



Margin Master

Media Center PCs: Managing Cost without Compromise

By Erik Sherman
February 2004

- E-mail this Article
- Print this Article
- Letter to the Editors

It seems clear in the consumer market that **PCs have a seat in the future digital living room**. Just last month, OEM Connect's *Market Analysis* ("[Entertainment Transforms the Entertainment Market](#)") covered the role that [Microsoft® Windows® XP Media Center Edition 2004](#) will play in this growing market.

Although many Media Center PCs are beginning to resemble stereo consoles on the outside, they share many inside parts with regular PCs. Still, there are significant differences that will affect product costs, says Mercury Research, Inc., a Cave Creek, Ariz. firm that analyzes the market for PC hardware. **OEMs will need to make design trade-offs**, balancing customer demands against market positioning and manufacturing costs to create products that have customer appeal at competitive prices.

An Emphasis on Entertainment

According to Dean McCarron, Mercury Research president and principle analyst, a Media Center PC is all about entertainment, which means recording and high-quality playback of video and audio. "Media Center devices are effectively **integrating what I would call a TIVO-like functionality**," says McCarron. The Media Center PC acts like a personal entertainment assistant -- storing broadcast video, providing enhanced programming information and playing DVDs.

Meanwhile, Media Center PCs are also emerging as **hubs for playing music and watching video games** on big living-room screens. In this setting, McCarron says the marketing emphasis is less on CPU, hard drive space and RAM, and more on the video and sound capabilities.

Hardware and Software Trade-Offs

To satisfy consumer demand, OEMs must **focus more on integrated television tuners** and connectors for video sources than they ordinarily would for the business market. Each Media Center PC needs a tuner -- specialized hardware that converts analog signals from satellite, cable or an antenna into digital and allows users to select a particular channel. Because broadcast signals take up lots of bandwidth, the PVR (personal video recorder) feature must be able to compress video to the MPEG-2 format and decompress it again, all in real-time.

For the highest quality PVR capabilities, McCarron **suggests hardware MPEG-2 encoding** as the answer. OEMs can choose to offer either a plain tuner with additional encoding hardware, or a high-end tuner with combined functions such as multi-monitor support or even FM radio tuning.

MPEG-2 encoding and decoding can be done in software, of course, but the **substitution puts strain on the CPU**. "With the software approach, there can be some gaps in the encode process -- you drop a frame, for example," McCarron says, "so you end up with a playback stream that may not be flawless."

To improve the image, **OEMs can use a more powerful**

Tune In on Tuners

Tuner Type	OEM Cost (\$ USD)
MPEG-2 hardware tuner board	<ul style="list-style-type: none"> ● \$85 to \$115 ● Requires separate graphics display board (\$15 to \$100)
Combination tuner/graphic display board	<ul style="list-style-type: none"> ● \$80 to \$90 (low end) ● Up to \$300 (high end)

CPU. A 2.8 gigahertz Pentium 4 chip, for example, can handle MPEG-2 encoding in software, even while a user is playing a graphically-intensive video game. A Celeron, on the other hand, might only be able to handle the video processing and nothing else.

Source: Mercury Research

Between the two extremes are potential trade-off adjustments to the video quality, such as recording video at lower frame rates and lower resolutions. The resulting lower-quality picture can, however, **put a product at a competitive disadvantage**, unless output filtering and up-sampling techniques are used to make up the difference.

When making hardware design decisions, OEMs must **look closely at the engineering specifications** for key parts. Many lower-end tuner/graphics boards offer MPEG-2 encoding, for example, but actually implement much of it in software. Whatever money is saved on the graphics hardware might then have to go into a more powerful CPU. Even high end graphics boards might provide only a partial hardware encoding assist, offloading a small amount of work from the CPU, but not all.

More Media Center Requirements

A Media Center PC has other specialized needs as well. One is video out: a feature handled by a video signal connector and circuitry that drives it. Additional costs to the OEM for video out run \$3 USD to \$5 USD per connector, although this feature is often **found integrated into graphics boards**.

The audio needs of Media Center PCs are also more critical than with regular PCs. While television audio is relatively easy to reproduce -- it is typically transmitted as two-channel stereo -- DVD playback requires something more substantial. "A lot of people **want 5.1 channel audio**," McCarron notes.

The new **Grantsdale chipset from Intel may help**. Although it includes an integrated multi-channel audio capability (see October, 2003 Margin Master, "[New PCs Configured for Profits](#)"), many compatible parts won't ship until later this year. Even then, high end Media Center PCs may still need better sound, as sound quality becomes a buyer rationale for spending more money.

Typical MPEG-2 Recording Requirements

Video Resolution (pixels)	Megabits/Second	Megabits/Second
352 x 288	4	1
720 x 576	15	3.75
1440 x 1152	60	15
1920 x 1152	90	22.5

Source: Maxtor Corp.

Add-in sound boards will likely cost OEMs \$35 USD to \$60 USD apiece, depending on volume. More feature-laden audio boards will run well into the hundreds of dollars. Mid-range and better sound boards often include digital audio output connectors, making these computers **compatible with home audio systems**.

Over the next year, OEMs will feel competitive pressure to keep street prices of mid to high end Media Center PCs **below the \$1,700 USD price point**, not leaving room for expensive additions. Additional trade-offs will be needed to control costs, and storage may be one area to consider.

Cost Cutting Measures

Practically all Media Center PCs will need a DVD burner, so this is one area of storage where cost cutting isn't much of an option. **DVD recorders today are expensive** and in demand, running an OEM \$90 USD to \$110 USD apiece. This compares unfavorably with the typical \$30 USD cost for a CD-RW drive.

Sizing the hard drive properly does offer **some chance to recoup other expenses**, however. Storing just one hour of video can take anywhere from 1 to 13 gigabytes (GB) of space, depending on the amount of compression. But that doesn't mean you have to be overly generous with storage, either. "Just because the Media Center PC is recording video, you don't necessarily say, 'I'm going to throw a 250 gig hard drive in there,'" says McCarron. The difference in cost between an 80 GB hard drive and a 250 GB unit is about \$150 USD.

DVD Burners: Fuel to Ignite Media Center Sales?

Year	Projected Revenues (\$USD, in billions)	Units (millions)
2003	1.48	3.5
2007	8.33	47.9


Source: [Semico Research Corp.](#)

Memory and processor speeds are more in line with what appear in regular PCs today, but if a Media Center PC already has encoding hardware built in, the OEM **might be able to reduce the processor speed** and memory to gain an edge.

Another potential area for savings is speakers. Although this may seem counter-intuitive because of the demand for better sound, many users will often **drive audio through their home stereo speakers**, not whatever speakers are included with the unit. For PC models that must offer self-contained speakers, good quality powered units may run \$50 USD to \$100 USD a pair wholesale, with high quality speakers selling for considerably more.

The stock choice for displays will continue to be 17-inch monitors. Because most Media Center PC will usually drive a television anyway, this is often good enough for most customers. Mid market LCD screens, while a big draw for regular PC users, often **leave something to be desired** for Media Center PCs.

"LCD screens are terrible for rendering videos compared to CRTs because of a lag time in shifting colors," McCarron says. A video connoisseur would likely stick with an old-fashioned tube, but many consumers won't understand the limitation and **will choose an LCD anyway** -- either because of the design appeal or because desk space is scarce.

OEMs face many design and cost trade-offs with Media Center PCs, but **taking the time** to make the right design choices can open new consumer markets -- and new streams of profit. 

For More Information

[Selecting ATA Disk Storage for Personal Video Recorders](#)

This Maxtor Corp. white paper by Gordon Paulus and Scott Stetzer examines some of the design trade-offs in recording video on hard drives (pdf download)


[Requirements and Recommendations for Windows XP Media Center Edition](#)

A Microsoft paper on the hardware and software components for Windows XP Media Center Edition and for Windows XP Media Center Edition 2004

[XP Media Center, Take 2](#)

Writing for *PC World*, Sean Captain describes the new features of Windows XP Media Center Edition 2004 and the new markets that Microsoft and OEMs are targeting

About Mercury Research, Inc.

Mercury Research (www.mercuryresearch.com ) , founded by experts in the field, Mike Feibus and Dean A. McCarron, is dedicated to providing insight into the markets for PC components and related hardware. As one of the industry's most quoted analysts, McCarron gained his national reputation for reliable microprocessor analysis as Vice President of Technology for In-Stat, with responsibility for technology content in the entire semiconductor research products portfolio. He has contributed to *Microprocessor Report* and *OEM Magazine*, and leads seminars on the PC and chip markets.

About the Author

Erik Sherman is a journalist and photographer whose technology work has appeared in *Electronics Design Chain*, *Electronic Business*, *Electronics Movers and Shakers*, MIT's *Technology Review* and *Newsweek*.

Have a question? Want more information? Contact the writers and editors at oemedit@microsoft.com.

© 2004 Microsoft Corporation. All rights reserved. This document is for informational purposes only and subject to change without notice. MICROSOFT MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, AS TO THE INFORMATION IN THIS DOCUMENT. The entire risk of the use or the results of the use of this document remains with the user.

Microsoft may have patents, patent applications, trademarks, copyrights, or other intellectual property rights covering subject matter in this document. Except as expressly provided in any written license agreement from Microsoft, the furnishing of this document does not give you any license to

these patents, trademarks, copyrights, or other intellectual property.

Last Updated: February 16, 2004

[Manage Your Profile](#) | [Contact Us](#) | [E-mail this Page](#) | [Newsletter](#) | [All Rights Reserved](#) | [Terms of Use](#) | [Feedback](#) | [Site Help](#)

©2004 Microsoft Corporation. All rights reserved. [Terms of Use](#) | [Privacy Statement](#)