

## **Safe Computing**

### **Preventative Maintenance for Disks**

Almost every time there is a problem with a file or a disk it has been caused by a flipped bit or a virus. First let's talk about flipped bits. Bits are tiny spots on the surface of the disk which can either be a "0" or a "1." If the bit's state changes from what it was intended to be, (the zero becomes a one or vice versa) then the bit is "flipped." If a bit has flipped in a sector, the computer will not read that sector and subsequently will not let you access that file. This is where utilities packages come into play. They have the ability to retrieve the information that is in all of the sectors except the one which has the flipped bit. They then reassemble the remaining sectors in your file in hopes that there will be enough there to work with. If flipped bits happen in your desktop file, then you may lose access to all of the files on that disk. This can be major trouble, and you must have a utilities package to salvage the files. To say the least, flipped bits can cause lots of problems, so how can you prevent flipped bits? There are several ways in which bits can flip. Because the disk's surface is magnetic, getting your disk near magnetic fields can cause a bit to flip. Also, physical damage to the surface of the disk can cause bits to flip. Below is a list which will help you decrease the likelihood of problems.

1. Try to avoid spilling anything on diskettes or touching their inner surfaces by sliding the metal tab open.
2. Avoid exposing diskettes to heat such as direct sunlight or near a radiator. Heat can warp the disk and cause misalignments with the disk drives.
3. Do not store disks in a way that can warp or damage them. It is best to keep disks in a clean box which stacks them evenly to prevent warping.
4. Try not to use a diskette (or disk drive) that is unusually hot or cold. This can cause problems with disk drive alignment. Even if you can read and write to the disk at the moment, you may be unable to access the information in the future. Wait until the disk (or drive) reaches room temperature before using it.
5. Try to never expose diskettes to magnetic fields, such as placing a disk on a stereo speaker, TV set, electric motor, etc. Even weak magnetic fields (such as telephones) can cause flipped bits over prolonged exposure. Note: don't leave disks lying on an ImageWriter—there is a magnet in its cover.
6. Do not expose diskettes to magnetic detectors such as those used in stores and libraries (to detect shoplifting) and airports (to detect weapons). X-rays cannot hurt a disk, so wrapping them in lead foil is not necessary. However, the X-ray machines themselves often emit a magnetic field which can cause flipped bits. It is a good idea to keep disks away from all detection devices.
7. Make sure that the label on your disk is firmly attached with no wrinkles or air bubbles. You can safely use removable labels (obtained in any stationery store) as long as heat does not loosen them. Do not use Post-It notes as labels—they can come off in disk drives, requiring a trip to the service center to remove them. Do not use mounting adhesive or rubber cement to fasten labels. Warning: if a label becomes stuck in your disk drive, do not try to remove it yourself—you can damage the drive mechanism.
8. To prevent damage to the read/write heads, do not transport your Mac or external disk drive without first inserting a spacer or diskette.

## **Viruses**

Another area of concern is viruses. A virus can cause lots of problems to files, software, and entire disks. A virus is a program that contains the instructions necessary to make exact replicas of themselves and insert these instructions into other executable programs. Each time an infected program is used, the viral code is executed, usually resulting in the infection of other programs. Computer viruses vary in the degree of harm that they cause. Some can display a humorous message, while others are designed to cause catastrophic damage. Listed below are some safe computing practices which may help keep your computer safe from viruses and the problems they create.

1. The most important practice is to use software that is obtained from reputable and reliable sources. In general, commercial software from well-known software publishing firms should be virus-free.

2. Treat public domain and shareware with caution. Keep public domain software on a floppy disk until it has been tested. Test the software before you use it. Remember, software viruses do not have an opportunity to replicate themselves until you execute the host program to which they are attached.

3. There have been a number of instances in which commercial software that was infected with viruses has been inadvertently shipped to consumers. While this is an infrequent occurrence, it is recommended that you test all new commercial software for possible contamination by computer viruses.

4. Be careful with any software that you obtain from other users. Treat such software with the same degree of care that you use with public domain software and shareware. Test the software before you use it.

5. Use care before copying any questionable software to your hard disk. Again, test the software before you use it.

6. Make a backup of your original System disks, fonts, and folders. This will enable you to restore your hard disk and data files should you experience a hard disk failure.

7. Make a backup of your System files after you have customized them with your favorite fonts, desk accessories, and utilities. This is particularly important for people who use many fonts, such as graphic artists. This precaution will save you hours of work rebuilding the system, in the event of a failure.

8. All newly acquired software applications should be backed up, write-protected, and put in a safe place before you use them. Always execute your application programs from backup copies or from fresh copies placed on your hard disk. This will prevent your applications from being contaminated by a virus, and insure that a fresh copy is always available if your working copy becomes damaged.

9. Systematically backup your important data files to insure that you do not lose important work. By backing up important data and application files, you will limit your losses in the event of a hard disk crash, or any other sudden computer failure. (Included with Apple's standard system software package is a utility named HD Backup, which enables you to perform global and incremental backup. Consult Apple's "Macintosh Utilities User's Guide" for further details about HD Backup.)

10. Be security conscious and promote security awareness throughout your organization.

by Misty Spinelli

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