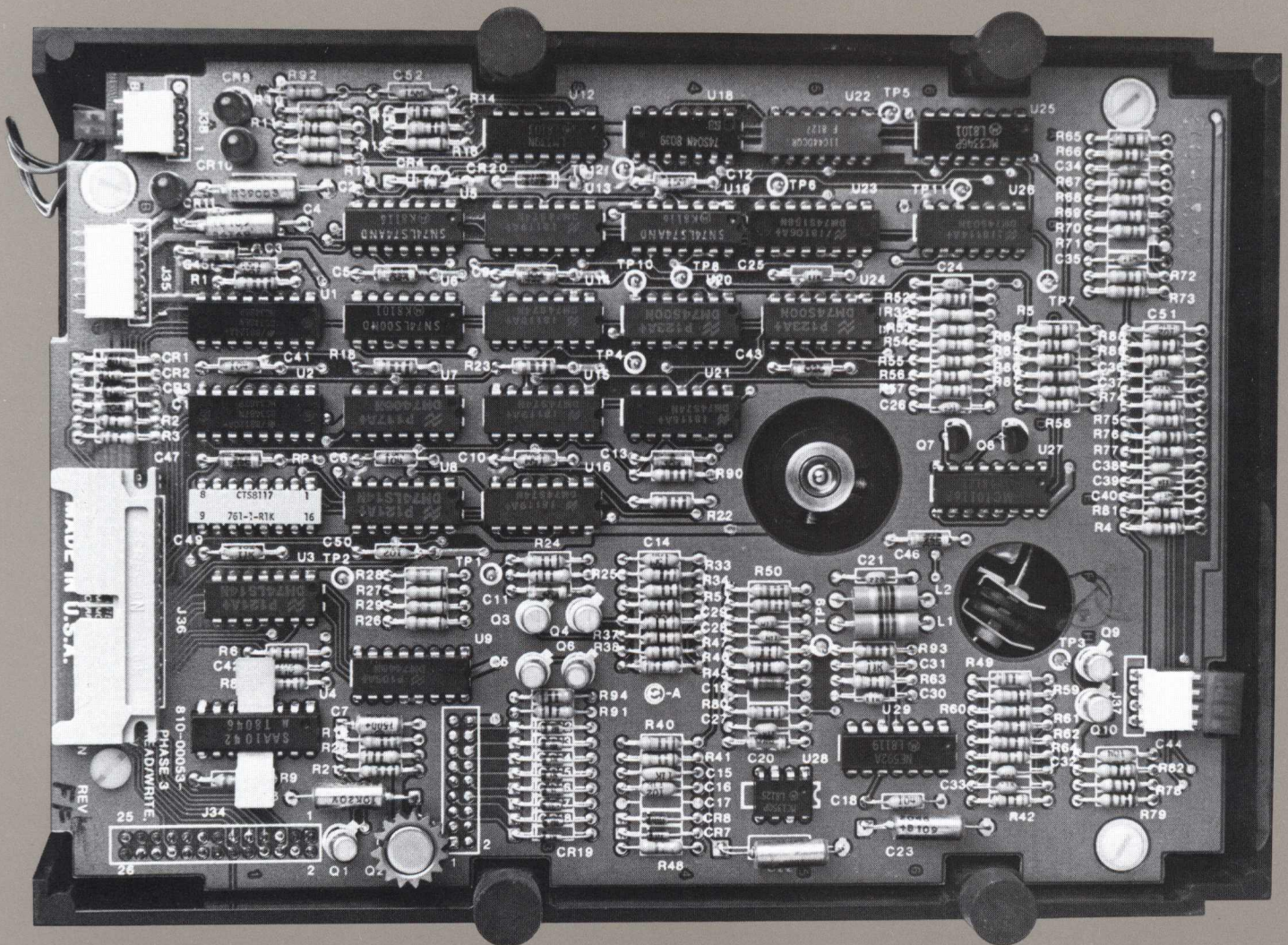# IMI 5000 Controller

**IMI**

# Controller for IMI 5007 5¼-inch Winchester Disk Drive.

# Controller Series

## Key features

- High level read/write commands
- 128, 256 and 512 byte logical sectors
- 512 byte buffer
- Logical or physical sector addressing
- Microprocessor controlled
- Media defects mapped automatically
- Sector interlacing

- Implied seek
- Overlapped commands
- Self test capability
- CRC checking
- Automatic error retry
- Performs all data encoding and decoding

- Data transfer may be program I/O or DMA driven
- Automatic head and cylinder switching
- Supports two IMI Model 5007 disk drives
- Data transfer (asynchronous) to 625 Kbytes/sec

## IMI 5000 Controller Specifications

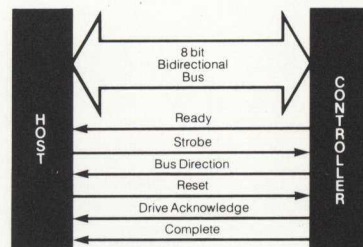| | |
|---|---|
| **Status Codes** | Following the completion of each operation the controller returns one of the following command execution status codes to the host. |
| | No errors detected. |
| | Servo fault during seek.* |
| | Header mismatch (cylinder or head).* |
| | Unimplemented or illegal command. |
| | Servo fault during rezero.* |
| | Disk transfer (read/write) timeout.* |
| | Drive not on line. |
| | Servo fault during write.* |
| | Format protected (format command issued without format enable). |
| | Servo fault during read.* |
| | Data CRC error during read.* |
| | Header mismatch (sector).* |
| | Write protected (write command issued with write protect). |
| | Illegal address (logical or physical). |
| | Drive does not acknowledge command. |
| **Commands** | Rezero Drive. |
| | Primary Format. Format the drive, with up to 255 write/read passes. Erase and rewrite the Defective Sectors List. |
| | Format. Format the drive with one write/read pass and add to the old defective sector information. |
| | Write Buffer. Transfer a sector of data from the host system to the controller write buffer. |
| | Store Sector on Disk without Verify. Write specified sector on disk with data in controller write buffer. Do not verify. |
| | Store Sector on Disk with Verify. Write specified sector on disk with data in controller write buffer. Verify correct CRC on next rotation. |
| | Write Sector without Verify. Transfer a sector of data from the host system, and write that sector on the disk. Do not verify. |
| | Write Sector with Verify. Transfer a sector of data from host system and write it on disk. Verify correct CRC on next rotation. |
| | Fetch Sector from Disk. Read a sector of data from disk into the controller read buffer. |
| | Read Buffer. Transfer a sector of data from the controller read buffer to the host system. |
| | Read Sector. Read a sector of data from drive, and transefer to the host system. |
| | Programmable Interlace. Set optimal host/controller sector transfer rate. |
| | Diagnostic Read. Allows access to system sectors (i.e., the Defective Sectors List). |
| | Diagnostic Write. Allows access to system sectors (i.e., the Defective Sectors List). |
| | Add Skip. Manually include marginal tracks to track skip list. |
| | Set Configuration. Software set drive configuration (Write or format protect, enable or disable Retries. Interlace Table. Seek Checking and Track Skipping). |
| | Poll. Used to determine if a particular drive is on line. |
| | Return Drive Type. |
| | Reset Drive. Do a warm-start reset of the controller hardware and software. |
| **Host Interface** | The host interface consists of an 8-bit bidirectional bus for commands, status and data along with six control lines. The interface utilizes standard TTL levels and no termination is required. |



| | |
|---|---|
| **Power** | +5 VDC, ±5%, 1.0 amp typical |
| **Dimensions** | 7.5 x 12.5 in (19.1 x 31.8 cm) |

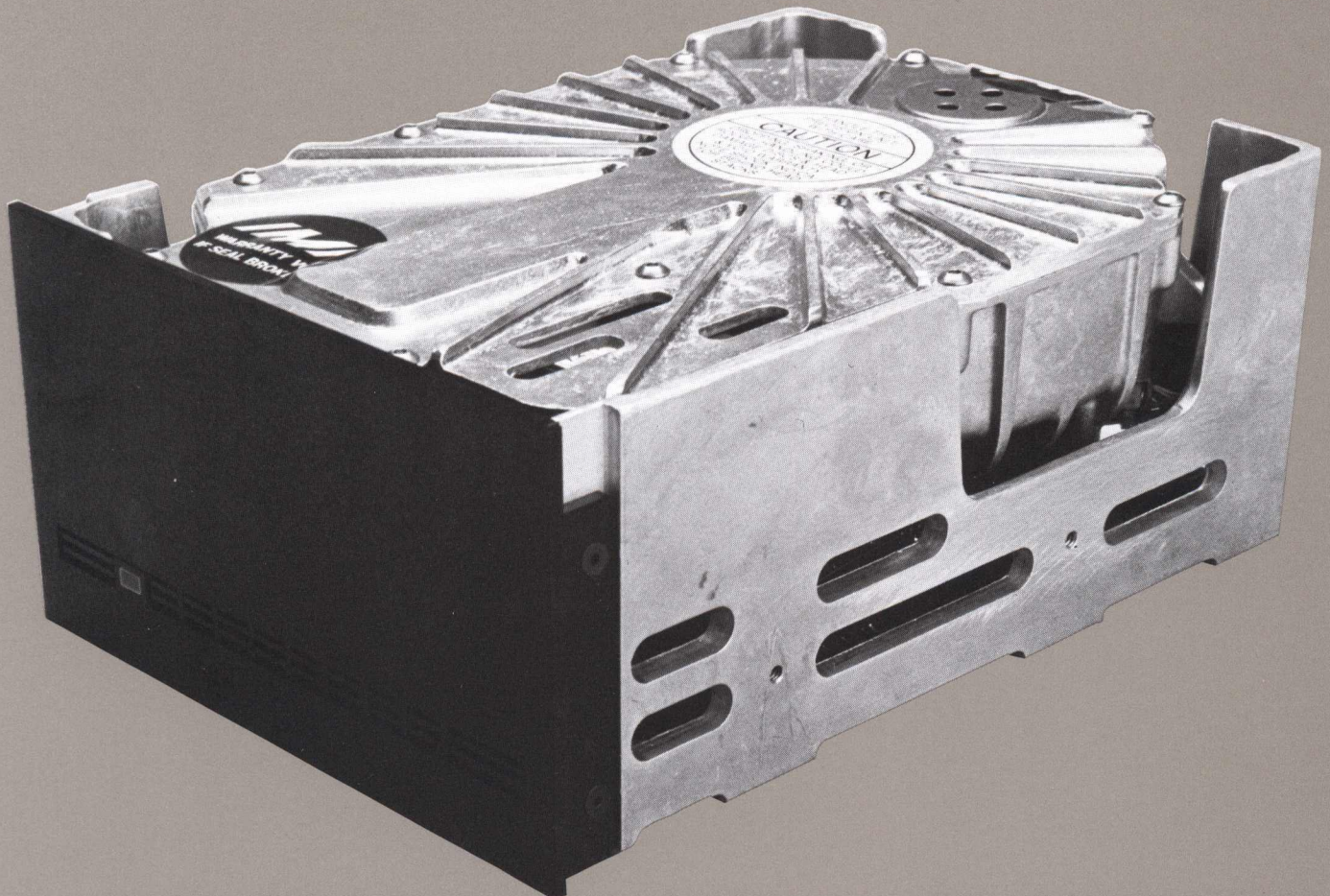*Automatic retries are attempted on these error conditions.

# IMI 5012H

## High reliability, high density 5¼-inch Winchester Disk Drive.

## 5000H Series

### Key benefits

- 12.76 Mbytes of unformatted data storage capacity.
- Ultra hard thin-film plated media lessens possibility of damage due to handling, lowering field service costs.
- 2-piece design with integral shock mounts extends service life.
- Mechanical design allows efficient thermal dissipation, preventing the head from being forced out of alignment.
- Dedicated shipping zone provided for heads at inner diameter of disks.

- Read preamplifiers on the head stack reduce EMI/RFI noise susceptibility, increasing data reliability.
- Automatic spindle brake reduces shipping and handling damage.
- External air circulation system cools electronics.
- Stepper-motor actuator with self-aligning, 3-point carriage suspension minimizes positioning errors caused by friction and wear.
- Magnetically-shielded DC spin motor ensures data integrity.

- Steel-band actuator with patented pre-load compensator ensures reliable, on-track operation.
- Industry standard interface allows fast system integration.
- Short, sturdy head arms improve data reliability by minimizing possible resonances.
- Drive requires no adjustments or preventive maintenance.
- DC power allows worldwide installation.

## IMI 5012H Specifications

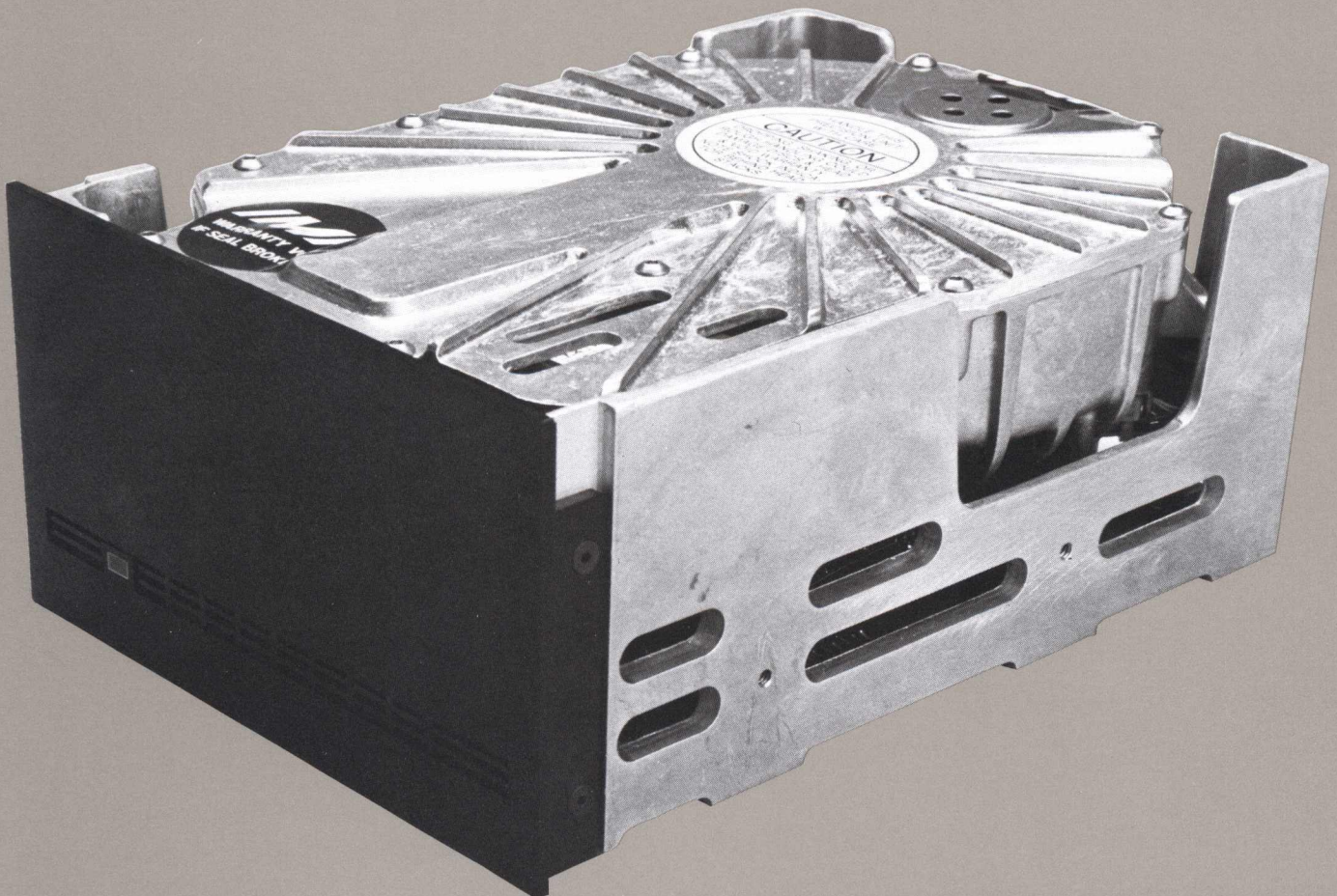| Functional | Capacity (unformatted) | Drive | 12.76 Mbytes |
|---|---|---|---|
| | | Per surface | 3.18 Mbytes |
| | | Per track | 10,417 bytes |
| | Capacity (formatted) | Drive | 10.0 Mbytes |
| | | Per surface | 2.50 Mbytes |
| | | Per track | 8,192 bytes |
| | | Sectors per track | 32 |
| | | Bytes per sector | 256 |
| | Recording density | | 9,706 bpi |
| | Track density | | 303 tpi |
| | Tracks per surface | | 306 |
| | Recording surfaces | | 4 |
| | Heads per surface | | 1 |
| | Disks | | 2 |
| Performance | Rotational speed | | 3,600 rpm |
| | Transfer rate | | 625 Kbytes/per second |
| | Positioning time | Track-to-track | 3 ms |
| | | Average | 85 ms |
| | | Maximum | 180 ms |
| | | Settling time | 15 ms |
| | | Average latency | 8.3 ms |
| Reliability | MTBF | | 10,000 POH |
| | MTTR | | less than 0.5 hour |
| | Error rates: | Soft | 1 in $10^{10}$ bits |
| | | Hard | 1 in $10^{12}$ bits |
| | | Seek | 1 in $10^{6}$ seeks |
| Power | +12 VDC, ±5%, 1.0 amps typical, 3 amps peak starting | | |
| | +5 VDC, ±5%, 1.0 amp typical | | |
| Environmental | Temperature | | 50°F to 122°F (10°C to 50°C) |
| | Relative humidity | | 10% to 80% |
| | Temperature variation | | 18°F (10°C)/hr. |
| | Altitude | | 10,000 ft (3050 m) |
| Physical | Height | | 3.25 in (8.26 cm) |
| | Width | | 5.75 in (14.61 cm) |
| | Depth | | 8.0 in (20.32 cm) |
| | Weight | | 5 lbs (2.27 kg) |
| Interface | ST506 and SA1000. IMI standard bus and controller interfaces, which are compatible with IMI 7000 Series 8-inch Winchesters, are also available. | | |
| Simple Installation | The 5012H can be installed either vertically on its side or horizontally on its base. Its physical size is identical to that of a minifloppy, and the mounting holes are identical to the minifloppy industry standard. | | |

# IMI 5018H

**IMI**

# High reliability, high density 5¼-inch Winchester Disk Drive.

## 5000H Series

## Key benefits

- 19.14 Mbytes of unformatted data storage capacity.
- Ultra hard thin-film plated media lessens possibility of damage due to handling, lowering field service costs.
- 2-piece design with integral shock mounts extends service life.
- Mechanical design allows efficient thermal dissipation, preventing the head from being forced out of alignment.
- Dedicated shipping zone provided for heads at inner diameter of disks.

- Read preamplifiers on the head stack reduce EMI/RFI noise susceptibility, increasing data reliability.
- Automatic spindle brake reduces shipping and handling damage.
- External air circulation system cools electronics.
- Stepper-motor actuator with self-aligning, 3-point carriage suspension minimizes positioning errors caused by friction and wear.
- Magnetically-shielded DC spin motor ensures data integrity.

- Steel-band actuator with patented pre-load compensator ensures reliable, on-track operation.
- Industry standard interface allows fast system integration.
- Short, sturdy head arms improve data reliability by minimizing possible resonances.
- Drive requires no adjustments or preventive maintenance.
- DC power allows worldwide installation.

## IMI 5018H Specifications

| Functional | Capacity (unformatted) | Drive | 19.14 Mbytes |
|---|---|---|---|
| | | Per surface | 3.18 Mbytes |
| | | Per track | 10,417 bytes |
| | Capacity (formatted) | Drive | 15.0 Mbytes |
| | | Per surface | 2.50 Mbytes |
| | | Per track | 8,192 bytes |
| | | Sectors per track | 32 |
| | | Bytes per sector | 256 |
| | Recording density | | 9,706 bpi |
| | Track density | | 303 tpi |
| | Tracks per surface | | 306 |
| | Recording surfaces | | 6 |
| | Heads per surface | | 1 |
| | Disks | | 3 |
| Performance | Rotational speed | | 3,600 rpm |
| | Transfer rate | | 625 Kbytes/per second |
| | Positioning time | Track-to-track | 3 ms |
| | | Average | 85 ms |
| | | Maximum | 180 ms |
| | | Settling time | 15 ms |
| | | Average latency | 8.3 ms |
| Reliability | MTBF | | 10,000 POH |
| | MTTR | | less than 0.5 hour |
| | Error rates: | Soft | 1 in $10^{10}$ bits |
| | | Hard | 1 in $10^{12}$ bits |
| | | Seek | 1 in $10^{6}$ seeks |
| Power | +12 VDC, ±5%, 1.0 amps typical, 3 amps peak starting | | |
| | +5 VDC, ±5%, 1.0 amp typical | | |
| Environmental | Temperature | | 50°F to 122°F (10°C to 50°C) |
| | Relative humidity | | 10% to 80% |
| | Temperature variation | | 18°F (10°C)/hr |
| | Altitude | | 10,000 ft (3050 m) |
| Physical | Height | | 3.25 in (8.26 cm) |
| | Width | | 5.75 in (14.61 cm) |
| | Depth | | 8.0 in (20.32 cm) |
| | Weight | | 5 lbs (2.27 kg) |
| Interface | ST506 and SA1000. IMI standard bus and controller interfaces, which are compatible with IMI 7000 Series 8-inch Winchesters, are also available. | | |
| Simple Installation | The 5018H can be installed either vertically on its side or horizontally on its base. Its physical size is identical to that of a minifloppy, and the mounting holes are identical to the minifloppy industry standard. | | |