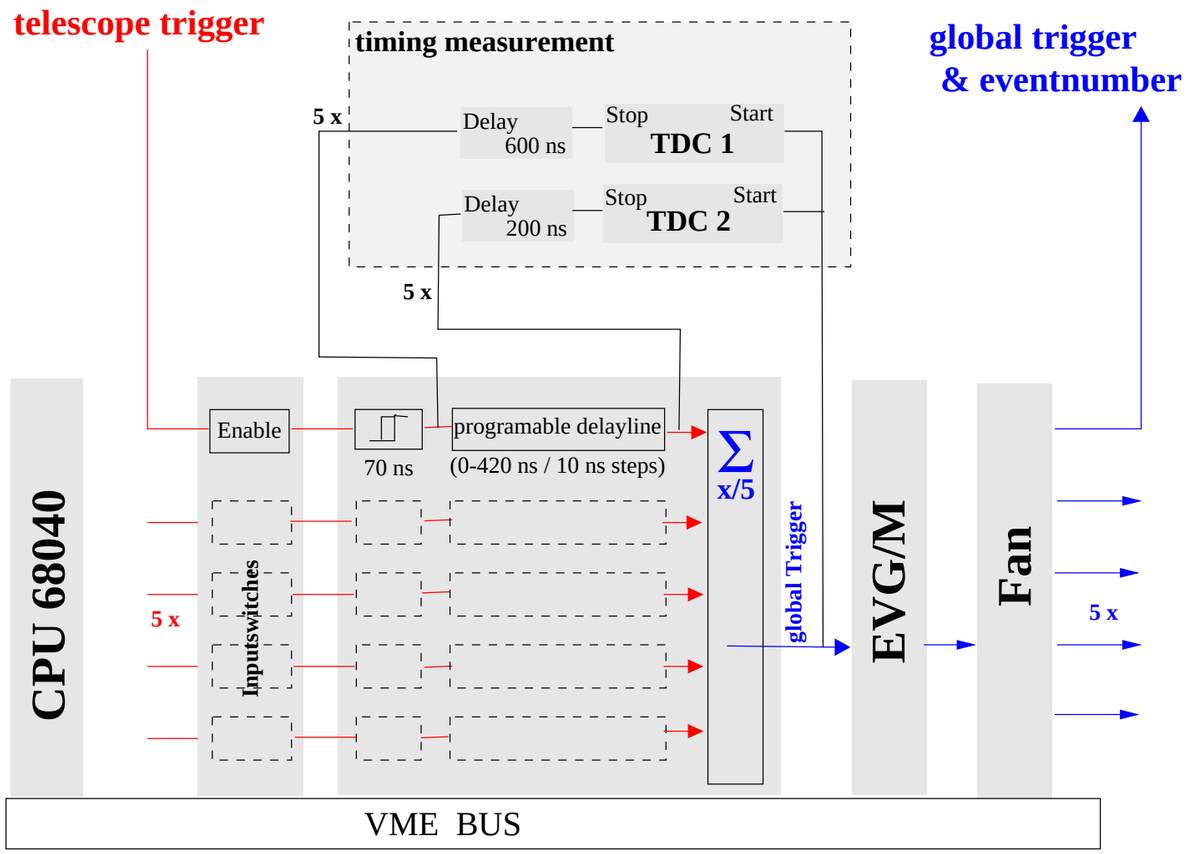
SYSTEM TRIGGER



The main task of the central station is to derive a trigger decision if at least a preset number of telescopes, typically two, have triggered within a given coincidence time. The central station essentially consists of a delay line, a majority unit and of an event grader to submit trigger signals and event numbers. All modules are completely computer controlled.

The telescopes of the stereoscopic system are arranged on a square with a length of about 100 m. Depending of the direction of the observations the arrival time differences of the light front at the different telescopes amount up to 400 nsec. Therefore the local trigger signals from the telescopes will not arrive simultaneously at the central station. In order to compensate these arrival time differences, the central trigger is equipped with programmable delay lines for the incoming trigger signals. The delays are updated continuously in steps of 10 nsec, as the orientation of the telescopes changes during tracking an object. Therefore it is possible to operate the central trigger with a much shorter coincidence window resulting in a reduced rate of accidental coincidences. Actually the coincidence time is set to a conservative value of 70 nsec. The global trigger signal is then sent to all telecopes of the system and the readout of the events is started. Together with the trigger signal an event number, generated by an event grader, is submitted to the telecopes, for the synchronization of the data.

In the central station two TDCs for each telescope are installed. These allow to measure the relative timing of and the coincidence time between the telescopes. Out of this measurements it is possible to monitor the accurate setting of the delays and to derive the relative arrival time of the light front at each telescope.

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REFERENCES

A. Daum et al. (HEGRA), accepted for publication in Astroparticle Physics (1997)

C. Köhler et al., Astroparticle Physics 1996, 6, 77-85

H. Lampeitl et al., in preparation (1997)