**Finder Algorithm VHDL Structure**
14 November 2002

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|---|---|
| finder_top | Finder top level diagram |
| finder_ctrl | Controls dataflow organization throughout Finder algorithm |
| seg_input | Segment input from Megabus |
| megabus_decoder | Decode Megabus to know which segment arrives when and write those segments to memory |
| seed_mem | Memory for seed segments |
| seg_mem | Memory for all segments |
| seedphi_lut | LUT : convert seedPhi into the fine phi coordinates of each superlayer |
| rho_tandip_finder | Given segments and seeds, finds seed track hypothesis (rho and tandip) |
| seg2prm | Fills the Pattern Recognition Matrix (PRM) based on segment phi information |
| hit_reg | Hit Register for one superlayer: decodes each segPhi – seedPhi value to a single bit |
| hit_reg_seg_map | Map input segments to possible segPhi – seedPhi ranges |
| hit_reg_sector | Sub-portion of a Hit Register covering up to one sector (2pi/16) in phi |
| hit_reg_bit | A single bit of a Hit Register |
| prm_findhits | Map Hit Register bits onto PRM bins |
| prm_counthits | Find which PRM bins have 9, 8, or 7 hits across all non-seed superlayers |
| prm_has9or8or7 | Count number of PRM hits for a single bin |
| prm_project | Project 2D PRM onto 1D rho or tandip registers |
| prm_reg | Find average rho or tandip value from register input |
| prm_reg_encode | Encode average into a 6 bit output |
| seg_pipe | Segment pipeline while finding tracks, before entering close_seg_finder |
| expphi_lut | LUT : given rho and tandip, what is the expected phi value at each superlayer? |
| close_seg_finder | Find the closest segments to a PRM track hypothesis |
| close_seg_sl | Close segment finder for a single superlayer |
| close_seg_filter | Filter which segments are within range to consider |
| find_best_seg | Given one segment at a time, keep the closest one to the desired phi |