Installation
Guide

Please register your part online at www.esupport.com **after you have installed your new bios.**

Read the sections of this manual that pertain to the product you received thoroughly before upgrading your BIOS.

Important warranty and technical information is enclosed.

DISCLAIMER

While every effort has been made to ensure that all products work as specified eSupport.com, its creator, and any dealers associated with this product, are not responsible for any loss of data directly or indirectly related to the use of these products.

Important: BIOS chips returned under RMA's , MUST be returned in "Crush-proof" containers. Damaged chips will not be refunded.

STOP!!!!

Although our Technical Support is free, it may be a long distance call for you.
Before calling Technical Support, please check the following resources for a solution to your problem. If you fail to resolve the problem, call our support center at (978) 686-2204.
To reduce your call time please have the following information available when calling tech support. Please refer to link #2 for help finding this information:

- Order # (or RMA#)
- Model # and Revision of your motherboard.
- Super I/O chip
- Clock chip if available

1. http://www.esupport.com/faq/

2. http://www.esupport.com/techsupport/beforecallingtech.htm

3. http://www.bootdisk.com

4. http://www.phoenix.com/en/customer+services/bios/awardbios/setup+index.htm

Return Policy - eSupport.com,

eSupport.com, warrants all products to be free from defects for a period of thirty (30) days from date of purchase. eSupport.com only guarantees products are compatible in the base system specified at the time of purchase. eSupport.com will not be responsible for any third party hardware or software incompatibilities or conflicts, nor does eSupport.com guarantee compatibility with future software or hardware products. At the time of this printing, there are no known incompatibilities with BIOS's distributed by eSupport.com. eSupport.com makes no guarantee, express or implied, that any eSupport.com product will correct particular problems assumed to be related to the part being replaced. All prepackaged software/firmware sales are final. If this product is somehow defective upon receipt, please call eSupport.com Technical Support (978) 686-2204.

eSupport.com will not accept the return of any product without an RMA (Return Merchandise Authorization) number issued by our Technical Support staff, who can be reached at 978-686-2204. Due to the information necessary to process an RMA request, you must telephone our Technical Support department and speak with a technician. We cannot ensure timely responses to faxes/email requests for support or RMA numbers. You must have your packing list/invoice # available at the time of your call. Returns will not be accepted without an RMA clearly printed on the outside of the package. RMA numbers are valid for 14 days from date of issue. After such date, we will assume the customer has decided not to return the product and the RMA will be invalid. We reserve the right to refuse any package with an invalid RMA number. Customers shall be charged a restocking fee for any product returned which was never used, returned for 3rd party incompatibility problems, or found upon testing in our facilities to be in proper functioning order. This fee shall not be less than 20% of the purchase price. Also, customers shall be charged the full purchase price of their product returned which is not in re-salable condition, whether returned for credit or exchange. Customers will also be assessed fees for any missing manuals, chip pullers, or any other items not returned. For any product returns, the refund will consist only of the purchase price for the merchandise minus any applicable restocking fee, and will not include shipping and handling charges. Any refunds issued after the 30 day period are at the sole discretion of management, and are calculated from INITIAL DATE OF PURCHASE ONLY.

eSupport.com will issue a credit/refund when the product is received in a proper shipping container, inclusive of all documentation and other parts associated with the returned merchandise (i.e., chip pullers and manuals). Enclose a COPY of your sales order to ensure proper credit. Return product in a box with the RMA # clearly printed on the outside. It is the customer's responsibility to ensure that the returned merchandise is received by eSupport.com Software, Credits are not issued for returns not received. Therefore, all returns should be shipped in a traceable manner. Credit card credits and refund checks will be issued only on the last day of each month.

Warranty Information

This agreement ("Agreement") applies to the acquisition of hardware products ("Products") from eSupport.com, Inc. by an eSupport.com customer ("Customer").

1. **Counteroffer**. This Agreement is a counteroffer to Customer's offer to acquire Products. eSupport.com does not agree to any other terms, including without limitation any terms on Customer's purchase order. Customer's acceptance of Products shall constitute Customer's acceptance of this Agreement.

2. **Payment**. eSupport.com will invoice Customer according to eSupport.com's current price list. Payment by Customer of the full invoice amount will be due within thirty (30) days after the date of such invoice. Customer shall pay all applicable taxes (other than taxes based on eSupport.com 's net income).

3. **Delivery and Acceptance.** eSupport.com shall use its reasonable commercial efforts to deliver the Products to the addresses and by the dates requested by the Customer. Title to Products will pass upon shipment; risk of loss of the Products will pass upon delivery of Products to Customer. Unless otherwise agreed by eSupport.com in writing, Customer will be responsible for all shipment costs. Products will be deemed accepted upon delivery and Customer hereby waives all right of revocation.

4. **Product Warranty.** Products are warranted to be free from defects in materials and workmanship for thirty (30) days from the date of purchase. In addition, eSupport.com warrants the products to be compatible in the base system specified at the time of purchase only. eSupport.com, at its option, either will repair or replace any defective Product which is returned to eSupport.com at Customer's expense or will refund its purchase price. Repair, replacement, or refund is the sole remedy for breach of this warranty. This warranty is extended to Customer only and in no event to any other party. This warranty does not cover defects or damages resulting from: (a) use of Products other than in a normal and customary manner; (b) physical or electronic abuse or misuse, accident, or neglect; or (c) unauthorized alterations or repairs made to Products.

   THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED, OR STATUTORY, INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NON-INFRINGEMENT. EXCEPT AS EXPRESSLY STATED IN THIS SECTION 4, eSupport.com PROVIDES THE PRODUCTS ON AN "AS IS" BASIS.

5. **Limitations of Liability.** IN NO EVENT WILL eSupport.com BE LIABLE FOR ANY LOSS OF USE, INTERRUPTION OF BUSINESS, COST OF PROCUREMENT OF SUBSTITUTE GOODS, TECHNOLOGY OR SERVICES OR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY KIND (INCLUDING LOST PROFITS) REGARDLESS OF THE FORM OF ACTION WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), STRICT PRODUCT LIABILITY OR ANY OTHER LEGAL OR EQUITABLE THEORY EVEN IF eSupport.com HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL eSupport.com's AGGREGATE CUMULATIVE LIABILITY FOR ANY CLAIMS ARISING OUT OF OR RELATED TO PRODUCTS EXCEED THE PRICE OF PRODUCTS.

6. **Product Service.** To obtain warranty service, Customer shall promptly notify eSupport.com in writing of defective Products. Upon such notification, eSupport.com will provide Customer with a Return Materialization ("RMA") number. All RMA numbers are valid for fourteen (14) days. Customer shall return all such defective Products to eSupport.com fully insured and freight prepaid.

7. **Confidential Information.** The Products contain certain valuable confidential or proprietary information of eSupport.com which is not generally known to the public (herein "Confidential Information"). Customer agrees that it will not abuse or disclose to any third

party any Confidential Information except as expressly permitted by this Agreement. This section shall not apply to the extent customer can establish that such information: (a) was already lawfully known to Customer; (b) has lawfully become publicly known without a breach of this Agreement; (c) was lawfully received by Customer from a third party without restrictions; (d) is required to be disclosed pursuant to any statute, regulation or court order, provided, however, that Customer provides reasonable notice thereof to enable eSupport.com to obtain a protective order or take other protective measures as eSupport.com may deem necessary. Customer agrees that it shall not reverse compile, disassemble, or otherwise reverse engineer Products and that it shall not use Products except as expressly permitted by this Agreement. Customer understands and agrees that all information provided by Customer shall be non-confidential.

8. **Applicable Law.** This Agreement shall be subject to the laws of the State of Massachusetts, as such laws are applied to agreements entered into and to be performed in Massachusetts between Massachusetts residents. The State and Federal courts located in Essex County, Massachusetts shall have sole jurisdiction over and shall be the sole forum for resolving any disputes arising hereunder and the parties hereby submit to the personal jurisdiction of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement.

9. **Compliance with Laws: Export.** In exercising its rights and performing its obligations under this Agreement, Customer will comply with all applicable international, national, and local laws and regulations. Without limiting the generality of the foregoing, Customer will not use or re-export, or permit any person to use or re-export, the Products without all required licenses, and Customer will comply, and require all of its own customers to comply, with all applicable export and import control laws. Customer will defend, indemnify, and hold harmless eSupport.com and its successors, agents, officers, directors, and employees from and against any violation of any laws or regulations by Customer or any of its agents, officers, directors, employees, or customers.

10. **General.** If any provision of this Agreement is held to be invalid or unenforceable for any reason, the remaining provisions will continue in full force without being impaired or invalidated in any way. The parties agree to replace any invalid provision with a valid provision which most closely approximates the intent and economic effect of the invalid provision. The waiver by either party of a breach of any provision of this Agreement will not operate or be interpreted as a waiver of any other or subsequent breach. Neither this Agreement nor any rights or obligations of Customer may be assigned by Customer in whole or in part. Any assignment in derogation of the foregoing shall be void. Neither party shall be liable hereunder by reason of any failure or delay in the performance of its obligations hereunder (except for the payment of money) on account of strikes, shortages, riots, insurrection, fires, flood, storm, explosions, or acts of God, war, governmental action, labor conditions, earthquakes, material shortages or any other cause that is beyond the reasonable control of such party. This Agreement sets forth the entire understanding and the agreement of the parties and supersedes any and all oral or written agreements or understandings between the parties as to the subject matter of this Agreement and may be changed only by a writing signed by both parties.

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Before Installing (All BIOS Products)

Occasionally, when you change your BIOS or insert an extender card you may have to repartition and reformat your hard drives. If this becomes necessary it would result in the loss of ALL DATA on your hard drive. For this reason, we strongly recommend that you back up all data on your hard drives before installing your new BIOS, or extender card. **NOTE**: This is usually only necessary when you have a drive that was not fully supported by the original BIOS (as in the case of a 540 drive on a non-LBA system.) Another time this may become necessary would be if you are using a disk manager software such as EZ-BIOS to manage a large disk that your computer could not fully utilize before the new BIOS/extender card. There may however be ways to avoid a full reformat. So check the software before you delete.

1. Enter the CMOS (BIOS setup) of the original BIOS and record the settings.
    Method 1: Enter each of the setup screens and press Print Screen.
    Method 2: Using pen and paper record the information found in each of the setup screens.
    Note: This information may be useful in setting up your new BIOS. Do not change the new settings to match your original settings unless necessary. The Default settings are usually sufficient for everyday operation.
2. To determine how to enter the CMOS, you can
    a) Refer to your computer's/motherboard's manual, or
    b) Follow the directions to enter SETUP during boot, or
    c) Turn on the computer and look for the BIOS manufacturer's name that displays on the first screen, and then refer to Table 1 for what keys to press. This table is by no means complete. Manufacturers are constantly changing things.

Note: A video BIOS identification screen may precede this screen. For example: "Trident VGA BIOS ver 3.00."

Table1

AMI	Press DEL while the memory test is running.
AWARD	Press DEL or CTRL+ALT+ESC during boot.
MR BIOS	Press ESC at boot or CTRL+ALT+ESC later.
PHOENIX	Press F2, CTRL+ALT+ESC or CTRL+ALT+S.

NOTE: if you purchased the BIOS in order to install a large hard disk please do not run/install a disk overlay program such as EZ-BIOS, MAXBLAST or LIFEGUARD UTILITIES. The new BIOS does not require these utilities to support a large hard drive, and you may need to remove it for correct operation of your computer.

Installing BIOS **CHIPS**

Before Installing Chips

In order to avoid problems with the new bios it is recommended that the CMOS of the computer be cleared out. (The CMOS is an area of memory, which hold setting for the BIOS it is not part of the BIOS chip.)

There are a few ways to clear the CMOS

- Run the CLRCMOS.EXE program. if you did not receive this program it is available at http://www.unicore.com/awardutils.htm
- Check your motherboard manual for a clear CMOS jumper and instructions.
- Unplug the computer. Remove the battery and allow computer to sit for approximately 24 hours
- Use a PassROM chip. It is a hardware clrcmos.exe solution.

PassROM

If your BIOS is set up to use a password, and you cannot remove it any other way, you can remove this password with PassROM. To order PassROM, call eSupport.com at 800-800-BIOS. Note: This will also clear the CMOS settings.

To remove your BIOS password with PassROM:

1. Follow instructions for installing a BIOS chip.
     NOTE: For a 32 pin BIOS socket and a 28 pin PassROM chip, leave
      four empty pinholes at the end of the socket with the notch.
2. When the chip is installed, turn on the computer. The PassROM will automatically erase the BIOS password.
3. Turn off the computer and re-install the original BIOS chip. When you re-boot the computer, the password will be gone.

To Install BIOS chip:

3. **Turn off the computer and unplug it.**

Make sure the computer is turned off and unplugged before you open the CPU case. Static electricity can hurt you as well as damage the sensitive components you are about to install. Be sure to grasp the metal of the CPU case before touching the inner components. Use a grounding strap, if you have one, attached to the system chassis.

4. **Open the CPU case.**

To open the CPU case, remove the cover's retaining screws (if you

don't know which ones are retaining screws, refer to your user's manual). There can be as many as six (6) of them along the back and side edges of the computer. Lift the cover off and put it to the side.

5. **Find the chip you want to change.**

Look on the motherboard for the BIOS chip. The chip may have a label with the name of the BIOS manufacturer on it to make it easier to locate.

Depending on which chip you ordered, the chip on your system could have either 28, 32, or 40 pins. The chip could also be a PLCC chip. This chip is an almost square chip with 7 pins on one side and 9 pins on the other.

6. **Remember the proper orientation of the chip.**

When you find the chip, remember in which direction the notch is pointed. The notch is at one end of the chip and may look like an indentation. Please refer to Figure 1.

Notch

Figure 1

Put the new chip in with the notch facing the same direction as the old chip. If you do not do this, you will destroy the chip and may be charged for a chip replacement. See Figure 1.

Note: Never follow the orientation of the label. It may not be the same.

7. **Be sure the chip is inserted in a socket, <u>NOT</u> soldered in see figure 2.**

When you find the BIOS chip, make sure that it is inserted in a socket. If it is not in a socket, trying to remove it will cause damage to your motherboard.

Note: If the chips are not in sockets, eSupport.com Software, will not be liable for any damage caused by persons trying to remove them. If the chips are soldered in, call the eSupport.com Tech Support Department at (978) 686-2204 for options and solutions to this problem.

8. **Carefully remove the old chip.**

Use a chip puller to remove the BIOS chip from the socket. Place the prongs of the chip puller on each end under the chip and gently but firmly apply upward pressure and, if necessary, slightly more pressure on one end than the other, in a rocking motion, until chip comes free.

Socketed

Socketed

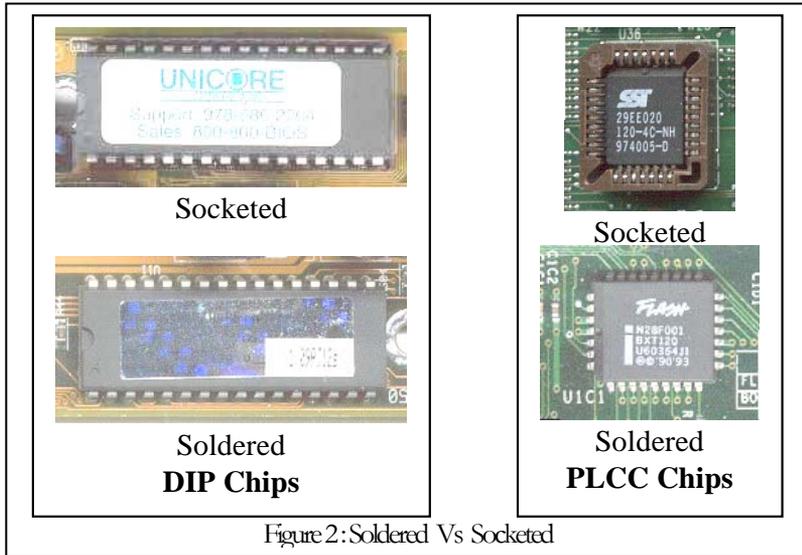Soldered

Soldered

DIP Chips

PLCC Chips

Figure 2: Soldered Vs Socketed

WARNING! Do not pull on only one end of the chip or you will bend the pins as you remove the chip. If you do not have a chip puller, you can remove the chips by placing the blade of a small flathead screwdriver under one end of the chip(s) and gently turning it until the chip moves. Repeat this on both ends of the chip evenly, a little at a time, in order to avoid bending the prongs.

Note: Place the chip puller's prongs between the chip and socket. **Never put any tool under the socket - this could damage the motherboard.** eSupport.com will not be liable for damage to motherboards resulting from improper removal/installation of BIOS chips.

9. **Insert the new chips.**

When the socket is empty, install the new chips. If the pins on the chips you received are slightly wider than the socket into which they must go, place the chip on a flat surface with the pins on one edge flat on the surface facing away from you. Hold the chip firmly and gently rock the chip forward until the pins bend inward a little bit. Repeat for the other side. (See Figure 3.) Check the fit of the socket. If the pins are still too wide, repeat the process.
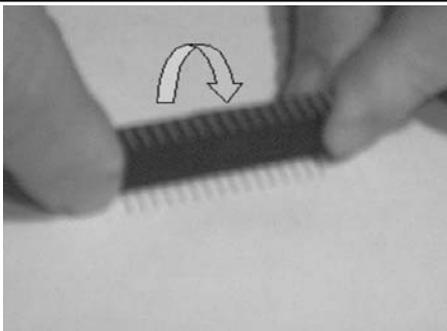
Figure 3

Note: Remember to bend the pins only a little at a time. It is much harder to bend them in the opposite direction.

When the chips are the correct width, place the pins in the socket and gently press down on the chip, being careful not to press too hard or you may damage the motherboard.
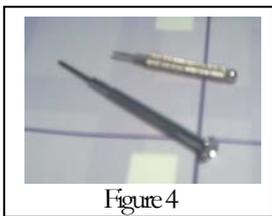
Figure 4

If you have a PLCC chip then you cannot use the chip puller tool. If you cannot find a PLCC chip tool than you can use small eyeglass type screwdrivers. See figure 4. Place the screwdriver blades in the notches at the 2 corners of the socket and pull screwdrivers away from each other. See figure 5

To install the new PLCC chip into the socket, place the chip flat on the socket. Be sure that the notch is correctly aligned. Place your finger in the center of the chip and gently press down until the chip snaps into

Figure 5

place.

Figure 6

You have now successfully completed the physical installation of your new ROM BIOS upgrade chip. Please refer to the setup manual you received with the BIOS or the troubleshooting section of this manual for further help with setup.

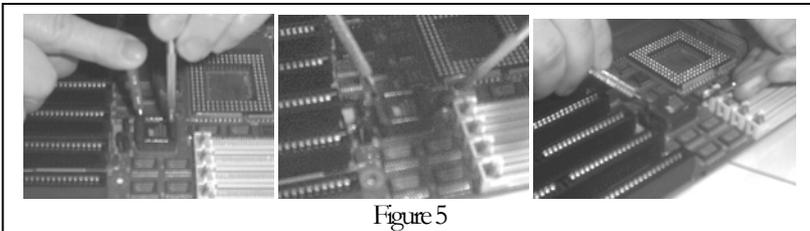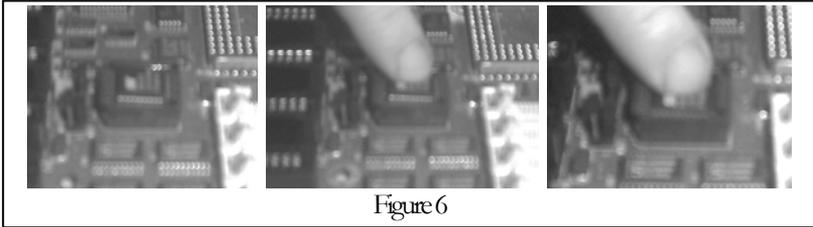BIOS **<u>Chip</u>** customers please stop here. If you need further assistance please see the troubleshooting section.

Installing Flash BIOS

Read this section if you received a Flash BIOS **DISK**.

WARNING: Flash upgrading your BIOS can render you system inoperative. eSupport.com will not be responsible for users who flash upgrade their BIOS and render their system inoperable due to the use of incorrect filenames or file types used to program the BIOS.

1. Enter BIOS CMOS setup and set the Boot Sequence to boot from the A: (floppy) first. Save settings and exit by pressing F10.

2. Shut down the system, and then insert eSupport Flash BIOS Upgrade Disk

3. Reboot the system.

4. The program will perform the flash automatically. When asked to continue or quit, press any key to continue. Do NOT reset or turn off the computer during the flash process or your BIOS may be damaged. Your disk may have a menu system. In this case read the onscreen instructions. If you have a problem, reset the computer, and select the help option. If the system stops responding you may need to reset the system. In this case check our online help. Support, what to do before calling tech support.

5. When the flash is finished, you will be prompted to <u>QUIT</u> the program or <u>RESTART</u> the system. Choose to <u>RESTART</u> the system. (**IMPORTANT**: Make sure that the flash disk has been removed). (note: the actual command may be different such as <u>RESET.</u>)

6. Your system has now been flashed with the new eSupport BIOS upgrade. You should see the new BIOS version displayed on the screen during boot-up. Press the Delete key to setup your BIOS again if necessary.

Flash bios **disk** customers please stop here. If you need further assistance please see the troubleshooting section.

Installing BIOS Extender Cards

Read this section if you received **LBA Pro, Millennium Pro,** or **Dual Pro**.

There are three different kinds of BIOS extender cards:

- **LBA Pro:** This EIDE card allows you to use a 500 MB or larger hard drive with your current motherboard. It overrides some motherboards' 500 MB hard drive limitation. It also overrides limitations at 2gb, 8gb and 32gb that have hampered some systems. The card has been tested with the largest drives available.

- **Millennium Pro:** This card fixes any Year 2000 problems with your BIOS and motherboard.

- **Dual Pro:** This card is a combination of LBA Pro and Millennium Pro's features.

Memory Address Configuration

There are two extender cards: one made in Singapore and one made in China. The default setting is C8000 for both cards. These cards are configured with this default at the factory, so you probably will not need to set or change them.

If you have problems, try changing the memory address of the card. Try setting the address to D800. Please leave jumper A0 on. **DO NOT TAKE OFF OR PUT ON A1.**

The options C8000, D0000 and D8000 on the card select the range of memory addresses for the BIOS code. The default value is C8000 will place LBA Pro function just above the BIOS of your video card in memory.

If you have a SCSI controller card with on-board BIOS, select the SCSI controller BIOS address to be higher than that used for LBA Pro. For example, in the default configuration, select the SCSI BIOS to be at D0000 or higher. Please refer to your SCSI card manual for more information on this procedure.

Preliminary Installation instructions – LBA/DUAL Pro

Before installing your LBA Pro and hard drives, print each BIOS screen (go to the screen and press the Print Screen button on your keyboard) so you will have a record of the original settings. If you don't have printing capabilities, write down the settings.

When you have a record of the BIOS settings:

1. In your CMOS utility program, set the hard drive(s) to "Not Installed", or "NONE" depending on what the option is in the bios. If you do not have this option try "user defined" heads = 16,

sectors = 63, cylinders = 1023. Note: if you must use this setting or are unable to configure the drives the LBA Pro may not work in your system.

2. If there is a setting for LBA mode, Large Disk Access, CHS Mode, or Large Mode in CMOS, set this to normal, standard, disabled, or off depending on what is available in your BIOS.

Note: A user with 486 IBM BIOS will not need to do this.

3. Insert the LBA Pro card in a slot and install any hard drives.

LBA Pro Features

LBA Pro has these features:

*   S.M.A.R.T. (**S**elf-**M**onitoring, **A**nalysis & **R**eporting **T**echnology) support. Warns of hard drive failure so you can backup data

*   Enhanced Disk Drive Specifications for drives **larger** than 8.4GBs. This is required for the PC97 specifications from Microsoft and is more powerful than the standard LBA BIOS, which can only support up to 8.4GBs. The theoretical limit is 32 terabytes.

*   Automatic IDE hard drive detection (up to 4 drives). True Plug & Play for IDE hard disk installation.

*   Multi-sector read/write for an up to 30% increase in drive access speed over your old BIOS.

*   Speed optimization.

*   32-bit port access capability.

*   Enables PIO modes up to Mode 4 & beyond for 16.6MBs/s performance or better.

*   Detects viruses attempting to write to partition and boot sectors.

S.M.A.R.T.

S.M.A.R.T. is part of the ATA-3 specifications. It means Self-Monitoring Analysis and Reporting Technology. S.M.A.R.T.-capable hard disk drives can detect drive failure conditions and report them to you so you can back up important files in a message that displays when you boot up the computer.

At bootup, LBA Pro detects all connected IDE drives and probes these drives for S.M.A.R.T. status. If S.M.A.R.T. is detected, LBA Pro announces this in bright green on the screen if the hard drive and card have S.M.A.R.T. and the hard drive is 1 Gigabyte or more.

- If the drive is okay, this will also be shown in bright green.
- If a possible failure condition is detected, it will be shown in bright red and you will be prompted to back up your data.

Hard disk manufacturers like Quantum treat S.M.A.R.T. failure alerts as actual, physical failures and will repair or replace these drives under standard field failure warranty terms

Note: On some hard drives such as Western Digital and Maxtor, it is necessary to remove the software that is shipped pre-installed on the drive. This software may be referred to as Maxblast, or ezBIOS.

TROUBLESHOOTING

WEBSITE

You can access many FAQ's on our website. If your question isn't answered here, chances are you can find it on the searchable Technical Support page.

To access the online FAQ's:
1. Go to http://www.esupport.com
2. On the left-hand side under Tech Support, click on Search.
3. Type in a phrase that describes your problem. For example, "installing BIOS."
4. Click the Find Documents button.

EMAIL

You can also send an email to eSupport.com about your problem. Send your email to support@unicore.com. Support will send an email back and give you a list of selected topics.

All BIOS

Q: When I start the computer with the new BIOS installed on the system the first screen appears to be distorted or have garbage on it. What do I do

Nothing.. this is a result of the video card being initialized later in the process than originally intended. This only happens with a very few combinations of video cards and new BIOS. It is not a fatal problem and for the most part can be ignored.

Q: When I boot the system I get a message "Conflict with I/O Port 2F8" how do I correct this error and what is the cause?

This error is caused by two devices trying to use I/O port address 2f8, usually a modem and one of the onboard com ports. The way to correct this usually is to enter setup and go to the integrated peripherals screen, find the onboard serial ports. (They may be listed as COM or uart.) If they are set to auto then manually set the first one to 3f8 and disable the second one (your needs may differ.) if the ports are already set to 3f8 and 2f8 then disable the port that matches the error message.

CHIPS

Q: The label on my BIOS chip says Phoenix but I was supposed to get an award bios. Is this the wrong chip?

Award and Phoenix merged. Phoenix being the dominant partner now determines what is on the labels of our BIOS chip license labels. The BIOS you received is still an Award BIOS.

Q: How do I tell what size BIOS chip is in my computer and what type it is

BIOS chips these days come in 5 different sizes and 2 different types. Those sizes are 256k, 512k, 1MB, 2MB and 4MB chips.

To tell what kind of chip you have, examine the chip. Peel the label back partially, usually on the end away from the notch. Look for a number that begins with either 27, 27c, 28, or 29. The number that follows will be the chip size. i.e. 100, 010, or 001 = 1m chip 200, 020, or 002 is a 2mb chip.

If the number begins with 28, or 29 the chip is a flashable chip. If the number begins 27 or 27c, the chip is a standard EPROM. There are newer types of chips now being used. New chips will be posted on our website when available.

Q: I just installed a new BIOS, but when I turn on the computer, there is no video or sound. I can hear the hard drive spin, but nothing else

Make sure:

- That the CMOS was cleared before the chips were installed. If you did not clear the CMOS you may be able to do so now. Please refer to chip installation instructions.

- the power is connected to the system

- the monitor is connected and plugged in

- the connector from the power supply to the motherboard is properly connected

- that you have installed the chips facing the proper direction

WARNING! Applying power to BIOS chips that are put in backwards will result in the chip heating up and if not turned off quick enough will result in the destruction of the chip!

- If you received two chips, try putting the chips in the opposite sockets.

Note: If you get a beep or a series of beeps, the chips are in the correct sockets.

Certain types of video cards require adjustments. In the BIOS setup utility, check:

- the wait state

- alternate timing

- turbo mode

- 16-bit BIOS access jumper/switches

- Changing IRQ settings may alleviate this problem in some rare cases.

On some older systems with two chips, the original chips may be 128k chips, but the set you received are 256k chips. See your computer's manual to determine the BIOS ROM size and find the settings for 256k (they may be referred to as 32k).

Q: When I save changes to the CMOS, the computer locks up. OR, when I don't modify the CMOS setup, the computer counts the memory and then just freezes.

A:
1. Go into the CMOS setup and disable the external cache, and then try to boot the system. If the system boots successfully, go back into setup and re-enable the cache now that the problem has been found. Try changing the settings for the cache (increase the burst read and read/write wait states). You change the settings in the external cache screen of the BIOS.
2. If the system still won't boot, re-enable the cache and go to the integrated peripherals screen. Find the PIO modes (there should be 4) and set them to mode 0. If this corrects the problem then try setting the PIO modes higher until the system no longer boots. Then reset the PIO modes 1 level lower.
3. Set the PIO modes back to Auto. Then find the UDMA modes. (there should also be 4 of these) Disable all 4 of them.

Note: If your system has a VESA Local Bus in the setup, (486 systems) there may be options in the chipset setup for VLB ready and VLB delay which may affect whether or not the computer will boot past the setup. VLB ready with a setting of 1 wait state will in many cases allow a system to boot.

Q: I installed the BIOS, but cannot boot from the floppy (A:)

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drive.

A: In the CMOS setup, depending on which BIOS you have, your options are Boot sequence or Quickboot.

- **Boot sequence:** make sure it is set to A: then C:.

- **Quickboot:** make sure that it is set to "off" or "no."

If your computer still will not boot from the A: drive, make sure there is a boot disk in the A: drive. A boot disk is a floppy with system files on it necessary to start a computer.

To make a boot disk on a working computer:
1. Put a floppy disk in the A: drive
2. Type **format A: /s**.
3. We recommend that you also include Fdisk.exe, Format.com, and Debug.exe on the boot disk. They are in the C:\DOS or C:\Windows\Command directory.

If your computer still will not boot from the A: drive:

- check the physical connections between the drive and the controller card

- make sure the controller card is firmly seated in its slot, if

Make sure that the cable is connected to both drives with the red or colored edge closest to pin 1.

Q: My computer is up and running, but Windows will not run correctly or causes the system to reboot, or my computer locks up while loading DOS or Windows.

A: For DOS 6.22 or earlier

Your system probably has to be adjusted for the new BIOS. Boot the system with the most basic configurations as described below.

If you are using DOS 6.xx, when you see the "Starting MS-DOS" message, press the **F5** key to bypass the config.sys and autoexec.bat files.

If you are using an earlier version of DOS, use a boot disk to start the system.

To isolate the problem you are having:
1. Copy the CONFIG.SYS and AUTOEXEC.BAT files to files having the same file name but with different file extensions to preserve a copy of the original files. For example, CONFIG.ORG.
2. Call up the files in a text editing program and place "REM" before every line in both files.
3. Remove the REM statement from one line and boot the system.
4. Repeat this process for each line until the system has the problem you noticed before.

5. When you find the line causing the problem, load the line in a different way. For example, if it is loaded high, try loading it in conventional memory (by taking the "high" out of the line.

Note: You may have to undo all of the load high and device high statements that your memory maker added and re-optimize them by loading the device drivers "high."

For Windows 95/98

1. If possible copy the windows CD to a directory/folder on the hard drive. (you may temporarily lose access to the CD)
2. Boot to Windows. If you cannot boot to normal mode then boot into "Safe Mode"
3. Open the device manager
4. Find the "System Devices" key.
5. Remove all entries under this key.
6. Shut down the system and restart. Windows should redetect all the devices, and set them up properly.

Things should now work correctly. If not you may need to reinstall windows either over itself (this way you will not lose your software settings, or completely by deleting the windows directory, or reformatting the hard drive.

FLASH

Q: When running BFLASH, I get an INSUFFICIENT MEMORY error message. What do I do?

If you receive a message insufficient memory error here is one solution Note: this is only if you are using a dos or windows 9x floppy.

- Copy HIMEM.SYS to the floppy. (it can usually be found in the windows directory/folder)

- Create a new config.sys file on the floppy. (use either edit in dos or notepad in windows)
  These lines should be in the config.sys file
  > Device = a:\himem.sys
  > DOS = high
  > Stacks = 0,0

- Save the file created to the floppy (be careful not to erase the config.sys file that is on your hard drive.)

- Copy the himem.sys file from your windows directory to the floppy.

Try using a windows 9x boot disk (not startup disk.) if you are not using windows 9x then you can obtain an image of a boot disk at www.bootdisk.com get a windows 98se boot image create the disk and remove all files from the disk including system and hidden files except COMMAND.COM, IO.SYS, and MSDOS.SYS. copy from the distribution disk the flash loader, the autoexec.bat file and the BIOS file. Note: the BIOS file should have a .BIN or .ROM extension.

If this does not solve the problem it is possible that your flash chip voltage is set to 5 volts. Some BIOS chips are made to be readable at 5 volts and read/write at 12 volts it may be possible to change this via a jumper on the motherboard

Make sure there are no write protect jumpers for the flash.

Make sure you used the proper flash loader. Your motherboard may need a special loader specific to your board.

If all else fails, you may need a physical chip upgrade.

While eSupport.com attempts to provide support for all flash chips, it may not be able to upgrade all of them with a flash loader because:

- The manufacturer may have arranged so that part of the chip could not be erased in an attempt to set up a boot block.

- The chip may be one of the few chips that BFLASH, AWDFLASH, AFLASH, or MRFLASH does not support.

- In the event that you are unable to flash the system please contact our tech support

department to determine if a chip upgrade can be provided for your system. Please check the http://www.esupport.com/techsupport/beforecallingtech.htm website before calling tech support.

Q: When I restart the computer after the flash procedure I get no video and no beeps or I get a BIOS ROM checksum error. What do I do.

If this happens to you there are a few steps that must be taken. First of all, don't panic. Your system can be recovered. And eSupport.com will do everything possible to get your system back up and running. We just need a little information about your system that only you can provide.

1. Does your system have a removable bios chip.
2. Is the chip a small square chip or a rectangular chip
3. If it is rectangular then how many pins are on the chip.

If the chip is not removable then the only option is to send the motherboard in to our facility and have our engineer recover the motherboard.

If the chip is replaceable then we need to send you a chip. Please make note of what type of chip you have and contact our technical support department.

BIOS Extender Cards

Windows 95 and PCI Motherboards

For LBA/Dual Pro to run properly with Windows 95 and PCI motherboards, make sure that at least one hard disk type is defined as installed in your CMOS configuration, even if your hard disk drive is different from the hard disk type selected. See your motherboard's manual for more information. Please set this drive for either type 1, or user defined. if you set it to user defined use these settings 1023 cylinders, 16 heads, 63 sectors, and set the mode to either Normal, standard or standard CHS, depending upon your particular bios. Note: for IBM BIOS ignore this section. (Note Some systems, when using drives larger than 32Gig may need to be set to NONE. as most systems using drives larger than 32Gig are using WIN 98 or higher this situation does not usually occur.)

Note: If you are running DOS, OS/2 or Windows NT, this is not necessary.

Q: I get this message: "Incompatible BIOS translation detected. Unable to load disk overlay." What do I do?

A: This message tells you that there is a disk manager overlay on the disk and that you also have the translation (or LBA mode) in the BIOS turned on. The two features are incompatible.

To get the system running:
1. Enter the CMOS setup and disable the translation or LBA mode for the hard drive.
2. Follow the procedures outlined in this document for getting rid of the disk manager overlay program.

Q: When I install the LBA Pro, my hard drive disappears.

A: Make sure all cards are seated firmly in their slots, and that all cables are firmly pushed into their sockets.

Q: I have a controller card with a built in BIOS (Promise 2300, Caching Controller, SIIG, etc.), so why does my computer crash (I get a "Buggy BIOS" message or the system halts)?

A: The built in BIOS on your card must be disabled for the LBA Pro to function properly. If you are using a caching controller, it must be set up for mode zero.

Also make sure that the drives are not set to auto mode, and if LBA is available in the system BIOS, you need to disable it.

Set the drive to "Not Installed" or "None" or type "0"

The LBA Pro will run with these controllers if they are set up as standard non-translating IDE controllers. The controller card cannot be set up to perform the translation that the LBA is supposed to do. Contact the controller card manufacturer for instructions on how to properly set up your card.

Q: I have an IBM PS/1 2168-38(SL-B). Will your LBA Pro allow me to use EIDE drives on my system?

A: Yes, the LBA Pro works in any system with an 8-bit XT/AT slot.

Q: Does the LBA Pro need to be installed before, during, or after installing the new hard drive?

A: Install the LBA Pro before installing the hard drive.

Q: I'm having some trouble getting Windows 95/98 to run correctly with my LBA PRO or LBA Power card, what can I do?

A: Optimize IDE drives with Win9x.

- Go to Start, Settings, Control Panel, Add New Hardware.

- When prompted with "Do you want Windows to search for your new hardware?" click No and Next.

- Select Hard Disk Controllers, Standard Hard Disk Drive, Standard IDE/ESDI Hard Disk Controller.

Two Possibilities now exist.

Possibility 1:

The system will tell you that there is a conflict. To resolve it:

1. Go to Start, Settings, Control Panel, System, and click the Device Manager tab.
2. Click on Hard Disk Controllers. You will see two Standard IDE Hard Disk Controllers. Click on the first, or primary, one.
3. Click on the **Resources** tab. Make sure that **Use automatic settings** is checked.
4. Click OK and then click on the second Standard IDE Hard Disk Controller listed.
5. Click on the Resources tab. Make sure that **Use automatic settings** is NOT checked.
6. Select Settings based on: with Basic configuration 1. Go to the General tab and click on Original Configuration (Current). Click OK and then reboot.

Possibility 2:

Windows will inform you that you can use these settings: Input/Output Range: 0170-0177, 0376-0376 and Interrupt Request: 15. Click OK and reboot.

In both cases, Win9x will use its own drivers for the IDE drives. However, at least one disk drive must be specified in the CMOS settings. This can be actual hard drive parameters (drive C) or some fictitious value, for example, Type 1 or 2.

Hard Drive Issues

- Some drive combinations are less compatible. If you have problems with your master/slave configuration, try switching the drives.

- A single drive on the data cable must be jumpered as a "single" drive (Western Digital drives should have no jumpers.) If there are two drives on a data cable use the appropriate master and slave settings. See your hard drive documentation for correct jumper settings.

- Make sure the data cables are correctly plugged in. Check your documentation for the location of pin 1 on the hard drive. Line up the red-shaded edge of the data cable to pin 1. The motherboard also has a pin 1, which must line up correctly with the data cable. Check your documentation to determine which pin is pin 1.

- IRQ 15 is reserved for the secondary IDE port in your computer. No other add-on cards can be set to this IRQ setting. If you have a problem, change the add-on card to a different IRQ setting in the Windows operating system or refer to the manuals that came with your add-on cards.

- You must have a bootable DOS 5.0 or above disk (you can use the WIN 95 startup disk) with these DOS files: FDISK.EXE, FORMAT.COM, DEBUG.EXE and SYS.COM. WIN 98 or higher is recommended. Note that you cannot make full use of a drive that is more than 8.4Gig using WIN 95 or DOS 6.22 or less.

- Backup your hard drive. If you have any type of disk manager software (EZ Drive, Ontrack, Max Blast, Drive Rocket, etc.) installed, uninstall it before installing LBA Pro cards. This is also a good idea with installation of new bios since it is no longer necessary and may be the cause of some incompatibilities. After the uninstall, you may need to repartition and reformat the drive if you can't get to your data or it's missing.

- Getting rid of unwanted Disk Manager software can sometimes be a problem. Here are some sure-fire ways to delete the Disk Manager.

Debug Utility

Delete all data on the master boot record of the drive
Note: This deletes everything on the hard drive.

1. Boot the system from a DOS floppy disk. This must be a bootable DOS 5.0 or above disk. The floppy must have these DOS files: FDISK.EXE, FORMAT.COM, DEBUG.EXE and SYS.COM.
2. Type **debug** and enter these lines at the prompt:
   ```
   F 200 L200 0
   a 100  [Note: at this point the prompt will change]
   mov ax,301
   mov bx,200
   mov cx,1
   mov dx,0080 [Note: use 0081 for second fixed disk.]
   int 13
   int 3
   [Press Enter to leave a blank space here.]
   G=100

   q
   ```

Then press the **Enter** key. The drive should now have no partitions on it. Use Fdisk to set up the drive and then format it according to your operating systems' manual.

To partition the drive:

3. At the A: prompt, type fdisk. (Note: For Drives larger than 8.4Gig you will need WIN 98 or higher)
4. Select option 5 to choose a drive in a two or more drive system.
5. Type the number of the drive you want to partition.

Warning! FDISK will automatically partition the first physical drive, unless specified otherwise, from within menu choice 5. If you have a working first drive, then you will not want to re-partition it.

6. You are now back at the main menu. Select option 1 to create a primary DOS partition or logical drive.
7. Select 1 again to create a primary DOS partition.
8. Press Enter to choose the available size. Reboot when instructed.

To format the drive:

1. Boot the system from a DOS floppy disk. This must be a bootable DOS 5.0 or above disk (the WIN 9x startup disk is OK). The floppy must have these DOS files: FDISK.EXE, FORMAT.COM, DEBUG.EXE and SYS.COM.
2. At the prompt, type **FORMAT c: /u /s**. Press **Enter** to confirm that this is what you want to do.

Note: If this is the second drive you are formatting, replace the drive letter C above for the letter of the drive that you are formatting.

3. When the disk is formatted, the A: prompt reappears.

For more information and instructions on repartitioning and reformatting, see your computer's manual or your hard

drive/computer manufacturers.

Q: I still cannot get my hard disk to be recognized at its full size. What can I do to get it to see the full size?

1. Make sure that the drives are set in the CMOS setup as type AUTO mode Auto.
2. The drive may have a size limiting jumper that must be removed. On Maxtor drives it is J46 on Western Digital drives if there are more than one jumper on the back then the limiting jumper is one of them. Notice that the difference between master and slave and remove the jumper that doesn't change.

Q: I just installed my new hard drive. How do I set it up

A: Before setting up a new hard drive, make a bootable system disk with a few utilities on it.

To make a bootable system disk in DOS

1. With the original hard drive still in the computer; place a blank disk in the floppy drive for drive A.
2. Type **format A: /S** and press **Enter**.
3. Copy Fdisk.exe, Format.com and Debug.exe onto the formatted floppy disk. These programs are in the C:\windows\command directory for WIN 9x and C:\DOS for DOS and Win 3.1. Check your operating system's manual for more information.
4. Physically install the new drive, making sure everything is connected according to the manufacturer's manual.

To set up the new hard drive:

1. Turn on the computer and go into the BIOS setup. To go into the setup, press the following key(s) according to which BIOS you have.

AMI	Press DEL while the memory test is running. At startup
AWARD	Press DEL or CTRL+ALT+ESC during boot up
MR BIOS	Press ESC at bootup, or CTRL+ALT+ESC later.
PHOENIX	Press F2, CTRL+ALT+ESC or CTRL+ALT+S.

2. Find the hard drive parameters and configure them according to the disk manufacturer's specifications.

Note: If your hard drive has more than 1023 cylinders, but your drive does not support LBA, you can enter only 1023 cylinders. This will however only allow the computer to see 500mb of space unless you are using an LBA/Dual Pro or Disk management software.

1. Boot your computer from the floppy (A) drive.
2. At the A: prompt, type **fdisk** and press **Enter**.
3. Select option **4. Displayed partition information**. The screen

should say: "no partitions defined." If it does NOT say this, see your operating system's manual for more information on deleting partitions.

4. Go to the main menu and select **1. Create DOS partitions**.
5. From the next menu, select **1. Create primary partitions**.
6. Either follow the prompts and create a single partition on the drive or split the drive into logical drives. If you want to split the drive, type **no** at the first prompt and press **Enter**. At the next prompt, select a size for the first drive in megabytes.
7. Select **2. Create extended partition**. Follow the prompts and put the remainder of the drive in the extended partition. You will be prompted to create logical drives in the extended partition.
8. If you split the drive and this is the master or the only disk on the system, select **2. Set active partition** in the main menu and make the first partition active.
9. Reboot the computer by exiting FDISK.
10. After the system reboots to the A:\ prompt, format the drive with the disk command **Format C: /S /U**. If you created logical drives, use this command for each drive created. For **Format X: /U**, X stands for the letter of the drive you are formatting.
11. Install your operating system and applications.

Q: When I turn on my computer, I get an error message saying that my hard drive or hard drive controller has failed

A: Make sure that:

- your hard drive(s) are properly installed,

- the hard drive's cables are installed with the red edge facing pin #1 on both ends,

- there is power going to the drive,

- the jumpers are properly set up as master or slave; see the manual that came with the hard drive for these settings,

- the controller card is properly seated in the slot. (for older systems with separate controller cards.)

- the hard drive is correctly configured in the BIOS CMOS setup utility.

If this error persists, run FDISK to set up drive partitions and format the drives. If you do not know how to use FDISK, see your operating system manual.

Q: My hard drive will not boot.

A: Make sure:

- your hard drive(s) are set up properly in the CMOS

- drive 1 is formatted with a bootable operating system

- the first partition is active

- If you previously used Disk Manager software to access the drive, it must be deleted and reformatted.

- If everything is correct and it still will not work try this. Boot to a floppy with the Fdisk.exe, and Sys.com utilities on it. Type "Fdisk /MBR". Then type "Sys c". The disk should now be bootable.

Q: Why isn't the drive as fast as it's advertised to be?

A: Advertised transfer rates are based on the fastest speed at which the drive can send data across the ribbon cable from the drive's buffer. When the buffer runs out of data, the transfer stops so that the drives can re-fill the buffer to finish the command.

When the command is finished, you have an average data transfer rate that is much lower that the advertised rate due to the combined overhead of the drive's media access all the way to the CPU/RAM transfer speed.

There are so many different PC configurations today that a drive's data transfer rate cannot be based on anything else than the transfer rate on the ribbon cable.

Q: How does the system know whether the drive is a master or a slave?

A: There are jumper pins, usually located at the rear of the hard drive, which configure your hard drive to be recognized as a Master or Slave IDE unit. Newer hard drives have the jumpering information located on the hard drives' label or circuit board.

You should refer to the manual or information sheet that accompanies the hard drive for proper jumpering configuration information. You can also refer to the web site of the hard drive manufacturer for jumpering information, or contact the manufacturer using our manufacturer's contact phone number list.

Q: Why does an old IDE drive not work with a new IDE drive?

A: Because the ATA IDE specification was ironed out only after many companies were already making and selling drives, many older IDE

drives have problems in dual-drive installations, especially when the drives are from different manufacturers.

In some cases, two particular drives may not function together at all. Fortunately, most of the newer drives follow the CAM ATA specification, which clears up this problem. Even so, you should realize that even the newest drives will not work together in some situations.

Q: Why is the new IDE drive not recognized as a slave or a master

A: Configuring IDE drives can be simple, as is the case with most single-drive installations, or complex, especially when it comes to mixing drives from different manufacturers on a single cable.

Most IDE drives come in three configurations:

- Single-drive or master in most current hard drives

- Master in a dual-drive system

- Slave in a dual-drive system

If you are not sure of the jumper settings for the old drive, call the manufacturer of the drive. The following are contact numbers for some of the current hard drive manufacturers:

Western Digital	(800) 832-4778
Seagate	(408) 438-8222
Quantum	(800) 826-8022
Maxtor	(800) 262-9867

Q: After changing the jumpers on the old drive, the drives still do not work together. What is wrong?

A: Install each drive by itself. If each drive works when it is the only drive connected, then you have a compatibility problem.

If the drives are incompatible, swap their roles. That is, make the drive that was the master into the slave and the drive that was the slave into the master.

Most computers now have two IDE interfaces. If the drives will still not work together, take the hard drive you want to boot from, set it as a master, and attach it to the first IDE interface. (primary) Then, take your second hard drive, set it as a master, and attach it to the second IDE interface (secondary). If one drive is much faster than the other, this will allow each drive to run at its maximum transfer rate because most systems will only transfer information at the fastest speed of the SLOWEST hard drive.

When using the secondary interface, each drive will be master to its own interface, which is given a different address and IRQ.

Q: Can I change the translation mode or parameters in the BIOS?

A: WARNING! Changing the translation can cause permanent data corruption and loss!

If a drive is partitioned, DOS and Windows know the size of the drive by the information in the BIOS. If the original parameters are changed and cannot be recovered, repartition the drive and write down the parameters used.

Q: What do I do if the computer returns the error message "Non-system disk or disk error"?

A: The Partition Boot Record is missing system files that enable the drive to boot.

Possible solutions:

- Make sure there are no floppy disks in your floppy drives.

- Make sure the boot sequence in the system's BIOS is A: then C:

- Run FDISK/MBR from the DOS setup disk.

- Boot to a DOS disk, type **SYS C:** and press Enter.

WARNING! The following solutions may cause loss of data.

- Repartition and reformat the drive.

- Perform a low-level format with the proper tools. Disk manufacturers have low level utilities for just their drives.

Q: What do I do if my computer returns the error message "Missing Operating System"?

A: WARNING! Do not write to the drive.

Follow these steps:

1. In the CMOS setup, set the hard drive parameters to the same ones used when the drive was originally installed. Refer to the documentation supplied by the manufacturer. To access these parameters on boot up, refer to the section "Installing Hard Drives FAQ". In Standard CMOS settings, view and write down the hard drive parameters. You may also be able to set the hard drive type to "AUTO" in some systems' BIOS's.

2. Boot from a bootable floppy and type **fdisk /mbr** and press **Enter.**

---

3. Type **sys c:** and press **Enter.**

WARNING! The following will cause loss of data.

4. Repartition and reformat the drive.
5. If two drives are connected to the IDE interface cable, make sure the jumpers on both drives are set correctly. Do NOT set both drives as the master.

Q: What do I do when FDISK hangs or the partition disappears after reboot?

A: This error occurs when the Master Boot Record is unreadable or has not been written to properly.

Possible solutions:

1. Boot from a bootable floppy and type **fdisk /mbr** and press **Enter.**
2. If more than one drive is connected to the interface cable, set this one up as the only drive in the system. Set up the drive in the center of the cable.
3. Try the drive in another system.

WIN 95/98

Q: Can you start Windows 95 without either a CONFIG.SYS or AUTOEXEC.BAT file?

A: Yes, when loading a third-party device driver, you need certain files. Windows 95 automatically loads files to boot the computer. For example: HIMEM.SYS, IFSHLP.SYS, SETVER.EXE, FILES=60, BUFFERS=30, STACKS=9,256.

If you specify a setting in the CONFIG.SYS or AUTOEXEC.BAT files for a file that Windows 95 normally loads, this setting overrides the Windows 95 default behavior.

If you do not want Windows 95 to load any of the files it loads automatically, add DOS=NOAUTO to the CONFIG.SYS file and Windows 95 will load only what is specified in the CONFIG.SYS and AUTOEXEC.BAT files.

Q: How do I exclude a portion of the upper memory area in Windows 95?

A: To exclude an upper memory block in Windows 95:
1. Click Start, Settings, Control Panel.
2. Double-click the System icon.
3. Select the Device Manager tab, then double-click Computer.
4. Select the Reserve Resources tab, click the Memory button and the Add button.
5. Use the up and down arrows to select the beginning and ending values for the memory areas you would like to reserve. Click OK.

Q: Do I have to reinstall Windows 95 to create a startup disk if I created one when I first installed Windows?

A: No. To create a startup disk in Windows 95:
1. Insert a floppy disk in the disk drive.
2. Click Start, Settings, Control Panel.
3. Double-click the Add/Remove Programs icon, then click the Startup Disk tab.
4. Click the Create Disk button to create a startup disk and follow the on-screen instructions.

Q: I added the line "BootMulti=1" to the MSDOS.SYS file, but the system still will not boot to the previous operating system. Why?

A: Windows 95 supports dual booting on computers with MS-DOS, OEM DOS version 5.0 or higher, or IBM PC DOS version 5.x or 6.x. If you are using an earlier version of DOS or Novell or DR DOS, you

cannot boot to the previous operating system. Also, if you used disk compression, edit the copy of MSDOS.SYS on the host drive

Windows NT

Q: What does "67 Error, Config Initialization Failed" mean?

A: If 5-1, 5-6 or 5-8 precede the error, then a request for memory from the Paging file failed. You may need more physical memory or need to make the Paging file larger.

If 0-0 precedes the error, then either:

- there is no more memory available,
- there is an internal memory error,
- there is a failed registry call, or
- the parameter table is corrupt.

At this point, the computer is not reading the disk, so you aren't having a hard disk failure, although a bad read can cause a corrupted parameter block.

Q: What does "69 Error, IO1 Initialization Failed" mean?

A: A driver failed to initialize because there wasn't enough memory and an I/O device failed.

To fix this:

- slow down the DMA rate on the interface for IRQ memory conflicts,
- make sure all NT system files are loaded, and
- make sure all drivers are supported.

Q: While converting the file system during installation on a previously partitioned drive, NT says the drive is full, but I know there is disk space available. Why do I get this message?

A: If a drive is too fragmented, there may be no room for system files, so Windows NT tells you that the disk is full. Run Defrag, or backup and run FDISK and format, then install NT again.

Q: Will caching controllers work with Windows NT?

A: Controllers with drivers that specifically support caching should work with NT. There is a greater chance of losing data using a caching controller. If you reboot the system or there is a power loss before the cache flushes the data to the drive, then it will be lost.

Note: If installation problems persist on a multiprocessing unit, disable the shadow ROM in the BIOS in Chipset Features.

NetWare

Q: What should the size of a file server's DOS partition be?

A: The DOS partition should not be less than 10 MB and really should not exceed 20 MB. Many NetWare users keep their DOS partition at about 10 MB.

Novell uses the rest of the disk space to create the NetWare partition. The DOS partition is only needed for DOS and Novell startup files (for example, SERVER.EXE). If you use a large DOS partition, space that could be allotted for the NetWare partition will go unused.

Q: Which Novell disk driver should I use when installing NetWare on an IDE drive?

A: The type of IDE disk driver you use depends on the capacity of the hard drive.

The rule of thumb is:

- If the hard drive's capacity is less than or equal to 1024 cylinders (504 MB's), use ISA.DSK.

- If the hard drive's capacity is greater than 1024 cylinders (504 MB's) and the file server has LBA (Logical Block Addressing) capability, use the most current version of IDE.DSK.

Note: There have been documented reports that when IDE.DSK fails to load or causes a NetWare file server to abend, the user may attempt to load ISA.DSK. For more information, contact Novell.

Q: What do I do if I have problems with a non-dedicated NetWare file server?

A: You can:

- Verify that the non-dedicated file server has either an updated BIOS (one that supports LBA) or uses an enhanced controller with LBA capability. Make sure you use the proper disk driver.

- There have been issues with multiple platforms conflicting on a non-dedicated NetWare file server.

- Contact Novell for further assistance.

SCSI

Q: What is termination? How do I set it on my drive?

A: Termination controls the signal in the SCSI cable. You install termination in devices at the physical ends of the cable, but you remove termination from devices between the ends of the cable.

To install or remove termination on a drive, see the installation sheet that came with your drive for the location of the termination resistors on the electronics board (PCBA) of your drive.

Q: Is SCSI Windows 32-bit access compatible?

A: Usually no, but some newer host interface cards can emulate it. It is completely dependent on the host interface card.

The drive has nothing to do with 32-bit access. If the controller is 32-bit access compliant, it will be 32-bit compatible.

Host interface card manufacturers supply the drivers for 32-bit operation. Check the card's documentation for directions on how to contact the manufacturer and on utility or driver software configuration and use.

Q: What SCSI drive parameters do I put in the CMOS?

A: SCSI host interface cards do drive translation for the computer and operating system. The computer's CMOS should be set to none or not installed for the specified hard disk drive. See the instructions that came with your SCSI host interface card.

Q: Will my new SCSI drive boot my computer?

A: The drive will need to be partitioned and formatted for your computer's operating system before it can be used as the boot drive. Follow the instructions in your operating system or computer manual for installing a new hard drive and loading the operating system.

eSupport.com provides technical support for our products. For hard drives or other equipment support, please see your owner's manual or contact its manufacturer.

For your convenience, we have included the following list of vendor/OEM service center numbers to contact if you have problems with products other than those from eSupport.com.

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ATI Technologies	905-882-2626	NEC	800-366-3632
Bus Logic	408-492-9090	NEC CPU	800-388-8888
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Compaq	800-345-1518	Novell Applications	800-638-9273
Conner Peripherals	800-468-3472	Number Nine	617-674-0009
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Cyrix	800-848-2979	Ontrack	800-872-2599
DFI	305-477-1988	Orchid	510-683-0300
Diamond Multimedia	408-736-2000	Panasonic	800-726-2797
Digital	800-354-9000	Panasonic Printers	800-222-0584
Emerald Systems	800-767-2587	Paradise - Western Digital	800-832-4778
Epson	800-445-5054		
Fujitsu	404-604-0270	Philips	800-845-7301
Future Domain	714-253-0400	Pinnacle Micro	714-727-3300
Gateway by Microdyne	800-255-3967	Practical Peripherals	805-497-4774
GoldStar	800-777-1192	Quantum	800-345-3377
Hayes	404-441-1617	Quarterdeck	310-392-9851
Hewlett-Packard	800-544-9976	Seagate	800-468-3472
Hyundai	800-627-7978	SMC	516-435-6253
IBM PC Company	800-426-0569	Sony	408-894-0225
Intel	800-538-3373	Sony Drives/Monitors	800-342-5721
Kingston Technology	714-438-2796	STAC	619-929-3900
Logitech	800-231-7717	STB	214-234-8750
Maxis	800-33MAXIS	Symantec Corporation	800-441-7234
Maxtor	800-262-9867	SyQuest	510-226-4000
McAfee	800-552-9876	Texas Instruments CPU	800-848-3927
Microdyne	800-255-3967		
Micro House	800-926-8299	Toshiba (CPU	800-999-4273
Micronics	510-651-2300	Toshiba Drives	714-583-3000
Micropolis	818-709-3325	Triton Technologies	908-855-9440
Microsoft Corporation	800-426-9400	Umax Technologies	510-651-8883
Microsoft OEM	512-706-7382	US Robotics	800-342-5877
MiniStor	800-943-0165	Western Digital	800-832-4778
Mitsubishi	714-236-6181	Zenith Data Systems	800-277-3360
Motorola	800-221-4380		
Mouse Systems	510-656-1117		

Technical Support

If you have questions not addressed in this manual, please check the manufacturers' web sites for the latest updates before calling

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Glossary

abend Short for abnormal end. Used when the execution of a program or task is terminated unexpectedly because of a bug or crash.

access The ability to use a program or to get information. The process of getting data.

adapter The device that serves as an interface between the system unit and the devices attached to it. Used by IBM to be synonymous with circuit board, circuit card, or card.

address Where a particular piece of data or other information is found in the computer. Also can refer to the location of a set of instructions.

address space All the accessible storage locations that a processor can reference; effectively, the amount of memory a microprocessor can reference.

API An acronym for application program interface. A system call (routine) that gives programmers access to the services provided by the operating system. On IBM-compatible systems, the ROM BIOS and DOS together present an API that a programmer can use to control the system hardware.

ATA An acronym for AT Attachment interface, an IDE disk interface standard introduced in March 1989 that defines a compatible register set and a 40-pin connector and its associated signals. See also IDE.

ATAPI Attachment Packet Interface (ATAPI) is a standard implementing SCSI-like devices on an ATA bus. Such devices include CD-ROMs, tape drives and other removable media. ATAPI's main advantage is that it is inexpensive and easy to implement in current systems. Its disadvantage is that it uses drivers for operability.

attribute byte A byte of information held in the directory entry of any file that describes various attributes of the file, such as whether it is read-only or has been backed up since it last was changed. Attributes can be set by the DOS ATTRIB command.

AUTOEXEC.BAT A special batch file that DOS executes at start-up. Contains any number of DOS commands that are executed automatically.

backup The process of duplicating a file or library onto a separate piece of media. This is good insurance against loss of an original.

backup disk Contains information copied from another disk. Used to make sure that original information is not destroyed or altered.

bad sector A disk sector that cannot hold data reliably because of a media flaw or damaged format markings.

batch file A set of commands stored in a disk file for execution by the operating system. A special batch file called AUTOEXEC.BAT is executed by IBM DOS each time the system is started. All DOS batch files have a BAT file extension.

bay An opening in a computer cabinet that can hold disk drives (hard disk, floppy disk, LS120, CD-ROM, etc) or tape drives.

BBS An acronym for bulletin board system, a computer that operates with a program and a modem to enable other computers with modems to communicate with it, often on a round-the-clock basis. Thousands of IBM- and Apple-related bulletin board systems offer a wealth of information and public domain software that can be downloaded. This method of sharing programs and information was popular before use of the internet became widespread.

binary Refers to the computer numbering system that consists of two numerals, 0 and 1. Also called base-2.

BIOS Basic Input-Output System. The part of an operating system that handles the communications between the computer and its peripherals. Often burned into read-only memory (ROM) chips.

bit Binary digit. Represented logically by 0 or 1 and electrically by 0 volts and (typically) 5 volts. Other methods are used to represent binary digits physically (tones, different voltages, lights, and so on), but the logic is always the same.

block A string of records, words, or characters formed for technical or logical reasons and meant to be treated as an entity.

boot Loading a program into the computer. The term comes from the phrase "pulling a boot on by the bootstrap."

boot record A one-sector record that tells the computer's built-in operating system (BIOS) the most fundamental facts about a disk and DOS. Instructs the computer how to load the operating system files into memory, thus booting the machine.

bootstrap A technique or device designed to bring itself into a desired state by means of its own action.

bps Bits Per Second. The number of binary digits or bits transmitted per second. Sometimes confused with baud.

byte A collection of bits that makes up a character or other designation. Generally, a byte is eight data bits plus one parity (error-checking) bit.

cache An intelligent buffer. By using an intelligent algorithm, a cache contains the data that is accessed most often between a slower peripheral device and the faster CPU.

cache memory Cache memory is a relatively small amount of high cost, fast access SRAM designed to improve access to system memory.

card A printed circuit board containing electronic components that form an entire circuit, usually designed to plug into a connector or slot. Sometimes also called an adapter.

CD-ROM Compact Disc Read-Only Memory. A computer peripheral device that employs compact disc (CD) technology to store large amounts of data for later retrieval. Phillips and Sony developed CD-ROMs in 1983. Current CD-ROM discs hold approximately 600Mb of information. CD-ROM drives are much slower than conventional hard disks, with 50X drives having an average-access times of 78 milliseconds or less and data transfer rates of about 7.2 megabytes per second. CDROM drives can use either the SCSI (Small Computer Systems Interface) bus or the IDE/ATAPI interface for connection to a system.

character A representation, coded in binary digits, of a letter, number, or other symbol.

chip Another name for an IC or integrated circuit housed in a plastic or ceramic carrier device with pins for making electrical connections.

CHS Cylinders Heads & Sectors, the conventional means for a BIOS to understand the physical layout of a hard drive for information storage. In older BIOS's, CHS has a limitation of 1024 cylinders, 16 heads and 63 sectors per track, resulting in a maximum hard drive capacity of 504MB.

circuit A complete electronic path.

circuit board The collection of circuits gathered on a sheet of plastic, usually with all contacts made through a strip of pins. The circuit board usually is made by chemically etching metal-coated plastic.

clock The source of a computer's timing signals. Synchronizes every operation of the CPU.

clock speed A measurement of the rate at which the clock signal for a device oscillates, usually expressed in millions of cycles per second (MHz).

clone An IBM-compatible computer system that physically as well as electrically emulates the design of one of IBM's personal computer systems, usually the AT or XT. For example, an AT clone has parts (motherboard. power supply, and so on) that are physically interchangeable with the same parts in the IBM AT system.

cluster Also called an allocation unit. A group of sectors on a disk that forms a fundamental unit of storage for an operating system. Cluster or allocation unit size can be determined by an operating system's or DOS's FDISK and FORMAT (or equivalent) commands when the disk is first being set up.

CMOS Complementary Metal-Oxide Semiconductor. A type of chip design that requires very little power to operate. In an AT-type system, a battery-powered CMOS memory and clock chip store and maintain the clock setting and system configuration information.

COM port A serial port on a PC that conforms to the RS-232 standard. See also RS-232. May also be referred to as UART

command An instruction that tells the computer to start, stop, or continue an operation.

COMMAND.COM An operating system file that is loaded when the computer is booted. This is the command interpreter or user interface and program-loader portion of DOS, and is a part of the Windows 95 and Windows 98 operating systems.

computer Device capable of accepting data, applying prescribed processes to this data, and displaying the results or information produced.

CONFIG.SYS A file that can be created to tell DOS how to configure itself when the machine starts up. It can load device drivers, set the number of DOS buffers, and so on.

configuration file A file kept by application software to record various aspects of the software's configuration, such as what printer it uses.

control bus A group of signal lines used by the microprocessor to control a variety of miscellaneous functions.

coprocessor An additional computer processing unit designed to handle specific tasks in conjunction with the main or central processing unit.

CPU Central Processing Unit. The computer's microprocessor chip, the brains of the outfit. Typically, an IC using VLSI (very-large-scale integration) technology to pack many different functions into a tiny area. The most common electronic device in the CPU is the transistor, of which several thousand to several million or more are found.

crash A malfunction that brings work to a halt. A system crash usually is caused by a software malfunction, and ordinarily you can restart the system by rebooting the machine. A head crash, however, entails physical damage to a hard disk and probable data loss.

cursor The small flashing hyphen that appears on-screen to indicate the point at which any input from the keyboard will be placed.

cylinder The set of tracks on a disk that are on each side of all the disk platters in a stack, and are the same distance from the center of the disk. A floppy drive with two heads usually has 160 tracks, which are accessible as 80 cylinders. A typical (and very old) 20Mb hard disk has 2 platters with 4 heads and 615 cylinders.

DEBUG The name of a utility program included with DOS, Windows 9X, and Windows NT 4.0, and that is used for specialized purposes such as altering memory locations, tracing program execution, patching programs and disk sectors, and performing other low-level tasks.

default Any setting assumed at start-up or reset by the computer's software for attached devices and operational subsections until changed by the user. An assumption the computer makes when no other parameters are specified. For example, when you type the dir (directory) command in DOS without specifying the drive to search, the computer assumes that you want it to search the current default drive. The term is used in software to describe any action the computer or program takes on its own with imbedded (predefined) values.

device driver A memory-resident program, loaded by CONFIG.SYS or Windows operating system , that controls a non-standard device, such as an expanded memory board.

disk operating system DOS. A collection of programs stored on the DOS disk with routines enabling the system and user to manage information and the hardware resources of the computer.

drive A mechanical device that manipulates data storage media.

EISA Extended Industry Standard Architecture, an extension of the Industry Standard Architecture (ISA) bus developed by IBM for the AT. The EISA design effort was led by COMPAQ Corporation. Later, eight other manufacturers (AST, Epson, Hewlett-Packard, NEC, Olivetti, Tandy, Wyse, and Zenith) joined COMPAQ in a consortium founded September 13,1988. This group became known as the "gang of nine." The EISA design was patterned largely after IBM's Micro Channel Architecture (MCA) in the PS/2 systems, but unlike MCA, EISA allows for backward compatibility with older plug-in adapters.

EMS Expanded Memory Specification Sometimes also called the LIM spec because it was developed by Lotus, Intel, and Microsoft. Provides a way for microcomputers running under MS/PC DOS to access additional memory. EMS memory management provides access to a maximum of 32M of expanded memory through a small (usually 64K) window in conventional memory. EMS is a cumbersome access scheme designed primarily for pre-80286 systems that could not access extended memory.

EPROM Erasable programmable read-only memory. A type of read-only memory (ROM) in which the data pattern can be erased to allow a new pattern. Usually erased by ultraviolet light and recorded by a higher than normal voltage programming signal.

error message A word or combination of words indicating that an error has occurred somewhere in the program.

expanded memory Otherwise known as EMS memory, memory that conforms to the EMS specification. Requires a special device driver and conforms to a standard developed by Lotus, Intel, and Microsoft.

extended memory Direct processor-addressable memory that is addressed by an Intel (or compatible) 286, 386, 486, Pentium (I, II, III) or equivalent processor in the memory address region above the first megabyte. Addressable only in the processor's protected mode of operation.

Extended Partition If your hard drive was partitioned with the MS DOS utility FDISK and has more than one partition, it probably has an extended partition. An extended partition by itself is not usable. You have to create logical partitions within an extended partition. It is these logical partitions which are allocated drive letters by MS DOS (like D, E, etc.).

FAT File Allocation Table. MS DOS and Windows 95/98 keep track of the sectors used in a hard disk drive or floppy in a FAT. The basic FAT system is limited to 2048MBs, hence the need for FAT32 to extend access to larger hard drive partitions (greater than 2048MBs).

file A collection of information kept somewhere other than in random-access memory.

file allocation table A table held near the outer edge of a disk that tells which sectors are allocated to each file and in what order.

file attribute Information held in the attribute byte of a file's directory entry. File attributes typically used in MS DOS are Read-Only, System, Archive, and Hidden.

file defragmentation The process of rearranging disk sectors so that files are located in consecutive sectors in adjacent tracks.

firmware Software contained in a read-only memory (ROM) device.

fixed disk Also called a hard disk, a disk that cannot be removed from its controlling hardware or housing. Made of rigid material with a magnetic coating and used for mass storage and retrieval of data.

floating-point processor Also known as the numeric coprocessor used to process floating-point math operations.

FORMAT.COM An MS DOS program that performs both low- and high-level formatting on floppy disks, but only high-level formatting on hard disks.

formatted capacity The total number of storage bytes of data on a formatted disk. The unformatted capacity is higher because storage space is lost defining the boundaries between sectors.

formatting Preparing a disk so the computer can read from or write to it. Checks the disk for defects and constructs an organizational system to manage information on the disk.

full-height drive A drive unit that is 3.25 inches high, 5.75 inches wide, and 8 inches deep.

giga A multiplier indicating 1 billion (1,000,000,000) of some unit. Abbreviated as g or G. When used to indicate a number of bytes of memory storage, the multiplier definition changes to 1,073,741,824. One gigabit, for example, equals 1,000,000,000 bits, and one gigabyte equals 1,073,741,824 bytes.

gigabyte A unit of information storage equal to 1,073,741,824 bytes.

global backup A backup of all information on a hard disk including the directory tree structure.

half-height drive A drive unit that is 1.625 inches high, and either 5.75 or 4 inches wide and 4 or 8 inches deep.

hard disk A high-capacity disk storage unit characterized by a normally non-removable rigid substrate media. The platters in a hard disk are normally constructed of aluminum or glass.

hard error An error in reading or writing data that is caused by damaged hardware.

hardware Physical components that make up a microcomputer: monitor, printer, and so on.

head A small electromagnetic device inside a drive that reads, writes, and erases data on the media.

heat sink A mass of metal attached to a chip carrier or socket to dissipate heat.

hexadecimal number A number encoded in base-16, digits include the letters A through F as well as the numerals 0 through 9 (for example, 8BF3, which equals 35,827 in base 10).

hidden file A file that is not displayed in DOS directory listings because its attribute byte holds a special setting.

high-level formatting Formatting performed by the DOS FORMAT program. Among other things, it creates the root directory and file allocation tables.

Hz A mnemonic for hertz, a frequency measurement unit used internationally to indicate one cycle per second.

I/O Input/Output. A circuit path that enables independent communications between the processor and external devices.

IC Integrated Circuit, a complete electronic circuit contained on a single chip. May consist of only a few transistors, capacitors, diodes, or resistors, or thousands of them, and generally is classified according to the complexity of the circuitry and the approximate number of circuits on the chip: SSI (small-scale integration), MSI (medium-scale integration), and LSI (large-scale integration). There is also VLSI (very-large-scale integration) and ULSI (ultra-large-scale integration).

IDE An acronym for integrated drive electronics. Describes a hard disk with the disk controller circuitry integrated within it. The first IDE drives commonly were called hard cards. Also refers to the ATA interface standard, the standard for attaching hard disk drives to ISA bus IBM-compatible computers. IDE drives typically operate as though they were standard ST-506/412 drives. See also ATA.

All the hard disk drive control electronics are integrated on the drives rather than on a controller card, thus providing an inexpensive way of connecting hard disk drives and CD-ROM drives to a computer.

input Data sent to the computer from the keyboard, the telephone, the video camera, another computer, paddles, joysticks, and so on.

instruction Program step that tells the computer what to do for a single operation.

integrated circuit See IC.

interface A communications device or protocol that enables one device to communicate with another. Matches the output of one device to the input of another device.

internal command In DOS, a command contained in COMMAND.COM so that no other file must be loaded to perform the command. DIR and COPY are two examples of internal commands.

internal drive A disk or tape drive mounted inside one of a computer's disk drive bays (or a hard disk card, which is installed in one of the computer's slots).

interrupt A suspension of a process, such as the execution of a computer program, caused by an event external to that process and performed in such a way that the process can be resumed. An interrupt can be caused by internal or external conditions such as a signal indicating that a device or program has completed a data transfer.

IRQ lines Interrupt request lines, physical connections between external hardware devices and the interrupt controllers. When a device such as a floppy controller or a printer needs the attention of the CPU, an IRQ line is used to get the attention of the system to perform a task. On PC and XT IBM-compatible systems, eight IRQ lines are included, numbered IRQ0 through IRQ7.

On the AT and PS/2 systems, 16 IRQ lines are numbered IRQ0 through IRQ15. IRQ lines must be used by only a single adapter in the ISA bus systems, but PCI adapters can share interrupts.

ISA address bus The buses used to transfer the address over the ISA bus. Lower address lines are designated SA0 through SA19 to access the first megabyte, the upper address lines are designated LA17 through LA23, and control line SBHE#.

jumper A small, plastic-covered, metal clip that slips over two pins protruding from a circuit board. Sometimes also called a shunt. When in place, the jumper connects two pins electrically and closes the circuit.

kilo A multiplier indicating one thousand (1,000) of some unit. Abbreviated as k or K. When used to indicate a number of bytes of memory storage, the multiplier definition changes to 1,024. One kilobit, for example, equals 1,000 bits, and one kilobyte equals 1,024 bytes.

kilobyte A unit of information storage equal to 1,024 bytes.

L1 cache Also known as level-one cache or first-level cache. The first layer of cache memory that the microprocessor's prefetcher and/or execution unit is connected to, and used to speed up the system's performance. The internal cache of the 80486 or the external cache that connects directly to an 80386 microprocessor are examples of first-level caches.

L2 cache Also known as level-two cache or second-level cache. A secondary cache that is several times larger than the L1 cache, and used to speed up the system's performance. Used primarily in systems that have a small L1 cache such as the 8KB internal cache in an 80486.

large mode is a generic translation scheme used by some BIOS's to access drives up to 1GB.

latency The delay between when the head is moved to a track for a piece of data and when the block of data rotates around to the spot where it can be read. The faster the drive spins, the shorter the latency, and the better the drive.

LBA Logical Block Addressing. Accesses disk sectors using a 28-bit linear sector number instead of cylinder/head/sector.

LBA is a mathematical scheme for addressing sectors beginning at cylinder 0, head 0 and sector 1, which is equal to LBA 0. This scheme linearly maps the drive until the final physical sector is reached.

LBA is efficient because it reduces system overhead by not having to convert the OS's LBA to the BIOS CHS and then back to drive LBA.

level-one cache See L1 cache.

level-two cache See L2 cache.

local data bus Used typically to reference the processor's data bus.

logical address The 16- or 32-bit address submitted by the X86 processor's execution unit to the segmentation unit.

Logical Block Addressing (LBA) mode is a more advanced method of translation than Large mode. LBA mode is a little faster and can access drives up to 32 Terabytes.

logical drive A drive as named by a DOS or Windows drive specifier, such as C: or D:. Under DOS 3.3 or later, a single physical drive can act as several logical drives, each with its own specifier.

lost clusters Clusters that have been marked accidentally as 'unavailable' in the file allocation table even though they belong to no file listed in a directory.

low-level formatting Formatting that divides tracks into sectors on the platter surfaces. Places sector-identifying information before and after each sector and fills each sector with null data (usually hex F6). Specifies the sector interleave and marks detective tracks by placing invalid checksum figures in each sector on a defective track.

master partition boot sector On hard disks, a one-sector record that gives essential information about the disk and the starting locations of various partitions. Always the first physical sector of the disk.

medium The magnetic coating or plating that covers a disk or tape.

mega A multiplier indicating 1 million (1,000,000) of some unit. Abbreviated as m or M. When used to indicate a number of bytes of memory storage, the multiplier definition changes to 1,048,576. One megabit, for example, equals 1,000,000 bits, and one megabyte equals 1,048,576 bytes.

megabyte A unit of information storage equal to 1,048,576 bytes.

memory Any component in a computer system that stores information for future use.

memory caching A service provided by extremely fast memory chips that keeps copies of the most recent memory accesses. When the CPU makes a subsequent access, the value is supplied by the fast memory rather than by relatively slow system memory.

memory-resident program A program that remains in memory after it has been loaded, consuming memory that otherwise might be used by application software.

MHz An abbreviation for megahertz, a unit of measurement for the frequency of one million cycles per second. One hertz (Hz) is equal to one cycle per second. Named after Heinrich R. Hertz, a German physicist who first detected electromagnetic waves in 1883.

micro A prefix indicating one millionth (1/1,000,000 or.000001) of some unit. Abbreviated as μ.

microprocessor A solid-state central processing unit much like a computer on a chip. An integrated circuit that accepts coded instructions for execution.

microsecond A unit of time equal to one millionth (1/1,000,000 or.000001) of a second. Abbreviated as μs.

milli A prefix indicating one thousandth (1/1,000 or .001) of some unit Abbreviated as *m*.

millisecond A unit of time equal to one thousandth (1/1,000 or .001) of a second. Abbreviated as *ms*.

module An assembly that contains a complete circuit or sub-circuit.

MOS An acronym for Metal-Oxide Semiconductor. Refers to the three layers used in forming the gate structure of a field-effect transistor (FET). MOS circuits offer low power dissipation and enable transistors to be jammed close together before a critical heat problem arises. PMOS, the oldest type of MOS circuit, is a silicon-gate P-channel MOS process that uses currents made up of positive charges. NMOS is a silicon-gate N-channel MOS process that uses currents made up of negative charges and is at least twice as fast as PMOS. CMOS, Complementary MOS, is nearly immune to noise, runs off almost any power supply, and is an extremely low-power circuit technique.

motherboard The main circuit board in the computer. Also called the system board.

multitask Running several programs simultaneously.

Multi-user system A system in which several computer terminals share the same central processing unit (CPU).

network A system in which a number of independent computers are linked to share data and peripherals such as hard disks and printers.

normal mode The standard BIOS translation scheme. It does not support drives greater than 504MB.

numeric coprocessor A processor that handles floating point instructions.

OEM Original Equipment Manufacturer, any manufacturer that sells its product to a reseller. Usually refers to the original manufacturer of a particular device or component. Most COMPAQ hard disks, for example, are made by Conner Peripherals who is considered the OEM.

operating system A collection of programs for operating the computer. Operating systems perform housekeeping tasks such as input and output between the computer and peripherals and accepting and interpreting information from the keyboard. DOS, Windows 95/98/NT, Linux and OS/2 are examples of popular operating systems.

output Information processed by the computer or the act of sending that information to a mass storage device such as a video display, a printer, or a modem.

parallel A method of transferring data characters in which the bits travel down parallel electrical paths simultaneously. For example, eight paths for eight-bit characters. Data is stored in computers in parallel form but may be converted to serial form for certain operations.

partition A section of a hard disk devoted to a particular operating system. Most hard disks have only one partition, devoted to a single operating system such as DOS, Windows 95/98/NT, etc. A hard disk can have as many as four partitions, each occupied by a different operating system.

peripheral Any piece of equipment used in computer systems attached to the computer. Disk drives, scanners, monitors, and printers are all peripherals.

physical address The address output onto the address bus by the processor, as contrasted to logical, linear or virtual addresses which may not be equal to the physical address.

physical drive A single disk drive. DOS defines logical drives, which are given a specifier such as C: or D:. A single physical drive may be divided into multiple logical drives. Conversely, special software can span a single logical drive across two physical drives.

port Plug or socket that enables an external device such as a printer to attach to the adapter card in the computer. Also a logical address used by a microprocessor for communication between itself and various devices.

port address One of a system of addresses used by the computer to access devices such as disk drives or printer ports. You may need to specify an unused port address when installing any new (to the system) adapter boards in a system unit.

POST Power-On Self Test, a series of tests run by the computer at power-on. Most computers scan and test many of their circuits and sound a beep from the internal speaker if this initial test indicates proper system performance.

power-on restart address The first address that the microprocessor places on the address bus after being powered up.

power-on self-test See POST.

power supply An electrical/electronic circuit that supplies all operating voltages and currents to a computer system.

primary partition An ordinary, single-volume bootable partition. See also extended partition.

processor speed The clock rate at which a microprocessor processes data. The original standard IBM PC, for example, operated at 4.77 MHz (4.77 million cycles per second). Today's computers clock rates are approaching 1 GHz (1000 MHz).

program A set of instructions or steps telling the computer how to handle a problem or task.

PROM Programmable Read-Only Memory. A type of memory chip that can be programmed to permanently store information that cannot be erased.

protected mode A mode available in all Intel 80286- or 80386-compatible processors. In this mode, memory addressing is extended to 16 or 4096 megabytes and restricted protection levels can be set to trap software crashes and control the system.

protocol A system of rules and procedures governing communications between two or more devices. Protocols vary, but communicating devices must follow the same protocol to exchange data. The data format, readiness to receive or send, error detection, and error correction are some of the operations that may be defined in protocols.

rails Plastic or metal strips attached to the sides of disk drives mounted in IBM AT's and compatibles so that the drives can slide into place. These rails fit into channels in the side of each disk drive bay position.

RAM Random Access Memory, all memory accessible at any instant (randomly) by a microprocessor.

random-access memory See RAM.

read-only memory See ROM.

real mode A mode available in all Intel 80x86-compatible processors that enables compatibility with the original 8086. In this mode, memory addressing is limited to one megabyte.

real time When something is recorded or processed as it is happening in the outside world.

real time clock chip The battery-backed device used to keep track of the date, time and computer system configuration information.

RMA number Return Merchandise Authorization number. A number given to you by a vendor when you arrange to return an item for repairs. Used to track the item and the repair.

ROM Read-Only Memory, a type of memory that has values permanently or semi-permanently burned in. These locations hold important programs or data that must be available to the computer when the power is initially turned on.

ROM BIOS Read-Only Memory Basic Input-Output System. A BIOS encoded in a form of read-only memory. Often applied to important start-up programs that must be present in a system for it to operate.

ROM scan The process of scanning device ROM's during the power-up sequence to identify and initialize expansion devices.

root directory The main directory of any hard or floppy disk. Has a fixed size and location for a particular disk volume and cannot be resized dynamically the way subdirectories can.

routine Set of frequently used instructions. May be considered as a subdivision of a program with two or more instructions that are related functionally.

RTC chip See real-time clock chip.

SCSI Small Computer System Interface, a standard originally developed by Shugart Associates (then called SASI for Shugart Associates System Interface) and later approved by ANSI in 1986. Uses a 50-pin connector and multiple devices (up to eight including the host) to be connected in daisy-chain fashion.

second-level cache See L2 cache.

sector A section of one track defined with identification markings and an identification number. Most sectors hold 512 bytes of data.

serial The sequential transfer of data characters one bit at a time using a single electrical path.

shadow ROM A copy of a system's slower access ROM BIOS placed in faster access RAM, usually during the start-up or boot procedure. This setup enables the system to access BIOS code without the penalty of additional wait states required by the slower ROM chips.

shutdown A microprocessor bus cycle type run when the processor encounters errors it cannot handle. Similar to the halt bus cycle the processor stops after a shutdown cycle. It is also the proper way to close MS Windows operating systems when you wish to shut off power to the computer. Accessed using the Start Button.

S.M.A.R.T Supporters of the S.M.A.R.T. standard includes all the major hard disk drive manufacturers. If your hard disk drive has more than 1GBytes and was manufactured in 1996 and later, it probably supports S.M.A.R.T.

software A series of instructions loaded in the computer's memory that tell it how to accomplish a problem or task.

storage Device or medium on or in which data can be entered or held, and retrieved at a later time.

string A sequence of characters.

surge protector A device in the power line that feeds the computer to provide minimal protection against voltage spikes and other transients.

system crash A situation in which the computer freezes up and refuses to proceed without rebooting. Usually caused by faulty software. Unlike a hard disk crash, no permanent physical damage occurs.

system files The two hidden DOS files, IO.SYS and MSDOS.SYS; they are the interface between the BIOS and DOS (IO.SYS) and the interface between DOS and other applications (MSDOS.SYS).

TSR Terminate-and-Stay-Resident, a program that remains in memory after being loaded. Because they remain in memory, TSR programs can be reactivated by a predefined keystroke sequence or other operation while another program is active. Usually called resident programs.

UART Universal Asynchronous Receiver Transmitter, a chip device that controls the RS-232 serial port in a PC-compatible system. Originally developed by National Semiconductor, several UART versions are in PC-compatible systems: the 8250B is used in PC- or XT-class systems, and the 16450 and 16550A are used in AT-class systems.

unformatted capacity The total number of bytes of data that can fit on a disk. The formatted capacity is lower because space is lost defining the boundaries between sectors. It should be noted that disk manufactures define their hard drives in terms of million bytes and not megabytes. (see Megabyte)

Universal Asynchronous Receiver Transmitter See UART.

USB Universal Serial Bus, a hardware spec developed by Intel for the attachment of devices to computers such as keyboards, mice, scanners, etc. The general idea behind the Universal Serial Bus is to replace the current method of attaching devices with a smarter and unified standard that would make attaching devices to your computer much simpler. USB devices all use the same kind of connector, and can be attached while the system power is on. The system will automatically detect USB devices, similar to Plug N Play. USB devices can be attached in a chain, like SCSI devices, so that a USB mouse can connect to a USB port on the keyboard, a USB port on the monitor, and a USB port on the computer. This eliminates the need for individual IRQ's and addresses for every serial, parallel, and PS2 port. The Universal Serial Bus should replace all that.

VESA Video Electronics Standards Association, founded in the late 1980s by NEC Home Electronics and eight other leading video board manufacturers to standardize the electrical, timing, and programming issues surrounding 800x600 resolution video displays commonly known as Super VGA. Super VGA has been superseded by the XGA standard subsequently introduced by IBM.

VGA Video Graphics Array, a type of PC video display circuit (and adapter) first introduced by IBM on April 2, 1987 that supports text and graphics. Text is supported at a maximum resolution of 80x25 characters in 16 colors with a character box of 9xl6 pixels. Graphics are supported at a maximum resolution of 320x200 pixels in 256 colors (from a palette of 262,144) or 640x480 pixels in 16 colors. The VGA outputs an analog signal with a horizontal scanning frequency of 31.5 kHz, and supports analog color or analog monochrome displays.

volume label An identifier or name of up to 11 characters that names a disk.