Fred: An Architecture for a Self-Timed Decoupled Computer

William F. Richardson and Erik Brunvand

UUCS-95-008

Department of Computer Science
University of Utah
Salt Lake City, UT 84112 USA

May 8, 1995

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.