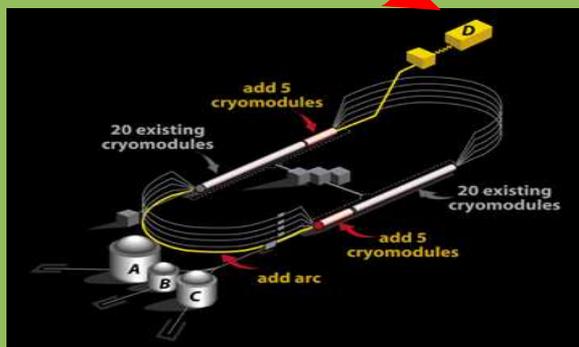
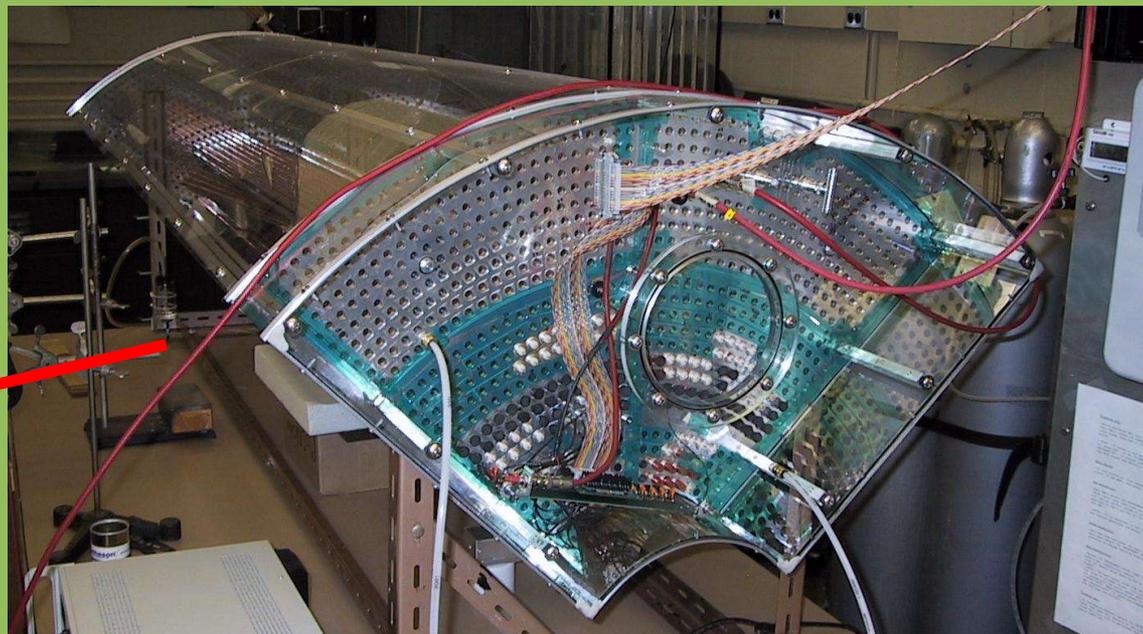
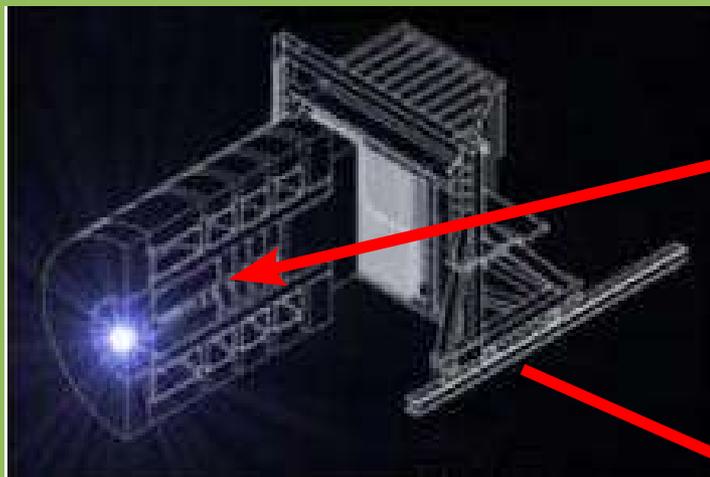


GlueX CDC Update and Electronics Outlook

GlueX/HallD Collaboration Meeting
Jefferson Lab
27-29 April 2006



Michael McCracken
Carnegie Mellon University
Advisor: Curtis Meyer



Two main foci:

Detector Hardware: High Voltage Distribution/Front-End Boards

- The first boards I designed were bad... really bad.
- In the next design, we have incorporated many of the features of the CLEO DR3 board.
- Matt Shepherd, Paul Smith, and Gerard Visser have been immeasurably helpful in designing the new boards.

Electronics Hardware/DAQ System and CODA

- Grad. student Zeb Krahn has been working to get the DAQ system fully functional.
- I will talk about what components we have, and our current understanding of the DAQ system/CODA.



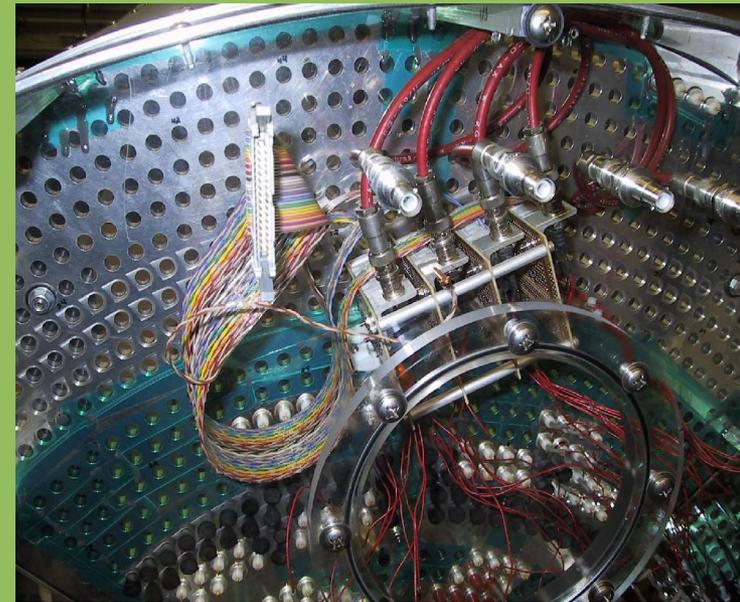
The First Distribution Boards

Why were they so bad?

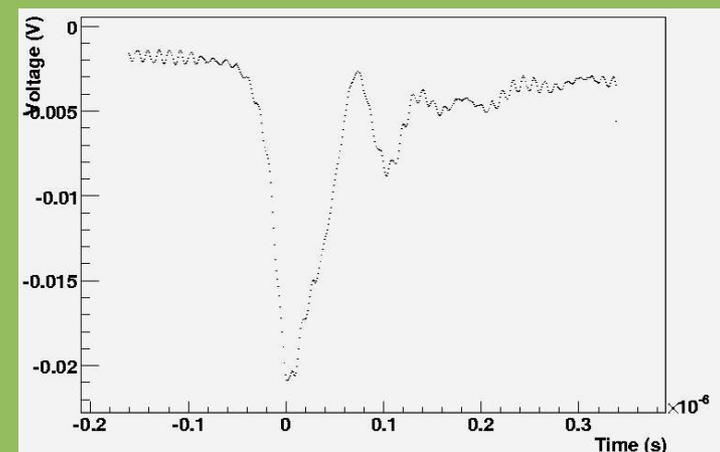
- They were built on left-over PCB's from another project. They had no ground plane and made the component configuration very awkward.
- I tried to cram too many signals through the 34-pin connector in the plenum cover, thus eliminating the possibility of twisted pair cabling.
- Overall, I made many rookie mistakes.

How bad is bad?

- There were horrible cross-talk and ringing problems in the signals. These boards were great antennae.
- They offered limited compatibility with JLAB's pre-amp boards. Connectivity would have been a nightmare.



Poorly designed front-end board, or expertly designed antenna?



An average pulse, but can we trust it?

The New Boards

- Matt pointed us in the direction of the CLEO DR3 boards. Our new design is very similar to these.
- These new boards will be built on custom-fabricated PCB's, designed with Paul and Gerard's help.

Features of the new boards include:

- More compact and sensible board architecture. R0-4003 to eliminate out-gassing.
- Large ground plane to provide more local and robust ground connection for paired output. This should help to control cross-talk and ringing.
- The sense wire connections are made with co-ax cabling with the sheath held at bias voltage.
- JLAB's FDC pre-amp boards will mate directly to the end of the distribution boards.
- These boards are much more compact without sacrificing the sense wire relocation we would like for this prototype.



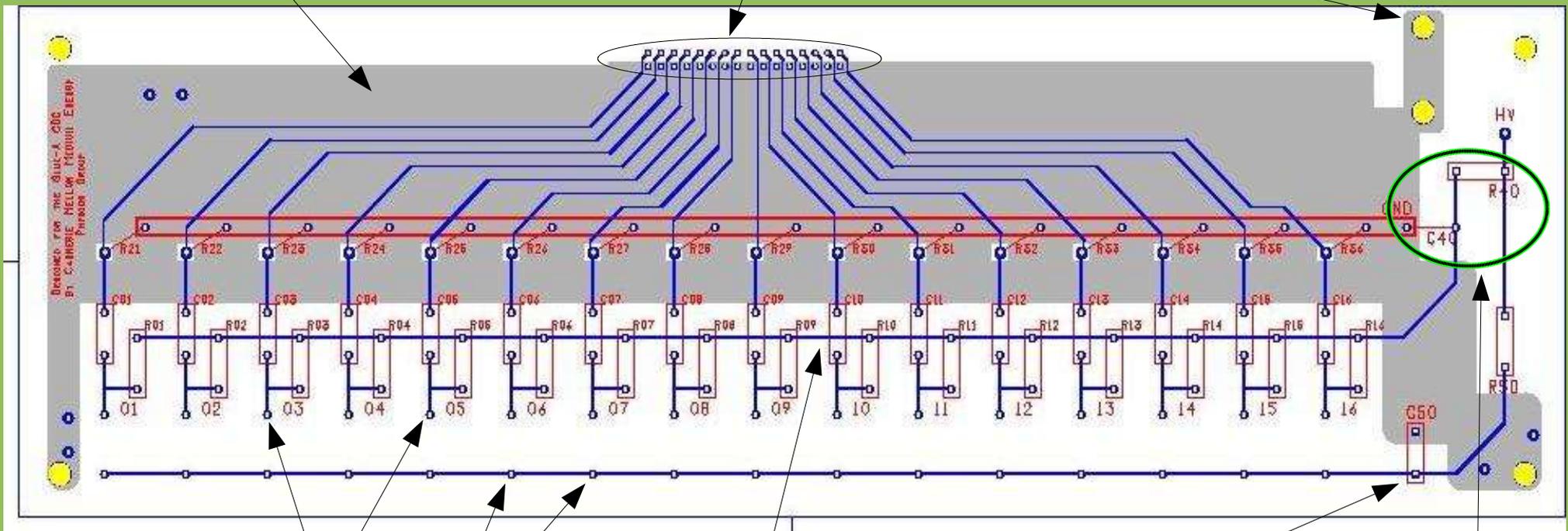
The Board in Some of Its Gory Detail:

The new board is shown below. The groundplane is shown in grey, traces in blue, and a silkscreen layer is shown in red.

Groundplane

Interface to Pre-Amps

Mount for HV connection



Sense wire connections

Connections to co-ax sheath

HV bus trace

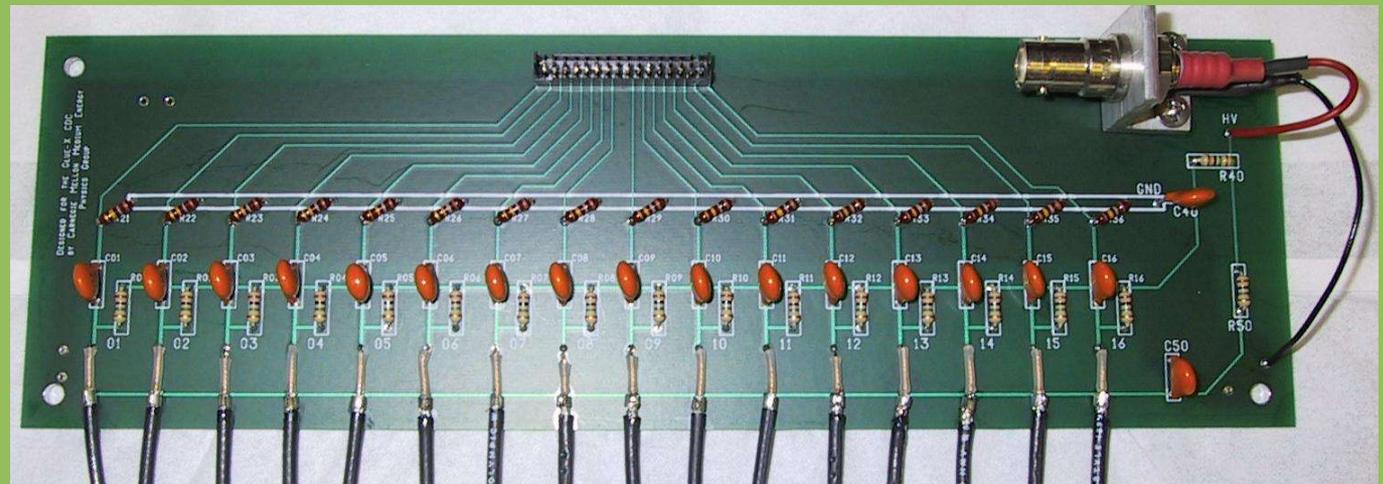
Jumper for grounding/
biasing sheaths

Low-pass HV
filters

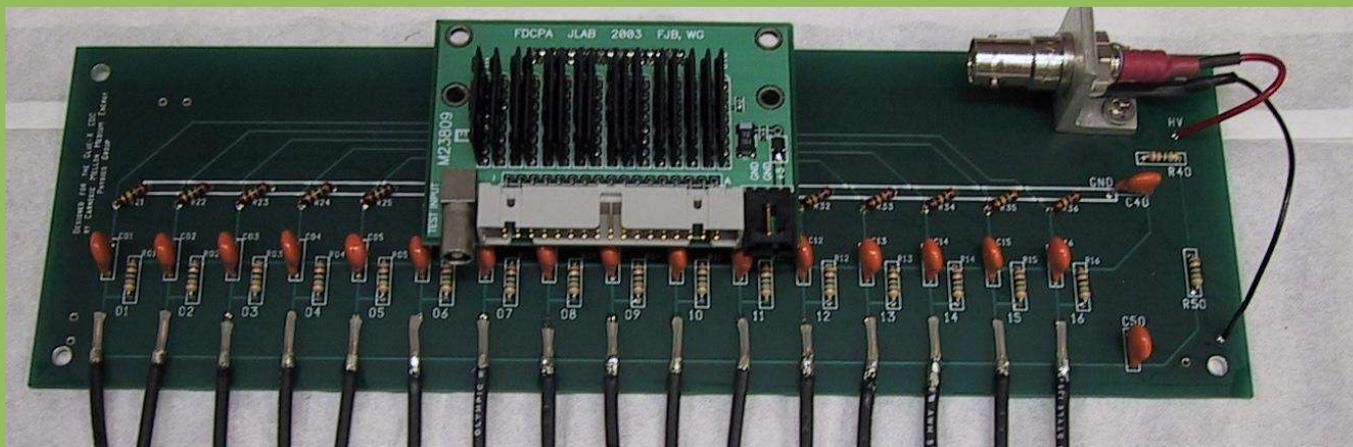


What they look like:

- We ordered a run of 5 boards from a fabrication company called eFabPCB (highly recommend for small volume {very cheap!}).
- The boards look great. Equipping them was a breeze, and so far they have passed high voltage testing.
- Some photos:



Below: HV board with JLAB FDC preamp board mated to it.



Above: a board with all components and sense wires installed.



Chamber status and outlook

- As we speak, the chamber is holding high voltage in Pittsburgh.
- Next week, I will begin looking at signals.
- We have all components in the chain between sense wire and DAQ system: HV distribution, preamp boards, differential post-amplifier.
- This brings us to our next topic...

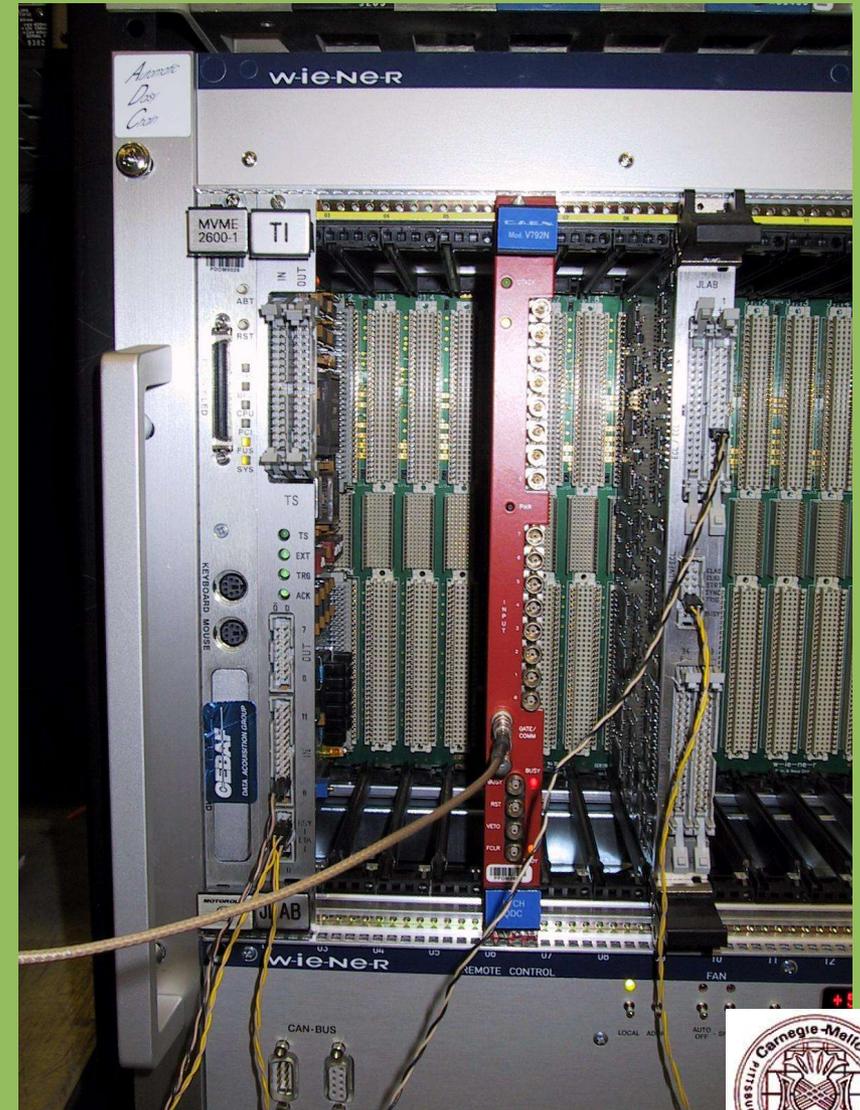


The DAQ System

We have been slowly gathering the pieces of a DAQ system to support the chamber. We now have:

- Wiener VME Crate
- 1 JLAB F1 TDC
- 1 CAEN v792N ADC
- JLAB Trigger Interface Board
- MVME2600 Motorola PowerPC
- LINUX node running CODA

We are still waiting on the Struck sis3320; hopefully there is news on that front...



What are our present capabilities?

- At the same time we realized that the previous HV distribution boards were useless, we were ready to take data with the ADC.
- The ADC is ready at any time, and Zeb has written code to interpret the ADC output that we get from CODA.
- Zeb is working to get the F1 TDC running with CODA. He has been talking with Dave Abbott about modifying the CODA readout lists to accept this. Should be working very soon.
- As soon as the HV dist. boards are complete, we should be ready to look at cosmics with both TDC and ADC.



What happens next?

- When I return, I will begin taking signals from each level of the CDC output: HV dist. board, premps, postamps.
- F1 TDC should be becoming functional as we speak. Taking some data with it is a big priority.
- Zeb will be finishing code in the next two weeks that interprets all of the CODA output.
- Integrating the fADC when we get it...

