

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

MYPAQ HOLDINGS LTD.,
Appellant

v.

**SAMSUNG ELECTRONICS CO., LTD., DELL
TECHNOLOGIES INC., ANKER INNOVATIONS
LTD.,**
Appellees

2023-2024, 2023-2025

Appeals from the United States Patent and Trademark Office, Patent Trial and Appeal Board in Nos. IPR2022-00311, IPR2022-00312, IPR2022-01131, IPR2022-01134.

Decided: April 24, 2025

JAMES CARMICHAEL, Carmichael Ip, Tysons, VA, argued for appellant. Also represented by STEPHEN MCBRIDE, MINGHUI YANG.

ELIOT DAMON WILLIAMS, Baker Botts LLP, Washington, DC, for appellee Samsung Electronics Co., Ltd. Also represented by ERIC J. FARAGI, NEIL P. SIROTA, New York, NY.

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LAUREN J. DREYER, Baker Botts LLP, Washington, DC, argued for all appellees. Appellee Dell Technologies Inc. also represented by THOMAS A. BROWN, Dell Inc., Hopkington, MA; KEVIN J. MEEK, McDermott Will & Emery LLP, Austin, TX; BRETT THOMPSEN, Slayden Grubert Beard PLLC, Austin, TX.

ERIC C. COHEN, Rimon, P.C., Raleigh, NC, for appellee Anker Innovations Ltd. Also represented by JASON XU, Washington, DC.

Before LOURIE, TARANTO, and STARK, *Circuit Judges*.
STARK, *Circuit Judge*.

MyPAQ Holding LTD. (“MyPAQ”) appeals two final written decisions of the United States Patent Trial and Appeal Board (“Board”) finding all claims of two of its patents invalid on anticipation and obviousness grounds in *inter partes* review (“IPR”) proceedings. We affirm.

I

MyPAQ’s U.S. Patent Nos. 8,477,514 (“the ’514 patent”) and 7,675,759 (“the ’759 patent”) relate to power converters for converting a given “input voltage” into a regulated “output voltage.” ’514 patent at 2:42-45. The patents, which have substantially similar specifications, relate to switch-mode power converters; that is, “power supply or power processing circuit[s] that convert[] an input voltage waveform into a specified output voltage waveform.” *Id.* The power converters are operated by a controller, which is “configured to dynamically increase or decrease the duty cycle of the power switches therein to regulate the internal or the output characteristic,” e.g., the input or output voltage, “at a desired value,” where the output voltage is used to power a load such as a computer or processor. *Id.* at 2:64-67. The patents purport to improve

on prior art devices by providing a system that “adaptively improves power conversion efficiency of a power converter in response to a measured parameter of the power converter . . . and includes consideration of” numerous potential variables, including a “system operational state of a load coupled to the power system.” *Id.* at 6:36-44.

Several pieces of prior art are relevant to the issues on appeal. U.S. Patent No. 6,873,136 (“Chagny”) discloses a voltage regulator module (“VRM”) that efficiently powers a computing device by “dynamically chang[ing] the switching frequency of the VRM in accordance with the activity of the processor.” J.A. 1056 at 3:48-50. In an embodiment depicted in Chagny’s Figure 2A, “VRM 200 includes, among other things, controller module 210 operable to receive activity input 202 indicative of levels of activity of processor 292 and to select a switching frequency of VRM 200 responsive to activity input 202 so that the switching frequency dynamically matches the level of activity of processor 292.” J.A. 14 (citing J.A. 1056 at 3:60-65, 4:66-5:3, 5:9-12; internal quotation marks omitted). Additionally, U.S. Patent No. 6,294,904 B1 (“Hirst”) “discloses a multiple frequency switching power supply that can operate with a first switching frequency when a load is in a normal operating mode and with a second switching frequency when a load is in a standby operating mode.” J.A. 85.

Samsung filed two IPR petitions which, collectively, challenged the validity of all claims of the ’514 and ’759 patents. The Board instituted both proceedings, held a consolidated oral hearing, and issued two final written decisions. The final written decisions explained that Samsung had proven all of the claims of the ’514 patent to be anticipated and/or rendered obvious by Chagny and all of the claims of the ’759 patent to be anticipated and/or rendered obvious by each of Chagny and Hirst alone. Other

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grounds of unpatentability asserted by Samsung are not pertinent to this appeal.¹

MyPAQ timely appealed. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A).

II

Claim construction presents a question of law we review de novo, although any underlying factual findings the Board bases on extrinsic evidence are reviewed for substantial evidence. *See Perfect Surgical Techs., Inc. v. Olympus Am., Inc.*, 841 F.3d 1004, 1012 (Fed. Cir. 2016). “The ultimate question of obviousness is a legal question that we review de novo with underlying factual findings that we review for substantial evidence.” *Roku, Inc. v. Universal El-ecs., Inc.*, 63 F.4th 1319, 1324 (Fed. Cir. 2023). “What the prior art discloses and whether a person of ordinary skill in the art would have been motivated to combine prior-art references are both fact questions that we review for substantial evidence.” *Bot M8 LLC v. Sony Interactive Ent. LLC*, 66 F.4th 1380, 1384 (Fed. Cir. 2023). Anticipation is also a question of fact reviewed for substantial evidence.

¹ MyPAQ has not appealed the Board’s findings that claims 1, 6-10, and 16-18 of the ’759 patent are unpatentable as both anticipated and rendered obvious by Hirst. J.A. 85-99, 103. Therefore, the challenges MyPAQ does make as to the unpatentability of claims 1, 6, and 16 of the ’759 patent (with respect to the “power system controller” and “duty cycle” limitations) are moot, since these three claims would remain unpatentable even if MyPAQ were to prevail on all the issues it presses on appeal. Because each of the issues MyPAQ raises need to be reached in connection with other claims, we reference claims 1, 6, and 16 of the ’759 patent where those claims are implicated by the appellate issues, even though our discussions below have no impact on the patentability of those three claims.

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See Kennametal, Inc. v. Ingersoll Cutting Tool Co., 780 F.3d 1376, 1381 (Fed. Cir. 2015). Substantial evidence is “such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Consol. Edison Co. v. NLRB*, 305 U.S. 197, 229 (1938).

III

At the Board, the parties disputed the proper construction of just two claim terms: “system operational state,” which is not pertinent to this appeal, and “core state.” On appeal, MyPAQ argues that the Board erred by rejecting its proposed construction of “core state” and further contends that the prior art did not disclose the “core state” limitation as correctly construed.

MyPAQ also argues that the Board implicitly construed four other claim terms – “upon startup,” “processor system,” “power system controller,” and “duty cycle” – and that the Board’s implicit constructions of each of these terms were incorrect. MyPAQ asserts that under what it characterizes as the “proper constructions,” the prior art references, specifically Chagny and Hirst, neither disclose nor render obvious any of the disputed limitations. *See* Open. Br. at 19.

We address these issues below.

1

The term “core state” appears in claims 4 and 9 of the ’514 patent and claims 4 and 14 of the ’759 patent. Claim 4 of the ’514 patent, which depends from claim 1, is illustrative:

1. A power converter coupled to a load, comprising:

a power switch configured to conduct for a duty cycle to provide an output characteristic at an output thereof; and

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a power converter controller configured to receive a signal from said load indicating a system operational state of said load and control an internal operating characteristic of said power converter as a function of said signal.

4. The power converter as recited in claim 1 wherein said load is a processor and said system operational state is dependent on one of a *core state* and a performance state of said processor.

J.A. 136 (emphasis added).

In front of the Board, MyPAQ proposed that “core state” be construed as limited to the specific list of “c-states” identified in an industry document, the Advanced Configuration and Power Interface Specification (“ACPI”), which describes how to control the amount of power provided to devices in a computer system. The ACPI is incorporated by reference in MyPAQ’s patents. ’514 patent at 5:22-27; ’714 patent at 4:1-6. Samsung countered that “core state” should be more broadly construed as encompassing additional types of “states,” including “the activity level (e.g., the rate at which instructions are executed) of the processor,” even though those states are not identified in the ACPI. J.A. 12. The Board agreed with Samsung. So do we.

MyPAQ’s proposed construction relies on reading the specifications of the ’514 and ’759 patents as “lexicographically defin[ing]” the claimed “core state.” Open. Br. at 17. My PAQ finds this purported “express[] defin[ition]” in following portion of the specification:

For example, the [ACPI] specification . . . describes “P-states” and “C-states” of a processor

[T]he *core state* (“C-state”), also under software operating system control, affects its level of power consumption from another perspective. The

highest processor C-state, C0, describes a processor at its full operational level. Lower C-state levels, C1, C2, . . . C4, describe various levels of a processor sleep state.

'759 patent at 4:1-6, 22-49 (emphasis added; second omission in original); *see also* '514 patent at 5:44-45 (“Another processor state indicator, the core state (‘C-state’)”); *id.* at 25:27-30 (“Turning now to FIG. 12, illustrated is a diagram of an embodiment of processor core states (‘C-states’) in accordance with the principles of the present invention illustrated.”)

To be sure, placing a quoted word or term inside parentheses is a conventional manner by which one may define another term used in a document – as we have done in the first three lines of this opinion with respect to the terms MyPAQ, Board, and IPR – and we have found such formulations may be indicative of lexicography in a patent. *See, e.g., SkinMedica, Inc. v. Histogen Inc.*, 727 F.3d 1187, 1200 (Fed. Cir. 2013). It does not follow, however, that every use of a quoted term inside a parenthetical in a patent document is definitional; each patent must be read individually, from the perspective of a person of ordinary skill in the art. *See generally Thorner v. Sony Comput. Ent. Am. LLC*, 669 F.3d 1362, 1368 (Fed. Cir. 2012) (“[A] person of ordinary skill in the art would have to read the specification and conclude that the applicant has clearly disavowed claim scope or has acted as its own lexicographer.”). And “[t]o act as its own lexicographer, a patentee *must clearly set forth a definition* of the disputed claim term other than its plain and ordinary meaning and *must clearly express an intent* to redefine the term.” *Kyocera Senco Indus. Tools Inc. v. Int’l Trade Comm’n*, 22 F.4th 1369, 1378 (Fed. Cir. 2022) (emphasis added; internal quotation marks omitted); *see also Thorner*, 669 F.3d at 1368 (“Simply referring to two terms as alternatives . . . is not sufficient to redefine a claim term.”). Here, as the Board found, the patentee did not “clearly set forth” a definition of “core state,” nor did it

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“clearly express an intent” to define the term solely by reference to the ACPI.

As the Board recognized, while the ’514 and ’739 patents “explain[] the concept of core states by reference to C-states as defined in ACPI,” the specifications as a whole would tell a skilled artisan “that the ACPI C-states are merely examples within the broader category of core states.” J.A. 13. For instance, the specification describes “examples indicating a system operational state include, without limitation, a signal providing a performance state or a core state of a processor *such as a P-state or C-state*,” J.A. 13 (emphasis added by Board; quoting ’514 patent at 9:11-23), “indicating, for example, that the system is operating from emergency power or battery reserve” ’514 patent at 9:14-23; *see also* ’514 patent at 5:22-23 (“*For example*, the Advanced Configuration and Power Interface (‘ACPI’) specification”); ’514 patent at 8:7-9 (describing Fig. 12, labelled “ACPI C-States – Idle Power Management,” as depicting “an *embodiment* of processor core states”) (emphasis added).

Moreover, the specification uses the term “ACPI C-states.” ’514 patent at 25:31 (emphasis added). The modifier “ACPI” in front of “c-states” would be unnecessary if the patentee intended for an ordinary artisan to recognize any reference to “c-state,” without a modifier or explanation, always and only to refer to “c-states” as defined in the ACPI. Thus, the presence of the modifier indicates that the patentee contemplated “c-state” to have a different, and broader, meaning than “ACPI c-state,” from which it logically follows that the patentee did not – by writing “core state (‘C-state’)” or otherwise – define “core state” as limited to just “ACPI c-states.”

Additionally, as Samsung observes, the patents repeatedly “use the term ‘core state’ without the abbreviation [C-state] in parentheses,” undermining MyPAQ’s suggestion that the patents clearly express an intent to link “core

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state” to “C-state.” Resp. Br. at 20 (citing ’514 patent at 8:7-9, 9:11-23, 22:63-67; ’759 patent at 7:16-28, 19:15-18. At minimum, there is such ambiguity in how the patents use C-state that we cannot conclude the patentee was acting as its own lexicographer. *See generally Renishaw PLC v. Marposs Societa’ per Azioni*, 158 F.3d 1243, 1249 (Fed. Cir. 1998) (“The patentee’s lexicography must, of course, appear ‘with reasonable clarity, deliberateness, and precision’ before it can affect the claim.”).

Because this claim construction dispute can be resolved based solely on the intrinsic evidence, we need not consider MyPAQ’s contentions that the testimony of both parties’ experts supports its proposed construction. *See Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1583 (Fed. Cir. 1996) (“In most situations, an analysis of the intrinsic evidence alone will resolve any ambiguity in a disputed claim term. In such circumstances, it is improper to rely on extrinsic evidence.”). Extrinsic evidence may not be used to alter the meaning of a claim term that is clear from the intrinsic evidence. *See id.* at 1584 (“[E]xtrinsic evidence in general, and expert testimony in particular, may be used only to help the court come to the proper understanding of the claims; it may not be used to vary or contradict the claim language.”).

Applying the Board’s correct construction of core state as “the activity level (e.g., the rate at which instructions are executed) of the processor,” and as including but not limited to the ACPI’s “c-states,” substantial evidence supports the Board’s finding that the “core state” limitation of claims 4 and 9 of the ’514 patent and claims 4 and 14 of the ’759 patent are anticipated by Chagny. *See* J.A. 41 (citing J.A. 1056, Chagny at 4:23-30); J.A. 82 (citing IPR 2022-00312, Exhibit 1002 at ¶¶ 155-57); *see also* J.A. 720 at ¶¶ 80-81 (Samsung expert Dr. Kiaei). MyPAQ does not offer any argument to the contrary. Accordingly, we affirm the Board’s finding that claims 4 and 9 of the ’514 patent and

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claims 4 and 14 of the '759 patent are unpatentable as obvious.

2

MyPAQ challenges what it characterizes as the Board's implicit construction of "upon startup," as recited in claims 13 and 18 of the '514 patent, as part of the limitation "wherein said signal is provided upon startup of said processor system." '514 patent at 30:16-17. In its petition, Samsung argued "that a person of ordinary skill in the art 'would have found it obvious that the generation and provision of Chagny's activity input 202 signal (i.e., said signal) would occur throughout the operating time of Chagny's information handling system device 290, including upon startup," J.A. 42-43 (quoting J.A. 745-46 at ¶¶ 138-40), pointing specifically to Chagny's disclosure of updating the activity input "on a periodic basis, e.g., once every millisecond, on an event basis or on an on-demand basis," J.A. 1056, Chagny at 4:43-45. The Board agreed with Samsung and found that claims 13 and 18 of the '514 patent were unpatentable as obvious based on Chagny alone.

MyPAQ's principal argument with respect to this limitation is that the Board implicitly construed "upon startup" as including "any time after startup" when it should have, in MyPAQ's view, instead limited "upon startup" to only those times "during the startup or boot sequence [and] . . . not afterward during continued operation." Open. Br. at 18.² According to MyPAQ, a person of ordinary skill would understand that its patents require the "startup" be

² We agree with MyPAQ that it did not forfeit this argument because it is entirely consistent with its position at the Board that "upon startup" excludes the time directly after startup. J.A. 483-84, 1958-59 (MyPAQ discussing Hwang); *see also* J.A. 45 (Board recognizing and addressing MyPAQ's position).

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mutually exclusive from “continued operation,” based on the specification statement that “[u]pon power-up of such a system, *or* during its continued operation, a power system controller can enable operation of its principal components to establish a state of maximum power drain.” ’514 patent at 13:39-42 (emphasis added). MyPAQ’s reading of this sentence, however, is not persuasive. The more natural reading of it is merely that startup and continued operation are different things, and they may or may not overlap, but this sentence has nothing to say about that question. Nothing in the claims or specification supports the absolute delineation between startup and operation that MyPAQ insists is a requirement of claims 13 and 18.

The Board had substantial evidence for its finding that, consistent with its implicit understanding of “upon startup” as including operations at any time after startup, Chagny discloses the limitation. As we noted above, Chagny discloses that its input signal “may be updated as frequently as once every millisecond,” which the Board pointed out would mean updating “would begin at startup.” J.A. 44-45 (citing J.A. 746-47 at ¶ 140). As Samsung states, “the Board pointed to the specification to confirm that the system is already *in* a state of power drain when the ‘signal’ is provided.” Resp. Br. at 29 (citing J.A. 45-46). Additionally, Samsung’s expert, Dr. Kiaei, testified that “it was well known in the art that a microprocessor would send control signals to an adaptive power supply coupled to that microprocessor as soon as the microprocessor was powered up to a level where its control signal was valid.” J.A. 746 ¶ 140 (cited by Board at J.A. 44). Dr. Kiaei cited specific prior art references that corroborated his opinion. *See id.* The Board credited this testimony and, again, had substantial evidence for its finding. J.A. 44-45.

3

Next, MyPAQ contends that the Board erred by implicitly construing the “processor system,” as used in claims 11

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and 16 of the '514 patent, as including internal components, “such as a control unit, a central processing unit [CPU], a memory to store the instructions to be executed, and input/output ports.” Open. Br. at 50. In MyPAQ’s view, including these types of components wrongly reads “the word ‘system’ out of the claims;” it insists a “processor system” must instead “be a *system* employing a processor, such as a server or personal computer, and not merely a processor by itself.” Open. Br. at 39. We do not agree with MyPAQ but, rather, share the Board’s implicit understanding.

MyPAQ identifies no persuasive basis in the intrinsic evidence for excluding internal components from what a person of ordinary skill would understand to be part of a processor system. MyPAQ relies on the specification’s statement that “[a] system such as a personal computer, processor system or a server is *often* constructed with a number of system components *such as* memory, hard drives, and specialized circuit cards that are specified and installed when the system is assembled for a particular application.” ’514 patent at 13:29-33 (emphasis added). Notably, this passage indicates only that a “processor system” “often” – not *always* – may have multiple components. We agree, instead, with Samsung, which aptly states: “a processor can constitute a processor system, just as a computer can constitute a computing system,” even without additional components. Resp. Br. at 34.

As we agree with the Board’s understanding of the scope of the claimed “processor system,” there is no dispute that substantial evidence supports the Board’s finding that Chagny’s processor 292 is “a processor system with multiple components” and, hence, a “processor system.” J.A. 27-28 (citing J.A. 525-26).

4

MyPAQ’s next challenge relates to the claim term “power system controller,” as recited in claims 6 and 11 of

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the '514 patent and claims 1 and 6 of the '759 patent. Representative of this dispute is claim 6 of the '514 patent, reproduced below:

6. A power system, comprising:

a *power system controller* configured to provide a signal characterizing a power requirement of a processor system; and

a power converter coupled to said processor system, comprising:

a power switch configured to conduct for a duty cycle to provide an output characteristic at an output thereof, and

a power converter controller configured to receive a signal from said power system controller to control an internal operating characteristic of said power converter as a function of said signal.

'514 patent at 28:29-41 (emphasis added).

MyPAQ contends that the Board implicitly interpreted “power system controller” too broadly, allowing that term to capture systems that merely *monitor* a processor but do not exert any *control* over them. MyPAQ argues that the proper construction of “power system controller” is “a separate element that coordinates control of various elements of the system (including power converters and components of the load) at a system-wide level to increase efficiency.” Open. Br. at 64.

We need not assess whether MyPAQ’s proposed construction is correct because, whether it is or not, the Board had substantial evidence for its finding that Chagny’s “software program 296 alone or with ICH 280” meets the “power system controller” limitation. J.A. 76. The Board specifically found: “Chagny’s software program 296 exerts control in the same manner” as the claimed power system

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controller in MyPAQ's patents, "by providing activity input 202 to frequency selector module 215 of controller module 210, which changes the switching frequency ('internal operating characteristic') of VRM 200 in response to activity input 202." J.A. 76 (citing J.A. 1057, Chagny at 5:9-12). Because substantial evidence supports the Board's finding that Chagny's software program *controls* Chagny's processor, and does not merely *monitor* that processor, Chagny teaches this claim limitation, whether or not such control is actually required.

5

Finally, MyPAQ disagrees with the Board's finding that Chagny discloses the "duty cycle" of claims 2, 7, 12, and 17 of its '514 patent and claims 1, 6, and 16 of its '759 patent. Specifically, MyPAQ criticizes Chagny's failure to refer to "duty cycles," "cycle," or "periodicity" by name, but we agree with Samsung that this does not mean Chagny fails to disclose the underlying concept of a duty cycle.

In finding that Chagny discloses the claimed limitation, the Board expressly adopted the parties' agreed-upon construction of "duty cycle" as the "ratio represented by a conduction period of a power switch to a switching period thereof," a construction derived directly from the specification. J.A. 34-35 (citing '514 patent at 2:57-59; '759 patent at 1:36-38). MyPAQ argues on appeal that despite the parties' agreement as to the meaning of the term, "the Board applied a different construction in which 'duty cycle' merely means turning a switch on and off without any 'cycle' or periodicity required." Open. Br. at 59. MyPAQ adds that conduction is a "fixed period" of on-time during each switching cycle.

The Board appropriately applied the agreed-upon construction and had substantial evidence for its finding that Chagny discloses the "duty cycle" limitations of MyPAQ's claims. As the Board explained, Chagny "discloses that power switch 220, controlled by charge control signal 212,

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is closed (i.e., conducts) during a charge cycle,” and goes on to describe how “DC voltage input 205 is ‘chopped’ by the charge switch 220 to generate the switched DC voltage output 225, which is then filtered to generate regulated DC voltage output 295.” J.A. 17 (citing J.A. 1057, Chagny at 5:40-42, 5:48-51). “By disclosing setting the switching frequency and, thus, the switching period, Chagny discloses that the duty cycle is controlled ‘in accordance’ with activity input 202, upon which the switching frequency is based.” J.A. 37. Relying on Dr. Kiaei’s testimony, Samsung explained, and the Board agreed, that “[b]y turning on and off Chagny’s power switch at a selected switching frequency, the *result* is that each on-and-off cycle has a conduction period (i.e., the on-time) and a switching period (i.e., the inverse of the switching frequency).” Resp. Br. at 43; *see also* J.A. 37 (citing J.A. 1370 at ¶ 31). Therefore, Chagny discloses a “duty cycle” consisting of a conduction period and a switching period, satisfying the challenged claims’ “duty cycle” limitation. MyPAQ criticizes the Board’s reliance on Dr. Kiaei’s opinion, but “expert testimony can constitute substantial evidence of anticipation when the expert explains in detail how each claim element is disclosed in the prior art reference.” *Acoustic Tech., Inc. v. Itron Networked Sols., Inc.*, 949 F.3d 1366, 1373 (Fed. Cir. 2020).

Therefore, the Board’s determination is supported by substantial evidence.

IV

We have considered MyPAQ’s remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm.

AFFIRMED