



# Your PDF Guides

You can read the recommendations in the user guide, the technical guide or the installation guide for MAXTOR D540X-4D. You'll find the answers to all your questions on the MAXTOR D540X-4D in the user manual (information, specifications, safety advice, size, accessories, etc.). Detailed instructions for use are in the User's Guide.

**User manual MAXTOR D540X-4D**  
**User guide MAXTOR D540X-4D**  
**Operating instructions MAXTOR D540X-4D**  
**Instructions for use MAXTOR D540X-4D**  
**Instruction manual MAXTOR D540X-4D**

**Maxtor®**

---

---

**Maxtor D540X-4D**  
**Product Manual**

March 5, 2002  
P/N: 1807-A



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>



.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
*.. Conventions...*

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

*.. 2.1 2.2 2.3 2.4 2.5 2.6 2.7 Product Description .*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*.. Key Features...*

.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....



*. Cylinder Limitation Jumper Description .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....

..... 3.

1 3.2 3.3 3.4 3.5 3.

6 3.7 3.8 3.9 3.10 3.

*11 3.12 Models and Capacities .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....

.....  
.....  
.....

*..... Drive Configuration ....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*.... Performance Specifications .....*

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

*.. Physical Dimensions .....*

.....  
.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
*Power Requirements.....*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*.. Power Mode Definitions ...*

.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*... EPA Energy Star Compliance ..*

.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....

*.. Environmental Limits ...*

.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....  
... *Shock and Vibration* ..  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... *Reliability Specifications*.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

..... *EMC/EMI* ..

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

.....  
.....  
.....

*Safety Regulatory Compliance* .....

.....  
.....  
.....

.....  
.....  
.....

.....  
.. UVPGV P Q% HQ GNDC 6 501+6#%+(+% '25 6%7&142 TGVRCJ% 01+62+4%5' & 6%7&142 TGVRCJ% 01+6%7&1460+ TGVRCJ% 1-1 1-1 1-2 1-2  
2-1 2-1 2-2 2-4 2-4 2-6 2-7 3-1 3-1 3-2 3-2 3-4 3-4 3-4 3-5 3-5 3-6 3-7 3-7 Maxtor D540X-4D vi Table of Contents 5&0#//1% #6# &0# '%#(4'60+ 57\$ #6#  
TGVRCJ% 01+6#.#650+ &0# )0+.  
&0#\* TGVRCJ% 4.1 4.2 4.3 4.4 4.  
5 4.6 5.1 5.2 5.3 5.4 5.5 Hard Drive Handling Precautions ....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.... *Electro-Static Discharge (ESD)* .

.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

..... *Unpacking and Inspection* ....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

..... *Repacking* .....

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

..... *Physical Installation* ..

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

..... *Physical Installation ..*

.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

... *4-1 4-1 4-2 4-5 4-5 4-5 INTRODUCTION ..*

.....  
.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....  
.....

..... *MECHANICAL INTERFACE .....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....

.....  
.....

*ELECTRICAL INTERFACE.....*

.....  
.....  
.....  
.....

.....  
.....  
.....  
.....  
.....

..... REGISTER ADDRESS DECODING ..

.....  
.....  
.....  
.....  
.....

.. COMMAND INTERFACE...

.....  
.....  
.....  
.....  
.....  
.....  
.....

.. 5-1 5-1 5-1 5-2 5-2 6412275 &0# '%+84'5 TGVRCJ% vii Maxtor D540X-4D 6.1 Service Policy ..

.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....  
.....

. 6-1 Figure 2-1 Figure 3-1 Figure 4-1 Figure 4-2 Figure 4-3 PCBA Jumper Location and Configuration .....

.....  
.....  
.....  
.....  
.....

.. 2-6 Outline and Mounting Dimensions .....

.....  
.....  
.....  
.....

.....  
.....  
.....  
.... 3-3 Multi-pack Shipping Container .....

.....  
.....  
.....

.. 4-3 Single Pack Shipping Container (Option A) .....

.....  
.....  
.....

. 4-4 Single Pack Shipping Container (Option B) .....

.....  
.....  
.....  
.....

.....

. 4-5 viii UGT W IK( HQ V UK. Maxtor D540X-4D Maxtor Corporation has been providing high-quality computer storage products since 1982. Along the way, we've seen many changes in data storage needs. Not long ago, only a handful of specific users needed more than a couple hundred megabytes of storage. Today, downloading from the Internet and CD-ROMs, multimedia, networking and advanced office applications are driving storage needs even higher. Even home PC applications need capacities measured in gigabytes, not megabytes. Maxtor's products meet the demanding data storage capacity requirements of today and tomorrow. They are available in 5400- and 7200- RPM configurations with capacity offerings from 10 to 80 GB and beyond. The Maxtor D540X-4D family of drives is a 5400 RPM hard drive with capacities from 30GB to 80GB.

No matter which capacity, all Maxtor hard drives are supported by our commitment to total customer satisfaction and our No Quibble Service guarantee. One call or a visit to our home page on the Internet ([www.maxtor.com](http://www.maxtor.com)) puts you in touch with either technical support or customer service. We'll provide you the information you need quickly, accurately and in the form you prefer a fax, a downloaded file or a conversation with a representative. © This hard disk drive reference manual is organized in the following method: Chapter 1Introduction Chapter 2Product Description Chapter 3Product Specifications Chapter 4- Handling and Installation Chapter 5ATA Bus Interface and ATA Commands Chapter 6Service and Support Glossary 0 1 + 6 % 7 & 1 4 6 0+ TGVRC J% POKVC\KPCIT1 NCWPC/ POKVCTQRTQ% TQVZC/ 78-9.



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>

36 863449# Maxtor D540X-4D 1-1 Introduction ATA bpi AT attachment bits per inch MB megabyte Mbts/sec MB/sec MHz ms MSB mV ns PIO RPM tpi UDMA usec V W megabits per second megabytes per second megahertz millisecond most significant bit millivolts nanoseconds programmedinput/output revolutions per minute tracks per inch ultra direct memory access microsecond volts watts CHS db dBA DMA ECC fci G GB Hz KB LBA LSB mA cylinder - head - sector decibels decibels, A weighted direct memory access error correction code flux changes per inch acceleration gigabyte hertz kilobyte logical block address(ing) least significant bit milliamperes If there is a conflict between text and tables, the table shall be accepted as being correct. The names of abbreviations, commands, fields and acronyms used as signal names are in all uppercase type (e.g., IDENTIFY DRIVE).

Fields containing only one bit are usually referred to as the "name" bit instead of the "name" field. Names of drive registers begin with a capital letter (e.g., Cylinder High register). Numbers that are not followed by a lowercase "b" or "h" are decimal values. Numbers that are followed by a lowercase "b" (e.g., 01b) are binary values. Numbers that are followed by a lowercase "h" (e.g., 3Ah) are hexadecimal values. 1-2 Maxtor D540X-4D P QK V RK T E U G & P QK V CK X G T D D # P QK V RK T E U G & UPQKVCKXGTDD# UPQKVPGXPQ% UFTQ9 [GIPKTGDOW0 P QK V CK X G T D D # Introduction UPQKVPGXPQ% NCPK5 Signal names are shown ierformance. Maxtor hard drives fully comply with the new ANSI Ultra DMA protocol, which greatly improves overall AT interface performance by significantly improving burst and sustained data throughput. Supports multi-word Direct Memory Access (DMA) mode transfers. All Maxtor hard drives feature a universal translate mode.

In an AT/EISA-class system, the drive may be configured to any specified combination of cylinders, heads and sectors (within the range of the drive's formatted capacity). Maxtor hard drives power-up in a translate mode: Product Description Each drive model has a fixed number of spare sectors per drive, all of which are located at the end of the drive. Upon detection of a bad sector that has been reassigned, the next sequential sector is used. For example, if sector 3 is flagged, data that would have been stored there is "pushed down" and recorded in sector 4. Sector 4 then effectively becomes sector 3, as sequential sectors are "pushed down" across the entire drive.

The first spare sector makes up for the loss of sector 3, and so maintains the sequential order of data. This push down method assures maximum performance. %%' GFQ% POKVEGTTQ% TQTT' GTCYFTC\* [N( GJV PI >14 symbols, single burst, guaranteed 24 symbols, single burst, guaranteed POKVCTGR1 MEQ. FPC MTC2 EKVCOQVW# Immediately following power down, dynamic braking of the spinning disks delays momentarily allowing the read/write heads to move to an inner mechanical stop. A small fixed magnet holds the rotary actuator in place as the disk spins down. The rotary actuator is released only when power is again applied. </& GPQ < VPG O GIC PC/ V EGH G & POKVEGTTQ% %%' GTCYVHQ5 IPK U UGT FF # M EQN \$ NC EKIQ . The Logical Block Address (LBA) mode can only be utilized in systems that support this form of translation. The cylinder, head and sector geometry of the drive, as presented to the host, differs from the actual physical geometry. The host AT computer may access a drive of set parameters: number of cylinders, heads and sectors per track, plus cylinder, head and sector addresses.

However, the drive can't use these host parameters directly because of zoned recording techniques. The drive translates the host parameters to a set of logical internal addresses for data access. The host drive geometry parameters are mapped into an LBA based on this formula: LBA where = (HSCA - 1) + HHDA x HSPT + HNHD x HSPT x HCYA = (HSCA - 1) + HSPT x (HHDA + HNHD x HCYA HSCA = Host Sector Address, HHDA = Host Head Address HCYA = Host Cylinder Address, HNHD = Host Number of Heads HSPT = Host Sectors per Track The LBA is checked for violating the drive capacity. If it does not, the LBA is converted to physical drive cylinder, head and sector values. The physical address is then used to access or store the data on the disk and for other drive related operations. Maxtor D540X-4D 2-3 Product Description 2-4 Maxtor D540X-4D 49# POKVCEQNNCG4 GVKT9 EKVCOQVW# UVPGPQROQ% #&\* TQLC/ VPGOGICPC/ GJEC% IPKMECV5 GJEC% GVKT9 POKKVCVPGOIG5 TGHHW\$ GFQ/ FCGJ# FCG4 OUKPCJEG/ GXKT & TQVCWVE# [TCVQ4 The data buffer is organized into two segments: the data buffer and the micro controller scratch pad. The data buffer is dynamically allocated for read and write data depending on the commands received. A variable number of read and write buffers may exist at the same time. Normally, this mode is active. Following a read request, disk read-ahead begins on the first sector and continues sequentially until the allocated buffer is full.

If a read request is received during the read-ahead operation, the buffer is examined to determine if the request is in the cache. If a cache hit occurs, read-ahead mode continues without interruption and the host transfer begins immediately. This feature is part of the write cache and reduces the risk of data loss during deferred write operations. If a disk error occurs during the disk write process, the disk task stops and the suspect sector is reallocated to a pool of alternate sectors located at the end of the drive. Following reallocation, the disk write task continues until it is complete.

Normally, this mode is active. Write cache mode accepts the host write data into the buffer until the buffer is full or the host transfer is complete. A command complete interrupt is generated at the end of the transfer. A disk write task begins to store the host data to disk. Host write commands continue to be accepted and data transferred to the buffer until either the write command stack is full or the data buffer is full.

The drive may reorder write commands to optimize drive throughput. A brushless DC direct drive motor rotates the spindle at 5400 RPM (±0.1%). The dynamically balanced motor/spindle assembly ensures minimal mechanical run-out to the disks. A dynamic brake provides a fast stop to the spindle motor upon power removal. The speed tolerance includes motor performance and motor circuit tolerances. All Maxtor hard drives employ a rotary voice coil actuator which consists of a moving coil, an actuator arm assembly and stationary magnets. The actuator moves on a low-mass, low-friction center shaft. The low friction contributes to fast access times and low power consumption. Product Description CKFG/ FPC UFCG\* GVKT9FCG4 UEKPQTVEGN' GVKT9FCG4 OGVU[5 POKVCTVNK( TK# TQUUGEQTRQTEK/ · Data sequencing · Host interface · Index detection · Seeks · Servo · SMART An integrated circuit mounted within the sealed head disk assembly (near the read/ write heads) provides a selection of up to eight heads depending on the model.



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>

It also provides read pre-amplification and write drive circuitry. Low mass, low force giant magneto-resistive read/write heads record data on 3.5inch diameter disks. Maxtor uses a sputtered thin film medium on all disks for Maxtor hard drives. All Maxtor hard drives are assembled in a Class 100 controlled environment. Over the life of the drive, a 0.1 micron filter and breather filter located within the sealed head disk assembly (HDA) maintain a clean environment to the heads and disks. Maxtor drives are designed to operate in a typical office environment with minimum environmental control. The microprocessor controls the following functions for the drive electronics: · Command execution · Cache management · Data correction and error recovery · Diagnostic execution · Head positioning (including error recovery) · Spin speed control Maxtor D540X-4D 2-5 Product Description 2-6 Maxtor D540X-4D P Q K V C T W I K H P Q % O G V U [ U D W 5 P Q K V R I V E G N 5 G N D C % V T Q R R W 5 G X K T & N C W & Two drives may be accessed via a common interface cable, using the same range of I/O addresses. The drives have a jumper configuration as device 0 or 1 (Master/ Slave), and are selected by the drive select bit in the Device/Head register of the task file.

All Task File registers are written in parallel to both drives. The interface processor on each drive decides whether a command written to it should be executed; this depends on the type of command and which drive is selected. Only the drive selected executes the command and activates the data bus in response to host I/O reads; the drive not selected remains inactive. A master/slave relationship exists between the two drives: device 0 is the master and device 1 the slave. When the Master is closed (factory default, figure 2-1), the drive assumes the role of master; when open, the drive acts as a slave. In single drive configurations, the Master jumper must be closed. CSEL (cable select) is an optional feature per ANSI ATA specification. Drives configured in a multiple drive system are identified by CSEL's value: If CSEL is grounded, then the drive address is 0. If CSEL is open, then the drive address is 1. Figure 2-1 PICA Connectors Product Description Master/Slave Only drive in single drive system\* Master drive in dual drive system\* Slave drive in dual drive system Cable Select Disabled\* Enabled Cylinder Limitation Disabled\* Enabled Factory Reserved Key \* = Default C C O O C O C O C O C = Closed (jumper installed) O = Open (no jumper installed) On some older BIOS', primarily those that auto-configure the disk drive, a hang may occur. The Cylinder Limitation jumper reduces the capacity in the Identify Drive allowing large capacity drives to work with older BIOS. The capacity reported when J45:J46 is closed will be as follows: drives less than or equal to 32GB will report 2.1GB. Drives greater than 32GB will report 32GB. Maxtor D540X-4D 2-7 . . . . . P Q K V R K T E U G & T G R O W , P Q K V C V K O K . T G F P K N [ % 0 1 + 6 # 4 7 ) + ( 0 1 % 4 ' 2 / 7 , Product Description 2-8 Maxtor D540X-4D Formatted Capacity (GB LBA Mode) 30.0GB 41.0GB 61.5GB GB means 1 billion bytes. Total accessible capacity varies depending on operating environment.

Data Surfaces/Number of Heads Number of Disks Sectors per Drive (max LBA) Integrated Interface Recording Method Servo Type Number of Servo Sectors Data Zones per Surface Data Sectors per Track (ID/OD) Areal Density (Gbits/in<sup>2</sup> max, ID/OD) Flux Density (kfc, ID/OD) Recording Density (kbp, ID/OD) Track Density (ktpi) 2 1 60,030,432 2 1 80,043,264 3 2 120,069,936 160,086,528 Maxtor Ultra ATA/100 (ATA-5/ATA-6) PRML Embedded 224 16 448/896 27.7/25.2 506/461 486/442 57 Maxtor D540X-4D \* & \* & 5 0 1 + 6 # % + ( + % ' 2 5 6 % 7 & 1 4 2 T G V R C J % \* & \* & \* & \* & \* & \* & U G K V K E C R C % F P C U N G F Q / P Q K V C T W I K H P Q % G X K T & 5 . ' & 1 / 5 . ' & 1 / 8 2 . 0 G B 4 2 3 - 1 Product Specifications Seek Times (typical read, ms) Track-to-Track Average (normal seek) Full Stroke (normal seek) Average Latency (ms) Controller Overhead (ms) Rotation Speed (RPM ±0.1%) Data Transfer Speed (MByte/sec max) To/From Interface (Maxtor Ultra ATA/100 - M5, up to) To/From Media (ID/OD up to nn.n, where nn.n is the maximum transfer rate possible) Sustained (ID/OD up to nn.n, where nn.

n is the maximum transfer rate possible) Data Buffer Size (MB)/Type Drive Ready Time (typical sec) 100 21.9/43.4 1 11 20 5.5 <0.3 5400 17. 8/35.9 2/SDRAM 7.5 Height (maximum in mm) Width (typical in mm) Length (maximum in mm) Weight (maximum in kg) 26.1 101.6 147. 0 0.580 3-2 Maxtor D540X-4D \* & \* & \* & ' 7 . # 8 \* & U P Q K V C E K H K E G R 5 G E P C O T Q H T G 2 U P Q K U P G O K & N C E K U [ J 2 4 ' 6 / # 4 # 2 5 . ' & 1 / Product Specifications Outline and Mounting Dimensions GTWIK( Maxtor D540X-4D 3-3 Product Specifications Spin-up (peak) Seek Read/Write Idle Standby Sleep 2100 881 649 424 40 40 550 567 561 566 307 285 The drive is spinning up following initial application of power and has not yet reached full speed. A random access operation by the drive. Data is being read from or written to the drive. The drive is spinning, the actuator is parked and powered off and all other circuitry is powered on. The drive is capable of responding to read commands within 40 ms. The motor is not spinning. The drive will leave this mode upon receipt of a command that requires disk access.

The time-out value for this mode is programmable. The buffer is active to accept write data. This is the lowest power state with the interface set to inactive. A software or hardware reset is required to return the drive to the Standby state. Maxtor Corporation supports the goals of the U.S. Environmental Protection Agency's Energy Star program to reduce the electrical power consumption of computer equipment. 3-4 Maxtor D540X-4D 9 4'912 31.4 <0.5 sec 13.

4 10.6 7.9 2.0 1.9 #/ 8 G E P C K N R O Q % T C V 5 [ I T G P ' # 2 ' # / 8 U P Q K V K P K H G & G F Q / T G Y Q 2 U V P G O G T K W S G 4 T G Y Q 2 G V K T 9 F C G 4 [ D F P C V 5 R W P K R 5 R G G N 5 M G G 5 & 1 / G N F + Product Specifications Temperature 0° C to 60° C low temperature (-40° C) high temperature (65° C) per MIL-STD-810E, method 501.

3, climatic category; hot-induced conditions. Thermal Gradient Relative Humidity Wet Bulb Altitude (relative to sea level) Acoustic Noise - sound power (per ISO 7779, 10 microphone, at sea level) 30° C per hour (maximum) 5% to 95% (non-condensing) 30° C (maximum) -650 to 10,000 feet Idle Mode (track following at speed) 2.9 bel average 3.4 bel maximum Normal Seek Mode 3.7 bel average 4.

1 bel maximum -650 to 40,000 feet Mechanical Shock Rotational Shock Random Vibration R>=0.988/shock at 60 Gs; r>=0.999/shock at 30 Gs R=0.



**You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide**  
<http://yourpdfguides.com/dref/2943893>

90@>= 300G R=0.95@>= 275G R=0.99@>= 250G 20,000 Rad/sec,0.5 to 1.0ms, no damage 10-45Hz at 0.004G2/Hz 48-62Hz at 0.008G2/Hz 65-300Hz at 0.

004G2/Hz 301-500Hz at 0.00005G2/Hz no errors PSD: 10Hz at 0.05G2/Hz 20Hz at 0.055G2/Hz 300Hz at 0.05G2/Hz 301Hz at 0.0014G2/Hz 500Hz-760Hz at 0.001G2/Hz 877Hz at 0.003G2/Hz 1000-1570Hz at .001G2/Hz at 0.001G2/Hz 2000Hz at 0.0001G2/Hz no damage Maxtor D540X-4D )#4165 )0+6#4'21 010 )0+6#4'21 010 3-5 )0+6#4'21 )0+6#4'21 UVKOK. NCVPGOPQTKXP' PQKVCTDK8 FPC MEQJ5 4'6'/#4#2 4'6'/#4#2 Product Specifications Swept Sine Vibration 10 to 300 Hz 1 G (0 to peak) amplitude, 0.25 octave per minute <1.0% Annualized Return Rate (ARR) indicates the average against products shipped. <750 DPPM The quality acceptance rate indicates the percentage of Maxtor products successfully installed by our customers, and/or the number of defective parts per million (DPPM) encountered during the entire installation process. >50,000 This indicates the average minimum cycles for reliable start/stop function. R=0.9998@ >4500, R=0.9995 @ >7500, R=0.5 @ >= 50000 <1 per 10e15 bits read Data errors (non-recoverable).

Average data error rate allowed with all error recovery features activated. 5 years (minimum) Component design life is defined as a.) the time period before identified wear-out mechanisms impact the failure rate, or b.) the time period up to the wear-out point when useful component life expires. 3-6 Maxtor D540X-4D )0+6#4'21 010 )0+6#4'21 UPQKVCEKHKEGR5 [VKNKDCNG4 GVC4 GEPVCVREE# [VKNCW3 GVC4 PTWVG4 FGKNCWPP# GHK. PIKUG& VPGPQROQ% UGNE[% RQV5VTCV5 [VKNKDCNG4 CVC& 4'6'/#4#2 Product Specifications GEPCKNROQ% %/' UPQKUUKO' FNGK( EKVGPICOQTVEGN' FGVCKFC4 +/'%/' The hard disk drive mechanism is designed as a subassembly for installation into a suitable enclosure and is therefore not subject to Subpart J of Part 15 of FCC Rules (47CFR15) or the Canadian Department of Communications Radio Interference Regulations. Although not required, the disk mechanism has been tested within a suitable end-use product and found to comply with Class B limits of the FCC Rules and Regulations of the Canadian Department of Communications. The CE Marking indicates conformity with the European Union Low Voltage Directive (73/23/EEC) when the disk mechanism is installed in a typical personal computer. Maxtor recommends that testing and analysis for EMC compliance be performed with the disk mechanism installed within the user's end-use application. VPGOGVCV5 UPQKUUKO' PCKFCPC% This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus as set out in the radio interference regulations of the Canadian department of communications.

Le present appareil numerique n'emet pas de bruit radioelectriques depassant les limites applicables aux appareils numeriques de Class B prescrites dans le reglement sur le brouillage radioelectrique edicte pa le ministere des communications du Canada. GEPCKNROQ% [TQVCNWIG4 [VGHC5 All Maxtor hard drives comply with relevant product safety standards such as CE, CUL, TUV and UL rules and regulations. As delivered, Maxtor hard drives are designed for system integration before they are used. Maxtor D540X-4D 3-7 Product Specifications 3-8 Maxtor D540X-4D To better avoid problems associated with ESD, Maxtor advises that anyone handling a disk drive use a wrist strap with an attached wire connected to an earth ground. Failure to observe these precautions voids the product warranty. To reduce the incidence of ESD-related problems, Maxtor recommends that any electronics manufacturing plans include a comprehensive ESD program, the basic elements and functions of which are outlined here: ESD Program Element Management Chief coordinator ESD Program Function Institute and maintain Organize and enforce 0 1 + 6 # . . # 6 5 0+ & 0 # ) 0+ . & 0 # \* TGVR C J% UPQKVWCEGT2 IPKNFPC\* GXKT& FTC\* · If the handling precautions are not followed, damage to the hard drive may result which may void the warranty. · During handling, NEVER drop, jar, or bump a drive.

Handle the drive by its sides and avoid touching the printed circuit board assembly (PCBA). · Hard drives are sensitive to electrostatic discharge (ESD) damage. Use proper ESD practices by grounding yourself and the computer system the hard drive will be installed in. · Allow the hard drive to reach room temperature BEFORE installing it in your computer system. · NEVER switch DC power onto the drive by plugging an electrically live DC source cable into the drive's connector.

NEVER connect a live connector to the hard drive's IDE interface connector. · ELECTRICAL GROUNDING - For proper operation, the drive must be securely fastened to a device bay that provides a suitable electrical ground to the drive baseplate. &5' GITCJEUK& EKVCV5 QTVEGN' Maxtor D540X-4D 4-1 Handling and Installation Multi-department committee Employee training Evaluate and improve Educate and inform ESD program supplies typically include: wrist- and foot-worn grounding straps; counter-top and floor antistatic matting; wrist strap testers; ESD video and training materials. Sources for such supplies include: Static Control Systems 3M 225-4S, 3M Center St. Paul, MN 55144 Desco-Charleswater 3651 Walnut Avenue Chino, CA 91710 Phone: (909) 627-8178 Fax: (909) 627-7449 www.charleswater.com

Maxtor also offers a complete video training package, "Care and Handling of Maxtor Disk Drives." Contact your Maxtor representative for details. 4-2 Maxtor D540X-4D PQKVEGRUP+ FPC IPKMECRP7 Retain any packing material for reuse. Inspect the shipping container for evidence of damage in transit. Notify the carrier immediately in case of damage to the shipping container. As they are removed, inspect drives for evidence of shipping damage or loose hardware. If a drive is damaged (and no container damage is evident), notify Maxtor immediately for drive disposition. Handling and Installation Multi-pack Shipping Container GTWIK ( Maxtor D540X-4D 4-3 Handling and Installation Single Pack Shipping Container (Option A) 4-4 Maxtor D540X-4D GTWIK( Handling and Installation Single Pack Shipping Container (Option B) If a Maxtor drive requires return, repack it using Maxtor packing materials, including the antistatic bag. PQKVCNNCVUP+ NCEKU[J2 PQKVCNNCVUP+ NCEKU[J2 The detailed installation instructions for Maxtor hard drives are provided in the Installation Guide.

To obtain a copy of the Installation Guide please visit Maxtor's web site at [www.maxtor.com](http://www.maxtor.com) and select the product family to view or download the correct installation information for this product.



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>



Comprised of eight bits. See also bit. **CONTROLLER CARD** An adapter holding the control electronics for one or more hard disks, usually installed in a slot in the computer. **CPU** Acronym for Central Processing Unit. The microprocessor chip that performs the bulk of data processing in a computer. **CRC** Acronym for Cyclic Redundancy Check. An error detection code that is recorded within each sector and is used to see whether parts of a string of data are missing or erroneous. **CYLINDER** On a disk drive that has more than one recording surface and heads that move to various tracks, the group of all tracks located at a given head position. The number of cylinders times the number of heads equals the number of tracks per drive. **D C CACHE** Random-access memory used as a buffer between the CPU and a hard disk.

Information more likely to be read or changed is placed in the cache, where it can be accessed more quickly to speed up general data flow. **CAPACITY** The amount of information that can be stored on a disk drive. The data is stored in bytes, and capacity is usually expressed in megabytes. **CDB** Command Descriptor Block. The SCSI structure used to communicate requests from an initiator (system) to a target (drive).

**CLEAN ROOM** An environmentally controlled dust-free assembly or repair facility in which hard disk drives are assembled or can be opened for internal servicing. **CLUSTER** A group of sectors on a disk drive that is addressed as one logical unit by the operating system. **CONTROLLER** Short form of disk controller. The chip or complete circuit that translates computer data and commands into a form suitable for use by the disk drive. **G-2 Maxtor D540X-4D DATA SEPARATOR** On a disk drive that stores data and timing information in an encoded form, the circuit that extracts the data from the combined data and clock signal.

**DEDICATED SERVO** A surface separate from the surface used for data that contains only disk timing and positioning information and contains no data.

**DEFECT MANAGEMENT** A method that is implemented to ensure long term data integrity. Defect management eliminates the need for user defect maps.

This is accomplished by scanning the disk drives at the factory for defective sectors. Defective sectors are deallocated prior to shipment. In addition, during regular use, the drive continues to scan and compensate for any new defective sectors on the disk. **DISK** In general, any circular-shaped data-storage medium that stores data on the flat surface of the platter. The most common type of disk is the magnetic disk, which stores data as magnetic patterns in a metal or metal-oxide coating. Magnetic disks come in two forms: floppy and hard. Optical recording is a newer disk technology that gives higher capacity storage but at slower access times.

**Glossary DISK CONTROLLER** A plug-in board, or embedded circuitry on the drive, that passes information to and from the disk. The Maxtor disk drives all have controllers embedded on the drive printed-circuit board. **DISKWARE** The program instructions and data stored on the disk for use by a processor. **DMA**

Acronym for direct memory access. A process by which data moves directly between a disk drive (or other device) and system memory without passing through the CPU, thus allowing the system to continue processing other tasks while the new data is being retrieved. **DRIVE** Short form of disk drive. **DRIVE GEOMETRY** The functional dimensions of a drive in terms of the number of heads, cylinders, and sectors per track. See also logical format. allocated to each file and in what order. **FCI** Acronym for flux changes per inch.

See also **BPI**. **FILE SERVER** A computer that provides network stations with controlled access to shareable resources. The network operating system is loaded on the file server, and most shareable devices (disk subsystems, printers) are attached to it. The file server controls system security and monitors station-to-station communications. A dedicated file server can be used only as a file server while it is on the network.

A non dedicated file server can be used simultaneously as a file server and a workstation. **FLUX DENSITY** The number of magnetic field patterns that can be stored in a given length of disk surface. The number is usually stated as flux changes per inch (FCI), with typical values in the thousands. **FLYING HEIGHT** The distance between the read/write head and the disk surface caused by a cushion of air that keeps the head from contacting the media. Smaller flying heights permit more dense storage of data, but require more precise mechanical designs.

**FORMAT** To write onto the disk surface a magnetic track pattern that specifies the locations of the tracks and sectors. This information must exist on a disk before it can store any user data. Formatting erases any previously stored data. **FORMATTED CAPACITY** The amount of room left to store data on the disk after the required space has been used to write sector headers, boundary definitions, and timing information generated by a format operation. All Maxtor drive capacities are expressed in formatted capacity. **FORM FACTOR** The physical outer dimensions of a device as defined by industry standard. For example, most Maxtor disk drives use a 3 1/2-inch form factor. **E ECC** Acronym for error correction code. The recording of extra verifying information encoded along with the disk data. The controller uses the extra information to check for data errors, and corrects the errors when possible.

**EMBEDDED SERVO** A timing or location signal placed on the disk's surface on the tracks that also store data. These signals allow the actuator to fine-tune the position of the read/write heads. **ENCODING** The protocol by which particular data patterns are changed prior to being written on the disk surface as a pattern of On and Off or 1 and 0 signals. **EXTERNAL DRIVE** A drive mounted in an enclosure separate from the PC or computer system enclosure, with its own power supply and fan, and connected to the system by a cable. **FAT** Acronym for file allocation table. A data table stored on the outer edge of a disk that tells the operating system which sectors are Maxtor D540X-4D G-3 Glossary **G GIGABYTE (GB)** One billion bytes (one thousand megabytes). **GUIDE**

**RAILS** Plastic strips attached to the sides of a disk drive mounted in an IBM AT and compatible computers so that the drive easily slides into place. **I INITIALIZE** See low level formatting. **INITIATOR** A SCSI device that requests another SCSI device to perform an operation. A common example of this is a system requesting data from a drive.

The system is the initiator and the drive is the target. **INTERFACE** A hardware or software protocol, contained in the electronics of the disk controller and disk drive, that manages the exchange of data between the drive and computer. **INTERLEAVE** The arrangement of sectors on a track.



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>

A 1:1 interleave arranges the sectors so that the next sector arrives at the read/write heads just as the computer is ready to access it. See also interleave factor.

**INTERLEAVE FACTOR** The number of sectors that pass beneath the read/write heads before the next numbered sector arrives. When the interleave factor is 3:1, a sector is read, two pass by, and then the next is read. It would take three revolutions of the disk to access a full track of data. Maxtor drives have an interleave of 1:1, so a full track of data can be accessed within one revolution of the disk, thus offering the highest data throughput possible. **H HALF**

**HEIGHT** Term used to describe a drive that occupies half the vertical space of the original full size 5 1/4-inch drive.

1.625 inches high. **HARD DISK** A type of storage medium that retains data as magnetic patterns on a rigid disk, usually made of an iron oxide or alloy over a magnesium or aluminum platter. Because hard disks spin more rapidly than floppy disks, and the head flies closer to the disk, hard disks can transfer data faster and store more in the same volume. **HARD ERROR** A repeatable error in disk data that persists when the disk is reread, usually caused by defects in the media surface. **HEAD** The tiny electromagnetic coil and metal pole piece used to create and read back the magnetic patterns (write and read information) on the media. **HIGH-CAPACITY DRIVE** By industry conventions typically a drive of 1 gigabyte or more. **HIGH-LEVEL FORMATTING** Formatting performed by the operating system's format program. Among other things, the formatting program creates the root directory and file allocation tables. See also low-level formatting.

**HOME** Reference position track for recalibration of the actuator, usually the outer track (track 0). **HOST ADAPTER** A plug-in board that forms the interface between a particular type of computer system bus and the disk drive. **G-4 Maxtor D540X-4D INTERNAL DRIVE** A drive mounted inside one of a computer's drive bays (or a hard disk on a card, which is installed in one of the computer's slots). **J JUMPER** A tiny box that slips over two pins that protrude from a circuit board. When in place, the jumper connects the pins electrically. Some board manufacturers use Dual In-Line Package (DIP) switches instead of jumpers. **Glossary K KILOBYTE (K)** A unit of measure consisting of 1,024 (2<sup>10</sup>) bytes. **M MB** See megabyte. **MEDIA** The magnetic film that is deposited or coated on an aluminum substrate which is very flat and in the shape of a disk. The media is overcoated with a lubricant to prevent damage to the heads or media during head take off and landing.

The media is where the data is stored inside the disk in the form of magnetic flux or polarity changes. **MEGABYTE (MB)** A unit of measurement equal to 1,024 kilobytes, or 1,048,576 bytes except when referring to disk storage capacity. 1 MB = 1,000,000 bytes when referring to disk storage capacity. See also kilobyte. **MEGAHERTZ** A measurement of frequency in millions of cycles per second.

**MHz** See megahertz. **MICROPROCESSOR** The integrated circuit chip that performs the bulk of data processing and controls the operation of all of the parts of the system. A disk drive also contains a microprocessor to handle all of the internal functions of the drive and to support the embedded controller.

**MICROSECOND (μs)** One millionth of a second (.000001 sec.)

**MILLISECOND (ms)** One thousandth of a second (.001 sec.). **MTBF Mean Time Between Failure.** Used as a reliability rating to determine the expected life of the product expressed in power on hours (POH). There are several accepted methods for calculating this value that produce very different results and generate much confusion in the industry. When comparing numbers you should first verify which method was used to calculate the values. **L LANDING ZONE** A position inside the disk's inner cylinder in a non data area reserved as a place to rest the heads during the time that power is off. Using this area prevents the heads from touching the surface in data areas upon power down, adding to the data integrity and reliability of the disk drive.

**LATENCY** The period of time during which the read/write heads are waiting for the data to rotate into position so that it can be accessed. Based on a disk rotation speed of 3,662 rpm, the maximum latency time is 16.4 milliseconds, and the average latency time is 8.2 milliseconds. **LOGICAL FORMAT** The logical drive geometry that appears to an AT system BIOS as defined by the drive tables and stored in CMOS. With an installation program like Disk Manager, the drive can be redefined to any logical parameters necessary to adapt to the system drive tables. **LOOK AHEAD** The technique of buffering data into cache RAM by reading subsequent blocks in advance to anticipate the next request for data. The look ahead technique speeds up disk access of sequential blocks of data. **LOW-LEVEL FORMATTING** Formatting that creates the sectors on the platter surfaces so the operating system can access the required areas for generating the file structure. Maxtor drives are shipped with the low-level formatting already done.

**LOW PROFILE** Describes drives built to the 3 1/2-inch form factor, which are only 1 inch high. Maxtor D540X-4D G-5 **Glossary MTTR Mean Time To Repair.** The average time it takes to repair a drive that has failed for some reason. This only takes into consideration the changing of the major sub-

assemblies such as circuit board or sealed housing. Component level repair is not included in this number as this type of repair is not performed in the field. **PLATED MEDIA** Disks that are covered with a hard metal alloy instead of an iron-oxide compound. Plated disks can store greater amounts of data in the same area as a coated disk. **PLATTER** An disk made of metal (or other rigid material) that is mounted inside a fixed disk drive. Most drives use more than one platter mounted on a single spindle (shaft) to provide more data storage surfaces in a small package. The platter is coated with a magnetic material that is used to store data as transitions of magnetic polarity.

**POH** Acronym for power on hours. The unit of measurement for Mean Time Between Failure as expressed in the number of hours that power is applied to the device regardless of the amount of actual data transfer usage. See MTBF. **POSITIONER** See actuator. **N NANOSECOND (ns)** One billionth of a second (0.000000001 second). **O OVERHEAD** The processing time of a command by the controller, host adapter or drive prior to any actual disk accesses taking place. **OVERWRITE** To write data on top of existing data, erasing it. **OXIDE** A metal-oxygen compound. Most magnetic coatings are combinations of iron or other metal oxides, and the term has become a general one for the magnetic coating on tape or disk.



[You're reading an excerpt. Click here to read official MAXTOR](http://yourpdfguides.com/dref/2943893)

[D540X-4D user guide](http://yourpdfguides.com/dref/2943893)

<http://yourpdfguides.com/dref/2943893>

**R REDUNDANT ARRAY OF INDEPENDENT DISKS (RAID)** - is a way of storing the same data in different places (thus, redundantly) on multiple hard disks. By placing data on multiple disks, I/O operations can overlap in a balanced way, improving performance. Since multiple disks increases the mean time between failure (MTBF), storing data redundantly also increases fault-tolerance. A RAID appears to the operating system to be a single logical hard disk.

**RAID** employs the technique of striping, which involves partitioning each drive's storage space into units ranging from a sector (512 bytes) up to several megabytes. The stripes of all the disks are interleaved and addressed in order. **RAID** See redundant array of independent disks **RAM** Acronym for random access memory. An integrated circuit memory chip which allows information to be stored and retrieved by a microprocessor or controller. The information may be stored and retrieved in **P PARTITION** A portion of a hard disk devoted to a particular operating system and accessed as one logical volume by the system. **PERFORMANCE** A measure of the speed of the drive during normal operation.

Factors affecting performance are seek times, transfer rate and command overhead. **PERIPHERAL** A device added to a system as an enhancement to the basic CPU, such as a disk drive, tape drive or printer. **PHYSICAL FORMAT** The actual physical layout of cylinders, tracks, and sectors on a disk drive. **G-6 Maxtor D540X-4D** Glossary any order desired, and the address of one storage location is as readily accessible as any other. **RAM DISK** A "phantom disk drive" for which a section of system memory (RAM) is set aside to hold data, just as if it were a number of disk sectors.

The access to this data is extremely fast but is lost when the system is reset or turned off. **READ AFTER WRITE** A mode of operation that has the computer read back each sector on the disk, checking that the data read back is the same as recorded. This slows disk operations, but raises reliability. **READ VERIFY** A disk mode where the disk reads in data to the controller, but the controller only checks for errors and does not pass the data on to the system. **READ/WRITE**

**HEAD** The tiny electromagnetic coil and metal pole piece used to create and read back the magnetic patterns (write or read information) on the disk. Each side of each platter has its own read/write head. **REMOVABLE DISK** Generally said of disk drives where the disk itself is meant to be removed, and in particular of hard disks using disks mounted in cartridges. Their advantage is that multiple disks can be used to increase the amount of stored material, and that once removed, the disk can be stored away to prevent unauthorized use. **RLL** Run Length Limited. A method used on some hard disks to encode data into magnetic pulses. RLL requires more processing, but stores almost 50% more data per disk than the MFM method. **ROM** Acronym for read only memory. Usually in the form of a ROM in the controller that contains programs that can be accessed and read but not modified by the system. **ROTARY ACTUATOR** The rotary actuator replaces the stepper motor used in the past by many hard disk manufacturers. The rotary actuator is perfectly balanced and rotates around a single pivot point.

It allows closed-loop feedback positioning of the heads, which is more accurate than stepper motors. **ROTATIONAL LATENCY** The delay between when the controller starts looking for a specific block of data on a track and when that block rotates around to where it can be read by the read/write head. On the average, it is half of the time needed for a full rotation (about 8 ms.). **S SCSI** Acronym for Small Computer System Interface, an American National Standards

Institute (ANSI) version of Shugart Associates' SASI interface between the computer and controller. SCSI has grown in popularity and is one of the most flexible and intelligent interfaces available. **SECTOR** A section of space along a track on the disk, or the data that is stored in that section. Hard disks most often have sectors that are 512 data bytes long plus several bytes overhead for error correcting codes. Each sector is preceded by ID data known as a header, which cannot be overwritten. **SEEK** A movement of the disk read/write head in or out to a specific track.

**SERVO DATA** Magnetic markings written on the media that guide the read/write heads to the proper position. **SERVO SURFACE** A separate surface containing only positioning and disk timing information but no data. **SETTLE TIME** The interval between when a track to track movement of the head stops, and when the residual vibration and movement dies down to a level sufficient for reliable reading or writing. **SHOCK RATING** A rating (expressed in Gs) of how much shock a disk drive can sustain without damage. **SOFT ERROR** An error in reading data from the disk that does not recur if the same data is reread.

Often caused by power Maxtor D540X-4D G-7 Glossary fluctuations or noise spikes. **SOFT SECTORED** Disks that mark the beginning of each sector of data within a track by a magnetic pattern. **SPINDLE** The center shaft of the disk upon which the drive's platters are mounted. **SPUTTER** A type of coating process used to apply the magnetic coating to some high-performance disks. In sputtering, the disks are placed in a vacuum chamber and the coating is vaporized and deposited on the disks.

The resulting surface is hard, smooth, and capable of storing data at high density. Maxtor disk drives use sputtered thin film disks. **STEPPER** A type of motor that moves in discrete amounts for each input electrical pulse. Stepper motors used to be widely used for read/write head positioner, since they can be geared to move the head one track per step. Stepper motors are not as fast or reliable as the rotary voice coil actuators which Maxtor disk drives use. **SUBSTRATE** The material the disk platter is made of beneath the magnetic coating. Hard disks are generally made of aluminum or magnesium alloy (or glass, for optical disks) while the substrate of floppies is usually mylar. **SURFACE** The top or bottom side of the platter which is coated with the magnetic material for recording data. @ @Thin film surfaces allow more bits to be stored per disk. **TPI** Acronym for tracks per inch.

@ @ @ @ @The number is specified as tracks per inch (TPI). **TRACK TO TRACK SEEK TIME** The time required for the read/write heads to move to an adjacent track. **TRANSFER RATE** The rate at which the disk sends and receives data from the controller. Drive specifications usually reference a high number that is the burst mode rate for transferring data across the interface from the disk buffer to system RAM. Sustained data transfer is at a much lower rate because of system processing overhead, head switches, and seeks. **U Ultra DMA (UDMA, or, more accurately, Ultra DMA/133)** is a protocol for transferring data between a hard disk drive through the computer's data paths (or bus) to the computer's random access memory (RAM).



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>

*The Ultra DMA/133 protocol transfers data in burst mode at a rate of 133 MBps (megabytes per second), twice as fast as the previous Direct Memory Access (DMA) interface. UNFORMATTED CAPACITY The total number of bytes of data that could be fit onto a disk. Formatting the disk requires some of this space to record location, boundary definitions, and timing information. After formatting, user data can be stored on the remaining disk space, known as formatted capacity.*

*The size of a Maxtor drive is expressed in formatted capacity. T TERABYTE (TB) A unit of measurement to 1,024 gigabytes (GB), or 1,099,511,627,776 bytes, except when referring to disk storage capacity. Storage capacities of one or more terabytes is achieved by installing multiple hard drive in a RAID system. 1 TB = 1,000,000,000,000 bytes when referring to disk storage capacity. See also gigabyte.*

*G-8 Maxtor D540X-4D Glossary V VOICE COIL A type of motor used to move the disk read/write head in and out to the right track. Voice-coil actuators work like loudspeakers with the force of a magnetic coil causing a proportionate movement of the head. Maxtor's actuator uses voice-coil technology, and thereby eliminates the high stress wearing parts found on stepper motor type actuators. W WEDGE SERVO The position on every track that contains data used by the closed loop positioning control. This information is used to fine tune the position of the read/write heads exactly over the track center.*

*WINCHESTER DISKS Hard disks that use a technology similar to an IBM model using Winchester as the code name. These disks use read/write heads that ride just above the magnetic surface, held up by the air flow created by the turning disk. When the disk stops turning, the heads land on the surface, which has a specially lubricated coating. Winchester disks must be sealed and have a filtration system since ordinary dust particles are large enough to catch between the head and the disk. WRITE ONCE In the context of optical disks, technologies that allow the drive to store data on a disk and read it back, but not to erase it. Maxtor D540X-4D G-9 Glossary G-10 Maxtor D540X-4D .*



[You're reading an excerpt. Click here to read official MAXTOR D540X-4D user guide](http://yourpdfguides.com/dref/2943893)  
<http://yourpdfguides.com/dref/2943893>