

IBM OEM STORAGE PRODUCTS DSAA-3270, DSAA-3360, DSAA-3540 & DSAA-3720

IBM OEM has introduced a new range of disk drives for the desktop personal computer marketplace. Available in four popular capacity points with AT interface, the drives provide excellent performance and improved reliability.

Applications

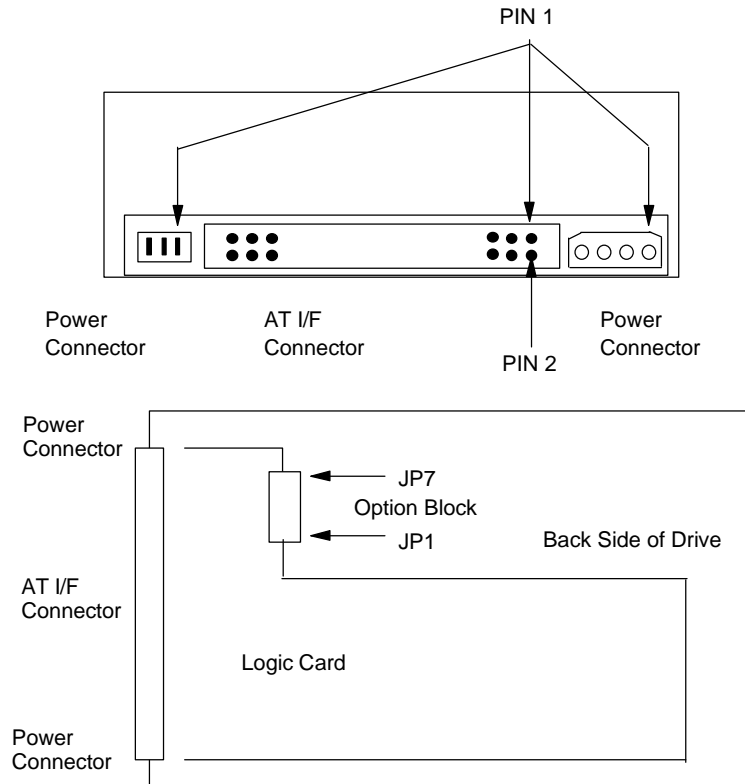
- Desktop personal computers
- Low end file servers

Features

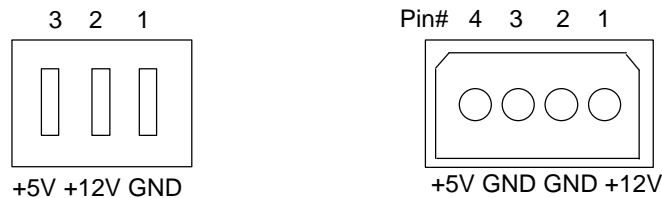
- 281, 365, 528, and 730 MB formatted capacity (512 byte/sector)
- 8.3 MB/s interface data rate
- 44.5 Mb/s (OD) media data rate
32.5 Mb/s (ID) media data rate
- Average seek time 12 ms (Read)
- 4500 RPM-
- 96 KB three segment buffer (option 224 KB)
- Read ahead caching with LFU (Least frequently used) segment update
- Industry standard mounting
- The drive can be mounted with any of its six surfaces facing down
- ECC on the fly
- CHS and LBA addressing modes
- Power saving modes
- Robust design for EMC/RFI
- MR (Magnetoresistive) head technology
- MTBF 300,000 hours

Benefits

- Generic range of popular storage capacities
- Fast interface data rate
- Excellent performance on long records
- Fast access to data
- Fast data retrieval in multi-tasking applications
- Ease of installation
- Improved data throughput
- Flexibility to support most appropriate addressing
- Reduced power consumption
- Easy integration across multiple platforms
- High area density, low component count
- Assured reliability

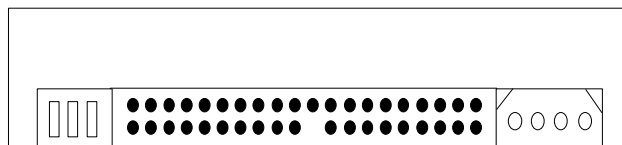


There is a choice of 2 power connections to this drive. One DC power connector is designed to mate with AMP PN 1-480424 (using AMP pins PN 350078-4). The other (3 pin) DC power connector is designed to mate with MOLEX 5480-03 (using MOLEX pins 5479). Equivalent



connectors may be used. Pin assignments are shown below, as viewed from the end of the drive.

AT Signal Connector



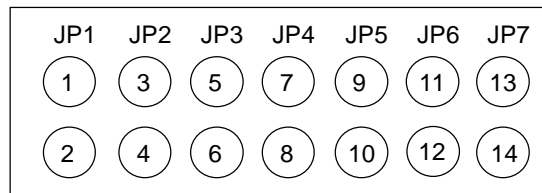
The drive uses single-ended drivers and receivers. The connector is designed to mate with 3M PN 3417-7000 or equivalent.

Note:

It is intended that the hard disk drive should only be in electrical contact with the chassis of the PC at a designated set of mounting holes. Other electrical contact may degrade error rate performance. As a result of this it is recommended that there should be no metal contact to the hard disk drive except at the mounting holes or the side rails into which the mounting holes are tapped.

Option Block

Jumper Settings



Jumpers may be fitted to select the following options:

	Pin Numbers
MASTER active	1-2
SLAVE active	3-4
Cable set	5-6
Write cache	9-10 (Disabled with jumper)
Auto reallocation	11-12 (Disabled with jumper)

Auto Reallocation Jumper

Auto reallocation jumper is checked during the initial power on reset (POR) check. Write cache is disabled when a jumper is fitted. (+) Auto reallocations jumper position needs to be OPEN when a user system wants to use write cache.

Note:

Auto reallocation only operates, and is mandatory, during write cache operations. Disabling either function by jumper disables both.

Write Cache Jumper

Write cache jumper is checked during the initial POR check. Write cache is disabled when a jumper is fitted.

Shipping Default Settings

MASTER is set to on (ie, jumper on pins 1-2).

No other jumpers are fitted.

Note:

The jumper positions JP1, JP2, JP3 must not be selected concurrently.

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 anti static 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.

Operating Environment

Operating Conditions

Temperature	5 to 55 degrees C*
Relative Humidity	8 to 90% non-condensing
Maximum Wet Bulb	
Temperature	29.4 degrees C non-condensing
Maximum Temperature	
Gradient	20 degrees C/Hour
Altitude	-152 to 3048 m

Non-Operating Conditions

Temperature	-40 to 65 degrees C
Relative Humidity	5 to 95% non-condensing
Maximum Wet Bulb	
Temperature	40 degrees C non-condensing
Maximum Temperature	
Gradient	20 degrees C/Hour
Altitude	-300 to 12000 m

Note:

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

Operating Shock

The hard disk drive meets the following criteria while operating in respective conditions described below. The shock test consists of ten shocks inputs in each axis and direction for total of 60. There must be a delay between shock pulses, long enough to allow the drive to complete all necessary error recovery procedure.

No errors

5 G, 11 ms half-sine shock pulse

No data loss, seek errors or permanent damage

10 G, 11 ms half-sine shock pulse

No data loss or permanent damage

15 G, 5 ms half-sine shock pulse 30 G, 4 ms half-sine shock pulse

Operating Vibration

Due to the complexity of this subject we recommend that users contact the IBM technical support group representative to discuss how to perform the necessary measurements if they believe this to be a area which requires evaluation.

Data Organization

Logical Layout	DSAA -3270	DSAA -3360	DSAA -3540*	DSAA -3720
Number of Heads	16	16	16 16*	16
Number of Sectors/Track	36	48	63 63*	63
Number of Cylinders	954	929	1062 1024	1416
Sector size	512	512	512 512*	512
Total Customer Usable Data Sectors	549,504	713,472	1,070,496 1,032,192*	1,427,328
Total Customer Usable Data Bytes	281 MB	365 MB	548 MB 528 MB*	730 MB

Note:

*2 versions of DSAA-3540

DC Power Requirement Limits

The following voltage specifications apply at the file power connector. Damage to the file electronics may result if the power supply cable is connected or disconnected while power is being applied to the file (No hot plug/unplug is allowed). There are inductive loads in the file which could cause destructively high voltage spikes on the file if the power connection is opened. There is no special power on/off sequencing required.

Nominal Supply Voltages	+5 Volts	+12 Volts
Maximum Ripple (0-20 MHz)	100 mV p-p	100 mV p-p
Voltage Supply Tolerance (include Ripple)	+ or - 5%	+10%/-8%
Power Supply Current (Amps)	+5 Volts	+12 Volts
Start peak	0.5	1.10
Idle average	0.19	0.14
R/W average	0.32	0.14

During the file start up and seeking, 12 volt ripple is generated by the file (referred to as dynamic loading). If several files have their power daisy chained together then the power supply ripple plus other file's dynamic loading must remain within the regulation tolerance of +10/-8%. A common supply with separate power leads to each file is a more desirable method of power distribution.

To prevent external electrical noise from interfering with the file's performance, the file must be held by four screws in a user system frame which has no electrical level deference at the four screws position, and has less than + or - 300 millivolts peak to peak level deference to the file power connector ground.

Signal Definition *The pin assignments of interface signals are listed as follows:*

PIN	Signal	I/O	PIN	Signal	I/O
01	-HRESET	I	02	GND	
03	HD07	I/O	04	HD08	I/O
05	HD06	I/O	06	HD09	I/O
07	HD05	I/O	08	HD10	I/O
09	HD04	I/O	10	HD11	I/O
11	HD03	I/O	12	HD12	I/O
13	HD02	I/O	14	HD13	I/O
15	HD01	I/O	16	HD14	I/O
17	HD00	I/O	18	HD15	I/O
19	GND		(20)	Key	
21	DMARQ	O	22	GND	
23	-HIOW	I	24	GND	
25	-HIOR	I	26	GND	
27	HIORDY	O	28	CSEL	
29	-DMACK	I	30	GND	
31	HIRQ	O	32	-HIOCS16	O
33	HAOI	I	34	-PDIAG	I/O
35	HAOO	I	36	HAO2	I
37	-HCSO	I	38	-HCSI	I
39	-DASP	I/O	40	GND	

Note:

"O" designates an output from the Drive.

"I" designates an input to the Drive.

"I/O" designates an input/output common.

Cabling

The maximum cable length form the Host system to the drive, plus the circuit pattern length inside the Host systems, must not exceed 18 inches (45.7 cm).

Interface

This data sheet describes some aspects of the host interface to ATA drives. The interface conforms to the CAM draft proposal for an ATA attachment with certain limitations described below.

Automatic Power Down Sequence

A hard reset will disable the automatic power down sequence.

Format Track

A drive will not perform a physical format. Instead it will simply write a data pattern of all zeros to the sectors which have been specified by the Format Track command. LBA mode for format track is not supported.

Format Track Interleave Factor

The drive only supports an interleave factor of 1:1, and may ignore any other specified interleave, without returning an error.

Write long

Write long command should be executed for the same sector after Read long command execution. Otherwise, unexpected ECC correctable error may occur. Because of the limitation of the emulation technique to support 4 byte ECC mode which is implemented in the drive.

Seek Overlap

The drive will wait for the seek to complete before interrupting the host. Therefore, no seek overlap can occur. This will be transparent to the host except that performance may be degraded in certain environments where the host could perform other work while waiting for seek complete, such a multi-tasking operating systems.

Sleep mode

During Sleep mode the drive will be activated by an command, including, but not limited to, a soft reset.

Drive/Head Register

Bits 5 and 7 of Drive/Head Register are not written to 0. (These 2 bits are always read as "I" even after host writes to "0"...).

The following Commands are supported by the drive:

<i>Commands</i>	<i>(Hex)</i>
Check Power Mode	(E5)
Execute Drive Diagnostics	(90)
Format Track	(50)
Identify Drive	(EC)
Idle	(E3)
Idle Immediate	(E1)
Initialize Drive Parameters	(91)
Read Buffer	(E4)
Read DMA (retry)	(C8)
Read DMA (no retry)	(C9)
Read Long (retry)	(22)
Read Long (no retry)	(23)
Read Multiple	(C4)
Read Sectors (retry)	(20)
Read Sectors (no retry)	(21)
Read Verify Sectors (retry)	(40)
Read Verify Sectors (no retry)	(41)
Recalibrate	(1X)
Seek	(7X)
Set Features	(EF)
Set Multiple	(C6)

Sleep	(E6)
Standby	(E2)
Standby Immediate	(E0)
Write Buffer	(E8)
Write DMA (retry)	(CA)
Write DMA (no retry)	(CB)
Write Long (retry)	(32)
Write Long (no retry)	(33)
Write Multiple	(C5)
Write Sectors (retry)	(30)
Write Sectors (no retry)	(31)

Registers

Address	Input Register	Output Register
1F0h	Data	Data
1F1h	Error	Features
1F2h	Sector Count	Sector Count
1F3h	Sector Number	Sector Number
	*LBA bits 0-7	*LBA bits 8-15
1F4h	Cylinder Low	Cylinder Low
	*LBA bits 8-15	*LBA bits 8-15
1F5h	Cylinder High	Cylinder High
	*LBA bits 16-23	*LBA bits 16-23
1F6h	Drive/Head	Drive/Head
	*LBA bits 24-27	*LBA Bits 24-27
1F7h	Status	Command
3F6h	Alternate Status	Device Control
3F7h	Drive Address	Not Used

The host uses the register interface to communicate to and from the drive. The registers are accessed through the host port addresses shown.

The host should not read or write any registers when the Status Register BSY bit=1.

Note:

*Meaning of Register contents when LBA addressing mode used.

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".

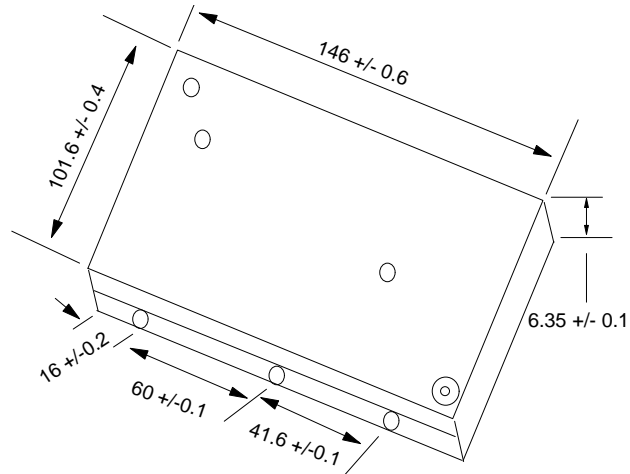
European Economic Community (EEC) directive 76/889 related to the control of radio frequency interference and the Verband Deutscher Elektrotechniker (VDE) requirements of Germany (VDE).

Mechanical Data

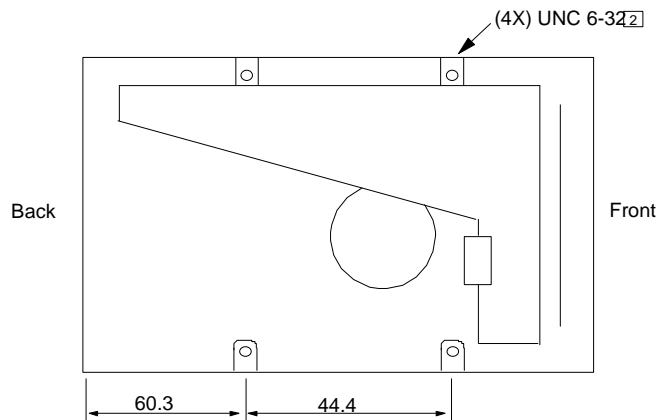
Dimensions

Height 25.4 mm + or - 0.4 mm

Width 101.6 mm + or - 0.4 mm



Depth 146.0 mm + or - 0.6 mm



Weight 530 grams

Mounting Orientation

The Drive can be mounted in any axis (6 directions).

The maximum allowable penetration of the mounting screws is 1 3.5 mm 2 6 mm.

The recommended mounting screw torque is 3 + or - 0.5 (KgF.cm)

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