VLSI DESIGN

JANUARY/FEBRUARY 1983

In VLSI design, as in life, you have to lay the groundwork if you want to succeed.

Publisher
Douglas G. Fairbairn

Editor-in-Chief
Jerry Werner

Managing Editor
Barbara S. Haymond

Technical Editor
Barbara Clifford

Contributing Editor
William D. Jansen

Technical Advisors
Robert P. Larsen
Allen F. Podell
Dr. Daniel G. Schweikert
Dr. Carlo H. Séquin

Editorial/Circulation
Monica Berg

Director of Promotion and Circulation
Joy Deason Mole

Circulation Manager
Lorri Ungaretti

Design Consultant
Mike Shenon

Designer
Willy Keats

Sales Representatives

West Coast
Neal Manning
(415) 966-8340

East Coast
Charles Winnicky
(201) 234-9497

Midwest
Norman Mole
(815) 459-9004

VLSI DESIGN, January/February 1983, Volume IV, No. 1. Publication of Redwood Systems Group, P.O. Box 50518, Palo Alto, CA 94303-0518. (415) 966-8340. The subscription rates for VLSI DESIGN are $19.95/6 issues and $37.95/12 issues (U.S.); $29.55/6 issues and $57.15/12 issues (Canada); $45/6 issues and $90/12 issues (Europe/S.Am./Mexico/C.Am.); and $55/6 issues and $110/12 issues (Japan/Asia/Australia). Foreign rates include airmail delivery (except Canada). All payments must be made in U.S. dollars drawn on a U.S. bank. Foreign subscriptions must be prepaid.

VLSI DESIGN (ISSN 0279-2834) is published six times a year by Redwood Systems Group, P.O. Box 50518, Palo Alto, CA 94303-0518. Second class controlled circulation postage paid at Mountain View, CA and additional entry office, San Jose, CA.

POSTMASTER: Send address changes to VLSI DESIGN, P.O. Box 50518, Palo Alto, CA 94303-0518.

VLSI DESIGN was founded to explore, expand, and define the interrelations between very-large-scale integrated circuits (VLSI) and computer architecture, design strategies, costs, and aids, as well as the electronics industry as a whole. VLSI DESIGN is unique in that it is written by and for the participants in this dynamic field. VLSI DESIGN intends to be the communication focus of a new VLSI design community, encourage its development, and help define its directions.

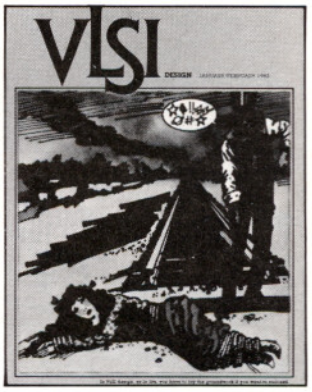
Over 21,000 copies of this issue printed.

VLSI DESIGN

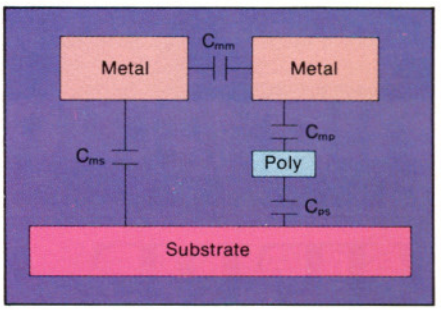
Volume IV, No. 1 January/February 1983

Cover

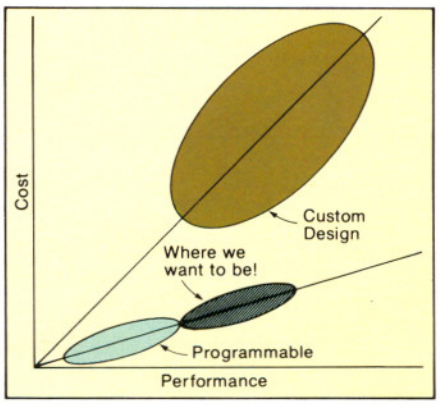
Although the "success" implied by this issue's cover is debatable, the point is clear: Success demands that all of the pieces come together at the right time. In VLSI design, due to the rapid progress of processing technology, one must sometimes start designing chips *in anticipation of* a new process (the "groundwork") that will not be perfected until months (or even years) later. Cover illustration by Dick Cole, San Francisco, CA.



Departments

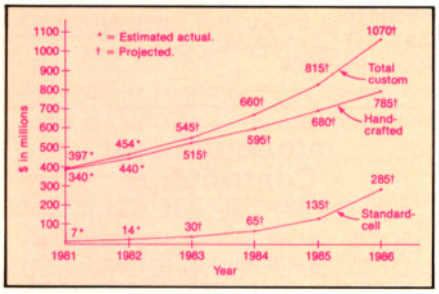


Page 64



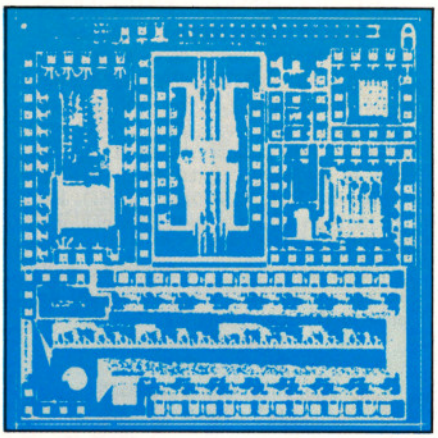
Page 4

Articles



Page 30

Page 40



Page 52