

Off Detector DAQ

- Primary Function
 - Receive data from slabs (FE chip)
 - Make data available for transfer to storage
 - Or Transfer data to storage

Features of input

- High input data rate
 - Greater than 100MB/s
- Low average data rate
 - ~10MB/s

Consequences of input data rates & size

- Off detector receiver needs to be able to buffer the whole of the data on the link for each spill (to avoid upstream buffering)
- Is 128MB per link enough?

Input Technologies

- Input rate achievable with existing technologies
 - Single or multiple Gigabit ethernet
 - 10 Gigabit ethernet
 - CERN s-link

CERN S-Link

- Simple data pipeline
- Defines electrical interface
 - 33 bits of data
 - Clock
 - Data valid
- Defines mezzanine card interface
- Mezzanine cards available off the shelf
- Cores available
- Used by Atlas & CMS
- www.cern.ch/HSI/s-link

Input data Format

- Header containing
 - Event ID
 - Source ID (for debugging and if source likely to change)
 - Beginning of data
 - End of data or Length of data

Data processing

- Data processing (compression) can be inserted into data stream in the FPGA
- This reduces output data rates and allows more channels to be written to single storage system

Output data presentation

- Data written to hard disk array
- Data written to memory disk
- Data written to custom memory array
- Data written to remote disk or system

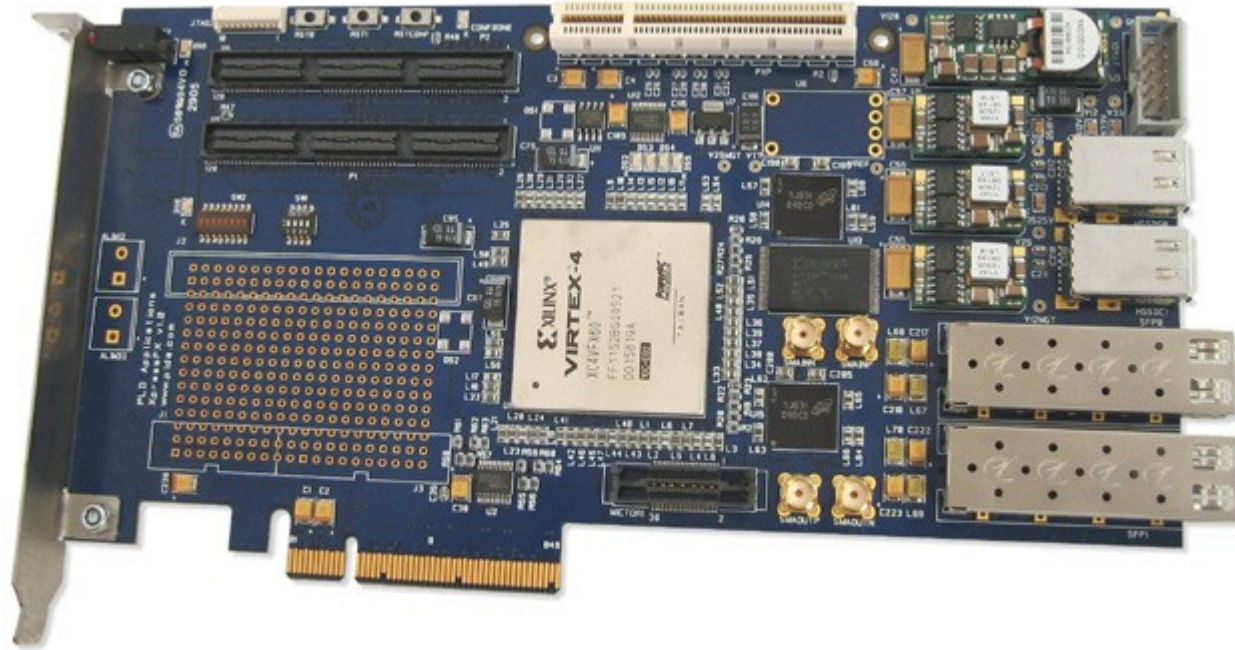
Handling of output data to disk

- Sustained data rates of $>200\text{MB/s}$ to disk can be handles
- Multiple Off detector receivers could write to local disk storage or remote storage using existing protocol (nfs, ssh)

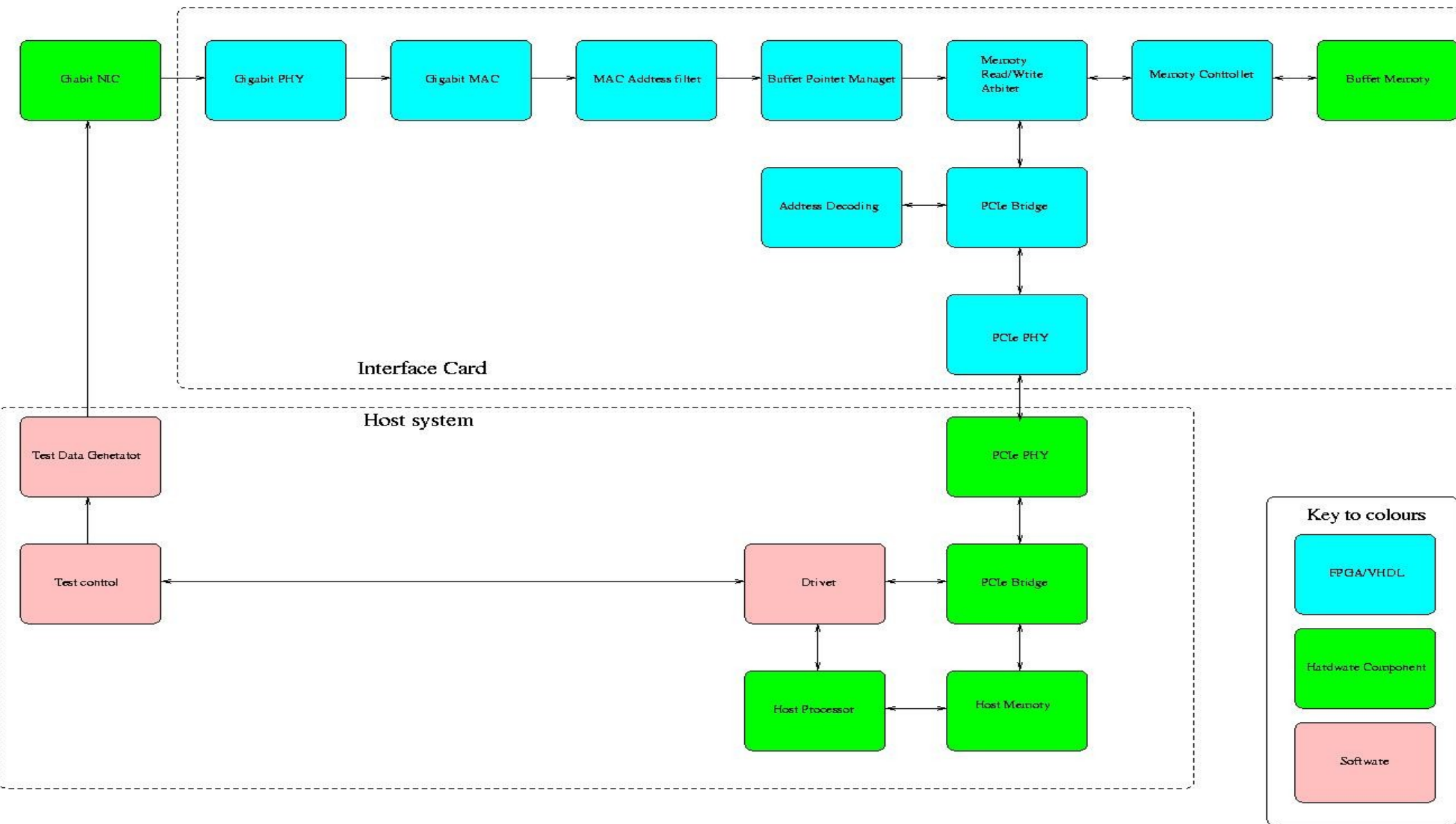
Output data format

- Data stored on disk index by event ID
- Directory entry = event ID
- Alternative

Off-Detector Receiver Prototype platform



Off-Detector Receiver Test Setup



Off Detector Receiver Status

- Prototype cards received
- Gigabit MAC core implemented
- PCI express core implemented
- Memory controller being worked on
- Basic linux driver implemented
- Other logic is straight forward