

XXIII. CUSTOM INTEGRATED CIRCUITS

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1. CUSTOM INTEGRATED CIRCUIT DESIGN

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In this project the objectives are to derive the mask specifications for a custom integrated circuit from an initial algorithmic specification. Currently, the target technology is NMOS using conservative design rules. Two projects center around the specification of algorithms. In one, the algorithm is expressed in terms of a hardware design language and then manipulated through various space-time alternatives to derive a resulting algorithm with the desired performance. In the other, the algorithm is replaced by a formal constraint representation which separates the competence of the algorithm from its performance. An appropriate performance strategy can then be erected on the competence base.

Another project is devoted to the study of placement and routing for subcomponents in an integrated circuit layout. We are also studying techniques for artwork analysis so that equivalent circuits can be derived from the mask geometry. Finally, we are building a computer facility, oriented around the Artificial Intelligence Laboratory LISP machine, including high-quality color and black-and-white graphics. The ultimate objective is to bring together the results of the various projects in this area to form a unified interactive design system.

