

OPERATING SYSTEMS

Compilers and real-time operating systems for LEON and ERC32



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 LEON3/4 and LEON2. 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.

- MMU and non-MMU system support
- SMP support (in 6.7 and later)
- Networking support (Ethernet 10/100/1000)
- UART, Timer, and interrupt controller support
- PCI, SpaceWire, CAN, MIL-STD-1553B, I2C and USB host controller support
- Eclipse based Workbench
- Commercial license

WIND RIVER

ThreadX

The ThreadX SPARC port supports LEON3/4 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.

- Non-MMU system support
- Bundled with newlib C library
- Support for NetX, and USBX
- Very small footprint
- Commercial license



Nucleus

Nucleus is a real time operating system which offers a rich set of features in a scalable and configurable manner.

- UART, Timer, Interrupt controller, Ethernet (10/100/1000)
- TCP offloading and zero copy TCP/IP stack (using GRETH GBIT MAC)
- USB 2.0 host controller and function controller driver
- Small footprint
- Commercial license



LynxOS

LynxOS is an advanced RTOS suitable for high reliability environments.

- Protection through MMU (required)
- SMP support
- UART, Timer, Interrupt controller, Ethernet (10/100/1000)
- Commercial license



Linux

Linux support for MMU based LEON3/4 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 μ CLinux.

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)
- μ CLibc and GNU Libc
- Open source



μ CLinux 2.0

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



RTEMS

The RTEMS SPARC port supports LEON3/4, 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 it easy to port applications and drivers between operating systems. The LEON RTEMS port is provided with a rich set of drivers.

- Non-MMU system support
- Distributed Multi Processing
- Networking support (Ethernet 10/100/1000)
- Filesystem support
- UART, Timer, IRQ, CAN, SpaceWire, MIL-1553B, PCI, SPI, I2C support
- CCSDS TM/TC support
- Newlib C library
- Open source



eCos

The eCos real-time operating system SPARC port supports LEON3/4 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.

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



GNU Cross Compiler System

All the above operating systems and kernels use a 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

- GNU Binutils (assembler, linker, etc.)
- Newlib C library
- Optional Eclipse-based IDE
- Windows and Linux hosts
- Open source

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