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 Cra** ✓

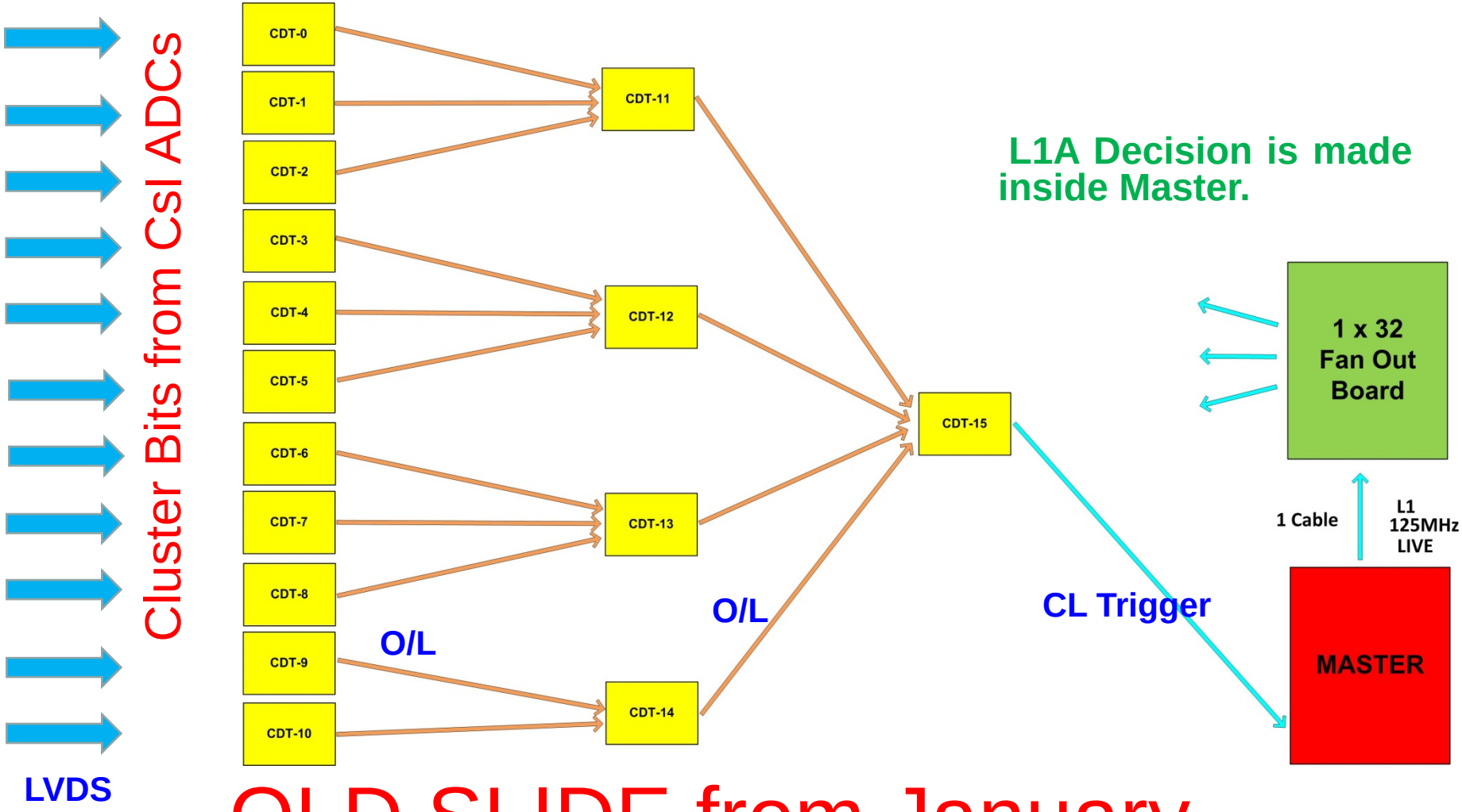
OLD SLIDE from January

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



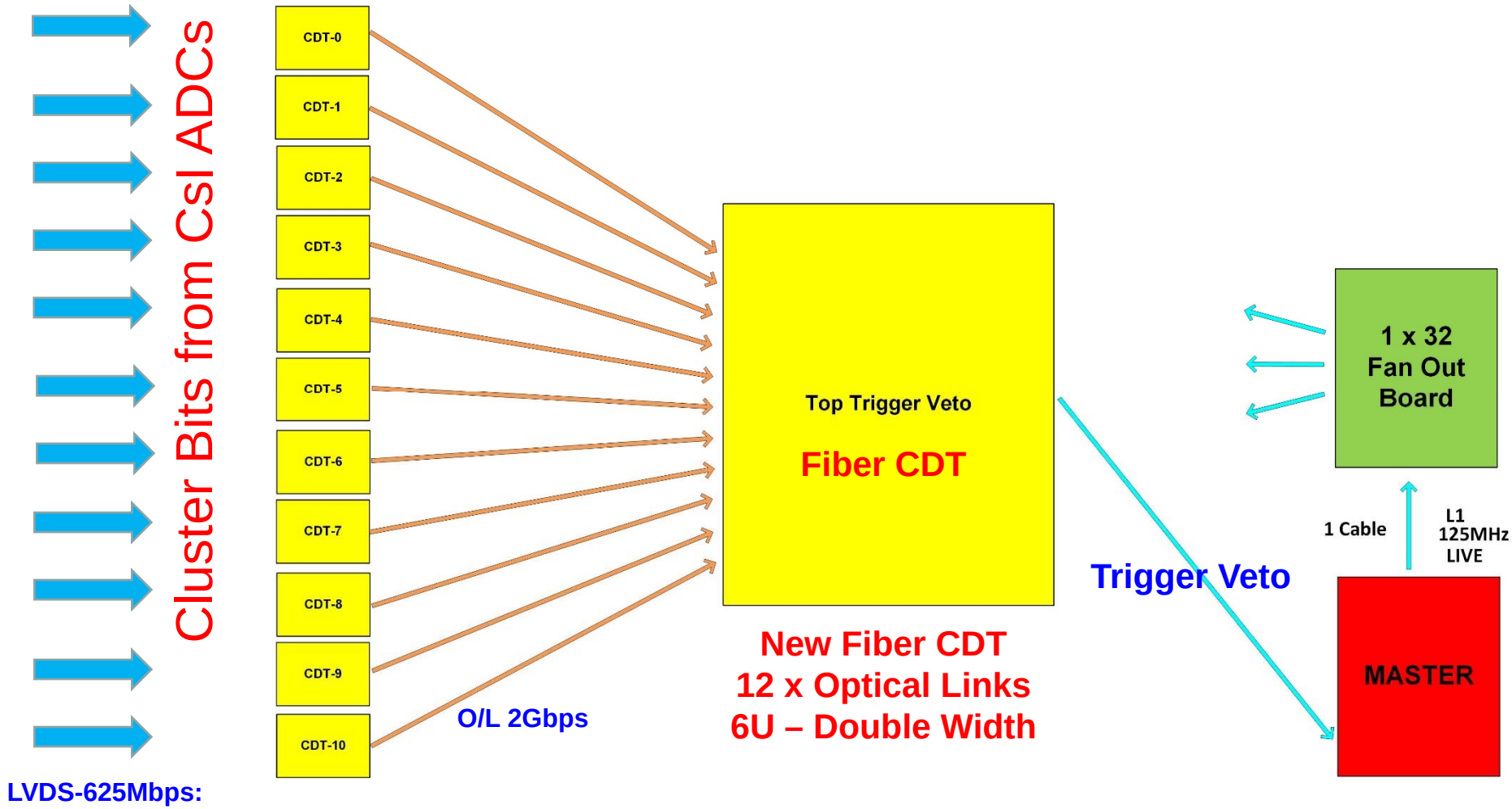
OLD SLIDE from January

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.**

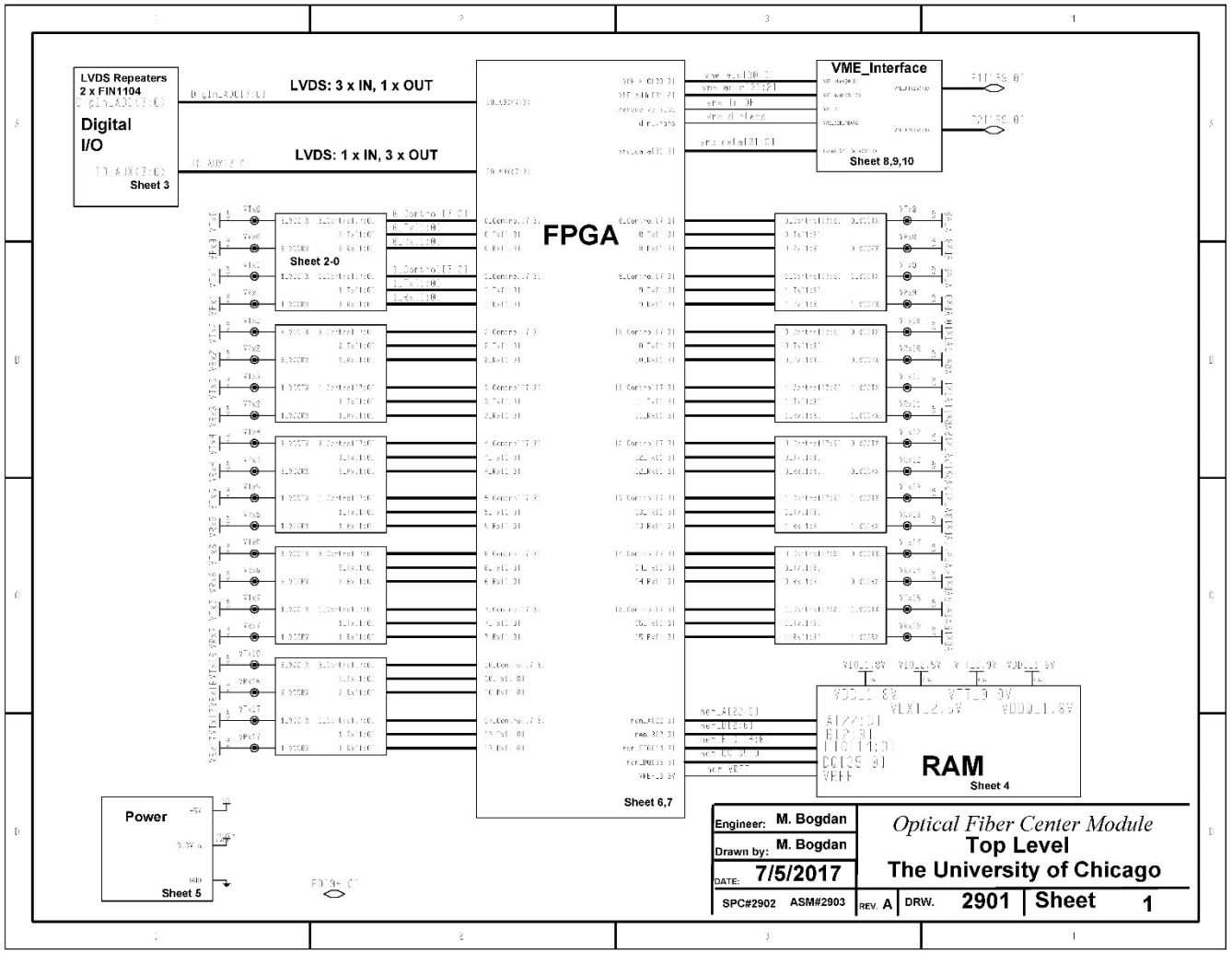
OLD SLIDE from January

CLUSTER Trigger Final Architecture



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

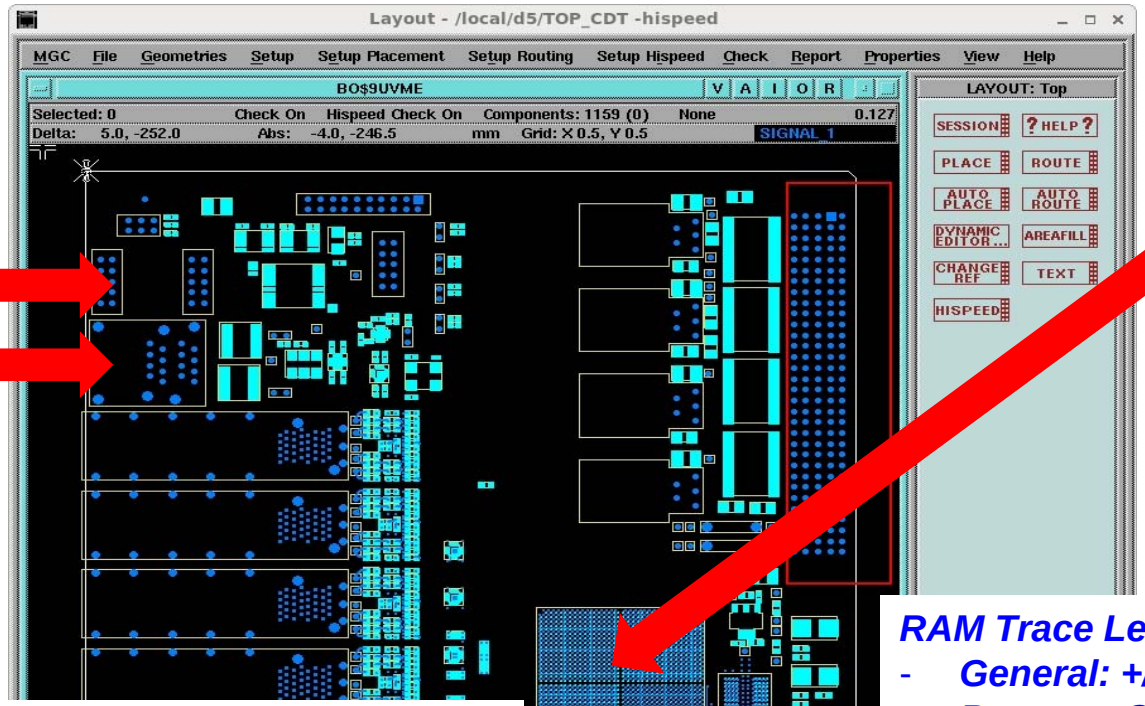
5AGXFB5H44F35C4N

576Mb RLDRAM2

MT49H16M36SJ-25:B

2 x 12A - DC/DC

Optical Fiber Center Module - RAM



JTAG - sof

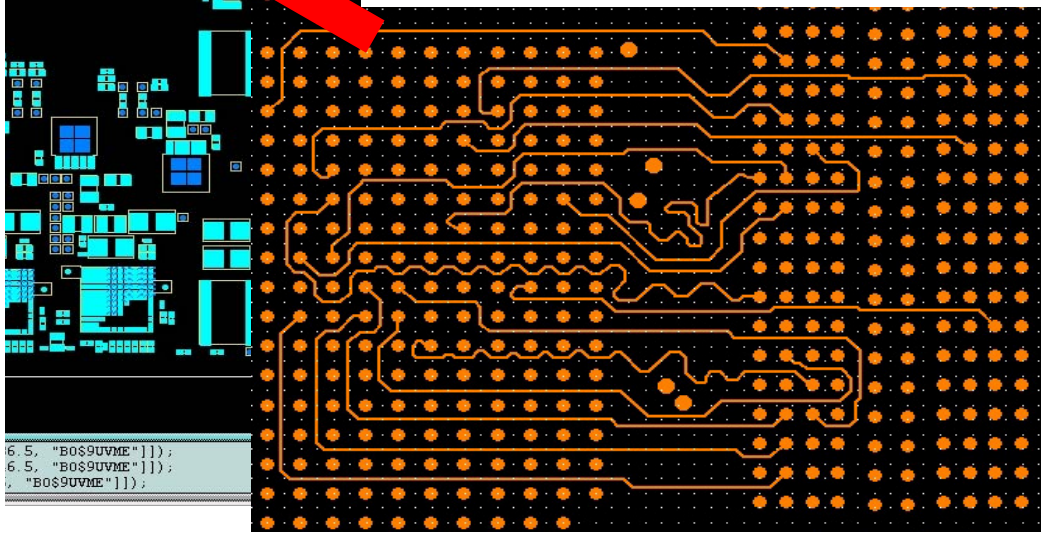
2 x RJ45

Arria V FPGA

5AGXFB5H44F35C4N

RAM Trace Length Matching

- *General: +/- 10ps*
- *Between Clocks: +/- 5ps*
- *Between P and N signals: + /-2ps*



RAM - MT49H16M36SJ-25:B

- *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**

14-Bit ADC Rev. D

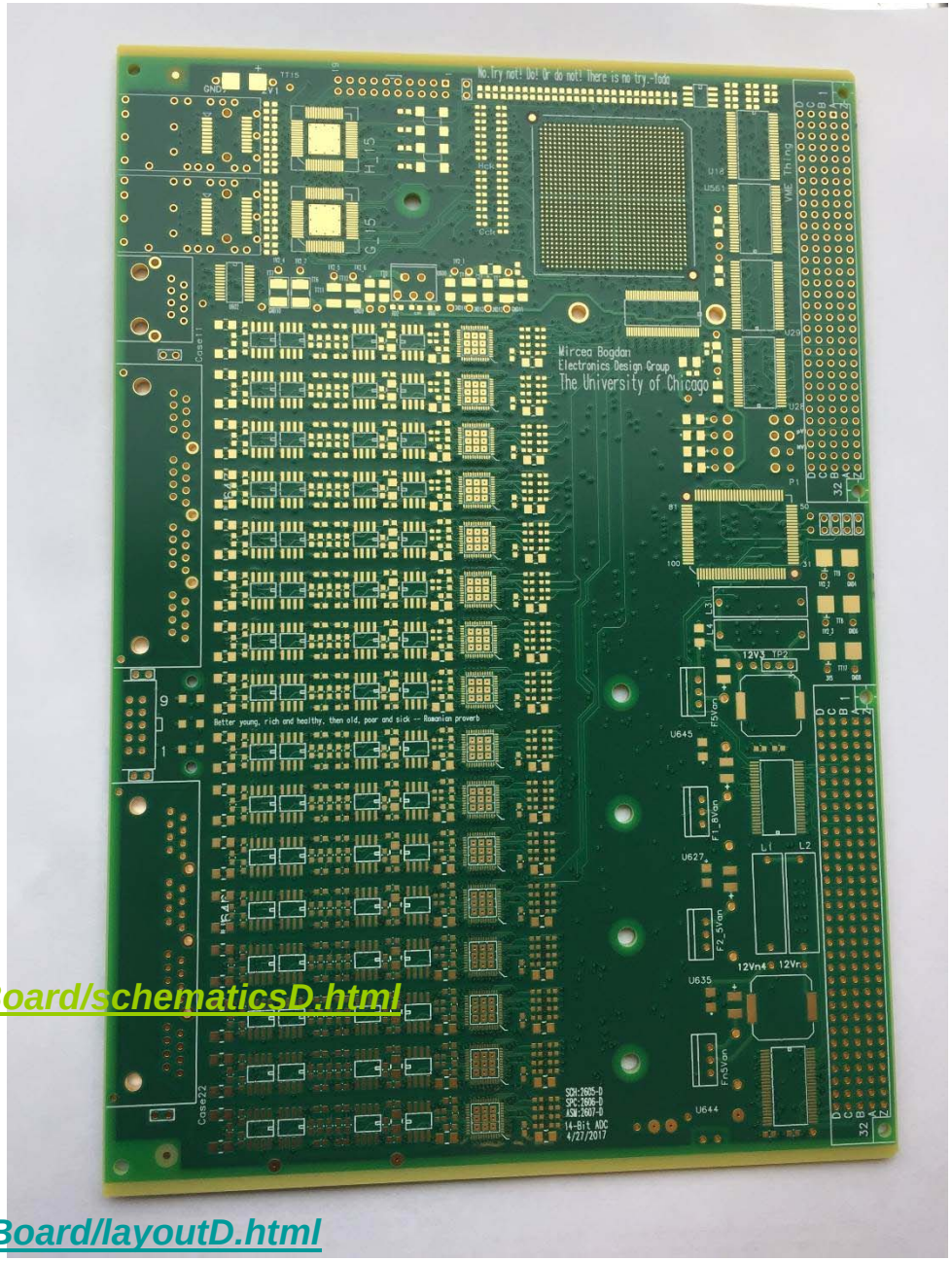
- **We need more 125MHz ADC Spares**
- **We need to fabricate more PCBs**

- **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

14-Bit ADC Rev. D

July 8, 2017 Status:

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