

Product Bulletin

DaVinci™ Technology Digital Video Software Development Kit

Overview

Used in conjunction with the Digital Video Evaluation Module (DVEVM), Texas Instrument's Digital Video Software Development Kit (DVSDK) overcomes many of the hurdles that often stand in the way of rapidly developing complex digital video systems. Targeted for TI's dual-core DSP/ARM® DaVinci™ video technology, the DVSDK is made up of software tools that simplify and accelerate the integration of multiple software elements and their subsequent optimization into a cohesive, finely-tuned video subsystem. Sometimes just getting started with an operating system (OS) can be time-consuming and laborious. The DVSDK addresses all of these factors.

The DVSDK is composed of three essential components:

- eXpressDSP™ Configuration Tool
- TMS320DM644x™ SoC Analyzer
- MontaVista Linux Support Package

Simplifying Integration

Digital video systems are made up of multiple encoders, decoders, CODECs (encoders/decoders), algorithms and other software

components which must all be integrated together into an executable image long before any content can run on the system. Stitching all these elements together and making sure they function cohesively can be a monumental task. Some systems will require distinct video, imaging, speech, audio and other multimedia modules. Manually integrating each software module or algorithm distracts developers from working on value-added functionality, such as incorporating compelling user features and applications that will be crucial to the system's success in the marketplace.

With the eXpressDSP Configuration Tool developers need not concern themselves with interfaces or software hooks from one module to the next. The Configuration Tool automatically bundles together into an executable image any software CODEC or module that conforms to the eXpressDSP Digital Media (xDM) specification. No more hand tooling is required, conceivably reducing development time by weeks, if not months. With this type of methodology, the tremendous cost savings generated by software re-use across distinct hardware platforms is simplified and made exceedingly efficient.

Key Features

- Accelerates development of digital video applications
- Frees developers to concentrate on value-added and differentiated functionality
- Fast start-up for development with proven and robust MontaVista Linux
- Integrate CODECs and software modules automatically into an executable image
- Visually identify bottlenecks to optimize a seamless and compelling user experience

Ready-to-implement xDM CODECs and software algorithms are available through TI's Digital Media Software Program, which is composed of software modules developed by TI and its third-party Authorized Software Providers (ASP). More information on the Digital Media Software Program can be found at www.ti.com/digitalmediasoftware

The eXpressDSP Configuration Tool incorporates the resources of the Linux operating system (OS) as well as DaVinci technology's CODEC Engine, DSP/BIOS™ and DSP/BIOS Link. CODEC Engine is a framework for controlling a multi-threaded CODEC environment while DSP/BIOS plays the role of the system's real-time kernel and DSP/BIOS Link functions as an abstraction layer for the inter-processor communications that takes place between a DaVinci processor's DSP and ARM cores.

Optimization Through Visualization

Integrating multiple software modules into an executable unit is just the first step. With several

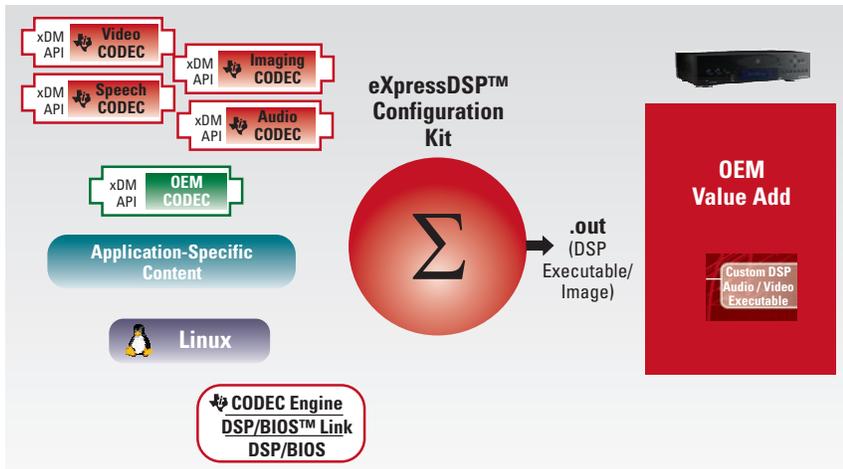


Figure 1. Minimize the Complexity of Digital Video Systems.

processing engines executing code in parallel, timing, input-output (I/O) and resource availability issues can arise and cause bottlenecks that degrade the overall processing performance and throughput of the video system.

The second element of the DVSDK, the TMS320DM644x™ SoC Visual Analyzer, is a noninvasive graphical tool that probes the video system and visually shows developers where and why performance degradations are occurring. Based on eXpressDSP™ Data Visualization technology, the SoC Analyzer eliminates the tiresome and lengthy task of manually writing invasive break points or demons, inserting these into the video system code where developers suspect bottlenecks might be and ultimately merging the results of executing the code on the system's two processing cores into one graph for analysis. Instead of this process, the TMS320DM644x SoC Analyzer simply visualizes the real-time data and processing flow of the system for developers, instantaneously pinpointing where bottlenecks exist.

By rapidly identifying and isolating performance degradations, the SoC Analyzer lets developers spend their time solving problems

not just looking for them. Ultimately, optimization is critical to providing a compelling and seamless user experience.

The TMS320DM644x SoC Analyzer is a comprehensive visualization tool. With it developers can immediately see the following:

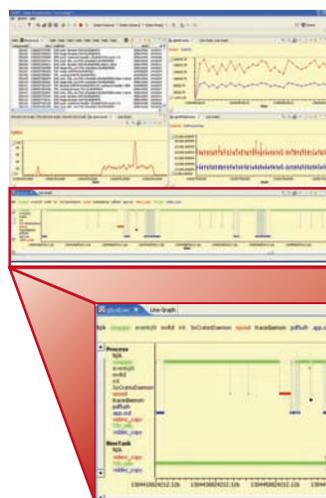
- System interaction analysis
- Load distribution analysis
- Bottleneck isolation
- Unexpected behavior
- Benchmark application performance

Ramp-Up Quickly

Often, ramping up the development of a video system is no trivial task in itself. The DVSDK's MontaVista Linux Support

Package lets developers leapfrog the ramp-up phase entirely. Rather than spending an excessive amount of time testing and validating the robustness of an operating system, locating the correct drivers that are needed and ensuring that all these elements work together cohesively, the development team can begin its real work immediately. The DVSDK's Linux kernel is a proven, fully-tested operating environment that's been optimized for video applications. It is fully supported and maintained with continual updates and enhancements via the one-year subscription to the MontaVista Zone website.

The MontaVista Linux support package, which is available from and supported by TI, has been specifically optimized for video development on DaVinci technology. Linux-based drivers for controlling the multimedia resources of the DSP core have been integrated into the OS's kernel. In addition, the DVSDK's standard video and audio application programming interfaces (API), which include V4L2 and FBDev for video and OSS for audio, give developers high-level coding capabilities that minimize development cycles.



TMS320DM644x SoC Analyzer

Based on eXpressDSP Data Visualization Technology

Industry's first graphical system visualization technology provides:

- System interaction analysis
- Load distribution analysis
- Bottle neck isolation
- Unexpected behavior identification
- Benchmark application performance

ARM® and DSP running tasks on same graph

Figure 2. Maximize Design Efficiency and Performance.

Moreover, the MontaVista Linux Support Package includes DevRocket, a comprehensive integrated development environment (IDE) that features a graphical and intuitive interface to accelerate programming tasks.

Get Started Today

When combined with the DVEVM, the TI DVSDK is a complete development kit from start to finish. Each of the component parts of the kit complements the others and each one plays its own critical role in moving a digital video development project to a swift completion.

MontaVista Linux with its vast cadre of tools, APIs, drivers and other open-source resources gives the design team the kind of traction and proven robustness it needs to begin development

immediately. The groundwork is already in place.

Following system definition, many, if not all, of the required CODECs, algorithms and other software modules can be quickly obtained through TI's Digital Media Software Program. Then, the eXpressDSP™ Configuration Tool accelerates the software integration of these xDM-compliant modules by automatically bundling them together, seamlessly linking each to the others and producing an executable image of the video system. Hand tooling is eliminated and the project rapidly moves into the optimization stage.

Next, the TMS320DM644x™ SoC Analyzer gives the development team visibility into the operation of this work-in-process video system. Optimizing the

executable image is required if the system is to provide the seamless and compelling user experienced that's imperative in today's marketplace. Without the visualization capabilities of the TMS320DM644x SoC Analyzer, optimization would be manual guesswork, stretching the development cycle out significantly. With the SoC Analyzer, the real-time flow of the video system's processes and data is graphically portrayed. The whereabouts and reasons for bottlenecks become apparent and the system is quickly and efficiently optimized.

For More Information...

For more information on the TI Digital Video Software Development Kit, go to www.ti.com/dvSDK or contact a TI salesperson.

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