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MAP-CA Ready for Prime Time

Equator, Hitachi Announce New Media Processor for Digital Television

By Peter N. Glaskowsky {3/13/00-04}

After shipping two general-purpose media processors meant to support a wide variety of applications, Equator and Hitachi have announced the first application-specific member of their media-accelerated processor (MAP) family, the MAP-CA—named for its intended market in consumer appliances. The MAP-CA is optimized for digital television and related applications. It comes with new core features and peripherals that enhance performance on video encoding and decoding, compared with the company's original MAP1000 processor (see *MPR 12/7/98-01*, "MAP1000 Unfolds at Equator").

The new chip is both faster and much less expensive than its predecessors. The MAP-CA operates at speeds up to 300MHz and costs just $40 in quantity, a great improvement over the die-shrunk MAP1000A's $110 price tag for 220MHz operation. The MAP-CA lacks some of the features found in the earlier chips, however. These deletions reflect the MAP-CA's tight focus on digital-video processing. They are meant to make the MAP-CA an affordable alternative to the combination of general-purpose processors and custom ASICs found in high-end digital televisions and related products.

Figure 1 shows a block diagram of the MAP-CA. Gone are several networking interfaces and a number of features that allowed the MAP1000 to be used as a multimedia coprocessor in PC applications. These features included a second PCI/AGP interface, USB support, and an AC97 audio controller. Also removed are the MAP1000's 3D-graphics support and its unique VersaPort, a 53-pin configurable I/O interface. The MAP-CA is superior to the earlier chip in some ways. The on-chip caches and data buffers are twice the size, and the MAP-CA also supports twice as much external SDRAM (128M) as the MAP1000. This memory operates at up to 150MHz.

With a list price of just $40 in high volume, the new chip is about as expensive as the fastest MIPS and PowerPC

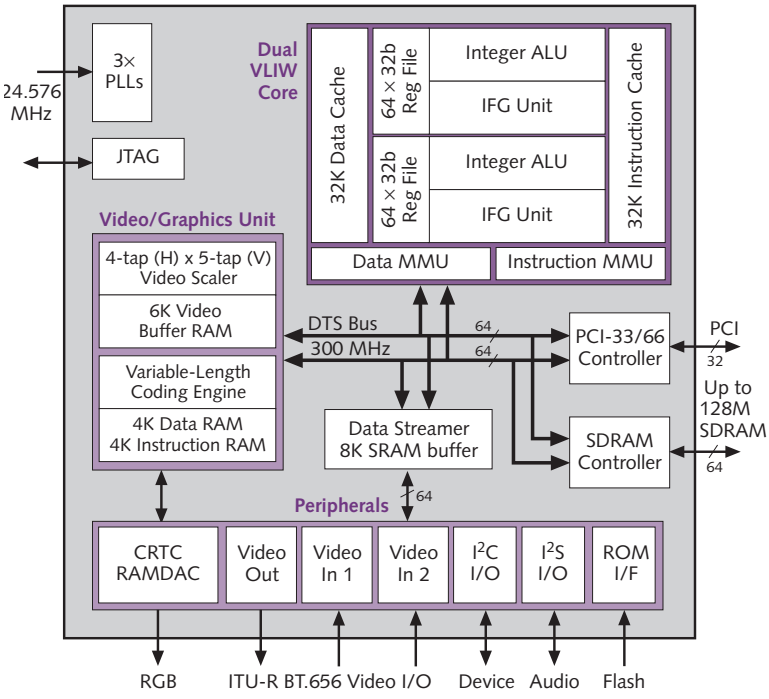

Figure 1. The MAP-CA lacks some of the special-purpose interfaces of its predecessor, the MAP1000, but it doubles the size of on-chip caches and buffers and provides better support for digital-television applications.

Price & Availability

Samples of the MAP-CA are available now. The chip will enter production this summer and will be priced at $40 in large quantities. For more information, visit the Equator Web site at www.equator.com.

embedded microprocessors, but it offers dramatically higher performance on video-processing algorithms. The MAP-CA lacks the floating-point function units of the MAP1000, however. Equator has removed these units as part of its cost-reduction efforts, believing they are of little value for digital television. Equator says the MAP-CA can perform 16 fixed-point multiply-accumulate operations per cycle on 16-bit operands at 300MHz, for a peak throughput of 9.6 GOPS (billion operations per second). For MPEG-2 encoding, the MAP-CA can perform motion estimation for 9.3 billion pixels per second, compared with just 800 million pixels per second for Philips' TriMedia media processor (according to Equator). The MAP-CA is thus fast enough to support simultaneous MPEG-2 encoding and decoding—the basis of hard-disk video recorders such as those from TiVo and ReplayTV.

Equator enhanced two elements of the MAP1000 design—a variable-length-coding (VLC) engine and a high-quality video scaler—to better meet the needs of the target market. The VLC engine, used to encode and decode digital-video bitstreams, is based on a simple 16-bit microprocessor, but most VLC processing is handled by custom extensions that Equator designed for this purpose. The new VLC engine is enhanced with new opcodes and double the local memory. The video scaler provides up to four vertical and five horizontal taps and includes 6K of line-buffer memory to support displays up to 2,048 pixels wide.

The new chip includes independent analog-RGB and NTSC/PAL digital-video outputs, as well as two digital-video inputs. If the application needs analog-component video—commonly found in today's high-definition television (HDTV) products—external components will be required. Additional I/O devices may be connected to the MAP-CA's PCI port, which supports both 33- and 66MHz operation. The AGP modes found in the MAP1000 are not present on the MAP-CA, which will not be used as the primary graphics adapter in PC systems.

The MAP-CA will be manufactured by Hitachi in its 0.2-micron, six-layer-metal process. The chip comes packaged in a 352-contact BGA and consumes 5W of 1.8V power at 300MHz. Also available is a 250MHz version, which runs on 3W at 1.5V. Both chips support 3.3V I/O.

With the MAP-CA, Equator pulls ahead of media-processor pioneer Philips, whose TriMedia processors have been evolving slowly since they were first announced in 1994. Philips's Nexperia NX-2600 and NX-2700 (see *MPR 9/13/99-en*, "New TriMedia Chips Come With New Roadmap") are also aimed at digital-TV applications but can't match the MAP-CA's performance or flexibility. The Nexperia chips lack memory-management units, a feature not expected on a TriMedia chip until the TM-1400 ships later this year. The TM-1400 is also expected to hit 300MHz and include a new 64-bit core, features that should narrow the performance gap relative to the MAP-CA.

The MAP-CA is the first product from Equator that meets the needs of a specific target market, and as such is the company's first opportunity for mainstream success. Hitachi's growing role as a development partner for MAP-family chips signals its interest in these devices for its family of consumer-electronics products, though neither company has yet announced specific design wins. The MAP-CA2—an even faster, more affordable derivative—is due out by 2Q01 with an expected speed of 450MHz at a price of just $25.

Equator's broad support from cable-TV companies and other major players in the media and communications industries (including Groupe Videotron, RealNetworks, and Interval Research) gives the company an opportunity to break the media-processor jinx and become the first independent media-processor maker to see real success. To achieve this goal, Equator must continue to develop and deliver products that meet real-world needs in specific applications. The MAP-CA shows that Equator is moving in the right direction.