Main Issues

1. Digital noise from chips mounted between sensors
2. Pipe line step must be 25 ns
3. Chip to chip communication required in both directions
4. Trigger and event read out must use the same hardware
5. Large amount of data at SLHC luminosities
6. Chip failure must have small affect on trigger efficiency
7. Many chips to read out at each crossing

MOUSETRAP Pipeline


Simple, asynchronous pipe line using Non Return to Zero signaling and transparent latches

Multi sensor read using dual output optical drivers

Multiple MEPHISTO address encoders
P. Fischer, NIM A 461 (2001) 499-504

Multiple MEPHISTO address encoders

Design Choices

1. Completely asynchronous design - the only clock is the crossing clock
2. Use MOUSETRAP micro pipeline for all chip to chip communication and readout
3. Use MEPHISTO encoder for encoding high Pt hits as well as clusters for event readout
4. Maximum event rate is 1/400 of trigger rate so imbed part of an event with every trigger
5. Readout path is reversible so have alternate readout path if a chip fails

Pipeline Steps on the Chip

1. Send phi hit data to neighbor chips in both layers (MOUSETRAP)
2. Find hit cluster centroids (max cluster width is 3 strips)
3. Send cluster centroids in z direction on top layer (MOUSETRAP)
4. Form stubs for high Pt tracks from the 2 sensor layers
5. Encode addresses using MEPHISTO encoders
6. Gather data into reg. for MOUSETRAP pipeline
7. Transmit data along blue lines to chip at end of column
8. Transmit data along green line to optical transceiver.