Optical Fiber Center (OFC) Module for KOTO a.k.a. Top CDT

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CDT Module Plan for Jan-March, 2017

- Fabricate 25 New CDT Modules ✓
- Install CDT Modules in all Crates ✓
- Connect Cat5 Cable from 1:32 F/O Board to all CDTs ✓
- Disconnect old Cat5 Cables from ADCs in every Crate ✓
- Connect New and Short Cat5 Cables from CDT to ADCs in every Crate ✓
- Run System as before ✓
- No Software or Firmware change needed for this ✓
- System should run with CDTs same as with old F/O Crate ✓

OLD SLIDE from January
CDT Module Plan
Test this Before April Run

• Finish Cluster Bits Firmware in ADC Boards ✓
• Implement Cluster Bits Firmware in CDTs ✓
• Test Cluster Trigger with CDTs in Pyramid Architecture ✓

OLD SLIDE from January
CLUSTER Trigger in Pyramid Architecture

OLD SLIDE from January
CDT Module Plan
Test this After April Run

- Design and Fabricate Fiber CDT Module
- Implement Firmware for Fiber CDT Module
- Test Cluster Trigger in Final Architecture.

OLD SLIDE from January
CLUSTER Trigger Final Architecture

Cluster Bits from CsI ADCs

LVDS-625Mbps:

CDT-0
CDT-1
CDT-2
CDT-3
CDT-4
CDT-5
CDT-6
CDT-7
CDT-8
CDT-9
CDT-10

O/L 2Gbps

Top Trigger Veto

Fiber CDT

New Fiber CDT
12 x Optical Links
6U – Double Width

Trigger Veto

1 x 32 Fan Out Board

1 Cable
L1 125MHz LIVE

MASTER

OLD SLIDE from January
OFC - Block Diagram

Schematics:
http://edg.uchicago.edu/~bogdan/KOTO_OFC_Module/schematics.html
Optical Fiber Center Module - Layout

- JTAG - sof
- 2 x RJ45
- Optical Links
- 18 x In/Out - SFP
- Up to 6.4Gbps/Link
- Arria V FPGA 5AGXFB5H44F35C4N
- 576Mb RLDRAM2 MT49H16M36SJ-25:B
- 2 x 12A - DC/DC
Optical Fiber Center Module - RAM

- RAM Design reused from other project;
- Minimal engineering and manufacturing costs
- May prove useful in the future:
  - Store Cluster Bits for Entire Spill
  - Use for Data Processing
OFC Module Specifications

- 1 Dual RJ45 (Same as CDT) to Communicate with Master
- Optical Links Connect directly to FPGA:
  - No TLK2501 Transceivers
  - Can Interface with all KOTO Modules
  - Support Other Protocols up to 6.4Gbps
- 18 SFP Optical Links:
  - Module can be used for other applications
OFC Module Plan for 2017

- Finish Layout and Routing Design – Target Date 8/20/2017 or earlier
- Fabricate New OFC Modules – Target Date 9/30/2017 or earlier
- Design/Test Firmware in Chicago – Target Date 10/15/2017 or earlier
- Install and Test New Module in JPARC
- Run System as before
We need more 125MHz ADC Spares
We need to fabricate more PCBs
Made changes to the 14-Bit ADC Module -> Rev D
14-Bit ADC Rev. D

ADC Rev. D
- Moved JTAG Connector to Front Panel
- More Caps on the 1.2V Supply
- Larger Heat Sink on 1.2V Supply
- Heat Sink for Clock Buffer

Schematics:
http://edg.uchicago.edu/~bogdan/14BIT_ADC_Board/schematicsD.html

Layout:
http://edg.uchicago.edu/~bogdan/14BIT_ADC_Board/layoutD.html
July 8, 2017 Status:

- Fabricated 30 pieces PCB
- Two Modules are in assembly now.