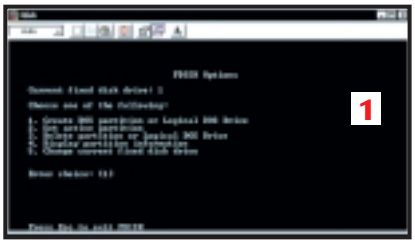
# Memory blocks

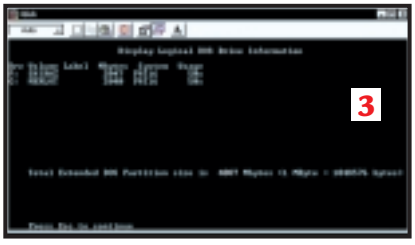
**Divide and rule, they say, and Gordon Laing reveals the benefits and the 'how to' of partitioning.**

In order for your PC to know where to find information on a hard drive, the disk must first be partitioned, then formatted with the desired file system. Normally most hard disks contain a single partition which occupies the maximum space, and hence provides the largest possible single volume – a 20GB hard drive would therefore provide a 20GB volume and that would be that.

However, there's no reason you couldn't split this drive into multiple partitions – a 20GB hard drive could consist of four 5GB partitions for example, allowing you to keep track of where you store specific data, such as work in one and games in another. You could also put Windows 98 on one, Linux on another, and choose which operating system you'd like to run when powering up your PC.









## Partition flavours

There are three types of partitions: primary, extended and logical. You can have up to four partitions per hard disk – all could be primary partitions, but only one can be an extended partition.

The extended partition, however, acts as a container for multiple logical partitions. In theory you can have as many logical partitions as you like in an extended partition, although the alphabetical drive letter convention used by PCs limits you to a total of 24 volumes – A and B are reserved for floppies.

So which type of partition should you use? Most operating systems demand to boot from a primary partition, located within the first 2GB of the first hard disk. So, if you've only got one hard disk, the first partition must be an 'active' bootable primary, which your PC will refer to as volume C.

If you just want to keep certain files on a separate volume to your main OS, use extended and logical partitions. A 20GB hard disk could be partitioned into an active 10GB primary for the OS, and the rest devoted to an extended partition; this could be subdivided into two 5GB logical partitions. You'd then have a 10GB C drive, 5GB D drive and 5GB E drive.

The drive letters can get confusing, particularly with multiple physical disks.

***1. The main FDISK options. Note the fifth option only appears in systems with more than one physical hard disk***
***2. Displaying the partitions on a PC with two disks. Note that primary partitions are always lettered first, so the primary on this second disk is drive D, forcing the logical partition on the first disk to become E***
***3. This disk has one extended partition containing two logical partitions. Note the FAT16 file system forces this 4GB disk to be partitioned into a pair of 2GB volumes***
***4. The same 4GB disk, but now using FAT32 allows a single 4GB partition***

The first visible primary partition of each disk is lettered first, so if you have two disks, each with a primary partition, then they become volumes C and D respectively. Next the extended partitions are taken a disk at a time. If the first disk had an extended partition with two logical partitions, these would be labelled as volumes E and F. Note that your CD/DVD-ROM drive follows the hard disk volumes, and would therefore become drive G in this case.

It's equally confusing for your OS, which may have installed an application from the CD-ROM drive while it was volume D, but post-partitioning now needs to be told to look for G instead.

## File systems

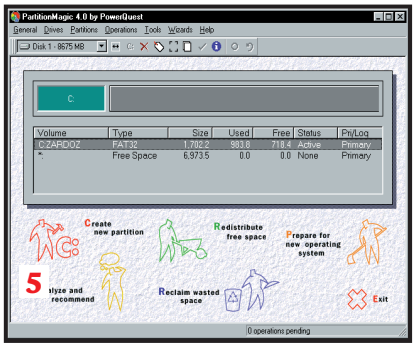
Once you've created your partitions, you'll need to format them with a suitable file system. The most common is the basic 16bit File Allocation Table, FAT16, which is supported by DOS, OS/2, Windows 3.x, 95, 98, NT and 2000. Great for volume compatibility on multi-boot systems, but FAT16 can't handle volumes larger than 2GB, and at that size, its cluster size becomes inefficient. Consequently, a 20GB drive would have to be partitioned into 10 2GB FAT16 volumes (screenshot 3).

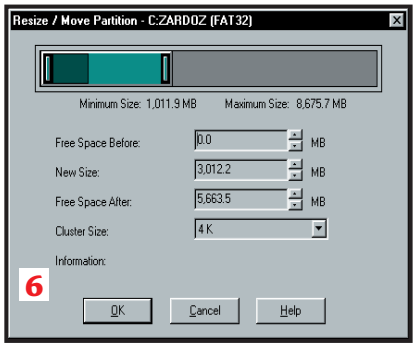
Enter FAT32, with improved cluster efficiency and volumes of up to 2Terabytes (2,000GB). Windows 98 supports FAT32, as does Windows 95 OSR2 and Windows 2000. However, DOS and NT (up to and including version 4), cannot see a FAT32 volume. Alternatively, there's the increased security and recovery of NTFS, but it can only be seen by Windows NT or 2000. Then there's HPFS, dedicated to OS/2 and early versions of NT. Linux uses its own file system, too.

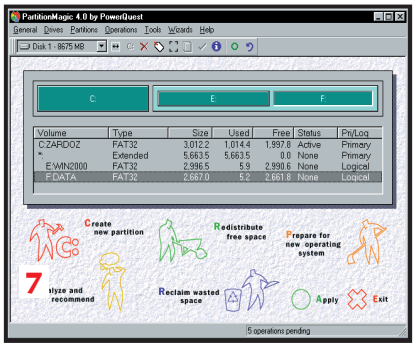
Clearly you should think carefully about which file system to choose when formatting a volume, particularly if it's a logical partition which is to be shared between multiple operating systems.

**WARNING!**

Partitioning and formatting a disk will wipe it clean. Before proceeding with any




***5. Displaying partition information for disk 1. Note this 8.6GB disk contains just one partition, a 1.7GB primary containing Windows 98. The remaining space is free***
***6. PartitionMagic uniquely allows you to change the sizes of partitions. Here the 1.7GB primary is extended to 3GB, leaving 5.6GB remaining on the disk***
***7. The remaining 5.6GB is turned into an extended partition containing two logical volumes of 3GB and 2.6GB. The first, volume D, is used to install Windows 2000, and the second, volume E, for data shared between the two OSs. Note that all three partitions use FAT32, and hence are visible to each other***

of the following, ensure you've backed up any essential files and documents.

## Adding a new disk

Microsoft's partitioning utility is called FDISK, and it runs from the DOS command prompt or from a DOS Window. You'll first be asked about large drive support, which is effectively asking whether you wish to use the FAT32 file system or FAT16.

To partition a new second disk, choose option 5 to change current fixed disk drive, (screenshot 2). Select disk 2, then choose option 1 from the main menu to create a new partition. If you're just using it for data, choose option 2 for an extended partition and key in the size you want it to be. Next you can create logical partitions within this, either one big one, or several smaller ones.

When complete, you'll need to restart your PC, after which you'll have to format your new drives, using either the DOS Format command, or by right-clicking the volume in Windows 95 onwards; if large drive support was activated, the file system will be FAT32, although NT and 2000 will also give you the option of NTFS. Note that your CD/DVD-ROM drive will have shunted backwards at least one letter.

## Resizing partitions

FDISK can't resize or move partitions to make room for any more. If you don't want to delete partitions and start from scratch, then check out PowerQuest's PartitionMagic. Using a graphical Windows interface you can merrily resize and move partitions, along with creating new ones with great ease, (screenshot 6). It also lets you create several primary C partitions and hide them from each other, which is great for multiple boot systems.

BootMagic is included which allows you to install and switch between multiple operating systems, by presenting you with a menu on first power-up. You can even convert one file system to another – quite literally magic!

## Dual booting with NT

You may not need BootMagic however. Windows NT 3.5x onwards comes with NT Loader, which can multiple-boot between various Microsoft operating systems. Remember that Microsoft OSs demand that certain system files are installed within the first 2GB of the first hard disk, so you'll have to choose a file system on this first C partition that your chosen OSs understand. Consequently, NTFS is out (apart from dual booting NT and 2000), and FAT32 is only possible if dual booting Windows 95 OSR2/98 and 2000. You will also need the bootable setup disks for both operating systems, either as floppies, or CDs if your BIOS can boot from them.

You should have at least two partitions, a primary C for your first OS and portions of the second OS, and a logical D partition for the bulk of the second OS. You may also want to have a third logical partition for sharing common data between both OSs – (screenshot 7).

**You can merrily resize and move partitions, along with creating new ones with ease**

Windows 95/98 prefers to live on the first primary, so install it on volume C. Once installed, insert the NT/2000 CD and run the setup. Ask for a clean installation and choose to install it on volume D. Once the installation is complete, the NT Loader will give you the option at startup of booting into one or the other OS. NT refers to your 95/98 installation simply as Microsoft Windows. You can rename this by editing the hidden BOOT.INI file on your C volume.

All is fine until you want to upgrade or reinstall one OS. Reinstalling NT/2000 retains your multi-boot options, but reinstalling 95/98 will remove NT Loader and set itself as the exclusive OS on your PC. To recover your multi-boot option, you'll need to boot off your NT/2000 startup disks, and choose the Repair option. To repair the Master Boot Record, choose only to inspect the boot sector. Once completed, remove the setup disk, reboot, and your multi-boot loader, along with NT/2000 should be back – phew!

Linux and BeOS also come with dual boot facilities, which, like NT Loader, allow you to check out a new OS, keeping your existing one as familiar backup.

## CONTACTS

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