OPERATING SYSTEMS

Compilers and real-time operating systems for LEON and ERC32

AEROFLEX GAISLER

Introduction

Aeroflex Gaisler provides LEON and ERC32 users with a wide range of popular embedded operating systems. Ranging from very small footprint task handlers to full featured Real-Time Operating System (RTOS). A summary of available operating systems and their characteristics is outlined below.

VxWorks

The VxWorks SPARC port supports LEON2 and LEON3. Drivers for standard on-chip peripherals are included. The port supports both non-MMU and MMU systems allowing users to program fast and secure applications. Along with the graphical Eclipse based workbench comes the extensive VxWorks documentation.

WIND RIVER

VxWorks 6.3 & 5.4

- MMU and non-MMU system support
- Networking support (Ethernet 10/100/1000)
- UART, Timer, IRQ, CAN, SpaceWire support
- Eclipse based Workbench
- Commercial license

ThreadX

The ThreadX SPARC port supports LEON3 and its standard on-chip peripherals. ThreadX is an easy to learn and understand advanced pico-kernel real-time operating system designed specifically for deeply embedded applications. ThreadX has a rich set of system services for memory allocation and threading.

THREADX®

ThreadX 5.0 Pico-Kernel

- Non-MMU system support
- Bundled with NewLibC
- Possible upgrade to NetX, FileX and USBX
- Very small footprint
- Commercial license

Linux

Linux support for MMU based LEON2 and LEON3 systems is furnished through a special version of the SnapGear Embedded Linux distribution, which is provided as a full source package containing kernel, libraries and application code for rapid development of embedded SPARC systems. In addition, support for non-MMU LEON systems is provided through µCLinux.

SnapGear Linux 2.6

- MMU system support only
- Symmetric Multi Processing (SMP) (LEON3 only)
- Networking support (Ethernet 10/100/1000)
- USB 2.0 and 1.1 support
- ATA DMA Support
- Graphical support (SVGA Frame Buffer)
- µCLibc and GNU Libc
- Open source

SNAPgear

µCLinux 2.0

- Non-MMU system support
- Networking support (Ethernet 10/100/1000)
- µCLibC
- Open source

RTEMS

The RTEMS SPARC port supports LEON3, LEON2 and ERC32 and their standard on-chip peripherals. RTEMS is a real-time kernel that has implemented standard interfaces such as pthreads, POSIX and driver models making is easy to port applications and drivers between operating systems. The LEON RTEMS port is provided with a rich set of drivers.

RTEMS 4.6.5 Real-Time Kernel

- Non-MMU system support
- Distributed Multi Processing
- Networking support (Ethernet 10/100/1000)
- Filesystem support
- UART, Timer, IRQ, CAN, SpaceWire, MIL-1553B support
- Newlib C-library
- Open source

eCos

The eCos real-time operating system SPARC port supports LEON3 and its standard on-chip peripherals. The highly configurable nature of eCos allows the operating system to be customised to precise application requirements, delivering the best possible run-time performance and an optimised hardware resource footprint.

eCos 2.0 Real-time Kernel

- Non-MMU system support
- Symmetric Multi Processing (SMP) (LEON3 only)
- Networking support (Ethernet 10/100/1000)
- Small footprint
- Open source

GNU Cross Compiler System

All the above operating systems and kernels, except for VxWorks and ThreadX, are based on a common GNU-based cross-compilation system. It also provides a simple bare-C run-time system with tasking and interrupt support, and an additional pthreads library.

GNU C/C++ cross-compiler (3.4.4)

- GNU Binutils (assembler, linker, etc.)
- Newlib Embedded C-library
- Boot-PROM builder (mkprom)
- Optional Eclipse-based IDE
- Windows (Cygwin) and Linux hosts
- Open source

Availability

Aeroflex Gaisler provides and maintains the above cross-compilation tool chains and operating systems for the LEON and ERC32 processors. All operating systems except VxWorks and ThreadX are provided free of charge and in full source code under the GPL/LGPL licenses.

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