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Integrated Circuit Layout Designs (Concept and Terms)

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Abstract:

Integrated circuit layout designs are a type of industrial property and are considered an invention in the electronic field. To benefit from legal protection and for the owner to enjoy all rights over them, a set of objective and formal conditions must be met. Therefore, the aim of this study was to clarify what is meant by integrated circuit layout designs, in addition to the conditions that must be met for them to be legally protected. Although the legislator has previously addressed this by providing a definition, the terms used were difficult and complex, leaning more towards the technical side than the legal side.

Keywords: Design; Integrated Circuit; Definition; Conditions.

INTRODUCTION

Innovation is inherent to human nature due to the intellect that has been instrumental in transitioning from a primitive life reliant on agriculture to a more advanced life based on industry. This innate trait has not changed; humans are always exploring and seeking a better and easier life.

Humans have invented machines and devices such as cars, trains, telephones, and televisions, with perhaps the most significant invention being the computer, which has become indispensable in all institutions and sectors, both public and private, and even at the individual level. This invention has proven its worth in information processing. Tasks that once required significant effort and time to collect, classify, tabulate, and store information have become easy and quick, requiring only a few keystrokes on the device.

By integrating machines into information processing, humans elevated their level of innovation and developed silicon chips, a successful fusion of computing and electronics technologies. These small electronics have become a fundamental element in information technology and communication, primarily based on the invention of the transistor used in semiconductors, which has become widespread due to its small size, low cost, ease of preparation, and low energy consumption.

Recognizing the importance of this product, advanced countries, both internationally and domestically, have become aware of the need to enact legal texts for intellectual property in general and for integrated circuit layout designs in particular. Among these countries, Algeria issued Order 03/08 dated July 19, 2003, concerning the protection of integrated circuit layout designs.

The scientific significance of this topic lies in explaining the legal framework for integrated circuit layout designs, specifically the concept and conditions, through a comprehensive overview of all aspects, including concept, conditions, registration, and publication. The practical significance of this topic highlights the role that integrated circuit layout designs play in the progress of countries and their positive impact on the economy when a country masters and understands the secrets of this technology. Researching the legal system governing them contributes to technological and industrial growth.

For integrated circuit layout designs to be legally protected, they must meet a set of conditions set forth by the legislator in Order 03/08 mentioned above. Thus, the questions that arise are:

- **What is meant by integrated circuit layout designs?**
- **what are the conditions that must be met for the owner to enjoy all rights over them?**

Considering the nature of the research and the specificity of the topic, we employed an integrative and coherent approach, relying on the descriptive method

to highlight and define the legal system of layout designs, especially concerning the concept and conditions. We also used the analytical method to study the legal texts that addressed this topic.

To address the proposed problem, we divided the study into two sections. The first section deals with "The Definition and Characteristics of Integrated Circuit Layout Designs," while the second section is titled "Conditions for the Protection of Integrated Circuit Layout Designs."

THE FIRST TOPIC: DEFINITION AND CHARACTERISTICS OF INTEGRATED CIRCUIT LAYOUT DESIGNS

The development of topographical designs has reached its peak due to the increasing use of electronic industries, which have taken a significant part of human life. Thus, before understanding the specific provisions related to them, we found it necessary to cover their meaning, and then we define their legal nature.

First requirement: Definition of Integrated Circuit Layout Designs

Chips, or more accurately integrated circuits, are somewhat new creations, actually considered among miniaturization technologies, aimed at producing a small product measured in micrometers or millimeters [1]. Definitions of integrated circuit layout designs vary from a legal perspective, doctrinal perspective, and technical perspective.

First section: Legislative Concept of Integrated Circuit Layout Designs

Integrated circuit layout designs have received a legal definition both at the level of international conventions, as pioneers in their regulation, focusing on the Washington Treaty on Integrated Circuits or at the level of domestic legislation, focusing here on Algerian legislation.

1- Definition by International Conventions of Integrated Circuit Layout Designs

Both international and domestic legislations "conventions and treaties" have given a definition to integrated circuit layout designs (IPIC) that is similar in content. For instance, Article 2 of the Washington International Treaty for Integrated Circuits of 1989 [2], defines them as: "Any arrangement in its final or intermediate form which includes elements, at least one of which is active, and some or all connections are an integral part of a piece of material or most of it, intended to perform an electronic function". The schematic, formal, or topographic design refers to: "Any three-dimensional arrangement of elements where at least one of these elements is an active component and all or some of the connections for an integrated circuit, or that three-dimensional arrangement prepared for an integrated circuit intended for manufacturing".

2- Definition by the Algerian Legislator of Integrated Circuit Layout Designs

The Algerian legislator defined integrated circuit layout designs within Order 03/08, relating to the protection of integrated circuit layout designs, in its article 2 as follows: "Integrated circuit: A product in its final or transitional form, at least one of its elements being an active element such as connections or part of it in an integrated part of a body and/or the surface of a piece of material, designed to perform an electronic function. Topographical design or equivalent: "Any three-dimensional arrangement, regardless of its appearance, at least one of which is an active element and for all the connections of an integrated circuit or some of them, or represents that three-dimensional arrangement prepared for an integrated circuit for the purpose of manufacturing". It is noted that this definition is similar to that provided by the Washington Convention, considering that topographic design and integrated circuits are scientific and technical matters in all countries[3].

However, it is observed that legal definitions, whether international or domestic, distinguished between design and integrated circuits in terms of definition. Some researchers argue that the reason for this is the possibility of assembling the elements of the integrated circuit without needing a design. This reason was mentioned in the Washington Convention in two different places, the first was in the last part of the design definition, and the second was in the part related to the arrangement of the elements forming the integrated circuit. However, this reason is not sufficient to provide each of the design and the integrated circuit with a separate definition, while they are two integral stages, as infringing on the model necessarily leads to infringing on the design [4].

Second section: Doctrinal Concept of Integrated Circuit Layout Designs

Due to the difficulty in defining the integrated circuit layout designs, some legislations have avoided defining this matter, leaving it to doctrine. We will discuss the definition according to Arab doctrine and then according to Western doctrine.

1- Arab Doctrine Definition:

Some have defined it as a final or intermediate product that includes elements, one of which is active. These elements aim to achieve an electronic function and are usually used in the manufacture of watches and household electrical devices [5].

2- Western Doctrine Definition:

The French doctrine defines it as a set of circuits embedded in a small area dedicated to the semiconductor, including integrated circuits[6].

Third section: Technical Concept of Integrated Circuit Layout Designs

In the technical field, integrated circuit layout designs are defined as: "Miniaturized electronics operating with semiconductors, mounted on a circuit called an integrated or embedded circuit, which takes the form of a small crystal made of silicon material called a chip. These circuits are placed on a box or metal by external fixatives and are divided into two types: a linear integrated circuit that has the function of transferring electronic charges, and a digital integrated circuit that has the function of operating and storing information in digital systems. These circuits rely on the decimal or octal numbering system. These circuits perform programming tasks such as the function of the ROM (Read-Only Memory) in computers" [7].

During the design of an integrated circuit, the engineer prepares a schematic drawing that defines the electrical components and describes the interconnection between them, then converts the plan into an actual layout. This conversion can be done via software and requires human skill. Each integrated circuit has numerical identification codes printed on the surface of the container for identification, and each seller issues a book or a data sheet with essential information about various integrated circuits [8].

Second requirement: The Legal Nature of Integrated Circuit Layout Designs

There has been considerable debate around the legal classification of the rights arising from the layout design of an integrated circuit. Some consider it a property right, others view it as having a dual nature, and some believe it has a unique nature.

First section: The Property Theory

Proponents of this theory believe that intellectual rights, including the rights of layout design owners, deserve protection more than ordinary property because they represent the results of intellect and are associated with their owner's person. If humans can own objects they possess as a result of their labor, then what exists in their mind and thought is even more deserving of ownership. This theory's adherents consider the rights on the designs as property rights because they encompass all elements of property rights: use, exploitation, and disposal.

However, despite the similarities between the rights on the design and property rights in terms of exploitation, disposal, and use, there are differences in several aspects, most importantly the object; in ordinary property, the object is something physical, whereas the rights on the designs have an intangible object. Also, the rights on the design are divided into material rights and moral rights, which give the rights a special character that conflicts with the property right since

the moral right cannot be seized, and the material right on the designs is a temporary right limited by the specific legislations for integrated circuits, while the property right is perpetual[9].

Second section: The Duality Theory

Proponents of this theory see the rights on the design as having a dual nature, combining two different and independent rights. Claiming that the right on the design is a single right with two aspects overlooks the truth, which the French Court of Cassation confirmed by recognizing the duality in its jurisprudence. For example, the court's stance in its famous ruling in the "Coke" case. Advocates of this theory have focused on explaining the differences between these two rights; the moral right expresses the relationship between the design and its owner, granting them multiple authorities that affirm their paternity over their creation and ensure respect for it as an extension of their personality. The material right, however, is the relationship between the design and its owner, justly allowing the design owner to benefit from it financially. The classification of the financial right has varied, seen as movable property and also as a real right [10].

Third section: The Unique Nature Theory

Proponents of this theory believe that the right on the design has a unique nature, independent of real rights and personal rights, as it is a new type of rights due to the significant and clear difference between its object and the objects of rights in the traditional division, which divides rights into material and moral rights. The object in a real right is a physical thing, regardless of its content that grants direct authority over a physical thing, while the object in a personal right is the person, regardless of the content of this right, whether it is an obligation to give, do, or refrain from doing something. In contrast, the object in the rights arising from topographic designs is intellectual output [11].

This theory has been criticized for not providing a name for these rights, although they fall within the scope of rights closely associated with personality [12].

In our opinion, this theory remains the closest to accuracy because intellectual property rights, in general, and the rights resulting from the registration of the layout design of an integrated circuit, include a material aspect represented in the right of exploitation and disposal, and a moral aspect represented in attributing the design to its creator, which is characterized by being inalienable, unseizable, and not acquired by prescription.

THE SECOND TOPIC: CONDITIONS FOR THE PROTECTION OF INTEGRATED CIRCUIT LAYOUT DESIGNS

After discussing the concept of integrated circuit layout designs, we now turn to the conditions required for such designs to be legally protected. The legislator has stipulated a set of substantive conditions and formal conditions.

First requirement: Substantive Conditions for Integrated Circuit Layout Designs

The legislator, in Order 03/08 concerning the protection of integrated circuit layout designs, has required a set of substantive conditions, including: novelty or originality, in addition to the requirement of the design being capable of industrial application, and that it is not excluded from protection.

First section: Novelty in Integrated Circuit Layout Designs

The Algerian legislator has referred to this element using the term "originality" and has detailed it in Article 3 of Order 03/08 concerning the protection of integrated circuit layout designs.

Novelty implies that the design has not been previously used by anyone, that the design possesses a unique character and function distinguishing it from other designs, and that the integrated circuit itself has a unique character and function that differentiates it from other similar integrated circuits.

A layout design is considered novel if it is the result of the intellectual effort of its owner and is not among the common knowledge of industrial art practitioners[13].

Thus, the Algerian legislator has adopted the "person skilled in the art" and "state of the art" criteria to determine the novelty of the design, considering a design as new if it was not known among the creators of layout designs, implying that the topography of integrated circuits must embody the idea of novelty.

After defining what is meant by the condition of novelty according to Order 03/08 concerning the protection of integrated circuit layout designs, the question arises as to what kind of novelty the legislator required: relative or absolute?

Referring to the last paragraph of Article 3, it states that layout designs can be composed of a combination of known elements and connections. Thus, protection of this type of creativity is possible only according to the previous paragraphs' provisions, meaning that the layout design must be original and not known among creators of layout designs and circuit makers. Hence, the legislator

relied on relative novelty, which becomes evident when a designer uses known connections or elements among creators and makers of integrated circuits but manages to create a fundamentally new product unknown to designers and circuit makers through their intellectual creativity and personal effort[14].

Second section: Industrial Applicability of Integrated Circuit Layout Designs

This condition generally means that the layout design for the integrated circuit must be manufacturable or capable of industrial application on products to distinguish them from others [15], such as a design found in a calculator or radio. Therefore, the legislator refuses to register a layout design for an integrated circuit that cannot be manufactured due to the lack of benefit from registering it.

Industrial application refers to the realization of the design, as it will not be protected under the layout design law but rather protected under copyright law as electronic industries, provided the design is integrated into a product.

Third section: The Layout Design of the Integrated Circuit Must Not Be Excluded from Protection

The legislator in Article 6 of Order 03/08 concerning the protection of integrated circuit layout designs has listed a number of cases - mentioned exhaustively - where the design is excluded from protection, including:

- Copying a protected layout design for private purposes or for research aiming at evaluation, analysis, research, or education.

- Incorporating an innovative layout design into an integrated circuit based on such analysis or evaluation, provided this design itself represents originality as defined above, or for the purpose of performing the acts mentioned in the first paragraph above.

- Performing any of the acts mentioned in Article 5, paragraph two, when the act is carried out on a protected layout design or an integrated circuit containing a layout design, put on the market by the rights holder or with their consent.

- Performing any of the acts mentioned in Article 5, paragraph "02" above, on a protected layout design or an integrated circuit containing a layout design copied in an unauthorized manner, or any material containing such an integrated circuit, when the person performing these acts was not aware or had no sufficient reason to know at the time of acquiring the circuit or

material containing such a circuit, that it contains a layout design copied in an unauthorized manner. However, once this person is fully informed that the layout design was copied in an unauthorized manner, they may continue performing the aforementioned acts on the inventory they represent or had ordered before being informed, and they must pay the rights holder a monetary amount equivalent to the royalty that could be demanded in the framework of an optional contractual share to improve the layout design.

- Performing any of the acts mentioned in Article 5, paragraph 02, when the act is carried out on an original layout design similarly independently created by others. Thus, the legislator has enumerated the acts not covered by protection, which are the same as those stipulated in the Washington Treaty on Layout Designs, including importing, selling, reproducing layout designs wholly or partially, in addition to two cases mentioned in Articles 36 and 37 of the TRIPS Agreement[16].

Second requirement: Formal Conditions for Integrated Circuit Layout Designs

The formal conditions consist of a set of procedures that must be followed, including filing the application (first branch), registering the layout design of the integrated circuit (second branch), and finally, its publication (third branch).

First section: Filing an application

As previously mentioned, the legislator has required, as a formal procedure, the filing of an application. Therefore, we clarify who has the right to file the application (firstly) and then the procedures for its filing (secondly).

1- Right Holders for Filing:

Articles 9 and 10 of Order 03/08, relating to the protection of integrated circuit layout designs, state that the right to file an application for obtaining the layout design of an integrated circuit belongs to its creator or to their rights holders. If the application is filed by two or more persons, the right belongs to all of them. If it was created under an employment contract or a corporate contract, the right belongs to the employer or the entity employing or the project owner, unless agreed otherwise. If the applicant resides abroad, a representative is appointed for this purpose, in respect of the principle of reciprocity as stipulated in Article 11 of the same order.

2- Application Filing Procedures:

This procedure involves the right holder submitting a clear, explicit, and sole application to the Algerian National Institute of Industrial Property. The application can be sent by mail with a receipt notification, or by any other suitable means that proves receipt, according to Article 2 of Executive Decree 05/275

mentioned above. The registration application must include a series of information such as the applicant's name, surname, address, nationality, and if it involves a legal person, the company's name, its headquarters, the agent's name, address, etc., as stipulated in Article 4 of the same executive decree. The legislator also required the protection application to include a series of documents, including the layout design registration application, a brief and precise description of the design, elements proving the right to protection, proof of fee payment, power of attorney if applicable, as stipulated in Article 3 of the same executive decree.

Second section: Registration of the Layout Design for the Integrated Circuit

Registration refers to the process conducted by the competent authority, which is the Algerian National Institute of Industrial Property, where a special register is maintained listing the works provided for in the law concerning registration data, as well as the data and information related to the layout design for the integrated circuit. Registration differs from filing, as filing involves the process of submitting the file, whereas registration is the process undertaken by the Algerian National Institute of Industrial Property to record the layout design in the designated register after accepting the file that meets the required conditions, although the authority does not verify the substantive conditions[17]. Subsequently, the authority issues a registration certificate to the depositor, as stated in Articles 15 and 16 of Order 03/08, relating to the protection of integrated circuit layout designs.

Third section: Publication

Article 18 of Order 03/08, relating to the protection of integrated circuit layout designs, stipulates that the public is made aware of the layout design through its publication in the Official Bulletin of Industrial Property. The publication includes all the data registered in the special register for integrated circuit layout designs. Among these data are, for example, the depositor's name and surname, address, and if it concerns a legal person, the institution and its headquarters, the filing date, the amount of fees paid, the method of fee payment, and a pictorial copy of the layout design, etc[18]. According to Articles 17 and 19 of Order 03/08 mentioned above, anyone interested has the right to inspect the registered layout design file and to obtain a copy of it. However, they must first obtain permission from the depositor and pay the fee set for this operation, which is usually determined by regulation.

CONCLUSION:

Through our study of this topic, we have found that:

- Integrated circuit layout designs are the embodiment of intellectual output in the form of a three-dimensional model of elements, at least one of which is an active component mounted on silicon wafers or metal with the purpose of performing an electronic function.
- The legal nature of the rights arising from their registration varied, with some considering it a property right, others seeing it as straddling moral and material rights, concluding ultimately that it possesses a unique nature that necessitates a new, dedicated classification.
- For the layout design of integrated circuits to benefit from protection, the law stipulated a number of conditions, including substantive ones represented in novelty, meaning it has not been previously used by anyone and that the design possesses a special nature and function distinguishing it from other designs and similar circuits. In addition to novelty, it must be capable of industrial application for its use and benefit, and it is essential that it is not excluded from protection. Besides these substantive conditions, a series of formal procedures must be fulfilled, including filing and defining protection claims for the design to be registered in a special register maintained by the Algerian National Institute of Industrial Property, and finally, it must be published in the official bulletin of the same entity.

Despite Order 03/08 addressing the topic of integrated circuit layout designs, it suffers from some shortcomings, including:

- The Algerian legislator's definition of both layout designs and integrated circuits has made the term more difficult and complicated.
- The legislator used the term layout design and the term topography equivalent, where its definition leaned more towards the technical aspect than the legal aspect.
- The legislator adopted only the condition of relative novelty, not absolute, and opened the door for anyone who sold, copied, imported, or distributed a layout design or integrated circuit without knowledge or sufficient reason to believe at the time of purchase that it includes a layout design copied unlawfully, to complete their work provided compensation is given to the owner as if a contractual license had been obtained from them, yet this restricts the owner in choosing whom to grant the contractual license.

Based on the shortcomings we identified during our study of this topic, we proposed a set of recommendations, including:

- Creating a comprehensive and definitive definition for the term integrated circuit layout designs, for example, to be phrased as follows: It is an intellectual output embodied in a three-dimensional arrangement of elements constituting an integrated circuit or specifically designed for producing an integrated circuit for the purpose of manufacturing and performing an electronic function.
- Associating the condition of relative novelty with the necessary legal protection by imposing a penalty on anyone who infringes, whether deliberately or in good faith, on the rights of the owner of the layout design of the integrated circuit to ensure full enjoyment of their rights.

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