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Software User's Guide (Linux)

PCIe4HOTLinkx6

Six-Channel HOTLink Interface

PCIe4HOTLinkx6

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Connection of incompatible hardware is likely to cause serious damage.



Product Description	4
Software Description	4
Installation.....	4
Application Programming model	5
Sample application	5
Invocation parameters	5
Warranty and Repair	6
Service Policy.....	6
Out of Warranty Repairs	7
For Service Contact:	7

Product Description

The PCIe HOTLink board is a six port interface card implementing the HOTLink® protocol. Nominally only the Rx function is utilized, a transmitter has been included for test purposes

This v2.0.0 supports only the the six port version of PCIe4HOTLinkx6 interface card

For a detailed description of the hardware including register definitions, see HW User Manual, PCIe4HOTLinkx6.

Software Description

The driver supports simultaneous operation of all ports independently. The card maybe operated in internal loopback, or external loopback via a fixture for test purposes.

By default 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.

Depending upon specific system requirements, and the mix of I/O frame sizes, the user may configure a port to always utilize single word or DMA access to the FIFOs. For example, if the data mix is mainly small frames with many back-to-back accesses, a port could be configured to utilize only DMA if CPU utilization is of greater concern than data throughput.

The version of this driver is v2.0.0. The driver has been validated on an i7 Ubuntu server running 3.8.0-44 kernel (64 bit) SMP.

Installation

- 1) Copy de_PciHOTLink.c and de_PciHOTLink.h to your module build directory. Invoke the system `make`.+ A makefile for this module has been included in the release tar-ball.
- 2) Copy the resulting de_PCIHotLink.ko module to the target platform/directory.
- 3) Copy the startup script bnm to the target.
- 4) Invoke the script (`./bnm_hl`), it will create the devices required by the HOTLink driver and performs an `insmod` of the module. You may invoke this script from the systems `rc.local` file as well



Application Programming model

After a port is opened, it must be configured for the desired mode of operation via the DE_CONFIG_PT ioctl. Both blocking and non-blocking modes of operation are supported. This behavior is set via the standard file flags upon open.

Besides access modes to the FIFOs, the following parameters are set via the config ioctl: op mode (External I/O, internal loopback), DMA priority, I/O direction (Rx vs Tx), Rx mode (10B data, 8B data, 10B compact (duplicate control chars dropped)), and frame delimiters (ordered set).

Please see de_PciHOTLink.h for details of the parameters for this ioctl.

Sample application

Two sample applications (de_loApp.c, de_ioctlApp.c) are provided to demonstrate configuration, ioctl invocation, and I/O in the supported modes.

1) Compile the sample application for your platform, the output executable for these examples are dyn_io and dyn_ioctl.

a. Nominal compilation gcc

```
gcc . Wall . o dyn_io de_loApp.c
```

```
gcc . Wall . o dyn_ioctl de_ioctlApp.c
```

The apps should compile without warnings, it is assumed de_PciHOTLink.h is resident in the same directory as the applications for these examples.

Invocation parameters

I/O application invocation is as follows:

```
./dyn_io port(0-5) frame_len(32 bit words) r(eader)|w(riter)
```

The first parameter specifies the port. The second parameter, frame length is specified in 32 bit words. The final parameter determines whether this port will be a reader or a writer.

If the external loopback fixture is attached, two instances of the app must be invoked to perform the loopback between ports. It is assumed the two ports under test are connected via this fixture.



In either mode, Rx data is compared to Tx data upon read completion for each iteration.

loctl application invocation is as follows:

`./dyn_ioctl`

A menu will be displayed:
Enter p(II program)||r(eg ops)|e(xit)

The loctl application demonstrates pll programming, register R/W/RMW operations.

Support Contract

Dynamic Drivers are provided AS-IS and sometimes our clients need a little help. Please refer to the support contract page on our website for options about getting help with your driver use and SW development.

<http://www.dyneng.com/TechnicalSupportFromDE.pdf>

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.

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For Service Contact:

Customer Service Department

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