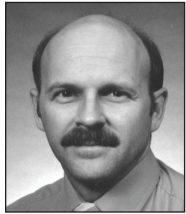# Intel Tries Integrating Graphics

## *Integrating i740 Graphics Into Whitney Could Be a Big Mistake*

Next year Intel will start down the path of integrating graphics. Its first step will be to integrate its i740 graphics chip into its Whitney north bridge, for the Celeron line. As a strategy to bolster its processor business, integrating graphics into the north bridge, and ultimately the processor, is a good idea. But Whitney itself may not be strong enough to accomplish the task; in fact, it could be a tactical blunder serious enough to derail an otherwise sound strategy.

It is possible that Intel is integrating graphics just to get a piece of the graphics-chip market. But this would be a waste of energy; even if it captured 100% of the market, the incremental revenue would be chump change to a $25 billion company. Intel cannot afford to swing at bad pitches; it must keep its eye on the microprocessor ball. For this reason, Intel is, or should be, interested in graphics only for what graphics can do for its microprocessor business.

Intel's microprocessor monopoly is a gigantic annuity, acquired through control of the x86 architecture. With that control, the company has been able to manage the market and fend off all contestants. While the x86 architecture is still sustaining the annuity, it is beginning to show stress cracks. Intel must concentrate on repairing this structural weakness.

The largest threat to Intel's annuity is slackening demand for the higher-performance processors that Intel is uniquely competent to produce. Somehow, the company must reinvigorate the demand for performance and at the same time re-establish the architectural control that will give it the same unfair advantage in the future that it enjoys today.

Intel has tried pouring money into the development of killer applications that might spur new demand for performance. But none has materialized. 3D graphics presents a ray of hope. It has the attractive attribute of being an infinitely deep sinkhole for processing power and, therefore, something Intel might be able to exploit to its advantage.

But today, 3D is of only marginal consequence, important only in games and engineering workstations. To make 3D the basis of a future annuity, Intel must find a compelling application with broad appeal and make 3D capability ubiquitous. It must also establish architectural control.

Intel's best chance of finding a compelling 3D application is to put the entire industry to work on the problem, but in a way that Intel ends up the winner. It could do this by deploying its 3D hardware ubiquitously. Doing so would give software a minimum capability on which to depend and would create a large number of common platforms to attract hordes of software developers. This plan would maximize the probability that a killer 3D app will surface.

Unfortunately, the current 3D market is too chaotic and not converging on a common level of functionality. Intel must step in to restore order, as it did with motherboards and chip sets, if it wants to push the industry forward. In this respect, Whitney is right on target. As part of the high-volume Celeron line, it has the opportunity to become ubiquitous and put Intel in control of graphics architecture.

The problem for Intel is that Whitney will not be widely deployed in Celeron systems until 2000. If Whitney is, as we expect, simply the integration of i740-level 3D graphics, Intel is setting a 1998 level of capability as the lowest common denominator for PCs that will not be ubiquitous until 2001.

This won't work. While no one knows what a future killer 3D app may look like, it will certainly require a level of capability beyond where we are today. After all, if today's capability were sufficient, the killer 3D app would already be here. It isn't, and it won't be if Whitney is the standard.

What Intel needs to do is integrate a 2001 level of graphics capability in 1999. If it can't find a way to do that at low cost, maybe it should forgo integration for now. If, as I predict, Whitney fails to meet a high performance threshold, it will not satisfy the strategic objective of serving as the basis for a compelling new class of applications based on 3D. If it fails in this objective, it's just another integrated graphics chip, which is not what Intel should be focused on. In fact, without an external AGP, Whitney just gets in the way by precluding high-performance, low-cost graphics add-ons. This shortcoming could cause a backlash, driving customers to other platforms and defeating Intel's hope of gaining control of graphics architecture.

Integrating graphics into the north bridge is a viable, even rational, strategy for making graphics ubiquitous, for establishing architectural control, and for setting up to integrate graphics capability onto the processor. But I'm afraid Intel has made a serious tactical error by underestimating the requisite level of 3D performance: Whitney will simply be too weak to support such a strategy. Thus, I expect Whitney to backfire, giving competitors an opening and forcing Intel to back away from integrated graphics. This misstep will torpedo the company's bid to seize control of graphics architecture and force it to forfeit this opportunity to shore up its annuity.   Ⓜ