

SpaceWire USB Driver

The SpaceWire USB Driver has been designed to support the development of SpaceWire applications. It can be used to communicate with STAR-Dundee's SpaceWire-USB Brick and SpaceWire Router-USB devices. Versions of the driver are available for Windows (Windows 7, Vista, XP, 2000) and Linux distributions using the 2.6 kernel.

An API is provided for the driver, allowing C and C++ applications to be written to communicate with SpaceWire-USB Brick and SpaceWire Router-USB devices. The API can be used to communicate with multiple devices at the same time, or the same device from multiple applications or threads. As the API for Windows and Linux is identical, porting an application from one platform to the other may simply require that application to be re-compiled.

The SpaceWire PCI-2 Driver provides a similar API to the SpaceWire USB Driver. This makes it a simple process to convert applications written for the USB Devices to work with the SpaceWire PCI-2 and SpaceWire cPCI devices, and vice-versa.

Router Configuration Library

A C/C++ library is supplied with the driver which provides functions to configure the routers on a network, including SpaceWire Router-USB and SpaceWire-USB Brick devices. It is also compatible with the Router IP available from STAR-Dundee and the ESA SpW-10X radiation tolerant router, available from Atmel as AT7910E.

The device being configured may be directly connected by a USB cable to the PC using the library, or to the local device by a SpaceWire network. Among the operations which may be performed using this library are specifying or reading routing tables of routers, starting and stopping links, setting device and link speeds and reading link status.

This library is also available for the SpaceWire PCI Driver so that SpaceWire PCI-2 and SpaceWire cPCI devices can be used to configure routers. This PCI version has an identical interface to the SpaceWire USB version, so code can easily be modified to use either type of device.

RMAP Packet Library

The SpaceWire Remote Memory Access Protocol (RMAP) was developed by the SpaceWire Working Group to provide a common protocol for reading and writing to registers or memory in a remote node.

The RMAP Packet Library provided with the SpaceWire USB Driver is a C/C++ API which includes functions to construct each of the different packet types available in RMAP. It also allows existing RMAP packets to be checked for correctness, and the values contained within fields in existing packets to be read.

The RMAP Packet Library does not perform any communication with SpaceWire devices, so it can be used to form packets for other SpaceWire devices. Identical versions for Windows and Linux are provided with the SpaceWire USB Driver, and the library is also provided with the SpaceWire PCI Driver.

SpaceWire Java Driver

An API for writing SpaceWire applications in Java is also provided with the SpaceWire USB Driver. The SpaceWire Java Driver provides a base class representing all STAR-Dundee SpaceWire devices. It provides methods common to all SpaceWire devices,

such as sending and receiving packets. A class derived from this provides access to the SpaceWire Router-USB and SpaceWire-USB Brick. A class is also provided for the STAR-Dundee SpaceWire PCI-2 and cPCI devices, derived from this base class. This makes it easy to develop applications which can use many different STAR-Dundee devices.

Each method in the SpaceWire USB Java Driver corresponds to a function in the C API, which makes converting an application from one language to the other relatively simple. Classes are also included to provide the Router Configuration Library and RMAP Packet Library functions available in the C/C++ libraries described above.

Using the SpaceWire Java Driver further simplifies development for multiple platforms. Code developed on Windows, for example, can instantly be run on Linux, without even requiring re-compilation.

A number of STAR-Dundee applications, including the SpaceWire Validation Software which is described in a separate data sheet, use the SpaceWire Java Driver.

Test Program

A test program and its source are provided with the driver. A screenshot is shown in Figure 1.

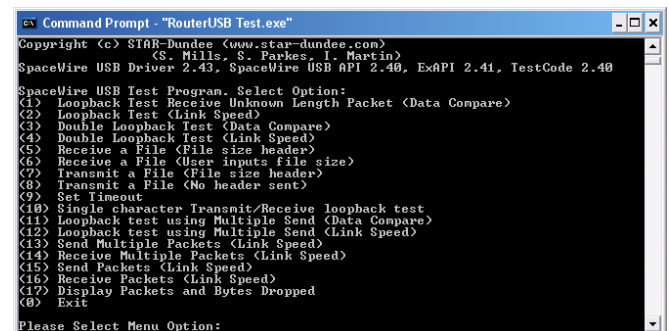


Figure 1: SpaceWire USB Test Software

This program includes a number of different tests which can be performed. These tests can be used to perform simple tests of devices and networks. The source of the program also serves as an excellent example of how to write applications using the SpaceWire USB Driver.

Example programs with source code are also provided to set the routing tables of routers and to build RMAP packets. These demonstrate the use of the Router Configuration Library and the RMAP Packet Library respectively.

Driver Performance

We are continually striving to improve the performance of our drivers. For latest information on the driver's performance please contact STAR-Dundee Ltd.

Contact Details

Steve Parkes, STAR-Dundee Ltd
 c/o School of Computing, University of Dundee
 Dundee, DDI 4HN, Scotland, UK
 Tel: +44 1382 385194 Fax: +44 1382 388838
 Email: enquiries@star-dundee.com
 Web: http://www.star-dundee.com