Introduction

This Symposium celebrates the enactment of a new mode of protection for the electronic technology of the proprietary integrated circuit. Dubbed a "sui generis" right in the congressional debates to signify its separation from traditional copyright and patent concepts,1 the Semiconductor Chip Protection Act of 1984 marks the first new system of protection for intellectual property since the passage of trademark legislation almost a hundred years ago.

A principal component of the new technology of computers and like electronic devices, the integrated circuit, in its commercial form as a "silicon sandwich," had become the object of unrestricted rivalry in design and marketing among the principal domestic producers by the mid-1970's. As the demand for semiconductor chips grew at an exponential rate in the late 1970's, some firms in the industry found themselves unable or unwilling to bear the large costs in both money and lead time of designing new circuitry. Copying some of a competitor's products became a common means of completing a full line of chip products for some domestic firms.2

With the entry of Japanese firms into the world market as competitors in the manufacture and marketing of chips, United States semiconductor manufacturers sought a more orderly mode of competition. A significant impetus to the domestic producers' perceived need for added industrial property protection was their comparative advantage over the Japanese firms in research and development, rather than production technology. As Japanese competitors began to draw heavily upon the innovations of the American firms to produce more reliable chips at lower prices in the world markets, the quest for protection of the underlying design of the semiconductor chips intensified.3 The first attempt to provide protection within the framework of the Copyright Act foundered in 1979 over dis-

3. Id.
agreements about the extension of traditional copyright doctrines to semiconductor chips.4

The Semiconductor Chip Protection Act of 1984 ("the SCPA" or "the Act"), enacted as new Chapter 9 of Title 17 of the United States Code,5 reflects the congressional goal of providing particular protection for the costly and time-consuming process of designing the circuitry of semiconductor chips. By according such protection, Congress sought to provide a continuous economic incentive for research and improvement of chip technology through an orderly mode of constructive rivalry. This Introduction provides a brief overview of the SCPA and the articles in this Symposium.

Under the SCPA, protection is extended to "a mask work fixed in a semiconductor chip product," which is, in effect, how the statute defines the set of sheets embodying the many individual layer images etched into the semiconductor chip.6 The Act avoids freezing protection in terms of the current chip technology by extending protection to reproduction of the mask work by any method.7 Like a mimeograph stencil in one of the older technologies of word reproduction, a mask contains the basis for the ultimate configuration of the circuitry on the silicon chip. Protection attaches either when the mask work is registered or when the mask work is first commercially exploited, whichever occurs first. Eligibility for protection of a mask work is conditioned on nationality. If the owner is a national or domiciliary of the United States, the mask work becomes eligible for protection upon registration or commercial exploitation.8 But if the owner of the mask work is a national of a foreign nation state, protection is possible only if that owner's country meets one of several tests: (1) it is a party to a treaty with the United States under which the foreign jurisdiction accords protection to the chips of nationals of the United States; (2) it has enacted laws providing such reciprocity, as confirmed by the United States; (3) it first commercially exploited the chip in the United States; or (4) it is making reasonable progress toward such reciprocity, as found by an order of the Secretary of Commerce of the United States, who delegates

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4. See Samuelson, supra note 1, at 477-78.
7. Id. § 905(1).
8. Id. § 902(a)(1).
this power to the Patent and Trademark Office.\footnote{12}

When protection attaches, the exclusive statutory rights are given for a period of ten years from the date on which the work is first registered or commercially exploited, whichever occurs first.\footnote{10} If, however, there is no application for registration as provided for in the Act the possibility of protection under the Act terminates; after two years from the date of first commercial exploitation without registration, all mask rights are forfeited and the work falls into the public domain.\footnote{11}

In order to be eligible for protection under the Act, a work must meet the statutory standard of creativity or novelty. The statutory standard of creativity is, first, that the protected design is original, in that it is the independent creation of an author who did not copy it from another source,\footnote{12} and second, that the work, when considered as a whole, does not consist of designs that are merely "staple, commonplace, or familiar in the semiconductor industry, or variations of such designs, combined in a way that, considered as a whole, is not original."\footnote{13}

By fashioning a requirement of originality requiring a departure from designs familiar and accepted in the industry, Congress sought to prevent the conversion of material in the public domain, or in its penumbra, to private monopoly under the SCPA.

When eligibility for protection is established, the SCPA gives the owner of a chip four exclusive rights.\footnote{14} These rights may either be exercised by the owner or by a person authorized by the owner. The first right is to reproduce the mask work; the second right is to distribute a semiconductor chip product embodying the mask work; the third is to import such products; the fourth is to induce or knowingly cause another person to engage in one of the three preceding acts. The grant of these exclusive rights is, however, subject to three major qualifications.

Reverse engineering,\footnote{15} the first qualification, is a major innovation in the law of intellectual property. Reverse engineering under the SCPA permits a competitor to study, analyze, and evaluate the concepts and techniques embodied in a pro-

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9. \textit{Id.} \S 914.
10. \textit{Id.} \S 904.
11. \textit{See id.} \S 908(a).
12. \textit{See id.} \S 902(b)(1); \textit{see Raskind, supra} note 2, at 401.
14. \textit{Id.} \S 905.
15. \textit{Id.} \S 906(a).
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tected chip and to incorporate the results of such evaluation in another chip for sale, without constituting an infringement. The SCPA does not, however, condone piracy. The legislative history of the reverse engineering provision states that the semiconductor chip product resulting from reverse engineering may be "substantially similar" to the first mask work so long as it is not "substantially identical." Congress then drew a line between infringing copying and legitimate reverse engineering by imposing on the copying competitor the further obligation to incorporate the work product of the reverse engineering in an original mask work.

Reverse engineering is a distinct departure from the concept of "fair use" in the Copyright Act, because the SCPA defines noninfringing copying in terms of the industry practice of using the chip of a competitor as the starting point in the development of a new one. Thus, the concept of "reverse engineering" has the narrow focus of customary industry practice, directed solely to the development and marketing conduct of direct competitors. The contrast with the broad, generalized approach of the fair use provision is marked. The fair use doctrine provides no more guidance to noninfringing copying than to state a variety of uses for protected works in which copying may be permitted, subject to four nonexclusive factors which speak both to ownership rights and to the economic consequences of the copying. Moreover, reverse engineering strikes a balance between the exclusive reproduction right of an owner and the public interest in innovation, by imposing the condition on the copyist that an improved, or at least original, chip product must result. The concept of reverse engineering is thus a significant departure from the traditional calculus of fair use criteria because the SCPA approach expressly balances a limitation on an exclusive ownership right to the extent that the copyist has contributed to the public interest.

The SCPA provides two further limitations on the exclusive rights which it grants to an owner of a mask work. The first is essentially the exhaustion doctrine of the Copyright Act and the patent laws, although the doctrine may be broader in scope in the SCPA. The first authorized sale of a semiconductor chip product fully exhausts all of the owner’s monopoly in

17. Id.
that chip. The vendee of the owner, or of its licensee, is free to resell that chip at any price or to use or dispose of it in any other way. The second limitation on the exclusive ownership rights provides for immunity or limitation of liability for infringement for a person who purchases and resells a chip product innocent of any knowledge or reason to believe that it is an infringing product. If such a person subsequently learns of the infringing circumstances, the product may be resold without further liability upon the payment of a reasonable royalty. This provision amounts, in effect, to a compulsory license for a limited time.

The remedies provided under the SCPA are essentially the traditional ones, coupled with mandatory awards of actual damages for lost profits or, in the alternative, discretionary statutory damages up to a maximum of $250,000.

The first two of the following articles discuss these various aspects of the SCPA in detail. The final four articles assess the impact of the SCPA and analyze its lessons for the future development of legal principles as intellectual property law is confronted with burgeoning technology.

Mr. Richard H. Stern contributes the first authoritative substantive interpretation of the Chip Act. Stern's article sets out a sequential analysis of the meaning of the various provisions, and what significance they have in the plaintiff and defendant's respective legal cases. As a participant in the legislative process himself, Stern draws on that experience to provide insights at various points of his exposition. This concise analysis of the SCPA should be helpful to counsel and to decisionmakers in applying the SCPA to past and to proposed courses of action.

Professor Leo J. Raskind's article assesses the significance of the reverse engineering provision as a doctrine in the law of intellectual property. Characterizing this provision as the capstone of the SCPA, Raskind examines reverse engineering as a variant of the misappropriation doctrine and as an alternative to the fair use doctrine of the copyright law in the protection of commercial intellectual property. Raskind then suggests an interpretation of the reverse engineering provision. Raskind concludes with a review of the Act against the background of

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20. Id. § 907.
21. See id. § 911.
recent studies of the structure and current competitive status of the semiconductor chip industry.

Representative Robert W. Kastenmeier and Mr. Michael J. Remington provide a unique legislative perspective on the development of the Act. Their article is a significant contribution to the legislative history of the Act. They provide insight into the various policy alternatives perceived by Congress as well as the details of the course of the development of the various key provisions of the Act as finally passed. They provide an indispensable guide to understanding the statute in the light of the public and private interests at stake when the SCPA was before Congress.

Professor Pamela Samuelson examines the Chip Act in terms of its development in Congress as a *sui generis* mode of protection. She identifies the governing policies as a balance between protection of the author and protection of the public. She then examines the present mode of copyright protection of machine readable computer programs. Given the underlying protectable interests and the nature of computer software and semiconductor chips, Samuelson considers it paradoxical that Congress included software under the copyright law, but found it necessary to give chip products *sui generis* protection. She concludes that *sui generis* protection should be given to both software and chip products.

Professor John A. Kidwell provides a basis for assessing the SCPA from the perspective of the technological content of the material to be protected. He probes the nature of legal doctrines when extended to the protection of computer software. In contrasting the software protection problem with the protection problems posed by semiconductor chips, he develops a taxonomy of analysis of legal principles to illuminate the uncertainty that attends protection to this kind of commercial intellectual property. Kidwell applies the taxonomy to software protection law, noting in particular that the development of legal standards for this class of property requires a consistent vocabulary which adequately expresses the design and function of these products. Kidwell’s taxonomy raises several other difficulties, and he concludes that changes in software protection must be made with an understanding of the underlying difficulties to avoid multiplying the existing confusion in the law of software protection.

Professor Ralph S. Brown’s article provides a context of analysis for assessing the significance of the Act’s contribution
to the law of intellectual property. The article traces the evolution of the changes in the structure of the Copyright Act brought about by new types of commercial intellectual property. Brown then traces the development of protection for utilitarian articles as it developed historically at the boundary of copyright and patent law. He then sets out the policy choices facing Congress in protecting commercial intellectual property. Congress could adopt the policy of rewarding authorship, either directly or by assisting the market mechanism to accomplish this objective. A correlative goal would be to favor the public interest by protecting innovation as a means of enhancing that process. Brown’s conclusion is that protection should be extended in a manner that reflects an understanding and an application of the traditional principles and policies of protection.

Leo J. Raskind
Richard H. Stern

The contributors and editors dedicate this Symposium to the memory of Melville B. Nimmer. His writings, notably his magisterial treatise on copyright, will stand as an enduring monument to a humane scholar and teacher.