



Paul Wardley continues his series of computer classes on upgrading your PC by providing a step-by-step guide to installing a new hard disk

Hard disk upgrade



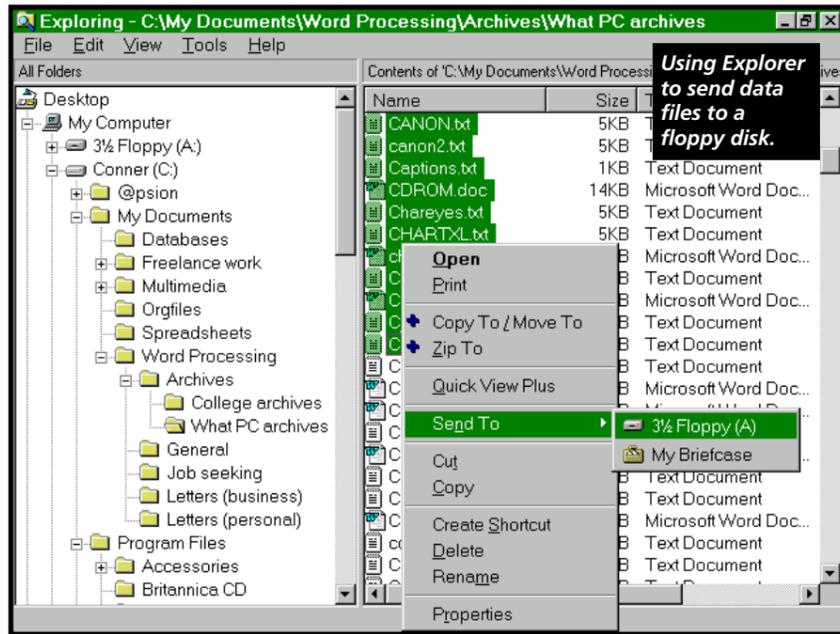
If your computer is much over a year old the chances are that its hard disk won't hold more than 500Mb, possibly much less. While you can manage with a disk of this size if you're willing to regularly delete all the stuff you don't often use, a larger disk gives you scope to install the latest disk-hungry software and enough space to store all your seldom-used but essential programs and utilities so they're there when you need them.

Can I do it myself?

There are two ways of upgrading: either replace the existing hard disk with a new one or install the new disk as a supplementary drive. Whichever method you choose, you're unlikely to have any problems installing the new disk: all it needs is a screwdriver and the ability to identify a couple of cables, remove them from the old disk and plug them into the new.

We tested these procedures by fitting a Western Digital AC32100 2.1Gb drive as a replacement disk inside a three-year-old machine. Such an old computer was not designed to accept a drive of this size but Western Digital supplies special EZ-Drive software to make it possible. ▶



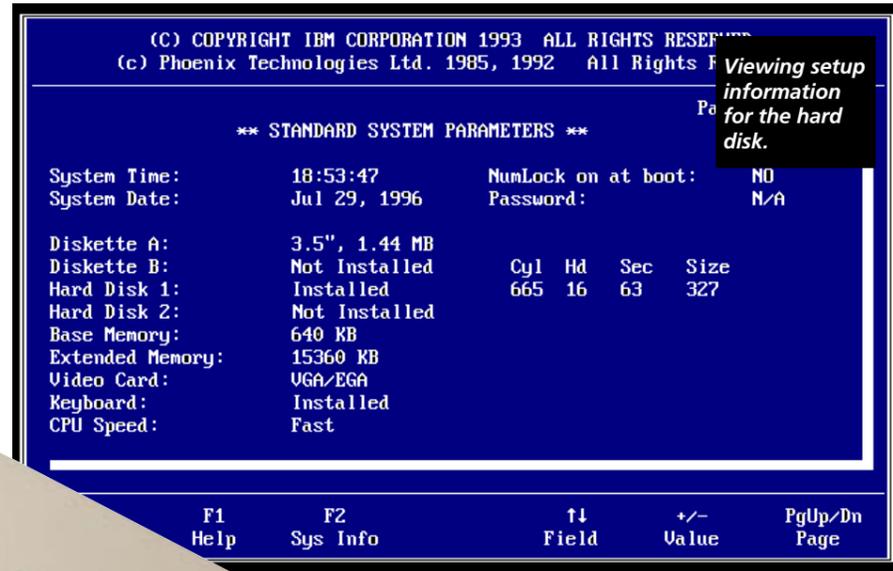


Step by step

1 The first thing to do is copy your existing data onto floppy disks. This includes all your letters, documents, pictures and anything else you've created yourself. The simplest way is to format some floppies and use Windows File Manager or Explorer to copy the files. If you have a lot of data (or if some of the files won't fit onto a single disk) use a backup program instead.

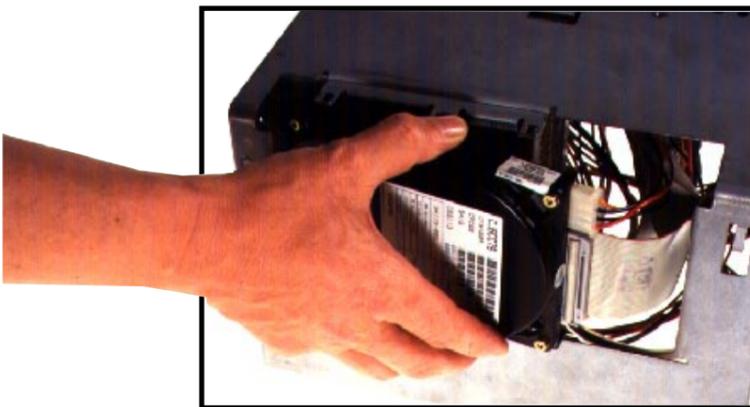
2 Before you open up your computer or tamper with any hardware or software settings, make sure you record the existing state of the hard disk as entered in the computer's setup program. If you're lucky, the figures will be recorded in your computer's manual, but if not you'll have to invoke the setup program and note them down for yourself. Most

computers, while they are booting up, tell you which key(s) to press to start the setup program. If yours doesn't, look in the manual under 'Setup', 'CMOS settings' or 'Configuration'. The figures you need to record are the numbers of heads, tracks and sectors, but also write down any other hard disk information your setup program provides.



4 You're now ready to remove the old hard disk and fit the new one. Switch off your computer and take off its cover - usually a simple matter of removing a couple of screws from the back of the case. Touch the metal chassis of the computer to discharge any static electricity, then unplug your machine from the mains.

5 Locate the hard disk inside the computer. It has two cables coming from it: a flat ribbon cable that carries the data and a D-shaped plug bringing low-voltage direct current from the power supply.



6 Remove the screws securing the disk to the case. In our picture the disk fits neatly into an easily accessible 3.5in bay with two screws at each side to retain it. Your hard disk may be in a more obscure position but the procedure for removal is the same. If the disk is mounted in a cage designed for a 5.25in bay, remove the cage first and then unscrew the disk.

7 Remove the old disk by withdrawing it from its mount and pulling out the power and data cables. Fitting the new drive is exactly the reverse of the above. Refit the case and don't forget to switch on again at the mains.

3 Make a boot disk. This is a floppy disk containing the essential files you need to start up your computer when there's nothing on the new hard drive. (Instructions for making a boot disk are in the box on the opposite page.) Don't forget to test the boot disk by switching off your computer and restarting it with the boot disk in the floppy drive. Don't continue unless you know your boot disk works.



Making a boot disk

To make a boot disk in Windows 95: double-click on My Computer, then right-click on the icon for Floppy disk A and select Format. Before clicking on OK make sure you have selected a full format and ticked the box that says Copy system files.

In Windows 3.1: start File Manager and click on the Disk menu, then choose Format Disk, followed by Make System Disk. To do the same thing in DOS, just type `FORMAT A: /S`

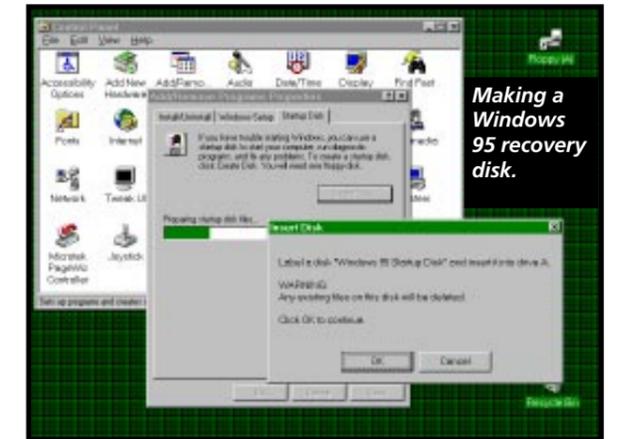
You also need to copy the following essential files onto the newly-formatted floppy. You'll find them in your DOS directory or in the `Windows\Command` directory if you're a Windows 95 user: `FDISK.EXE`, `MSCDEX.EXE` (if you have a CD-ROM drive), `FORMAT.COM`, `KEYB.COM`, `KEYBOARD.SYS`, `COUNTRY.SYS`, `IDE.SYS` (or whatever your CD-ROM driver is called).

The final stage in the preparation of a boot disk is to use Notepad or any text editor to create two files on the floppy disk called `AUTOEXEC.BAT` and `CONFIG.SYS`.

`AUTOEXEC.BAT` should contain the statement: `Keyb uk, ,keyboard.sys` and then a second line to load `MSCDEX.EXE`. `CONFIG.SYS` should include the statement: `country=044, ,country.sys`

followed by a line to load the CD-ROM driver. We can't be specific about the commands required to activate the CD-ROM drive because these vary from maker to maker. You'll have to refer to your CD drive's manual or adapt the lines in the existing `AUTOEXEC.BAT` and `CONFIG.SYS` files on your hard disk. The following examples are typical of those needed by most drives:

`MSCDEX /D:MSCD001 /V /M:8` (in `AUTOEXEC.BAT`)
`DEVICE=IDE.SYS /D:MSCD001` (in `CONFIG.SYS`)



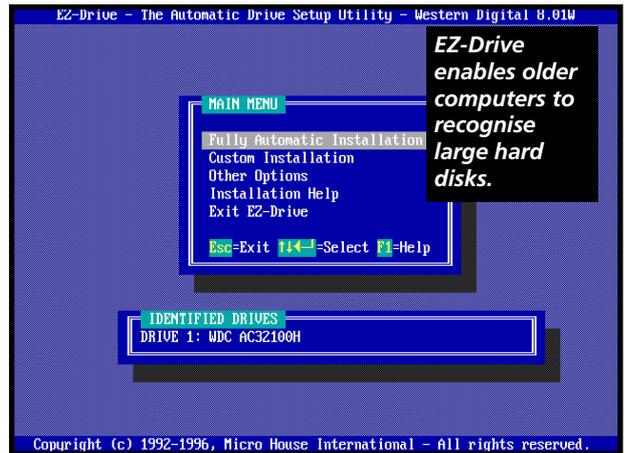
and `DEVICE=IDE.SYS /D:MSCD001` (in `CONFIG.SYS`)
 Windows 95 users have an easier alternative to most of the preceding by getting Windows itself to make a recovery disk. To do this open the Start menu and choose Settings, Control Panel; then double-click on Add/Remove Programs and select Startup Disk. Follow the instructions on the screen, but remember that making a startup disk will wipe out any files already on the floppy, so use a new disk, or one you're sure has nothing important on it. The resulting disk will contain a number of useful files and utilities, but you'll still have to copy `MSCDEX.EXE` and the CD-ROM driver yourself.

Choosing a hard drive

As in other areas of life, size is important, especially when it comes to choosing a hard disk. Standard 3.5in drives can store anything up to 2.5Gb (2,500 million bytes), but the right size for you will probably depend on how cramped you feel with your existing drive. Aim to at least double your current disk's capacity in order to make the exercise worthwhile, but don't buy anything smaller than 1Gb.

It's very important to make sure your disk supplier provides special software to enable your computer to cope with disks larger than 528Mb. The reason for this is historical, because the original PC design was only meant to cope with disks up to this size. Recent computers are fitted with something called a translating BIOS, which tricks the computer into recognising bigger disks, but older machines need some extra software to help them do the same thing. Two such pieces of software are EZ-Drive and OnTrack, so make sure the disk you buy comes with one of these or something similar.

The Western Digital drive used in this class came with EZ-Drive software, mounting screws, an IDE cable and a bracket to adapt the 3.5in drive to a 5.25in bay. Other manufacturers provide some or all of these, but some just sell you a bare drive, so ask before you part with your money.



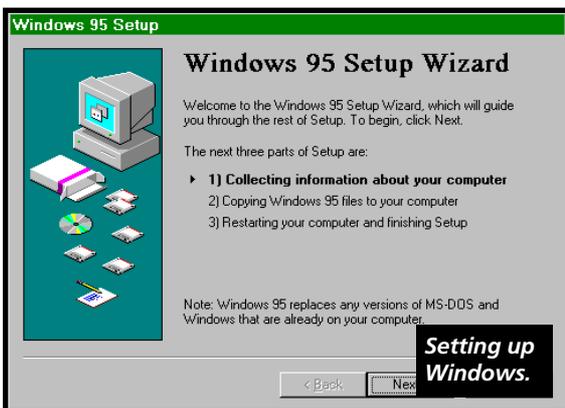
8 When you first switch on with the new disk installed your computer won't start because the disk has nothing on it. However, you should see a message on the screen that the computer's configuration has changed and be offered the chance to run its setup program. If you don't see this message, run the setup program manually (see step 2). Type in the parameters of your new drive (heads, tracks and sectors) by referring to the manufacturer's guidelines for the size of disk you are fitting. The chances are that the disk will work even with the wrong parameters, but you won't necessarily be able to use its full capacity.

10 The next stage is to partition your new disk. This is really just a question of deciding whether your new disk will be seen by your computer as one huge disk C, or whether you'd like to split it into two or more logical disks. Logical disks act just like real disks and are lettered D, E, F and so on. As a rule of thumb, use logical disks if your hard disk is bigger than 1Gb because partitions bigger than this are wasteful in the way they store data. If you're using EZ-Drive or similar, it will partition your disk for you, but if not, run the FDISK program you copied onto your boot disk.

11 When the partitions have been made, each one has to be formatted. Drive C should be formatted using the command:

FORMAT C: /S

This puts the system files onto the disk as well as formatting it. Any other logical drives can be formatted in a similar way but without the '/S' after the drive letter, because these are not bootable drives and don't need the system files on them.



12 You can now switch off your computer and when you switch on again it should boot from the new hard disk. The final stage is to reinstall all your programs from their original CDs or floppies (starting with Windows itself) and then copy over the data that you backed up at the outset (see step 1). You may need to use your floppy boot disk to get the CD-ROM drive to work, at least until you have reinstalled its software.

Using two hard drives

It's possible to fit a new hard disk while retaining the use of the old one, and this has the additional advantage of removing the need to make a floppy boot disk or reinstall all your software. On the down side, the old disk will probably not perform as well as the new one and it will tend to make disk housekeeping more complicated by spreading files around two disks.

If you decide to install two disks, one of them has to be designated as the master and the other as its slave, which is done by moving small electrical jumper connections fitted to the drives. The new disk will come with instructions on how to do this, but you will also need similar information for the existing drive. The master drive is C (the one you boot from) and the slave is drive D. Both drives are connected to the same IDE cable and it doesn't matter which way round they go because the master/slave relationship is set by a drive's jumpers, not by its position on the cable.

Despite the tedium of reinstalling all your software we recommend you fit your new drive as a replacement, not an addition: it's a more straightforward procedure and the new drive will perform better than the old one. Once you've got the new drive working you can fit the old one as a slave at a later date.