

SHMS Wire Chamber Update

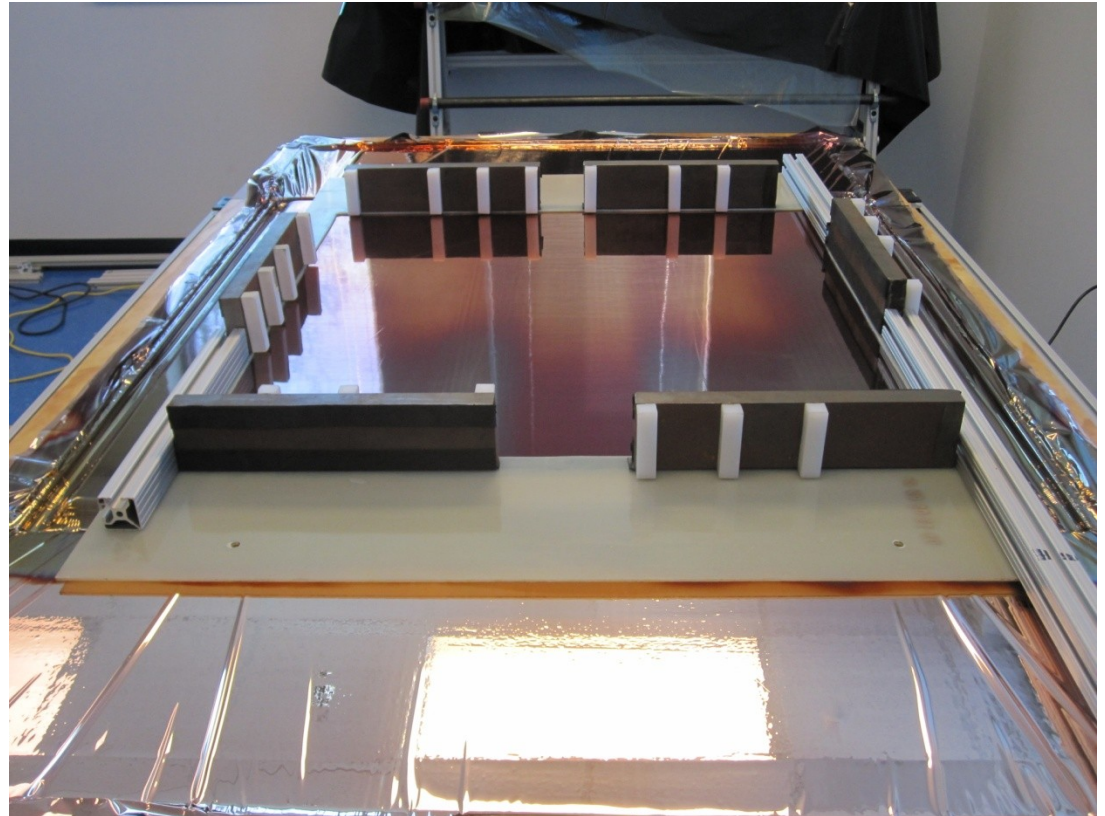
- Recap of this past year.
- Update on large area printed circuit boards.
 - Redesigned large area printed circuit boards for narrower width
 - Requisition submitted with Triangle Labs, Nevada
- Further developed and tested our construction procedures.
 - Built prototype wire planes and mock-up models
 - Tested procedures and continually making improvements
- Design of mounting frame and position adjustment complete.
- Moving forward with purchase requisitions.

Printed Circuit Boards

- Redesigned the wire and cathode planes to be narrower – 38.7 inches
- Purchase order submitted with Triangle Labs, Nevada in January 2011
- Raw material purchased; electronic artwork printed.
- First machining of blank boards resulted in a catastrophic failure of their large area machine (March 2011)
 - they broke the spindle; working area only 36 inches!
 - Triangle decided to invest in a new, larger machine (June)
 - order placed; expect machine to arrive in late September, then Nov., and finally January (!!)
- Latest from Triangle – machine arrived and is being installed!
- Anticipated pcb production by the end of January 2012.
- Full scale production of wire chambers delayed.

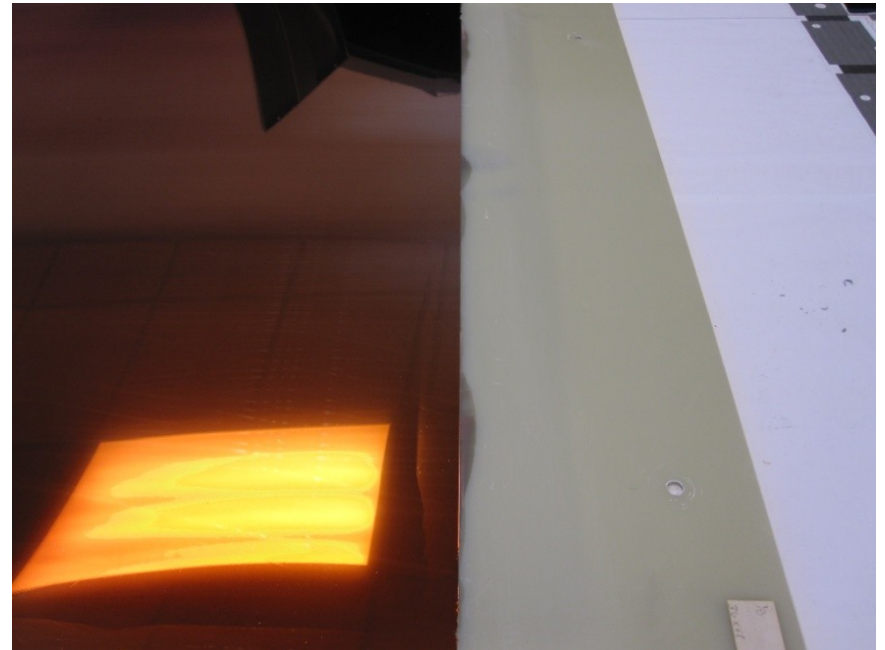
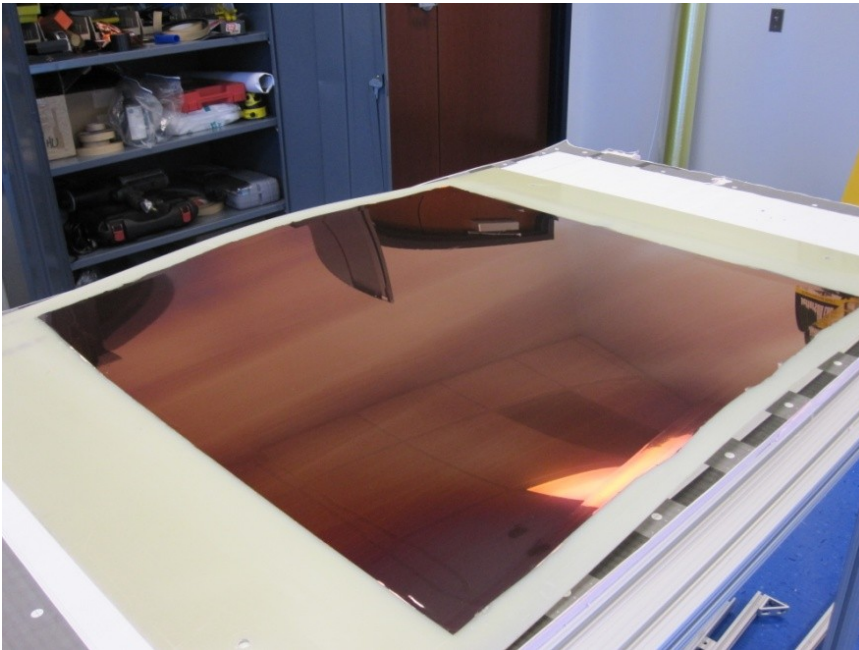
Cathode Foil

- Copper coated kapton foil found to easily peel off the test board
- Tested five different epoxies for peel strength
- Found 3M-DP190 had best peel strength
- Made a full scale test
- Extended vacuum stretcher to fit the full size pcb



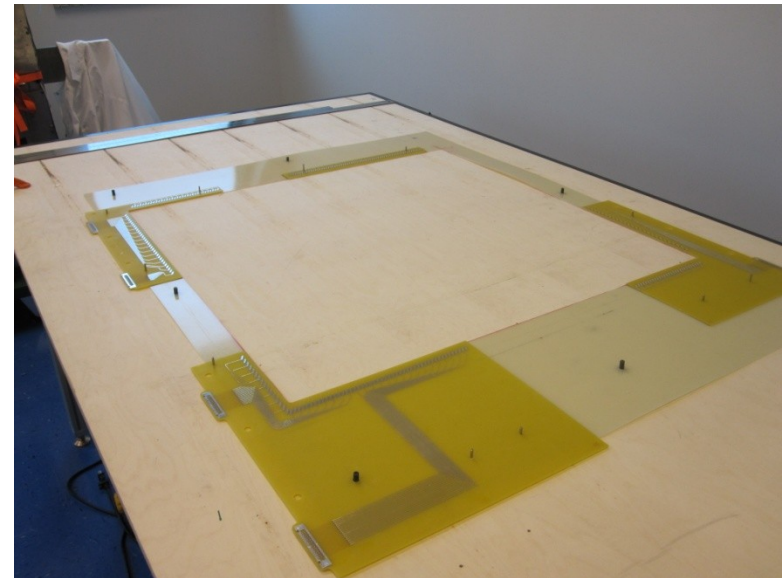
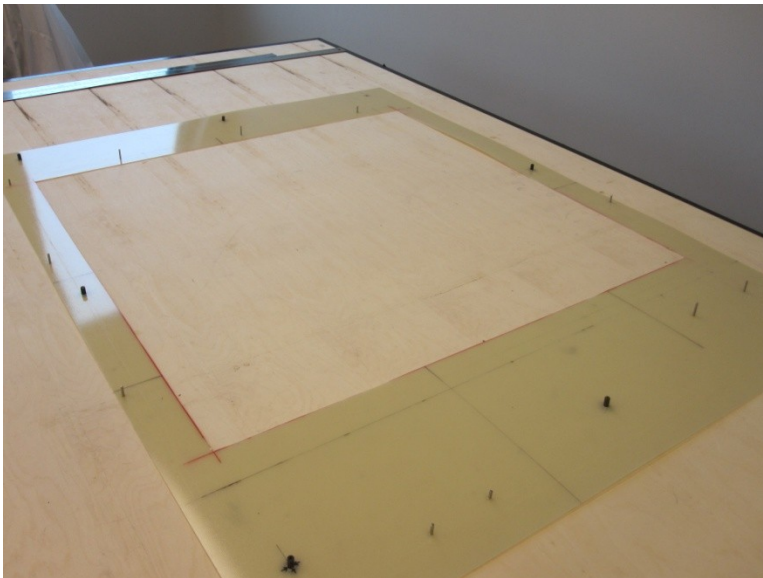
Cathode Foil Glue Test

- Now the foil can be trimmed without causing the cathode plane to peel and separate off the glue joint.



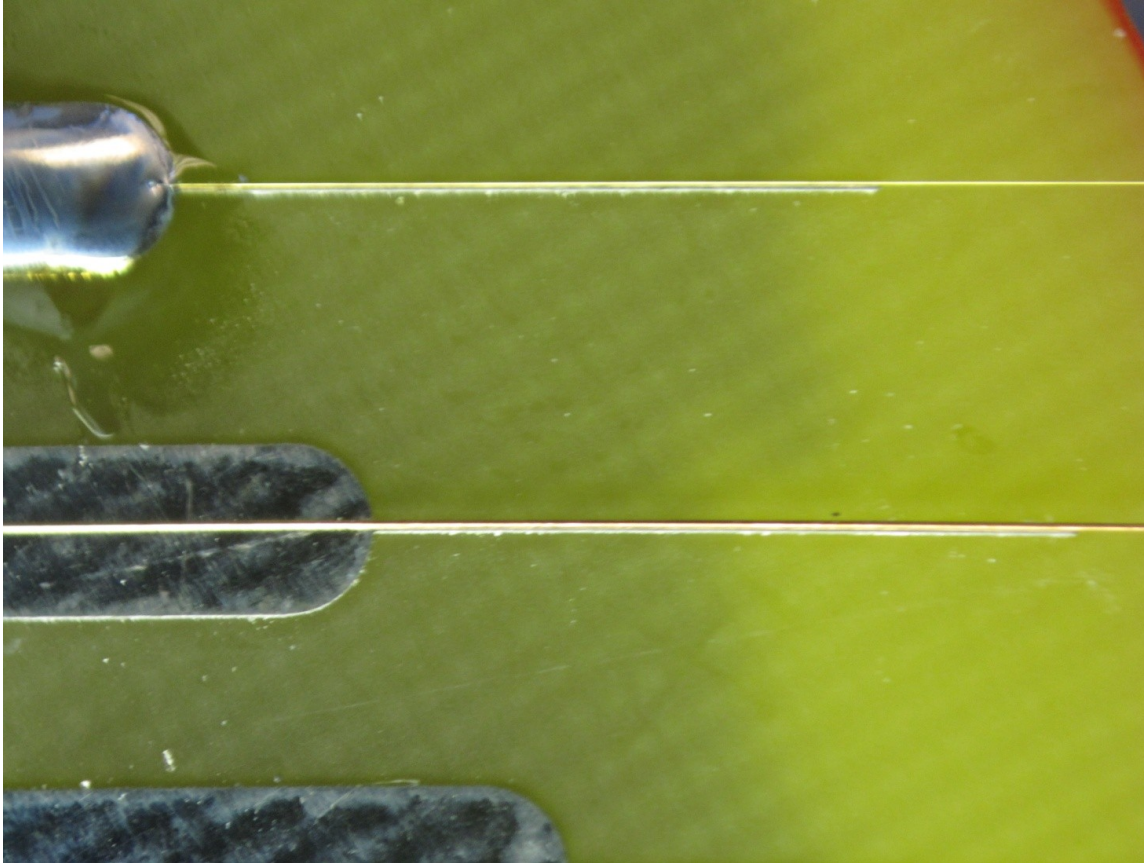
Prototype Wire Plane (U)

- Sets of four small PCBs manufactured courtesy of JLab.
- Each pcb is a cut out of part of the full size wire plane board.
- Mounted on the corners of the acceptance of a dummy board.
- Allows a stringing test with components on the same scale as the full size boards.



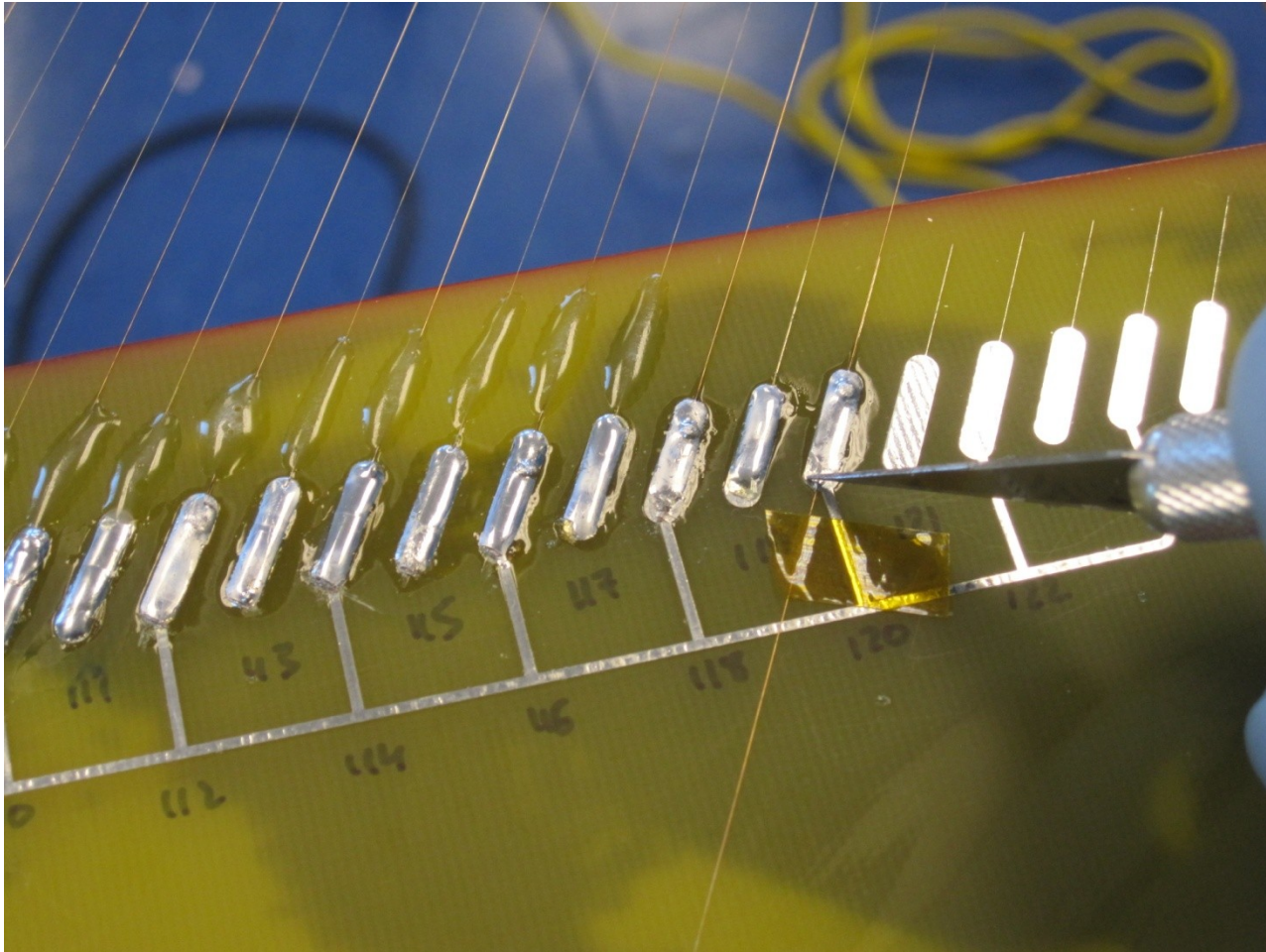
Wire Alignment

- Thinner signal wires tend to roll off the alignment marks.
- Lightly sand the surface of the alignment marks to flatten them.



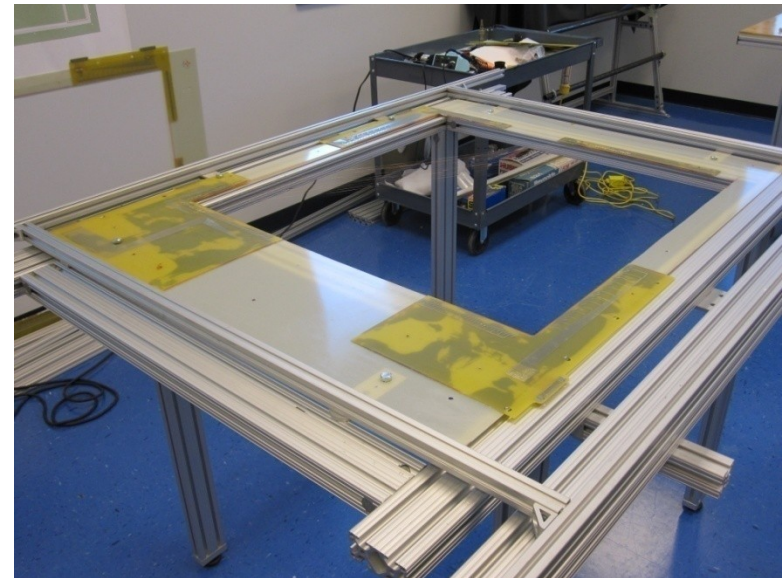
Test Wire Stringing

- Wires are epoxied after being tensioned and soldered.



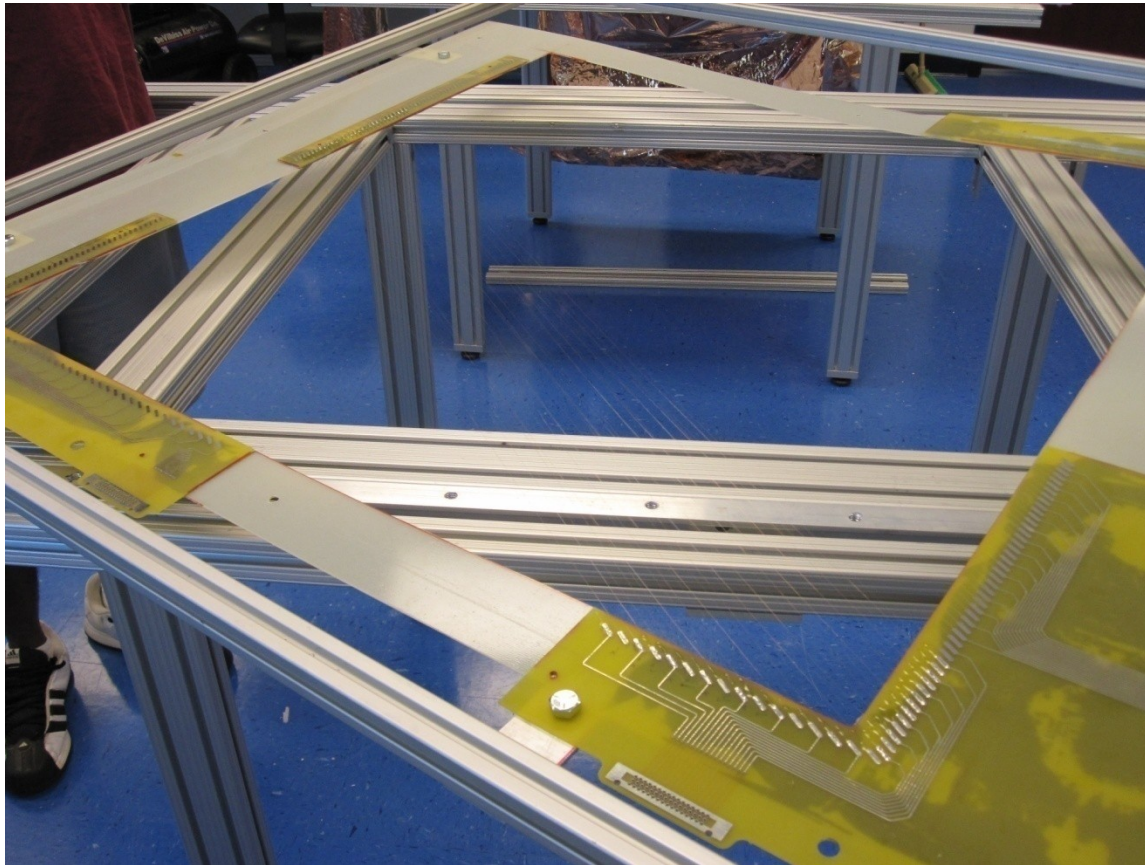
Lifting Frame for Wire Planes

- Lifting frame boundary is outside the wire plane footprint.
- Add supports to stringing jig at the side; attach side rails of lifting frame to the wire plane at two points.
- Slide bottom rails on to side rails and attach to wire plane.



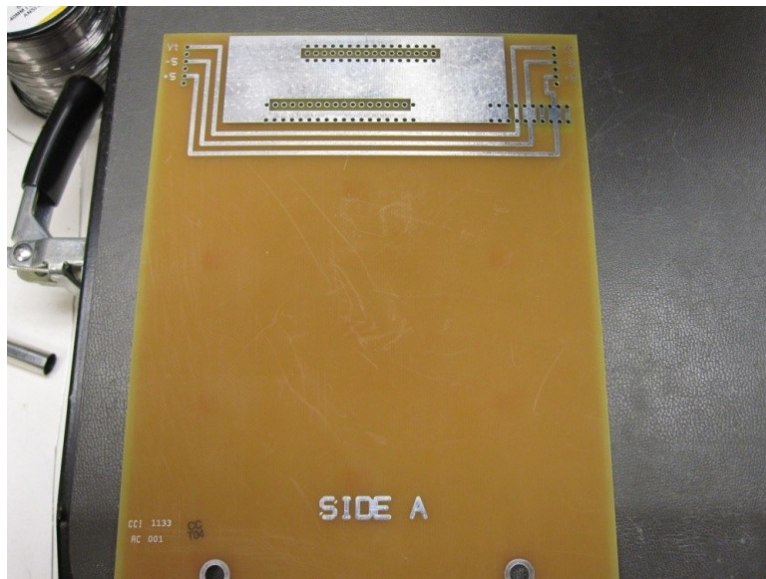
Testing the Lifting Frame

- Successfully lifted the wire plane without breaking any wires!



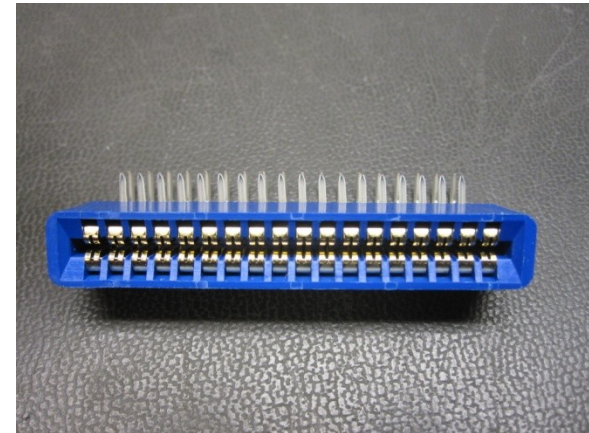
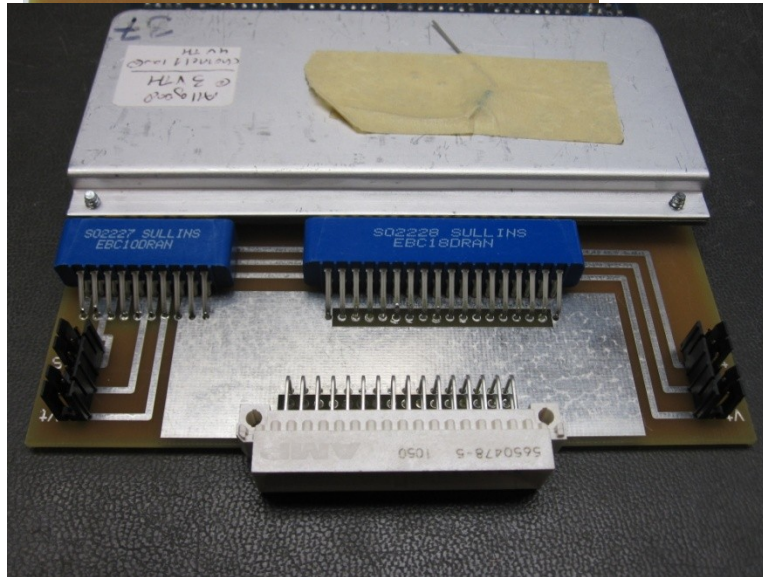
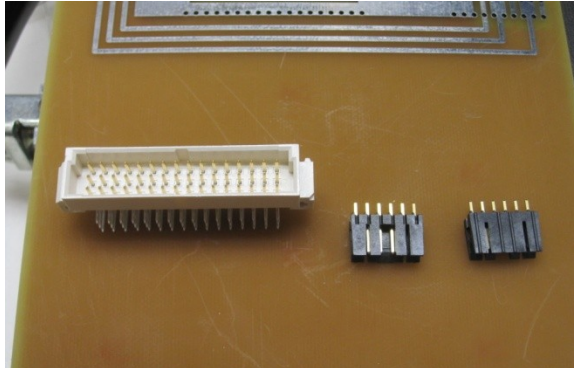
Adapter Cards for Amp/Disc. Cards

- Using the same board as HKS.
- New set were manufactured courtesy of Jlab.
- Delay in sourcing some of the connectors required; now in hand.



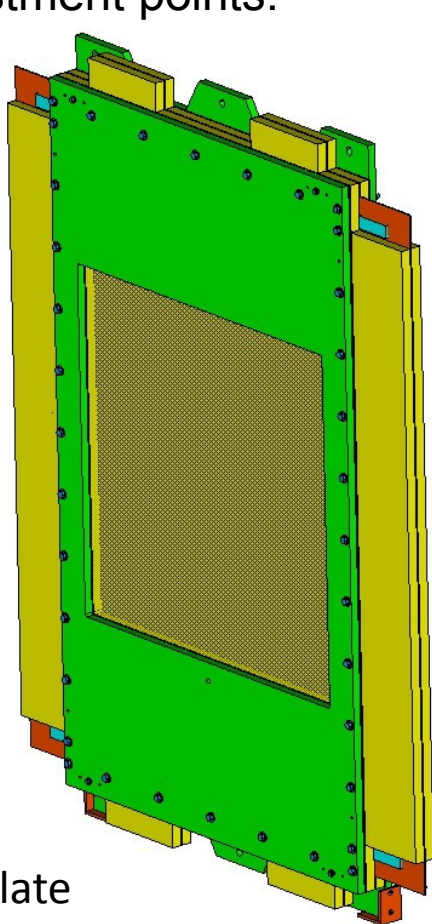
Adapter Cards for Amp/Disc. Cards

- Started soldering in the components.

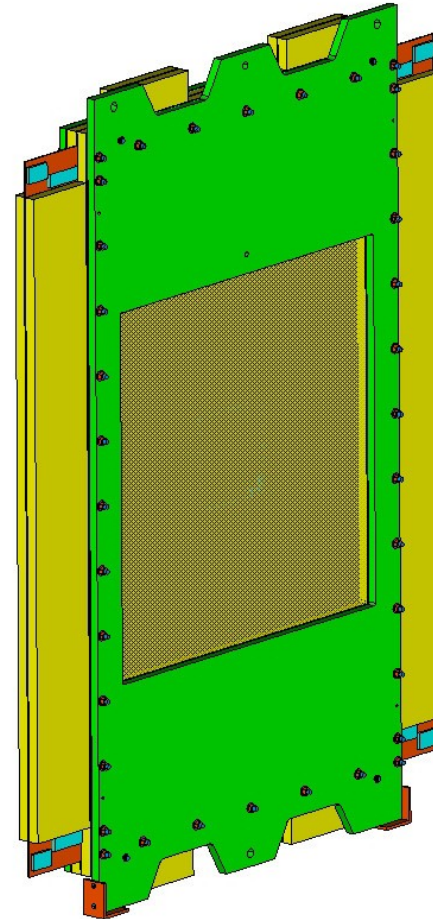


Mounting Plate Design

- Working closely with Bert Metzger to ensure sufficient lifting and adjustment points.

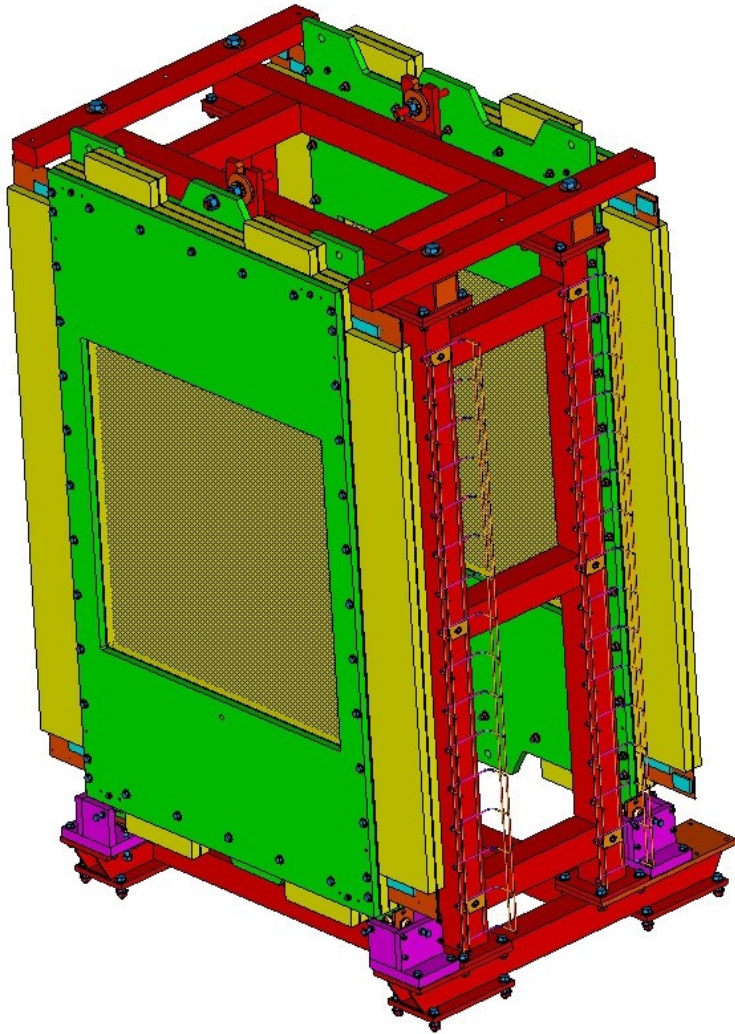


Rear plate



Front plate

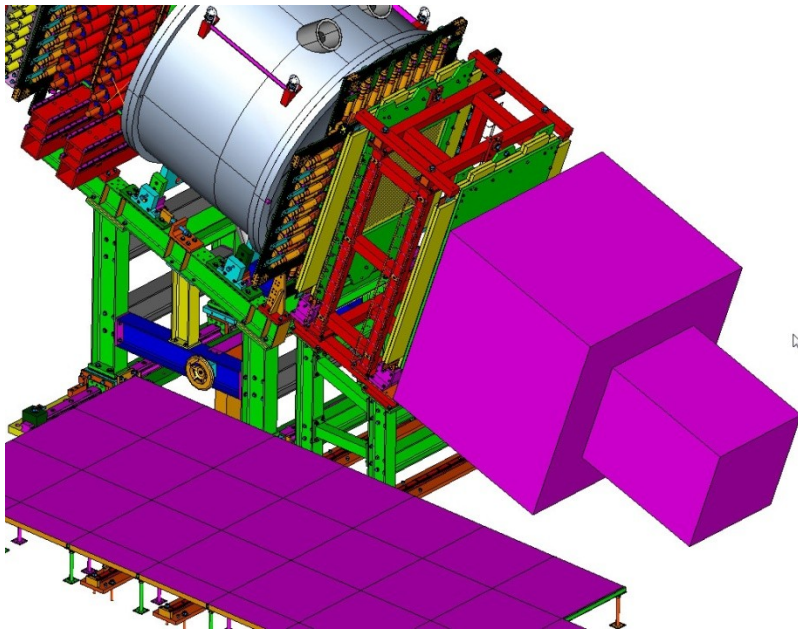
Mounting Frame for the Detectors



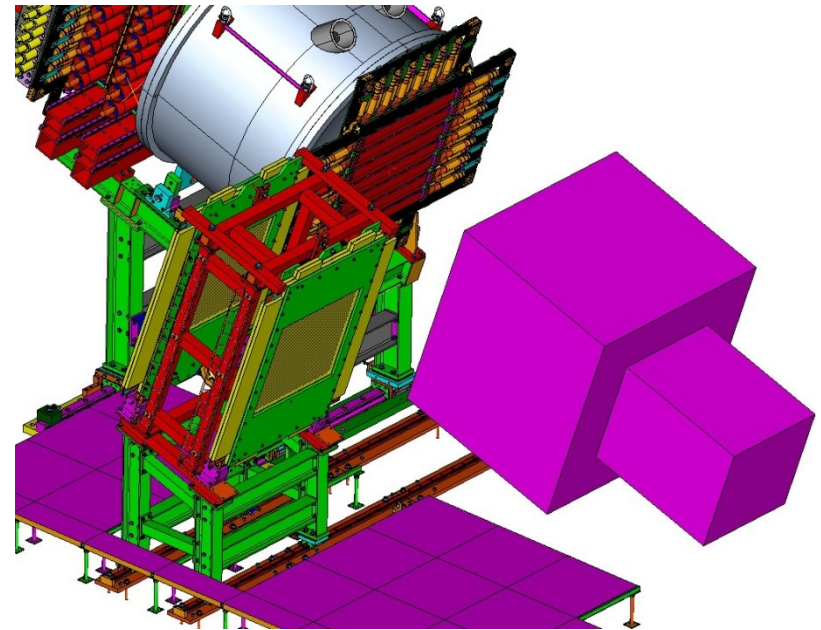
- Designed by Bert Metzger.
- Frame allows fine adjustment of wire chamber positions.
- Various interferences have been identified and fixed.
- Frame keeps the chambers mounted together as a pair.

Mounting the Detector in the Spectrometer

- The chambers are mounted together on a frame that can be inserted and removed from the detector stack.



In the stack



Out of the stack

Current Parts Status and Requisitions

- i. Components in hand
 - i. Wire spools (signal & HV)
 - ii. Epoxy
 - iii. Cathode and gas window foil
 - iv. Adapter cards to carry amp/disc. Cards
 - v. Electronics components
- ii. Parts Ordered
 - i. Large PCBs for chamber (est. delivery starting in March)
 - ii. Material for stringing jigs and lifting frames
- iii. Outstanding Requisitions
 - i. Front/Rear plates (3 weeks ARO)
 - ii. Center (dummy) board to carry amp./disc. cards; (est. 3 weeks ARO)
 - iii. Dummy boards for gas windows
 - iv. Various tools and supplies

Summary

- Large area PCBs delayed; expect delivery starting March.
- Continuing to test, develop, revise, improve procedures and set-up in lab.
- Tested foil stretching apparatus with copper coated kapton with DP-190
 - Foil can now be trimmed without causing separation from glue.
- Began to test string wires on prototype model – good training!
- Tested a lifting frame to attach to PCB for moving it from jig to assembly.
- Begin making the adapter cards.
- Working with Hall C engineer on the mounting plates, frame and components to ensure all interferences fixed.
- Preparing for a smooth production start with large PCBs finally arrive.