

SpaceWire RTEMS Driver

The SpaceWire RTEMS driver provides a library of functions to program the SpaceWire PCI Mk2, cPCI Mk2 and PCIe devices under the RTEMS real-time operating system. The driver is provided as a custom RTEMS module in the form of a compiled C library. RTEMS configuration and initialisation, which must be built into the application, is provided as customisable source code.

The fully interrupt-driven driver provides support for transmitting and receiving data simultaneously out of all three SpaceWire links. Data transfer to and from user buffers is performed by the onboard DMA controller and so is light on target processor load. Full double buffering is used to achieve efficient data transfer.

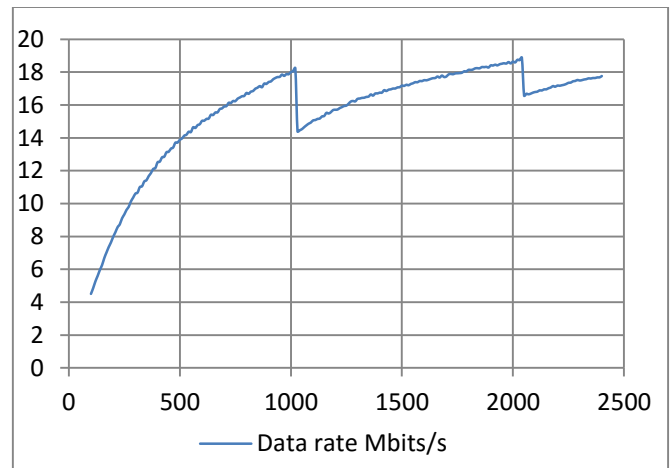
STAR-System, STAR-Dundee's software suite for controlling SpaceWire devices, is also provided with the RTEMS driver. STAR-System presents a common interface across operating systems, and allows different types of SpaceWire devices to be accessed in a consistent manner.

Key Features

- **Extensive API:** A rich, high-level API is provided to enable the development of SpaceWire related application software.
- **Transmitting data:** One or more packets from a user buffer can be transmitted out of a specified SpaceWire link.
- **Receiving data:** One or more packets, or a specified amount of data, can be received on a specific SpaceWire link.
- **Link error recovery:** Link errors are detected giving the user the option to clear errors if appropriate.
- **Documentation:** A detailed user manual is supplied which includes a full reference of all driver interface functions and data structures.
- **Example code:** A rich set of example code applications is provided to demonstrate how to use the driver library and also to provide a good starting point to develop more complex applications.
- **Ease of use:** The high-level API and detailed example code should enable an RTEMS programmer to quickly create applications using the driver.
- **High performance:** The driver and STAR-System have been designed to provide the highest possible performance with the lowest possible CPU usage.
- **Modularity:** In order to minimise the software footprint, it is possible to customise the modules in the system that are included in the RTEMS executable.
- **First class support:** As with all of our products, the RTEMS SpaceWire driver and STAR-System include a year's support and maintenance. This support is provided by the team that developed the software so we can respond with appropriate answers to your questions, give assistance with application development, and quickly resolve any problems.

Driver Performance

The graph below shows the data transfer rates when transmitting and receiving packets of various sizes on a 200 Mbits/s link. This test was run on an Aeroflex Gaisler GR-LEON4-ITX board, using a dual-core LEON4 running at 200 MHz clock speed.



Specifications

RTEMS Version Currently Supported:

- 4.10.2
- Contact us for other versions

Currently Supported Hardware Platforms:

- Aeroflex Gaisler GR-LEON4-ITX (Dual Core LEON4)
- Contact us for other platforms

Supported Languages:

- C
- C++

Supported Devices:

- SpaceWire PCI Mk2
- SpaceWire cPCI Mk2
- SpaceWire PCIe

Provided APIs and Modules:

- STAR-API
- RMAP Packet Library
- Modules for Configuring Devices:
 - Remote Device Configuration API
 - Router Configuration API
 - Mk2 Interface and Router Configuration API
 - Configuration APIs for individual devices
- Drivers for individual device types:
 - SpaceWire PCI Mk2 Device Driver

If you have a requirement for another language, operating system or device, please contact us and we will do our best to assist.

See www.star-dundee.com/products/star-system for more information on the STAR-System software suite.