

Backing Up your Hard Drive

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Your computer hard drive is very important: Your hard drive is the heart of your computer system. It contains your Windows operating system, which is the master control program of your computer. It also contains all of your application programs that help you do productive things with your computer. But, most importantly, it contains all the data files that you create using your application programs. These data files are the most valuable part of your computer and the hardest to replace if something should happen to your hard drive.

Yes, your hard drive will fail on you someday: Your hard drive is a mechanical device that spins constantly and is certain to wear out. The life of a hard drive is only 2-3 years. If you are lucky, your drive may last you 4 or 5 years, but it could go out in just 6 months. It is not a question of **if** your hard drive will fail, but it's a question of **when** it will fail. All you can do is to be ready when it does fail by having a copy of all of the files on your hard drive saved away from your computer. Then you can replace the failed drive with an empty new drive and put all of the files on the new hard drive. This lets you be back up and running in a matter of minutes instead of days or weeks rebuilding your drive. This process is called backing up and restoring your hard drive and is the topic of this article.

What files should you backup: One of the first decisions you must make is what files need to be backed up to adequately protect you. I consider your data files as the most important ones to backup. Your data files are those files that you create using your application programs. If you use Quicken, then the data file that needs to be backed up contains all of your financial records entered into Quicken. If you research your genealogy, then the database of your ancestors that you've collected for years is the important data file that must be backed up. If you correspond extensively using E-mail, then the folders of your E-mail correspondence needs to be backed up. You should plan on backing up your data files at least daily.

The second most important thing to backup is your entire hard drive and all of the files on it. This includes your Windows operating system as well as all of your application programs. By backing up the entire hard drive, you will not have to rebuild your system from scratch, but will be able to quickly get your system back up and running again. Some would suggest that you really don't need to backup your operating system and application programs because you can always reload them from the CDs they came on. While this is mostly true, you need to consider how much time this will take you to reinstall the operating system and all of the applications you own. Then, how long will it take you to download all of the software patches and add-ons that you have added to your

system. Finally, how long will it take you to enter all of the special settings that you must do to have your system work exactly as you like it to. To this lengthy time, consider how you can recover the many programs and files for which you do not have a CD. I think when you consider all of these factors, you'll agree that having a backup of your entire hard drive is a wise investment of your time. You should plan on backing up your entire hard drive on a monthly basis.

What media is best for backup: The next question you need to consider is what is the best media to backup your files from your hard drive. A few years ago, tape backup systems were the most popular backup media. The only problem with these tape systems was that they were very slow. Backing up a 1-2GB hard drive in a couple of hours was reasonable, but backing up today's 40GB hard drives to tape would take too long. You would not do it often enough to be usable. The next popular backup media to come along were the removable disk cartridge drives. These were much faster than tape, but the cartridges tended to be expensive. For example, a 40GB hard drive would need 10-20 Jazz (2GB) cartridges to backup the entire drive. At \$100 each, you would need to invest over \$2,000 in cartridges to backup your entire drive. Writing to blank CDs promises to be one of the best backup media today, but even the fastest drives are slow and it takes many blank CDs to backup a large hard drive.

So, what is the best media to backup a 40GB hard drive today? Another 40GB hard drive! Hard drives are much faster than tape and are even faster than the disk cartridge systems. You can backup an entire 40GB hard drive in less than an hour or so. Since it is fast, you'll tend to backup your system more often and this means better protection for you. Hard drives are also very inexpensive to purchase. If you watch prices carefully, you can get a 40GB hard drive for \$99 or less. I would plan on having an extra hard drive for backup purposes for each hard drive that you save data on.

What type of backup software is available: There are two very different backup utilities on the market today -- File backup utilities and Partition backup utilities. File backup utilities are by far the most common. These utilities backup individual files one at a time. They can also be used to restore individual files to your hard drive. A good feature of File backup utilities is that they can select individual files from all parts of your hard drive. This is great for picking and choosing your important data files to backup. On the other hand, File backup utilities tend to be quite slow in backing up your entire hard drive and you would need to make many extra steps in rebuilding your hard drive partitions in case of a total failure. That is where Partition backup utilities have the advantage. Partition backup utilities backup entire partitions and all the files contained in them. Some of these Partition backup utilities work at the lowest hardware level and are very fast. Restoring a partition to an empty hard drive using a partition backup utility will create and format partitions as it restores the partition file.

PowerQuest Corporation has an excellent backup software package that contains both a File backup utility and a Partition backup utility combined in one product. This product is called Drive Image and has a list price of \$69.95. The File backup utility in this product is called DataKeeper and is designed to backup your individual data files on a frequent

basis. The Partition backup utility in the product is called Drive Image and is designed to backup your entire hard drive every month or so. Let's take a look at how these two utilities can be used to backup your system.

Backing up your important Data files: As mentioned earlier, the data files on your system are the most important files on your computer. They are also the hardest to replace if something should happen to your hard drive. Backing up your data files should be your first objective in establishing a good backup plan for your system. Data files change daily and need to be backed up on a daily basis.

Using PowerQuest's DataKeeper utility, you can select all of your important data files from various part of your hard drive. If you have spent a little preparation in organizing your hard drive, you may already have all of your data files collected together in the same partition. This makes it easier to identify and backup these important data files. DataKeeper will let you backup all of your data files or backup only those that have changed since the last backup. You can also compress the backup files to about half their original size when you save them to conserve space. You can backup an individual file up to 99 times without replacing an earlier backup copy of that file. This gives you the ability to keep multiple backup versions of a data file as it is being developed. If you need to see the file, as it was several versions ago, you can do so with DataKeeper. It will backup these files to any device having a standard drive letter, such as a special backup partition on a hard drive or a removable cartridge drive. If you create your data file backups on a hard drive, try to place them on another hard drive than the one the original data files are stored on. Also, you should copy these backup files to a blank CD every month so that you will have some removable media that you can store away from your computer.

One of the best features of DataKeeper is its ability to monitor the import data files that you select and to automatically backup a file as soon as it is changes. Using this monitoring approach, you never have to think about backing up your data files since this is done for you automatically. It also assures that you have a backup of these important files that is current to the last minute or so. This is a powerful feature of DataKeeper and one that I would highly recommend using.

Backing up your entire hard drive: The second most important part of your backup plan is to backup your entire hard drive at least once a month. Having this backup in place will protect you from a major failure of your entire hard drive. Using PowerQuest's Drive Image to backup your entire hard drive you have two approaches to select from. Let's look at each of these approaches separately.

The first full-drive backup approach is to use Drive Image to copy all of the partitions from your main hard drive to a backup hard drive. Both hard drives must be installed on the same computer system to do this approach. Using Drive Image's Disk-to-Disk Copying facility, you copy the partitions from your main drive to the backup drive, one at a time. When Drive Image copies a partition, it creates a new partition on the backup drive, so the drive can be empty of partitions before you start the process. Also, copying a

partition copies not only the partition, but also all of the hidden files, system files, and other files contained in the partition to the backup hard drive. So, when you finish copying all of the partitions from your main drive to the backup drive, you have an exact duplicate of your main drive that could be used if your main drive failed.

After copying all of the partitions to your backup hard drive, you need to disconnect the backup drive and remove it from your computer system. You should store the drive away from your computer, so that if anything happens to your computer, your backup drive will not be affected, too. Once a month, you'll need to retrieve this backup hard drive and insert and connect it back into your computer and repeat the backing up of all of your partitions, then remove it again from your computer. If something should happen to your main hard drive, simply get your backup hard drive and replace your main hard drive with the backup drive, setting it as a master drive, and you should be able to immediately start your computer and have it run. To simplify the frequent removal and replacement of your backup hard drive, you can purchase a hard drive rack mounting system from your computer store for about \$25 that will let you remove and insert the drive without removing the covers of your computer.

The second full-drive backup approach is to use Drive Image to cross backup one hard drive to another. With this approach, you install and leave both hard drives in your computer all the time. For this approach to work, you'll need to setup a large backup partition at the end of each of the two hard drives. PowerQuest's PartitionMagic utility is the best way to create these backup partitions on your hard drives. Once the two drives are in place with a large backup partition on each of them, you can use Drive Image to create condensed image files of entire partitions and store them on the backup partition of the other hard drive.

To make this a little easier to understand, let's look at a simple example. You have two hard drives and the following partitions on each of the two hard drives:

Drive 1:

C: partition (Contains your Operating System)

D: partition (A backup partition)

Drive 2:

E: partition (Contains your Application Programs)

F: partition (Contains your Data Files)

G: partition (A backup partition)

Using Drive Image, create an image files of your entire C: partition and all of its contents on your G: backup partition. Then, using Drive Image, create an image file of your E: and F: partitions on your D: backup partition. These image files represent the entire partition and all of their active content. These image files can be condensed by 40-50% to save room on your backup partition. Notice that we save the images from one hard drive to the other hard drive's backup partition and visa-versa. Hence, we call this the cross backup approach.

Once a month, you'd repeat this cross backup approach from one drive to the other until you fill up the backup partition. Then you'd delete the oldest image file to make room for the new image file to be stored in your backup partition. If either of your hard drives should fail on you, all you have to do is to remove the failed drive and place an empty new drive in its place. Then using Drive Image, you find the latest condensed image of the partitions on the failed drive on the other drive's backup partition and restore that image to recreate the partitions and all of their content on the empty drive. This lets you be back up and running your computer in a matter of minutes instead of days or weeks rebuilding your system. If the drive that failed was your first drive containing your operating system, that is no problem. You can boot Drive Image from a DOS diskette and quickly rebuild your operating system partitions from the second drive's backup partition.

What if both hard drives fail together: While it is rare, it is possible for both of your hard drives to fail at the same time, thus leaving you without either of your backup partitions to use to rebuild the other hard drive. For example, your computer could be burned in a fire or taken by a thief. In these cases, you'd lose not only your main drive, but your backup images as well. So, you need to make some special provisions to guard against these situations. I'd recommend that every 3 months, after you have backed up your partitions using the cross backup approach, you use Drive Image's ImageExplorer to split your condensed image file into multiple segments that will fit on blank CDs. Drive Image will burn these image segments on multiple CDs for you or you can use the CD burning utility that came with your CD-R/RW drive. While this may take a while to do, it will give you an inexpensive removable backup of your entire hard drive that you can store away from your computer. I would repeat this process of creating backup CDs of your entire hard drive every 3 months or so.

Summary: If you follow the suggestions in this article, then you will have a comprehensive backup plan that will protect both your important data files as well as your entire hard drive. You must make sure that you follow the time intervals suggested so that your backups are current enough to be usable. PowerQuest's Drive Image product, a second hard drive, and a CD-R/RW drive are all the software and hardware you need to run this backup plan. A second hard drive and a CD-R/RW drive can both be purchased for about \$100 each. Faster models are available for only a few dollars more. User group members can purchase Drive Image at the user group price of \$35 by accessing a secure web order form at www.ugr.com/order/. You will need to enter the name of your user group and the special code UGNL02. I wish you success in setting up your backup plan.