Calorimeter Regional Trigger

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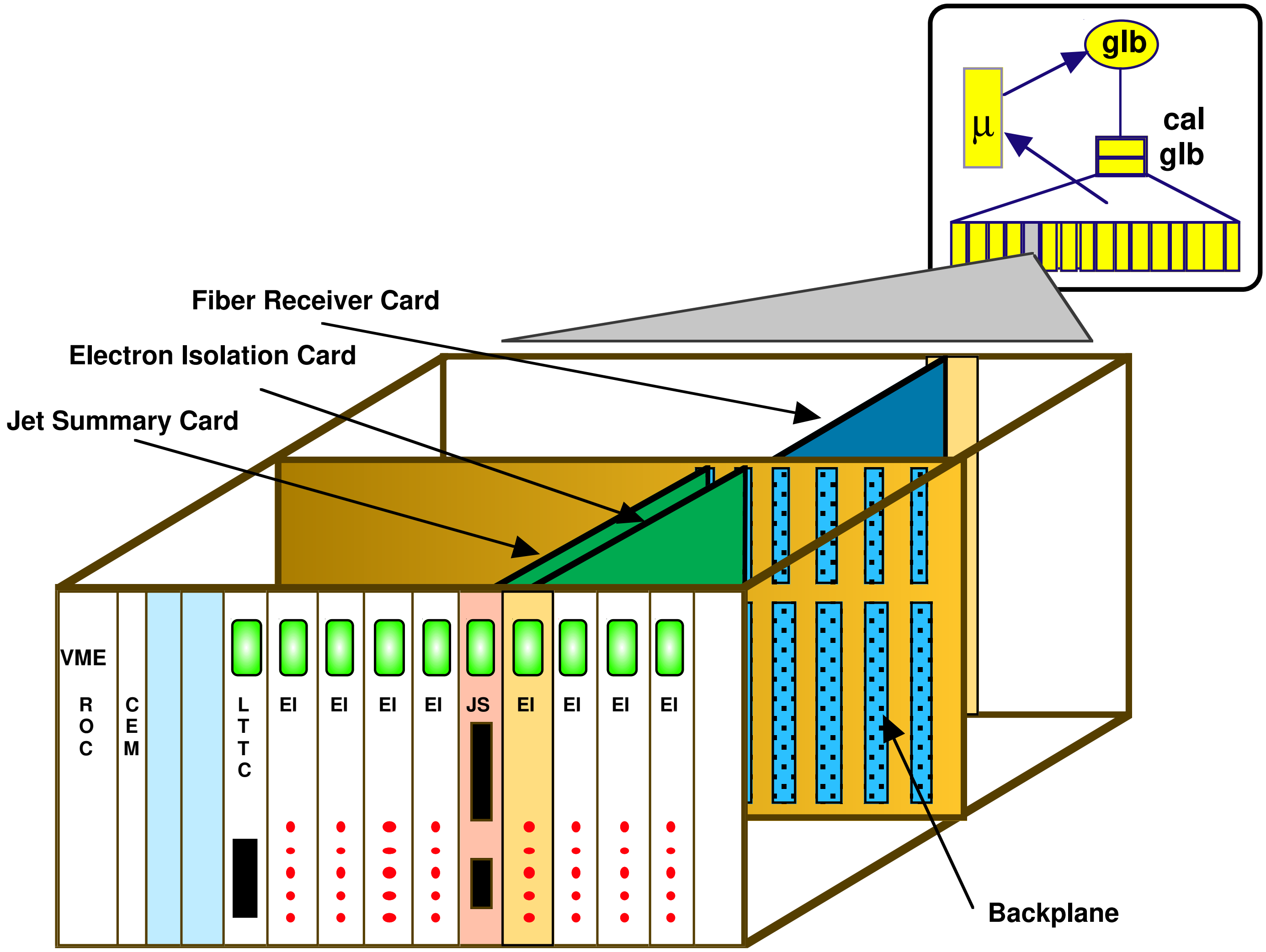
Outline:

Design Developments
Hardware Developments
Schedule

Calorimeter Regional Trigger Crate



ECAL & HCAL data on copper or optical fibers

- Into rear-mounted Receiver Cards

160 MHz point to point backplane

- Receiver, Electron Isolation, Jet Summary Cards Operate @ 160 MHz

Output to calorimeter global trigger

- From Jet Summary Card

"Quiet" bits to muon trigger

ASIC Tester & Backplane design plan

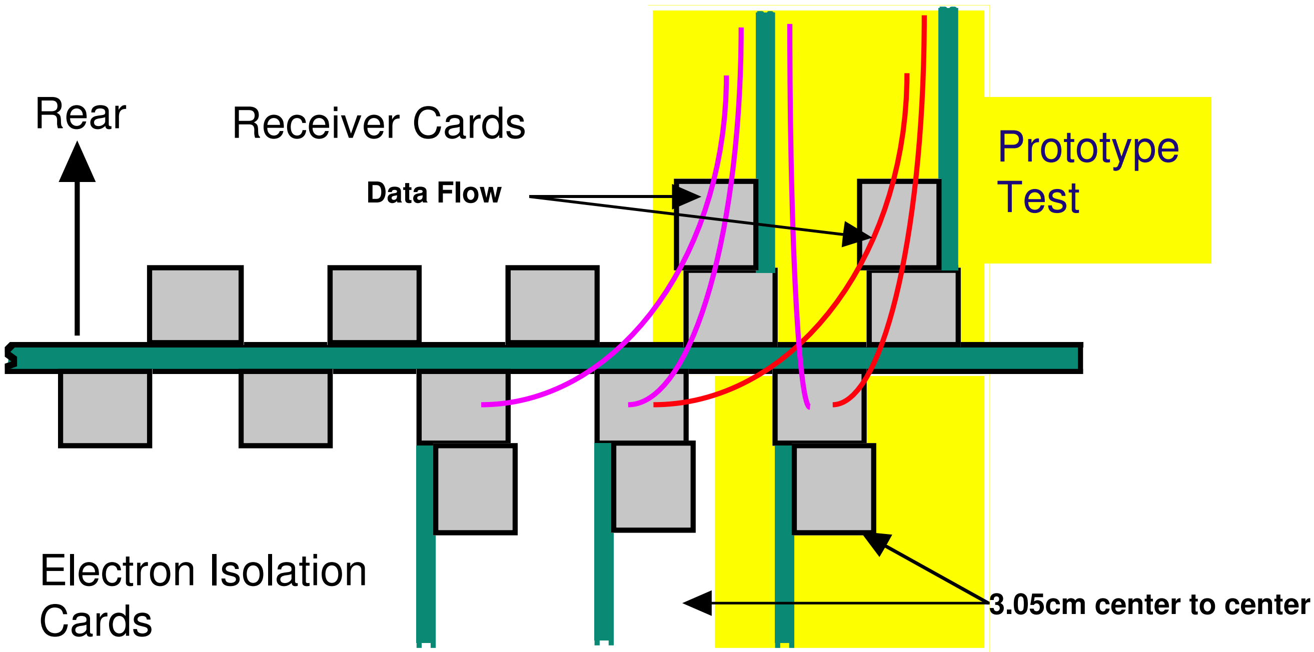
Tester

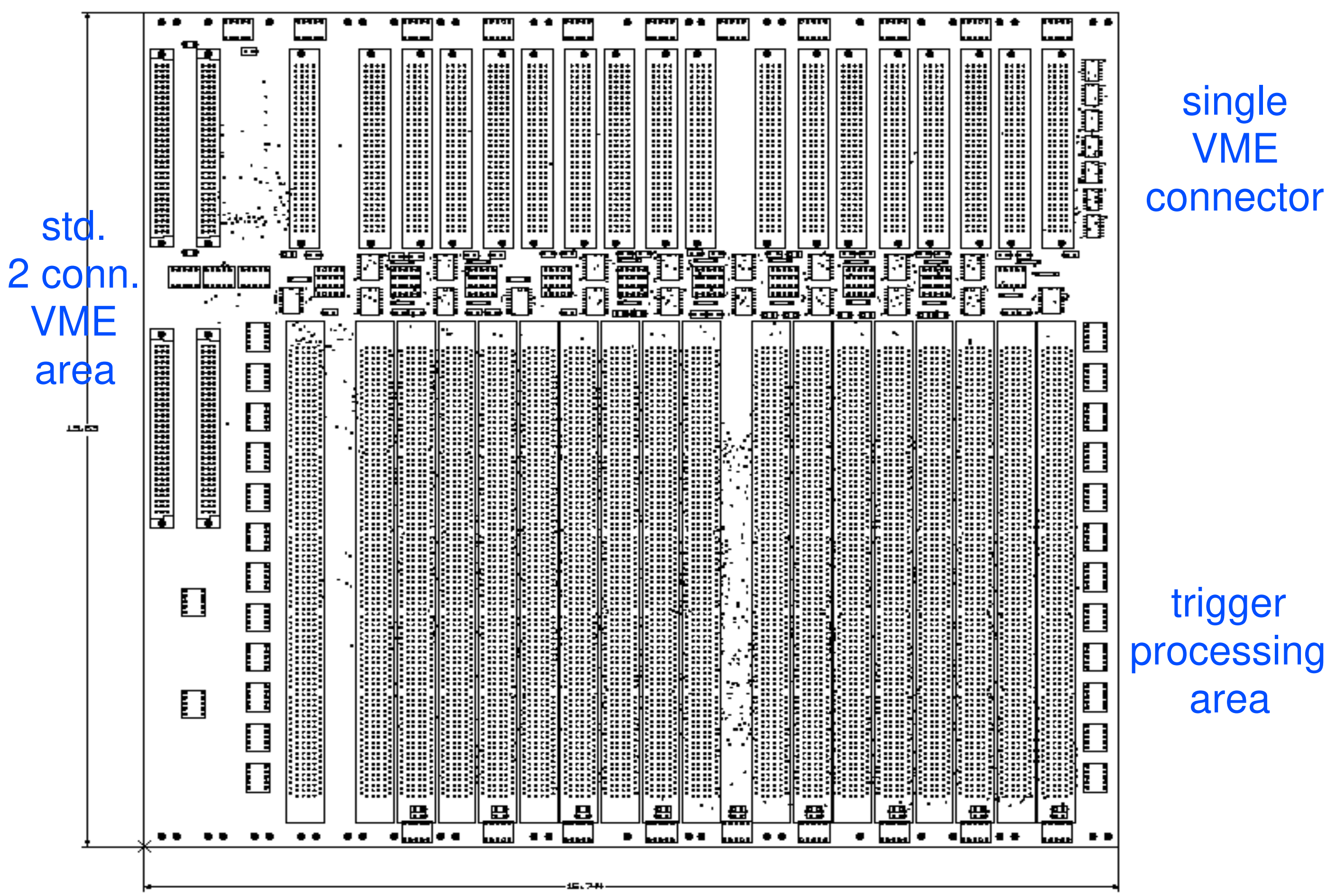
- **Built as stripped down Receiver Card**
- **Memory Lookup Tables will supply test vectors at speed**
- **JTAG controller will test ASIC's JTAG & board - level boundary scan techniques**
- **Test driver - connector - backplane integrity**
- **Verify board level clock distribution design**

Backplane Design

- **Full size with all positions routed.**
  - Only some card positions will be stuffed
  - There is a VME control station
  - There are three card positions implemented in the trigger data region:
    - Two primitive Receiver cards
    - 1 Primitive Electron Isolation card
    - Will examine timing & ground offset
  - Simple clock card for local timing control
  - Will confirm mechanical integrity

160 MHz Backplane Prototype

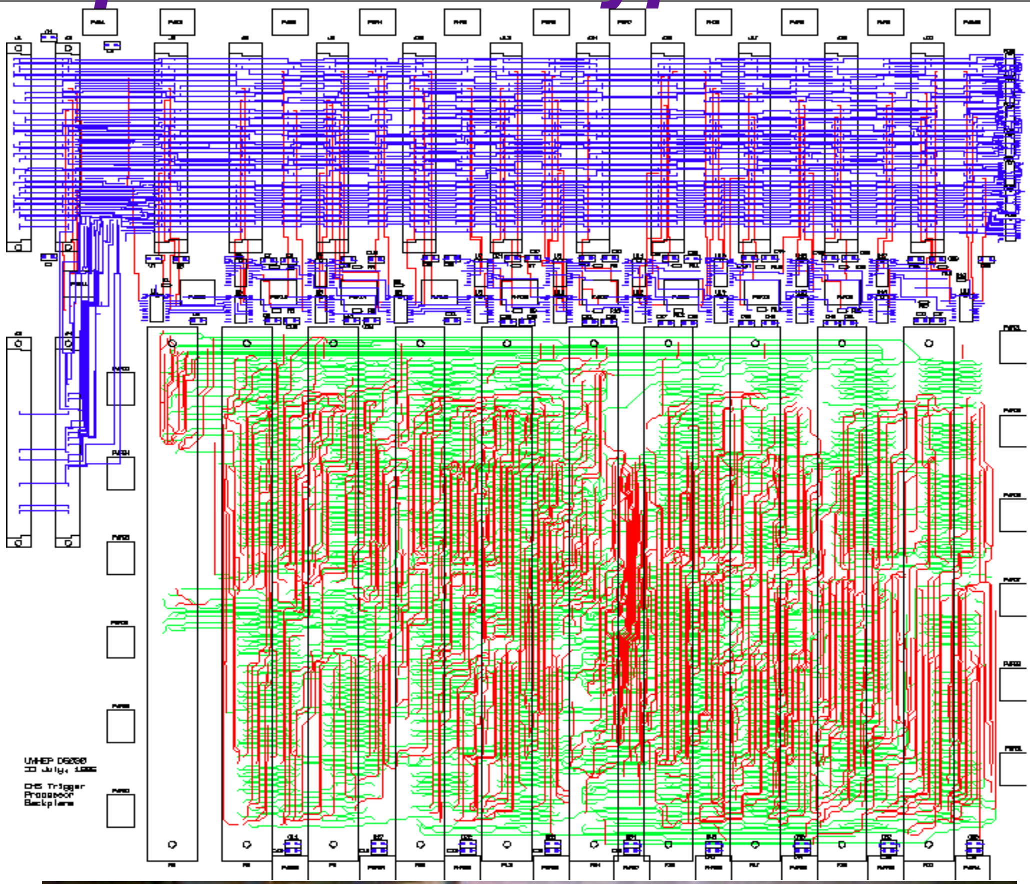




Backplane Prototype

Display of 3 out of 5 signal layers:

(most signals are hidden by top layer)



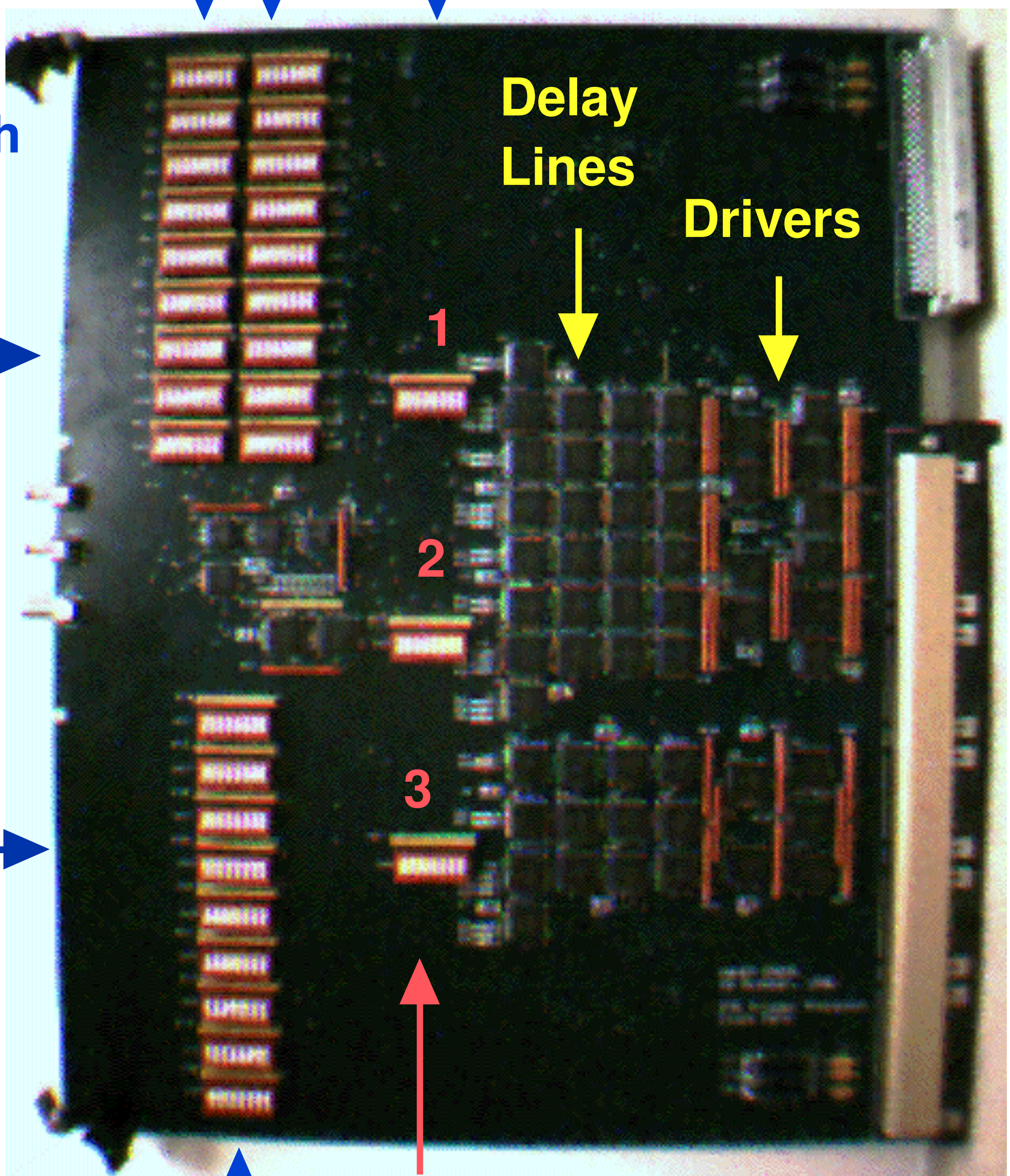
View of prototype backplane installed in prototype crate

Prototype Clock Board

switches to set delay lines

synch & reset

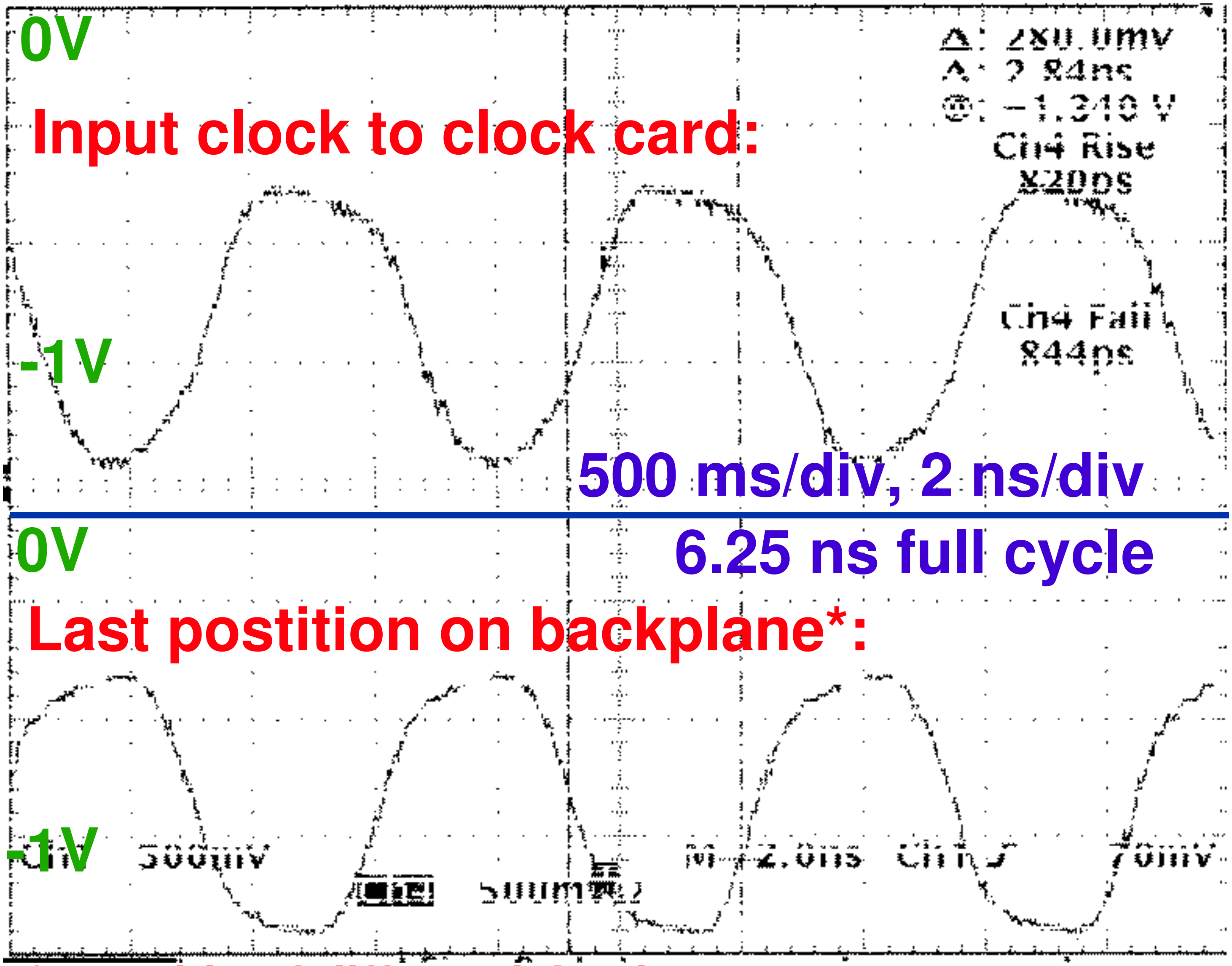
clock



1:Rcvr-E.I. 2:clk-synch 3:clk-reset

4 Recvr Cards, 4 Electron Iso, 1Jet/Sum

Backplane Test Results



*one side of differential pair

Conclusions:

- Output of backplane rise 820 ps
- Output of backplane fall 840 ps
- Measured 20% to 80%

Receiver & Pseudo -Electron Isolation Card Status/Plans

Receiver Card:

- Design & Layout Finished
- Routing finished by Apr. 1
- Fine-tuning finished by Apr. 15
- Artwork generation & Quotes by May 1
- Manufacture finished by June 1
- Assembly finished by July 1
- Test & Eval from July 1 on

Pseudo-Electron Isolation Card

- Conceptual design finished
- Detailed design start May 1
- Schematics finished by June 1
- Layout done by July 1
- Board delivery by Aug. 15

Full Backplane tests start Sept. 1

- See them during Madison meeting!

Conclusions

CMS calorimeter trigger hardware:

- Backplane prototype manufactured
- Clock Card manufactured
- First Backplane tests very good
- Receiver card being manufactured
- Electron Isolation card under design
- Full system tests start in Sept.