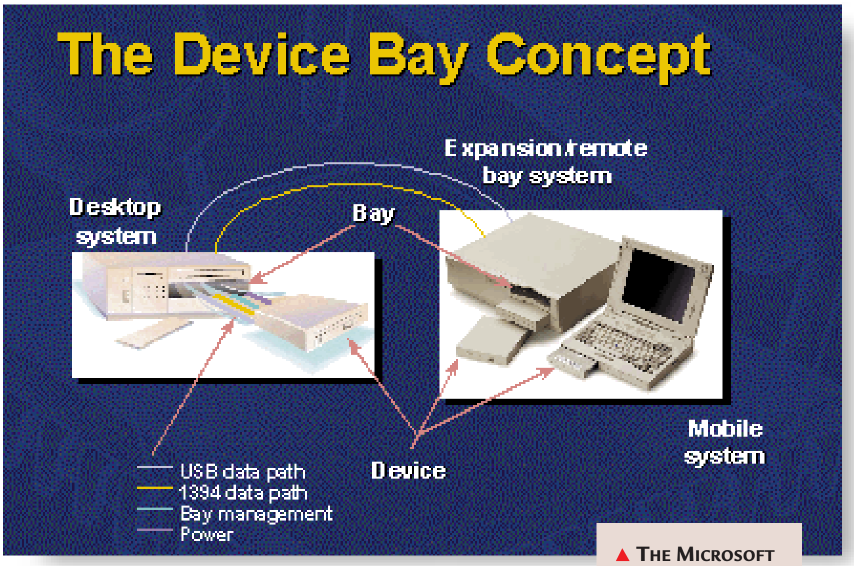
Device Bay-watch

Will Device Bay make child's play of connecting up your peripherals? Roger Gann dips his toe into the water.



▲ THE MICROSOFT HARDWARE DEVELOPERS WEB SITE <WWW.MICROSOFT.COM/HWDEV> HAS COPIOUS AMOUNTS OF INFORMATION

I've touched on Device Bay in a previous column and my exposure to USB and IEEE 1394 in the March issue reminded me to revisit the topic and find out what's been happening since.

To recap, Device Bay is a new hardware form factor/interface that involves both USB and 1394. Developed jointly by Compaq, Intel and Microsoft, it's similar in concept to PC Cards and will bring to the desktop the simplicity which mobile users have enjoyed with attaching peripherals to their notebooks.

At its most basic a Device Bay consists of a connector slot in one of three standard form factors, including two small enough for notebook computers. The back of each slot will contain connectors for both USB and IEEE 1394 — a Device Bay peripheral can use either bus to provide hot-swappable operation.

In essence, with Device Bay, you never again need to take the lid off a PC; to install a new peripheral you simply slide it in to an empty Device Bay. If it were a low-speed device, it would use the USB bus. If it were a high-speed device, it would use the 1394 bus. Plug-and-Play would then take care of the driver installation. Typical uses of Device Bay are for additional hard drives, DVD-ROM drives, backup and removable media devices, and so on.

These changes should bring expandability to the outside of the case: future PCs will let you add almost any new capability without opening the case; no unscrewing, restarting or rebooting need occur. And 'hot swappability' means you will be able to simply plug these devices into their slots and they will work without rebooting.

There are three sizes of Device Bay: DB13, DB20, and DB32. They are 13 x 130 x 141.5mm, 20 x 130 x 141.5mm and 32 x 146 x 78mm respectively. The largest, DB32, is for desktops. DB20 was designed both for laptops and desktops.

◀ THE MAIN DEVICE BAY WEB SITE AT WWW.DEVICE-BAY.ORG CONTAINS MUCH USEFUL INFORMATION. UNFORTUNATELY, MOST OF IT SEEMS DESTINED TO REMAIN JUST 'SLIDEWARE'

DB20 bays can be located at the back of desktop computers for devices that require cables, such as modems and network cards. And, DB13 is designed for laptops and can be used in desktop PCs as well.

Although initially developed for the consumer market, corporate users are also attracted to Device Bay. It allows a computer with a failed hard disk to be functional in minutes rather than hours, though IT managers may view with alarm the ease with which a PC on their network can be totally reconfigured.

Systems which previously required a CD-ROM drive for software installation now require only an empty Device Bay slot. When the drive is needed, it can be quickly inserted, used and removed again. The reduced cost for service and upgrade of PCs will significantly decrease the total cost of ownership and improve the ownership 'experience' for all customers. All peripherals in use today can be designed to utilise one of these interfaces, with three exceptions: because of bus bandwidth limitations, memory, CPUs and video cards must still be attached to the motherboard. Device Bay will be supported by Intel chipsets and future versions of Windows 2000.

The specification includes some nifty features like software-controlled physical interlock which can prevent sudden removal of a device at a bad time. Its architecture also supports the inclusion of a software agent which can manage the system resources as they are allocated to devices. All in all, Device Bay offers many advantages to the corporate and consumer end-user. Even manufacturers benefit — think how easy it will be to put a built-to-order PC together using Device Bay. It also allows newer technologies to be incorporated more rapidly, reducing design lead-times in the process.

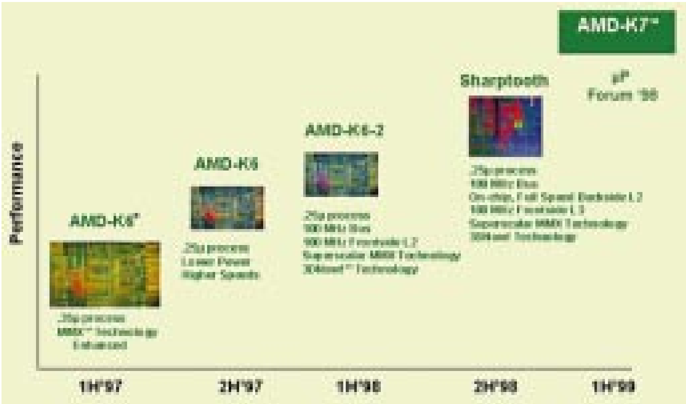
Device Bay is eyed with scepticism by notebook manufacturers. Standardisation is a concept with which desktop PC makers are comfortable, but notebook makers are not. They are far more interested in trying to dissipate heat from their products and reduce their weight.

Peripheral manufacturers are equally wary. The standard calls on manufacturers of optical and magnetic drives, as well as makers of audio and communications peripherals, to redesign their products at considerable cost in order to use a USB or 1394 connector interface.

At the moment, remaining price-competitive is more of a consideration than a new form factor. Last year, drive makers complained that adhering to the Device Bay specification would involve redesigning/ruggedising their drives to lessen additional vibration and operating shock. And adding a 1394 interface is something drive makers are reluctant to do now that Ultra DMA/66, a lower-cost ATA alternative, is available. At the moment, the 66Mbps throughput offered by that standard will suffice for a couple of years. Only after that will 1394 begin to appeal to hard disk makers.

Another thing holding back Device Bay is the question mark hovering over 1394-B. This is a compelling variation of the 1394 interface that will potentially offer throughputs of 800Mbps and 1.6Gbps. Sadly 1394-B, has yet to be standardised, let alone developed into a product. In the meantime, Adaptec, one of the few manufacturers making 1394 interface cards, seems to be losing interest in 1394, so don't hold your breath.

With Device Bay, you never again need to take the lid off a PC



◀ Some say that the AMD Roadmap is really going places, while Intel appears to be going nowhere in 1999

It may rival sliced bread but like so many 'great ideas' in the world of PCs Device Bay has been a long time coming and today it seems no closer to fruition. Its projected 1998 debut has come and gone. The omens for the putative standard are none too good, either. An earlier attempt to provide a standardised interface for removable storage peripherals, Exabyte's Eagle Nest (based on IDE), was not launched over here and was dropped last year in the US despite a promising start. Available in both internal and external versions, the $100 Eagle Nest host bay allowed hot-swapping of 'nest-ready' drives including Zip, Travan tape, LS-120 and hard drives. It nevertheless died a death.

■ Slot 1 RIP?

The launch of the Pentium III confirmed Intel's adherence to the Slot 1 architecture but it is gradually becoming apparent that this divergence from the 'traditional' CPU architecture may eventually turn out to be a dead-end and no more than a temporary aberration.

Strange as it may seem, there's a strong likelihood that Intel will return to using the Pin Grid Array (PGA) form factor that the vast majority of CPU makers employ. While Intel's mainstream processors continue to use Slot 1 the 'three dwarves', as Intel's CPU rivals are quaintly termed, continue to use the classic Pentium Socket 7 ZIF Socket for their processors. Despite Intel's direst predictions, this has not unduly hindered processor speeds and the fastest CPUs compete directly with Intel's finest silicon: Super 7 motherboards run the popular AMD K6-2 3DNow! at 400MHz with a Front Side Bus running at exactly the same speed (100MHz) as the latest Pentium II and Pentium III motherboards. Slot 1 is still a relatively expensive solution however, and in a bid to compete with AMD and Cyrix on price, Intel recently performed a U-turn in processor architecture and reverted to a low-cost socket technology, Socket 370, for its latest Celeron releases.

There is speculation in the US press that Intel may eventually abandon Slot 1 when it shifts to an 0.18µm process later this year with the release of the 600 or 667MHz Pentium III — it could never release a processor with the mark of the beast, 666MHz, etched on it!

The advanced process will make it easier to incorporate the L2 cache on-chip, something that AMD has adopted with its release of the K6-III. Intel has previously cited the prohibitive cost of putting the L2 cache on-chip as the reason for switching from the Pentium Pro/Socket 8, to the Pentium II/Slot 1, which has the L2 cache off-chip. Apparently, incorporating the high-speed cache on the same die as the CPU was a little too hit and miss back then. Sometimes the cache would work and the CPU not, or vice versa, meaning that this particular chip, although '50 percent OK', was still destined for the bin. Placing the chip on a daughtercard, although imposing a performance penalty, avoided costly production errors such as these. However, the adoption of the 0.18µm process may see Intel turning full circle and using the Socket 370 architecture or something similar for all future processors.

■ AMD bounces back

Intel seems to have had more than its share of the spotlight in recent months, what with the launch of the Pentium III processor formerly known as Katmai. Its arch rival, AMD, seems to be at long last getting its act together and the latest version of the K6 and the upcoming K7 look likely to give Intel a hard time over the next year or so.

First in the queue is the high-end complement to the successful K6-2 CPU – the K6-III (a.k.a. Sharptooth). The K6-III will be similar to the K6-2 but with 256Kb of L2 cache integrated into the chip itself running at the same speed as the processor, *à la* Pentium Pro and Celeron/Mendocino. This should significantly accelerate systems built around the K6-III, since slow (i.e. 66-100MHz) cache speeds have always been the bane of Socket 7 architecture chips.

For the first time it will allow AMD's K6-III to compete head to head with Intel Pentium II processors. Most users will find that the 400MHz K6-III will have the edge on 450MHz Pentium II. Don't forget that the majority of Super 7 motherboards will also have L2 cache on the motherboard. With the K6-III, this SRAM isn't ignored but is employed as a kind of 'Level 3' cache!

Games written to the 3DNow! standard will give the K6-III the edge over the PII by a small margin. However, games that don't support 3DNow! instructions will lag due to the weaker K6 floating point unit. The Pentium III's gaming potential has yet to be evaluated but with its enhanced 'Streaming SIMD Extensions' (a kind of MMX Mk II) this looks to be the dog's danglies. Even so, don't expect a mass migration of games to the new standard. The enormous installed base of K6-2 users will dwarf the small number of Pentium III early adopters. And, because it is Intel's premier processor, it will be priced at a premium.

The upcoming K7 looks likely to give Intel a hard time over the next year or so

The K6-III will initially be made on a 0.25µm process (with a die-size of 135mm²), and will be shifted to a 0.18µm process some time in the second or third quarter of this year. It will then run at 500MHz, still using a Super 7 motherboard running a 100MHz FSB and eventually going to 600MHz at the turn of the century. Socket7 platforms will thus be faster or at least as quickly as the fastest Slot 1 platforms, for the first time in history. As upgrade paths go, the humble Super 7 motherboard looks likely to be a good bet. So, if you are planning to upgrade your system with a K6-III and your motherboard currently supports AMD K6-2 processors, you can use a K6-III processor straight away.

• *We take a look at the K6-III 450MHz in our Reviews section, starting on page 76.*

Then there's the K7, which AMD formally announced at the Microprocessor Forum 98. From what's been said so far, it seems clear that the K7 will almost certainly compete head to head with the Pentium III. Although this CPU will physically fit a Slot 1 connector it won't be electrically compatible with it because AMD is shunning Intel's P6 GTL+ bus protocol in favour of Digital's Alpha bus protocol, EV-6. As a result, it has designated its version of Slot 1 as 'Slot A'.

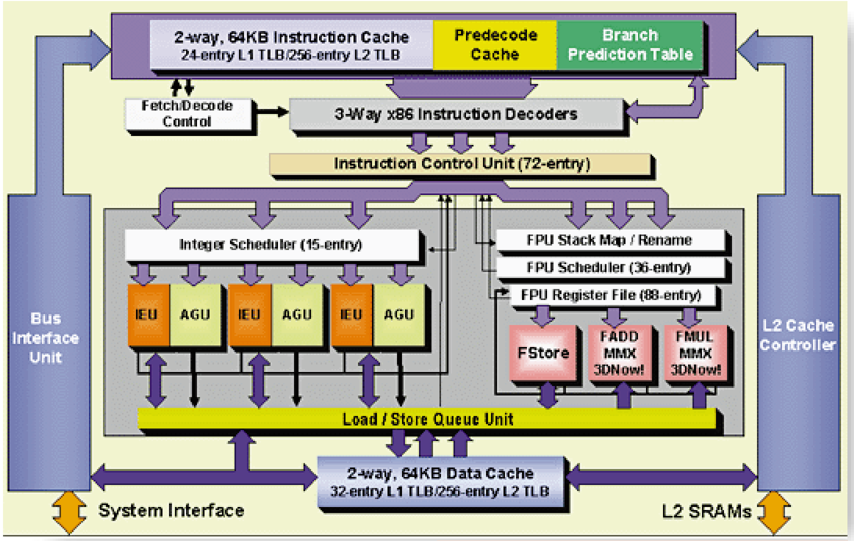
EV-6 can run at 200MHz and higher, twice that of Slot 1/GTL+. As a result the K7 will be the first CPU to take advantage of high (1.6Gbps) bandwidth memory architectures such as Direct Rambus. To put it another way, Pentium III cannot make full use of the bandwidth offered by Direct RDRAM.

Due to its high clock speed, K7 will have 128Kb of Level 1 cache (64Kb data and 64Kb instruction cache). And it will come with a backside L2 cache. Initial versions will feature 512Kb but AMD is also planning K7 versions with no less than 2Mb up to 8Mb, using an additional external tag RAM as Intel does in the case of P6 CPUs. The L2-cache speed will range from one third to full CPU speed and it is planned to use normal as well as double data rate (DDR) SRAMs for this L2 cache. It will initially run at 500MHz but, like the Alpha, there's plenty of scope for higher clock speeds further down the road.

There's even better news on the floating point front. So far, AMD processors have been plagued by relatively poor floating point performance. But no longer. The K7 will feature a trio of out-of-order, fully parallel FPU pipelines. As a result, the K7 will for the first time offer much better FP performance than Intel's finest.

Finally, AMD has stated that the K7 will feature chipsets which support Symmetric Multi-Processing (SMP). The K7 will thus be the first non-Intel x86 chip to be able to use more than one processor in a system. This will be significant in the workstation and server market, especially if the K7 can deliver the performance AMD is promising.

For once it seems like the CPU boot is on the other silicon foot for a change. This year has the makings of a bad 1999 for Intel.



▲ IF THE ANALYSTS ARE TO BE BELIEVED, THE PENTIUM III WILL TAKE A PASTING WHEN THE K7 SHIPS LATER THIS YEAR. ITS CACHE AND FP PERFORMANCE WILL BE GREATLY IMPROVED

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