



GLAST

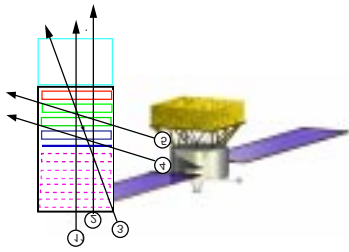
Prototype Tracker Tower Construction Status

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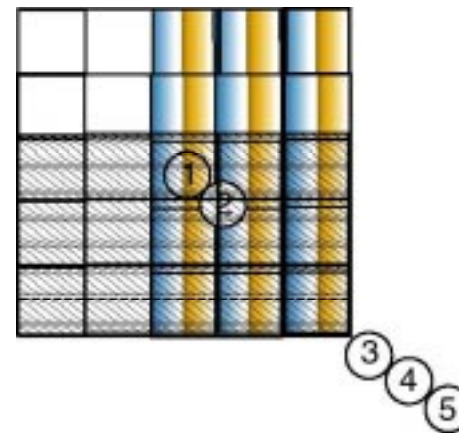
Prototype Tracker Tower Configuration

- 17 Trays, 16 x-y planes, with a total of 135 32-cm detector ladders.
- 32 readout sections, all fully instrumented (51,200 channels).

Tray	Number ladders each side	Pb Thickness	Number 4-in detectors	Number 6-in detectors
17	T: 0 B: 3	3.5%	15	
10-16	T: 3 B: 3	3.5%	210	
9	T: 3 B: 4	3.5%	35	
8	T: 4 B: 5	3.5%		27
4,5,6,7	T: 5 B: 5	25%		120
2,3	T: 5 B: 5	0		60
1	T: 5 B: 0	0		15
Total: 17	Total: 126	Total: 135%	Total: 260	Total: 222

My corrections to Hartmut's earlier proposal, which had only 16 trays and too many detectors.

Proposed test beam trajectories.





Tracker Mechanical Status

- Tray components to be assembled at SLAC:
 - 16 “middle” closeouts in hand.
 - Bottom closeout in fab.
 - 3-mil carbon face sheets in hand.
 - 1-mil Al hexcell cores in hand.
 - 4 2-mil “SuperGLAST” cores still need to be ordered if we are to have the thick Pb trays.
 - 10-mil C face sheets for thick-lead trays in hand but need trimming.
- Tray assembly: some delay—new gluing fixture is being made, as prototype tray was out of square. First tray due by end of June. Final tray should be assembled by mid July.
- Other Assembly fixtures:
 - Ladder gluing fixtures, in hand.
 - Ladder work holders, in hand.
 - Back-side ladder prober, in hand.
 - Ladder wire bonding support, in hand.
 - Ladder potting fixture and mask, in hand.
 - Hybrid work holders, in hand.
 - Hybrid burn-in fixtures in hand.
 - Chip gluing guides, in hand.
 - Tray wire-bonding work holders, in progress.
 - Fixtures for attaching hybrids to trays and wire bonding, in progress.
 - Alignment fixture for mounting detector ladders, in progress.
 - Connector mating clamp and special screw drivers, in progress.



Tracker Silicon-Strip Detector Status

- Detectors from 4-inch wafers
 - 300 manufactured.
 - 260 are available for the prototype tower.
 - 52 ladders have been completed with these detectors, including gluing, wire bonding, testing, and potting.
- Detectors from 6-inch wafers
 - 230 manufactured, 5 rejected and 5 still in Japan for studies.
 - 73 ladders can be constructed, and 18 are completed, with 15 in progress.
- Detector QC
 - Broken capacitors and shorts detected by probing at Hamamatsu.
 - Global I-V done at Hamamatsu.
 - Visual inspection and global I-V at UCSC/SLAC.
 - Visual inspection, optical survey, and I-V after edge bonding.
 - Global I-V and capacitance measurement on every strip after wire bonding (detects broken capacitors, failed bonds, shorts, opens). Repairs are made at this point, before potting wire bonds.
 - Global I-V after potting and before mounting onto tray.



Tracker Readout Electronics Status

- Front-end Readout Chips
 - 20 wafers manufactured.
 - 6 wafers tested and then diced.
 - \Rightarrow 1350 good chips (800 needed).
- Readout Controller Chips
 - 100 chips manufactured.
 - 75 tested (64 good chips needed).
- Hybrid PC board
 - 40 manufactured (32 needed).
 - 35 loaded with passive components and connectors.
 - 2 loaded with chips and tested.
 - Remainder are at Promex being loaded with chips.
 - Backing plates, in hand.
- Kapton Detector Bias Circuit
 - 37 manufactured (32 needed).
 - 1 bonded to a prototype tray and hybrid for wire bonding tests.
- Kapton Cables
 - 2 each of 4 types needed.
 - 10 pieces of one type are in hand.
 - 1 loaded with connectors for testing.
- DAQ Interface
 - 2nd iteration tracker VME card is being designed by Stanford/HEPL.
 - Shielded twist-pair cable with Glenair Micro-D connectors needs to be manufactured.
 - Interface board from the kapton cables to the twist-pairs is being laid out. It includes LVDS repeaters and noise filtering.

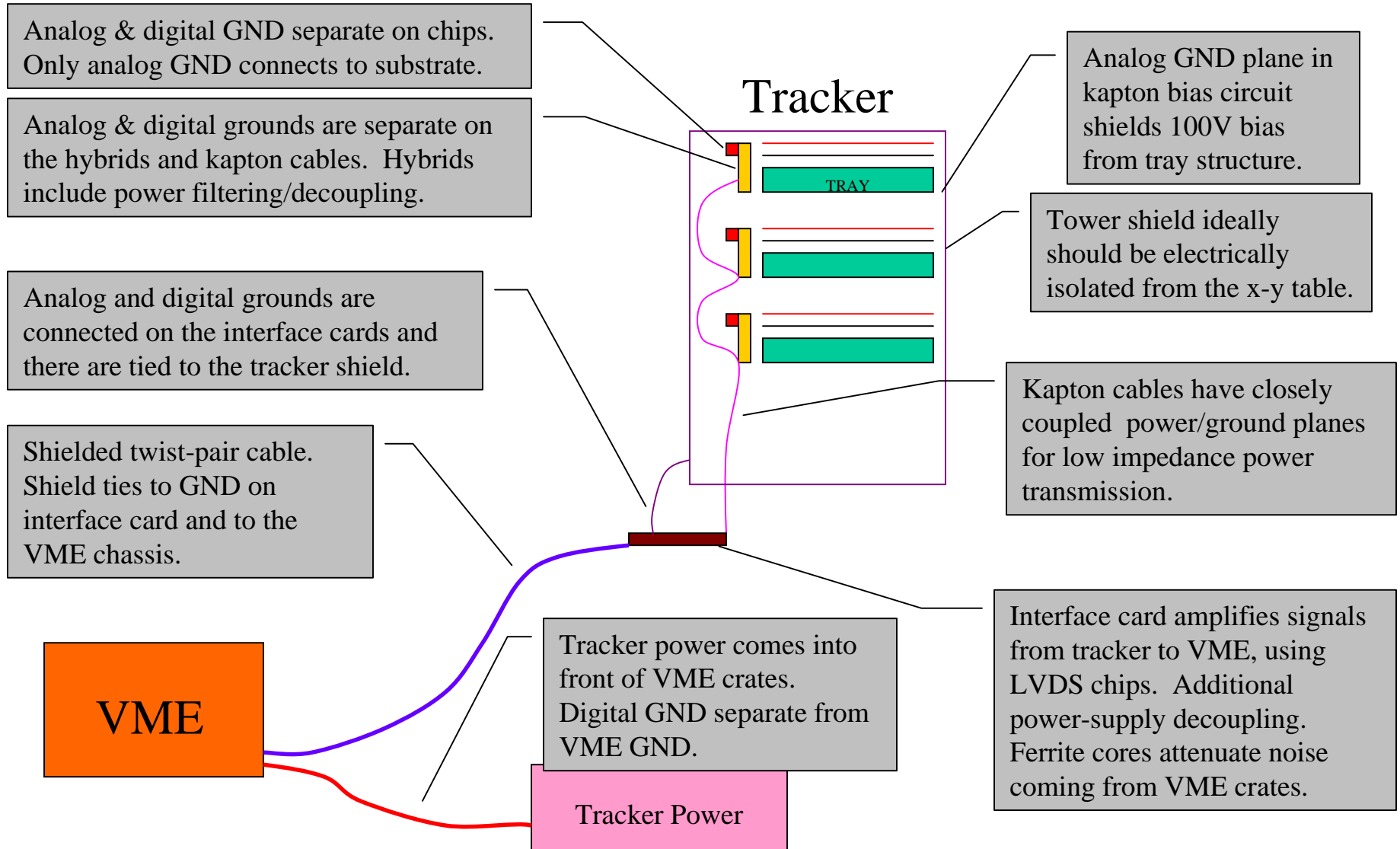


Tracker Shielding & Grounding Scheme

- Analog & digital grounds are separate on the readout chip. Analog ground connects to the chip substrate; digital ground does not.
- Analog & digital grounds are separate on the hybrids and kapton cables (optionally, a resistor or jumper can be placed between the grounds on the hybrid).
- Hybrids contain a lot of power filtering and decoupling to ground. The kapton bias circuit includes an analog ground plane between the detector bias and the tray structure.
- Kapton cables plug into interface cards at the base of the tower. Here analog and digital grounds are tied together and tied to the shield (walls) of the tracker.
- The interface card amplifies all signals going from the tracker to the VME crates, using LVDS receivers & drivers.
- Shielded twisted-pair cables connect the interface cards to the VME crates. The shield ties to the ground on the interface card.
- Ferrite cores on the interface card attenuate common-mode noise coming up from the VME crates.
- The shields on the twisted-pair cables connect to the VME chassis. Ideally, the shield on the tracker tower should be isolated from the mechanical stage.
- The tracker digital ground is not tied directly to the VME digital ground. Each have separate ties to the chassis.



Tracker Shielding and Grounding Scheme





Prototype Tracker Schedule Highlights

- **June 30:** Complete mounting of chips and wire bonding hybrids.
- **July 8:** Complete hybrid gluing fixtures and begin mounting hybrids.
- **July 16:** Complete tray wire-bonding work holder.
- **July 30:** Complete ladder production.
- **August 11:** Complete 3 remaining types of kapton cables.
- **August 13:** Complete tray mechanical fabrication and detector alignment fixture. Begin mounting detector ladders onto trays.
- **August 25:** Finish mounting and wire bonding hybrids to trays.
- **August 31:** Complete fabrication of walls, spacers, cable terminations.
- **September 1:** Finish mounting detectors ladders. Finish DAQ interface.
- **September 10:** Complete stacking of trays and begin tower testing.
 - Survey.
 - Noise scans.
 - Threshold calibration.
 - Bad-channel masking.
 - Cosmic-ray data.
- **Conclusion:** the schedule has slipped for mechanical components, but we still have a couple of weeks of contingency.



Prototype Tracker Construction Schedule

