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**PICSIL:
DESIGN AND SYNTHESIS OF DIGITAL ICs
FROM
DATA FLOW DIAGRAMS**

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in partial fulfillment of the requirements
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Abstract

This thesis describes the background, development, and testing of PICSIL, a system for designing digital integrated circuits by structured decomposition.

PICSIL draws upon graphical and textual specification techniques; the first for high-level, architectural, system components, the second for more detailed, functional, specification.

Many graphical design paradigms already exist. Of these, DFDs (Data Flow Diagrams) best suit the assembly and intercommunication of abstract modules. With minor adaptations, DFDs were used as the high-level specification language. Lower-level functionality was described using a textual language based on HardwareC. Although HardwareC is not ideally suited to this use, and had to be extended in several areas it was adopted mainly for pragmatic reasons.

To accept a system definition and subsequently determine the details of its synthesis, the PICSIL system had not only to capture and edit high-level specifications, but also to deliver these specifications to one of several possible synthesis paths. The practical part of the thesis therefore consisted of implementing a graphical editor and a synthesis compiler. These drive the lower level Olympus and Octtools synthesis packages to provide a complete path from PICSIL input to chip layout. A layout produced by following this path has been sent for fabrication.

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