Update From SLAC

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7/18/2019

Resistive Field Cage-

Test #1 - Practice lamination with Masterbond EP29LPSP

Happened a couple of months ago

Was ok / functional, but not very elegant

Glue acceptable but not pretty

Only gravity and physical force to set glueline thickness

First generic metallic / copper tape pressed against surface (force only)

Copper relatively thick

Seemed ok - Some parts got loose with thermal shock

Cold electrical test unsure – possible equipment issue

Did not seem great

Test #2 – Purchase well known Copper tape with 3M conductive adhesive

Use heat and pressure to bond (similar thickness of copper)

Bonded to existing plate and glass slide

Cold test – delamination from glass slide

Resistive panel passes cold test

Still seeking more robust solution

Test #3 – Recent test – Practice lamination with vacuum bagging technique

Integrate thin metal (aluminum) foil into lamination process

Metal is so soft and thin that it should yield with the G-10

(Bond should be stronger than the metal)

Had a bubble form in one area while warming up – possible contamination on surface

- need to re-run test with better part cleaning

Test #4- Next generation vacuum bagging to have better glue control – hopefully later this week-

Silicone dams control epoxy near edges – better cleaning of aluminum

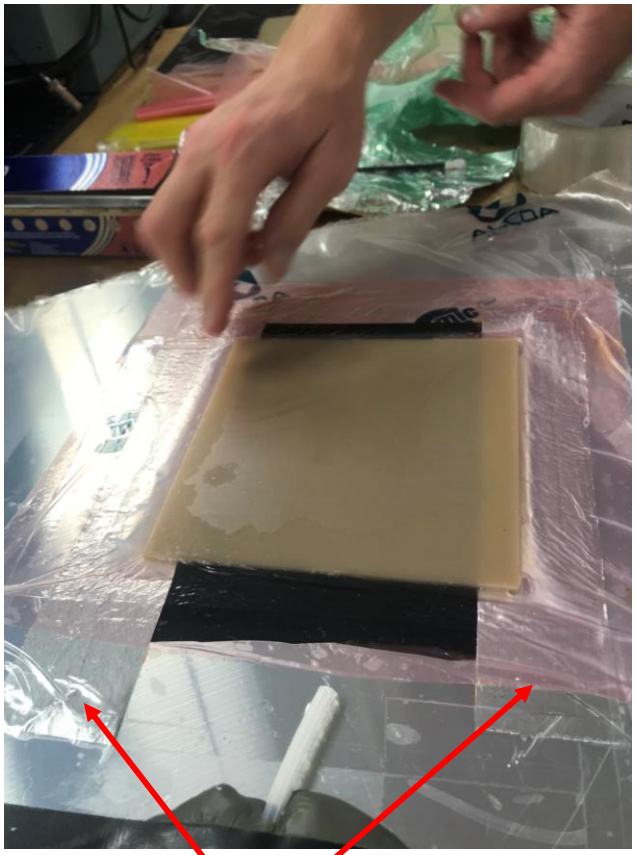
We still have some ideas which may be worth testing – current path seems to be progressing

Vacuum bagging Test #3-

From bottom to top- Metal flat plate (could be glass now), polyethylene release sheet, resistive film, epoxy, thin Al on edges, epoxy, G-10, porous bleeder sheet, absorber sheet, vacuum line, flexible sealing bag

Removing bagging materials

Removing bagging materials



Resistive polyimide
(much flatter - some flaws from bag)

Thin Al sheet between layers

Robust laminate with metallic edges

Where to go from here- Field Cage

Refine process-

- Electrical connection – to wires - to other parts
- Control extra adhesive (later this week)
- Double sided
- Better edges
- Test holes
- More cold testing

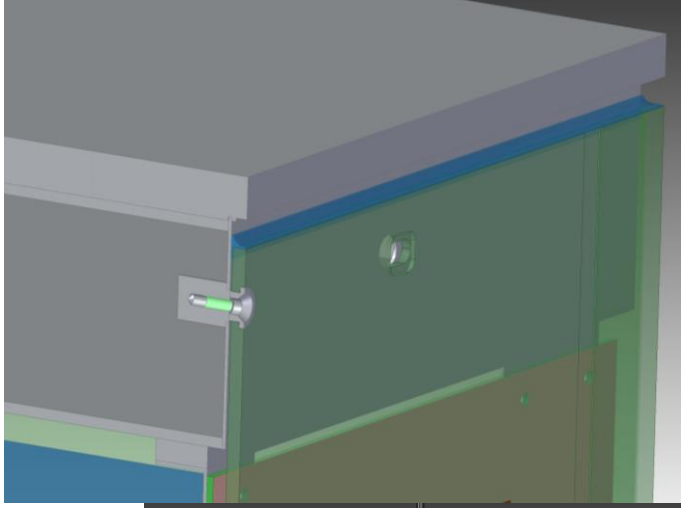
TPC layout-

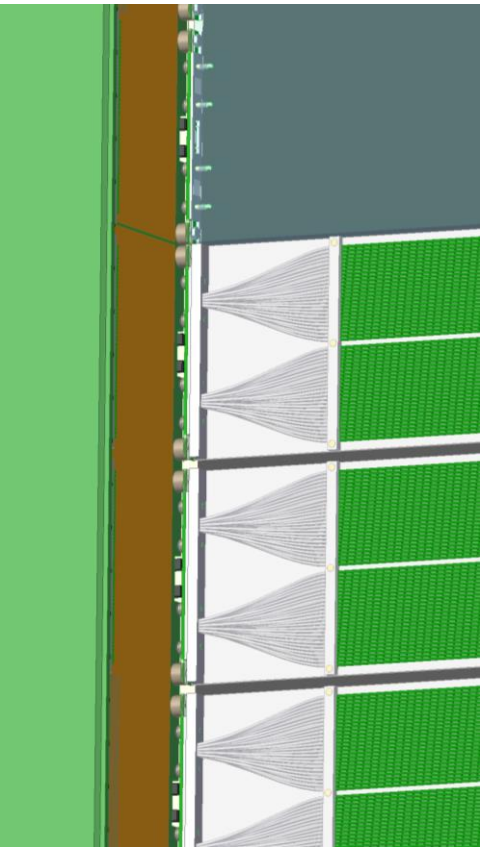
Have added various brackets and fasteners-

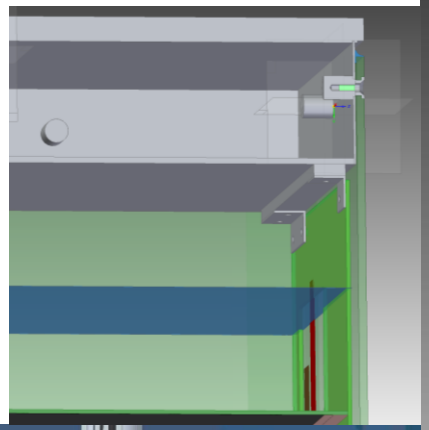
Recent release of proposed pixel board drawings-

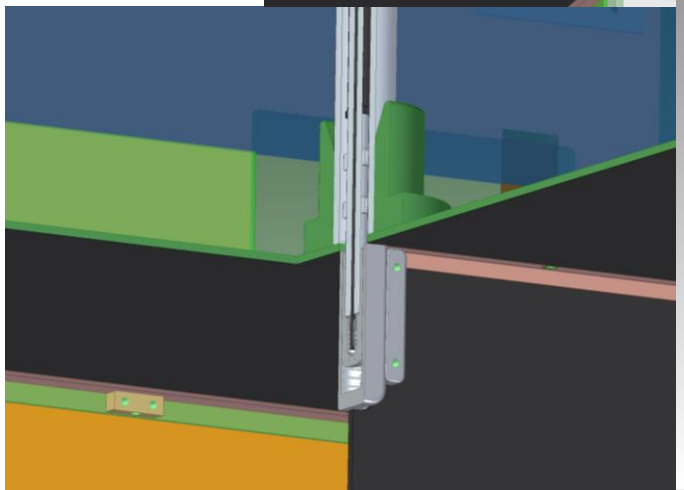
Weights of parts soon-

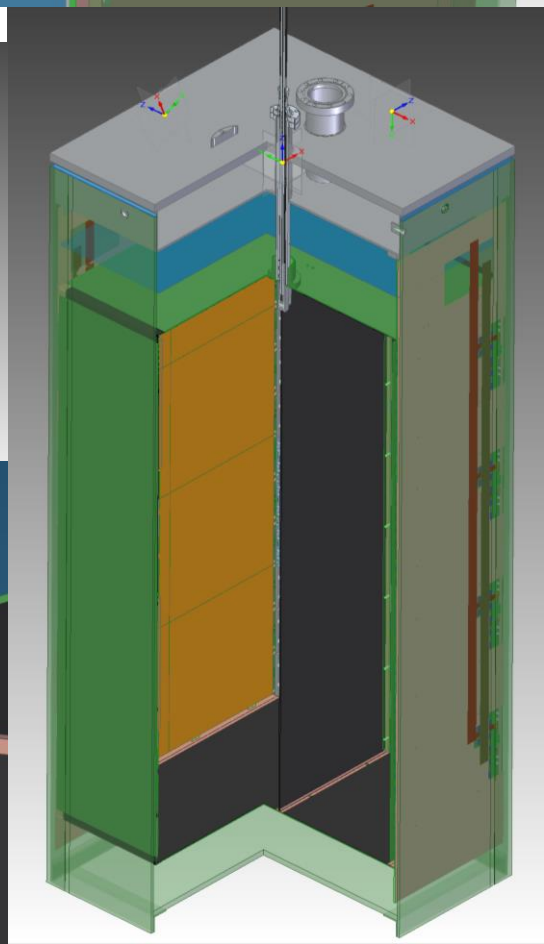
Some discussion about coax vs flex for light readout
– see on subsequent slides



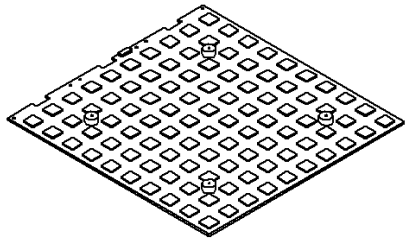


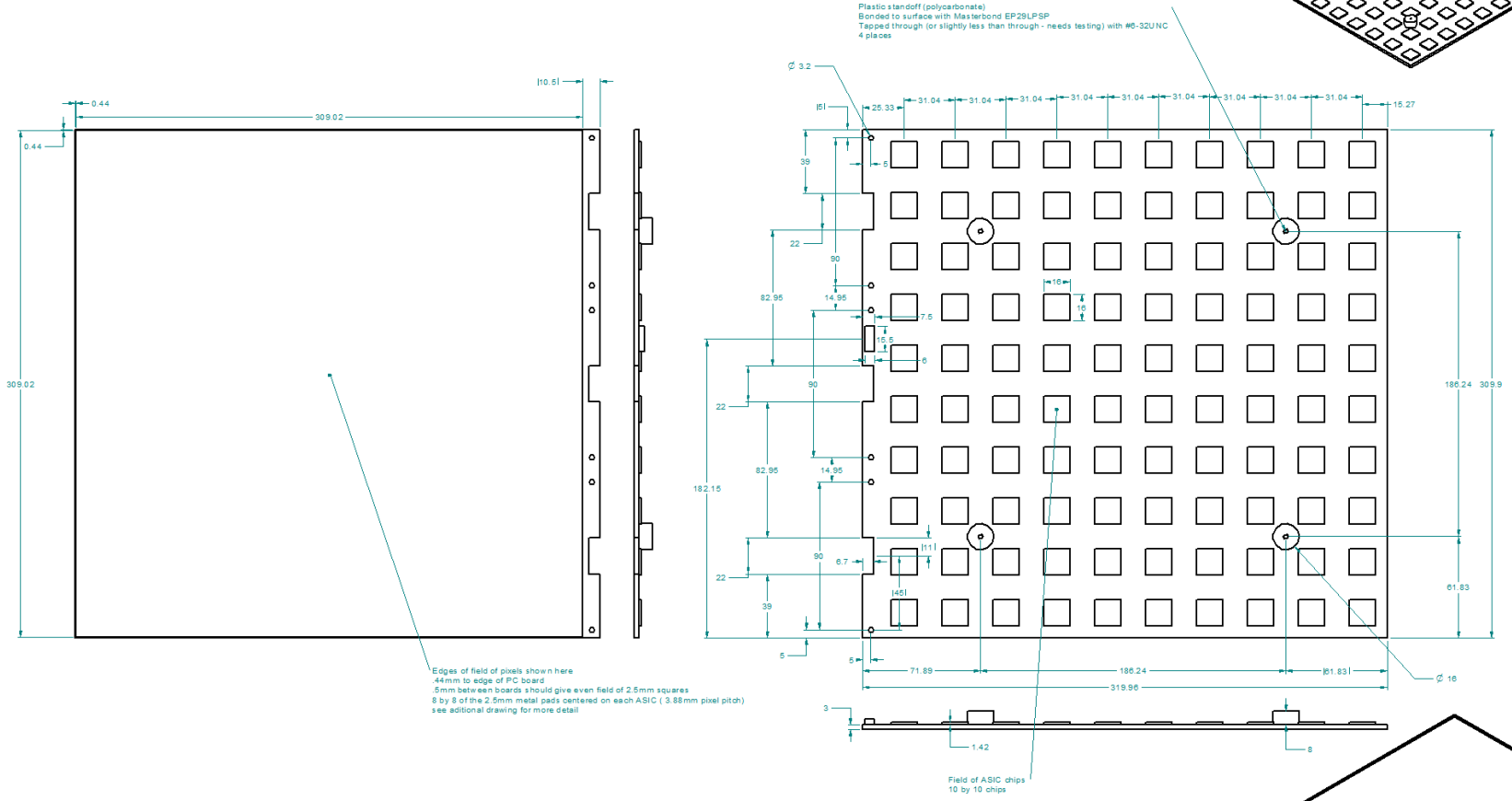


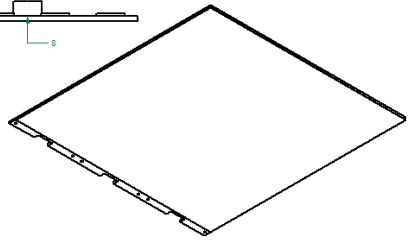




See attached .PDF for full size drawing

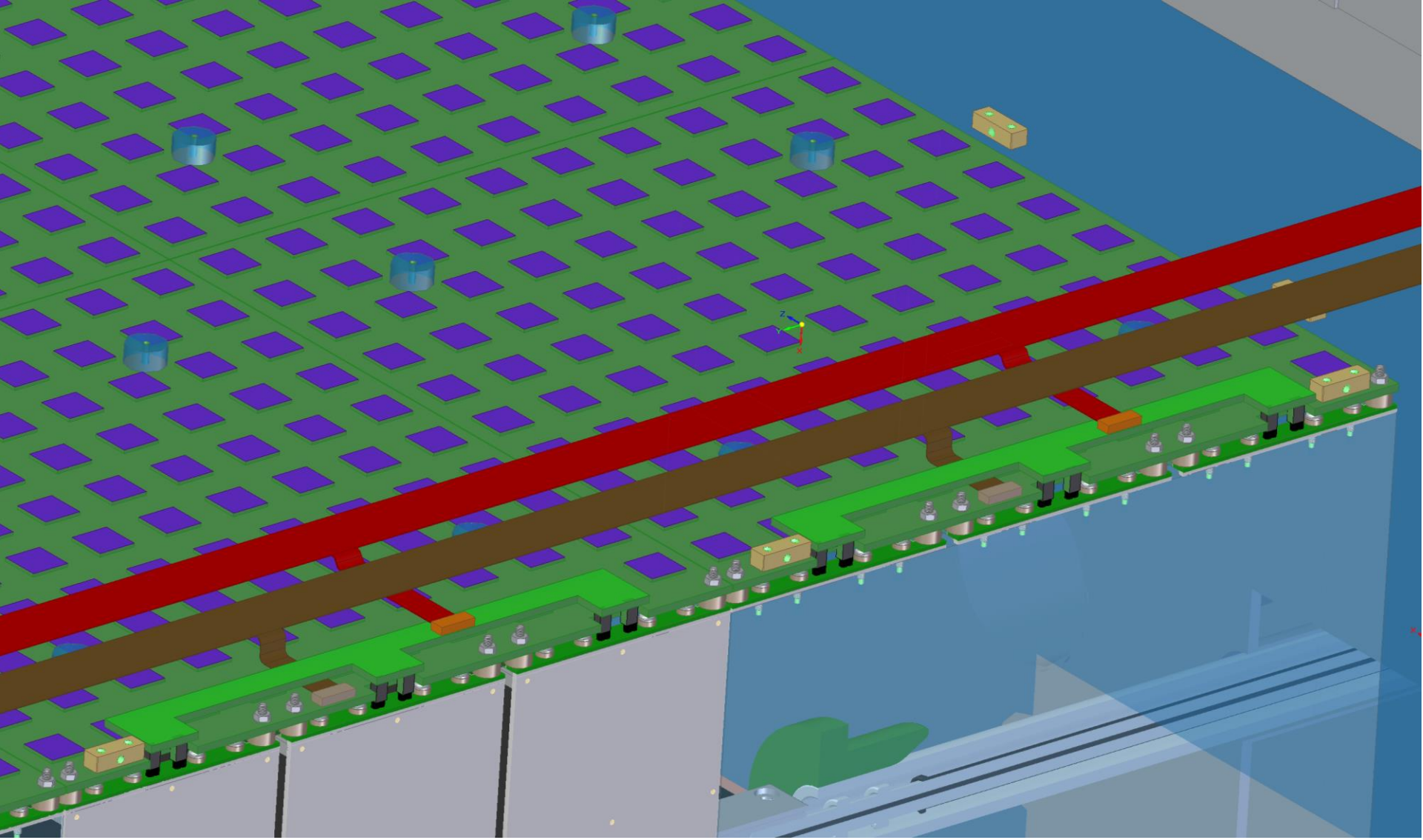


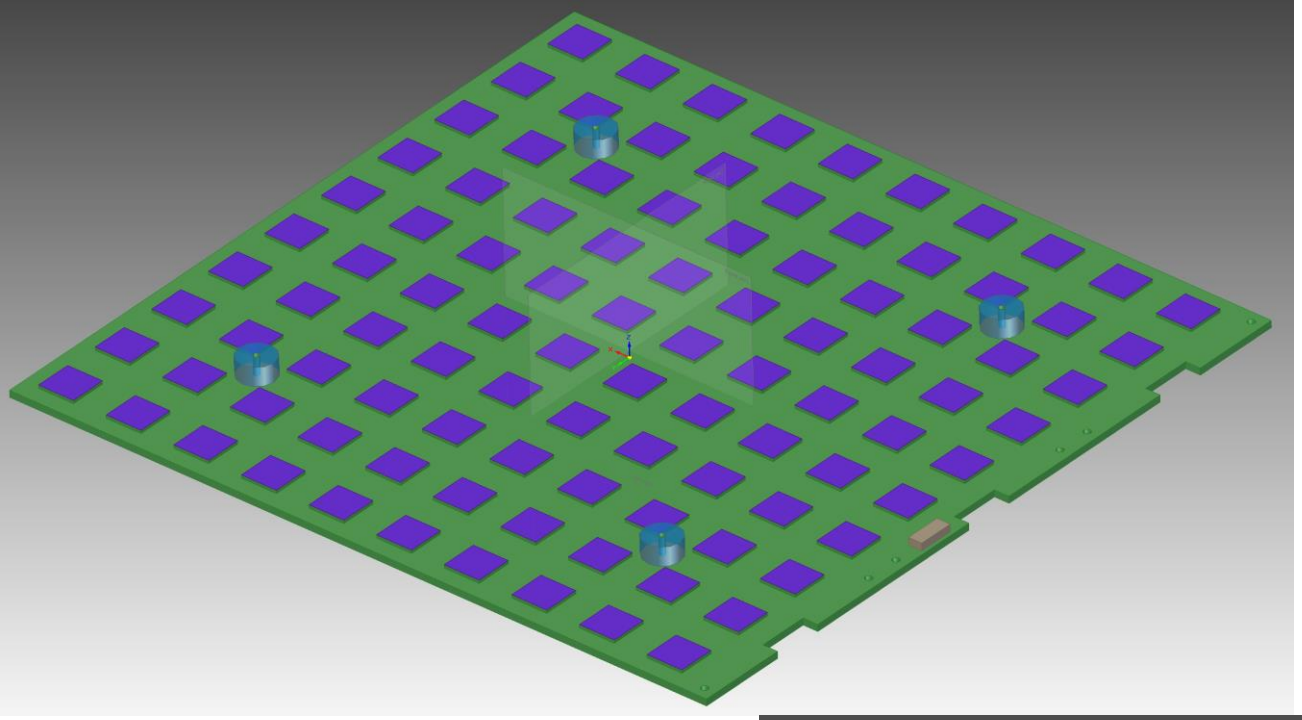


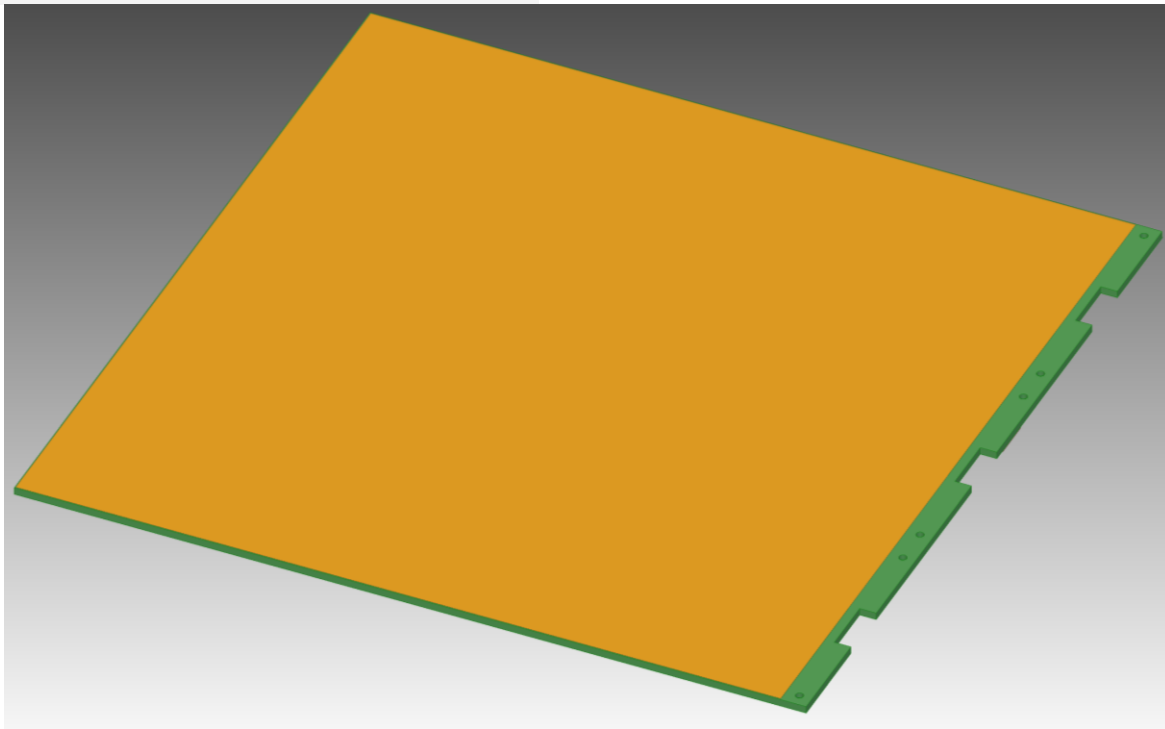


NEXT ASSEMBLIES:	SCALE: DO NOT SCALE DRAWING	ESTIMATED MASS:	CAD FILE NAME:
	SLAC NATIONAL ACCELERATOR LABORATORY / U.S. DEPARTMENT OF ENERGY	Pixel Board Mechanical Concept	
	DRAWN: Knut Skarpaas	DWG NO: LCRD-010114	REVISION NUMBER: E
	CHECKED:		
	APPROVED:		

Detail of intersection of Pixel boards
(Pixel spacing consistent between boards)







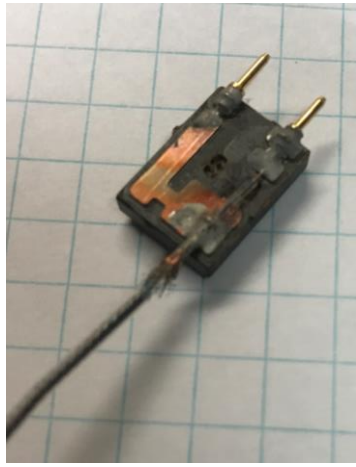
Some discussion about coax vs flex for light readout –

The use of coax vs flex has several advantages and drawbacks

Pro for coax-
Possibly better signal / less noise – perhaps – not sure
Don't need to wait for another group to select / cold test a connector
Could get rid of E board and use small simple boards instead

Con-
Need to test and prototype two types of connections to boards
Need to have more and more complex feedthroughs at top (crowded flange)
Must terminate cables inside (can not do potting method since they leak)
Presuming they are PTFE or PFA coated – can not glue to them
Requires much more tricky solder and cable stripping work
– unless there is very clever termination
LZ had a tricky time with their small coax terminations
Needs good strain relief – perhaps pass cable through a series of holes like sewing
Changes backplane design
Needs cable guides
Very fragile (thin wires)
Does not scale to a large system well (many connections to deal with)
More difficult to assemble?
We still need the flex for the other system

If flex, it would look a lot like this
(but not 90 degree option)
These were tested to 165K

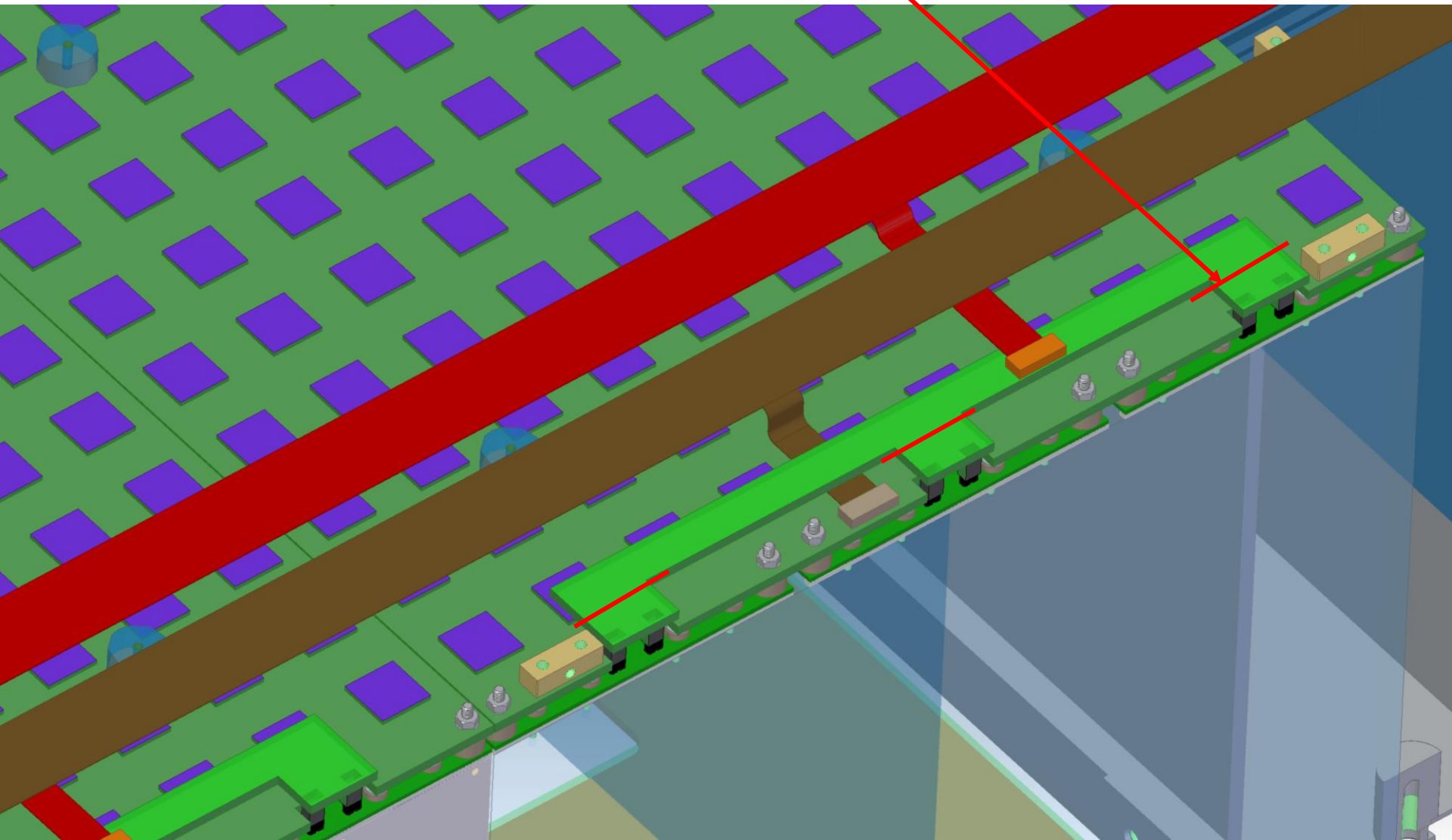


This was an LZ mini coax
prototype connector

If the coax option was desired, I think we would cut the E board into 3 pieces (simple but more parts) The purpose of the E shaped boards was to provide a location for one connector for all 6 SiPMs

Amplifiers could either be on the small boards or on the SiPM boards

(if the amplifiers were on the SiPM boards, the coax could go directly to those sockets – presuming you can come up with some sort of plug for them)



HV status-

We have the cable sample for our tests

Bob has machined a few parts (for final feedthrough – presuming cold tests are ok)

Most parts are modeled, but dimensions need to be verified and dimensions must be given to Bob for the remaining parts

(we did make a cable to cable adapter for the HV tests and this will be used as the warm end)

Shown below is HV Adapter