
Stephen A. Becker

Follow this and additional works at: https://repository.law.uic.edu/jitpl

Part of the Computer Law Commons, Internet Law Commons, Privacy Law Commons, and the Science and Technology Law Commons

Recommended Citation

https://repository.law.uic.edu/jitpl/vol6/iss4/1

This Article is brought to you for free and open access by UIC Law Open Access Repository. It has been accepted for inclusion in The John Marshall Journal of Information Technology & Privacy Law by an authorized administrator of UIC Law Open Access Repository. For more information, please contact repository@jmls.edu.
LEGAL PROTECTION OF SEMICONDUCTOR MASK WORKS IN THE UNITED STATES

by STEPHEN A. BECKER*

TABLE OF CONTENTS
I. HISTORY OF THE ACT ...................................... 590
II. CHIP PROTECTION ACT .................................... 595
   A. REGISTRATION IN GENERAL ............................. 598
   B. ENFORCEMENT ......................................... 599
   C. REGULATIONS PROPOUNDED PURSUANT TO THE ACT ...... 601
   D. REGISTRATION PROCEDURES ............................. 602
   E. RIGHTS OF FOREIGN MASK WORK OWNERS ............... 603
CONCLUSION .................................................. 604

The substantial growth in electronics and computers over the past two decades, created in part by the advent of integrated circuitry, has exceeded the ability of existing intellectual property laws to protect high technology innovations from piracy. Although substantial research is required to develop the integrated "chips" which form the components of both staple consumer products, such as digital timepieces and sophisticated microcomputer architectures, the circuit layout patterns (called "mask works") embodied in the chips do not clearly fall under the patent or copyright laws. This is because the circuitries underlying the chips frequently do not have the requisite "novelty" and "unobviousness" to warrant patent protection, and mask works themselves are considered too utilitarian to be covered by copyright.

In response to extensive lobbying by chip producers, Congress recently enacted a bold new law, the Semiconductor Chip Protection Act of 1984, to provide mask work owners exclusive rights in the mask work fixed in a semiconductor chip. Although designated as chapter 9 of the Copyright Act of 1976, and resembling copyright law in some re-
pects, the 1984 Act is a *sui generis* law which forms a model for international chip protection.

This Article includes the historical developments of the Semiconductor Chip Protection Act of 1984, the substance of the Act, current Regulations for implementing the Act, and recent administrative experiences with the Act.

I. HISTORY OF THE ACT

On January 7, 1985, Intel Corporation of Santa Clara, California, became the first applicant for registration\(^1\) of a claim for protection of a mask work,\(^2\) an event marking the end of a nearly five-year legislative process. In 1979, in response to lobbying by prominent members of the computer chip\(^3\) industry, such as Intel and the Semiconductor Industry Association (S.I.A.), H.R. 1007\(^4\) was introduced by Reps. Edwards and Mineta of Northern California (which includes the "Silicon Valley"). The lobbying arose from a need to protect the fourteen billion dollar semiconductor chip industry\(^5\) from increasing domestic and foreign piracy.\(^6\) It had become apparent that without exclusivity, chip designers and manufacturers would be reluctant to make the substantial investments required to develop chips.\(^7\)

Although patent, trade secret, and copyright law may protect the subject matter underlying a chip, none provides effective protection for

---

1. Registration MW1 issued on January 7, 1985, for work a entitled "Mask Work as Contained in 27C256."

2. A "mask work," as defined by the new Act, is a series of related images corresponding to the three-dimensional pattern formed by the layers that make up the final or intermediate form of a semiconductor chip. Each layer corresponds to a "mask." For example, a chip having six etching and deposition steps during manufacture requires six different masks.


5. Statement of President Reagan on signing the Chip Act (Nov. 9, 1984). *See also House Hearings, supra note 3, at 1-4 (testimony of Senator Mathias).*

6. *House Hearings, supra note 3, at 28 (testimony of F. Thomas Dunlap, Jr., Corporate Counsel and Secretary of Intel Corporation).*

7. A relatively simple chip, containing approximately 1,200 transistors, can require two to three years to develop, at a cost of approximately $500,000; yet the chip can be copied in three to six months at a cost of $30,000. A complex chip, containing tens of thousands of transistors, would require more than three years and several million dollars to develop, but can be copied within six months for approximately $100,000. *House Hearings, supra note 3, at 32. See also Wilson & LeBarre, The Semiconductor Chip Protection Act of 1984: A Preliminary Analysis, 67 J. PAT. OFF. SOC'Y 57, 60 (1985) [hereinafter cited as Wilson].*
the chips themselves. Patent protection safeguards the process of producing the chip, the electronic circuit embodied in the chip, and the chip itself as an article of manufacture, assuming that the process, circuit, and article of manufacture meet the patentability requirements of being new, useful, and unobvious. Although a patent on the circuit will protect against the unauthorized manufacture, use, or sale of the circuit, the circuits in chips are often well known and therefore unpstatentable. Patents for the chip-manufacturing process or for the chip itself as an article of manufacture would ordinarily not protect against the unauthorized use of the design of the chip. Furthermore, it requires at least two years to process a patent application, which is too long in view of the short commercial life of many chips.

Trade secret protection for chip designs is not practical because an integrated circuit chip can often be revealed by inspection. This problem is particularly acute in mass marketed chips which cannot be controlled by contract.

Copyrights protect the “expression” contained within a chip’s program, as well as any aesthetic features of the chip's layout which exist independently of the chip's function. Copyrights do not, however, protect the design of a chip. Although schematic diagrams or works containing data and drawings of electric circuits constituting “original works of authorship” are registerable as “pictorial, graphic or sculptural works,” protection does not extend to the semiconductor chip product portrayed by the drawing or technical data. The Copyright Office has historically refused to register claims to copyright in the design or layout of printed circuit boards, or in the imprinted patterns in semiconductor chips, on the ground that the topology of a microelectronic circuit, or other device formed in semiconductor material, is an intrinsically useful part of a useful article.

In an attempt to extend the scope of copyright protection to cover chips, H.R. 1007 broadened the definition of “pictorial, graphic and

9. Wilson, supra note 7, at 62.
13. Id. § 101.
15. Id. at 30.
sculptural works." H.R. 1007 added the sentence: "Such pictorial, graphic and sculptural works shall also include the photographic masks used to imprint patterns on integrated circuit chips and include the imprinted patterns themselves even though they are used in connection with the manufacture of, or incorporated in a useful article." 

In hearings on H.R. 1007, the Copyright Office, although supporting the principle of protection for imprinted design patterns on chips, questioned whether extension of copyright law to chip designs beyond works of authorship would grant protection to uncopyrightable concepts, principles or ideas. The Office was also concerned that the normal, seventy-five-year period of copyright protection was too long for chip designs which have relatively short commercial lives.

The semiconductor chip industry itself was divided over H.R. 1007. Those supporting the bill argued that protection is necessary to combat the rising threat of unfair competition from chip pirates, particularly the "threatening competition from Japan." Intel Corporation and Mostek Corporation based their support of the bill on the ground that chip developers should not be left powerless against pirates. They argued that some type of protection, even if imperfect, should be adopted as soon as possible. Opponents of the bill, including Fairchild, Texas Instruments, and National Semiconductor Corporation, argued that chips and masks are utilitarian objects, not writings of authors, and thus are not entitled to copyright protection. Concern was also expressed for the "innocent" infringer who might adopt a chip in good faith for use in his product, and then be enjoined from using the chip. Furthermore, the application of copyright protection to chips would discourage reverse engineering, thereby destroying an important second source market. Finally, any protection provided by the bill would not apply to foreign firms who pirate chips for sales abroad.

The differing positions on H.R. 1007 in the industry made it clear that the bill was too simplistic as written. Thus, no further action was taken. Thereafter, Sen. Mathias of Maryland and Rep. Edwards of California introduced S. 3117 and H.R. 7207 in 1982. These bills, which were virtually the same as H.R. 1007, were not acted upon.

17. H.R. 1007, supra note 4.
19. Senate Hearing, supra note 14, at 35.
In 1983, Sens. Hart and Mathias introduced S. 1201.22 Rep. Edwards introduced a similar bill, H.R. 1028.23 These bills received substantial attention from industry lobbyists, who were united behind the need to adopt some type of chip protection, probably because legitimate second source chip manufacturers were becoming victims of piracy.

The Senate bill, as H.R. 1007 before it, incorporated chip protection into the Copyright Act, in addition to including provisions to address the issues raised by the opponents of the 1979 House bill. Unlike the 1979 bill, which included mask works among “pictorial, graphic or sculptural works,” S. 1201 created a new category of copyrightable works known as “mask works.” Moreover, S. 1201 provided a ten-year term of protection beginning from the first authorized distribution or use of a commercial product in commercial quantities. Exclusive rights provided by the bill included the right to embody the work in a mask, to distribute the work, to use a mask embodying the work to manufacture a chip product, and to distribute or use a chip product thereby made. The Senate bill also provided a compulsory license to an innocent infringer who had invested substantial funds to use the chip and who would suffer substantial financial detriment if enjoined. The compulsory license required the innocent infringer to pay a reasonable royalty to the copyright owner. Copying for purposes of reverse engineering was specifically excluded as an infringement.

Although the Senate bill was well-received by the semiconductor industry, members of the legal community, as well as the Copyright Office, expressed serious reservations about expanding copyright law to protect what is basically a utilitarian device.24Opponents of the Copyright Act approach were concerned that the original chip manufacturers would invoke the fair use doctrine to prevent copying for the purpose of reverse engineering.25 Furthermore, extending copyright protection to chip designs would require the United States, under the Universal Copyright Convention (UCC),26 to provide equivalent protection to UCC countries for works first published in those countries (or created by UCC nationals), without receiving protection in return. Although the United States theoretically27 could retaliate under the UCC if other UCC nations refused to protect mask works, such retaliation would require legislation for which there was no precedent.

Nevertheless, the Senate passed the bill, justifying its passage on
the grounds that expansion of copyright protection to new forms of expression was common, and that inclusion of chip protection within federal copyright law would encourage certainty and stability within the field of semiconductor chip design. Further, the adoption of a non-copyright based approach would raise uncertainties in the application of the law within the United States. Similarly, it would be uncertain whether foreign nations would recognize a new species of protection governed by a United States statute.

H.R. 1028 was similar to S. 1201 in many respects. Like S. 1201, it was based upon the notion of classifying chip designs in the Copyright Act and creating a new subject category of copyrightable works known as "mask works." The House bill also provided a ten-year term of protection, and similar exclusive rights; however, it provided a "use right," that is, an exclusive right to use a chip product embodying a mask work. H.R. 1028 provided a compulsory license to innocent infringers, but contained no explicit reverse engineering provision, relying instead upon the doctrine of fair use.

The Copyright Office opposed both the House and Senate bills, preferring instead "industrial design legislation." Although based upon the copyright principle of originality, such legislation would occupy a separate chapter of title 17 of the United States Code and would cover a broad array of useful articles.

During consideration of H.R. 1028, the House Subcommittee became convinced that a new form of protection, i.e., a *sui generis* approach, would protect chips more fully than would strict copyright. The Committee, in adopting a *sui generis* approach, expected that the philosophical, constitutional, legal, and technical problems associated with any attempt to protect mask works or semiconductor chip designs under copyright law could be avoided. Rather than risk confusion, uncertainty, and distortion of existing copyright laws by attempting to modify fundamental copyright principles to suit the unusual nature of chip design, the House Committee concluded that a new body of statutory law should be developed. A new bill, H.R. 5525, was introduced by Reps. Edwards and Mineta to replace H.R. 1028.

Although H.R. 5525 and S. 1201 differed in their copyright versus *sui generis* approaches, the House and Senate recognized that the two bills were nevertheless similar in substance. The Senate agreed to

29. See H.R. 2985, 98th Cong., 1st Sess. (1983). Design protection legislation was initially proposed by the Senate in 1975, but ultimately failed to be enacted.
amend its bill and adopt the House *sui generis* approach. The House, acceding to the Senate’s concerns regarding the retroactivity\(^2\) of the Act and the foreign provisions,\(^3\) agreed to make concessions regarding the effective dates for chip protection. The House also agreed to incorporate international transitional provisions encouraging foreign countries to adopt similar chip protection laws. The resulting bill, H.R. 6163 was passed unanimously by both the Senate and the House.\(^4\)

II. CHIP PROTECTION ACT

The Semiconductor Chip Protection Act of 1984 amends title 17 of the United States Code by adding chapter 9.\(^5\) The Act defines a semiconductor chip product as a multi-layered product of metallic, insulating, or semiconductor material created in accordance with a predetermined pattern and intended to perform electronic circuitry functions.\(^6\) A “mask work” is defined as a series of related images, however fixed or encoded, that represent the three-dimensional pattern or typography of the chip’s surface.\(^7\) A mask work is “fixed” in a chip when its embodiment is sufficiently permanent or stable to enable it to be perceived or reproduced for more than a transitory period.\(^8\)

The “owner” of a mask work is the person who created the mask work, his legal representative, or a party to whom all rights in the mask work are transferred.\(^9\) Where a work is developed within the scope of a person’s employment, the “owner” is the employer or party to whom all the rights in the mask work are transferred.\(^10\) An exclusive licensee of all rights in less than the entire mask work is not the “owner.”\(^11\)

The Act grants the owner of the mask work the right to reproduce

---


\(^3\) The Senate bill sought to encourage international protection for mask works through the Universal Copyright Convention, whereas the House bill rejected reliance on the UCC. See 130 CONG. REP. 12,924 (daily ed. Oct. 3, 1984; pt. II) (statement of Sen. Mathias).


\(^7\) Id. § 901(a)(2).

\(^8\) Id. § 901(a)(3). This language contemplates manufacture of chips without the use of a mask per, such as laser or electron beam etching by apparatus controlled by magnetically stored data.

\(^9\) Id. § 901(a)(6).

\(^10\) Id.

the mask work, the right to import or distribute a semiconductor chip product in which the mask work is embodied, and the right to induce another to reproduce, import or distribute the mask work.¹² Distribution of a mask work includes the proffered or actual sales, rentals, leases, or other transfers of ownership.¹³ These rights apply not only to chips embodying the mask work, but also to data base tapes containing programming for controlling the laser or electron beam etching of a chip design.¹⁴

Protection is not available for a mask work that is not original,¹⁵ or for one that consists of designs considered to be "common" in the semiconductor industry.¹⁶ Moreover, protection does not extend to any idea, procedure, process, system, method of operation, concept, principle, or discovery.¹⁷ The Act does not define what constitutes an "original" mask work. Clearly, some minimum level of creativity must exist in the mask work, but the mask work does not have to be inventive.¹⁸ Although the Act requires far less creativity than that required to obtain a patent, it probably requires slightly greater creativity than that necessary to obtain copyright protection. The legislative history of the Act provides some guidance as to what constitutes originality in a mask work, but courts will ultimately have to flesh out the originality requirement on a case-by-case basis.

Although the Copyright Office does not require identification of the old and new elements in a mask work,¹⁹ the applicant must describe generally the original contribution for which protection is sought.²⁰ The Office will not make a substantive examination of applications to determine whether mask works are original, nor will it confirm that the works are not commonplace.²¹ Issuance of a registration, however, constitutes prima facie evidence of the facts stated therein, creating a

¹⁶. Id. § 902(b)(2).
¹⁷. Id. § 902(c). See also 17 U.S.C. § 102(b) (1982).
¹⁹. See infra text accompanying notes 70-76.
²⁰. See 37 C.F.R. § 211.4(b)(1985).
²¹. During the Copyright Office's early implementation of the Act, there has been only one permanent, full-time Examiner, who is neither an engineer by training nor an attorney. The Examiner makes only a cursory examination of the application; the validity of the registration must ultimately be tested in court.
rebuttable presumption of originality and a presumption that the designs contained in the mask work are not commonplace.

To be eligible to receive protection on a mask work, the owner must, on the earlier of the mask work registration date or the date of first commercial exploitation of the mask work anywhere in the world, be a national or domiciliary of the United States. Protection is also available if on that date the owner is a national, domiciliary, or sovereign authority of a foreign nation which is a party to a U.S. treaty affording protection to mask works, or if the owner is a stateless person. Additionally, protection of a mask work under the Act is available if the mask work is first exploited commercially in the United States. Alternatively, protection under the Act is available by presidential proclamation. A presidential proclamation will issue if the President finds that the country seeking protection under the Act affords roughly equivalent protection to U.S. nationals or domiciliaries abroad.

The owner of the exclusive rights in a mask work may assign or license the rights by a written instrument. Such an instrument may be recorded in the Copyright Office.

Protection under the Act begins on the date of registration of the mask work or the date of first commercial exploitation, whichever occurs earlier. The term of protection extends for ten years.

Reproduction of a mask work for the purpose of reverse engineering does not trigger liability under the Act. "It is therefore permissible for a competitor to reproduce a mask work by photographing the semiconductor chip product and studying and analyzing the photograph, in order to create another semiconductor chip product that competes with the first one." Furthermore, the Act permits reproduction of a mask work, or portions thereof, in a nonprofit classroom or similar place, for purposes of studying the principles of operation of the mask work. This is based on the principle that such reproduction does not interfere with the market or the value of the mask work and benefits the

53. Id.
54. Id. § 902(a)(1)(B).
55. Id. § 902(a)(1)(C).
56. Id. § 902(a)(2).
57. Id. § 903(b).
59. 17 U.S.C. § 904(a)(Supp. II 1985). The period of pendency of applications during the initial period of implementation has been one week.
60. Id. § 904(b).
61. Id. § 906(a).
public by advancing scientific knowledge.\textsuperscript{63}

Courts may be forced to look for a "paper trail" of records to distinguish between second source chips properly developed through reverse engineering and pirated ones, because pirates typically do not keep development records, whereas original chip developers do. Of course, it is possible for a pirate to develop an artificial paper trail or to maintain records associated with the copying process. Presumably, the difference between these records and records legitimately generated during original chip development will be ascertainable at trial through cross-examination.

The Act includes a first sale doctrine which operates to extinguish the rights of a mask work owner in mask work products sold by the owner or his agent. This prevents a mask work owner from exercising any post-sale price control or other control over semiconductor chip customers once the chips have passed into their hands. This protects purchasers' rights to use and resell the chips.\textsuperscript{64} The Act further limits the rights of a mask work owner. Infringement by an innocent purchaser of an infringing semiconductor chip, or by anyone who directly or indirectly purchases an infringing semiconductor chip from an innocent purchaser, is not actionable.\textsuperscript{65} An innocent purchaser is one who purchases a semiconductor chip product in good faith without actual notice that the chip product is protected, or without reasonable grounds to believe that the mask work is protected.\textsuperscript{66} The innocent purchaser incurs no liability in connection with purchases made before he receives notice of protection.\textsuperscript{67} After receiving notice of protection, the innocent purchaser is liable only for a reasonable royalty to be determined by the court in a civil action for infringement, or as resolved between the parties.\textsuperscript{68} Semiconductor chip products purchased after notice of protection are not immune under the innocent infringement provisions.\textsuperscript{69}

A. Registration in General

To obtain protection of a mask work product under the Act, the mask work must be registered with the Copyright Office. Registration is a prerequisite to the commencement of an infringement action.\textsuperscript{70} Unless the owner of the mask work registers the claim for protection with

\textsuperscript{63} Id. at 22, 1984 U.S. CODE CONG. & AD. NEWS at 5771.


\textsuperscript{65} 17 U.S.C. § 907(a), (c) (Supp. II 1985).

\textsuperscript{66} Id. §§ 901(a)(8), 907(a)(1).

\textsuperscript{67} Id. § 907(a)(1).

\textsuperscript{68} Id. § 907(a)(2), (b).

\textsuperscript{69} Id. § 907(d).

\textsuperscript{70} Id. § 910(b)(1).
the Copyright Office within two years from the date the mask work was first commercially distributed anywhere in the world, all protection terminates, and the work falls into the public domain.\textsuperscript{71}

If the Copyright Office refuses to register the mask work, the applicant may seek judicial review.\textsuperscript{72} If the Register of Copyrights does not issue a certificate of registration within four months after an application is filed, a refusal is deemed to have been issued, and the applicant may appeal.\textsuperscript{73} The applicant may seek judicial review of any refusal by bringing an action for review in an appropriate United States district court within sixty days of the refusal.\textsuperscript{74}

Notice under the Act is optional. It does, however, constitute prima facie evidence to others that the mask work is protected.\textsuperscript{75} The notice shall consist of: (1) the words "mask force," the symbol "M," or the symbol M within a circle; and (2) the name of the mask work owner, or an abbreviation by which the name is recognized or generally known.\textsuperscript{76}

B. ENFORCEMENT

Enforcing protection of a mask work requires that the alleged infringing work be "substantially similar" to the protected mask work.\textsuperscript{77} The concept of substantial similarity varies depending upon the nature of the work. Courts may consider copyright law precedents on the issue of substantial similarity, yet it is likely that a new body of law specific to semiconductor chip infringement will be developed.\textsuperscript{78}

Since very subtle mask work changes may represent significantly different and original designs, application of the substantial similarity doctrine to mask works may prove to be difficult.\textsuperscript{79} It is unclear, for example, whether substantial similarity will be deemed to exist if the same basic design is reproduced in a chip using a different chemical process or is reproduced in a different type of chip (e.g., bipolar versus MOS). Is there substantial similarity if two different chips are formed with several identical layers and one or two different layers? Also, how much of a chip must be copied to result in substantial similarity, considering that many microprocessor and logic chips are formed using differ-

\textsuperscript{71} Id. § 908(a).
\textsuperscript{72} Id. § 908(g).
\textsuperscript{73} Id.
\textsuperscript{74} Id.
\textsuperscript{75} Id. § 909(a). The Regulations substitute "mask work" for "mask force." 37 C.F.R. § 211.6(b)(1)(1985).
\textsuperscript{76} 17 U.S.C. § 909(b) (Supp. II 1985).
\textsuperscript{77} H.R. REP. NO. 781, supra note 30, at 26, 1984 U.S. CODE CONG. & AD. NEWS at 5775.
\textsuperscript{78} Id.
\textsuperscript{79} Senate Hearing, supra note 14, at 145-46.
ent arrays of identical logic blocks or cells? A jury may indeed have difficulty identifying differences in similar chip designs. Infringement litigation involving the issue of substantial similarity will thus require extensive use of expert witnesses.

The Chip Protection Act became effective on January 8, 1985 (sixty days following enactment). An action for infringement may nevertheless lie for a mask work first commercially exploited in the sixty-day intervening period (November 8, 1984 to January 8, 1985). Mask works which were first commercially exploited between July 1, 1983, and November 8, 1984, may be protected if the mask work is registered before July 1, 1985. Chips made between July 1, 1983, and November 8, 1984, may be imported into or sold in the United States for two years after registration of the mask work, but only if the importer or seller pays a reasonable royalty for all chips imported or sold after November 8, 1984.

Upon obtaining a certificate of registration from the Copyright Office, a mask work owner or an exclusive licensee of all rights may sue for infringement by instituting a civil action. Of course, the infringement must have occurred after either registration or the first commercial exploitation, since protection does not begin until the mask work is registered or used commercially.

If the registration has been refused, but a proper application has been received by the Copyright Office, the applicant may still institute a civil action for infringement. Notice of the action, together with a copy of the complaint, must be served on the Register of Copyrights. The Register has the option to become a party to the action on the issue of eligibility for registration of the mask work.

A mask work owner has several rights and remedies, such as the right to seek an injunction against importation from a district court, or the right to seek an exclusion order from the International Trade Commission under 19 U.S.C. § 1337. Additionally, the Customs Service and the Postal Service may issue importation regulations. The Customs

80. Wilson, supra note 7, at 87-88.
82. Id. § 913(c).
83. Id. § 913(d)(1).
84. Id. § 913(d)(2), (3).
85. Id. § 910(b)(1).
86. Id. § 910(b)(2).
87. Id. § 910(b)(2). See also id. § 908(g).
88. Id. § 910(c)(1).
Service will thus be able to assist the mask work owner in preventing pirated chips from being imported into the United States.

Federal courts have exclusive jurisdiction over infringement actions under the Chip Act. Available remedies include temporary restraining orders and injunctions, actual damages, and an award based upon the infringer’s profits. Statutory damages of up to $250,000 with respect to all infringements involved in the action are also available. The court may order the impounding of all semiconductor chip products, drawings, tapes, masks, or other items from which such products may be reproduced. The court may also order the destruction or other disposition of any infringing semiconductor chip products, masks, tapes, or other instruments for reproducing the products. Finally, the prevailing party may be awarded full costs, including attorneys fees.

The Chip Act in no way affects existing copyright or patent laws. Computer programs, data bases, or other copyrightable works embodied in semiconductor chips remain protected under copyright law. Thus, the copyright in the computer program exists independently of the mask work protection for the layout of the chip. Similarly, if the semiconductor chip embodies patented circuitry, the patent is not affected by the mask work. Moreover, trade secret law is not preempted and remains available to protect unfixed, unregistered, and unpublished mask works. Indeed, trade secret protection is particularly applicable to mask works prior to their registration or commercial exploitation. Registration of a mask work does not necessarily eliminate the potential for trade secret protection; special provisions for depositing material protected by trade secrets are available.

C. REGULATIONS PROPOUNDED PURSUANT TO THE ACT

On October 4, 1984, the Copyright Office opened an inquiry into the implementation of the Semiconductor Chip Protection Act. The Copyright Office received testimony on six issues from the Semiconductor Industry Association. A draft of “Form MW,” to be used to register

91. Id. § 911(b).
92. Id. § 911(c).
93. Id. § 911(e)(1).
94. Id. § 911(e)(2).
95. Id. § 911(f).
96. Id. § 912(a).
98. See infra text accompanying notes 103-13.
mask works, was distributed for comment.100 The hearings and follow-up comments focused on the meaning of "originality," deposit requirements, and maintaining trade secret protection for deposited material. There was also a substantial amount of discussion over what circumstances should permit an owner of a mask work to register an intermediate form of a chip. The Copyright Office was particularly concerned with establishing safeguards for registrations of intermediate forms.101 Also of concern was the need for establishing the amount of identifying material to be deposited in support of a claim for registration, particularly where trade secrets are involved.102

D. REGISTRATION PROCEDURES

An application for registration is submitted on Form MW,103 accompanied by a twenty-dollar registration fee,104 and a required deposit.105 For commercially exploited mask works, the identifying material consists of four chips as they were first commercially exploited and one full set of visually perceptible reproductions of each layer of the mask work.106 The applicant may deposit either plastic color overlays, composite plots, or photographs of layers of the mask work which magnify the actual size at least twenty times.107 For mask works which have not been commercially exploited, the identifying material ordinarily consists of one full set of either plastic color overlays or composite plots of each layer of the semiconductor chip product.108 In either case, the visually perceptible material should be submitted in an 8½ x 11-inch format.109

Where an applicant makes a claim for trade secret protection, the deposit consists of four chips as they were first commercially exploited. In lieu of color overlays, plots, or photographs, special "identifying por-

100. Testimony covered registration forms, fees, coverage of application, form of deposit, form of notice, and publication of registration.
101. 49 Fed. Reg. 39,171, 39,173 (1984). The Copyright Office decided, in its Interim Regulations, that it would register intermediate forms only if it represents 20% or more of the final form of the chip. These Regulations have been codified at 37 C.F.R. § 211.5(b)(2) (1985). The Copyright Office has recently eliminated the 20% rule in response to pressure by chip producers.
102. The Copyright Office elected to adopt in its Interim Regulations suggestions made by the Semiconductor Industry Association and others.
104. Id. § 211.3(a).
105. Id. § 211.5.
106. Id. § 211.5(b)(1).
107. Id.
108. Id. § 211.5(b)(2).
109. Id. § 211.5(b)(1), (2)(ii).
tions” for one or two affected layers must be provided. Identifying portions consist of a printout of mask work design data pertaining to each withheld layer, reproduced in microfilm, with the sensitive material blocked out or stripped from the deposited material. The deposit will be accessible for public inspection.

Where a claim of trade secret protection is made in connection with any layer of a mask work that has not been commercially exploited, the deposit consists of special identifying portions and a single photograph of the top layer of the mask work and any other layer visible from a single exposure.

Other forms of deposit may be considered by the Copyright Office if accompanied by a Request for special relief setting forth the specific reasons for the request.

E. RIGHTS OF FOREIGN MASK WORK OWNERS

A non-American national or domiciliary is eligible for mask work protection under the Act if the mask work is first commercially exploited in the United States or if all of its U.S. rights in the mask work are transferred to a U.S. subsidiary or parent corporation. In addition, foreign mask owners may become eligible for protection if their nation enters into a treaty with the United States protecting mask works, or if there was a presidential proclamation. Furthermore, in accordance with the Act’s transitional provisions, the Secretary of Commerce is authorized to extend protection to foreign nations upon either the Secretary’s own motion or by petition by any person. The Secretary can extend protection to the foreign nation even before it enters a treaty or enacts legislation protecting mask works upon proof that the nation is making good faith efforts and reasonable progress toward entering into a Chip Act treaty with the United States. Congress must, however, confirm that the foreign nation, and persons controlled by it, are not engaged in misappropriation, unauthorized distribution, or commercial exploitation of mask works.

The Copyright Office has received petitions from several foreign countries, under section 914 of the Act, for reciprocal interim mask

110. Id. § 211.5(c)(1).
111. Id.
112. Id. § 211.5(c)(2).
113. Id. § 211.5(d).
115. Id. § 902(a)(1)(A).
116. Id. § 902(a)(1)(C).
117. Id. § 914(a).
118. Id. § 914(a)(1).
119. Id. § 914(a)(2).
work protection. Most of the petitions are from countries which extend legal protection under their respective copyright laws. This raises some concern since Congress has made it clear that mask work protection is *sui generis*, i.e., not covered by U.S. copyright law. Therefore, mask works are not protectable under the provisions of the Universal Copyright Convention.\textsuperscript{120}

**CONCLUSION**

The new Semiconductor Chip Protection Act represents the first intellectual property act in nearly a century. The Act is expected to provide effective copyright-like protection for semiconductor chips and to spur continued growth of this industry. Application and enforcement

\textsuperscript{120} As of this writing, reciprocal protection has been extended to owners of mask works as citizens of the following countries (reciprocal time period in parentheses):

(a) Japan (6/1/85-6/1/86) adopted a new Chip Protection Act which substantially tracks U.S. law; however, Japan's law uses a different standard of “novelty.” Furthermore, Japan allows more detail of the product on the application. Trade secret protection is available, but trade secret material cannot be deleted. Moreover, there is no mechanism to request special relief from deposit requirements.

(b) United Kingdom (3/1/85-11/8/87) and Australia (5/23/85-6/21/86) currently rely on standard copyright protection for protection of mask works.

(c) Canada (6/12/85-6/27/86) is revising its copyright law and is making “good faith efforts and reasonable progress” with respect to mask work protection. Canada may consider a shorter period of protection for mask works, as well as a specific allowance for reverse engineering.

(d) Sweden (4/25/85-6/13/86) is currently revising its Copyright Act to provide a 10-year period of protection for mask works and to permit fair use copying “exclusively for analysis or for teaching.” Since Sweden is a signatory to the Berne Copyright Convention, a body which prohibits formalities, including registration, it is unlikely that mask works legislation in Sweden will be similar to U.S. law in that regard. After the interim reciprocity period given to Sweden, review will be made of progress made toward developing a legislative proposal.

(e) Members of the European Economic Community [Belgium, Denmark, France, West Germany, Greece, Ireland, Italy, Luxembourg (6/20/85-9/12/86) and Netherlands (6/3/85-9/12/86)] have drafted a proposal for a Chip Protection Act. France has proposed a Chip Act similar to U.S. law. The Netherlands asserts that its copyright law extends protection to mask works, although it is seriously considering amendments to its law to resolve any uncertainties.

(f) WIPO (World Intellectual Property Organization) has developed a draft treaty for the protection of “integrated circuits.” A meeting of experts was scheduled for the end of November 1985 to consider the draft. The draft is largely compatible with U.S. law. It appears to be flexible and no *sui generis* law appears to be needed. The subject matter of the treaty, however, is not defined within it. The rationale is that the technology changes too quickly. Under the treaty, national treatment given to the minimum rights concerning formalities to be allowed might be more explicit than under the Berne Convention. Furthermore, the WIPO treaty would provide for remedies, an approach more akin to patent and trademark treaties, not copyright. Among the remedies proposed are injunctions and damages or reasonable royalties.
of the new law is not expected to be trouble-free. There will be difficulties in interpreting what constitutes "originality"\textsuperscript{121} and "substantial similarity."\textsuperscript{122} Further, one may expect that courts will confuse the new Chip Act, which provides copyright-like protection, with existing copyright laws.\textsuperscript{123}

Although not many applications for registration were submitted during the early stages of the enactment,\textsuperscript{124} the number is expected to increase substantially as deposit requirements are finalized.\textsuperscript{125} Following favorable results with the Chip Protection Act in the United States, foreign nations will probably develop comparable chip protection in an effort to achieve reciprocity.

Presumably, the new Act will substantially reduce the threat of chip piracy, thereby encouraging semiconductor manufacturers to invest in more complex and extensive designs, resulting in product diversification. At the same time, manufacturers will have to exercise more care in procuring semiconductor chip products, so as to avoid injunctions for purchasing infringing chips.

\textsuperscript{121} See 17 U.S.C. § 902(b) (Supp. II 1985).

\textsuperscript{122} See Senate Hearing, supra note 14, at 145-46.


\textsuperscript{124} Although only 23 applications were filed as of April 1985, the bulk of the remaining applications were received in June to meet the July 1 deadline for retroactive protection. As of October 24, 1985, out of 1,774 applications received by the Copyright Office under this Act, just 1,100 of them have resulted in registrations, including 651 from the United States, 449 from Japan and under 100 from the rest of the world. The Copyright Office has refused registration on 139 applications.

Reasons for registration refusal include: (1) inapplicability of the subject matter to protection under the Act, i.e., applications for chips commercially exploited prior to July 1, 1983; (2) insufficient new contribution; (3) work not fixed in a semiconductor product; and (4) failure to apply timely for registration, i.e., for deposit requirements.

The Copyright Office employs the "rule of doubt" to extend registration to claimants under special circumstances. Such circumstances include the embodiment of trade secrets in the mask works, as discussed earlier in this Article. The Copyright Office has given the benefit of the doubt to owners of chips from countries belonging to the European Economic Community, otherwise exempted from eligibility by the U.S. Patent and Trademark Office deadline for retroactive protection. This is due to apparent conflict between § 914 of the Act and the periods for timely registration as delineated in § 908 and § 913.

\textsuperscript{125} The Final Regulations, published on June 28, 1985, have been codified at 37 C.F.R. §§ 211.1-.6 (1985).