20 The protection of semiconductor chip products in TRIPS

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1. Introduction

In the second half of the 20th century, semiconductor technology as integrated circuits (ic), commonly known as microchips, became more and more dominating in our lives. Microchips are the control center of simple things like toasters as well as of complex high-tech machines for medical use. Of course, they also depict the heart of each computer. With the invention of semiconductor technology, a whole new economic sector began to grow and soon played a major role in the economies of the big industrial countries like the USA, Japan and the EC. Especially, it stands out for its innovational power and its readiness to invest. Microchips are a symbol of modern industrial society.

Inexplicably, this new economic sector was totally ignored by the legislators for a long time. The power of innovation mentioned earlier was not as well protected as it should have been. In particular, the danger of forging microchips did not occur to governments. It is technically very easy and rather cheap to copy these chips, while development causes high costs. So the producers of microchips were exposed to an increasing number of copyists. Existing national patent and trademark laws fail to give sufficient protection to this economic sector, because they require a very high standard of originality or inventiveness.

At the beginning of the 1980s, the governments of the developed countries eventually realized the risks this posed for their local microchip industry.

1.1 Technical function of microchips[1]

In order to illustrate the regulations of the protection of semiconductor chip products in TRIPS, a first short look at the technical devices is necessary. Microchips consist of silicon dies (wafers) on which integrated circuits are 'printed'. These integrated circuits are miniaturized electronic circuits and mainly consist of semiconductor devices. The circuits are put on a wafer through specially created patterns (masks) in a photolithogra-

[1] Cf. Hoeren, Thomas, *Der Schutz von Mikrochips in der Bundesrepublik Deutschland*, Münster and New York: Waxmann, 1988, p. 3.

phy process. They send electrical impulses which, for example, control a computer. The three-dimensional disposition of the pattern, which designates the structure of the circuit, is called layout design or topography.

1.2 First protection in the USA

The first country which developed a new kind of industrial property law in order to protect the chip industry was the USA. The local producers of microchips who were threatened by copyists located in Korea and Japan forced the US legislators to enact a sui generis system of chip protection. With the Semiconductor Chip Protection Act 1984 (SCPA),[2] a new kind of industrial property containing elements of patent, copyright and competition law was created.[3] The object of protection was the 'mask-work'. The 'mask' is the pattern used to set the circuits on the silicon wafer in order to create the integrated circuit.

Additionally, the SCPA provides a new way of imposing international pressure. All nations must adopt the main elements of the SCPA. Otherwise, topographies and mask works of a foreign chip producer would not be protected in the United States. Furthermore, the SCPA only grants interim protection where a State convinces the US Patent and Trademark Office that it is applying 'good faith and reasonable progress' towards providing protection on substantially the same basis.[4]

These provisions led to a legislative race against time in all parts of the world. In Europe, the EC member states tried to establish harmonized chip protection legislation that conformed with the SCPA. Other European states, however, resisted the exhortative behavior of the United States and created their own way to protect chips.

1.3 Protection in the EC

After interim protection in the United States[5] had been accorded to the EC Commission for nationals and domiciliaries of EC member states until

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[2] Tide III of Public Law 98-620 of November 8, 1984, now 17. USC Section 901 et seq.; *Industrial Property Laws and Treaties,* United States of America – Text 1-001.

[3] Chip Topography protection in die USA; Richard H. Stern, *Semiconductor Chip Protection,* New York 1986; David Ladd, David E. Leibowitz, Bruce G. Joseph, *Protection for Semiconductor Chip Masks in the United States,* Munich 1986; Charles N. Quinn, 'Protecting Semiconductor Chips in U. S.', *La Nouvelles,* September 1987, p. 95; Wade Woodson and Douglas C. Safreno, 'The Semiconductor Chip Protection Act of 1984', *Computer & High Technology Law Journal (Comp. & High Techn. L. J.)* 7 (19, 85), 1996.

[4] Section 902(a)(l)(2).

[5] The first Interim Order was issued on September 12, 1985 (51 *Fed. Reg.* 30690).

November 8, 1987, the EC authorities hastily prepared a new Directive for chip protection. Soon the Directive on the Legal Protection of Semiconductor Products (87/54/EEC) was adopted by the EC Council on December 16, 1986[6] in order to harmonize the composition of legal protection for semiconductor technology. In the Directive, the EC authorities set some guidelines which have to be achieved by member states for its protection in Europe:

(1) Not the microchip itself but its 'topography' is to be protected, that is, 'the three-dimensional pattern of the layers of which a semiconductor product is composed'.[7] Unlike the SCPA, this definition does not use the term 'mask work' to describe the object of chip protection. A topography is capable of protection if it is 'the result of its creator's own intellectual effort and is not commonplace in the semiconductor industry' (Article 2 (2)).
(2) The right holder must be a national of an EC member state or has to start commercial exploitation within the EC. Otherwise, the protection depends on special declarations of the member states in agreement with the Commission (Article 3).
(3) Article 5 provides the right holder with the exclusive right to authorize or prohibit the reproduction, commercial exploitation.

The EC member states had to implement this Directive into national law by November 7, 1987. The Federal Republic of Germany, for example, issued the *Halbleiterschutzgesetz*[8] (Semiconductor Protection Act) on November 1, 1987. Essentially, this act includes the guidelines from the Directive.

1.4 Criticism of the reciprocity rule in the particular law

With the semiconductor protection acts of the USA and the EC in the 1980s, a totally new type of intellectual property right has been created. All these acts have a material reciprocity in common. This is a totally new way to force other nations not only into accepting but also into adopting this new right in their own legislation in case they want to get protection for their own semiconductor industries as well.

This new system of material reciprocity was harshly criticized in

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[6] *OJ*, L 24/36 of January 27, 1987.
[7] Art. 1(i) Council Directive 87/54/EEC of December 16, 1986 on the legal protection of topographies of semiconductor products.
[8] BGBl. I S. 2294 ff.

subsequent publications[9]. It was said to contradict the principles of industrial property law. For centuries, the national treatment principle had been regarded as the cornerstone of international patent and copyright law.[10] Inventions and copyright works had been protected irrespective of the nationality of their creators. This concept of protection was based upon the idea that creativity and originality are essential elements of human nature and should therefore be protected like the fundamental rights of each individual.

1.5 IPIC Treaty

Mainly because of the pressure from the new reciprocity rule, an international agreement on the minimum standards for semiconductor protection became more and more necessary.

A first try was the Treaty on the Protection of Intellectual Property in Respect of Integrated Circuits (IPIC), which was passed at the diplomatic conference of the WIPO in Washington on May 26, 1989.[11] Though the treaty was accepted by the majority of participating countries, it was never ratified. The major reason for this treaty never coming to life was the disclaiming position of the USA and Japan, both of which are leading countries in microchip production. A strong aspect of criticism, especially from the USA, was Article 8 IPIC which limited the protection time to only eight years.[12] However, important semiconductors like computer chips (Intel) do in fact have a lifespan which is much longer than only eight years.

Another major point of criticism on the part of the USA was the compulsory license ruled in Article 6 (3) IPIC. The USA, and also Japan, were protesting heavily against this article. Finally, it can be assumed that the IPIC Treaty collapsed due to the refusal of the USA and Japan.[13]

1.6 TRIPS

After the failure of IPIC, the protection of semiconductor technology was regulated in Articles 35 to 38 of the Agreement on Trade-related Aspects

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[9] *Cf.* e.g. Hoeren, *Das deutsche Halbleiterschutzgesetz vom 1.11.1987*, BB 1988, 1904 ff.

[10] *See* T. Dreier, 'National Treatment, Reciprocity and Retorsion – The Case of Computer Programs and Integrated circuits', in: Friedrich-Karl Beier and Gerhard Schricker (eds), *GATT or WIPO? New Ways in the International Property of Intellectual Property,* Weinheim 1989, 63, 70 et seq.

[11] WIPO Doc. IPIC/DC/46.

[12] *Cf.* Hoeren, Thomas, *Das Washingtoner Abkommen zum Schutz des geistigen Eigentums an integrierten Schaltkreisen,* NJW 1989, 2605, 2606.

[13] *Cf.* Staehelin, Alesch, *Das TRIPs-Abkommen: Immaterialgüterrechte im Licht der globalisierten Handelspolitik,* Bern 1997, p. 100.

of Intellectual Property Rights (TRIPS) in 1994. The main norms from IPIC were leading in the direction of the arrangements in TRIPS, so that Article 35 refers to them.

2 The organization of semiconductor protection in TRIPS

The protection of the layout designs (topographies) of integrated circuits, that is, microchips, is regulated in Articles 35 to 38 of the TRIPS Agreement. Article 35 refers back to the IPIC Treaty to describe the object of protection. Article 36 codifies the scope of protection, Article 37 mentions acts which do not require the authorization of the right holder, and finally, in Article 38, the term of protection is illustrated.

2.1 Relation to IPIC Treaty

The IPIC Treaty constitutes the basis for regulation in Articles 35 to 38 TRIPS. This refers to the elementary parts of chip protection in IPIC, that is, the definition of the protection object, the requirement and the scope of protection. Furthermore, the IPIC Treaty constitutes the way the member states have to implement the regulations in national law. Moreover, it makes obeying the national treatment principle obligatory. Secondary rules in IPIC, including innocent infringements, exhaustion of rights, local commercial exploitation and registration, are referred to.

Consequently, with its reference to the regulation of protection, TRIPS mainly adopts the regulation of the IPIC Treaty. With the regulation in the TRIPS Agreement, only contentious issues of chip protection in the IPIC Treaty should be cleared. Thus, in order to clarify the international protection of semiconductor products, a further look at the rules in IPIC (with the amendments and changes in TRIPS) is necessary.

Basically, there were two major points on which the regulations in TRIPS amended the IPIC Treaty: compulsory licensing and the term of protection. Both points were either ruled on differently (term of protection) or omitted (compulsory licensing). Article 35 TRIPS explicitly excepts the controversial Article 6 (3) IPIC, which defines the compulsory licensing of its enumeration.

Article 35 TRIPS applies to the indisputable parts of the IPIC Treaty (Articles 2 to 7, apart from Article 6 (3); Articles 12 and 16 (3)) which primarily serve to regulate the object of protection in Article 3 IPIC (see below).

Furthermore, Article 35 TRIPS hints at Article 5 IPIC, in which the provision of national treatment is restored. The provision of national treatment was given up with the American SCPA in 1984 and, after that, in the majority of subsequent national acts in the world (see above).

The provision of national treatment tells the participants to give foreign

chip producers (from a participating state) the same protection as local producers. It was a huge achievement of IPIC at last to give this provision – a maxim of intellectual property law – to the settlement of semiconductor protection.[14] Yet, this achievement is realized in TRIPS.

In Article 6 of the IPIC Treaty, the scope of protection (amended by Article 36 TRIPS) and acts not requiring the authorization of the right holder (amended by Article 37 TRIPS) are defined. In this Article, an exception from protection is allowed 'for private purposes'.[15] It also applies to reverse engineering[16] and allows exceptions for innocent infringements.[17]

Article 7 IPIC Treaty allows participating states to require local commercial registration (in addition to Article 38 TRIPS). Article 12 IPIC Treaty safeguards rights under the Paris and Berne Conventions. Finally, Article 16(3) IPIC Treaty, as the final clause, allows member states to exclude layout designs, which have already been in existence at the time of entry into force.

Articles 36 to 38 TRIPS are appendices to those parts of IPIC for which no consensus could be found.[18] Besides the major points of criticism, this part concerns in particular the scope of the rights.[19] Apart from that, in its vocabulary the regulation in TRIPS is oriented towards the formulations in the IPIC Treaty.

The details of the protection are not applied in TRIPS and IPIC. Each member state is free to set the protection of semiconductor technology in their own legal system either as a sui generis law or in existing copyright or patent law.[20]

2.2 The object of protection

The core element of setting a useful parameter for the protection of microchips is to find a clear definition for the object of protection. Only if such a clear definition can be found, can the treaty guarantee protection to the creators of new products. Also, a definition had to be found which allows for technical developments in the unstable microchip sector. In that case, giving protection to a specific newly created chip cannot meet

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[14] *Cf.* Hoeren, NJW 1989, 2605, 2606.
[15] Article 6 (2) lit. a IPIC Treaty.
[16] Article 6 (2) lit. b IPIC Treaty.
[17] Article 6 (4) IPIC Treaty.
[18] Staehelin, Alesch, p. 100.
[19] *See* Gervais, Daniel, *The TRIPS Agreement: Drafting History and Analysis*, London 1998, p. 174.
[20] Article 4 of the IPIC Treaty, *cf.* Hoeren, NJW 1989, 2605, 2606.

these requirements. Otherwise, the definition of the protection-object has to be constituted as clearly as possible so as to avoid ambiguity in interpretation.

Finally, in Article 35 of the TRIPS Agreement it is not the semiconductor product itself (that is, the microchip) that is defined as the object of protection. The member states of TRIPS rather have to provide protection 'to the layout-designs (topographies) of integrated circuits'.[21] Furthermore, for example, in the American SCPA (see above) it is not only the method of bringing the circuits on to the die with a mask (that is to say, the ic 'mask-work') that is protected. Here, other possible methods of setting the circuits on the wafer do not fall under this protection. Thus, protecting the topography of the integrated circuit is broader and offers guidelines for the semiconductor protection of technical developments in the future.

To find out how far the protection lasts, consideration of the definitions of both terms 'layout-designs (topographies)' and 'integrated circuit' is needed. TRIPS adopted the definitions from the IPIC Treaty (see above). They can be found in Article 2 (1), (2), where the layout design (topography) is defined as

> the three-dimensional disposition, however expressed, of the elements, at least one of which is an active element, and of some or all of the interconnections of an integrated circuit, or such a three-dimensional disposition prepared for an integrated circuit intended for manufacture.[22]

The layout design of an integrated circuit is protectable, that is,

> a product, in its final form or an intermediate form, in which the elements, at least one of which is an active element, and some or all of the interconnections are integrally formed in and/or on a piece of material and which is intended to perform an electronic function.[23]

These are very explicit definitions. In sum, the three-dimensional structure of the circuit-elements on the silicon-wafer, which has a specific layout design, known as topography, is protected. Every integrated circuit functions according to a different 'diagram'. The structure of this 'diagram' is its topography. So, the topography defines whether the microchip controls an icebox, a computer or even a jumbo-jet: it is the 'heart' and also

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[21] Article 35 of the TRIPS Agreement.

[22] Article 2 (2) of the IPIC Treaty; *see* http://www.wipo.int/clea/en/text_html.jsp?lang=en&id=4029.

[23] Article 2 (1) of the IPIC Treaty.

the 'thinking brain' of the integrated circuit, whereas the silicon material on which it is incorporated is only the naked corpus. Consequently, it is inevitable that this 'heart', that is the topography, should be protected and not the chip itself. The actual creation of the chip producer is the new topography.

The topography of the circuits and the silicon wafer, on which the circuits are 'printed', are together the 'integrated circuit'.

In conclusion, in a comparison with the EC Directive on the Legal Protection of Semiconductor Products (87/54/EEC),[24] the regulation with regard to the object of protection in TRIPS and IPIC was mostly influenced by this Directive. In both settlements the protection object is the topography of the integrated circuit.

2.3 Requirement for protection

In TRIPS, there are basically two major requirements for protection: first, the topography that is to be protected must show some originality and, moreover, it has to resemble some degree of newness.

Article 35 TRIPS, referring to Article 3 (2) lit. a IPIC, makes only minimum demands: in order to get protection, a special kind of originality for the layout design is required. This 'originality' is the basic requirement for protection.[25] The layout designs are original 'in the sense that they are the result of their creators' own intellectual effort and are not commonplace among creators of layout-designs (topographies) and manufactures of integrated circuits at the time of their creation'.[26] So, the topography first has to show some creativity in its design. Here 'intellectual effort' can be spoken of. Furthermore, the topography has to show some degree of inventiveness. This inventiveness is not acquired if the topography turns out to be 'commonplace'. Some new features have to be designed for the existing topography. Only in that case, the already developed topography turns out to be a 'creation', that is, the work of the developer. The criterion 'commonplace' seems not to be easy to substantiate. In order to find out about the meaning of 'commonplace', clearly defined standards for the semiconductor industry are required. Especially because of rapid developments in this industry, such a standard is difficult to find. Even if it is possible for such a standard to exist, it seems very complicated to ascertain it reliably for any particular case.

On the other hand, topographies do not need to present such a very high

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[24] See above.

[25] *See* Gervais, Daniel, p. 175.

[26] Article 3 (2) lit. a of the IPIC Treaty.

degree of inventiveness as a product getting patent protection. Indeed, protection is also possible for layout designs which consist of commonplace interconnections if only the combination taken as a whole achieves the requirements of a 'solo' topography (Article 3 (2) lit. b of the IPIC Treaty).

Secondly, the topography has to be 'new' to get protection. At the time of the development of the chip, its topography needs to bring some aspects which are 'fresh' to the semiconductor technology.

With the requirements set out in TRIPS and IPIC, on the one hand, a sui generis system of protection has been created. This becomes especially clear with regard to the term 'commonplace' as a negative definition for the requirement of originality. This term is alien to the system and new to the field of intellectual property law.

On the other hand, with the set of requirements for protection of semiconductors in TRIPS, the well-known vocabulary of intellectual property law is used. Thus, the term 'intellectual effort' is similar to criteria used in copyright law.[27]

Evidently, the pattern of requirements in TRIPS and IPIC combine new and familiar vocabulary in order to create a sui generis right in intellectual property law. This has mostly been influenced by copyright law ('originality', 'intellectual effort'), but it brings its own parts as well.

All in all, the requirements for getting protection in TRIPS (referring to Article 3 (2) IPIC) are not extremely hard to achieve. They could not stand comparison with patent law. Requirements for this sui generis right are more similar to those in utility patent law.

2.4 Scope of protection

The scope of protection, first of all, is mostly described with the reference to Article 6 (1) in Article 35 of the IPIC Treaty. According to this article, the chip creator is the keeper of the exclusive rights to, first, reproducing and, secondly, selling integrated circuits in which the layout design (topography) is used. The participating nations, however, are free to protect other acts than those mentioned.[28] As just said (see last point), the protection in the WTO treaties is similar to the utility patent law, and so is the scope of protection:[29] it contains not only the exclusive right of the creator to reproduce the microchip but also the exclusive right to commercialize the integrated circuit created.

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[27] Gervais, Daniel, p. 175.
[28] Article 6 (1) lit. b IPIC Treaty.
[29] *Cf. also* Staehelin, Alesch, p. 101.

2.4.1 The Act of Reproducing

The first right of the protected chip generator is the exclusive act of reproducing. Article 6 (1) lit. a (i) IPIC mentions

> the act of reproducing, whether by incorporation in an integrated circuit or otherwise, a protected layout design (topography) in its entirety or any part thereof, except the act of reproducing any part that does not comply with the requirement of originality referred to in Article 3 (2).

Incorporating the topography in an integrated circuit means the production of a microchip using the protected topography. Consequently, the topography of the integrated circuits is incorporated. This exclusive right is reserved for the creator of the protected topography. It requires the act of reproducing by another manufacturer to be approved by the right holder; he could issue a license to the producer in order to have a share in his profit. This point leads to the next one, namely the acts of distributing for commercial purpose.

2.4.2. The Acts of Distributing for Commercial Purpose

Connected to the right to reproduce is the exclusive right to use the produced microchip with its protected topography for commercial purposes. This is the second right of the creator. It is also pointed out by the reference to the IPIC Treaty in Article 35 TRIPS. Here, Article 6 (1) lit. a (ii) talks about 'the act of importing, selling or otherwise distributing for commercial purpose a protected layout-design (topography) or an integrated circuit in which a protected layout-design (topography) is incorporated'.

In particular, the acts of importing and selling are pinpointed here. These acts seem to be the most influential imaginable aspects in commercializing the created topography. Importing and selling are examples of commercial purpose. In order to protect not only these two acts, an abstract definition of the right of commercial use is added by 'otherwise distributing for commercial purpose'. This formulation includes all possible ways of commercial use to the greatest possible extent. So, this formulation is a general clause. The right holder could rely on this general clause if his exclusive right is attacked by other acts than importing or selling.

2.4.3 Amendments in Article 36 TRIPS

First of all, Article 36 TRIPS takes its wording from Article 6 (1) (a) (ii) IPIC about commercial purposes. There is only the addition: 'or an article incorporated such an integrated circuit only in so far as it continues to contain an unlawfully reproduced layout-design'. This addition became necessary because of the fear of member states that the extension of rights for products incorporating protected topographies would give rights not

to the circuits themselves, but to any product incorporating them.[30] The formulation in Article 36 TRIPS provides that the right holder can only take legal action against the distributor of products with unlawfully incorporated integrated circuits. So, a diffusion of the scope of protection is avoided.

2.5 Acts not requiring the authorization of the right holder

There are some exceptions to the protections of the topography-creator which limit his rights. Some of these exceptions are named in Article 6 of the IPIC Treaty, to which we have referred. Other exceptions follow from amendments to the IPIC regulation in Article 37 of TRIPS.

2.5.1 Acts for Private Purposes

First, an exception is made to the right of reproduction without the authorization of the right holder 'where the act is performed by a third party for private purposes or for the sole purpose of evaluation, analysis, research, or teaching'.[31] In this phrase, two exceptions are made. The first is an exception for private purposes, that is, acting without profit motive. The other exception is relevant for academic research. Here, the right holder also has no right to stop such research.

2.5.2 Reverse Engineering

'Reverse engineering' means to create a new topography by analyzing an existing one. This principle is taken from the American SCPA.[32] Article 6 (2) lit. b speaks about 'reverse engineering', if

> the third party [. . .], on the basis of evaluation or analysis of the protected layout-design (topography) [. . .] creates a layout design (topography) complying with the requirement of originality [. . .], that third party may incorporate the second layout-design in an integrated circuit [. . .]'

Thus, a third person is allowed to analyze the existing topography of a microchip from another producer in order to create his own, new one. To put it the other way around, simply rebuilding the same chip is not 'reverse engineering'. The topography of the new chip has to fulfill the requirement of originality. If it does not fulfill this requirement, a mere copy of the existing chip has been created. It is, in fact, problematic which criteria of originality have to be met in order for a new chip to be made by

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30 Gervais, Daniel, p. 177.
31 Article 6 (2) lit. a of the IPIC Treaty.
32 *Cf.* 17 USC § 906 (a) (2).

'reverse engineering'. In that case, the same considerations as taken for the requirement of protection (see above) are to be taken into account because Article 6 (2) (b) IPIC refers to the definition of the requirement in Article 3 (2) IPIC. Nevertheless, the principle of 'reverse engineering' seems to be defined only imprecisely, so that some copyists could refer to this principle in order to defend themselves against the right holder.

2.5.3 Innocent Infringements

The second exception to the protection is the so-called 'innocent infringement'. This principle is constituted in Article 6 (4) of the IPIC Treaty, which is also referred to in Article 35 TRIPS. In short, it says that a third person who did not know that the product in question consists of copied chips is unaffected by the consequences of the exclusive rights from the right holder. Article 6 (4) IPIC speaks about

> the performance of any of the acts referred to [. . .] in respect of an integrated circuit incorporating an unlawfully reproduced layout-design (topography) where the person performing or ordering such acts did not know and had no reasonable ground to know, when acquiring the said integrated circuit, that it incorporates an unlawfully reproduced layout-design (topography).

With this regulation, the trusting person shall be protected from right holder benefits which that person could not imagine being confronted with. Therefore, the working of the exchange is guaranteed.

2.5.4 Amendments in Article 37 TRIPS

Article 37 (1) TRIPS differs extensively from the principle of 'innocent infringement' of Article 6 (4) of the IPIC Treaty just mentioned.[33] While in Article 6 (4) IPIC, the formulation 'no Contracting Party shall be obliged to consider unlawful [. . .]' is used, Article 37 (1) TRIPS provides 'that no member shall consider unlawful [. . .]'. Its formulation is stricter than that used in IPIC. Another important amendment dealing with 'innocent infringement' is that a person who did not know about the protected topography has to pay 'a reasonable royalty such as would be payable under a freely negotiated license' to the right holder if he get to know about the protected topography. This amendment is reasonable, especially, because the person who gets to know about the real facts cannot be trusted anymore. Thus, he is to be handled like any third party who sells such products: this person has to pay for a license.

Another amendment, made in Article 37 (2) TRIPS, deals with

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[33] *Cf.* Gervais, Daniel, p. 179.

'compulsory licensing'. This issue was a big point of contention with IPIC (see above). Now, in Article 37 (2) TRIPS, it refers to the regulation concerning patents in TRIPS. Otherwise, the cases of compulsory licensing seem to be very limited.[34]

2.6 Term of Protection, Article 38 TRIPS

As already mentioned (see above), the term of protection was a major point of criticism in the IPIC Treaty on the part of the USA and Japan. The term of protection in Article 8 IPIC was constituted as at least eight years. The criticism is only partly acceptable. Indeed, the lifespan of some microchips is much longer than eight years. But the majority of microchips are far from being used longer than eight years. This is because of the fast-moving chip industry and the fast development of new layouts.

Nevertheless, the term of protection in Article 38 TRIPS was extended to ten years. Here, the same formula is used as in patent section.[35] It specifies the earliest date on which the protection may end.[36] According to Article 38 TRIPS, there are two possible starting dates: first, 'the date of filing an application for registration' and, secondly, 'from the first commercial exploitation wherever in the world it occurs'. In case WTO member states decide to establish a registration of the topography in order to get protection, the date of the application for this registration is the decisive factor. Otherwise, the decisive factor would be the first commercial use. Noticeably, in contrast to Article 8 IPIC, the date of creation of the layout would not be taken into account.[37]

According to Article 38 (3) TRIPS, it is also possible for a member state to decide to accord a term of protection to the creator which lapses 15 years from the creation of the microchip.

3. Relevance of the protection for practice

The question of how to protect semiconductor technology was extensivly discussed between the mid-1980s and the early 1990s. It was a big issue at that time. Consequently, a large number of literary works from all over the world were published during that period. The leading chip industries of the developed countries (especially the USA) feared potential copyists from the Far East. Thus, this industry put the American government under pressure to create a new part of intellectual property law and to give

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[34] Gervais, Daniel, p. 179.

[35] '(. . .) shall not end before the expiration of a period of (. . .)'; cf. Article 33 TRIPS.

[36] Gervais, Daniel, p. 180.

[37] Gervais, Daniel, p. 181.

protection to their semiconductor products. The American government finally passed the SCPA – the beginning of enacting laws to protect integrated circuits all over the world. Afterwards, the protection of semiconductor products found its way into the international WTO treaties IPIC and, finally, into TRIPS.

However, since the mid-1990s, precisely since semiconductor protection has been included into TRIPS, this subject seems to have disappeared totally. There is hardly any publication on the protection of semiconductor technology, except for reviews in standard works, for example, textbooks. Furthermore, jurisdictions are nowhere to be found, either in the USA or in the EC or Germany. After the discussion of how to protect microchips, the issue seems to have lost its practical relevance. Remarkably, only a very small number of chip inventions are registered.[38] Apparently, the original interest in protection on part of the semiconductor industries has ceased. Already, some authors talk about chip protection as a dead subject.[39]

There are various reasons for senior industry executives to turn their backs on the legal protection of semiconductor technologies.

First, it is problematic that only the layout design (topography) of microchips is the object of protection. For industry, it is more important to protect the function of an integrated circuit than the design.[40] Furthermore, layout designs are easily variable without loss of functionality. However, topographies are no longer protected once the design is altered ('reverse-engineering'). It is a condition of semiconductor protection that layout designs are based upon intellectual effort. These days, however, topographies are often designed by software. Thus, the object of protection becomes unattractive for the chip industries.

A second reason could be that microchips, that is, their layout designs, are highly complex, miniature entities which are hardly ever copied.[41] This fact makes protection against forgers superfluous.

In the end, the protection of semiconductor technology is uninteresting from an economic point of view. Because it is a fast-developing technological sector, microchips have a short lifespan, while the process of getting legal protection is rather time-consuming. Furthermore, there seems little

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[38] Only 15469 registrations in Germany in 2007. The reduction of this number continues. In 2001, there were still c. 18500 registrations. *Cf.* http://presse.dpma.de/docs/pdf/jahresberichte/jb2007_dt.pdf.

[39] *Cf.* Karnell, Gunnar, 'Protection of Layout-designs (Topographies) of Integrated Circuits – R.I.P.?', *IIC* 2001, 648. He says, that the protection is 'not only a "lame" but rather "dead duck".'

[40] Karnell, Gunnar, p. 652.

[41] *Cf.* Karnell, Gunnar, p. 654.

reason to protect semiconductor technology because of the 'danger' of reverse-engineering. As already mentioned, microchips with different topographies can accomplish the same function.

All in all, the market for semiconductor products is tough. The decline in prices of microchips places an added burden on producers. Most recently, the German chip producer Qimonda went bankrupt, thus endangering Infineon, one of the leading chip manufacturers in the world.