SCUBA-2 PCI Card Application

pciecho – PCI card fibre echo application

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1. Introduction

Applications can be downloaded to the PCI card's DSP to enable specific specialised functionality out-with the normal operation of the card. Such applications are downloaded to the DSP via a series of PCI "write_memory" commands, and are executed with the PCI "start_application" command. Typically a script would be employed to download and execute an application.

This document describes the PCI echo application, which is utilised in conjunction with clock card firmware to carry out a fibre link Bit Error Rate (BER) test.

The downloadable application file is called "PCI_APPL_fibre_echo.lod". The script employed to download and execute the application is called "pciecho".

2. Echo Application Description

This application has the following features.

- On startup initialise a larger circular buffer in Y memory. Specifically write 0xFFFFFF to memory locations Y:000000 → Y:1FFFFF.
- Subsequently, store any words arriving on the fibre in the large circular buffer in Y memory (Y:000000 → Y:1FFFFF).
- Echo 32-bit words back down the fibre in the same byte order that they arrived.

As an example consider a 32-bit word sent from the MCE to the PCI card just after the application has started running. The word is sent with a little endian byte order: b1, b2, b3, b4 (where b1 is the least significant byte).

Bytes b1 and b2 are byte swapped and stored in Y:0, then b3 and b4 are byte swapped and stored in Y:1 resulting in:

Y:0	00-b2-b1	(b1 and b2 byte swapped since DSP is big endian).
Y:1	00-b4-b3	(b3 and b4 byte swapped since DSP is big endian).
Y:2	FF-FF-FF	
Y:3	FF-FF-FF	

etc

These four bytes are then sent back down the fibre in the order b1, b2, b3, b4.

These four bytes can be accessed from the circular buffer by issuing the PCI read_memory commands:

>pcicmd READ Y 0 0

>pcicmd READ Y 1 0

Similarly the next 32-bit word be written to locations Y:2 and Y:3

3. How to Download and Run the Echo Application

To download run the fibre echo application carry out the following:

1. Execute the script “pciecho”.

The script downloads and starts the application running. Normal PCI card operation will only resume once the application has been terminated, by issuing a stop_application command “pcicmd STOP y 0 0”.

To re-initialise the buffer in Y memory simply issue a stop_application command “pcicmd STOP y 0 0” then re-issue “pciecho”.