Requirements for TOF connection to STAR Trigger

1. Requirement: TOF must return a multiplicity value to L0 that meets the physics requirements of the L0 trigger.

Justification: STAR requires a multiplicity measurement in L0 to operate the triggers needed for its physics program. This currently includes triggers for central and minbias HI collisions and for UPC.

Status: TOF will send a value of 0-24 from each tray to L0. The MRPC channels are "or"ed into this sum in groups of 8. If any of the 8 are above threshold, the value of 1 is added to sum from the tray. This gives a maximum count of 2880 into L0 from TOF. The system is currently under simulation to investigate the efficacy of this arrangement for meeting STAR's multiplicity needs.

2. Requirement: TOF information must fit into the existing CTB DSM tree. The digital signals must be available at the DSM interface boards within 700ns of the interaction.

Justification: TOF is to use the existing Central Trigger Barrel DSM tree. There is no plan to alter this information path. TOF must not increase the time required to make an L0 decision.

Status: The system will be designed and tested to meet this requirement.

3. Requirement: TOF hit information for each cell (23k bit map) must come into Level 2 within 200 micro-sec of the interaction.

Justification: needed for charged vs. neutral discrimination in the calorimeters so that electrons and photons can be identified for use in particle ID triggers. These triggers are used to enrich samples of rare particle production.

Status: TOF will provide this bit map. The current plan is to use an SIU-RORC combination to push the 3kB of information per event into L2.

4.Requirement: TOF start detector must provide signals to Level 0 so that we can tighten the vertex position requirement, taking advantage of the timing resolution of the TOF start detector.

Justification: The current vertex cut based on ZDCs or BBCs leads to 20-30% of the data being unusable because the vertex selection is not tight enough.

Status: The current design for the TOF start detector electronics will provide an LVDS output from each discriminator that can be the input to the L0 fast-z electronics. This detector and electronics of the start detector system is under review in STAR.