

System Overview and Grounding

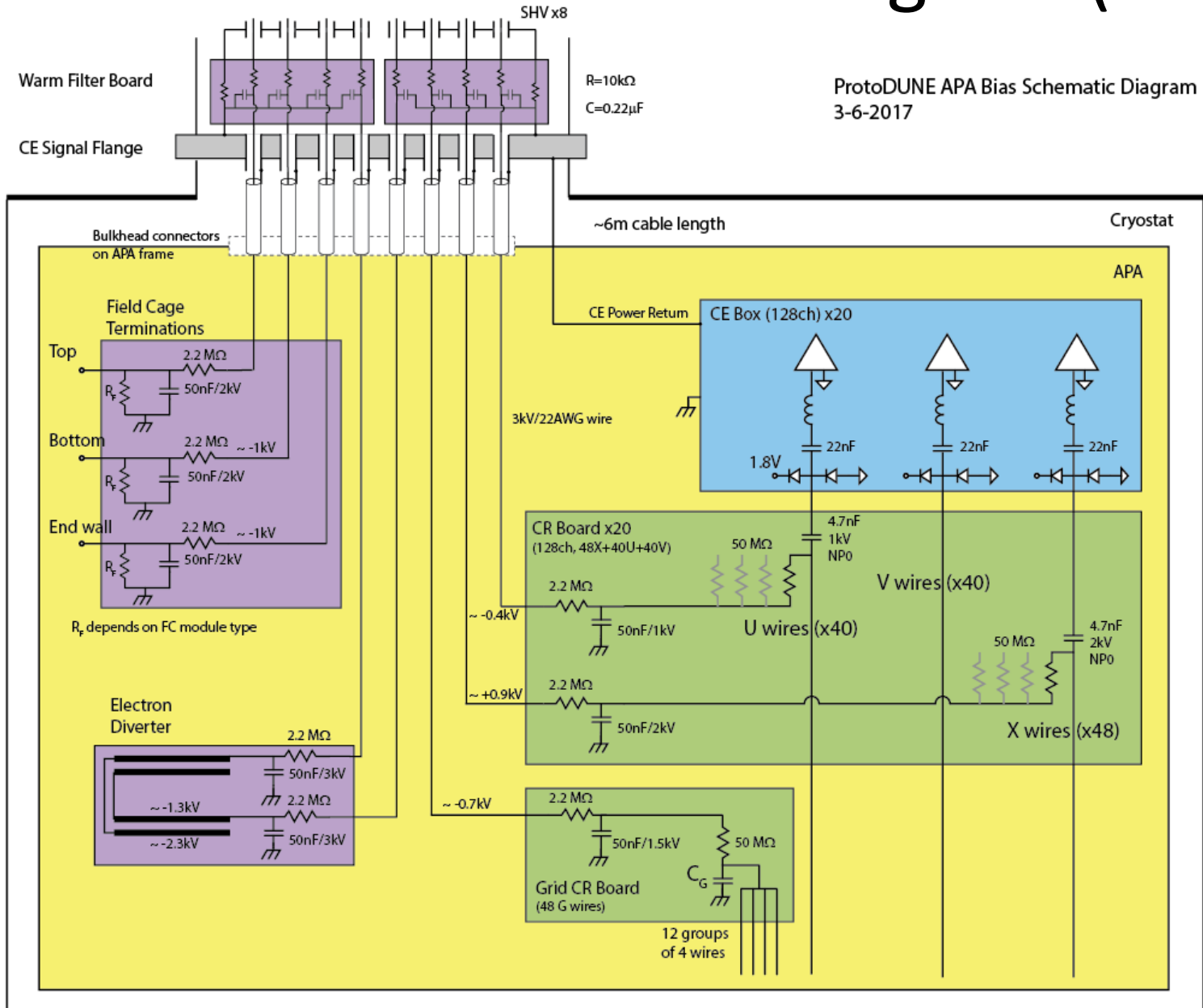
Andrew Laudrie

UW Physical Sciences Lab

DUNE Electronics Review

2019 November 18

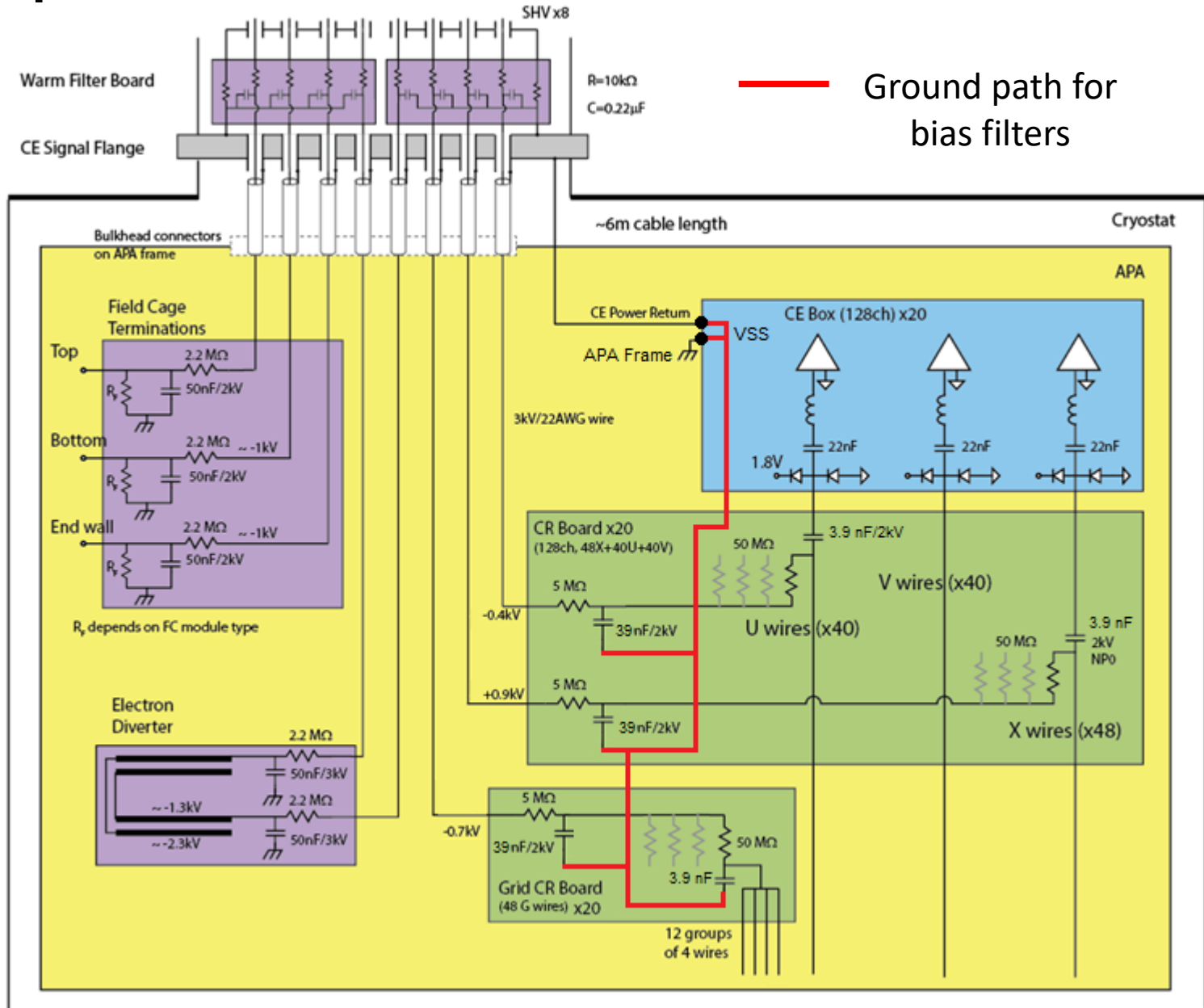
Previous APA Schematic Diagram (Bo's)



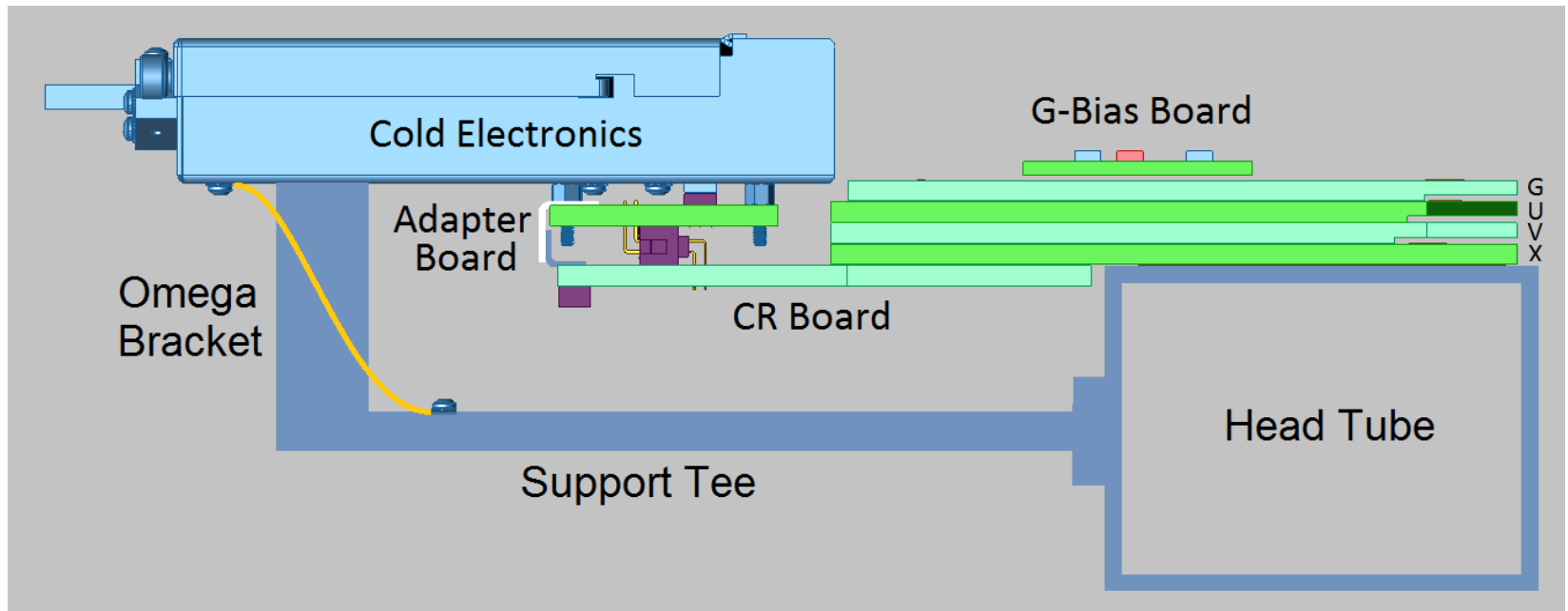
ProtoDUNE Implementation Details

- Single part for coupling and bias-filter caps
 - 3.9 nF +/- 5 percent, 2 kV used throughout
 - Met minimum coupling capacitance requirement
 - Bias filters use ten capacitors in parallel for 39 nF
- All bias filters were grounded through connections to VSS pins on the Cold Electronics Front-End input connectors
- VSS connects to the frame via the CE box

Updated APA Schematic ProtoDUNE



Frame Ground Paths Through Support Tees



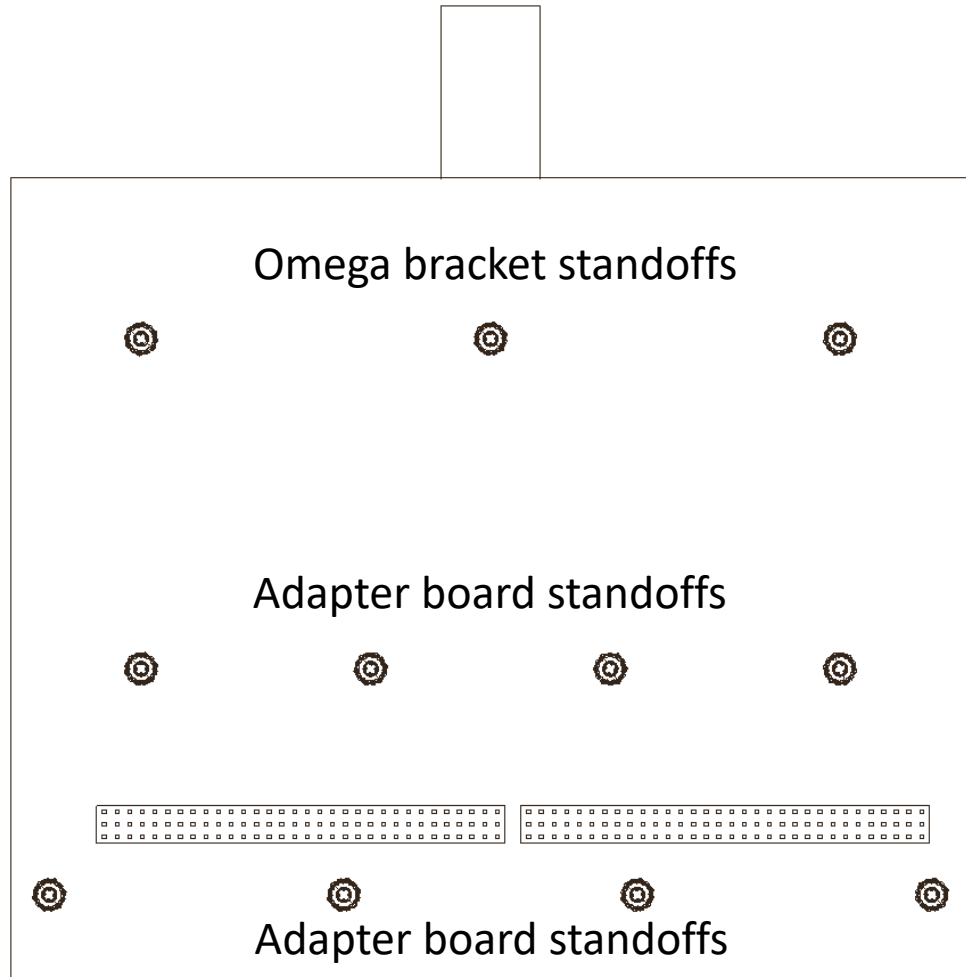
- The power-return wire connects the CE enclosure (and VSS on circuit boards) to the cryostat wall
- CE enclosures are electrically bonded to the APA frame through omega brackets and ground straps connected to support tees mounted on the head tube

Ground Connections to CE Boxes

CE enclosure outline
(side facing CR board)

The center row of pins
on the front-end
input connectors
are connected to the
VSS power plane.

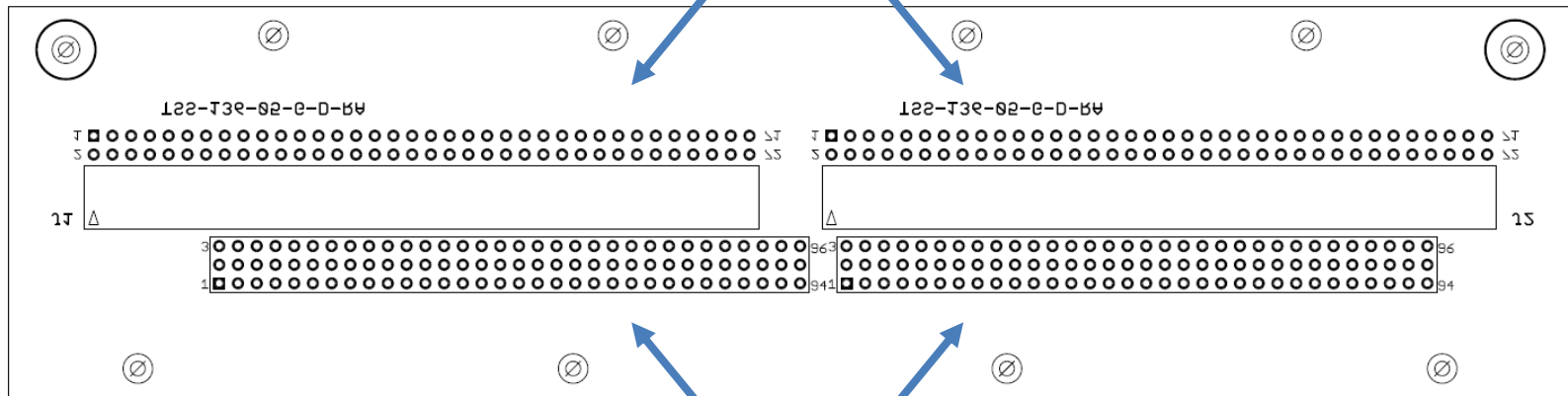
VSS also connects to the
Cold Electronics enclosure.



Ground Path Through Adapter Boards

Connections to VSS are carried through Adapter boards

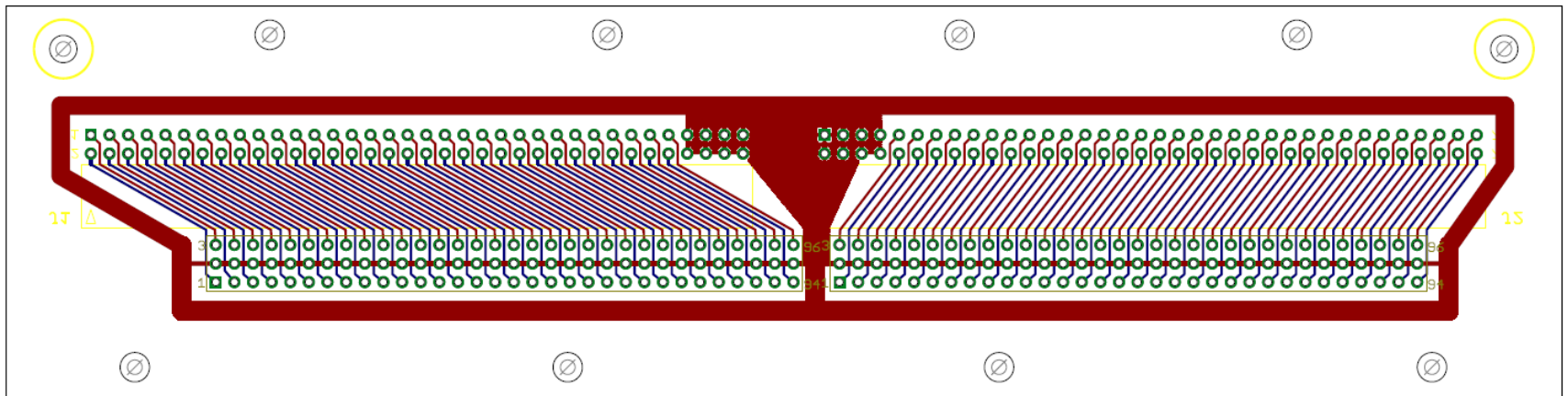
Two 2 x 36 connectors receive
plugs from the CR board



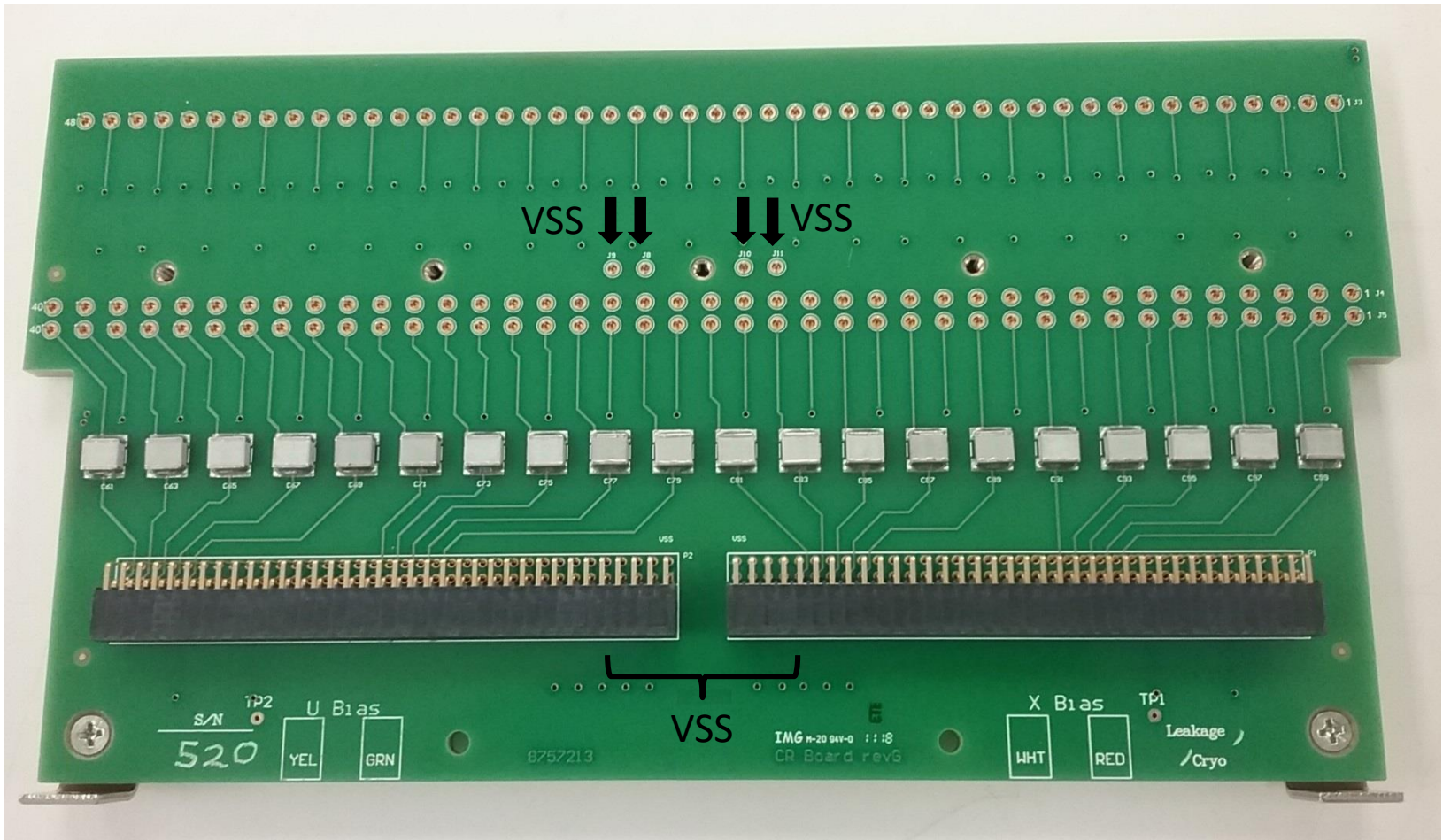
Two 3 x 32 connectors
plug into the CE box

Ground Path Through Adapter Boards

The center row of pins plugged into the CE input connectors are routed to the eight inner-most pins in connectors that mate with the CR board with a “ground pour” for low inductance



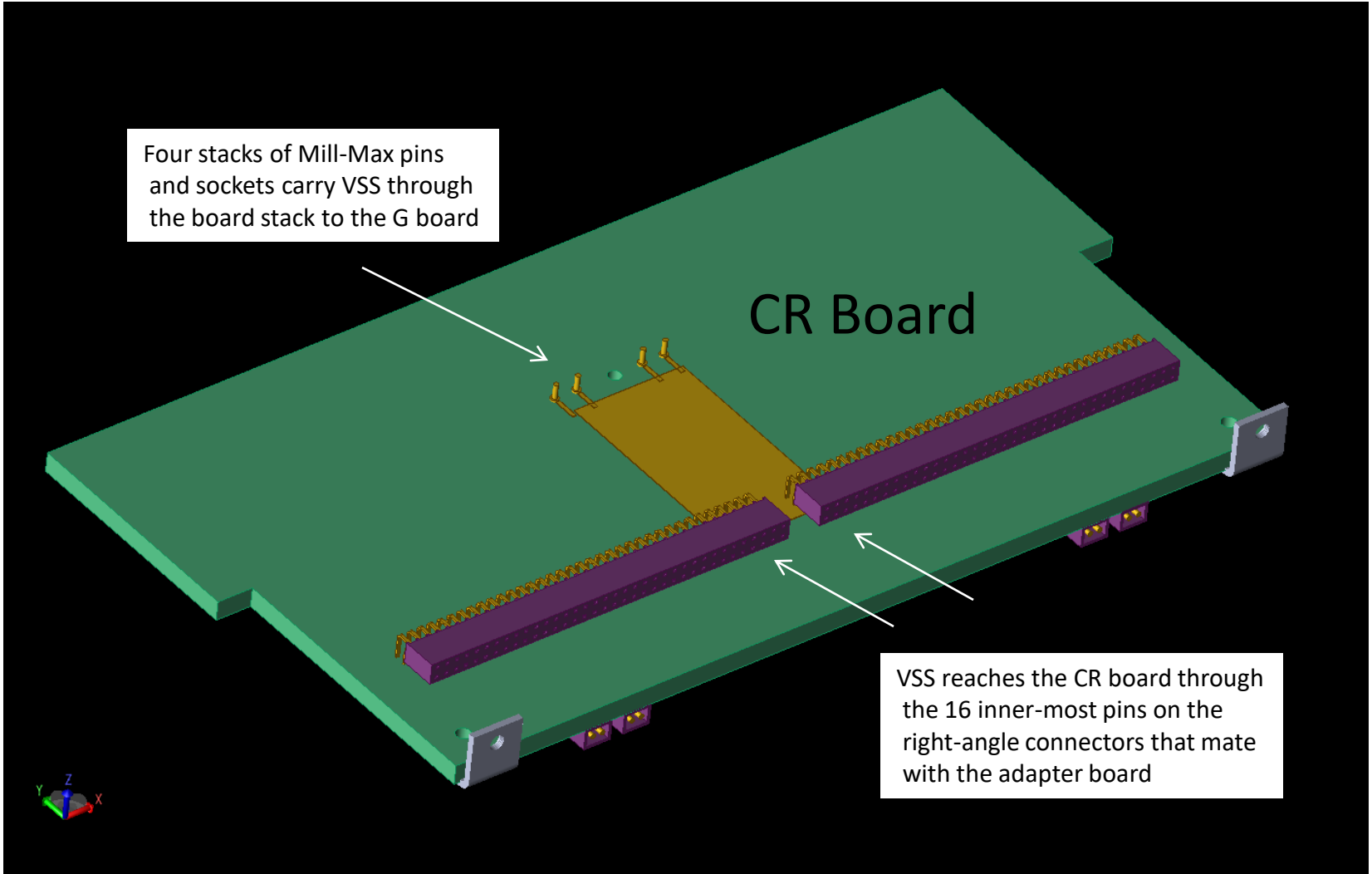
CR boards carry VSS to the board stack



Four stacks of Mill-Max pins and sockets carry VSS through the board stack to the G board

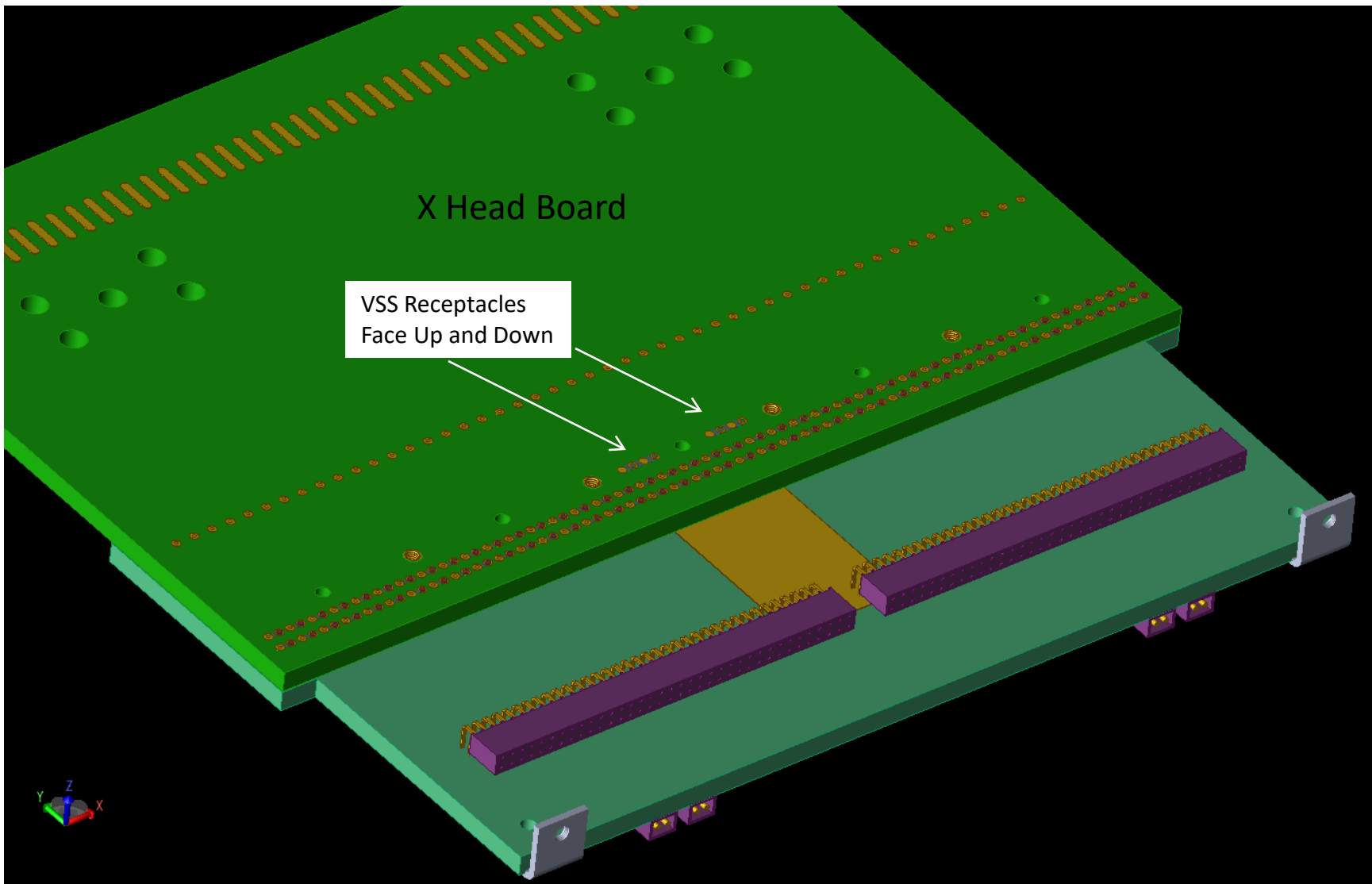
CR Board

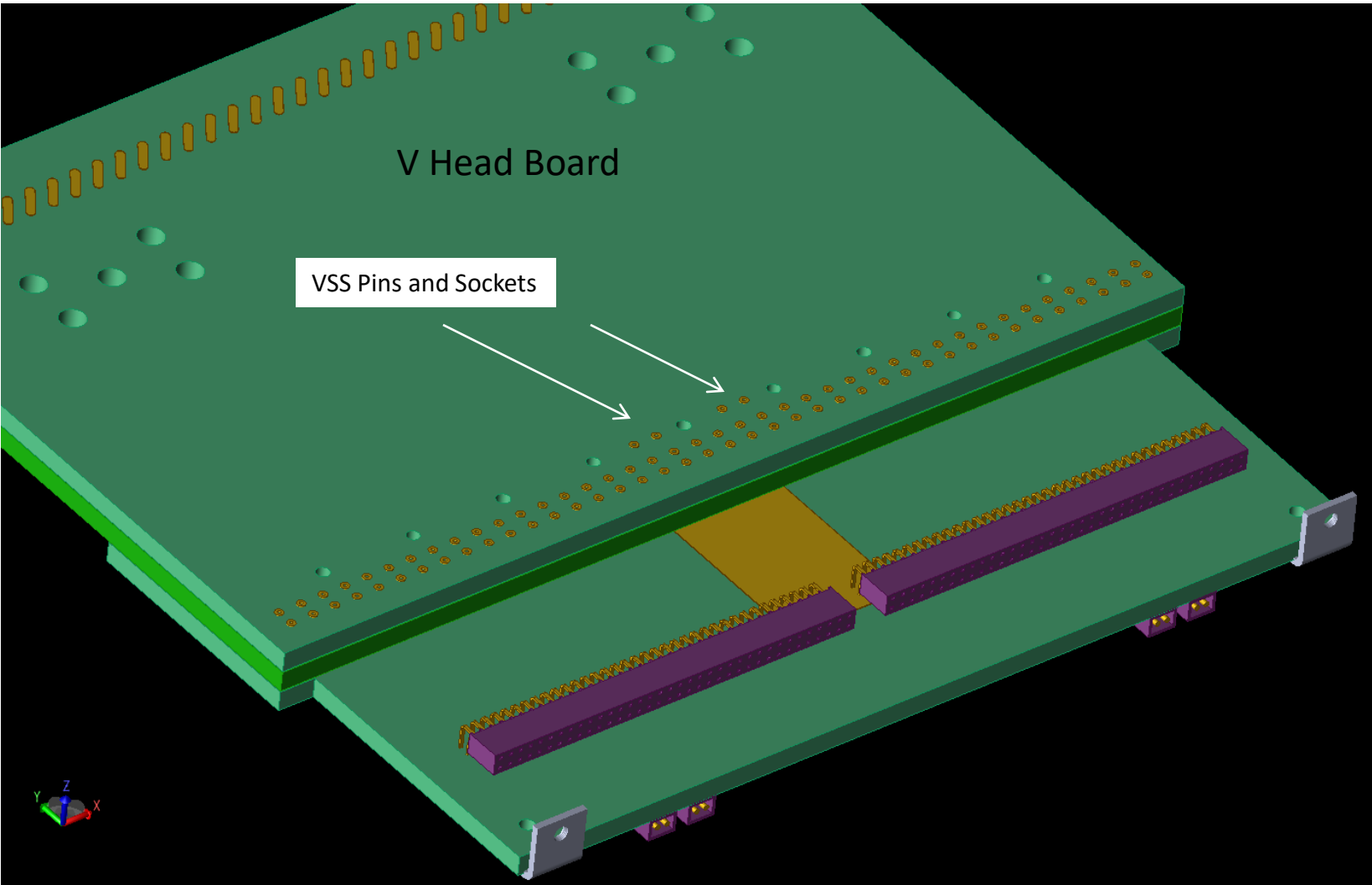
VSS reaches the CR board through the 16 inner-most pins on the right-angle connectors that mate with the adapter board



X Head Board

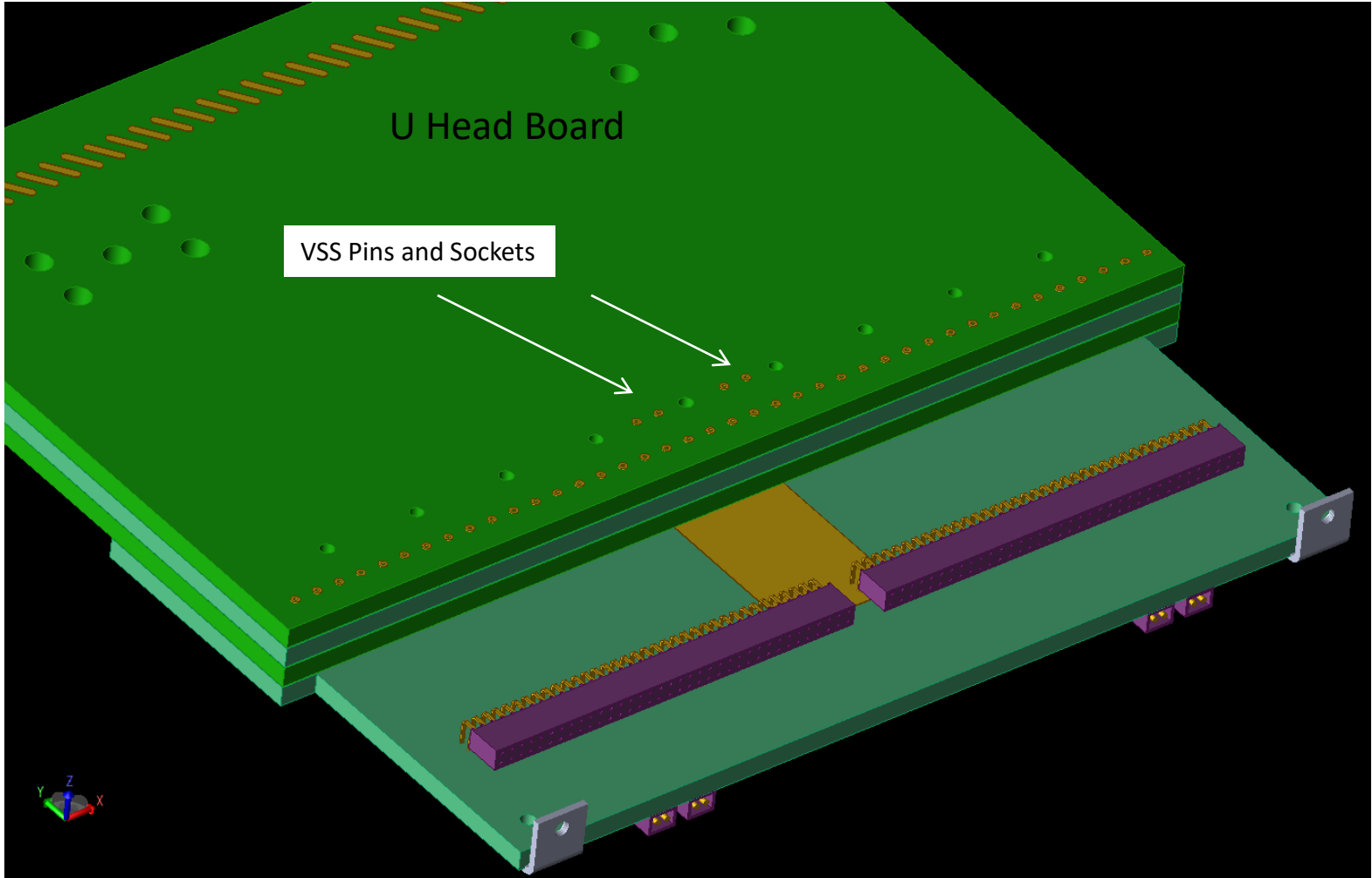
VSS Receptacles
Face Up and Down

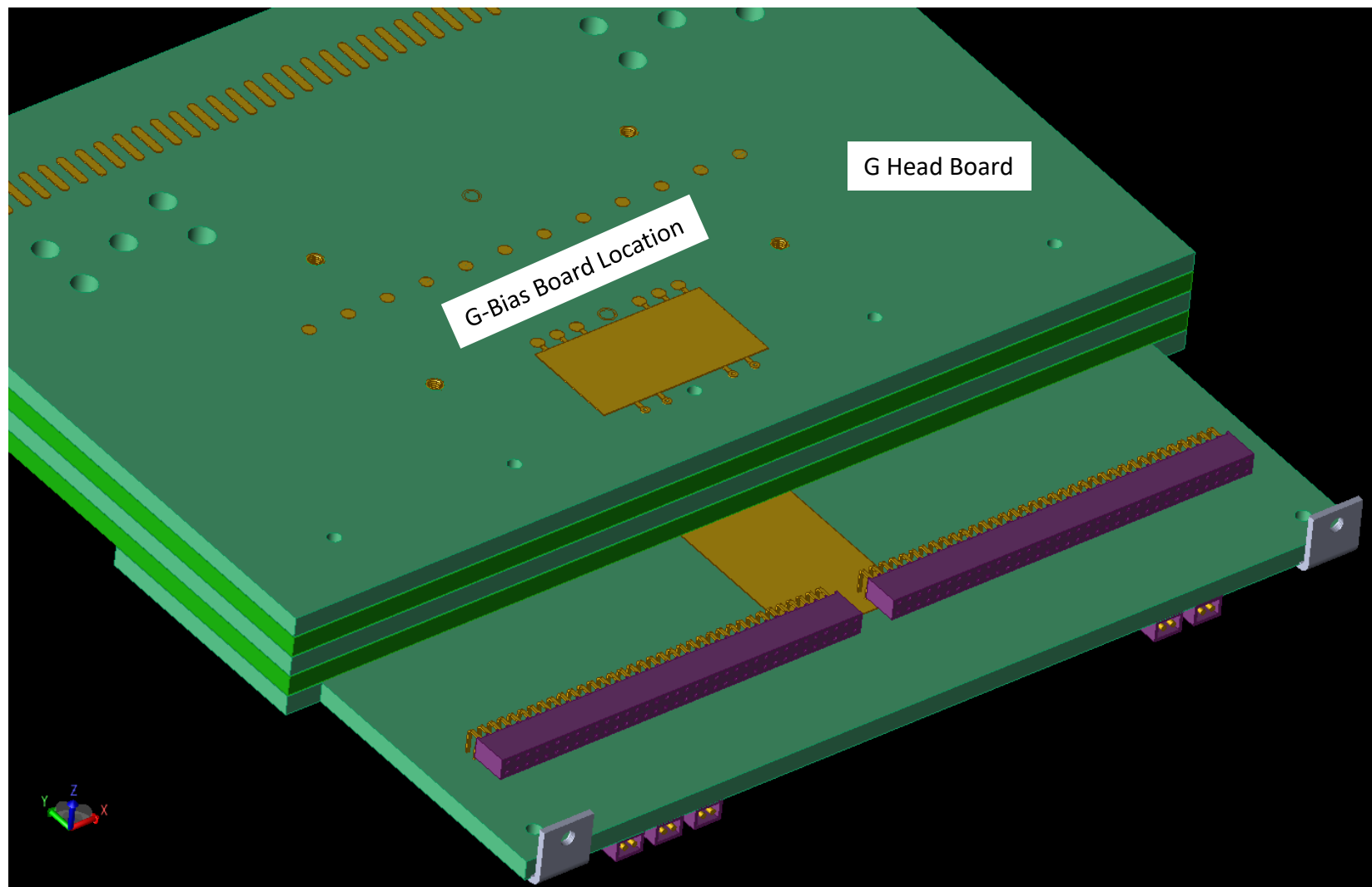




U Head Board

VSS Pins and Sockets

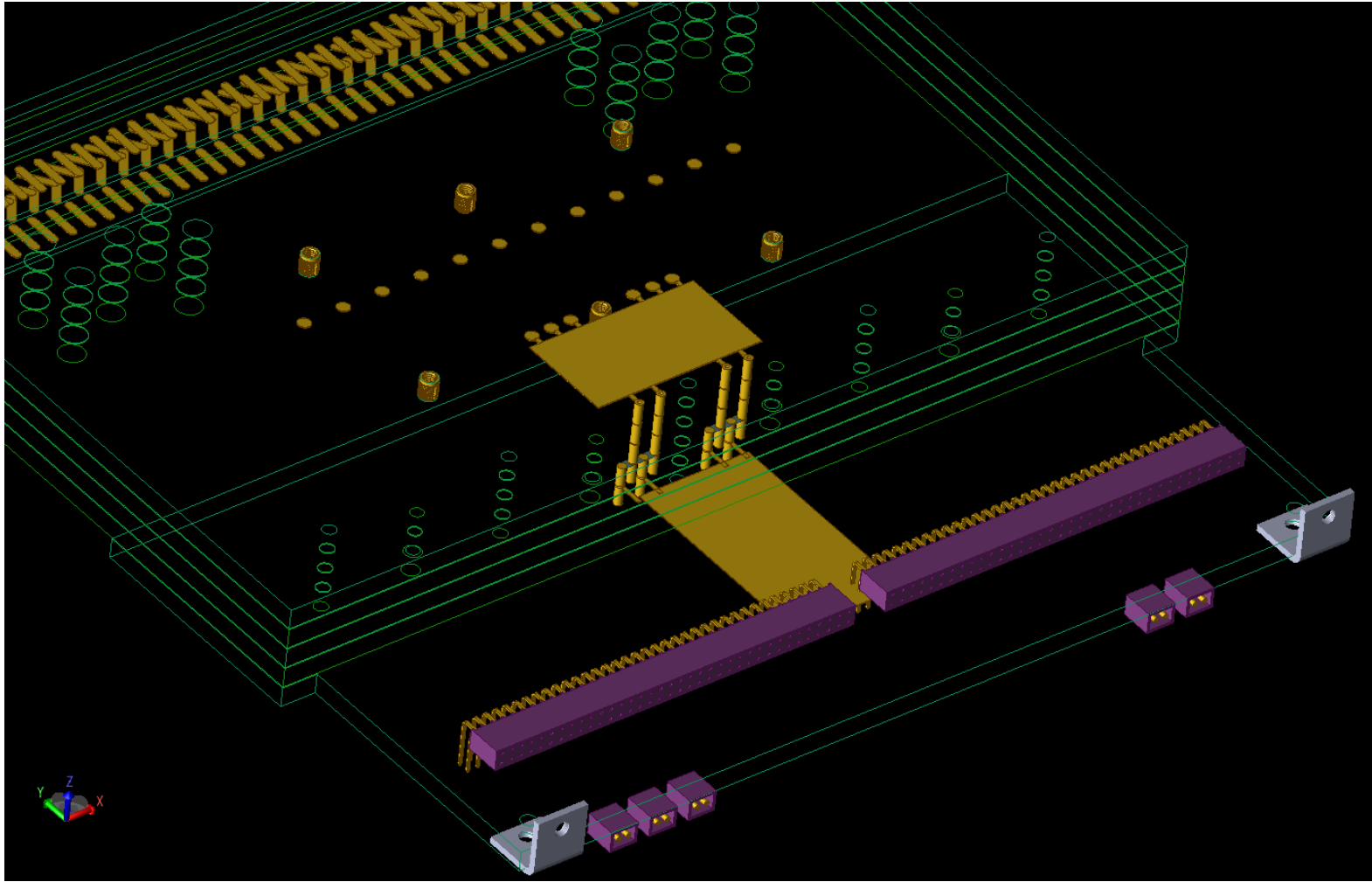




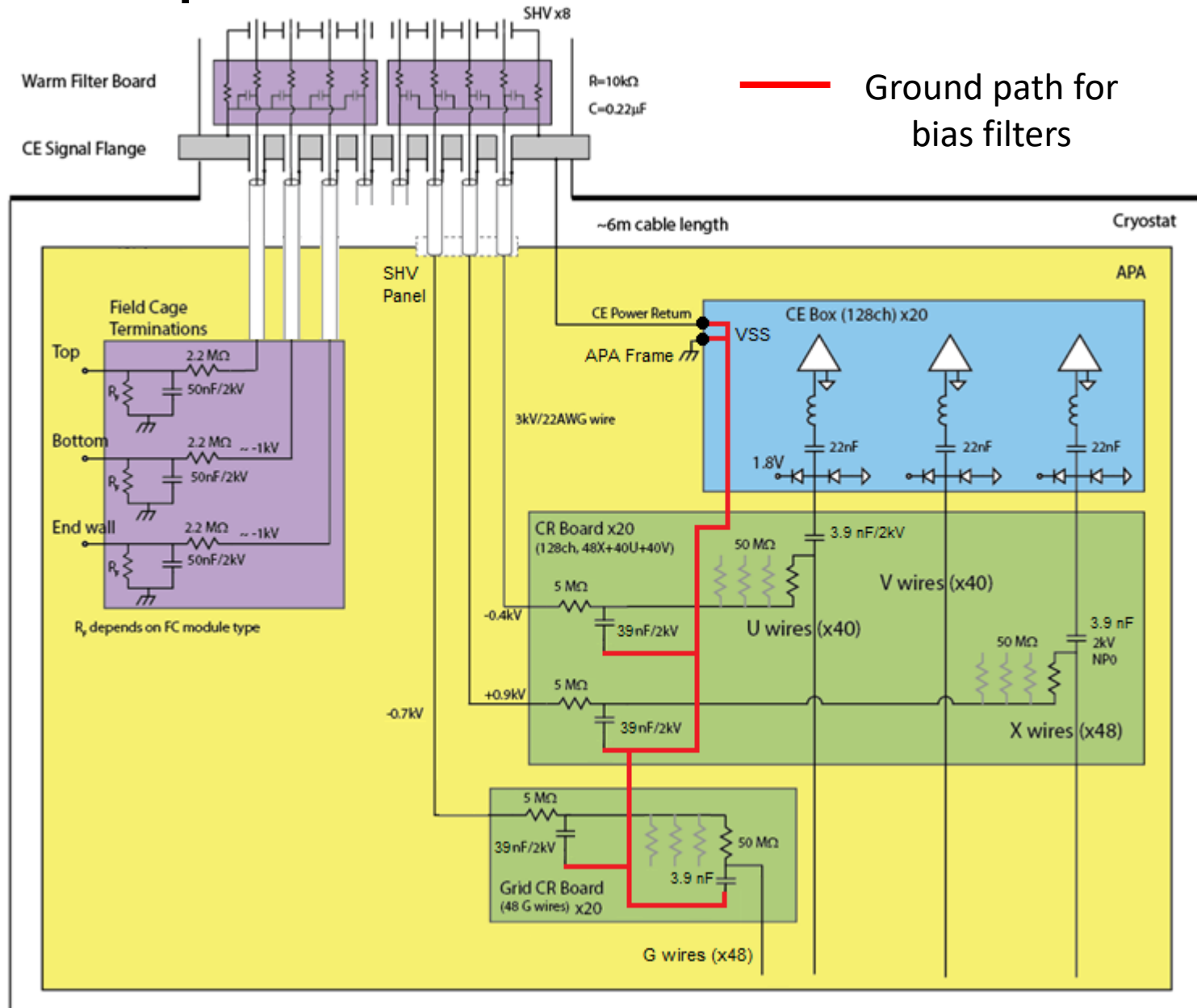
G Head Board

G-Bias Board Location

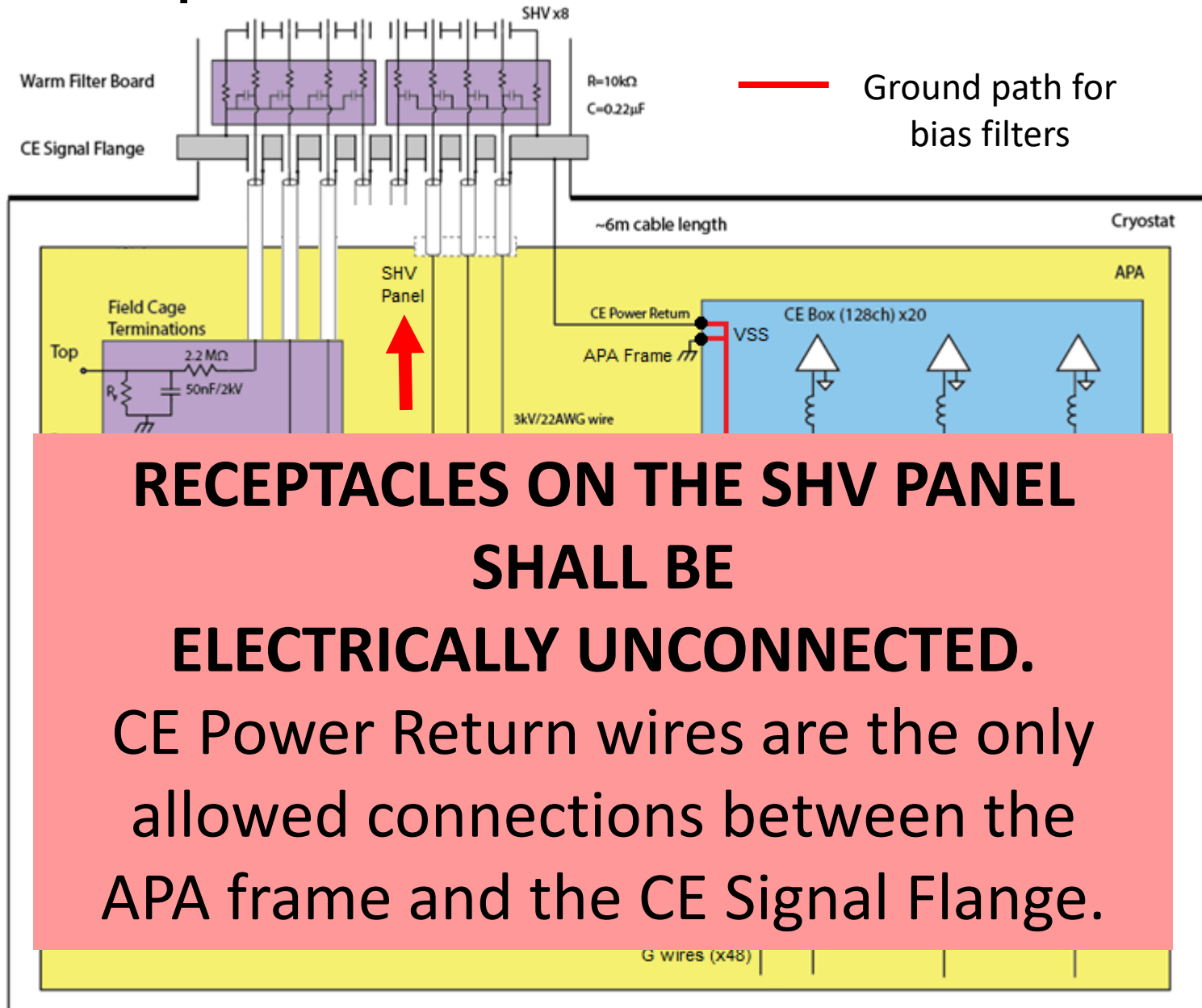




Proposed APA Schematic DUNE



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