Gordon Laing unveils Intel's latest troop movements in the battle of the processor titans.

When the chips are up

It's strange to think how recently we were driving along Intel's carefully-planned road map, enjoying the time to peruse gently rolled-out products – 'look mum, another lovely 50MHz increase, but are we at Alton Towers yet?' Then pesky AMD came from nowhere, flashed its headlights and shot past. Its powerful Athlon processor really gave Intel the heebee geebees. You can forget your gently-paced announcements now – it's the clash of the titans.

Since late October we've had a veritable cornucopia of new Intel CPUs to choose from, including no fewer than four different 600MHz Pentium IIIs. Yes, you've got the choice of 100 or 133MHz front-side bus (FSB), and each of those with their Level 2 cache in either 512KB half-speed or 256KB full-speed flavours.

Up until very recently, Intel used a 0.25micron manufacturing process for its PII, PIII and Celeron processors. The process defines the actual distance between adjacent components on the silicon wafer itself, so the finer it is, the more you can fit in the same physical dimensions. Intel is now slowly moving over to a finer 0.18micron process, codenamed Coppermine. It's good news for everyone, with higher yields, faster speeds, lower power consumption and less heat generated. During the interim, however, new 0.18 and old 0.25micron products will co-exist on Intel's price list.

All the older 0.25 micron Pentium IIIs employ 512KB of Level 2 cache, running at half its core speed. All the new 0.18micron Pentium IIIs feature 256KB Level 2 cache, but it's part of the processor die, so runs at the same speed as the core.

Over to the FSB. It's a popular misconception that the PC's main memory matches the pace of the FSB. Not so, and it's purely coincidental that current 66 and 100MHz FSBs drive their memory at the same speed. Intel's brand new 133MHz chipsets won't talk to PC133 memory, and will instead only support PC100 memory until RAMBUS issues are resolved. So the only thing going at 133MHz in an official Intel system is the communication between the main CPU and its supporting chipset. This is still a benefit, but enthusiasts may prefer a Taiwanese VIA chipset solution with full support for PC133 memory.

So how do you spot the difference between these new Intel Pentium IIIs? The answer is simple, but you'll have to look closely: all Coppermine chips will be labelled with the suffix E (for Enhanced process), while any chip designed to run with a 133MHz FSB will carry a letter B (for faster Bus). Hence, for a short while at least, customers opting for a 600MHz Pentium III will have to choose from a 600, 600B, 600E or the particularly groovy 600BE.

Also look out for the newly introduced 500E and 550E Socket-370 FC-PGA Pentium IIIs, at first designed for smaller form factor systems, but later heralding the death of Slot 1. Coppermine employs a lower voltage than 0.25micron, but we'll let you know if these new chips will work in existing socketed Celeron motherboards with BX chipsets.

Of course, you probably won't be interested in the slower chips, as the new 650, 667 (non-satanic), 700 and 733MHz PIIIs may be too much to resist. Watch out, though, because while all four of them are Coppermine chips, only the 667 and 733 parts enjoy the superior 133MHz FSB. Other chips blessed with 133MHz FSB are the 533B, 533BE, 600B and 600BE.

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I reckon these are the smart buys. Then again, since the 0.18micron process is capable of supporting speeds near the 1GHz mark, you may want to consider buying a Coppermine chip with a slower 100MHz FSB, then overclocking it to 133MHz. Properly taken care of, the 600E Coppermine processor may just work at six times 133, or 800MHz.

Regular readers of this column will know I've recently performed a similar trick with a pair of 366MHz Celerons. Designed for 66MHz FSB, their 0.25micron process nonetheless supported an FSB increase to 100MHz and a resulting clock-speed of 550MHz (*see this month's Hands On, Hardware on p246*). Okay, overclocking doesn't always work, and my system may burn out this afternoon, but with 1.1GHz of combined dual-processing power, I'm at least ahead in the numbers game.
Merry Christmas.

gordonl@pcw.co.uk