

Micro Digital Extends SMX® RTOS Support to BeagleBone Black



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SMX® RTOS is now available on BeagleBone Black. SMX RTOS provides deterministic real-time performance that enable developers to use it for industrial applications that have hard real-time requirements. SMX RTOS includes the smx multitasking kernel, smxNS TCP/IP stack, smxFS FAT file system, and smxUSB host and device stacks. Developers can choose only the modules they need for their application. These modules are shipped fully preconfigured and running together on the board together with the board support package (BSP). Detailed BSP notes are provided for each board that summarizes key settings in the BSP, kernel, and middleware modules and to alert about any special hardware issues. SMX RTOS has previously been released for other Sitara™ AM335x boards, such as the industrial development kit (IDK), EVM, and software development kit (SDK). It has also been used in multiple Sitara AM335x applications.



The smx real-time kernel has an advanced architecture that incorporates numerous features that enable developers to easily meet real-time deadlines while benefiting from the ease-of-use offered by starting with a proven set of RTOS modules. Some of its key features that offer superior real-time performance include:

- Link service routines (low overhead threads) for low interrupt latency
- Preemptive scheduling and support for one-shot tasks and stack sharing
- Messaging with features for safety, priority passing, broadcasting, multicasting, and block migration, as well as simple queue-type messaging
- Mutexes with priority inheritance and ceiling protocol, which support priority propagation and staggered priority demotion
- Semaphores of six types including event, resource, threshold, and gate.
- Event groups that support AND, OR, and AND/OR combinations of flags.
- Timers (one-shot and cyclical) that invoke LSRs to reduce jitter, as well as pulse timers for PWM, PPM, and FM.
- Heap that uses bins to maximize performance and minimize fragmentation, with the ability to easily tune it for your application.

SMX RTOS has also associated debug features and tools that enable developers to more easily optimize system design and debug any multitasking-related issues. The error management system allows both local and central handling so the developer can handle and, if necessary, customize error messages with minimal effort. The smxAware debugging tool has graphical displays for event timelines, stack usage, profiling, memory usage, and memory map overview. These views allow the developer to optimize memory use and performance to ensure real-time deadlines are being met. SMX RTOS requires IAR Embedded Workbench for ARM as the development environment and a JTAG connector must be added to the BeagleBone.

For more details on SMX RTOS features that simplify development of real-time applications, go to www.smxrtos.com/special.

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