Upgrading by the book

Notebooks are an attractive option, but obsolescence can strike faster than crowsfeet or a receding hairline. Roger Gann takes a look at upgrading your personal power unit.

N otebook PCs are awkward and expensive to upgrade. This is largely due to one thing: all notebooks sold today are essentially one-off proprietary designs. As a result, they're all different and share very few common, standard parts. Sure, they'll have standard Intel CPUs and RAM, but beyond that, they will all use unique casing designs and motherboards.

Size precludes the incorporation of items like standard PCI slots or drive bays, or even relatively small features like SIMM slots. Often, the only way to upgrade a notebook is to make use of its PC Card slots or invest in a docking station that will feature expansion slots and a drive bay or two. You see, from an upgrading perspective, the architecture of a notebook is largely a closed book (*ha-ha!*).

Other factors conspire to make upgrading awkward and uneconomical. The pace of technological change in the notebook industry often makes it less expensive to buy a new machine after a few years than to upgrade an existing one: that new notebook computer you just pulled out of the box could be obsolete within a year. Technology in the notebook computer market is changing so rapidly that product life cycles last six months or less.

You might be hesitant to buy a notebook for fear of obsolescence. But take heart: there's a lot you can do to extend the life of your portable system.

A word of advice: if you want to upgrade, don't delay — do it as soon as possible after buying your notebook. As I've mentioned, notebooks have a depressingly short product life and are essentially proprietary designs. If you do want to buy an add-on for your notebook, a docking station for instance, you may not be able to obtain one 18 months down the line. And because of its unique design, you won't generally be able to use an alternative.

What's possible
So, *nil desperandum...* It is possible, with a little bit of ingenuity, to upgrade a limited number of notebook features. So what exactly is possible? Obviously, all modern notebooks will have one or two PC Card slots and these are the equivalent of the standard PC expansion slot. You can fit a wide variety of cards, from network cards, to SCSI cards to sound cards. And if you're feeling particularly flush, you can even fit tiny PC Card hard disk drives.

So the PC Card option has to be your first port of call when upgrading. It might be a relatively expensive solution, certainly compared to a similar upgrade performed on a normal desktop PC, but it's very quick and easy to install; particularly if you're using Windows 95, which has turned PC Card software support from a nightmare into a dream.

One upgrade which is common among desktop PCs but is almost without exception impossible on notebooks is the CPU upgrade. Unfortunately, most notebooks use CPUs that are hard-soldered to the motherboard and so cannot easily be removed. A few notebook brands do feature socketed CPUs and so, in theory, they are upgradeable, but I would be very careful about dropping in a faster Pentium, say, unless that notebook explicitly supported a faster CPU. Overheating is a very real problem in the close confines of a notebook, and simply fitting a faster Pentium is a recipe for notebook meltdown. Height restrictions

(caused by the integral fan) will probably preclude you from fitting a Pentium overdrive, too. So one way or another, CPU upgrading is a no-no, as is upgrading other permanent parts of the system like sound and graphics.

OK, so what's left? The RAM and the hard disk: these are both upgradeable.

Memory upgrades
Perhaps the best way to improve your notebook's performance is to add more memory. Your applications will run faster and smoother, while more RAM will even extend the amount of time you get out of a battery charge.

Nowadays, many notebooks are supplied with 8Mb of RAM which is considered insufficient for running Windows 95: 16Mb is a more appropriate figure. Unfortunately, SIMMs and DIMMs are just too big for the latest slimline notebook designs. So, instead of using what has become a generic commodity, the SIMM, notebook users are forced to buy RAM cards made specifically for their notebook. The recent slump in RAM prices has taken the edge off notebook memory prices: for example, a 16Mb upgrade for a Toshiba Portege or Satellite Pro can be had for about £85: contrast this with what I paid to add a meagre 4Mb of RAM to my Dell, which set me back a cool £140 about two years ago.

Plan your RAM upgrade carefully, because the number of RAM expansion sockets in your notebook will be limited. You may have as few as two spare RAM sockets and if you buy, say, 8Mb and find it to be insufficient for your needs, you may have to junk your existing RAM to install 16Mb. What I'm saying is: if at all possible, buy more RAM than you actually need because you're bound to need it next year.

Installing the memory modules is easy, much easier than the corresponding task on a desktop PC — normally, you remove a clip-on panel, either above or below the keyboard, plug in the modules, replace the cover and power up the notebook. End of story. But one word of caution: these memory modules often use quite flimsy PCBs, so treat them gently.

Hard disk upgrades
Notebooks are no different from desktop PCs when it comes to storage: there's never enough! Luckily, swapping a hard disk is not an insurmountable problem. The vast majority of notebooks use 2.5in IDE hard disks, which are just smaller versions of the familiar 3.5in IDE drives we see everyday. Apart from size, these tiny drives differ from their larger peers in that they have a single connector that carries both power and data. To all intents and purposes they are identical, and installing a larger IDE drive in your notebook is in theory no different to that of installing one in a desktop PC. Sadly, the practice is somewhat different. The problem lies in gaining access to the drive itself.

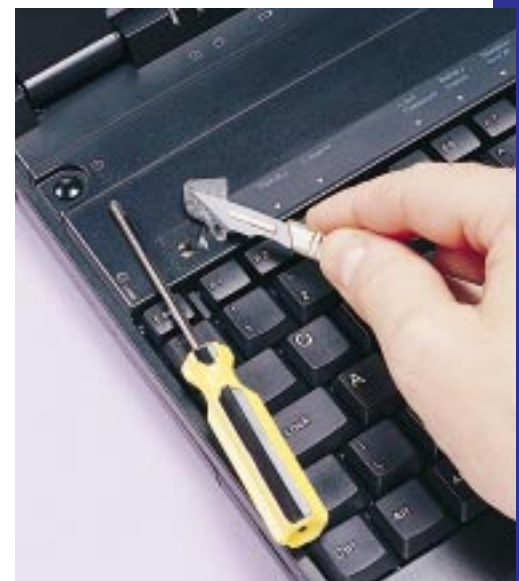This is not a problem if the drive itself is removable and slides out of the notebook casing after a catch is released. All you have to do is dismantle the plastic shell surrounding the drive, *very carefully* disconnect the thin ribbon cable, extract the old drive and replace it with the new one. With the drive installed, you then load CMOS Setup to get the notebook to auto-identify the drive, and away you go.

Note that some older notebooks have BIOSes that can't handle large drives, i.e. those bigger than 540Mb. And as it's now virtually impossible to get 2.5in drives smaller than 810Mb, it means that older notebooks cannot easily be upgraded. If your notebook has a Flash BIOS, it's worth checking out the manufacturer's web site in case BIOS upgrades are available. For details of commissioning the drive, installing an operating system and so on, refer to my Hands On column in *PCW* August '96.

In many notebooks, the drive isn't removable and is buried inside the notebook. Accessing these types of drive is hard work but by no means impossible. Be careful: if there's any warranty left on your notebook, you'll probably invalidate it by doing this. Notebooks are not easy to open. I can't begin to describe the various dismantling permutations for all the different notebooks, so what follows is only a general guide.

1. The plastic casing will be held together by a number of tiny screws. Some will be visible and others won't because they'll be hidden! For example, the rubber feet on the underside of a notebook often conceal

screw holes. Likewise, adhesive labels above the keyboard may disguise the presence of screws. The first job is to locate all these screws and remove them, making a careful note of which screw went where.

2. The casing top should now separate from the bottom. You may have to unplug a couple of thin, delicate cables that link the two halves: examine the plug at one end and slide down the sleeve to release the cable. Watch out, too, for a tiny micro-switch that is depressed when you close the lid: this is vulnerable.

3. The old hard disk will probably be held in a metal clamp, secured by a pair of screws. Release the drive and carefully pull the ribbon cable off the rear. Install the new drive and, as they say in all the best car

Screws can be hidden under adhesive labels

repair manuals, reassembly is the reverse of disassembly!

A final note: transferring the contents of the old hard drive to the new is a problem in notebooks. VisionTek offers an interesting solution to this problem — Drive Exchange. It consists of a Type II PC Card plus cables and software. You plug the new drive into the PC Card, then insert this into the notebook. The software takes a complete copy of the old drive. When it's done, you simply install the new drive.

Alternatives

You don't necessarily have to go down the PC Card route to upgrade: there are other ways to connect peripherals to your notebook, especially physically-large devices such as CD-ROM drives or tape streamers.

■ **Parallel port devices**
The parallel port is a useful fallback if all your Card slots are spoken for. For example, you'll be able to hook up an external CD-ROM drive — the Micro Solutions' Backpack 4X CD-ROM (around £140 on the street) is a quad-speed, 250ms, 3.5lb, mains-only drive which is solidly constructed and works with both standard and the newer, faster, enhanced parallel ports. Installation with the included software takes less than a minute. A printer cable attaches to the throughput connector on the back of the drive. An 8-speed version is available (about £240) and both models can have sound, too, which adds about £80 to the final bill.

■ **Docking Stations**
A desk-based docking station adds desktop PC-like expansion opportunities to notebook computers, as they often feature expansion slots and drive bays to which you'd fit ordinary common-or-garden expansion cards and CD-ROM drives. The downside is that docking stations aren't cheap and can cost several hundred pounds. They are not designed with too much portability in mind, either.

■ **Direct Cable Connection**
This is a low-cost way of networking your notebook to a desktop PC to enable you to access its hard disk or CD-ROM drive as though they were directly connected to your notebook. The Windows 95 Direct Cable Connection lets you make what is, in effect, a network connection to another PC via a parallel or serial cable to access shared resources on that machine, such as a CD-ROM drive. Direct Cable Connection is part of Windows 95 and is free — all you need is a cable, which will set you back around £15. DOS and Windows 3.1x users can use the slightly less sexy InterLink facility instead.

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