



Stepping up to CD

Roger Gann takes you through the basics of installing a CD-ROM drive.

PCW Step by Step Photography by David Whyte

A CD-ROM is no longer a luxury, only needed to play exotic and resource-hungry games. With today's large applications and even larger operating systems, it's easy to argue that it's now a necessity: who wants to install something that comes on 30 floppy disks?

So this month I'll show you how to fit a complementary peripheral: a CD-ROM drive. More and more software is being supplied, as standard, on CD-ROM. Corel-Draw 6.0, for example, comes on four CD-ROM discs.

It's quite possible to justify investing in an inexpensive CD-ROM drive for the sole purpose of installing software. As little as £50 will buy you a quad-speed IDE drive, so they've never been more affordable. Besides, you need something on which to play our brilliant cover disks!

Step-by-Step

HOW TO INSTALL A CD-ROM DRIVE

As with fitting a sound card, installing a CD-ROM entails fitting the drive then installing the software drivers.

Hardware installation

Step 1

- As ever, take the usual safety precautions before opening up your PC — gather together all the relevant instructions and installation disks, together with all the tools you need.
- Power down the PC, remove the casing lid, and enter within.

Step 2

- Now's the time to configure the CD-ROM drive, if it needs it.
- If it's being connected to a (primary) IDE interface then it most probably doesn't require configuring at all: most will work just fine with their default settings, which is usually "slave".
- However, if you're installing it on the secondary IDE channel, then set it to "Master".
- As far as a SCSI drive is concerned, check to make sure that its SCSI ID is unique and doesn't clash with any other SCSI devices installed.
- If it's the "last" device in the chain you may have to "terminate" the connection (and "un-terminate" the previous device).

Step 3

- Check out the drive fixings and the

place where it's going to fit — you'll need a free 5.25in drive bay for the new drive.

- If possible, try not to mount it in the lowest drive bay, as the disk tray or caddy could foul your keyboard. Mounting it high also makes it easier to get at the disk eject button with the tray open.
- If it's an IDE/ATAPI drive try to keep it close to the IDE hard disk, as IDE ribbon cables tend to be short.
- Make sure you have the right mounting hardware, too: things like bolts or rails.
- Insert the drive into the drive bay and make sure it doesn't foul anything else.
- Tighten the mounting bolts but don't over-tighten them.

Step 4

- With the driver installed in its bay, attach a spare power cable and the 40-way ribbon cable to it. Some connectors



The front panel of a CD-ROM

- 1 Loading bay/access door 2 Headphone jack 3 Volume control
4 Status indicator 5 Play Next Track button 6 Stop/Open/Close button

The rear panel of a CD-ROM drive

- 1 Digital output connector
2 CD/Audio connector
3 Master/slave configuration jumper
4 Interface connector
5 Power connector



Step 4

Here, the cable's red stripe indicates alignment with pin 1



Step 5

The audio cable goes from the back of the CD-ROM drive to the sound card



are "polarised" with a little notch and can't therefore be fitted the wrong way round, but if yours isn't, make sure the coloured (red or blue) stripe on the ribbon cable goes to Pin 1 of the connector on the drive (normally the side next to the power connector).

- If you're lucky, the pins will be numbered. Likewise, make sure it is correctly orientated at the interface-card end. If you're connecting to a SCSI card, you'll have a similar but wider (50-way) ribbon cable.

Step 5

- If you have a sound card, don't forget to connect the audio cable. This is a thin, flexible cable that plugs into the back of the CD-ROM drive and into the sound card. While it's not necessary to have this cable to be able to play sound from a video or game, it will be necessary if you want to play an audio CD through your setup.

Step 6

- Power up the PC. The POST diagnostics won't report anything new, but if you've fitted a SCSI CD-ROM, the SCSI BIOS will recognise the new addition and list it, along with all the other SCSI devices. Either way, you don't have to make any alterations to your CMOS setup.
- The drive's activity LED should flash, signifying the drive is receiving power.

Software installation

With the hardware installation complete, we now have to get the operating system to recognise the new drive and to assign it a drive letter.

- To do this, we need to install driver software, though if you use Windows 95 and don't need to boot in DOS mode, you can rely on Windows 95's own 32-bit internal drivers.

- Your CD-ROM drive will come with a driver disk. This will normally install two files: a driver, specific to that drive, which is loaded in CONFIG.SYS; and a generic DOS CD-ROM Extension, loaded in AUTOEXEC.BAT.

- Because the actual name of the driver will vary from drive to drive, I'll have to generalise.

The line in CONFIG.SYS will look something like this:

DEVICE=C:\CDROM.SYS /D:MSCD0000
The "/D:MSCD0000" assigns a system signature to that CD-ROM (you can fit

more than one CD-ROM drive, after all). You can call it whatever you like, but this signature has to be identical to the one specified by MSCDEX (see below).

- If you're running a SCSI system, you'll use a generic CD device driver. If you were using an Adaptec SCSI host adaptor, you'd add a line like this instead:

DEVICE=C:\ASPICD.SYS /D:MSCD0000
The line in AUTOEXEC.BAT might look like this:

MSCDEX /D:MSCD0000 /M:10

Note the matching "signature", MSCD0000. The "/M:10" switch specifies the number of sector buffers to allocate to the CD-ROM — a crude kind of cacheing.

- There are other switches you might want to use:

/S: Enables sharing of CD-ROM drives on Windows for Workgroups servers.

/L: Specifies the drive letter to assign to the first CD-ROM drive, so using /L:G would assign the drive letter G to the CD-ROM drive.

- Although Windows 95 has its own 32-

Choosing a CD-ROM drive

Apart from your budget, there are three factors you should consider before buying a drive.

1. The first is choice of interface. There are now just two to choose from: either IDE (also known as ATAPI), or SCSI.

Most PCs will already have an IDE interface card, so fitting an IDE will probably be the cheapest and simplest solution. However, if your PC lacks an Enhanced IDE interface, with dual IDE channels, then you really should invest in one — they cost between £20 and £40.

While it's perfectly possible to slave an IDE CD-ROM to an IDE hard disk, it's not really recommended as it can slow down your hard disk. The "lowest common denominator" rule means that with a CD-ROM drive slaved to a hard disk on the same IDE channel, you'll reduce the hard disk's data transfer rate to that of the CD-ROM drive: that is, 600Kb/sec if you've got a quad-speed drive — an IDE hard disk's data transfer rate will normally be at least four or five times this. With a dual channel EIDE interface card you can connect the hard disk to the faster EIDE, or primary channel, and the CD-ROM to the slower IDE, or secondary channel.

For more demanding use, I'd recommend opting for the dearer SCSI alternative. This is because IDE typically uses Programmed I/O to manage the data transfer, which requires a high degree of CPU attention — many so-called "six-speed" drives can only hit their specified

data transfer rate by taking 100 percent of the processor's time, which leaves zero for anything else.

SCSI, on the other hand, offloads the task of supervising the transfer of data from the CPU to the host adaptor and so is very suitable for computer-intensive tasks such as software MPEG decoding. So, if you're going to use your CD-ROM for serious video playback, I'd look at SCSI. Most current CD-R writers are SCSI, which is another reason for picking this interface.

2. The second factor is data transfer rate. Most drives are now either quad-speed (600Kb/sec) or six-speed (900Kb/sec). Older (double-speed) drives are no longer made).

Most CD-ROM multimedia discs are still cut to run on humble double-speed drives, but an increasing number are now being mastered to run on quad-speed drives. The discs therefore won't run well on older drives. So from a multimedia point of view, a quad-speed drive will be adequate for the foreseeable future.

Consider buying a six-speed drive *only* if you need its superior average access speed and data transfer rate for database searching chores, where the extra turn of speed will be noticeable, especially if the drive is shared on a network.

3. The final consideration is a practical one to do with loading — do you want a tray-loader drive or one that requires a disc caddy? It's horses for courses, but I prefer the former simply because it's quicker.

bit protected mode CDFS CD-ROM file system and doesn't need real-mode DOS drivers, it helps to install the older drivers first because the "Add New Hardware" auto-detection wizard will first look at the contents of the startup files before it tries to sniff out the devices.

If it finds a CD-ROM device driver



Explanation of acronyms and terms used

● Low level

CPU Central processing unit.

● Hard drive and peripheral interface standards

BIOS Basic input/output system.
EIDE Enhanced integrated drive electronics.
IDE Integrated drive electronics.
SCSI Small computer system interface.

● Other terms

ATAPI AT Attachment Packet Interface.
CDFS Compact Disk File System.
CMOS Complementary metal-oxide semiconductor.
MPEG Moving Picture Expert Group.
MSCDEX Microsoft Compact Disk Extension. (A TSR program giving DOS access to CD-ROM drives.)
VCache Virtual cache.
Wizard A Microsoft term describing online help which guides you through tasks on the fly.

there, it knows one should be physically present. In actual fact, Windows 95 can only specifically detect the older types of CD-ROM drives that used proprietary interfaces, such as Mitsumi or Panasonic.

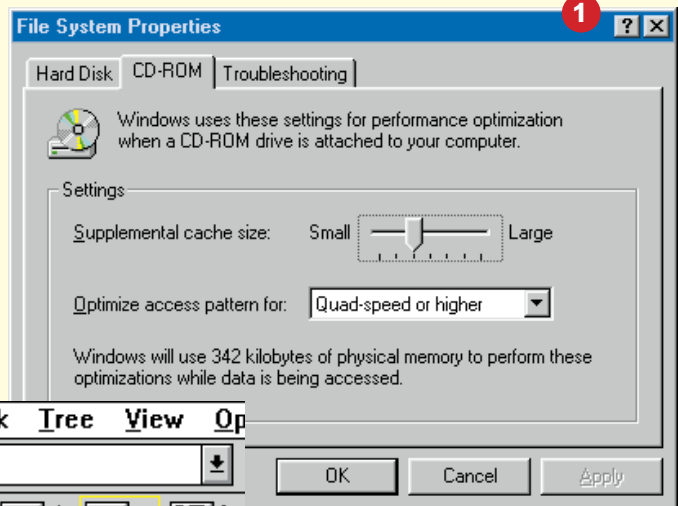
● When it comes to IDE and SCSI CD-ROM drives, they will automatically be installed in the same manner as would an IDE or SCSI hard disk. This will occur as long as the interface card is properly installed.

Cacheing CD-ROM drives

CD-ROM drives are relatively slow devices, but their performance can be enhanced by cacheing.

Ever since MSDOS 6.2, SmartDrive has been able to cache CD-ROM drives. To do this, just make sure that MSCDEX is loaded prior to SmartDrive. Windows 95 uses a 32-bit development of SmartDrive, VCache, which ought to be adjusted to suit

Fig 1 Once you have installed your CD-ROM in Windows 95, check to see that its settings are correct



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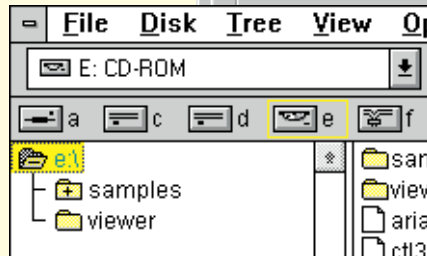


Fig 2 If all has gone well, then the Windows 3.1 file manager should have an extra drive icon

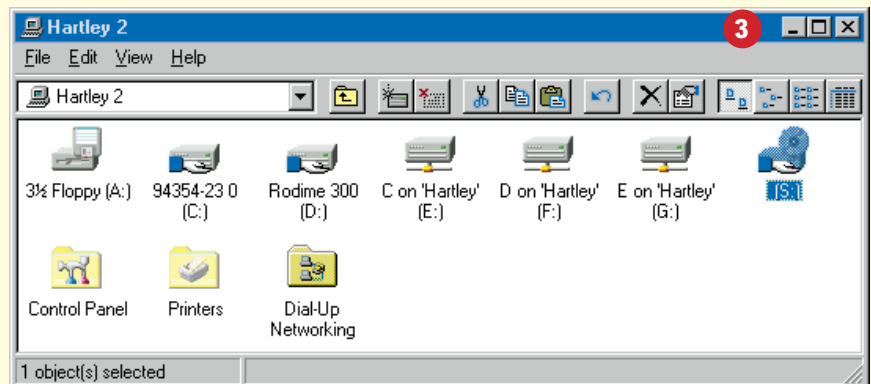


Fig 3 If all has gone okay under Windows 95, the presence of your new CD-ROM drive will be denoted by a new icon in the "My Computer" group