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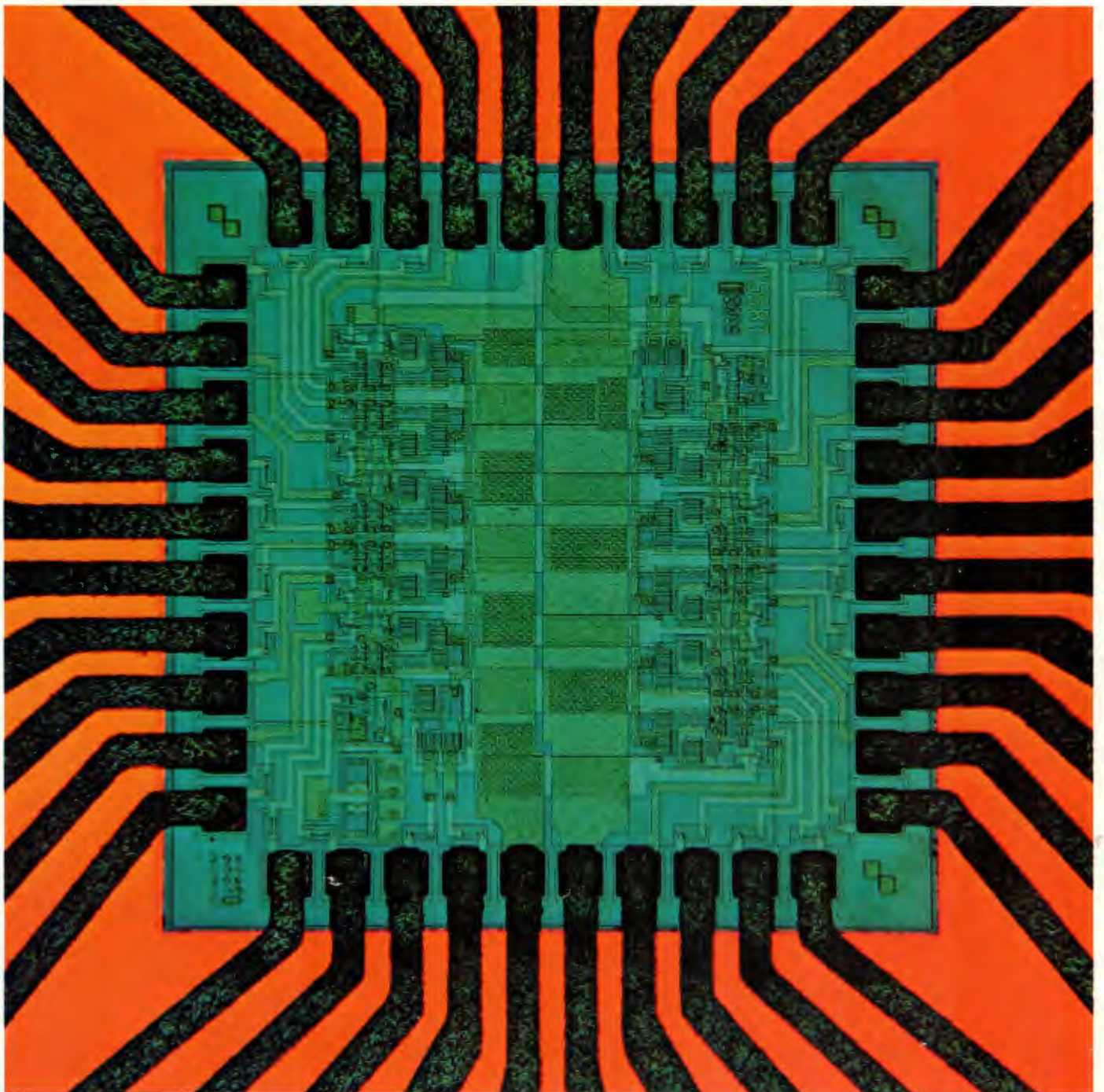
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A SCIENTIFIC *Book*
AMERICAN

MICROELECTRONICS

COMPLIMENTS OF
H-P
CUPERTINO INTEGRATED
CIRCUITS OPERATION



Ronald Reagan Presidential Library Digital Collections

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A **SCIENTIFIC AMERICAN** Book

MICROELECTRONICS

"This book tells of the virtual disappearance of the computer. Within 25 years, this glamorous piece of hardware has come and gone! . . .

"Present microelectronics technology can pack 10,000 computer circuit elements (the capacity of a big central processor) into a chip of semiconductor material measuring a centimeter or so on a side. The memory circuits, formerly contained in a separate magnetic-core unit, are being inscribed on the same chip alongside the processor or incorporated into its circuitry. With electron beams and x-rays to write and print the circuits, computer technologists are learning to pack them even tighter—more than 20,000 circuits per square centimeter. The computer has, in effect, imploded into the crystal lattice of a chip of semiconductor. . . .

"The computer itself is disappearing into the devices and machines it operates or that operate it. Thus, the typewriter that once typed messages into and out of the computer now incorporates the computer and becomes the intelligent terminal, proliferating into office jobs throughout the economy. The scientific instrument that formerly reported its readings to the computer now . . . interprets its own readings. The on-line process controller now makes the decision as well as the reading, and raises the temperature, squeezes down the press, or adjusts the cutting blade to a ten-thousandth."

— FROM THE FOREWORD

The editors of SCIENTIFIC AMERICAN have dedicated their September 1977 issue to articles detailing the myriad possibilities of microelectronics. These eleven articles and their illustrations are now a book that will serve as stimulating reading for students, professionals, and interested laymen curious about recent advancements in computer science, engineering, or electronics.



W. H. FREEMAN AND COMPANY
660 Market Street, San Francisco, California 94104
58 Kings Road, Reading, England RG1 3AA

CONTENTS

MICROELECTRONICS

by Robert N. Noyce

Introducing a volume on the technology of emplacing electronic circuits on tiny silicon "chips."

MICROELECTRONIC CIRCUIT ELEMENTS

by James D. Meindl

The principal element is the transistor, thousands of which can be created on a single chip.

THE LARGE-SCALE INTEGRATION OF MICRO-ELECTRONIC CIRCUITS

by William C. Holton

The elements on a chip are not wired together but are emplaced as a unit.

THE FABRICATION OF MICROELECTRONIC CIRCUITS

by William G. Oldham

The patterns on a chip are first created in the large. They are then laid down photographically.

MICROELECTRONIC MEMORIES

by David A. Hodges

Memory chips based on transistors are now able to store more than 16,000 bits (binary digits).

MICROPROCESSORS

by Hoo-Min D. Toong

A microprocessor is essentially the entire central processing unit of a computer on a single chip.

THE ROLE OF MICROELECTRONICS IN DATA PROCESSING

by Lewis M. Terman

Modern computers could not exist without a variety of microelectronic components.

THE ROLE OF MICROELECTRONICS IN INSTRUMENTATION AND CONTROL

by Bernard M. Oliver

Microprocessors make measuring instruments and machines "smart."

THE ROLE OF MICROELECTRONICS IN COMMUNICATION

by John S. Mayo

The high reliability and low cost of microelectronic devices make them ideal for the purpose.

MICROELECTRONICS AND COMPUTER SCIENCE

by Ivan E. Sutherland and Carver A. Mead

Microelectronics makes it possible to reconsider the design of computers.

MICROELECTRONICS AND THE PERSONAL COMPUTER

by Alan C. Kay

In the 1980's many people will possess a small computer with the capacity of a large one of today.