

member of the panel, Yale's Jack Sandweiss, who also heads the High-Energy Physics Advisory Panel, recalls that some Europeans at the Abington meeting supported the SSC but could

not bring themselves to admit that CERN should be second to the US in particle accelerators. Europe, it seems, wants to keep its options open, awaiting the US decision on the SSC.—IG

At last, chips get copyright protection

At a small ceremony in the Library of Congress Copyright Office on 7 January, Intel Corporation registered the first integrated circuit for copyright under P.L. 98-620, the Semiconductor Chip Protection Act of 1984, signed by President Reagan on 8 November. Intel's 27C256 is an erasable, programmable read-only memory chip with 256 000 binary digits of memory. With its electronic circuits intricately etched on 15 mask overlays, 27C256 is a new kind of intellectual property that Congress decided, after six years of wrangling, ought to be protected from illicit copying both at home and abroad. Minutes after Intel received its copyright, Motorola registered its MC68020 HCMOS (for highly complementary magnetic oxide silicon) microprocessor, capable of executing 2.5 million instructions per second, and Harris Corporation a 64 000-bit read-only memory.

Semiconductor chips have been in legal limbo between the traditional patent and copyright laws. Chips were not entitled to copyright protection, lawyers argued, because they are not written like song, plays or books, and thus cannot be considered works of art. Moreover, they cannot qualify for patenting, because chips do not represent a wholly new invention or concept, such as the transistor, which is the main component of semiconductor

chips. So instead of bending the existing laws around a new technology or revising the copyright law that was last rewritten in 1976, Congress enacted protection for the design and layout of the circuits as well as for the photographic masks used to etch the layouts into chips. The legislation represents the first expansion of the legal protection of intellectual property in the US in more than 100 years.

Piracy has become a serious threat to the companies that are the most advanced in semiconductors. US manufacturers invest heavily in improved chips, only to find competitors disassembling the mask works—the term is “reverse engineering”—and marketing copies that can be sold more cheaply because the pirates bear none of the R&D costs. R&D for a chip as complex as Intel's new 256K EPROM can run as high as \$50 million. The cost of duplicating such a chip is often less than \$50,000.

Sui generis. Copies of advanced chips by US semiconductor manufacturers, Representative Ed Zschau of California's Silicon Valley told his colleagues during a House debate last June, threaten to knock off a big hunk of the industry's total sales, amounting to about \$100 billion last year. As a case in point, Zschau spoke of the Z-80 microprocessor developed by Zilog, a

company in his district, that had been copied and sold by a pirate firm in Japan at half the price of the US chip. Within months after the copy was introduced, Zilog lost 50% of the market and more than \$10 million. “Such losses are hardly an incentive for innovating,” said Zschau.

P.L. 98-620 provides a wholly new part—Chapter 9—of Title 17 (the copyright section) of the US Code, specially for chips. It recognizes that, distinct from the author's or artist's copyright for a new work or the inventor's patent for a new product, the particular layout of a chip is *sui generis*—unique intellectual property and, as such, fully entitled to protection. The new law makes it illegal to reproduce any semiconductor design for 10 years after registration and carries penalties of up to \$250 000. It is this protection that the chip makers sought through their Congressmen.

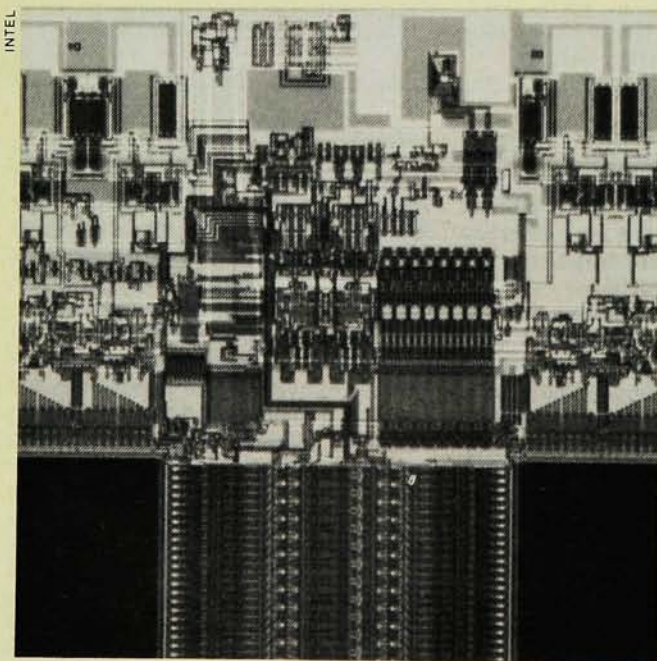
Japanese backing. The legislation was also supported by Akio Morita, chairman of Sony and president of the Electronics Industries Association of Japan, who called it “highly desirable, both of itself and as an indication of the proper direction for the international protection of such intellectual property.” In a letter to Representative Robert W. Kastenmeier of Wisconsin, chairman of the House Subcommittee on Courts, Civil Liberties and the Administration of Justice, which has copyright jurisdiction, Morita wrote:

Both governments should recognize that some form of protection to semiconductor producers for their intellectual property is desirable to provide the necessary incentives for them to develop new semiconductor products. And both governments should take their own appropriate steps to discourage the unfair copying of semiconductor products and the manufacturing and distribution of the unfairly copied products.

With the backing of Morita and Japan's Ministry of International Trade and Industry, legislation similar to P.L. 98-620 will be submitted to the Diet in March.

During hearings on the chip legislation in Congress last year, US Patents and Trademarks Commissioner Gerald J. Mossinghoff had opposed protecting foreign manufacturers, especially the Japanese, until they enacted similar laws. As it stands, the US law contains an international transition provision that enables foreign firms to obtain mask work protection in the US if their country is moving toward protecting chip designs at home or has already enacted such laws, and if their citizens or “persons controlled by them” are not engaged in pirating chips in the marketplace.

—IG □



Memory chip. Detail of Intel's recently copyrighted 27C256 EPROM is enlarged some 23 times. The chip itself is 10 mm on a side; the photo shows a central 3.6-mm portion.