

THE EDITOR'S VIEW

A New World for Intel

By Michael Slater

From the mid-'80s until last year, Intel owned the most lucrative monopoly the semiconductor business has ever seen. Last year, AMD grabbed a sizable chunk of the 386 market, shipping over 2 million units—half of them in the fourth quarter. AMD shipped more than 2 million units in the first quarter of 1992, doubling its fourth-quarter 1991 shipments and capturing roughly 40% of the 386 market. This must be the fastest production ramp in the history of the microprocessor business.

Why was AMD able to grab so much 386 business so quickly? A key to AMD's early design wins was that Intel wasn't meeting the demand, especially in the Far East. In the U.S., most of AMD's early customers were drawn by the higher clock rates AMD offered. For the portable market, AMD's static operation and lower power consumption were significant factors. And some OEMs simply wanted an alternative to Intel.

Now, C&T and Cyrix are both close to shipping production volumes of their 386-pin-compatible chips. Like AMD, C&T has found its early customers in the Far East, and while it is easy to criticize them as having only "no-name" customers, some of those no-name companies ship a lot of motherboards. Cyrix has had somewhat more success with second-tier U.S. PC makers, and there are rumors of some first-tier design wins (such as Tandy or Compaq).

The big boys have yet to challenge Intel in the 386/486 market, but such a challenge probably isn't too far away. Texas Instruments is making chips for both C&T and Cyrix, and it seems likely that TI will offer one of them under its own name. Eventually, one or two of the major Japanese chip makers is likely to jump into the game. The x86 market is just too big to be ignored.

When Intel was the only supplier of 386 and 486 microprocessors, it set all the rules. Intel wanted the 386SX to be limited to the low end, so it could continue to sell its higher-profit 386DX and 486 chips to the more performance-driven users. Intel's 386SX was therefore offered only in 16- and 20-MHz versions, while the 386DX was available at 33 MHz. AMD captured numerous design wins, including AST Research, by offering a 25-MHz 386SX. AMD also gained a design win at Compaq, but this was too much for Intel to take—Intel broke down and agreed to offer the 386SX at 25 MHz to prevent AMD from getting the Compaq business.

The same scenario is likely to be played out with the 486SX. Intel has offered this chip only in 16-, 20-, and 25-MHz versions, but there is no reason it can't be of-

fered at 33 MHz or even 50 MHz. There are plenty of users that want fast integer performance and just don't care about floating-point. Intel's profit margins are much higher on the 486DX, however, so the company wants to keep 486SX designs limited to lower clock rates to protect its 486DX business. This situation can stand only as long as Intel is the only supplier.

Intel chose to abandon the 386 pinout when it moved to the faster 486 CPU core with on-chip cache memory, and there are good engineering reasons to do so. There is a market, however, for a 486-class core in a 386 pinout, and Intel has ignored it—leaving a nice opportunity for Cyrix (and, to some degree, C&T). Another market Intel ignored was for a 386SX core in a 286 pinout. It is probably too late for this product to be very attractive to 386-compatible processor makers, but if there had been multiple 386 vendors several years ago, one of them would have seized this opportunity.

Intel is doing everything it can to fend off the attackers, but the best it can hope for is to slow them down. Intel can challenge the legality of their designs, and this may hamper the marketing of the compatible products. In the long run, however, Intel isn't likely to prevail. The compatible chip makers might win by using the foundry licensing defense, they might be able to convince a court that their designs don't violate Intel's patents, and they might be able to overturn the patents. If all else fails, the chips will be sold by companies, such as TI and SGS-Thomson, that have patent cross-license agreements with Intel, with royalties paid to the chips' designers.

Intel is also challenging the compatible processors through a massive advertising campaign to create an Intel brand image that Intel hopes will make customers insist on Intel microprocessors. It won't work. Just as PC buyers learned that IBM wasn't the only company that made quality PCs that ran all their software, they will learn that Intel isn't the only company that makes quality microprocessors that can run all the software.

It is inevitable, then, that Intel's share of the microprocessor market, as well as its profit margins, will decline. This doesn't necessarily mean the decline of Intel, but it does mean that the company will have to accept lower profit margins and devote some resources to developing products its customers want, not just those that optimize its profits. Ultimately, Intel is dependent on the PC business returning to high growth rates. The only way Intel can continue to increase its PC microprocessor business is for the market to grow faster than Intel's share of it declines. ♦