

Upgrading Applications to DSP/BIOS II

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Abstract

DSP/BIOS II provides support for API functions that existed in the previous version of DSP/BIOS that is 100% compatible with the previous version. This upgrade adds new API modules and functions, along with a new Code Composer Studio plug-in. This document briefly describes the new features. It also describes how to upgrade applications and how to disable portions of the API in order to minimize code size.

Contents

What's New in DSP/BIOS II?	3
New Modules	3
New Functions for Existing Modules	3
New Kernel/Object View Plug-in	4
New Examples and Documentation	4
Converting Applications	4
Converting Configuration Files	4
Rebuilding Programs	4
Minimizing Code Size	5

What's New in DSP/BIOS II?

New Modules

This DSP/BIOS upgrade adds the following modules to DSP/BIOS:

- ☐ ATM. Atomic functions
- ☐ C54 or C62. Target-specific functions
- ☐ DEV and Dxx. Device driver interface
- ☐ LCK. Resource lock manager
- ☐ MBX. Mailbox manager
- ☐ QUE. Queue manager
- ☐ SEM. Semaphore manager
- ☐ SIO. Streaming I/O manager
- ☐ SYS. System services manager
- ☐ TSK. Task manager

A major new feature is the addition of task threads. Tasks have priority levels lower than those of software interrupts (SWIs) and higher than the idle thread. In contrast to SWIs, tasks are blocking threads. You can suspend a task and it will wait until some other thread readies the task. You can use the LCK, MBX, and SEM modules to create objects used to manage task synchronization and data sharing. Do not confuse the mailboxes supported by the MBX module with the mailbox values used by SWIs. Section 4.1.3 of the *DSP/BIOS User's Guide* compares the thread types supported by DSP/BIOS.

DSP/BIOS now includes a streaming I/O model. This model provides a more structured approach to device-driver creation. It provides blocking functions to access the stream and a set of built-in device drivers. Section 7.2 of the *DSP/BIOS User's Guide* compares the pipe and stream I/O models.

The new ATM modules adds atomic functions for performing some basic operations on variables without allowing interrupts during execution of the function. The new C54 or C62 module (depending on your DSP family) provides functions for making dynamic changes to the hardware interrupts. The new QUE module manipulates a queue data structure. The new SYS module adds functions for handling formatted data output and program termination conditions.

New Functions for Existing Modules

The MEM and SWI modules provide several new functions. The new MEM functions allow dynamic allocation of memory segments. The new SWI functions allow you to dynamically create and delete software interrupt objects and to change their properties at run-time. (Many of the new modules described in the previous section also allow you to dynamically create and delete objects at run-time.)

New Kernel/Object View Plug-in

A new plug-in, called the Kernel/Object View has been added to Code Composer Studio. This plug-in has six tabbed pages that allow you to view system-wide information (KNL), tasks (TSK), mailbox objects (MBX), semaphore objects (SEM), memory segments (MEM), and software interrupts (SWI).

New Examples and Documentation

Several new examples have been added in the c:\ti\cXXXX\examples\bios folder. These include examples that use the new DSP/BIOS modules.

The *DSP/BIOS User's Guide* and the DSP/BIOS online help have been updated to include documentation for the new modules and other new features.

Converting Applications

The process for converting an application from the previous version of DSP/BIOS is simple. Your existing code that uses DSP/BIOS is 100% compatible with the new DSP/BIOS API. You will simply allow the Configuration Tool to convert your configuration file to add support for the new modules. However, you should note that this is a one-way conversion. You should make a copy of your application project and convert the copy.

Converting Configuration Files

Follow these steps to convert your configuration file. The conversion adds new modules and objects to the configuration.

1. Use Code Composer Studio to open the copy of your project.
2. Choose File→Open and select Configuration Files (*.cdb) in the Files of type list.
3. Select your configuration file and click Open.
4. You will see a message that tells you the configuration file is out of date.
5. Click Yes to convert the configuration file.
6. Save the configuration file so that the header and linker command files are recreated.

Rebuilding Programs

After you convert the configuration file, be sure to rebuild the program using Rebuild All rather than by doing an incremental build.

Minimizing Code Size

If you are concerned about code size and do not plan to use task threads or dynamic memory allocation, you can disable support for these features in the TSK and MEM manager property windows. This helps to minimize the size of your program.

To disable the task manager, right-click on the TSK - Task Manager and choose Properties from the pop-up menu. In the Properties window, remove the checkmark from the Enable TSK Manager box and click OK.

To disable dynamic memory allocation, right-click on the MEM - Memory Section Manager and choose Properties from the pop-up menu. In the Properties window, put a checkmark in the No Dynamic Memory Heaps box and click OK.

Functions that dynamically create objects affect code size only if a program calls these functions. For example, if you are concerned about code size, create your SWI objects using the Configuration Tool, rather than by calling SWI_create.

References

1. *TMS320C5400 DSP/BIOS User's Guide* , SPRU326B, 12/99.
2. *TMS320C6000 DSP/BIOS User's Guide* , SPRU303A, 12/99.
3. DSP/BIOS online help.

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