

Adding components piecemeal to maintain a **cutting-edge machine** is a fallacy the PC thrives on.

## Upbraiding upgrading



The world of the personal computer moves forward at a frightening rate. No other purchase you make will be outdated quite as quickly as a PC. Of course if a faster PC becomes available after you've bought yours it doesn't make

your equipment redundant, but you can't help feeling cheated when you buy cutting-edge technology one month, only to find that it's been superseded the next.

The answer to this problem is upgradability. The PC is supposedly an upgradable platform, so when it starts to get long in the tooth you can simply replace a couple of parts and make it cutting edge once more. Unfortunately it's not quite that simple. The problem with upgrading is compatibility. The chances are that you're likely to want to upgrade your PC after a couple of years, but you'll probably find that it's more trouble than it's worth. In the two years that you've had your machine-processor technology would have moved on so far that your current motherboard won't support the latest CPUs. Straight away this means that you'll have to rip out the guts of your system and rebuild it from scratch.

But it doesn't end there. In the two years since you bought your computer, memory technology has probably advanced as well, so the chances are your existing system memory won't be compatible with a new CPU. Add to this the fact that graphics cards advance at an even faster rate than processors and the cost and effort of upgrading a PC becomes prohibitive.

The key is to buy the best system you can get at the point of purchase rather than settling for less with the intention of upgrading later. But buying the best system you can get doesn't necessarily mean spending a fortune on the fastest technology available. For the majority of users the fastest Pentium III CPUs aren't necessary and Intel's cheaper Celeron can easily handle the job at hand.

Unfortunately Intel doesn't want people choosing the Celeron over a Pentium III and has tried to relegate the Celeron to low-specification systems that can't handle the type of tasks that a Pentium III machine can. Intel has managed this by introducing the 810 and 810e chipsets for the its Celeron CPUs. These chipsets lack

features that the 820 or even BX chipsets sport. The 810 chipsets feature an on-board graphics solution which is no match for any current 3D graphics accelerator. This makes an 810 chipset-based machine inadequate for games; something that's a major consideration when buying a home PC. Most alarming, though, is the lack of an AGP slot, so the user isn't even left the option of using a decent graphics card to improve performance.

Unfortunately this is just one example of Intel making things difficult for the end user. A few years ago Intel turned its back on its socketed designs for its CPUs, switching to Slot 1 instead for the Pentium II and subsequent Celeron and Pentium III designs. However, after the failure of the original Celeron with no Level 2 cache Intel decided to put 128KB of Level 2 cache on the processor die. Intel then realised there was no need for the Celeron to be produced in an expensive Slot 1 design and returned to a Socket, this time calling it Socket 370.

As if this revolution wasn't enough, the latest generation of Coppermine Pentium III chips also have full speed on-die cache, making the Slot 1 design

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completely redundant. Already we've seen Intel's Flip Chip (see page 70), which is a Coppermine Pentium III in a socket. So after years of design changes and updates, Intel has produced a processor almost identical to its ill-fated Pentium Pro that was released back in 1996.

The Pentium Pro never fulfilled its potential due to high cost and the fact that Intel didn't push the speed further than 200MHz, leaving a great many people with expensive Socket 8-based workstations and servers with no processor upgrades available. That said, it wasn't all Intel's fault. The Pentium Pro was optimised for 32bit code and Windows 95 was still based on a 16bit core, so to all intents and purposes it was ahead of its time, a factor that usually counts in a product's favour.

So what's the answer to the upgrade issue? There isn't one, other than to forget that the PC should be upgradable and see it as a one-off commodity.

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