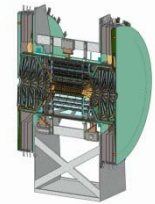


Electrical Integration

WBS 1.8.2

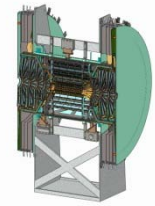
Eric J. Mannel
Columbia University
Electronics Project Engineer
VTX and FVTX

Electronics Integration



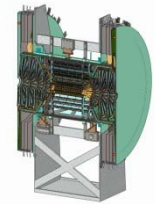
- Personnel
 - Eric J. Mannel: Electronics Project Engineer for both VTX and FVTX
 - Martin Purschke: PHENIX DAQ Coordinator
 - Steve Boose: DAQ Deputy Coordinator, Hardware
 - Ed Desmond: DAQ Deputy Coordinator, Software
 - FVTX Subsystem Managers and Electrical Engineers

Electronics Review Process



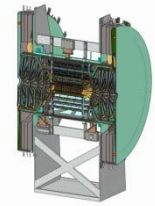
- Reviews held to date:
 - FPHX-1 Design reviews 2008
 - Released FPHX-2 production
 - FPHX-2 Design reviews 3/2009 & 9/2009
 - Released chip for engineering run:
“Given the schedule constraints and the need to construct the detector system in a timely manner, preparation for the fabrication of the chip should proceed.”
 - HDI Prototype review held 10/2009
 - Recommend 2nd round rapid prototype:
“It is the recommendation of the reviewers that the FVTX group should look into the delivery of a small number of preproduction HDIs,... with a quick delivery, along with a first prototype of the interconnect cable.”

Electronics Review Process



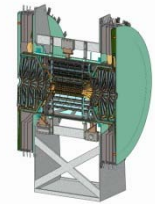
- FVTX Overall Electronics Design Review
 - Held in 8/2008 to review the overall design of the FVTX electronics chain.
 - Summary report with suggestions and concerns was submitted to the FVTX group in August 2008.
- Preliminary VTX/FVTX C-AD Safety Review
 - Held in 6/2009 to review the overall design of the FVTX electronics chain.
 - No significant electrical safety issues were found
 - Still waiting for written report from C-AD

Electronics Review Process



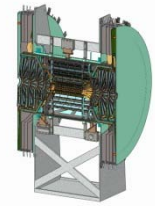
- Pending Design Reviews
 - Follow up HDI review- 2Q FY10
 - ROC Design and Layout- 2Q FY10
 - FEM Design and Layout- 2Q FY10
- Pending Safety Reviews
 - Preliminary electrical power design- 3Q FY10
 - Final Safety and Operational Readiness Review after installation.

Electronics DAQ Integration



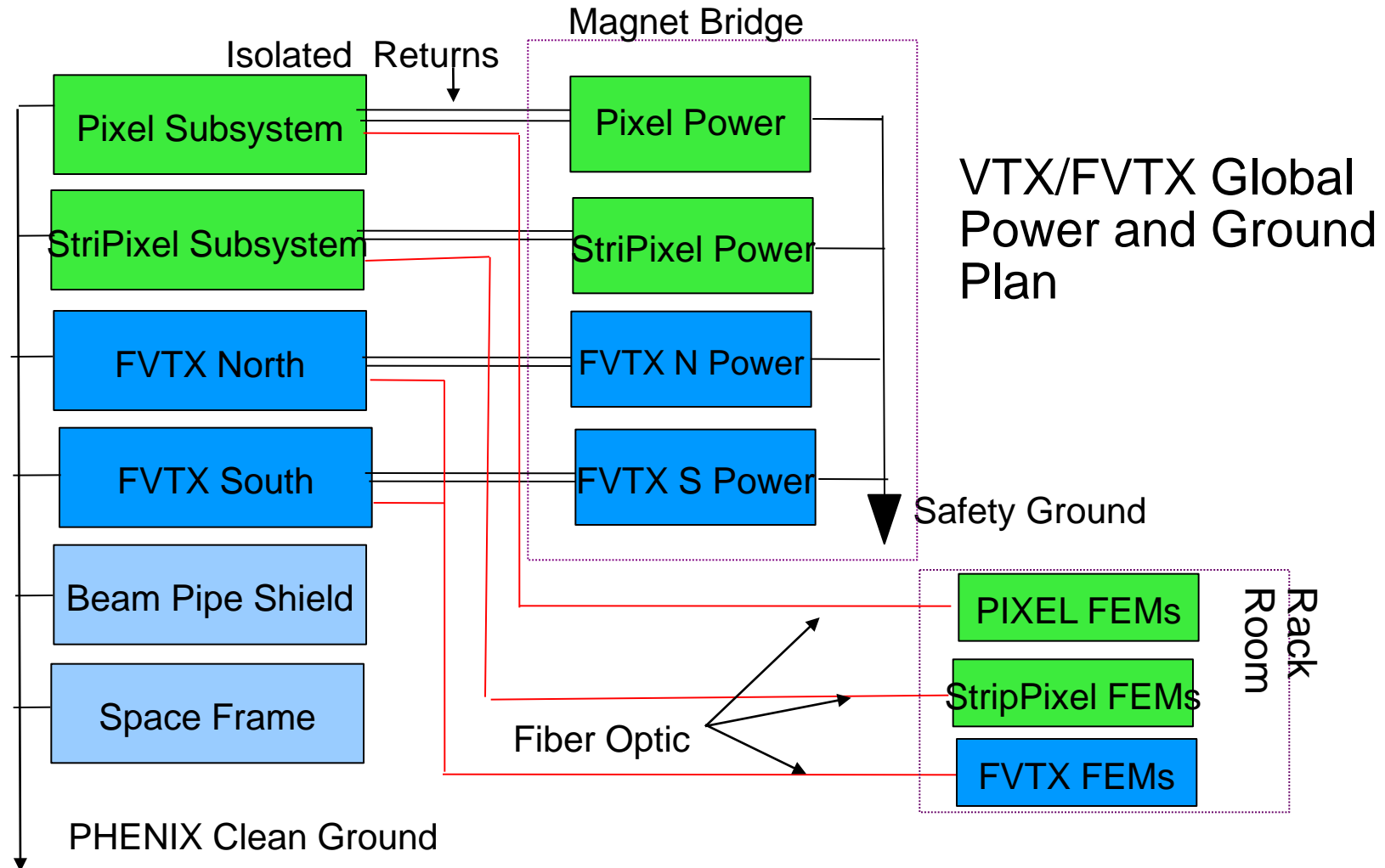
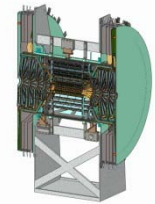
- PHENIX DAQ/ONCS Integration
 - Coordinate meetings with PHENIX DAQ and ONCS groups.
 - Work with design teams to make sure that all interfaces are compatible with PHENIX DAQ and online systems.
 - Initial meeting in January 2008 to review the general concept.
 - Follow up discussion January 2009, November 2009.
 - Additional meetings occur as required.

Power and Ground

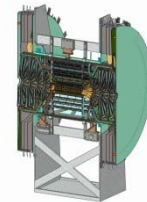


- Power and Ground Plan
 - Common plan for VTX and FVTX
 - VTX and FVTX electrically isolated from each other and other PHENIX systems.
 - Shield around beam pipe and enclosure.
 - Based on star ground plan.
 - Single point connection to PHENIX clean ground
 - Optical connections to Rack Room/DAQ

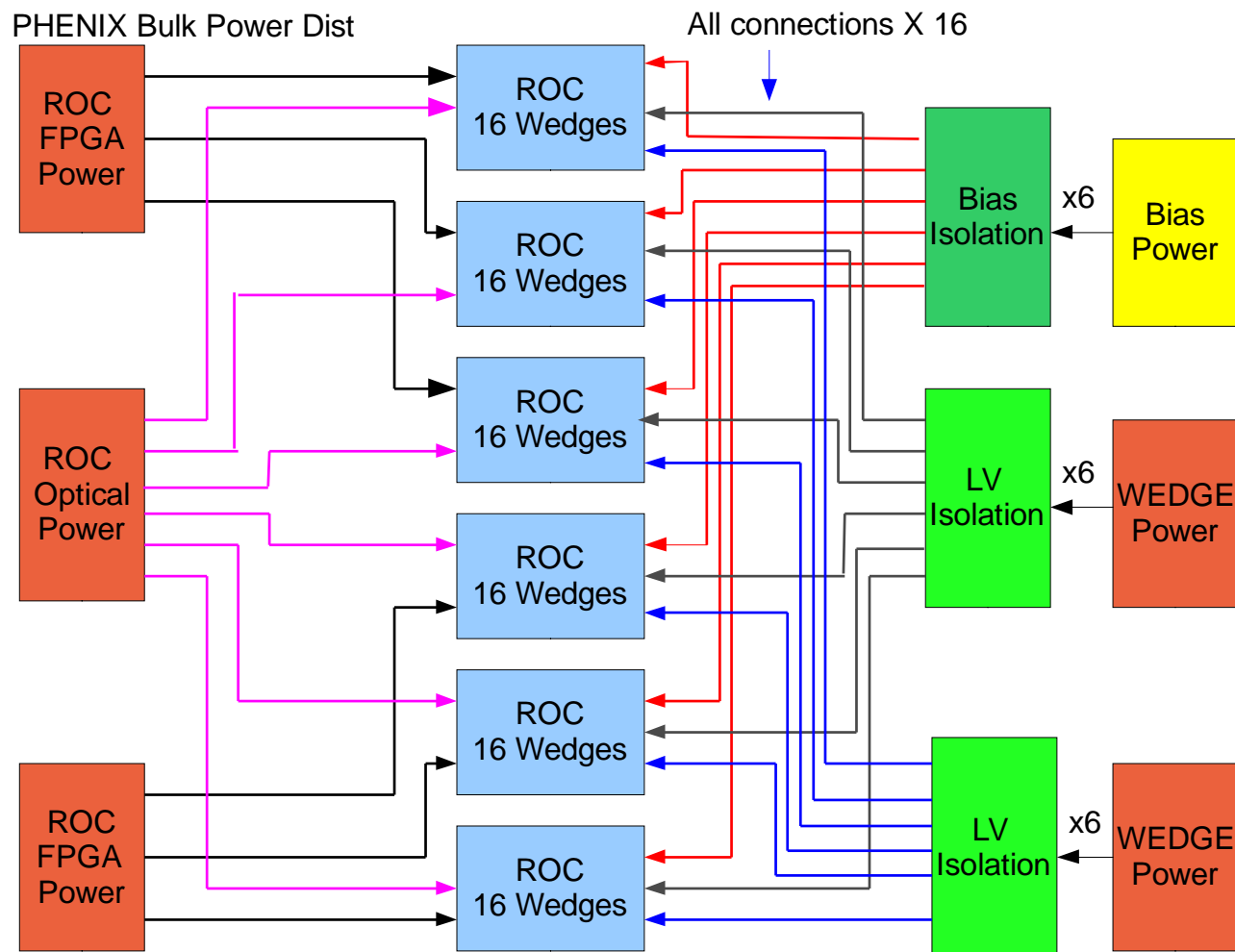
Global Power and Ground



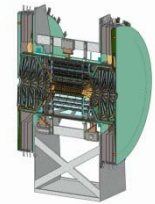
FVTX Power and Ground



Power for
 $\frac{1}{4}$ FVTX

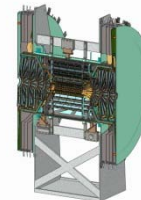


Power Systems

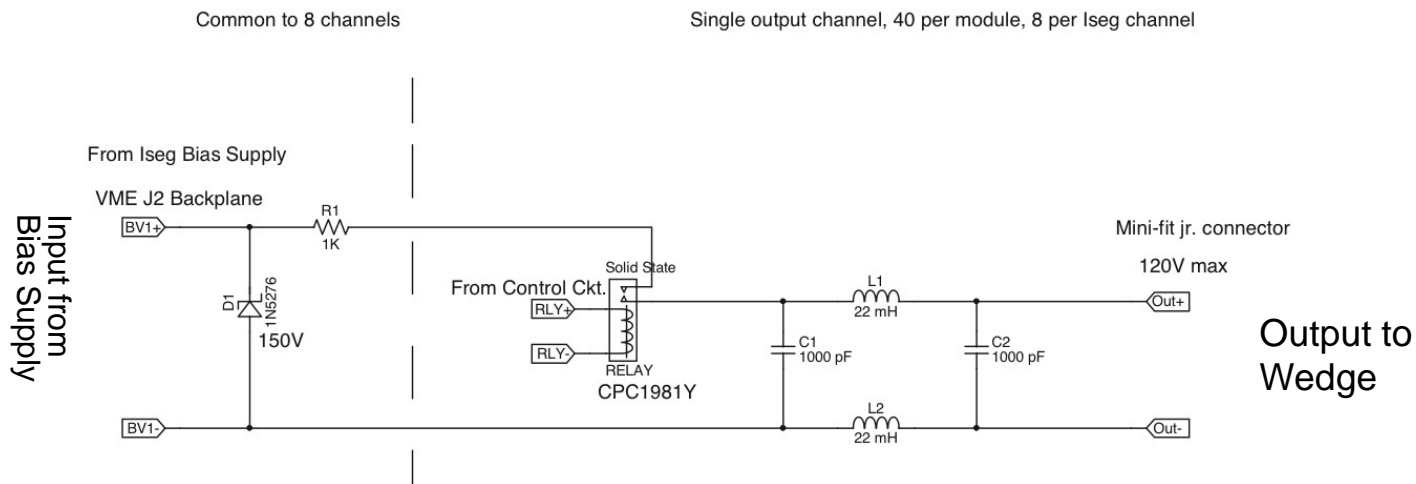


- When possible use same vendor for components
 - Wiener/ISEG system for Bias (See backup slides)
 - Evaluation model tested
 - » Mar-May 2008 (Used for VTX Pixel bias test)
 - » July-Sept 2008 (Software integration testing)
 - » DAQ/ONCS group concludes that it will be easy to integrate into PHENIX
 - PHENIX standard low voltage power distribution system (See backup slides).
 - Used for MuTrig Upgrade
 - Additional AC ground isolation for wedge analog, digital and bias power

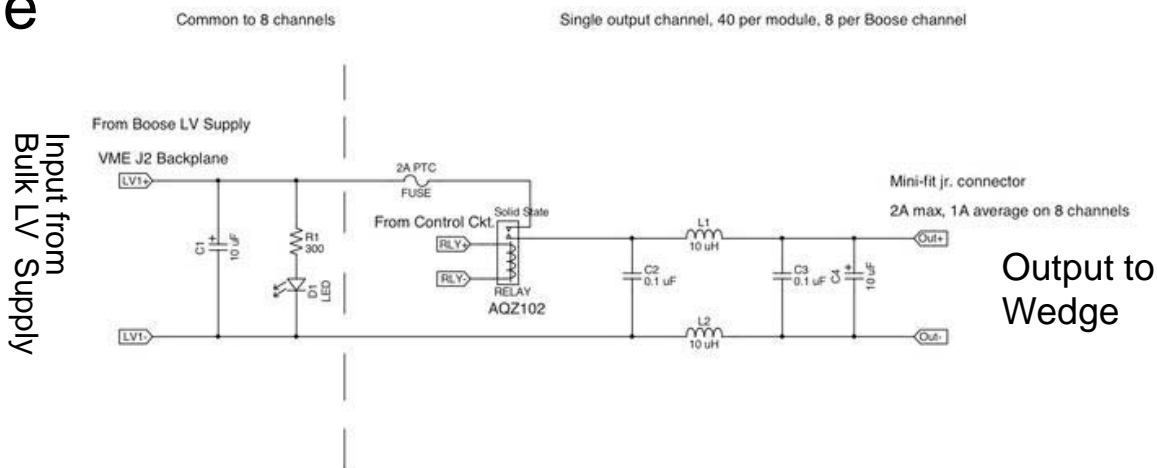
Wedge Power Isolation



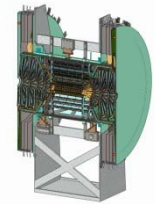
Bias Isolation



Low Voltage Isolation

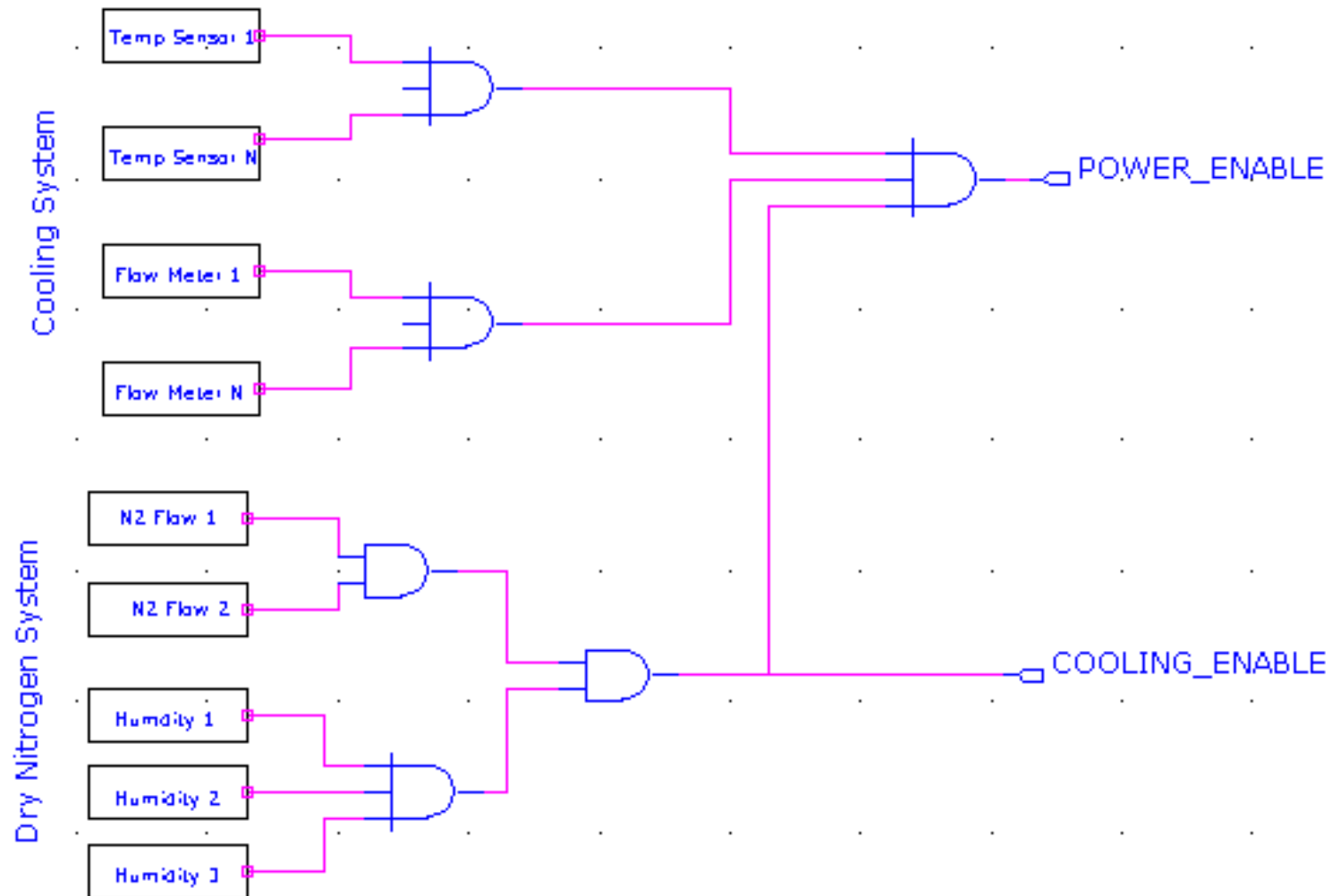
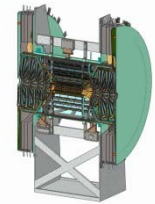


System Interlocks

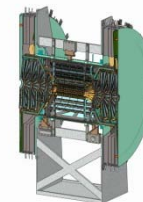


- Global VTX/FVTX interlock system
 - Cooling subsystem
 - Power subsystems (LV/Bias)
 - Environmental monitoring
 - Temperature, Humidity, Flow (Coolant/N₂)
- Active monitoring provides early alert
- Hardware failsafe, active enable for cooling and power (LV and Bias).
- Full design in conjunction with VTX to begin in 1Q-CY2010

System Interlocks

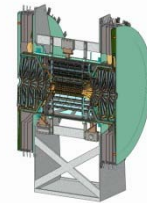


DCM-2 Status



- DCM-2
 - Upgrade to PHENIX DAQ interface.
 - Optical fiber connections.
 - 8/10 bit encoding
 - 1.6 Gbps.
 - Optical interface complete.
 - Implemented as daughter board using current DCB.
 - Operational for the HBD and MuTrig Upgrade.
 - Available for system chain test
 - Funding (PHENIX R&D) in place to complete the design work.
 - Preproduction testing currently in progress
 - Fabrication scheduled to be finished 3Q-FY10

Summary



- Review Procedures in place and being implemented.
- Preliminary discussion have occurred with the PHENIX DAQ/ONCS group to insure seamless integration into PHENIX.
- Grounding plan has been developed for the VTX/FVTX effort.
- Working with the PHENIX integration group on location of racks, cable routing, patch panels, etc.
- Power system design in progress
- DCM-2 development on track.
- Close communication with FVTX mechanical and integration engineers.