Frequently Asked Questions

What is TI announcing?

For what applications is the DM355 processor best suited?

What are the key market drivers for this device?

What is the availability of the DM355 processor products?

What are the technical specs for the processor?

Which operating systems does the DM355 processor support?

What is the anticipated power consumption on this device?

Why are you introducing an ARM®-based processor?

How is this a DaVinci device when it has a different architecture from the TMS320DM644x and TMS320DM643x devices?

Why is this solution a better offering for the customer?

What if customers want the flexibility of a DSP?

What is included with the development tool?

What software comes with the processor and/or DVEVM?

Since software is included with the processor, if your customers are using it for something other than video, would you encourage that?

What differentiates TI from the competition?

What new features will this product enable for digital still cameras?

Texas Instruments

DaVinci™-Based Products: TMS320DM355 Processors

What is TI announcing?

TI is announcing a new DaVinci technology solution for low-cost, HD video systems. This offering includes:

- A digital media processor, the TMS320DM355, based on an ARM9 plus video accelerators. It is available in two clock speeds – 216 MHz version for U.S. $9.75 at 50 KU or the 270 MHz version for $11.49 at 50 KU.
- HD MPEG-4 SP encode or decode at 720p and 30 frames per second and JPEG encode or decode at 50 MegaPixels per second.
- The DM355 Digital Video Evaluation Module (TMDXEVM355 EVM), complete with demos, production-ready, fixed-function codecs and MontaVista Linux Pro Demonstration tools, available for U.S. $495.

Key benefits of the DM355 processor include:

- HD video for less than U.S. $10: New DaVinci digital media processors for MPEG-4 HD tuned for digital video applications
- Longer battery life: The DM355 processor provides ultra-low power consumption for portable HD video/imaging products
- Fastest time to market: Proven, integrated DaVinci technology saves months of development time

By providing this offering to the mass market as part of the DaVinci technology portfolio of products, TI has the opportunity to reach new segments within the digital video market.

For what applications is the DM355 processor best suited?

- Digital cameras
- Digital photo frames
- Low-power network cameras
- Video doorbells
- Video baby monitors
- Portable media players
- Low-cost four-channel DVRs
- Many others

What are the key market drivers for this device?

There is a growing demand for high-definition video capture and playback in handheld devices at consumer price points. OEMs and ODMs are looking for a complete solution that will enhance their products, keep them affordable and reduce time-to-market.

What is the availability of the DM355 processor products?

At announcement date (September 4, 2007), silicon will be available and development tools will be available with an eight-week lead time. The devices will reach production volume in 1Q08.

What are the technical specs for the processor?

The DM355 processor contains:

- An ARM926EJ-S™ core running at 215 MHz
- A video/image co-processor running at 216 MHz or 270 MHz
- A MPEG/JPEG co-processor and a video processing subsystem
- Memory on ARM of 16-KB I-Cache; 8-KB D-Cache; 8-KB ROM; 32-KB program/data
- Peripheral highlights include the Video Processing Subsystem with resizer, image processing engine, 16-bit digital input, integrated OSD, one video DAC, 16-bit digital YCbCr output
- USB 2.0 HS device and mini-host with PHY
- And a variety of other peripherals
- In a package of: 13 × 13 mm BGA, 329 pin, 0.65-mm pitch

Which operating systems does the DM355 processor support?

The DM355 processor supports Linux and Windows® CE. Linux support is available from MontaVista, while Windows CE is in development by select third-party partners.

What is the anticipated power consumption on this device?

- <400 mW for HD video encode (720p)
- ~1 mW standby power, deep sleep mode

Why are you introducing an ARM®-based processor?

We are dedicated to meeting the needs of our customers and one thing we've been hearing is that they want and need to be able to create scalable product lines, within which they can have similar products at varying levels of functionality and price. By offering the DM355 processor and DVEVM, we've made it easier for our customers to do this.

This device includes the same Video Processing Subsystem as all DaVinci™ processors to help offload the processing required by the ARM. It also includes an MPEG/JPEG co-processor (MJCP) which handles the "heavy lifting" of the video processing. Thus the ARM, whether you have the 216 MHz or 270 MHz device, will be free to handle features such at the audio processing, user interface, networking, etc.

Finally, the ARM architecture allows the enormous number of open source Linux developers to reuse their IP on this device.

How is this a DaVinci™ device when it has a different architecture from the TMS320DM644x and TMS320DM643x devices?

DaVinci technology represents TI's complete offering for digital video applications, and we recognize that different video applications have different processing requirements. Through DaVinci technology, we offer a range of processing architectures for our customers to select from and all are wrapped with DaVinci software, development tools and support.

Why is this solution a better offering for the customer?

The DM355 processor offers much higher performance than what is currently available from other ASICs and ASSPs on the market today. The combination of HD video capture and display, with additional ARM horsepower and included software codecs, all for less than U.S. $10 is unprecedented.

What if customers want the flexibility of a DSP?

TI has a strong heritage in digital signal processing and offering our customers the most robust products possible by whatever means necessary. TI is committed to digital video processing by offering a variety of devices that meet the needs and demands of our customers so that they can develop the most advanced and varied digital video end equipments possible. If they need more flexibility than the DM355 processor offers there are other architecture options in the DaVinci portfolio that they should consider.

What is included with the development tool?

The DM355 DVEVM (TMDXEVM355) includes:

- MontaVista Linux Pro 4.0 demonstration version
- Full software board support package (BSP)
- All drivers including UART, I2C, SPI, EDMA, NAND, MMC, SDIO, USB high speed
- U-boot loader
- On-board Ethernet controller with application notes and schematics
- JPEG and HD MPEG-4 SP production codecs and G.711 codec
- Video capture of NTSC or PAL signals via composite video input
- NTSC or PAL output via composite video output
- Other features such as microphone in, headphone out, line in and line out, UART, USB 2.0 OTG, 2-GB NAND Flash memory and JTAG for test
- Free ORCAD files, schematics and PCB layout files

What software comes with the processor and/or DVEVM?

Royalty and license-free* production-ready HD MPEG-4 encode and decode and JPEG encode and decode plus a G.711 codec are included with the DM355 processor solution.

Since software is included with the processor, if your customers are using it for something other than video, would you encourage that?

Sure. TI is always interested in seeing what our customers do with the technology we provide them. This is one of the best ways to see innovation in the market and we have no interest in trying to limit our customers. By making this part available to the mass market, we are eager to see how our customers will innovate with it.

** Patent IP royalties are not included, and must be licensed and paid for separately.*

What differentiates TI from the competition?

TI's solution offers exceptional performance (providing up to 75 MegaPixels of hardwired performance). This translates into such features as stunning image quality, the ability to do video stabilization, automatic red-eye removal, in-camera editing and panoramic stitching – allowing the consumer to take the perfect shot every time. Additionally, there is no memory penalty, as in some competitor's products.

What new features will this product enable for digital still cameras?

TI's solution enhances core features – such as noise filtering, red-eye removal, in-camera editing and panoramic stitching – while enabling new ones such as lower latency, more image enhancement, and the ability to take a picture in less than a 10th of a second.

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