

Fred: An Architecture for a Self-Timed Decoupled Computer

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Abstract

Decoupled computer architectures provide an effective means of exploiting instruction level parallelism. Self-timed micropipeline systems are inherently decoupled due to the elastic nature of the basic FIFO structure, and may be ideally suited for constructing decoupled computer architectures. Fred is a self-timed decoupled, pipelined computer architecture based on micropipelines. We present the architecture of Fred, with specific details on a micropipelined implementation that includes support for multiple functional units and out-of-order instruction completion due to the self-timed decoupling.