

Caviar™ Series

WDAC280 / WDAC2120 / WDAC1170 / WDAC2200 / WDAC2340

80, 120, 170, 200 and 340 Megabyte

3.5-Inch Disk Drives

Radio Frequency Interference Statement

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If interference problems do occur, please consult the system equipment owner's manual for suggestions. Some of these suggestions include relocation of the computer system away from the television or radio, or placing the computer AC power connection on a different circuit or outlet.

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If You Need Help

If you need additional information or help during installation or normal use of this product, contact Western Digital Technical Support at (714) 932-4900, or access the Technical Support Bulletin Board if you have a modem.

To access the bulletin board you need a Hayes-compatible modem, 1200 or 2400 Baud rate, and the following format: 8 data bits, 1 stop bit, and no parity. The Technical Support Bulletin Board number is (714) 753-1234. The Bulletin Board asks some preliminary questions about your modem setup and the type of system you are calling from before the main bulletin board menu is displayed. Refer to your modem manual for instructions on proper modem setup.

Western Digital also offers related documentation for those users who require more detailed information. The Technical Reference Manual for the Caviar Drives provides complete specifications and technical information. Contact Western Digital Literature Distribution Department at (714) 932-4900 to obtain a copy of the Technical Reference Manual.

- For the Caviar AC280 (80 Mbyte capacity), order part #S0475.
- For the Caviar AC2120 (120 Mbyte capacity) order part #S0477.
- For the AC2200 (200 Mbyte capacity), order part #S0837.
- For the AC2340 (340 Mbyte capacity) and AC1170 (170 Mbyte capacity), order part #S0839.

Introduction



Overview

The Western Digital Caviar™ intelligent disk drives are available in 80, 120, 170, 200, and 340 megabyte capacities. These drives are suitable as new, upgrade, or replacement drives for installation in your IBM PC/AT or compatible system. The Caviar hard drive is an intelligent drive, which means that the hard disk has the controller circuitry and 40-pin IDE connector attached directly to the drive. It does not require a separate controller card if your system provides a 40-pin connector on the motherboard.

Because of its compact size (1-inch height), the Caviar drive is easily incorporated into the newest generation of small desktop and transportable PC/AT systems. The Caviar hard disk is a 3.5-inch drive that can also be used in a 5.25-inch drive bay with a 5.25-inch frame available from your dealer.

With an average seek time of less than 17 ms (15 ms for the Caviar 120; 14 ms for the Caviar 200; 13 ms for the Caviar 170 and 340) and a 1:1 interleave, the Caviar operates in high-speed, AT-compatible systems (80286, 80386SX, 80386, 80486SX, and 80486). **Your intelligent drive is low-level formatted and defect free.**

You can use your Caviar drive with Disk Operating System (DOS) version 3.0 or later. It is also compatible with other operating systems such as OS/2, Xenix, Novell Netware, UNIX, and with applications such as Windows and DESQVIEW.

The Caviar contains an automatic disk head parking feature that parks the disk drive heads in a safe, non-data area when the system power is turned off. This allows you to move the com-

puter system without damaging the hard disk media. For more technical information and specifications on the Caviar intelligent disk drive, refer to the **Reference** section of this manual.

Installation Options

There are a number of installation options depending on your current system components and configuration.

- If your system has a 40-pin IDE (Intelligent Drive Electronics) connector on the motherboard, the Caviar drive is cabled directly to the motherboard.
- If your system does not have a 40-pin IDE connector on the motherboard, you must install an AT bus to IDE adapter card and connect the hard drive to the connector on the adapter card.
- If you are installing the Caviar drive as your second IDE hard drive (dual installation), the hard drives must be daisy-chained together using a daisy-chain cable. One connector attaches to the adapter card or motherboard, and the other two attach to the drives.

The Caviar drive is not compatible with non-intelligent drives using a standard AT controller. For example, if you have an ST-506 or ESDI drive, you must remove it and the AT controller card before installing the Caviar drive.

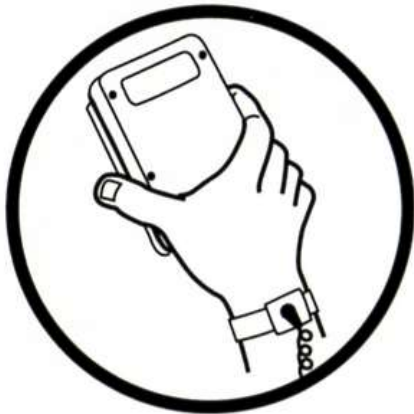
Unpacking and Handling Precautions

Western Digital products are designed to withstand normal handling during unpacking and installation. Be aware of the following precautions when unpacking and installing the Caviar drive.

- Be careful when handling the disk drive. Do not drop the drive or subject it to electrostatic shock. Doing so can permanently damage the drive and void the warranty.
 - Handle the intelligent drive by the ends only, and avoid touching the circuit board components.
 - Do not lift the intelligent drive by the faceplate or the circuit board.
 - Once the Caviar drive is unpacked, place the drive on an antistatic surface such as the antistatic drive bag. We recommend that you do not unpack the drive until you are ready to install it.
- Retain your packing material in case you need to return the drive.

Before Installing the Drive

Caution: Remember to handle the drive with care. To protect the drive components from damage and static, leave the drive in the anti-static bag until you are ready to install it into your system. Discharge static electricity by touching the metal chassis of your computer before handling the drive. Remember to handle the drive only by the sides to avoid contact with the circuit components.



Be sure that you have the following items before installing the Caviar drive:

- Computer system manual
- DOS version 3.0 or later, or compatible operating system
- Operating system manual
- A screwdriver
- A 40-pin host interface cable, not more than 18 inches long.

There are some other items your system may require:

- You may need to use a power Y-adapter if you are installing the Caviar drive as a second hard drive and you do not have two internal power connectors. This adapter can be purchased through your computer dealer.
- You may need jumper shunts if you are changing the factory default jumper settings.
- Some systems require drive mounting rails. Check your computer system manual to determine if drive mounting rails are required. These rails can be purchased through your computer manufacturer or dealer.
- If you are installing the Caviar intelligent disk in a 5.25-inch drive bay, you need a 5.25-inch frame. This frame mounts on the drive and adapts it to the larger bay. Contact your dealer if you need to purchase this frame.
- If your system does not have a 40-pin IDE connector on the motherboard, you need an IDE adapter card to connect the drive. Usually, replac-

ing an ST-506 drive requires the use
of an adapter card.

Installation

Step One: Determining Your Installation Configuration

This section provides the steps necessary to prepare and install the Caviar intelligent disk drive in your computer.

- Step One: Determining Your Installation Configuration
- Step Two: Setting the Drive Jumpers
- Step Three: Mounting the Drive

Once you have all of the items necessary, you are ready to install the intelligent drive in your system.

You may use the Caviar drive as a new disk in the computer, or as a replacement for an existing hard disk drive. There are two main installation configurations:

- The drive is cabled directly to a 40-pin connector on the motherboard.
- The drive is cabled to an adapter card mounted in one of the expansion card slots in the computer.

Both configurations use a 40-pin host interface cable.

Dual Installation

If you are using the Caviar drive as one of two IDE hard disk drives in the computer (dual installation), you may use either installation configuration. In dual installations, you must use a 40-pin host interface cable with three connectors, and daisy-chain the two drives to the motherboard or adapter card.

Dual installations require a master/slave drive configuration, where one drive is designated as the primary drive (master) and the other is designated as the secondary drive (slave). The Caviar drive is compatible in dual installations with other intelligent drives that support a master/slave configuration.

Be sure to determine your installation requirements, configuration, and materials before proceeding.

Step Two: Setting the Drive Jumpers

The Caviar drive has a jumper block (J8) located next to the 40-pin connector on the drive. These jumpers select options on the hard drive. The Caviar drive is factory set for single drive installation. If you are installing the Caviar drive as the only intelligent drive in your system, you do not need to install any jumper shunts. In dual drive installations, jumper shunts are needed to designate which drive is master and which is slave.

Refer to Figure 1 for an illustration of all jumper settings.

- If you have a dual installation (two intelligent drives), you must designate one of the drives as the master and the other as the slave. The jumper pins on block J8 need to be configured for the dual installation.

- For your other drive, consult its installation guide for master/slave configuration.

To designate the Caviar drive as the master, place a jumper shunt on pins 5-6.

To designate the Caviar drive as the slave, place a jumper shunt on pins 3-4.

To install a jumper shunt on the J8 jumper pins:

1. Refer to the previous descriptions and Figure 1 to determine your configuration.
2. Carefully place the shunt over the two pins specified in Figure 1.
3. Push the shunt into place until it is flush against the base of the jumper block.

Note: Designation of a drive as either master or slave is determined by jumper configuration, not by the order in which it is daisy-chained to the other drive.

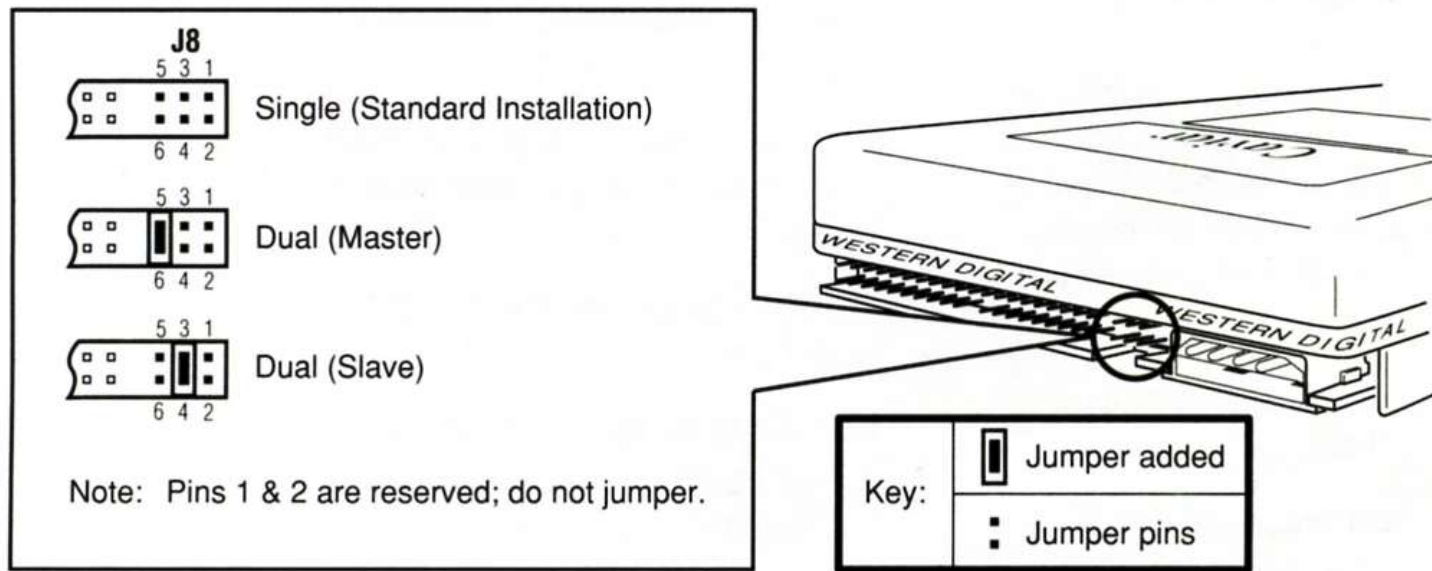


Figure 1. Jumper Settings

Step Three: Mounting the Drive

You are now ready to install the Caviar drive. Make sure your interface cable is no longer than 18 inches. Also, if you are connecting two drives together, you need a daisy-chain cable that has three, 40-pin connectors. You may order this cable from your dealer.

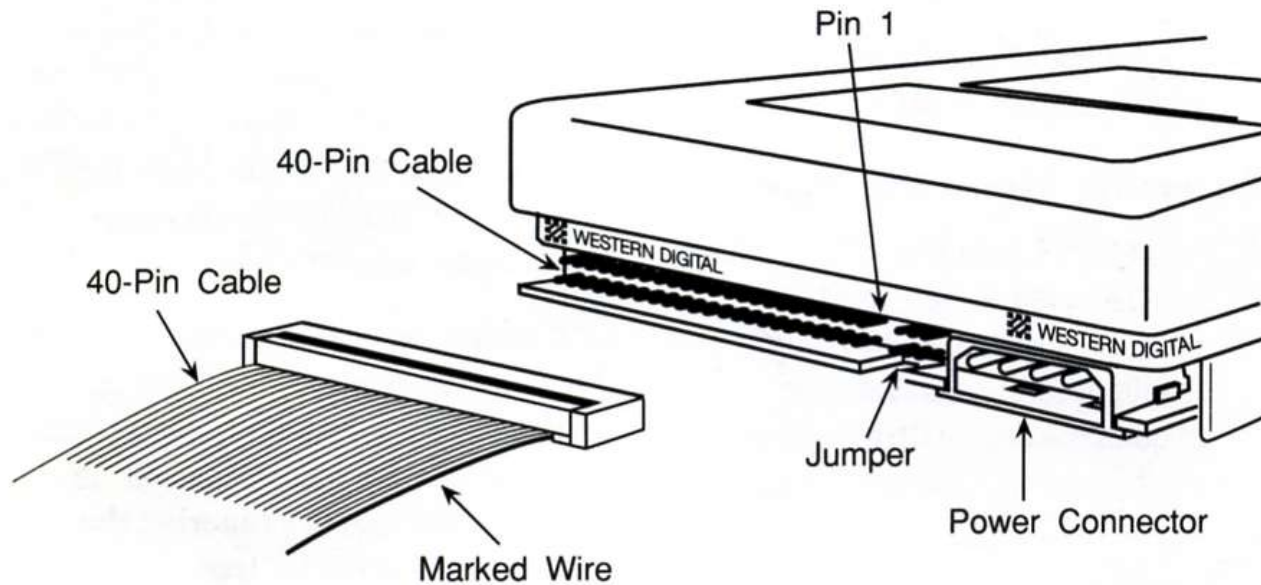


Figure 2. Caviar Connector Locations

Caution: You may damage the Caviar drive if the interface cable is not connected properly. To prevent incorrect connection, use a cable that has keyed connectors. The female connector on the interface cable should have a plug in position 20.

Connecting the Interface Cable to the Drive

1. **Be sure to turn off system power.**
2. Open the computer case according to the system manual instructions.
3. Connect the 40-pin interface cable to the 40-pin connector on the Caviar hard drive. For dual installations, daisy-chain the two drives together by connecting them with a

three-connector interface cable. Be sure to connect pin 1 of the cable to pin 1 of the connector.

4. Route the cable toward the motherboard or card slot area. The cable should easily route from the hard drive to the card slot area. The cable should not block any air flow paths.
5. Insert the drive halfway into the drive bay.

Note: The LED activity light is socketed and can be removed if you wish to extend the connection to an external LED.

Connecting the Power Supply Cable

1. Attach the power cable to the power connector on the hard drive.
2. If unattached, attach the other end of the power cable to the power supply in your computer.
3. Completely insert the drive into your system drive bay.

Inserting Mounting Screws

1. Mount the Caviar drive in the drive bay using four 6-32 screws (3/16 inch). Be sure to use the correct length of screw. Screws which engage the drive with more than six threads may damage the Caviar drive.

Connecting the Interface Cable to the Host

1. If you have a 40-pin connector on the motherboard, connect the other end of the interface cable to the motherboard connector.
2. If your installation requires an adapter card, install it at this time. When installation is complete, connect the end of the 40-pin interface cable to the adapter. Make sure pin 1 of the cable is connected to pin 1 on the adapter card.
3. After the interface cable is properly connected, close the computer case according to the instructions provided in your system manual and proceed to **Preparing the Caviar Drive for Use**.

*Preparing the Caviar Drive
for Use*

Preparing the Caviar Drive for Use

Selecting Your Drive Tables

Your Caviar drive has been low-level formatted. The hard drive is ready to set up and is defect-free. The drive must be partitioned and high-level formatted so it can accept files. This section of the Installation Guide provides guidelines for preparing your drive. Consult your operating system documentation for complete information on preparing the drive for use with your operating system.

The computer system provides an initial setup utility, which you access with a series of key strokes or run from a floppy diskette. System setup procedures vary from system to system, but each setup procedure allows you to tell the system what type of hardware you are using. Follow the setup instructions in your computer system manual.

Drive	Recommended Parameters	Total Sectors Available
Caviar 80 Mbyte Drive	980 x 10 x 17	166,628
Caviar 120 Mbyte Drive	872 x 8 x 35	244,308
Caviar 170 Mbyte Drive	1010 x 6 x 55	333,300
Caviar 200 Mbyte Drive	989 x 12 x 35	416,346
Caviar 340 Mbyte Drive	1010 x 12 x 55	666,600

Table 1. Recommended Drive Parameters

One step in the setup procedure asks you to specify the type of hard drive used in your system.

There is no standard drive type for the 80 Mbyte, 120 Mbyte, 170 Mbyte, 200 Mbyte or 340 Mbyte drives. Some suggested drive parameters are listed on the next page. Use the setup utility to examine the available drive tables. Choose a drive type that comes as close as possible to the recommended

parameters listed above. **Do not exceed the total number of sectors available on the drive.**

The Basic Input/Output System (BIOS) may request values for write precompensation and landing zone. You may input any value. The drive's controller electronics eliminates the need to specify these parameters and will ignore this information.

Drive	Cylinders	Heads	Sectors/Track	Total Sectors
80 Mbyte	980	10	17	166,600 (85.3 Mbyte)
	640	10	26	166,400 (85.2 Mbyte)
	841	6	33	166,518 (85.3 Mbyte)
	980	5	34	166,600 (85.3 Mbyte)
	1024	9	17	156,672 (80.2 Mbyte)
120 MByte	872	8	35	244,160 (125.0 Mbyte)
	1024	14	17	243,712 (124.8 Mbyte)
	763	10	32	244,160 (125.0 Mbyte)
	842	10	29	244,180 (125.0 Mbyte)
170 MByte	1010	6	55	333,300 (170.6 Mbyte)
	980	10	34	333,200 (170.6 Mbyte)
	952	7	50	333,200 (170.6 Mbyte)
	807	7	59	333,291 (170.6 Mbyte)

Table 2. Suggested Drive Parameters

To calculate the number of sectors a drive type supplies, multiply the number of cylinders by the number of heads by the number of sectors on each track. For example, a drive type with 980 cylinders, 10 heads, and 17 sectors supplies 166,600 sectors (980 x 10 x 17). The table on this page and the following page shows the number of sectors for several different drive types. Cylinders, heads and sectors can be of any combination as long as the total number of sectors is not exceeded.

Drive	Cylinders	Heads	Sectors/Track	Total Sectors
200 MByte	989	12	35	415,380 (212.7 Mbyte)
	987	12	35	414,540 (212.0 Mbyte)
	987	10	42	414,540 (212.0 Mbyte)
	882	10	47	414,540 (212.0 Mbyte)
	735	12	47	414,540 (212.0 Mbyte)
	658	14	45	414,540 (212.0 Mbyte)
340 MByte	1010	12	55	666,600 (341.3 Mbyte)
	1013	14	47	666,554 (341.3 Mbyte)
	807	14	59	666,582 (341.3 Mbyte)
	952	14	50	666,400 (341.2 Mbyte)

Table 2. Suggested Drive Parameters (Continued)

You may need to partition your drive(s) to overcome certain limitations of your MS DOS version. Partitioning allows you to divide your disk into multiple partitions, which function as separate disk drives. Use the MS DOS FDISK.COM utility to display a series of menus that help you partition your hard disk for MS DOS.

To partition your intelligent disk:

1. Insert your MS DOS system diskette into drive A.
2. Reboot the system by simultaneously pressing [CTRL], [ALT], and [DEL]. Make sure the MS DOS diskette with FDISK.COM (located on the diskette) is inserted in Drive A .
3. Type **FDISK** at the A: prompt.
4. Press the [Enter] key.

5. Follow the default options. For more information, refer to your MS DOS manual.

MS DOS versions 3.3 and higher allow you to create a primary partition, create an extended partition, change the active partition, delete a partition, and display partition data.

Your version of DOS determines how you can partition your disk(s).

- If you have an MS DOS version earlier than 3.3, you can only address 32 megabytes maximum on your drive. You cannot partition the drive without second party software. We recommend you upgrade to MS DOS 3.3 or above.
- If you have MS DOS version 3.3, DOS allows you to partition larger drives into logical disk drives with a

maximum of 32 megabytes per partition.

- If you are working with MS DOS version 3.31 or greater, you can partition a disk drive to the maximum size of the drive. You are not limited to 32 megabytes.
- Some newer versions of DOS may automatically partition and format the drive.
- Some non-Microsoft versions of DOS may allow larger partitions than those mentioned here.

FDISK.COM automatically assigns drive IDs to the partitions. Refer to your operating system manual for more information on partitioning drives.

Just as you need to format a floppy diskette before it can accept files, you must high-level format the Caviar drive to prepare it to receive files. **You do not need to perform a low-level format.**

To high-level format the first logical drive (the "C" drive) to be bootable:

1. Insert the MS DOS diskette with the FORMAT.COM utility into drive A.
2. Type **FORMAT C:/S** at the A: prompt. (The "/S" parameter installs the operating system files needed to boot from the hard disk. It is only required for drive C.)
3. Press the [Enter] key.

If you designated other drives or partitions during the FDISK.COM routine, you must format those drives as well.

Booting the System

For example, type **FORMAT D:** at the A: prompt and then press [Enter]. Continue the format process until you have formatted all drives. When the formatting process is complete, copy all DOS files from the floppy onto your hard drive. For more information on formatting, refer to your operating system documentation.

After you have properly formatted your drive(s) and copied the operating system, you are ready to use the computer. Boot the system from the active operating system drive, usually C. *Be sure to remove any diskettes from drive A before booting.* To boot the system:

1. Simultaneously press [CTRL], [ALT], and [DEL].
2. The system should respond, and the monitor should display **C>** after you have entered the current date and time.

Refer to your system documentation for more information on booting the system.

If the system will not boot, or if you are unable to access the new drive, refer to your operating system documentation. Verify that you ran the system utilities

correctly, specified the correct drive tables, designated an active partition, and partitioned and formatted the hard disk correctly. If your system still won't boot, you may have improperly installed or connected the drive. Re-read the installation instructions provided in this manual to be sure that you installed and connected everything properly. Refer to the **Troubleshooting** section of this manual for more information.

Preparing the Caviar Drive for a Novell Network

Using the Drive

Automatic Head Park Feature

If you are installing Novell, and your version of Netware has COMPSURF, you must COMPSURF the Caviar drive. The following parameters are recommended:

- Format the disk No
- Maintain the current media defect list No
- Enter media defects No
- Number of sequential passes Default
- Number of I/O random test Default
- Are parameters correct Yes

After running COMPSURF on the Caviar drive, run NETGEN. Refer to your Novell installation manual for more information on COMPSURF and Novell installation procedures.

It is extremely important to regularly back up the data on your hard disk. Data can be damaged or lost due to a number of unanticipated factors.

Consult your operating system documentation for back-up instructions and procedures.

The Caviar drive provides an automatic feature that parks the drive heads when the system power is turned off. No separate utilities are required to park the Caviar drive. If you move your system, be sure to turn the system power off. The drive heads are then automatically moved to a safe, non-data area, and the heads are locked into place. This helps protect the disk media and the heads from accidental damage due to vibration, moving, or shipping.

Troubleshooting

Troubleshooting

This section lists procedures to resolve problems you may encounter when installing the Caviar drive.

- Reread the installation instructions provided in this manual to be sure that you followed the instructions correctly and included all necessary hardware.
- Refer to your system documentation to be sure that you followed the setup procedures correctly.
- Make sure that you partitioned and formatted the intelligent drive and any additional drive with the DOS FDISK.COM and FORMAT.COM utilities. (If you are making this disk bootable, remember to specify the /S parameter.) Refer to your operating system documentation to check these procedures.
- If using DOS 4.0 or DOS 5.0, be certain to make the partition active during FDISK.
- Check the physical installation of your system. Make sure:
 - The jumper selections on the drive are correct for your installation.
 - The cables are correctly connected.
 - The adapter card, if installed, is properly seated, connected, and configured.
 - Power is properly connected to your system and the system is plugged in.
 - There is not an ST506 AT controller in the system. Another 16-bit (AT) hard disk controller cannot

be used in the same system as the Caviar drive.

If you have further questions or trouble, contact your dealer or Western Digital Technical Support at (714) 932-4900 or contact the Western Digital Bulletin Board at (714) 753-1234 for more information.

Reference

Physical Specifications

This section contains the physical and environmental specifications and requirements for the Caviar intelligent disk.

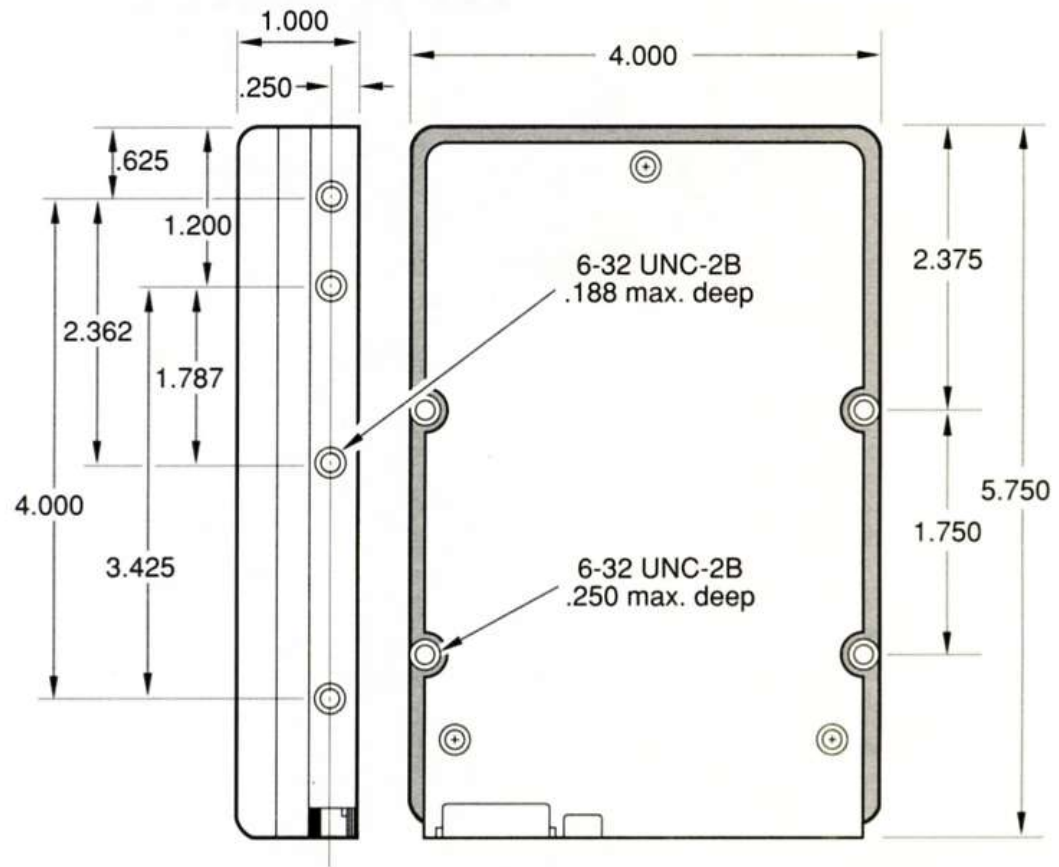


Figure 3. Mounting Dimensions

Note: Do not exceed the maximum sector capacity of the drive when specifying the number of cylinders, heads and sectors per track.

General					
	80 Mbyte	120 Mbyte	170 Mbyte	200 Mbyte	340 Mbyte
Formatted Capacity	85.3 Mbytes	125.0 Mbytes	170.6 Mbyte	213.2 Mbytes	341.3 Mbytes
Interface	40-pin PC/AT	40-pin PC/AT	40-pin PC/AT	40-pin PC/AT	40-pin PC/AT
Actuator Type	Rotary Voice Coil	Rotary Voice Coil	Rotary Voice Coil	Rotary Voice Coil	Rotary Voice Coil
Number of Disks	2	2	1	2	2
Data Surfaces	4	4	2	4	4
Number of Heads	4	4	2	4	4
Number of Cylinders	1082	1350	2233	1971	2233
Average Track Density	1405 TPI	1712 TPI	2481 TPI	2400 TPI	2481 TPI
Formatted Cylinder Capacity	78,848 bytes	80.9 to 97.3 Kbytes	114.7 to 196.6 Kbytes	97.3 to 113.6 Kbytes	114.7 to 196.6 Kbytes
Bytes per Sector	512	512	512	512	512
User Sectors per Drive	166,628	244,308	333,300	416,346	666,600
User Sectors per Cylinder	154	158 to 190	112 to 192	190 to 222	224 to 384
Physical Sectors per Track	39	40 to 48	56 to 96	48 to 56	56 to 96
Servo Type	Embedded Sector Servo	Embedded Sector Servo	Embedded Sector Servo	Embedded Sector Servo	Embedded Sector Servo
Recording Method	2,7 RLL	2,7 RLL	1,7 RLL	2,7 RLL	1,7 RLL
Recording Density	31,591 BPI	33,465 BPI	55,200 BPI	43,000 BPI	55,200 BPI

Table 3. General Specifications

General (Cont'd)					
	80 Mbyte	120 Mbyte	170 Mbyte	200 Mbyte	340 Mbyte
Flux Density	21,061 FCI	22,310 FCI	41,400 FCI	28,667 FCI	41,400 FCI
ECC	56-bit	56-bit	Reed Solomon	56-bit	Reed Solomon
Head Park	Automatic Head Parking	Automatic Head Parking	Automatic Head Parking	Automatic Head Parking	Automatic Head Parking
Suggested Logical Parameters Cyl/Hds/SPT	980/10/17	872/8/35	1010/6/55	989/12/35	1010/12/55

Table 3. General Specifications (Continued)

Form Factor					
	80 Mbyte	120 Mbyte	170 Mbyte	200 Mbyte	340 Mbyte
Form Factor	3.5 inches	3.5 inches	3.5 inches	3.5 inches	3.5 inches
Height	1.00 inches, \pm .010	1.00 inches, \pm .010	1.00 inches, \pm .010	1.00 inches, \pm .010	1.00 inches, \pm .010
Length	5.75 inches, \pm .010	5.75 inches, \pm .010	5.75 inches, \pm .010	5.75 inches, \pm .010	5.75 inches, \pm .010
Width	4.00 inches, \pm .010	4.00 inches, \pm .010	4.00 inches, \pm .010	4.00 inches, \pm .010	4.00 inches, \pm .010
Weight	1.12 pounds (0.508 g)	1.12 pounds (0.508 g)	1.12 pounds (0.508 g)	1.12 pounds (0.508 g)	1.12 pounds (0.508 g)

Table 4. Form Factor Specifications

Performance Specifications

Performance					
	80 Mbyte	120 Mbyte	170 Mbyte	200 Mbyte	340 Mbyte
Average Seek Time	Sub-17 Milliseconds	Sub-15 Milliseconds	Sub-13 Milliseconds	Sub-14 Milliseconds	Sub-13 Milliseconds
Track-to-Track Seek	6 Milliseconds	6 Milliseconds	4 Milliseconds	5 Milliseconds	4 Milliseconds
Maximum Seek	28 Milliseconds	28 Milliseconds	26 Milliseconds	24 Milliseconds	26 Milliseconds
Index Pulse Period	16.67 Milliseconds ($\pm 0.1\%$)	16.67 Milliseconds ($\pm 0.1\%$)	18.1 Milliseconds ($\pm 0.1\%$)	16.67 Milliseconds ($\pm 0.1\%$)	18.1 Milliseconds ($\pm 0.1\%$)
Average Latency	8.34 Milliseconds ($\pm 0.1\%$)	8.34 Milliseconds ($\pm 0.1\%$)	9 Milliseconds ($\pm 0.1\%$)	8.21 Milliseconds ($\pm 0.1\%$)	9 Milliseconds ($\pm 0.1\%$)
Rotational Speed	3595 Revolutions/min ($\pm 0.1\%$)	3605 Revolutions/min ($\pm 0.1\%$)	3322 Revolutions/min ($\pm 0.1\%$)	3652 Revolutions/min ($\pm 0.1\%$)	3322 Revolutions/min ($\pm 0.1\%$)
Controller Overhead	0.3 Milliseconds average	0.3 Milliseconds average	0.3 Milliseconds average	0.3 Milliseconds average	0.3 Milliseconds average
Data Transfer Rate: Buffer to Disk Buffer to Host	12 Mbits/second 4.5 Mbytes/second	12 to 15 Mbits/second; 4.5 Mbytes/second	17 to 30 Mbits/second 6 Mbytes/second	15.625 to 18.75 Mbits/second 5 Mbytes/second	17 to 30 Mbits/second 6 Mbytes/second
Interleave	1:1	1:1	1:1	1:1	1:1
Buffer Size	32-Kbyte RAM (8 Kbyte optional)	32-Kbyte RAM (64 Kbyte optional)	64-Kbyte RAM (128 Kbyte optional)	64-Kbyte RAM	64-Kbyte RAM (128 Kbyte optional)
Spindle Start Time	5 Seconds (typical)	5 Seconds (typical)	5 Seconds (typical)	5 Seconds (typical)	5 Seconds (typical)
Spindle Stop Time	6 Seconds (typical)	6 Seconds (typical)	6 Seconds (typical)	6 Seconds (typical)	6 Seconds (typical)
Start/Stop Cycles	10,000 cycles minimum	10,000 cycles minimum	20,000 cycles minimum	10,000 cycles minimum	20,000 cycles minimum
Acoustics (typical)	Idle at 1 meter, 40 dBA Seeking at 1 meter, 42 dBA	Idle at 1 meter, 40 dBA Seeking at 1 meter, 43 dBA	Idle at 1 meter, 38 dBA Seeking at 1 meter, 42 dBA	Idle at 1 meter, 40 dBA Seeking at 1 meter, 43 dBA	Idle at 1 meter, 38 dBA Seeking at 1 meter, 42 dBA

Table 5. Performance Specifications

Power Specifications

Note: For information on Power Save features incorporated in your Caviar drive, please refer to the Technical Reference Manual for that drive.

12 VDC and 5 VDC Typical Current Draw						
Operation	80 MByte			120 MByte		
	Input Voltage		Power	Input Voltage		Power
	12 VDC $\pm 5\%$	5 VDC $\pm 5\%$		12 VDC $\pm 5\%$	5 VDC $\pm 5\%$	
Read/Write	0.35A	0.22A	5.30W	0.24A	0.30A	4.38W
Seek (1/3 stroke)	0.37A	0.22A	5.60W	0.28A	0.30A	4.86W
Spinup	1.08A 1.40A max.	0.20A 0.25A max.	13.96W	0.60A 0.80A max.	0.30A 0.35A max.	8.70W
Ripple Voltage	Maximum	Frequency		Maximum	Frequency	
12 VDC	200 mV (peak-to-peak)	0-20 MHz		200 mV (peak-to-peak)	0-20 MHz	
5 VDC	100 mV (peak-to-peak)	0-20 MHz		100 mV (peak-to-peak)	0-20 MHz	

Note: Spin mode begins at zero RPM spindle speed and ends with normal speed. A complete spin-up operation typically requires five seconds.

Table 6. 12 VDC and 5 VDC Typical Current Draw

12 VDC and 5 VDC Typical Current Draw						
Operation	200 MByte			170 Mbyte/340 MByte		
	Input Voltage		Power	Input Voltage		Power
	12 VDC $\pm 5\%$	5 VDC $\pm 5\%$		12 VDC $\pm 5\%$	5 VDC $\pm 5\%$	
Read/Write	0.30A	0.30A	5.10W	0.11A	0.33A	3.0W
Seek (1/3 stroke)	0.33A	0.30A	5.46W	0.24A	0.30A	4.4W
Spinup	0.80A 1.10A max.	0.33A 0.38A max.	11.25W	0.96A 01.20A max.	0.10A 0.35A max.	12.0W
Ripple Voltage	Maximum	Frequency	Maximum	Frequency		
12 VDC	200 mV (peak-to-peak)	0-20 MHz	200 mV (peak-to-peak)	0-20 MHz		
5 VDC	100 mV (peak-to-peak)	0-20 MHz	100 mV (peak-to-peak)	0-20 MHz		

Note: Spin mode begins at zero RPM spindle speed and ends with normal speed. A complete spin-up operation typically requires five seconds.

Table 6. 12 VDC and 5 VDC Typical Current Draw (Continued)

Power Connectors and Cables	
Power Connector	4-pin MOLEX (P/N 15-24-4041 or equivalent) 3-pin MOLEX (P/N 30-27-0032 or equivalent). Factory installed option.
Mating Connector	Body (AMP 1-480424-0 or equivalent) Pins (AMP 60619-4 or equivalent)
Power Cable Wire Gauge	18 AWG

Table 7. Power Connectors and Cables

Environmental Specifications

Note: The system environment must allow sufficient air flow to maintain the air temperature adjacent to the casting at or below 50°C (122°F).

Environmental	80 Mbyte	120 Mbyte	170 Mbyte	200 Mbyte	340 Mbyte
	Shock				
Operating	10 Gs	10 Gs	10 Gs	10 Gs	10 Gs
Non-operating	75 Gs	75 Gs	100 Gs	75 Gs	100 Gs
Vibration					
Operating	5-20 Hz, 0.034" (double amplitude) 20-400 Hz, 0.75 Gs (Peak)	5-20 Hz, 0.034" (double amplitude) 20-400 Hz, 0.75 Gs (Peak)	5-20 Hz, 0.034" (double amplitude) 20-400 Hz, 0.75 Gs (Peak)	5-20 Hz, 0.034" (double amplitude) 20-400 Hz, 0.75 Gs (Peak)	5-20 Hz, 0.034" (double amplitude) 20-400 Hz, 0.75 Gs (Peak)
Non-operating	5-20 Hz, 0.195" (double amplitude) 20-500 Hz, 4 Gs (Peak)	5-20 Hz, 0.195" (double amplitude) 20-500 Hz, 4 Gs (Peak)	5-20 Hz, 0.195" (double amplitude) 20-500 Hz, 4 Gs (Peak)	5-20 Hz, 0.195" (double amplitude) 20-500 Hz, 4 Gs (Peak)	5-20 Hz, 0.195" (double amplitude) 20-500 Hz, 4 Gs (Peak)
Sweep Rate	One half octave/minute	One half octave/minute	One half octave/minute	One half octave/minute	One half octave/minute
Temperature					
Operating	5°C to 50°C (41°F to 122°F); 10°C/hour Thermal Gradient	5°C to 50°C (41°F to 122°F); 10°C/hour Thermal Gradient	5°C to 55°C (41°F to 131°F); 20°C/hour Thermal Gradient	5°C to 50°C (41°F to 122°F); 10°C/hour Thermal Gradient	5°C to 55°C (41°F to 131°F); 20°C/hour Thermal Gradient
Non-operating	-40°C to 60°C (-40°F to 140°F); 20°C/hour Thermal Gradient	-40°C to 60°C (-40°F to 140°F); 20°C/hour Thermal Gradient	-40°C to 60°C (-40°F to 140°F); 20°C/hour Thermal Gradient	-40°C to 60°C (-40°F to 140°F); 20°C/hour Thermal Gradient	-40°C to 60°C (-40°F to 140°F); 20°C/hour Thermal Gradient

Table 8. Environmental Specifications

Environmental (Cont'd)					
	80 Mbyte	120 Mbyte	170 Mbyte	200 Mbyte	340 Mbyte
Relative Humidity					
Operating	8% to 80% RH non-condensing	8% to 80% RH non-condensing	8% to 80% RH non-condensing	8% to 80% RH non-condensing	8% to 80% RH non-condensing
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)	26°C (79°F)	26°C (79°F)	26°C (79°F)
Non-operating	5% to 95% RH non-condensing	5% to 95% RH non-condensing	5% to 95% RH non-condensing	5% to 95% RH non-condensing	5% to 95% RH non-condensing
Maximum Wet Bulb	26°C (79°F)	26°C (79°F)	35°C (95°F)	26°C (79°F)	35°C (95°F)
Atmospheric Pressure					
Operating	-1000 to 10,000 feet	-1000 to 10,000 feet	-1000 to 10,000 feet	-1000 to 10,000 feet	-1000 to 10,000 feet
Non-operating	-1000 to 40,000 feet	-1000 to 40,000 feet	-1000 to 40,000 feet	-1000 to 40,000 feet	-1000 to 40,000 feet

Table 8. Environmental Specifications (Continued)

Reliability Specifications

Reliability	80 Mbyte, 120 Mbyte, 200 Mbyte	170 Mbyte, 340 Mbyte
	Mean Time Between Failures (MTBF)	100,000 power-on hours
Mean Time to Repair (MTTR)	10 Minutes typical	10 Minutes typical
Component Design Life	5 Years	5 Years
Error Rate	<1 in 10^{13} bits read unrecoverable	<1 in 10^{13} bits read unrecoverable
Warranty Period	2 Years	2 Years
Specifications subject to change without notice		

Table 9. Reliability Specifications

Agency Approvals

The Caviar drives meet the standards of the following regulatory agencies:

Underwriters Laboratories

UL-Standard 1950, for Safety, Electronic Data Processing Units and Systems. File Number - E101559

Federal Communication Commission

Verified to comply with FCC Rules for Radiated and Conducted Emission, Part 15, Subpart B, for Class B Equipment

Canadian Standards Association

CSA-Standard C22.2, No. 950 - M89 Safety of Information Technology Equipment, Including Electrical Business Equipment. File Number LR 68850

TUV Essen Laboratories

IEC 950 (EN 60 950) Standard for Information Technology and Business Equipment

Obtaining Warranty and Non-warranty Service

Warranty and non-warranty service is available from Western Digital. However, if this Western Digital product ever needs service, check with your dealer. You may also contact Western Digital Technical Support.

No product may be returned to us without first calling Technical Support at (714) 932-4900. Technical Support will determine the cause of the product problem. If it is decided that your Western Digital product needs to be repaired or replaced, you will be given a Return Material Authorization number (RMA#) and instructions on how and where to return your product. Please include this RMA# when returning the product. No unauthorized shipments will be accepted.

Limited Warranty

WESTERN DIGITAL CORPORATION (WDC) expressly warrants, in accordance with the terms described below, that it will either repair or replace this WDC peripheral Product if it proves to be defective in design, material, or workmanship in the course of its normal use, within two (2) years from the Buyer's date of purchase from an authorized WDC dealer.

For warranty repair or replacement, the defective Product must be returned within two (2) years to place of purchase or to an authorized WDC service center, either in person or by insured mail, packaged in the original container and accompanied by proof of purchase, model number, and serial number. A repaired or replacement Product shall be warranted as above for the balance of the original product Warranty Period or ninety (90) days, whichever is longest.

The normal intended use of the Product is as computer peripheral equipment in accordance with the functional, environmental and operational standards published by WDC or generally accepted in the industry. WDC shall have no obligation with respect to lost data or data contained in any Product placed in its possession.

WDC's liability to Buyer or anyone claiming through or on behalf of Buyer with respect to claim or loss arising out of this transaction or alleged to have resulted from an act or omission of WDC shall in no event exceed the purchase price of the Product with respect to which such liability is claimed. In no event shall WDC be liable for consequential damages, losses, or expenses arising out of this transaction. The return of the purchase price or the repair or replacement of the product shall be the buyer's sole remedy hereunder. All claims hereunder must be presented to WDC within ninety (90) days

following discovery of an alleged defect in the Product.

This limited warranty is WDC's sole warranty. WDC makes no other warranty of any kind whatsoever, expressed or implied. All implied warranties of merchantability and/or fitness for a particular purpose are hereby disclaimed by WDC.

In the United States, some states do not allow exclusion or limitation of incidental or consequential damages, so the limitations above may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.



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