



The integration of ALICE trigger system with sub-detectors



Central Trigger Processor - CTP

The CTP is implemented using seven different types of 6U VME board, together making up eleven active boards for the CTP. This system will receive and align up to 60 trigger inputs in parallel from the trigger detectors. There are three different hardware trigger levels (L0, L1 and L2) with latencies from 1.2 μ s to 100 μ s. The CTP boards have been upgraded with new functionality allowing the status of trigger inputs to be read at the time of the L0 trigger. The system allows dynamic partitioning in order to make optimum use of detector readout. The system provides also a flexible past-future protection. Outputs from the CTP go to the LTUs of each sub-detector.



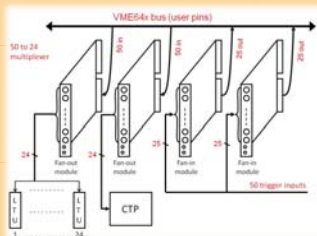
Local Trigger Unit - LTUvi

The LTU is designed to serve as the interface between the CTP and the detectors. It can run in a global mode or a standalone mode. In standalone mode it can fully emulate the CTP. The LTU receives BUSY signals from detectors and propagates them to the CTP. The LTU has been updated to LTUvi version which incorporates the TTCvi functions required for ALICE. The LTUvi manages coding, serialization and sending of data for A and B channels of TTC system plus the whole functionality of LTU.



Trigger Input Switchboard - TIS

ALICE now has more L0 trigger inputs than in the original design. The TIS allows to choose 24 from 50 trigger inputs. It is based on four Fanin/Fanout cards connected together via user defined pins on VME backplane. The first two Fan-in cards receive 50 trigger inputs. The 3rd and 4th cards are Fan-out with a switch inside Actel FPGA, which can choose 24 from 50 trigger inputs for CTP or LTUs (standalone run for detectors with selected trigger input). The TIS has a monitoring counter for each trigger input.



Integration and first beam

After installation of the ALICE trigger electronics in the experimental cavern and integration of the ALICE trigger system with sub-detectors, testing of the trigger system itself with the new experimental infrastructure has been done. Before the planned global cosmic run each detector was running in standalone mode. After intensive tests in standalone runs, detectors have been tested in a 'global' run, i.e. one involving other detectors. During the commissioning period, many different configurations of the CTP were tried. The CTP was able to operate stably with up to 12 detectors, both in one or in several clusters. During the brief period of circulating beam in September 2008, timing measurements for trigger input detectors were successfully made.

