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## **dtFLY : A FIBER OPTIC LINK FOR HIGH-SPEED DATA STREAMING**

### **ABSTRACT**

The dtFLY Link is a fiber channel data streaming interface, allowing easy connection between several different platforms for high-speed data exchange.

The Link was designed to provide high reliability, high bandwidth and low overhead data transfer while maintaining a simple design and easy configuration.

One of the Link's main goals is to provide the host system designer with easy integration modules by relieving from concerns about the details of data protocols.

It can handle transfer rates of up to 4.25 Gbps per channel of data over a fiber with minimal host CPU loading, low latency and overhead.

The Link is supplied in two board formats (Mezzanine and 4-lane PCI Express®) and is mechanically and electrically compatible with PCI Express®, Xilinx Aurora and CERN's S-Link 64.

As it is built onto an FPGA core, it is possible to add configurable hardware add-ons maximizing its flexibility.

Built-in monitoring and control logic is capable of handling the aspects

concerning the link, avoiding data overflow or under run, issuing alerts in case of any serious problem.

### **TECHNOLOGY STAGE**

- Final testing phase and tuning. It shall be available during the 2<sup>nd</sup> quarter 2011.

### **POSSIBLE APPLICATIONS**

- High-speed data streaming
- Instrumentation
- Medical Imaging
- Physics experiments
- Hardware testing
- IP Development
- Data transfer in electrically hostile environments

### **EXISTING APPLICATIONS**

- Medical Imaging (ClearPEM scanner)
- Hardware testing
- IP Development

### **SPECIFICATIONS**

#### **dtFLY Link M (Mezzanine board)**

- Optic link data rates: up to 4.25Gbps
- Power supply: 3.3V
- Power consumption: 4W (typical)
- Form factor: Mezzanine

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- Interfaces: 1 x SFP, 1 x CMC (S-Link 64), 1 FPGA MGT routed to 4 x SMA connectors
- Debug interfaces: JTAG<sup>®</sup>, 6 x config. microswitches, 6 x config. LEDs

### dfFLY Link P (PCI-Express board)

- Optic link data rates: up to 4.25Gbps
- Power supply: 5.0V
- Power consumption: 20W (typical)
- Form factor: 4-lane PCI-Express
- Interfaces: 2 x SFP, 1 x 4-lane PCI-e
- Debug interfaces: JTAG<sup>®</sup>, 6 x config. microswitches, 6 x config. LEDs, 1 x front-panel 26-pin Erni connector



Figure 1. Aspect of dtFLY Link M



Figure 2. Aspect of dtFLY Link P

### ADVANTAGES

- High-speed data transfer
- Easy integration
- Flexibility of its FPGA core to accommodate HW add-ons
- Plug-and-play PCI-Express card

### LIMITATIONS

- Mezzanine side's limited offer on interface buses (it will very soon accept both PMC and XMC formats)

### REFERENCES

The Link wasn't yet explicitly referenced in scientific publications. For related information on the ClearPEM Scanner Project, please check:

J. Varela et al., "High-speed DAE for a PEM Scanner", 2009 Real-Time Conference (RT2009), Beijing, China, May 2009.

E. Albuquerque et al., "The Clear-PEM Imaging Scanner for Positron Emission Mammography", ICENES 2009, Ericeira, Portugal, July 2009.

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