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IP PROTECTION OF INTEGRATED CIRCUIT AND LAYOUT DESIGNS

ABSTRACT

The layout designs of integrated circuits are creations of human intelligence. This research paper explores the complex landscape of intellectual property (IP) protection concerning integrated circuits (ICs) and layout designs. With the rapid advancements in technology and the increasing importance of semiconductor devices in modern society, safeguarding the intellectual property rights associated with ICs and layout designs has become paramount. This paper provides an overview of the legal framework, challenges, and emerging trends in IP protection in this field. It examines the significance of protecting ICs and layout designs, analyses the various forms of protection available, including patents, copyrights, and semiconductor works, and discusses the Indian law and implications of recent developments such as international treaties and technological advancements. The article has been written based on the Washington treaty, TRIPS Agreement, The Semiconductor Integrated Circuit Layout Design Act, 2000 in India, different books, various articles of prominent researches, numerous newspaper reports and many more websites.

Keywords: - Semiconductor Integrated Circuits, Layout Design, TRIPS Agreement, Washington treaty, The Semiconductor Integrated Circuit Layout Design Act, 2000.

INTRODUCTION

Intellectual property rights (IPR) encompass concepts, innovations, and imaginative works, which are recognized as property due to society's acknowledgment of their value and protection. Intellectual Property Rights grant certain exclusive rights to the inventor or creator of the property so that they can derive commercial benefits from their creative endeavours or

reputation. There are several types of intellectual property protection such as patents, copyrights, trademarks, etc.

The semiconductor integrated circuit layout designs are considered as one of the forms of intellectual property. It is an essential component of every computer and most of the model equipments. It plays a vital role for the advancement of technology, especially for electronics and information technology. In India, the semiconductor integrated circuit layout design Act, 2000 provides for the protection of semiconductor integrated circuit and layout design and for matter concerning therewith or incidental thereto.

Integrated circuit layout design is a creation of human intellect and that is why it is known as intellectual property (IP)¹. Integrated circuit (ICs) are the fundamental building blocks of modern electronics, powering devices ranging from a smartphone to spacecraft. It is utilised in large range of product including articles of daily use such as watches, smartphones, televisions, washing machine, automobiles, computers, etc; as well as electric vehicles emerging as a new invention nowadays and other sophisticated data processing equipment.

While to renovate an existing integrated circuit or creation of new layout design for integrated circuit involves a huge and important investment of time and money. Copying of such a layout design may cost only a fraction of investment. The unauthorized replication or violation of integrated circuit designs can stifle research, innovation, development, and substantial investment. This replication could involve the process of photographing each layer of an integrated circuit and subsequently creating masks for its production based on these captured images.

In order to prevent unauthorized copying of layout designs and to provide incentives for investing in this field, is the main reason for the introduction of legislation for the protection of layout designs.

Therefore, in 1989, a diplomatic gathering convened in Washington, DC, resulting in the adoption of the Treaty on Intellectual Property related to Integrated Circuits, alternatively known as the Washington Treaty or IPIC Agreement. Subsequently, this treaty became integrated into the TRIPS Agreement, which mandated compliance with the majority of the essential provisions outlined in the IPIC Treaty. As a member state of the WTO, India enacted

¹ Dr. Md. Nayem Alimul Hyder, Dr. Md. Abdul Jalil, Integrated Circuit Layout Design Protection Law: Bangladesh and International Perspective

legislation in harmony with the TRIPS agreement, namely the Semiconductor Integrated Circuits Layout-Design Act (SICLDA) passed in 2000².

BACKGROUND OF EVOLUTION OF INTEGRATED CIRCUIT LAW

The Universal Declaration of Human Rights (UDHR) 1948 provides: —Everyone has the right to the protection of moral and material interests resulting from scientific, literary or artistic production of which he is the author.³

In the late 1950s, inventors Jack Kilby of Texas Instruments, Inc., and Robert Noyce of Fairchild Semiconductor Corporation found ways to lay thin paths of metal on devices and have them function as wires. Their solution to the problem of wiring between small electrical devices was the beginning of the development of the modern IC⁴.

In 1989, Washington Treaty or IPIC Agreement was signed in Washington DC, on May 26, 1989 which adopted a Treaty on Intellectual Property in Respect of Integrated Circuits, is open to Members States of WIPO or the United Nations and to intergovernmental organizations meeting certain criteria⁵. The Treaty has been incorporated by reference into the TRIPS Agreement of the World Trade Organization (WTO)⁶, subject to the certain modifications. The IPIC Treaty is currently not in force, but was partially integrated into the TRIPS agreement.

India, being an active member of TRIPs Agreement, has enacted a special legislation on the Semiconductor Integrated Circuits Layout Design Act, 2000, to protect and promote the innovation of integrated circuits at large.

WHAT IS INTEGRATED CIRCUIT?

An integrated circuit (IC), commonly known as a chip or microchip or microelectronic circuit, is a tiny electronic device that consists of multiple interconnected electronic components, such as transistors, resistors, capacitors, and diodes, fabricated onto a single semiconductor substrate, typically made of silicon. These components are integrated onto the semiconductor

² <https://www.lawctopus.com/academike/rights-semiconductor-act-2000/>

³ Article 27(ii), The Universal Declaration of Human Rights (UDHR), 1948.

⁴ Leslie Berlin, *The Man behind the Microchip: Robert Noyce and the Invention of Silicon Valley* (Oxford University Press)

⁵ Washington Treaty

⁶ TRIPs Agreement

substrate using intricate manufacturing processes, such as photolithography and doping, to create complex electronic circuits. Integrated circuits (ICs) serve various functions such as amplification, oscillation, timing, counting, logic gating, memory storage, and the operation of microcontrollers or microprocessors.

An ICs constitute the foundational component of contemporary electronic devices⁷. An organized circuit is a small semi-track chip which mounts an entire circuit. The regular circuits of the free circuit segments, the size of the finger nail are small in comparison. The most often used circuit has been the strong built-in circuit. In the case of about any computer or equipments, we today see or use such as mobiles, TVs, PCs and even toys, incorporated circuits are used.

Types of Integrated Circuit: Integrated circuits can be categorized into two types based on the nature of the input signals:

1. Linear or analog ICs: In the type of analog signals, they have continuously varying feedback. A linear function of the input is the output signal. They are widely used in amplifiers for radio frequency and audio frequency.
2. Digital ICs: The digital inputs are specified on two levels and not for a continuous array of values. It includes logical gates with 0 (low state) or 1 input signals (high state). It is found in computers.

Layout designs (topographies) of integrated circuits are a three-dimensional course of action of components framing an incorporated circuit planned for assembling. This plan and requesting of components follow from the electronic capacity that the coordinated circuit is to perform. Merriam-Webster characterizes a circuit as "the total way of an electric flow including typically the wellspring of electric energy" and an incorporated circuit as "a little mind boggling of electronic segments and their associations that is delivered in or on a little cut of material (like silicon)".⁸

An 'integrated circuit' means 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

⁷ <https://www.techtarget.com/whatis/definition/integrated-circuit-IC>

⁸ <https://www.merriam-webster.com/dictionary/integrated%20circuit>

integrally formed in and/or on a piece of material and which is intended to perform an electronic function.⁹

‘Layout-design (topography)’ means 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.¹⁰

Layout-designs of integrated circuits are also called topographies of integrated circuits or mask works of semiconductor chip products.

INTEGRATED CURCUIT AND LAWS IN INDIA

India has enacted a special legislation on the Semiconductor Integrated Circuits Layout Design Act, 2000. As a member of TRIPS Agreement, India has enacted the Semiconductor Integrated Circuit Layout Design Act, 2000. The Semiconductor Integrated Circuit Layout Design Act 2000, protects original, inherently distinctive layout designs that have not been previously commercially exploited and registration is a necessary pre-requisite for protection.

Section 2 of the Semiconductor Integrated Circuit Layout Design Act, 2000, defines various terms like semiconductor integrated circuit, layout design, commercial exploitation, registered layout design, register proprietor and transmission etc.

Section 2(r) defines “semiconductor integrated circuit” means a product having transistors and other circuitry elements which are inseparably formed on a semiconductor material or an insulating material or inside the semiconductor material and designed to perform an electronic circuitry function.¹¹

The term ‘integrated circuit’ is not defined under this Act but Article 2 of treaty on intellectual property in respect of integrated circuit 1989 (IPIC Treaty) defines that ‘Integrated circuit’ means a product, in its final form or 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.

⁹ Article 2(i) of IPIC Treaty

¹⁰ Article 2(ii) of IPIC Treaty

¹¹ Section 2(r) of SICLD Act, 2000

According to section 2(h), “layout-design” means a layout of transistors and other circuitry elements and includes lead wires connecting such elements and expressed in any manner in a semiconductor integrated circuit.¹²

The Treaty on Intellectual Property in respect of Integrated Circuits, 1989, define that “layout-design (topography)” means 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.

SUBJECT MATTER OF PROTECTION

Protection for integrated circuits refers to the aspects of an integrated circuit design that are eligible for legal protection under the Semiconductor Integrated Circuit Layout- Design Act, 2000. The protection generally covers the layout design of the integrated circuit, which includes the arrangement and interconnections of the various electronic components on the semiconductor substrate.

Integrated circuit layout designs are protected as a form of intellectual property because they represent the creative and innovative effort involved in designing the physical layout of the circuit. This protection allows designers and manufacturers to prevent unauthorized copying, reproduction, or distribution of their layouts, thereby safeguarding their investment in research, development, and production. The main keys aspects elements of protection for integrated circuits includes; Layout Design, Originality, Fixation, Ownership, Duration of Protection¹³.

Registration: Layout design which are original, not commercially exploited anywhere in India or in a convention country, have distinctiveness and capable of being distinguishable from another registered layout design can be registered. A layout design is deemed original when it originates from the intellectual endeavour of its creator and is not commonly familiar to other layout creators.

Exclusive Rights: The registered owner has the exclusive right to reproduce in any way the registered layout design or any part thereof. But the Act permits 'reverse engineering' of layout

¹² section 2(h) of SICLD Act, 2000

¹³ Gupta, Atul. —Integrated Circuits and Intellectual Property Rights in India||, Journal of Intellectual Property Rights, Vol 10, November 2005.

designs for limited purposes. The registered owner also has the exclusive right to import, sell or distribute for commercial purposes any semiconductor chip product in which the registered layout design is embodied.

Infringement and Remedies: The law provides for criminal remedies for violations of layout design expressly, including civil remedies such as injunctions, damages, and accounts of profits. It also prescribes criminal penalties for deliberate infringement, including fines and imprisonment¹⁴.

Duration of Protection: The protection of a layout design is fixed for a period of 10 years from the date of filing and application for registration in anywhere in India or in any convention country¹⁵.

Enforcement: Enforcement of layout design rights is carried out through civil and criminal proceedings in designated courts. The Act establishes the Semiconductor Integrated Circuits Layout-Design Appellate Board to hear appeals and adjudicate disputes relating to layout design rights.

Who can apply?

The individual eligible to submit an application for layout design protection includes the purported creator of the design, their legal representative, a layout design agent registered according to specified procedures, or an individual under exclusive and consistent employment by the principal. This application must be made in written form to the registrar, adhering to the prescribed guidelines.¹⁶

The application can be filed either alone or jointly (with co-owner). The application must be submitted within the territorial boundaries, specifically at the primary business location in India of the applicant.

¹⁴ Section 56 of SICLD Act, 2000

¹⁵ Section 15 of SICLD Act, 2000

¹⁶ Rajkumar, Dubey. Semiconductor Integrated Circuits Layout Design in Indian IP Regime (24 September 2004).

Procedure for registration¹⁷

- Begin by drafting an application (form LD-1) and submitting it to the registrar at the SICLD office. Alongside the application, include three sets of meticulously crafted drawings elucidating the layout design, as well as three sets of photographs showcasing the masks utilized in fabricating semiconductor integrated circuits based on the design or drawings provided.¹⁸
- Upon submission, expect to receive an acknowledgment of receipt, indicating the registrar's acceptance of your application. However, be aware that should the registrar identify any discrepancies or find the application ineligible for registration, they retain the right to withdraw their acceptance¹⁹.
- Upon acceptance, a crucial step ensues: the advertisement of your application in accordance with prescribed protocols, to be completed within 14 days of acceptance. This period serves as an opportunity for interested parties to voice any opposition. Should opposition arise, a formal notice must be submitted to the registrar within three months from the date of advertisement. Subsequently, both parties may be called upon to furnish evidence, leading to a final adjudication by the registrar.
- Assuming no opposition or the successful resolution of any conflicts, the registrar proceeds to officially register your layout design in the register of layout designs. Concurrently, you will be presented with a certificate, bearing the esteemed seal of the SICLD Registry, affirming the registration of your design.

REGULATORY AUTHORITIES

The central government appoints a person to be known as a registrar of the SICLD. The Registrar's primary responsibility is to administer the registration process for layout designs and maintain the register of layout designs. The registrar receives and processes applications for registration, examines the applications, and oversees the registration procedure. Additionally, the Registrar may have other administrative duties as specified under the SICLD Act.

¹⁷ Rajkumar, Dubey. Semiconductor Integrated Circuits Layout Design in Indian IP Regime (24 September 2004).

¹⁸ Section 8 of SCILD Act, 2000

¹⁹ Section 11 of SCILD Act, 2000

The central government also establish an appellate board to exercise the jurisdiction, powers and authority conferred under section 32 of the Act²⁰. The Layout design Appellate board has been given some powers-

- 1) For cancellation of registration of layout design,
- 2) To regulate its procedure
- 3) Appeals
- 4) Permit certain uses of layout design

If any person is not satisfied by an order or any decision of the Appellate Board may file an appeal to the High Court within 3 months from the date on which the order or appeal sought to appealed.

CONCLUSION

The protection of semiconductor integrated circuit layout designs is crucial in the realm of intellectual property rights (IPR), acknowledging the significant role these designs play in modern electronics and technology. Integrated circuits are the backbone of various electronic devices, from smartphones to spacecraft, and their layout designs represent a culmination of human ingenuity and creativity.

The Semiconductor Integrated Circuit Layout Design Act, 2000 in India provides a robust legal framework for the protection and enforcement of intellectual property rights associated with integrated circuit layout designs. By aligning with international agreements and establishing clear processes for registration and enforcement, this Act contributes significantly to fostering innovation, research, and development in the semiconductor industry in India and globally.

²⁰ Section 32 of SICLD Act, 2000