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Est. 1988

Software User's Guide (VxWorks)

SpaceWire

Four-Channel SpaceWire Interface

SpaceWire

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Connection of incompatible hardware is likely to cause serious damage.



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Product Description

The SpaceWire I/O card is available in multiple formats. All variants support four channels or ports of the SpaceWire protocol. Various configurations are available including addition of external FIFOs to support further burst capability.

This driver supports SpaceWire revisions F-J, Xilinx Design Rev 10 or greater.

For a detailed description of the hardware including register definitions, see HW User Manual, SpaceWire.

Software Description

The SpaceWire driver supports simultaneous operation of all ports independently. The driver auto-detects the presence of external FIFOs on a per port basis and controls the HW accordingly.

Further, the driver optimizes transfers to/from the interface for efficiency. Small packets are transferred to the I/O card via single word accesses rather than DMA to eliminate the overhead of DMA setup.

The version of this driver is v1.0.0. The driver has been validated on VxWorks revision 6.9 on a P2020 platform (multi-core PPC) which is big endian.

Installation

Copy the tar ball containing this driver to the `$(WIND_BASE)/target/3rdparty/dyneng` directory of your project. If a `dyneng` directory does not exist, create one. After extraction you should find the following files in the `dyneng` tree:

```
Makefile README
de_SpaceWire
  40de_Spwr.cdf deSendPacket.c deSendPacket.mk deloctl.c
  deloctl.mk deRcvPacket.c deRcvPacket.mk de_SpwrDrv.c
  de_SpwrDrv.dc de_SpwrDrv.dr de_SpwrDrv.h Makefile README
  release_notes.txt
de_SpaceWire/apps
  de_SpwrApp.c Makefile
```

The README file contained in `de_SpaceWire` directory contains the configuration and build steps required to include this driver in your VxWorks image. This information is specifically not included in this document to avoid conflicts that may occur due to updates in the source tree.



VxBus driver methods

The SpaceWire driver supports custom ioctl, and port methods (deIoctl, deSendPacket deRcvPacket) implemented via VxBus.

The application/middleware must configure a port prior to invoking the port methods. This is the only ioctl required operationally. The remaining ioctls are either informational such as fetching I/O card specific parameters, obtaining current interrupt count, or provided to enable debug or user specific customizations. Please see `dyneng/de_SpaceWire/de_SpwrDrv.h` for a detailed description of the supported driver methods.

Sample application

A sample application, `de_SpwrApp.c` (`de_sp`) is provided to demonstrate configuration, and packet transfer operations.

Invocation parameters

`de_sp` (`VXB_DEVICE_ID` `pDev`)

pDev can be obtained by issuing `vxBusShow`, find the entry corresponding to the device to be utilized by this application:

```
PCI_BUS @ 0x003467C8 with bridge @ 0x0034c308
```

Device Instances:

```
de_SpwrDrv unit 0 on PCI_BUS @ 0x0034cb08 with busInfo 0x00000000
```

Application executes until terminated by `<CTRL C>`

The application can be invoked from the serial console, or a telnet shell.

Each time the application is invoked a port group consisting of two adjacent SpaceWire ports/channels is configured, and data is continuously transferred between the ports in the following sequence: Write from port N to port N+1. Data is read from port N+1. Data length, and first/last words are validated. The same packet is then written to port N+1, and read from port N.

This sequence is repeated until interrupted by the user via `<CTRL-C>`, or incorrect packet length, invalid data is detected. Two scatter/gather buffers are utilized for both Tx and Rx packets demonstrating S/G functionality.



The app assumes port 0 is attached to port 1, port 2 attached to port 3. The first invocation of the app exercises ports 0 and 1, second invocation, ports 2 and 3. The instances may be executed simultaneously demonstrating proper SMP handling/locking.

Warranty and Repair

Please refer to the warranty page on our website for the current warranty offered and options.

<http://www.dyneng.com/warranty.html>

Service Policy

Before returning a product for repair, verify as well as possible that the suspected unit is at fault. Then call the Customer Service Department for a RETURN MATERIAL AUTHORIZATION (RMA) number. Carefully package the unit, in the original shipping carton if this is available, and ship prepaid and insured with the RMA number clearly written on the outside of the package. Include a return address and the telephone number of a technical contact. For out-of-warranty repairs, a purchase order for repair charges must accompany the return. Dynamic Engineering will not be responsible for damages due to improper packaging of returned items. For service on Dynamic Engineering Products not purchased directly from Dynamic Engineering contact your reseller. Products returned to Dynamic Engineering for repair by other than the original customer will be treated as out-of-warranty.

Out of Warranty Repairs

Out of warranty repairs will be billed on a material and labor basis. The current minimum repair charge is \$150. Customer approval will be obtained before repairing any item if the repair charges will exceed one half of the quantity one list price for that unit. Return transportation and insurance will be billed as part of the repair and is in addition to the minimum charge.

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