

# **IBM OEM Storage Products DHAS-2270, DHAS-2405 & DHAS-2540**

The latest 2.5" disk drives from IBM provide up to 540 MB in a slim 17 mm high package. Using the latest MR head technology IBM provides high performance drives particularly suited to the mobile computing market.

## ***APPLICATIONS***

- High performance portable computers
- Non-IT - process control/fax
- Removable/secure storage units

## ***FEATURES***

- 270/405/540 MB at (512 bytes/sector)
- SCSI2 interface
- Media data rate 24.9/36.0 Mbits/s (8 zones)
- Rotational speed 3800 rpm.
- Average seek time 14 ms (Read)
- Magneto resistive heads
- 64K Look Ahead Buffer
- ECC on the fly
- 1.2 watt idle
- Shock 250G (2ms) non op. All 6 axis mounting
- Spin up 2.2 sec (typical)
- Power saving modes

## ***BENEFITS***

- High capacity 2.5" drives
- Popular interface with excellent performance
- Excellent data rate across disk surface
- Fast access to data
- High areal density, low component count
- Fast access to data and improved throughput
- Low power for battery powered applications
- Robust design for portable computing applications
- Fast recovery from standby
- Features for Green PC and battery systems
- Assured reliability

## ***ELECTRICAL CONNECTOR LOCATIONS***

*Driver/Receiver*



Total Customer Usable Data Bytes (MB)	270	405	540
Number of Blocks	527,688	791,532	1,055,376

### ***DC POWER REQUIREMENTS***

Supply Voltage	+5 Volts
Power Supply Ripple (0-20Mhz) 1	100 mvp-p max
Tolerance 2	+/- 5%
Supply Current	Mean Value
Idle average	0.24 A RMS
Read/Write	0.56 A RMS
Seek average	0.40 A RMS
Standby	0.08 A RMS
Startup (average to ready)	0.70 A RMS
Startup (maximum (peak))	0.94 A RMS
Supply Rise Time	7-100 ms

#### ***Notes:***

1. The maximum supply ripple is measured at 5V input on the HDD.
2. The disk drive shall not incur damage for an over voltage condition of +25% (maximum duration of 20 ms) on the 5 volt nominal supply.

### ***SIGNAL DEFINITION***

The pin assignments of interface signals are listed as follows:

PIN	Signal Name	PIN	Signal Name
01	+5V	02	+5V
03	RET	04	RET
05	GND	06	DB0
07	GND	08	DB1
09	GND	10	DB2
11	GND	12	DB3
13	GND	14	DB4
15	GND	16	DB5
17	KEY	18	DB6
19	GND	20	DB7
21	GND	22	PARITY
23	GND	24	TERM PWR
25	-ATTN	26	-BSY
27	GND	28	-ACK

29	-RST	30	-MSG
31	GND	32	-SEL
33	-I/O	34	-C/D
35	GND	36	-REQ
37	RET	38	RET
39	+5V	40	+5V

### J1 Signal Assignment

PIN	Signal Name	PIN	Signal Name
1	(Unused)	2	-No Spin Up
3	-INDEX	4	(Unused)
5	-ID1	6	-ID2
7	-ID4	8	-LED

### J2 Signal Assignment

**Note:** No Spin up, if this pin is grounded (Pin 2) the drive will not spin up at power up - drive must be started with a start stop unit command.

### ***SIGNAL LINE DESCRIPTIONS***

Name	Description
BSY	BUSY indicates that the bus is in use
SEL	SELECT is used by an Initiator to select a Target or by a Target to re-select an Initiator C/D CONTROL DATA indicates whether control (1) or data (0) information is on the bus
I/O Initiator	INPUT/OUTPUT indicates whether the data on the bus is an input (1) to the or an output (0) to the Target. This line is also used to differentiate between SELECTION phase (0) and RE-SELECTION phase (1)
MSG	MESSAGE is driven by Target and indicates a message phase
REQ	REQUEST is driven by Target and indicates a request for a REQ/ACK data transfer handshake
ACK	ACKNOWLEDGE is driven by the Initiator and indicates an acknowledgement of a REQ/ACK data transfer handshake
ATN	ATTENTION is driven by an Initiator to inform a Target that the Initiator has a message ready
RST	RSET clears all SCSI devices from the bus and resets them Note: The target will not drive this line
DB(n)	8 data bits are used to transfer data over the bus. DB(7) is the most significant
DB(P)	PARITY bit associated with DB(7-0). Data parity is odd
ID(n)	These signal pins are used to set the drive address
INDEX	The signal is just for reference, and the function is not specified
LED	The signal is just for reference, and the function is not specified

## ***ELECTROMAGNETIC COMPATIBILITY***

The Drive meets the following EMC requirements when installed in the user system and exercised with a random accessing routine at maximum data rate:

United States Federal Communication Commission (FCC) Rules and Regulations Part 15, Subject J -Computer Devices "Class B Limits".

European Economic Community (EEC) directive #76/889 related to the control of radio frequency interference and the Verband Deutscher Elektrotechniker (VDE) requirements of Germany (GOP).

## ***OPERATING MODES***

### *Description*

#### *Spin-Up*

This power on mode is defined as the period of time from receipt of power at the drive assembly or receipt of Start SCSI command, to Idle mode (or 'Ready' state).

#### *Idle*

In this mode the disks are spinning at rated speed, the drive is able to accept and immediately execute commands requiring disk access. Actuator assembly is located on track in the 'Ready' state.

#### *Standby*

Spindle motor is stopped. All modules except the host interface are sleeping. Commands can be received immediately. Drive is in an interrupt waiting mode with the lowest power dissipation.

#### *Seek/Read/Write*

This is a command execution mode where the driver actuator is moving or data is being written to or read from the media.

#### *Note 1:*

After power down or spindle stopped, a head locking mechanism secures the heads in the ID parking position.

## ***MODE SELECT OPTIONS***

Certain parameters are alterable using the SCSI 'Mode Select' command. This allows certain drive characteristics to be modified to optimize performance on a particular system. Refer to the DHAS-2XXX Functional Specification for a detailed definition of Mode Select parameters.

The changeable parameters are:

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Vendor Unique Parameters

UAI - Unit Attention Inhibit (0)

DSN - Disable Target Initiated (0)  
DPC - Disable Parity Checking (0)

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Read-Write Error Recovery Parameters  
TB - Transfer Block (0)  
PER - Post Error (0)  
DTE - Disable Transfer on Error (0)  
DCR - Disable Correction (0)  
Read Retry Count (01)  
Write Retry Count (01)

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Disconnect/Reconnect Control Parameters  
Read Buffer Full Ratio (30H)  
Write Buffer Empty Ratio (30H)

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Caching Parameters  
RCD - Read Cache Disable (0)

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Power Condition  
Standby (1)  
Standby Timer (1A5E0h {3hrs})

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Standby Timer Parameters  
Auto Standby Time (B4h {3 hrs})

**Note:** Default parameters are shown in closed brackets (X)

## ***OPERATING ENVIRONMENT***

*Humidity:*

Operating	8% to 90% non-condensing
Relative	
Non-Operating	5% to 95% non-condensing Relative

*Wet Bulb Temperature:*

Maximum Wet Bulb:	
Operating	29.4 C non-condensing
Non-Operating	40 C non-condensing

*Elevation:*

Operating Altitude	-300 to 3000m
Ship/Storage	-300 to 12000m
Altitude	

*Temperature:*

Operating	5 to 55 C
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Storage 0 to 65 C  
Shipping -40 to 65 C  
Temperature Gradient 20 C per hour (maximum)  
(Operating, Storage & Shipping)

**Note:**

The system is responsible for providing sufficient air movement to maintain surface temperature below 60 deg C at the center of top cover of the drive.

*Air Cooling Requirement*

The host system must provide sufficient air flow across the drive to maintain the temperature at less than 60 C (measured at the center of the drives' top cover).

*Operating Shock*

The Drive will withstand (with no hard error) a 20G half-sine wave shock pulse of 12ms duration and no data loss or permanent damage at idle, seek and read modes within shock pulses of 60 G3.5 ms half-sine wave.

*Non-Operating Shock*

The Drive will withstand (with no permanent damage or degradation in performance) a 120G half-sine wave shock pulse of 11 ms duration or 250G for 2 ms.

*Operating and Non-Operating Vibration*

Due to the complexity of this subject we recommend that users contact the Distributor to discuss how to perform the necessary measurements if they believe this to be an area which requires evaluation.

**MECHANICAL DATA**

Dimensions	All models
Height (mm)	17.0 + 0.35/-0.3
Width (mm)	70.0 + or - 0.25
Length (mm)	100.0 + or - 0.25
Weight (gram)	180 Max

*Mounting Orientation*

The drive will operate in all axes (6 directions). The drive will operate within the specified error rates when tilted + or - degrees from these positions.

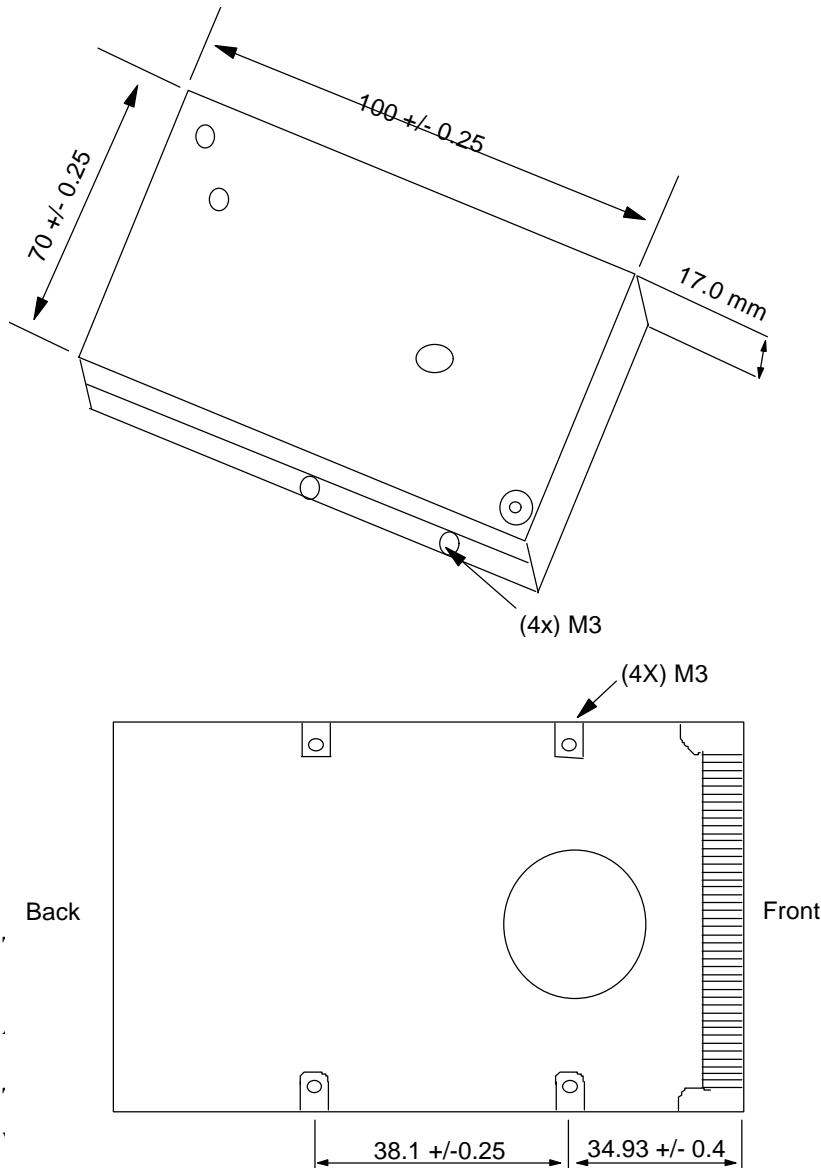
Performance and error rate will stay within specification limits if the drive is operated in the other permissible orientations from which it was formatted. Thus a drive formatted in a horizontal orientation will be able to run vertically and vice versa.

The recommended mounting screw torque is 3 + or - 0.5 kgf. cm.

The recommended mounting screw depth is 3.5 + or - 0.5 mm for bottom and 5.0 + or - mm for horizontal mounting.

The system is responsible for mounting the drive securely enough to prevent excessive motion or vibration of the drive at seek operation or spindle rotation, using appropriate screws or equivalent mounting hardware. Consult the issuer of this specification for actual application.

Vibration test and shock test are to be conducted with mounting the drive to the table using bottom four screws.



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**PACKAGING:** The drive must be protected against Electro-Static Discharge especially when being handled. The safest way to avoid damage is to put the drive in an antistatic bag before ESD wrist straps etc are removed.

Drives should only be shipped in approved containers, severe damage can be caused to the drive if the packaging does not adequately protect against the shock levels induced when a box is dropped. Consult your IBM marketing representative if you do not have an approved shipping container.

