

Product Bulletin

DSP/BIOS™ Link for the OMAP™ Platform

Microprocessor-DSP communications services integrated with DSP/BIOS

Key Features

- Point-to-point data streaming between microprocessor and DSP
- Easily bootload the DSP from microprocessor
- Pre-tested driver support for OMAP
- Compact, scalable footprint on both microprocessor and DSP
- Source-code porting kit

Many DSP-based applications, including everything from digital cameras to mobile communications, use a microprocessor to control the DSP. This requires developers to implement communications software that enables data and control information to be exchanged between the microprocessor and the DSP. In addition, the microprocessor may be responsible for booting the DSP and instantiating the algorithms required by a specific function into DSP internal memory. Previously, developers had to create these functions from scratch. DSP/BIOS Link eliminates this task by providing a robust set of microprocessor-DSP communications services for TI's OMAP platform.

Source-code porting kit addresses broad range of microprocessor platforms

Since embedded applications use a wide variety of real-time operating systems (RTOS), DSP/BIOS Link provides a C source-code porting kit. This enables developers to easily port DSP/BIOS Link services to any microprocessor RTOS. DSP/BIOS Link has been carefully designed to simplify portability, with both driver and RTOS dependencies abstracted into specific modules. A pre-ported version of DSP/BIOS Link for the Monta Vista embedded Linux operating system is included in the porting kit.

Bootling and data streaming

DSP/BIOS Link provides a COFF parser and loader that enables the microprocessor to load the boot image into DSP memory. To support easy exchange of data or commands between the microprocessor and DSP, DSP/BIOS Link provides data streaming services. The data streaming enables multiple virtual channels to be created over a single physical link. For OMAP devices, up to 16 channels are supported. The virtual channels provide higher performance, point-to-point communication between microprocessor and DSP threads, compared to single channel implementations that required a dedicated thread at each end to forward messages.

The application may create streams dynamically or statically. On the DSP, a developer simply uses the DSP/BIOS streaming input/output (SIO) objects. The data streaming provides asynchronous, frame-based input/output (I/O) where the sending thread issues multiple buffers into the

stream without waiting for the receiving thread to respond. This improves efficiency by enabling double- or triple-buffering for streams with high data rates.

Compact footprint minimizes memory requirements

DSP/BIOS™ Link is highly scalable to help developers minimize overall system memory requirements. On the microprocessor, developers can optionally include four components. The data streaming module requires approximately 10 kBytes of code and the boot-loader requires roughly 3 kBytes of code. These modules require the presence of the Link Driver module, the size of which varies

according to the communications medium complexity. For applications with extremely constrained memory on the microprocessor, a low-level module that provides the ability to read/write DSP memory and interrupt the DSP can be used without the other modules.

On the DSP core, the Link Driver typically requires about 1–2 kWords of memory, depending on whether direct memory access (DMA) support is desired. The bootloader does not require the presence of any DSP/BIOS modules. Data streaming requires the DSP/BIOS SIO module to be included.

OMAP™ link driver support

DSP/BIOS Link provides a pre-tested working driver for OMAP. This driver uses the CPU to copy data from DSP memory to ARM® memory. For Linux-based applications, this driver offers data transfer rates of up to 11 MBytes/sec. In the future, a driver based on OMAP's system DMA will offer even higher data transfer performance.

For more information

The DSP/BIOS Link can be found at www.ti.com/bioslink

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