9.8 MB/sec

PIO-4 transfer mode

Sustained read: 7.2 - 7.4 MB/sec (read/write sector or multi-16 commands)

Sustained write: 5.7 - 8.5 MB/sec (read/write sector or multi-16 commands)

Access time: <0.04 ms

### Physical

Form factor: 2.5"

Mounting: Industry standard

Case dimensions (mm): 100.2 (L) X 69.8 (W) X 8.5 to 34.2 (H)

Weight: 0.1 kg for 1GB; 0.38 kg for 21.5GB

### 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 ft

Operating shock: 1,500 G, MIL-STD-810F

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

### Power

Input voltage: 5VDC (4.75-5.25V range)

Typical power consumption for 3GB unit

Power mode: Idle/Standby/Sleep: 460 mA (2.3 W)

No activity mode: 620 mA (3.1 W)

Sustained read/write: 760 mA (3.8 W)

Sanitize Secure Erase/Fill: 760 mA (3.8 W)

### Compliance

CE, UL, EN 55022 Class B, CISPR 22 Class B, AS/NZS 3548

Class B, BSMI CNS 13438 Class B, CAN/CSA-V-3/2001.04

(VCCI), FCC Part 15 Class B, EN 61000-3-2, EN 61000-3-3,

IEC 61000-4-2/3/4/5/6/8/11, MIL-STD-810F

### Reliability

MTBF: 1,804,403 hours MTBF for 1.0 GB

1,019,576 hours MTBF for 3.0 GB

Based on Telcordia SR-332, GB, 25°C

EDC/ECC: 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 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: 16-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

Access LED: Green LED

### Enhanced Security Erase

Entire disk security erase: 6-120 sec (depending on capacity)

Sanitize complies with NISPOM DoD 5220.22-M, NSA 130-2,

Air Force AFSSI 5020, Army 380-19, Navy NAVSO P-5239-26

Secure erase/Sanitize software interrupt, hardware interrupt optional

Auto-resume Security Erase/Sanitize on power interrupt

Partial Security Erase

LED indication for Secure Erase/Sanitize

### Warranty

5 years (a 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 also in the USA & for FMF

### Contact Us

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### Ordering Information

#### FFD-25-IDEP-CCCCC-T-H

CCCCC: Unformatted capacity (MB) 256 to 21504

T: Operating temperature range

Blank – Commercial: 0°C to +70°C

N – Enhanced: -25°C to +75°C

X – Extended: -40°C to +85°C

H: Case Height (mm)

A – 8.5 mm up to 1.0GB; B – 11.3 mm up to 3.0GB;

C – 14.3 mm up to 6.1GB; D – 18.5 mm up to 9.2GB;

F – 26.6 mm up to 15.3GB; H – 34.2 mm up to 21.5GB



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