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HDMI goes mobile

Posted: 01 May 2008

How to connect to a large-screen TV and display high-definition video from portable devices without losing image quality is key design challenge facing many OEMs.

In response, [MIPS Technologies](#) unveiled what it claims is the industry's first 65nm IP offerings for HDMI. The low-power HDMI transmit IP will support data rates of 1.65Gbit/s per transition minimized differential signaling (TMDS) channel (approximately 5Gbit/s in total) and video resolution up to 1,080-line progressive at 60Hz, according to MIPS.

"HD content needs to get out of a cellphone to a TV in HD format," said Mark Tyndall, VP of business development at MIPS.

HD everywhere

At the Mobile World Congress, several chip vendors such as [NXP Semiconductors](#), [Texas Instruments](#), Broadcom and Nvidia showed off how HD content--video and photos shot by an HD-capable camera phone or a movie stored in a cellphone's SD flash card—can be moved to a living room TV.

While such demonstrations did not illustrate which interface technology these chip vendors will ultimately use to move HD content, MIPS' Tyndall said, "I was reinforced [on the industry need for a low power, high definition connectivity solution."

Separately, MIPS sealed a deal with NXP Semiconductors allowing MIPS to license NXP's advanced HDMI receive technology, currently used in the Dutch company's DTV chips.

The deal allows MIPS to further develop HDMI-receive IP solutions in advanced geometries for integration onto SoCs as part of the HDMI product portfolio of its analog business group, formerly known as Chipidea.

MIPS plans to drive its IP to a lower geometry—eventually down to 40nm—and make it broadly available. Noting NXP's expertise in consumer SoCs, Tyndall said the relationship with NXP "will give us credibility and help us a lot in entering the market."

Rival solutionMoving content from mobile devices to TV wasn't an issue until recently, largely because the industry assumed that nobody needed HD-quality video on a portable device because the screen is so small.

That assumption, however, no longer holds true. If trade show demonstrations are any indication, more portable devices—including mobile handsets, portable media players and portable camcorders—will soon start featuring video encoding and decoding capabilities at HD video resolution.

If so, there will be a huge gap to fill—in terms of HD connectivity between portable devices and TV. MIPS, however, is not alone eyeing the opportunity to bring high-end wired HDMI to mobile devices. At this year's Consumer Electronics Show, Silicon Image announced plans to start sampling in February chips for its new [mobile high-definition link](#) (MHL).

MHL cuts the three TMDS channels in a standard HDMI connection to just one. A streamlined transmitter is embedded in a mobile device and a full HDMI bridge chip is placed in a separate wired cradle designed by OEMs.

MHL offers a 2.25Gbit/s link consuming 60mW average power on mobile devices. It operates over five pins that can be mapped to any existing connector on a device. It also aims to carry up to full 1,080-progressive video encrypted with HDMI's High-Bandwidth Digital Content Protection (HDCP).

Tyndall, however, is skeptical of MHL. He said MHL, in pursuit of a small form factor, has deviated from the standard. For MHL-featured mobile devices to connect to an HDTV equipped with

standard HDMI, a bridge chip housed in a dongle needs to be plugged into the HDTV. "This is not going to fly," said Tyndall. "The dongle approach has been tried with other standards before, but it never worked."

Power specs undisclosed

Aside from the MHL vs. HDMI debate, Richard Wawrzyniak, senior market analyst at Semico Research Corp., said the essential difference is that MIPS offers an HDMI solution to be embedded in an SoC. Silicon Image offers a simplified HDMI interface for mobile devices in discrete devices.

"The advantage for MIPS is in being able to offer this IP to every designer of SoCs that is contemplating targeting his solution at consumer applications that need HDMI," Wawrzyniak said. "With Silicon Image, you need to buy discrete devices, not create your own solution."

For now, MIPS is not disclosing the exact power consumption required for its HDMI transmit IP supporting a 5Gbit/s link, except to say that its 65nm IP will enable a "low-power, high definition" HDMI transmit solution for mobile chip vendors. When pressed, Tyndall said, "It will be much less than 60mW."

He added that the new IP lets HDMI move onto SoCs more cost effectively, using less power in a smaller foot print. The first mobile products using MIPS' low-power HDMI IP core are expected to reach the market by year-end, the company said.

The HDMI transmit integrates configurability options to support data rates up to 10.2Gbit/s and video resolutions to 1,080p at 120Hz, 1,440p and beyond.

MIPS also said a High-Bandwidth Digital Content Protection (HDCP) encryption/decryption feature is available as an option. Additionally, the integrated DMA will eliminate the need for a separate audio or video interface, allowing autonomous access from the HDMI controller to the audio and video information stored in SoC system memory.

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