Alpha-10™

Highest performance and reliability of any Removable Disk Drive • Lowest-cost 10 megabyte Disk Cartridge • More resistant to shock and vibration than any other Fixed or Removable Disk Drive • More resistant to contamination than any other Removable Disk Drive • Fastest start/stop (cartridge replacement) time of any high performance Disk Drive • Only Disk Cartridge Subsystem (drive, controller and cartridge) to dimensionally conform to the diskette standard (size and mounting)
Disk Drive Subsystem Specifications

Performance
Data Transfer Rate
Drive to Controller 1.13 Mbytes/sec
Controller to Host
Single Record Burst (256 bytes) 1.13 Mbytes/sec
Contiguous Records (same track) 896 Kbytes/sec

Seek Time (including settling time)
Minimum 10 msec
Average 35 msec
Maximum 75 msec

Latency 20 msec

Track to Track Access Time,
consecutive records over track boundary 10.3 msec

Start/Stop Time 4/5 sec

Power
DC Voltages +5, ±12
AC Voltages None
Power (first drive with LSI controller) 45 watts
Power (each additional drive) 10 watts

Physical
Height 114.3 mm 4.50 in
Width 217.0 mm 8.54 in
Depth 364.0 mm 14.33 in
Weight
Drive 5.13 kg 11.3 lb
Controller .73 kg 1.6 lb

Reliability
Error Rates
Data
Recoverable
Non-Recoverable at Host Interface with ECC
Seek
MTBF, Drive
MTBF, Controller
MTTR
Service Life

Environmental (Operating)
Temperature 10°C–46°C 50°F–115°F
Relative Humidity (non-condensing) 10%–80%
Maximum Wet Bulb 26.6°C 80°F
Altitude to 3,048 m (10,000 ft)
Shock 3 g’s for 20 msec
Vibration
.85 g’s at 5 to 17 Hz
.25 g’s at 17 to 500 Hz

Functional
Rotational Speed 1500 RPM ±.5%
Encoding Method RLLC
Recording Density 24,000 BPI
Flux Density 18,000 FCI
Track Density 300 TPI
Disks—Removable
Fixed
Recording Surfaces 1

Disk Subsystem Architecture

Host
Controller

Disk Drive Electronics
Read Pre-Amplifier
Write Driver

Disk Drive Hardware
Actuator
Power distributed radially from host +5, ±12
To downstream drive or terminator

Planar Board #1
Servo Logic
Servo Demodulator
Clock & Detect
AD/DA
Misc. Ports

File Control Logic

Planar Board #2
Interfae
Buffer/ECC
CPU/RAM/ROM

To Upstream Drive or Controller

Power

To downstream drive or terminator
Host Interface Specifications

Control Lines

Physical interface contains an 8 bit bi-directional data bus, a parity bit, and 8 control lines:

**Busy (BSY)** Assertion by the controller indicates the controller is busy and cannot be interrupted.

**Acknowledge (ACK)** Assertion by the host indicates each data byte on the bus has either been received by the host (read operation) or is ready to be received by the controller (write operation).

**Reset (RST)** Assertion by the host causes all operations in the controller to cease. If asserted during a write operation, written data on the disk will be incorrect and the ECC sector will not be updated. The controller must be reselected if further commands are to be issued.

**Message (MSG)** assertion by the controller indicates the current operation is complete. This signal is accompanied by a REQ-ACK handshake, but the data signals on the bus have no significance. When the handshake is complete, the controller will deassert all control lines and return to an idle state.

**Select (SEL)** Assertion by the host along with the controller address bit on the data bus causes the desired controller to be selected. The line is de-asserted when the controller responds with "Busy."

**Command/Data (C/D)** Assertion by the controller indicates that command or status information is on the bus. De-assertion indicates data is on the bus.

**Request (REQ)** assertion by the controller on a host-to-controller transfer indicates that the controller is ready to receive data and the deassertion indicates receipt of data. For a controller-to-host transfer, assertion indicates the presence of data on the bus. The host must respond with ACK within 256 µsec or the operation will be terminated.

**Input/Output (I/O)** Assertion by the controller indicates data transfer from controller to host; deassertion indicates transfer of information from host to controller.

Command Menu

Class 0 (no data transfer)

- Format "Z" Track
- Flag Sector
- Flag Track
- Unflag Tracks
- Seek
- Home
- Request Status
- Request Extended Status
- Test Controller Status
- Host Write Protect

Class 1 (data transfer, drive to host)

- Read Data
- Read ID
- Read Data with Offset
- Diagnostic Read

Class 2 (data transfer, host to drive)

- Write Data
- Write ID
- Resequence ID Fields
- Diagnostic Write

Hardware Interface

The interface is a 50 pin, general purpose, DMA structure as follows:

<table>
<thead>
<tr>
<th><strong>Data Lines (Bi-Directional)</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Data 0 (least significant bit)</td>
</tr>
<tr>
<td>Data 1</td>
</tr>
<tr>
<td>Data 2</td>
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<tr>
<td>Data 3</td>
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<tr>
<td>Data 4</td>
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<tr>
<td>Data 5</td>
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<tr>
<td>Data 6</td>
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<tr>
<td>Data 7 (most significant bit)</td>
</tr>
<tr>
<td>Data 8 (parity bit-odd)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Control Lines</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Busy</td>
</tr>
<tr>
<td>Acknowledge</td>
</tr>
<tr>
<td>Reset</td>
</tr>
<tr>
<td>Message</td>
</tr>
<tr>
<td>Select</td>
</tr>
<tr>
<td>Command/Data</td>
</tr>
<tr>
<td>Request</td>
</tr>
<tr>
<td>Input/Output</td>
</tr>
</tbody>
</table>

Input/Output (I/O) assertion indicates data is on the bus.

All signals TTL negative true (0-0.4 VDC) positive false (2.5-5.25 VDC)

Assertion = true
Maximum Cable Length = 6 meters
Recommended mating connector: 3M 3425-6050

Electrical Interface:
10 Megabyte Removable Cartridge

Capacity
Formatted 10.03 Megabytes
Unformatted 14.11 Megabytes

Configuration
Drives Per Controller 1 to 4
Cartridges per Drive 1
Flexible Disks per Cartridges 1
Recording Surfaces per Flexible Disk 1
Formatted (User-available) Tracks per Surface 306
Formatted (User-available) Sectors per Track 64
Records per Sector 2
Bytes per Record 256

Cartridge Size
Height 0.71 in 18.0 mm
Width 8.23 in 209.0 mm
Depth 11.02 in 280.0 mm
Weight 1.30 lbs 0.59 kg

Flexible Disk Dimensions
Outside Diameter 198.0 mm
Inside Diameter 17.0 mm
Disk Thickness 3.0 Mils

Surface Format
Outer Guard Bands 16
Data Tracks 306
"Z" Track 1
Spare Tracks for Field Flagging 4
Inner Guard Bands 16
Total 343

Track Format
Servo Sectors 70
Data Sectors 64
ECC Sectors 1
Spare Sectors, min/max.* 3/5
Records/Sector 2
Bytes/Data Record 256
Bytes/Sector 512
Bytes/Track (unformatted) 45,360
Bytes/Track (User Available) 32,768

*For field flagging

Sector Format/648 Bytes

<table>
<thead>
<tr>
<th>PAD</th>
<th>SERVO FIELD</th>
<th>GAP</th>
<th>SECTOR ID FIELD</th>
<th>GAP</th>
<th>DATA RECORD 1</th>
<th>GAP</th>
<th>DATA RECORD 2</th>
</tr>
</thead>
<tbody>
<tr>
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<td>24</td>
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<td>1</td>
<td>4</td>
<td>2</td>
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<tr>
<td>256</td>
<td>2</td>
<td>22</td>
<td>1</td>
<td>256</td>
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