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Multi-purpose True Event Timer Module

The work describes a technical solution for obtaining very accurate time-stamps of events that are taken with respect to Coordinated Universal Time (UTC). The solution is based on utilizing the integrated circuit THS788 (from the Texas Instruments) in combination with an external time scale implemented in an FPGA. A specific architecture as well as an algorithm that provide producing the single-valued time stamps were proposed and investigated. The external UTC-based 1PPS (One Pulse Per Second) signals are time-stamped too, which allows monitoring the offset drift of the Timer's internal time scale with respect to the 1PPS signal and perform the necessary correction with the accuracy of several psec. Most important of achieved parameters are: RMS resolution of 6-7 ps of time-stamping; input-to-input offset drift -0.2 ps/oC . These and other parameters are confirmed by results of experimental measurements.