United States District Court,
N.D. California.

SYNOPSYS, INC,
Plaintiff.
v.
RICOH CO., LTD,
Defendant.
Ricoh Co., Ltd,
Plaintiff.
v.
Aeroflex, Inc., et al,
Defendants.

April 7, 2005.

CLAIM CONSTRUCTION ORDER

MARTIN J. JENKINS**, District Judge.**

INTRODUCTION

Before the Court is the parties' proposed construction of disputed terms contained in Plaintiff Ricoh Company, Ltd.'s ("Ricoh") patent. The suit involves an invention directed to a process for the design of application specific integrated circuits ("ASICs").

FACTUAL BACKGROUND

This case concerns the alleged infringement of U.S. Patent Number 4,922,432 ("the '432 patent") entitled "Knowledge Based Method and Apparatus for Designing Integrated Circuits Using Functional Specifications." The issue before the Court is the construction of ten disputed terms contained in the patent.

The '432 patent, owned by Ricoh, claims methods for using a CAD design system to design an ASIC. "An [ASIC] is an integrated circuit chip designed to perform a specific function, as distinguished from standard, general purpose integrated circuit chips, such as microprocessors, memory chips, etc." '432 patent, col. 1:13-17. According to the '432 patent, the ASIC design processes of prior art require the designer to consider the required objectives and tasks of the desired ASIC and define the structural level design specification for that ASIC. This structural level design specification must define the various hardware components and their required interconnections, as well as a system controller for synchronizing the operations of those hardware components. This process requires an ASIC designer to have an "extensive and all encompassing knowledge" of these hardware components and their required interconnections. '432 patent, col. 1:28-31. There are only a small number of very large scale integration technology (VLSI) designers who possess the highly specialized skills needed to create structural level integrated circuit hardware descriptions.

The stated goal of the '432 patent's claimed invention is to enable the non-expert designer to design ASICs. The '432 patent claims a method for enabling the use of higher level input descriptions by allowing designers to describe ASIC specifications at a functional level. This functional level description is done without specification of structure, implementing technology, or architecture. This process involves taking architecture independent specifications and selecting previously designed circuit components or structure used as building blocks for implementing an ASIC. The process selects the optimum hardware cells to be included in the desired ASIC. Following this method, a user who does not have expertise in VLSI design can write architecture independent ASIC descriptions that ultimately can result in the automatic selection of hardware cells to be used in the ASIC.

Claim 13 of the '432 Patent is at issue in this proceeding. Independent claim 13 describes a process in which a designer describes an ASIC through an input specification using architecture independent descriptions. These architecture independent descriptions are used to select architecture dependent hardware cells. This process uses a library of definitions of the architecture independent, functional descriptions, a library of available hardware cells, and a expert system knowledge base. The expert system knowledge base contains a set of "rules" that embody the knowledge of VLSI experts. In order for each desired function to be performed by the ASIC, one of the definitions from the library of definitions is specified. The rules in the knowledge base are then applied to select architecture dependent hardware cells from the library of available hardware cells.

LEGAL STANDARD

The construction of a patent claim is a matter of law for the Court. Markman v. Westview Instruments, Inc., 517 U.S. 370, 372 (1996). The Court must conduct an independent analysis of the disputed claim terms. It is insufficient for the Court to simply choose between the constructions proposed by the adversarial parties. Exxon Chem. Patents v. Lubrizol Corp., 64 F.3d 1553, 1555 (Fed.Cir.1995). To determine the meaning of a patent claim, the Court considers three sources: the claims, the specification, and the prosecution history. Markman v. Westview Instruments, Inc., 52 F.3d 967, 979 (Fed.Cir.1995) (*en banc*), *aff'd,* Markman, 517 U.S. 370.

The Court looks first to the words of the claims. Vitronics Corp. v. Conceptroni, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). "Although words in a claim are generally given their ordinary and customary meaning, a patentee may choose to be his own lexicographer and use terms in a manner other than their ordinary meaning, as long as the special definition of the term is clearly stated in the patent specification or file history." *Id*. (citation omitted). "A technical term used in a patent document is interpreted as having the meaning that it would be given by persons experienced in the field of the invention, unless it is apparent from the patent and the prosecution history that the inventor used the term with a different meaning." Hoechst Celanese Corp. v. BP Chems. Ltd., 78 F.3d 1575, 1578 (Fed.Cir.1996). The doctrine of claim differentiation creates the presumption that limitations stated in dependent claims are not to be read into the independent claim from which they depend because different language used in separate claims is presumed to indicate that the claims have different meanings and scope. Tandon Corp. v. U.S. International Trade Com., 831 F.2d 1017, 1023 (Fed.Cir.1987).

Second, it is always necessary to review the specification to determine whether the inventor has used any terms in a manner inconsistent with their ordinary meaning. Vitronics, 90 F.3d at 1582. The specification can act as a dictionary when it expressly or impliedly defines terms used in the claims. *Id*. Because the

specification must contain a description of the invention that is clear and complete enough to enable those of ordinary skill in the art to make and use it, the specification is the single best guide to the meaning of a disputed term. *Id*. The written description part of the specification itself does not delimit the right to exclude, however; that is the function and purpose of claims. Markman, 52 F.3d at 980.

Third, the court may consider the prosecution history. Vitronics, 90 F.3d at 1582. "Although the prosecution history can and should be used to understand the language used in the claims, it too cannot enlarge, diminish, or vary the limitations in the claims." Markman, 52 F.3d at 980 (internal quotation marks deleted) (citations omitted). However, a concession made or position taken to establish patentability in view of prior art on which the examiner has relied, is a substantive position on the technology for which a patent is sought, and will generally generate an estoppel. In contrast, when claim changes or arguments are made in order to more particularly point out the applicant's invention, the purpose is to impart precision, not to overcome prior art. Such prosecution is not presumed to raise an estoppel, but is reviewed on its facts, with the guidance of precedent. Pall Corp. v. Micron Separations, Inc., 66 F.3d 1211, 1220 (Fed.Cir.1995) (citations omitted).

Ordinarily, the Court should not rely on expert testimony to assist in claim construction, because the public is entitled to rely on the public record of the patentee's claim (as contained in the patent claim, the specification, and the prosecution history) to ascertain the scope of the claimed invention. Vitronics, 90 F.3d at 1583. "[W]here the public record unambiguously describes the scope of the patented invention, reliance on any extrinsic evidence is improper." *Id*. Extrinsic evidence should be used only if needed to assist in determining the meaning or scope of technical terms in the claims, and may not be used to vary or contradict the terms of the claims. *Id*. (quoting Pall Corp., 66 F.3d at 1216); Markman, 52 F.3d at 981.

The Court is free to consult technical treatises and dictionaries at any time, however, in order to better understand the underlying technology and may also rely on dictionary definitions when construing claim terms, so long as the dictionary definition does not contradict any definition found in or ascertained by a reading of the patent documents. Vitronics, 90 F.3d at 1584 n. 6. The Court also has the discretion to admit and rely upon prior art proffered by one of the parties, whether or not cited in the specification or the file history, but only when the meaning of the disputed terms cannot be ascertained from a careful reading of the public record. Id. at 1584. Referring to prior art may make it unnecessary to rely on expert testimony, because prior art may be indicative of what all those skilled in the art generally believe a certain term means. *Id*. Unlike expert testimony, these sources are accessible to the public prior to litigation to aid in determining the scope of an invention. *Id*.

Disputed claim terms are construed consistently across all claims within a patent. Southwall Techs., Inc. v. Cardinal IG Co., 54 F.3d 1570, 1579 (Fed.Cir.1995). Where patents-in-suit share the same disclosures, common terms are construed consistently across all claims in both patents. Mycogen Plant Sci, Inc. v. Monsanto Co., 252 F.3d 1306, 1311 (Fed.Cir.2001) (*overruled on other grounds*).

"The subjective intent of the inventor when he used a particular term is of little or no probative weight in determining the scope of a claim (except as documented in the prosecution history)." *Markman,* 50 F.3d at 985 (citation omitted). "Rather the focus is on the objective test of what one of ordinary skill in the art at the time of the invention would have understood the term to mean." *Id*. at 986.

DISPUTED CLAIM TERMS

The following is a list of ten terms identified by the parties in the October 21, 2004 Joint Submission of Terms, Phrases, and Clauses for Claims Construction:

1) **computer-aided design process for designing**

2) **architecture independent actions and conditions**

3) **a set of definitions of architecture independent actions and conditions**

4) **describing ... a series of architecture independent actions and conditions**

5) **expert system knowledge base**

6) **a set of cell selection rules**

7) **selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell**

8) **said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed**

9) **specifying for each described action and condition of the series one of said stored definitions**

10) **a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit**

ANALYSIS

A. *A computer-aided design process for designing*

Ricoh contends that the term means "during manufacture of a desired application specific integrated circuit (ASIC) chip ... a process of designing the desired ASIC using a computer." Aeroflex Inc. and Synopsys, Inc. ("Aeroflex") state that the term means "a process that uses a computer for designing, as distinguished from a computer-aided manufacturing process, which uses a computer to direct and control the manufacturing process." In essence, the parties' fundamental disagreement revolves around whether the computer-aided design process described in claim 13 also encompasses the ASIC manufacturing process.

Ricoh bases it proposed construction on the text of the patent specification. Specifically, Ricoh directs the Court to language in the specification that states that "the present invention, for the first time, opens the possibility for *the design and production* of ASICs by designers, engineers and technicians who may not possess the specialized expert knowledge of a highly skilled VLSI design engineer." '432 patent, col. 2:15-20 (emphasis added). Ricoh also emphasizes that the present invention produces a "physical chip layout level description [that] provides the mask data needed for fabricating the chip." ' 432 patent, col. 1:42-44; *see also* '432 patent, col. 3:68-4:4 ("FIG. 1c illustrates a physical layout level representation of an integrated circuit design, which provides the detailed mask data necessary to actually manufacture the devices and conductors which together comprise integrated circuit.").

Aeroflex argues that Ricoh's proposed construction is contrary to the '432 patent's claims and specifications.

FN1 Specifically, Aeroflex focuses on the claim language that provides that the invention is a "computer-aided design process for designing ...." ' 432 patent, col. 16:34. Aeroflex also directs the Court to specification language that states the invention "relates to the design of integrated circuits, and more particularly relates to a computer-aided method ... for designing integrated circuits ." FN2 ' 432 patent, col. 1:9-12.

FN1. Aeroflex also argues that Ricoh's proposed construction is contrary to statements made in the '432 patent's file history. Specifically, the April 1989 Amendment provides: "The present invention is a computer-aided design ... method whereby the use can design application specific integrated circuits ...." (April 1989 Amendment at 8).

FN2. Aeroflex also argues that its proposed construction is more consistent with the '432 patent's title: "Knowledge Based Method and Apparatus For *Designing* Integrated Circuits Using Functional Specifications" (emphasis added).

Ricoh's proposed definition is problematic because it clearly attempts to blur the line between the process of designing integrated circuits and the process of manufacturing integrated circuits. Nothing in the claim language supports Ricoh's attempt to broaden the claims to include a manufacturing process for a desired ASIC. Rather, the claim language describes a "computer-aided design process for designing an [ASIC] ...." '432 patent, col. 16:34-35. Likewise, the specification consistently describes a design, rather than a manufacturing, process. In fact, the term "manufacture" does not appear in the claim or specification language.FN3 While the "netlist" may be required to "produce the particular [ASIC]," *see* ' 432 patent, col. 2:44-49, that does not compel the conclusion that the ' 432 patent's design process is inherently a part of the manufacturing process of the actual ASIC chips. Given the Court's "focus ... on the objective test of what one of ordinary skill in the art at the time of the invention would have understood the term to mean," *Markman,* 50 F.3d at 985, the Court finds that the "computer-aided design process" described in claim 13 does not include a manufacturing process for ASICs.FN4

FN3. In its reply, Ricoh focuses solely on the specification language that states "the present invention, for the first time, opens the possibility for the design *and production* of ASICs by designers, engineers and technicians who may not possess the specialized expert knowledge of a highly skilled VLSI design engineer." '432 patent, col. 2:15-20 (emphasis added). However, this language, standing alone, does little to persuade the Court that the present invention was intended to encompass the ASIC manufacturing process. Rather, a fair reading of this language is that the present invention simply opened up the "possibility" that non-experts could produce or manufacture ASICs at some point in the future, but not that the present invention currently encompassed such a process.

FN4. This conclusion is also bolstered by the language in claim 14. Claim 14 describes "[a] process as defined in claim 13, including generating from the netlist the mask data required to produce an integrated circuit having the desired function." '432 patent, col. 16:66-68. This language clarifies that the generation of the netlist (the final step in claim 13) and the production of the integrated circuit are two distinct processes.

Given these considerations, the clearest reading of "A computer-aided design process for designing" is *a*

process that uses a computer to direct and control the design of an ASIC chip.

B. ***architecture independent actions and conditions***

Ricoh contends that the term means "functional or behavioral aspects of a portion of a circuit (or circuit segment) that does not imply any set architecture, structure or implementing technology." Aeroflex states that the term means "the logical steps and decisions that are represented as rectangles and diamonds in the flowchart; where register-transfer level (RTL, as defined in Darringer et al.) descriptions are excluded." Thus, the parties disagreement focuses on whether claim 13 limits input specifications for the proposed ASIC to data in a flowchart format.

Ricoh admits that Fig. 1a illustrates an embodiment that utilizes a flowchart representation. However, Ricoh argues that Aeroflex's definition impermissibly attempts to limit the scope of the claimed invention to the preferred embodiment of the '432 patent. Ricoh contends that a broader interpretation of "architecture independent actions and conditions" is supported by the patent specification:

The architecture independent functional specifications can be defined in a suitable manner, *such as in list form* or preferably in a flowchart form. The flowchart is a highly effective means of describing a sequence of logical operations, and is well understood by software and hardware designers of varying levels of expertise and training. From the flowchart (*or other functional specifications*), the system and method of the present invention translates the architecture independent functional specifications into an architecture specific structural level definition of an integrated circuit, which can be used directly to produce the ASIC.

'432 patent, col. 2:21-34 (emphasis added).FN5 Ricoh also relies on specification language stating that "the present invention ... enables a user to define the functional requirements for a desired target integrated circuit, using an easily understood architecture independent functional level representation ...." ' 432 patent, col. 2:6-11. Ricoh also notes that patent claim 11, not patent claim 13, specifically references a flowchart format and recites "having boxes representing architecture independent actions" and "diamonds representing architecture independent conditions." ' 432 patent, col. 16:10-12. Ricoh argues that this demonstrates that if the patentee intended the use of "architecture independent" in claim 13 to be restricted to a flowchart format, the patentee would have used the same or similar limiting language as used in claim 11.

FN5. Ricoh argues that a "list form" input specification is a preferred embodiment of the '432 patent. However, this argument does not find any support in the patent specification.

Aeroflex responds that the '432 patent's file history conclusively demonstrates that claim 13 requires a sequence of logical steps and decisions in a flowchart format.FN6 *See* April 1989 Amendment at 11; October 1989 Examiner Interview Summary; November 1989 Amendment at 7. Aeroflex contends that the Examiner Interview Summary explicitly states that the examiner and the applicant reached an agreement on application term 20 (patent claim 13). Specifically, the Examiner Interview Summary form shows that the examiner checked the box providing: "Agreement was reached with respect to some or all of the claims in question." (October 1989 Interview Summary). The summary form identifies application claim 20 (patent claim 13) as one of the claims discussed, and states that the following agreement was reached: "It is agreed that the features 'flowchart editor' and 'expert system for translating the flowchart into a netlist defining the necessary hardware cells of the integrated circuit' are patentable [sic] distinct from the reference list above." Aeroflex argues that this language demonstrates that an agreement was reached and that the features

"flowchart editor" and "expert system for translating the flowchart into a netlist" were the examiner's only basis for allowing all of the claims including patent claim 13. Furthermore, Aeroflex contends that the file history demonstrates that all register-transfer level descriptions were explicitly excluded from the claimed invention.

FN6. Aeroflex's reliance on the specification language to support its argument is not well taken. Aeroflex cites almost exclusively to language from the preferred embodiment. *See* '432 patent, col. 3:50-59; 4:5-22, 4:35-38, 7:12-23. However, in construing disputed claim terms, a limitation cannot be imported from the preferred embodiment into the claims themselves. Markman, 52 F.3d at 980.

Ricoh responds that the October Interview summary, at best, is ambiguous and inconclusive. Ricoh states that while the Interview summary clearly identified the claims discussed in the interview, it specifically left undefined which claims were subject to any agreement reached because the form indicated that an agreement was reached as "to some or all of the claims." Thus, Ricoh concludes that the only thing evidently agreed upon was that the features of a "flowchart editor" and an "expert system" were distinct over prior art, and any claims containing those features would be understood by both parties to be patentable over the cited prior art. Ricoh contends that this understanding is supported in the November 1989 Amendment, in which the patentee stated as follows:

During the interview, the Examiner carefully reconsidered the prior art and applicants' claims, and upon reconsideration agreed that certain features as defined in applicants' claims, such as the "flowchart editor" and the "expert system for translating the flowchart into a netlist defining the necessary hardware cells of the integrated circuit" patentably distinguish applicants' invention from the prior art of record, including Darringer et al. 4,703,435. Thus, it was agreed that Claim 18 [patent claim 11] in its present form, for example, patently defines applicants' invention over the prior art of record.

November 1989 Amendment at 7. Ricoh argues that the patentee could have made a similar statement with respect to application claim 20 (patent claim 13). Furthermore, Ricoh argues that Aeroflex's attempt to exclude register-level transfer descriptions from the claimed invention improperly distorts the file history.

Initially, the Court finds that the specification language supports Ricoh's arguments. While the flowchart format input specification is the single embodiment of the '432 patent, the specification explicitly contemplated alternative input descriptions. *See* '432 patent, col. 2:21-24; 2:27-28. "[I]t is improper to read limitations from a preferred embodiment described in the specification-even if it is the only embodiment-into the claims absent a clear indication in the intrinsic record that the patentee intended the claims to be so limited." Liebel-Flarshiem Co. v. Medrad, Inc., 358 F.3d 898, 913 (Fed.Cir.2004). Given the explicit patent language, the Court finds that the specification language does not support the conclusion that the input specification of the claimed invention is limited to a flowchart format.

Furthermore, the Court is not persuaded that the prosecution history unmistakably demonstrates that the input specification of the claimed invention is limited to the designer's use of a flowchart format. As noted by Ricoh, the October Interview Summary specifically left undefined which claims were subject to any agreement between the patentee and the examiner. Thus, contrary to Aeroflex's argument, this case is distinguishable from cases such as Spring Window Fashions LP v. Novo Industries, L.P., 323 F.3d 989 (Fed Cir.2003), in which the court held that a reasonable competitor could rely on unequivocal statements of disclaimer made during the prosecution history. Here, the statements made during the prosecution history

upon which Aeroflex attempts to rely, are at best, ambiguous.

In addition, while the patentee and the examiner evidently agreed that the features of a "flowchart editor" and an "expert system" were distinct over prior art, there is no indication that those terms necessarily applied to application term 20 (patent claim 13). Moreover, the fact that those terms were not included in the final version of patent claim 13 suggests just the opposite. "To be given effect, a disclaimer must be 'clear and unmistakable.' " Sunrace Roots Enter. Co. v. SRAM Corp., 336 F.3d 1298, 1306 (Fed.Cir.2003) (quoting Omega Eng'g, Inc. v. Raytek Corp., 334 F.3d 1314, 1325 (Fed.Cir.2003)). While Aeroflex's interpretation of the October Interview summary may be reasonable, the law requires much more. Accordingly, "because the statements in the prosecution history are subject to multiple reasonable interpretations, they do not constitute a clear and unmistakable departure from the ordinary meaning of the [claim term at issue]." Golight, Inc. v. Wal-Mart Stores, Inc., 355 F.3d 1327, 1332 (Fed.Cir.2004).

Aeroflex's argument pertaining to the file history of register-transfer level descriptions is more persuasive. The file history demonstrates that the patentee amended the patent claims to include the phrase "architecture independent," and distinguished the claimed invention from prior art partially on that basis. *See* November 1989 Amendment at 7. The patentee stated that the "specifications used by Darringer et al. are not truly at an *architecture independent* level, but rather are at a lower level which is indeed *hardware architecture dependent* and defines the system at a 'register-transfer' level description." *Id*. Similarly, in the April 1989 Amendment, the patentee stated that "a very clear distinction between Darringer and the present invention is that the input to the Darringer system is in the form of a register transfer level flowchart control language .... [and] input to the present invention is in the form of an architecture independent functional specification." *Id*. Based on this language, Aeroflex argues that Ricoh disclaimed the "register-transfer" level descriptions described in the Darringer prior art from the scope of its claimed invention. Ricoh responds that the patentee's use of the term "register-transfer level" was merely a shorthand reference used to denote the "structural" RTL-type, as opposed to "functional" RTL-type, of input systems prevalent at the time.

In order to make this determination, the Court must examine the Darringer 4,704,435 Patent ("the '435 patent") and how closely it reads upon the present invention. The '435 patent specifically defines a register-transfer level description and the subsequent translation or transformation steps described in that patent do not alter this explicit definition.FN7 '435 patent, col. 5:27-38. The Court finds no relevant distinction between the RTL described in the '435 patent and the RTL specifically disclaimed by Ricoh in the April and November 1989 Amendments. Furthermore, an examination of the ' 432 patent's public record fails to provide any support for Ricoh's distinction between "structural" and "functional" RTL-type input systems. Given these findings, Ricoh's attempt to limit the patentee's disclaimer to only "structural" level RTL-type input systems is unpersuasive. *See* Kumar v. Ovonic Battery Co., Inc., 351 F.3d 1364, 1368 (Fed.Cir.2003) (adopting definition of term in cited prior art which is intrinsic evidence). Accordingly, the prosecution history indicates that the patentee expressly disclaimed all register-transfer level descriptions.

FN7. "[T]he process of this invention begins at step 100 with a register-transfer level description e.g. of the type shown in Fig. 4. The description consists of two parts: a specification of the inputs, outputs and latches of the chip to be synthesized; and a flowchart-like specification of control, describing for a single clock cycle of the machine how the chip outputs and latches are set according to the values of the chip inputs and previous values of the latches. At step 102 in FIG 2., the register-transfer level description undergoes a simple translation to an initial implementation of AND/OR logic. '435 patent, col. 5:27-38.

Given these considerations, the Court defines "architecture independent actions and conditions" as *functional or behavioral aspects of a portion of a circuit (or circuit segment) that does not imply a set architecture, structure, or implementing technology, but excludes the use of register-transfer level descriptions as taught in Darringer*.

C. ***a set of definitions of architecture independent actions and conditions***

Ricoh contends that the term means "a library of definitions of the different architecture independent actions and conditions that can be selected for use in the desired ASIC." In contrast, Aeroflex proposes that the term means "a set of named descriptions defining the functionality and arguments for the available logical steps and decisions that may be specified in the flowchart where register-transfer level (RTL, as defined in Darringer et al.) descriptions are excluded."

It appears that the parties real dispute centers, once again, around the term "architecture independent actions and conditions." This phrase should be construed as explained *supra*. It does not appear that the Court needs to construe "a set of definitions," as this term should be given its ordinary and customary meaning. To the extent that "a set of definitions" needs to be construed by the Court, Aeroflex's Responsive Brief is unhelpful because it never addresses Ricoh's proposed construction. It appears that Aeroflex's use of the terms "named descriptions" and "arguments" intends to encompass the "macros" shown in Table 1 of the '432 patent. *See* '432 patent, col. 7:29-49. Given Aeroflex's lack of analysis of this term, the Court cannot accept Aeroflex's definition as it has not presented a basis for narrowing the claim term. Ricoh's use of the term "library" is supported by the patent's intrinsic evidence. *See* '432 patent, col. 2:20-22. Thus, the Court construes "a set of definitions of architecture independent actions and conditions" as *a library of definitions of the different architecture independent actions and conditions that can be selected for use in the desired ASIC*.

D. ***describing ... a series of architecture independent actions and conditions***

Ricoh contends that the term means "a user describing an input specification containing the desired functions to be performed by the desired ASIC." Aeroflex states that the term means "the designer represents a sequence of logical steps (rectangles) and decisions (diamonds), and the transitions (lines with arrows) between them in a flowchart format that excludes any register-transfer level (RTL, as defined in Darringer et al.) descriptions.

Once again, it appears that the parties real dispute centers around the term "architecture independent actions and conditions." This phrase should be construed as explained *supra* and is not limited to the use of a "flowchart format." To the extent that the terms "describing" and "series" need to be defined, they should be given their ordinary and customary meaning. "Describe" is defined as "to represent or give an account in words." Merriam-Webster's Ninth New Collegiate Dictionary (1987). The parties have not provided the Court with the ordinary meaning of the term "series."

Aeroflex argues that Ricoh's proposed construction is contrary to the claim language because it merely requires an input specification "containing the desired functions," and thus eliminates the requirement that the designer must describe "a series." Aeroflex contends that such a definition contradicts the actual words in the claim (i.e., "describing ... a series) and is also contrary to the requirement in the patent's specification that the designer must "describ[e] a sequence of logical operations." '432 patent, col. 2:24-25. Ricoh does not address this argument. Accordingly, the Court defines "describing ... a series of architecture independent actions and conditions" as *describing an input specification containing a series of desired functions to be*

performed by the desired ASIC.

E. *expert system knowledge base*

Ricoh contends that the term means "a database used to store expert knowledge of highly skilled VLSI designers." Aeroflex defines "expert system" and "knowledge base" separately. Aeroflex states that "expert system" should be defined as "software that solves problems through selective application of the rules in the knowledge base by an inference engine, as distinguished from conventional software, which uses a predefined step-by-step procedure (algorithm) to solve problems." Aeroflex asserts that a knowledge base is a "portion of the expert system software having a set of rules, each rule having an antecedent portion (e.g.IF) and a consequent portion (e.g., THEN), and embodying the knowledge of expert designers for application specific integrated circuits."

Ricoh's proposed construction relies heavily on the '432 patent's specification. Specifically, the specification states that "[t]he knowledge base 35 contains ASIC design expert knowledge required for data path synthesis and cell selection." '432 patent, col. 5:6-8. "Using a rule based expert system with a knowledge base 35 extracted from expert ASIC designers, the KBSC system selects from the cell library 34 the optimum cell for carrying out the desired function." '432 patent, col. 5:25-29. Based on these passages, Ricoh argues that an "expert system knowledge base" is a collection of data that represents knowledge obtained from experts in ASIC design.

Aeroflex dismisses Ricohd7Ds proposed construction as overly simplistic. Aeroflex argues that a person of ordinary skill in the art in 1988 would have known that two distinct approaches existed for selecting hardware cells: 1) rule-based expert system software; and 2) conventional algorithmic software. Aeroflex further contends that a person of ordinary skill in the art would have understood that rule-based expert system software must contain an inference engine, a knowledge base, and a working memory, which enable the inference engine to selectively apply the rules stored in the knowledge base to what is stored in the working memory (as distinguished from conventional algorithmic software, which uses a predefined step-by-step procedure). To support its argument, Aeroflex cites to a technical dictionary entitled "Artificial Intelligence Terminology" that states: "An expert system will generally consist of a rule base, an inference engine and a user interface (which will generally provide an explanation facility)." Aeroflex also cites the Court to the Dunn Patent 4,656,603 ("the '603 patent"). The '603 patent speaks in general terms regarding the distinction between the two types of software and states that since rule-based expert systems "often must make conclusions based on incomplete or uncertain information, they differ substantially from conventional computer programs which solve problems in accordance with pre-defined algorithms and complete data sets." '603 patent, col. 1:44-49.

Aeroflex also argues that the distinction between the rule-based expert system approach and the conventional algorithmic approach is evident from the prior art that the patentee distinguished in the patent's file history. In the November 1989 Amendment, the patentee added the following language to application claim 5 (patent claim 1): "said cell selection means comprising an expert system including a knowledge base containing rules for selecting hardware cells from said cell library and inference engine means for selecting appropriate hardware cells from said cell library in accordance with the rules of said knowledge base." November 1989 Amendment at 2. The patentee stated that application claim 5 (patent claim 1) was amended to "clearly distinguish it over the cited prior art by more clearly defining the expert system aspects of applicant's invention including the provision of a knowledge base containing rules for selecting hardware cells, inference engine means for selecting appropriate hardware cells, and netlist generator means for

generating a netlist defining the hardware...." November 1989 Amendment at 8. Although this amendment applied only to application claim 5 (patent claim 1), the patentee also amended application claim 20 (patent claim 13) to include "applying ... a set of cell selection rules stored in said expert system knowledge base...." The patentee explained that this language was added to "emphasize the expert system aspects of applicants' method." November 1989 Amendment at 9. Thus, Aerofiex is essentially arguing that the description of an expert system in patent claim 1 (including an inference engine) should also be read to encompass the expert system described in patent claim 13.

Ricoh responds that the patentee's statement in the November 1989 Amendment only further proves its point. Ricoh argues that this statement does not establish that an "expert system" had become an element of claim 13, but merely confirmed the patentee intent to claim certain aspects (i.e., the claimed "expert system knowledge base") of an expert system-not an expert system itself.FN8 Moreover, Ricoh argues that even if the Court finds that the patentee intended to encompass both an "expert system" and a "knowledge base," there is nothing in the claim language, specification, or prosecution history that requires that an expert system contain an inference engine and a working memory.

FN8. In other words, Ricoh is arguing that the term "expert system" is grammatically read as an adjective or other modifier for the noun "knowledge base."

Initially, the Court finds no support for Ricoh's argument that "expert system" is simply an adjective modifying the noun "knowledge base." The patentee explicitly stated that claim 13 was "amended to emphasize the expert system aspects of applicant's method." November 1989 Amendment at 9. Therefore, the Court finds that "expert system" was an element of claim 13.

Next, the Court finds that Aeroflex's assertion that a person of ordinary skill in the art would have understood that rule-based expert system software must contain an inference engine, a knowledge base, and a working memory is simply not supported by the intrinsic evidence. As noted by Ricoh, claims one through nine of the '432 patent specifically claim an inference engine, while claim 13 does not make such a claim. Aeroflex's attempt to have the Court read the description of an expert system from patent claim 1 onto the expert system described in patent claim 13 is unpersuasive. Additionally, the technical dictionary definition provided by Aerofiex states that an inference engine is "generally" an element of an expert system. Given the qualified language of the definition, in combination with the fact that claim 13 makes no mention of an "inference engine," the Court finds the technical dictionary definition unhelpful in this context. Finally, Aeroflex's reference to the ' 603 patent is ultimately unhelpful, as the '603 patent describes an intentional expert system, as opposed to a knowledge-based expert system, and makes no mention of an inference engine. '603 patent, col. 5:53-56. Given these considerations, the Court defines "expert system" and "knowledge base" separately. "Expert system" should be defined as *software that solves problems through selective application of rules in the knowledge base*. "Knowledge base" should be defined as a *portion of an expert system software having a set of rules and embodying expert knowledge of highly skilled VLSI designers*.

F. *a set of cell selection rules*

Ricoh contends that the disputed term is defined as "a plurality of rules for selecting among the hardware cells from the hardware cell library, wherein the rules comprise the expert knowledge of highly skilled designers formulated as prescribed procedures." Aeroflex contends that the term is properly defined as "a set

of rules embodying the knowledge of expert designers for application specific integrated circuits, each rule having an antecedent portion (e.g.IF) and a consequent portion (e.g., THEN), which enables the expert system to map the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description."

Aeroflex states that its proposed construction is consistent with contemporaneous technical dictionaries, treatises, and the prior art. *See* Ex. 15 at 74-75, Ex. 17 at 10-11, Ex. 14 at 10, 53, Ex. 18 at 8, Ex. 20 at 14-15, Ex. 21 at 269. "The two parts of a rule are a premise and a conclusion, a situation and an action, or an antecedent and a consequent. These statements are written in an IF-THEN format." Ex. 15 at 74, Louis E. Frenzel Jr., *Understanding Expert Systems*. The technical dictionary provided by Aeroflex defines "rule" as follows: "(If-Then Rule). A conditional statement of two parts." Ex. 21, Paul Harmon, *Expert Systems: Tools & Applications*. Aeroflex also argues that the patent's specification requires that the "rules" not only embody expert knowledge, but that the expert knowledge also be used for mapping the specified definitions in the flowchart to the hardware cell descriptions. Aeroflex Responsive Brief at 48; *see* '432 patent, col. 8:21-23; 8:34-37.

Ricoh contends that the general usage dictionary definition of "rule" should apply. Also, while Ricoh admits that the preferred embodiment of the '432 patent disclosed that "rules" could be in the format of "an antecedent portion (IF) and a consequent portion (THEN)," it also asserts that nothing in the public record justifies restriction of the claimed "rules" to the exemplary format disclosed as the preferred embodiment. Richo additionally contends that the '432 patent states specific rules in the specification that are not stated in the if/then format. *See* '432 patent, col. 12:31-35. Moreover, Ricoh also disagrees with Aeroflex's inclusion of the following requirement: "embodying the knowledge of expert designers for application specific circuits." Ricoh argues that to the extent Aeroflex is attempting to create a distinction between the knowledge of designers for ASICs and the knowledge of designers skilled in VLSI design, the claim should be construed broadly to include either skill. *See, e.g.,* '432 patent, col. 2:58-61 ("The KBSC utilizes a knowledge based expert system, with a knowledge base extracted from expert ASIC designers with a high level of expertise in VLSI design ..."); col. 4:8-11 ("In the KBSC system of the present invention, however, integrated circuits can be designed at a functional level because the expertise in VLSI design is provided and applied by the invention.")

Based on Aeroflex's citation to the technical dictionary, it appears that "rule" as used in the '432 patent would have had a particular meaning to one of ordinary skill in the art. Therefore, to the extent Ricoh's definition relies on a general dictionary definition, it must be rejected. *See* Vanderlande Industries Nederland BV v. I.T.C., 366 F.3d 1311, 1321 (Fed.Cir.2004). The technical dictionary definition offered by Aeroflex demonstrates that the ordinary meaning of "rules" when used to refer to rules that are contained in the knowledge base of a rule-based expert system must include an "IF-THEN" component. The Court is not persuaded that column 12, lines 31 to 35 of the '432 patent state "rules" as that term is understood in the patent. Rather, lines 31 to 35 appear to be discussing other actions that a user could take if additional rules were present.

However, the Court finds little support for Aeroflex's argument that claim 13 requires that the rules stored in the knowledge base of the rule-based expert system embody the expert knowledge for mapping the specified definitions in the flowchart to the hardware cell descriptions. Certainly, the plain language of claim 13 does not dictate that the "rules" encompass the "mapping" function. Moreover, while the patent's specification does suggest that the rules might play such a role in the preferred embodiment, *see* '432 patent, col. 8:34-37, such a conclusion is not compelled from the specification language. In any event, the Court should not

"limit[ ] the claimed invention to preferred embodiments or specific examples in the specification." Ekchian v. Home Depot, Inc., 104 F.3d 1299, 1303 (Fed.Cir.1997).

Furthermore, Ricoh correctly states that the definition should not make a distinction between the knowledge of designers for ASICs and the knowledge of designers skilled in VLSI design. The specification clearly contemplated that both sets of knowledge would be included in the knowledge base. *See* '432 patent, col. 2:58-61; col. 4:8-11. Furthermore, Aeroflex's attempt to include the following language in the definition-"for each logical step and decision represented in the flowchart"-should be rejected for the reasons discussed *supra*. Accordingly, the Court construes "a set of cell selection rules" as *a set of rules embodying the expert knowledge of highly skilled VLSI designers, each rule having an antecedent portion (e.g., IF) and a consequent portion (e.g.THEN)*.

G. *selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell*

Ricoh contends that the term means "selecting from the plurality of hardware cells in the hardware cell library a hardware cell for performing the desired function of the desired ASIC." Aeroflex contends that the term means "mapping the specified stored definitions for each logical step and decision represented in the flowchart to a corresponding stored hardware cell description."

Ricoh's argues that this term simply refers to the process of selecting hardware cells from those stored in the hardware cell library that can be used to implement the desired functions of the ASIC to be produced. In support of its argument, Ricoh cites the specification language stating that "[t]he Cell Selector 32 is a knowledge based system for selecting a set of optimum cells from the cell library to implement a VLSI system." '432 patent, col. 8:21-23.

Aeroflex argues that its proposed construction is supported by the language in claim 13, which according to Aeroflex, "dictates that mapping the specified definitions to the stored hardware cell descriptions must be performed by a rule-based expert system and not conventional software." Aeroflex Responsive Brief at 41:3-6. Aeroflex relies upon the following specification language to support its argument: "To design a VLSI system from a flowchart description of a user application, it is necessary to match the functions in a flowchart with cells from a cell library. This mapping needs the use of artificial techniques because the cell selection process is complicated and is done on the basis of a number of design parameters and constraints." '432 patent, col. 8:31-31-37.

Although it is a close question, Aeroflex's argument is ultimately more compelling. As discussed above, the patent file history demonstrates that the patentee distinguished the present invention based on the rule-based expert system's ability "to accomplish a task of selection of cells from the cell library." April 1989 Amendment at 10. This amendment strongly suggests that the mapping of the specified definitions to the stored hardware cells must be performed by a rule-based system. *See* Aeroflex Responsive Brief at 42. Ricoh's proposed language does not include a reference to a "rule-based system," Aeroflex's use of the word "mapping" is supported by the specification language '432 patent, col. 8:34; col. 9:53. Furthermore, at the claims construction hearing, Ricoh's counsel stated that he had no objection to the use of the term "mapping" in this context. However, Aeroflex's inclusion of the phrase "for each logical step and decision represented in the flowchart" is improper because it attempts to limit the claim to the preferred embodiment of the flowchart input specification, as discussed *supra*. Therefore, the Court construes "selecting from said stored data for each of the specified definitions a corresponding integrated circuit hardware cell" as *mapping*

the specified stored function to a corresponding stored hardware cell.

H. said step of selecting a hardware cell comprising applying to the specified definition of the action or condition to be performed

Ricoh argues that the term is defined as "selecting from the plurality of hardware cells in the hardware cell library a hardware cell ... through application of the rules; and generating a netlist that identifies the hardware cells needed to perform the function of the desired ASIC." Aeroflex contends that the term should be defined as "the mapping of the specified definitions to the stored hardware cell descriptions must be performed by applying to the specified definitions in the flowchart a set of cell selection rules stored in an expert system knowledge base."

The parties proposed constructions are not substantially different. As discussed above, Aeroflex's attempt to restrict the term to "definitions in the flowchart" is incorrect. However, Aeroflex's proposed use of the term "expert system knowledge base" also seems incorrect because it is unnecessary here; the term does not require a definition that specifies the location where the cell selection rules are found. Similarly, Ricoh's inclusion of "generating a netlist that identifies the hardware cells needed to perform the function of the desired ASIC" seems unnecessary here; such a definition would function to incorporate a separate step of the claim not covered by the current term. Accordingly, the Court defines the term as *the mapping of the specified definitions to the stored hardware cell descriptions by applying to the specified definitions a set of cell selection rules*.

I. *specifying for each described action and condition of the series one of said stored definitions*

Ricoh proposes that this term be construed as "specifying for each desired function to be performed by the desired ASIC one of the definitions of the architecture independent actions and conditions stored in the library of definitions that is associated with the desired function," Aer flex contends that the proper construction of the term is "the designer assigns one definition from a set of stored definitions to each of the logical steps and decisions represented in the flowchart." The parties dispute centers around whether the "specifying" step must be performed manually by a user, or whether the assignment of macros can be done automatically.

Ricoh admits that the patent discloses a "manual mapping" embodiment. '432 patent, col. 7:24-25 ("Edit actions allows the designer to assign actions to each box."). However, Ricoh argues that the construction of the claim should not be limited merely because it is the only embodiment disclosed. *See* Liebel-Flarshiem Co., 358 F.3d at 913. Furthermore, Ricoh contends that the patent describes macros being "mapped" automatically through the application of rules. *See* '432 patent, col. 9:14-18. Ricoh argues that if col. 9:14-18 is read in context, the passage shows that the quoted rules are to be applied "during this stage," which refers to the "first step of cell list generation." Accordingly, Ricoh contends that this passage does not apply to a statelist in which the "macros" have already been assigned to the desired actions.

Aeroflex disagrees with Ricoh's proposed construction. First, Aeroflex argues that the prepositional phrase "for each described action and condition of the series" refers only to the fact that the "specifying" step is performed for each action and condition in the described series resulting from the previous "describing" step. Thus, Aeroflex concludes that the claim language for this "specifying" step requires that "the designer assigns one stored definition for each logical step and decision described in the flowchart." Second, Aeroflex argues that other claims demonstrate that for each action and condition described, this step requires the designer to specify one stored definition (from a macro library) and that this "specifying" step and the

previous "describing" step together are the steps that define the input specification for the claimed invention's method. Third, Aeroflex argues that Ricoh's proposed construction impermissibly attempts to replace the phrase "for each described action and condition" with the phrase "for each desired function to be performed by the desired ASIC." Finally, Aeroflex argues that the '432 patent does not contain an automated "mapping" embodiment.

The Court finds that Aeroflex's attempt to limit the "specifying" step to encompass only a user manually assigning a single definition to each action and condition is too narrow of a construction. The plain language of the claim simply does not support this construction, and the Court should not "limit [ ] the claimed invention to preferred embodiments or specific examples in the specification." Ekchian, 104 F.3d at 1303. Moreover, while Aeroflex is correct that claim 1 and claim 9 require the designer to "specify" one stored definition for each action and condition described, this contention alone does not suggest that the Court should juxtapose these claims onto claim 13. Claim 13 simply does not contain similar language.FN9

FN9. Aerofiex's proposed construction is also flawed because of its inclusion of the phrase "logical steps and decisions represented in the flowchart." *See* discussion *supra*.

Additionally Ricoh's attempt to replace the phrase "for each described action and condition" with the phrase "for each desired function to be performed by the desired ASIC" is permissible. Throughout the specification, each "action and condition" is referenced as a "function." *See* '432 patent, col. 2:21-30. Therefore, the Court construes "specifying for each described action and condition of the series one of said stored definitions" as *specifying for each desired functional specification to be performed by the desired ASIC one of the definitions from the set of stored definitions*.

J. a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit

Ricoh contends that the term means "a description of the hardware components (and their interconnections) needed to manufacture the ASIC as used by subsequent processes, e.g., mask development, foundry, etc." Aeroflex states that the term means "producing a list of the needed hardware cells by eliminating any mapped hardware cells that are redundant or otherwise unnecessary, producing a custom controller type hardware cell for providing the needed control for those other hardware cells, and producing the necessary structural control paths and data paths for the needed hardware cells and the custom controller." '432 patent, col. 5:38-46.

Ricoh's proposed construction also relies heavily upon language in the specification. Specifically, Ricoh notes that the specification states that "[t]he list of hardware cells and their interconnection requirements may be represented in the form of a netlist. From the netlist it is possible using either known manual techniques or existing VLSI CAD layout systems to generate the detailed chip level geometrical information (e.g. mask data) required to produce the particular application specific integrated circuit in chip form." ' 432 patent, col. 2:42-49. The specification also states that "[t]he netlist provides all the necessary information required to produce the integrated circuit. Computer-aided design systems for cell placement and routing are commercially available which will receive netlist data as input and will lay out the respective cells in the chip, generate the necessary routing, and produce mask data which can be directly used by the chip foundry in the fabrication of integrated circuits."

Aeroflex also relies heavily upon the patent's specification to support its proposed construction. Aeroflex initially argues that the claim language "generating for the selected ... hardware cells, a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit" requires that this step eliminate any selected hardware cells that are not needed. *See* '432 patent, col. 13:59-66. Aeroflex also contends that the patent's specification defines the "interconnection requirements" for the necessary hardware cells defined in the netlist as "data and control paths." *See* '432 patent, col. 5:30-35. Finally, Aeroflex contends that a system controller must be generated for the netlist. In support of its argument, Aeroflex cites language from the preferred embodiment that states "[t]he netlist includes a custom generated system controller, all other hardware cells required to implement the necessary operations, and interconnection information for connecting the hardware cells and the system controller." '432 patent, col. 4:39-43. Additionally, Aeroflex asserts that the requirement that a controller be generated is also supported by the patent's file history. Specifically, Aeroflex argues that the file history limits the input specification to exclude register-transfer level descriptions that would define the control for the hardware cells of the ASIC, and thus a controller must be generated to provide necessary control for the ASIC.

The Court agrees with Ricoh that Aeroflex's arguments regarding "eliminating any mapped hardware cells that are redundant or otherwise unnecessary" and "producing a custom controller type hardware cell for providing the needed control for those other hardware cells" bear no relationship to a plain reading of claim 13. Additionally, contrary to Aeroflex's assertion, a review of the patent file history does not reveal that a controller must be generated in claim 13. Furthermore, while claim 10 expressly includes the generation of a controller, claim 13 includes no such language. *See* '432 patent, col. 16:1-4 ("The system as defined in claim 9 additionally including control generator means for generating a controller and control paths for the hardware cells selected by said cell section means.").

The Court also finds that claim 13 does not restrict the interconnection requirements of the hardware cells to "data and control paths." To be certain, "data and control paths" are the types of interconnections disclosed in the patent's preferred embodiment. But, the Court should not "limit[ ] the claimed invention to preferred embodiments or specific examples in the specification." Ekchian, 104 F.3d at 1303. Moreover, while claim 15 expressly includes the generation of control paths, claim 13 includes no such language. *See* '432 patent, col. 17:1-3 ("A process as defined in claim 13 including the further step of generating data paths for the selected integrated circuit hardware cells."). For these reasons, the Court agrees with Ricoh's proposed construction of the term. The Court defines "a netlist defining the hardware cells which are needed to perform the desired function of the integrated circuit" *as a description of the hardware components (and their interconnections) needed to manufacture the ASIC as used by subsequent processes, e.g., mask development, foundry, etc.*

CONCLUSION

Based on the analysis above, the Court adopts the foregoing constructions of the disputed claim terms.

IT IS SO ORDERED.

N.D.Cal.,2005.
Synopsys, Inc. v. Ricoh Co., Ltd.

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