

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APTIV SERVICES US, LLC,
Petitioner,

v.

MICROCHIP TECHNOLOGY, INC.,
Patent Owner.

IPR2024-00646
Patent 9,471,074 B2

Before BRIAN J. McNAMARA, CHRISTOPHER L. OGDEN, and
JASON M. REPKO, *Administrative Patent Judges*.

OGDEN, *Administrative Patent Judge*.

DECISION
Granting Institution of *Inter Partes* Review
35 U.S.C. § 314

I. INTRODUCTION

Petitioner Aptiv Services US, LLC (“Petitioner”) filed a Petition (Paper 1, “Pet.”) under 35 U.S.C. §§ 311–319 requesting *inter partes* review (“IPR”) of claims 1–18 of U.S. Patent No. 9,471,074 B2 (Ex. 1001, “the ’074 patent”). Patent Owner Microchip Technology Inc. (“Patent Owner”) filed a Preliminary Response (Paper 7, “Prelim. Resp.”).

Under the authority delegated to us by the Director of the U.S. Patent and Trademark Office under 37 C.F.R. § 42.4(a), we may institute an *inter partes* review when “the information presented in the petition . . . and any response . . . shows that there is a reasonable likelihood that the petitioner would prevail with respect to at least 1 of the claims challenged in the petition.” 35 U.S.C. § 314(a); *see also* 37 C.F.R. § 42.108(c). Applying that standard, we institute an *inter partes* review of all the challenged claims of the ’074 patent for the reasons explained below. This is a preliminary decision, and we will base our final written decision on the full trial record.

II. BACKGROUND

A. THE ’074 PATENT (EX. 1001)

The ’074 patent describes a USB voltage regulator that “has a large gm^[1] current buffer driver added between a first stage of an operation amplifier and a last stage power transistor.” Ex. 1001, code (57), 1:17.

¹ “gm” (or “g_m”) refers to transconductance. *See* Ex. 1001, 3:30; Ex. 1004, 1733.

According to the '074 patent, “USB voltage regulators operate with extremely low equivalent series resistance (ESR) values, for example around 10 milliohms.” *Id.* at 1:25–27. The ESR values “heavily impact the design of [low-drop out (‘LDO’)] voltage regulators due to [their] variable zero pole locations depending upon the load conditions.” *Id.* at 1:39–41. “Therefore existing products having a USB interface use standard voltage regulator architectures that require very large external capacitor sizes with variations of ESR values in order to keep the voltage regulator stable.” *Id.* at 1:41–51.

The '074 patent proposes a voltage regulator with a large-gm current buffer “to reduce compensation capacitor size and provide for a wide range of external compensation capacitor ESR values.” *Id.* at 1:18–21; *see also id.* at 1:55–59. An embodiment is shown in Figure 2, reproduced below:

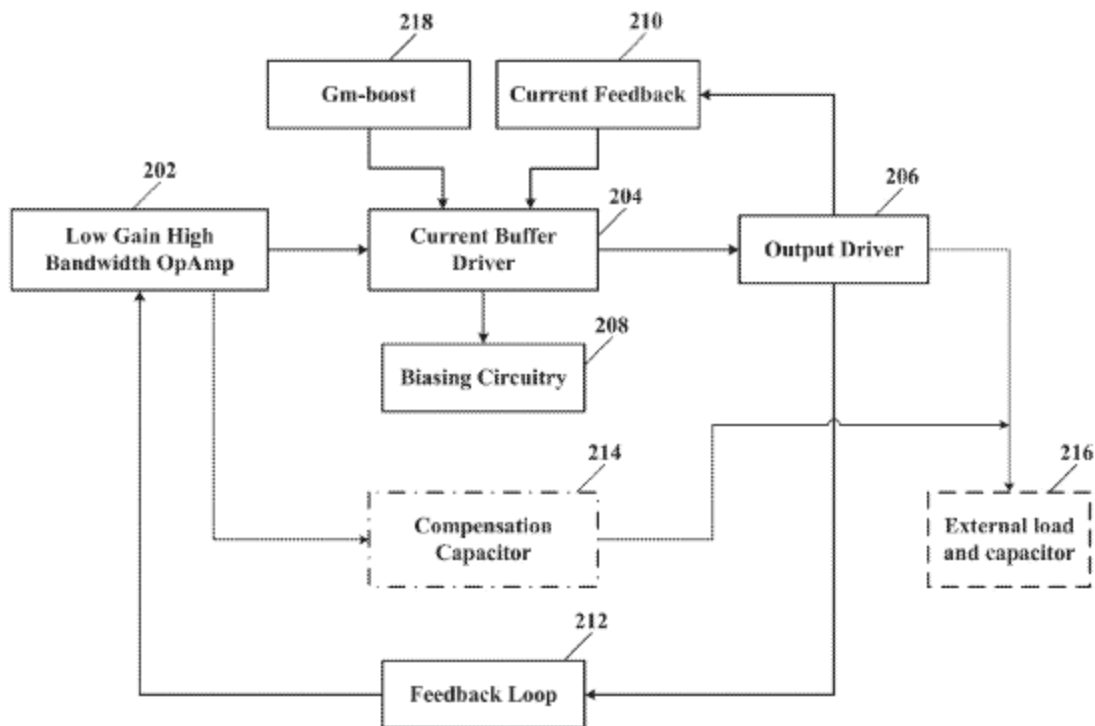


FIGURE 2

Figure 2 is a schematic block diagram of a voltage regulator comprising low-gain operational amplifier (“OpAmp”) 202, low-impedance current buffer driver 204, and power output driver 206. Ex. 1001, 3:55–58. As “[t]he key to being able to use smaller value internal and external capacitances,” current buffer driver 204 is coupled between OpAmp 202 and output driver 206. *Id.* at 3:58–62. The regulator also “comprise[s] biasing circuits 208, current feedback 210, a feedback loop 212, a compensation capacitor 214 and a gm-boost circuit 218.” *Id.* at 3:62–65. The voltage regular supplies power to external load and capacitor 216. *Id.* at 3:65–67.

“Since the output driver 206 may provide very large amounts of switching current during power supply operation, the gate capacitance is significantly high due to the size of the driver, thereby resulting in the generation of a pole at relatively low frequency.” Ex. 1001, 4:6–11. As a result, “current buffer driver 204 pushes this pole to a high frequency beyond unity-gain frequency due to its low-impedance characteristics in order to get the pole-splitting effect. To achieve this, it is necessary to provide a fairly large gm value of the current buffer driver 204.” *Id.* at 4:11–15. With the help of current feedback 210, gm-boost circuit 218 “provide[s] a gm-boost technique that will increase the impedance value of the current buffer driver 204 with the help of the current feedback 210 which may sense the current change at the output of the output driver 206.” *Id.* at 4:15–20.

The ’074 patent also discloses that biasing circuit 208 contains transistors that “may be shut off during disabling/power down operation to make sure [the bias] circuit will consume substantially no DC current,” and there is an “enable signal coming to the regulator circuit so that the module can be turned off when disabled.” Ex. 1001, 4:43–46, 52–54.

B. CHALLENGED CLAIMS AND GROUNDS

Independent claim 1 is as follows:

1. A voltage regular, comprising:
 - 1[a] an operational amplifier;
 - 1[b] a gm enhanced current buffer driver;
 - 1[c] a biasing circuit coupled to the current buffer driver to set a biasing ratio for gm-boost of the current buffer driver;
 - 1[d] an enable/disable function to enable/disable the biasing circuit for reducing standby current[;]
 - 1[e] an output power driver, wherein the current buffer driver is coupled between the operational amplifier and the output power driver;
 - 1[f] a current feedback circuit coupled between the output power driver and the current buffer driver; and
 - 1[g] a feedback loop coupled between the output power driver and the operational amplifier.

Ex. 1001, 6:3–16 (Petitioner’s reference numbers added).

Petitioner argues two grounds for *inter partes* review, as summarized in the following table (*see* Pet. 9–10):

Claim(s) Challenged	35 U.S.C. §	Reference(s)/Basis
1–18	103(a) ²	Al-Shyoukh, ³ Ivanov, ⁴ Stanescu ⁵
1–18	103(a)	Rincon-Mora, ⁶ Rincon-Mora Paper, ⁷ Al-Shyoukh, Ivanov, Stanescu

C. DECLARATORY TESTIMONY

Petitioner submits a declaration by Michael S. Chen, Ph.D. Ex. 1002. Patent Owner does not submit expert testimony supporting its Preliminary Response.

D. RELATED PROCEEDINGS

As a related matter, the parties identify *Microchip Technology Inc. v. Aptiv Services US, LLC*, No. 23-cv-00778 (D. Del. filed July 17, 2023). Pet. 88; Paper 3, 2.

² 35 U.S.C. §§ 103 (2006), *amended by* Leahy–Smith America Invents Act (“AIA”), Pub. L. No. 112-29 §§ 102, 103, sec. (n)(1), 125 Stat. 284, 287, 293 (2011) (effective Mar. 16, 2013). Petitioner does not take a position on whether this pre-AIA version or the post-AIA version of §§ 102 and 103 applies. *See* Pet. 10. We note, however, that the ’074 patent claims priority to a provisional application dated March 13, 2013, prior to the effective date of the AIA. *See* Ex. 1001, code (60). Our decision would be the same under either statute.

³ Al-Shyoukh, Lee & Perez, *A Transient-Enhanced Low-Quiescent Current Low-Dropout Regulator With Buffer Impedance Attenuation*, 42 IEEE J. Solid-State Circuits 1732 (2007) (Ex. 1004).

⁴ Ivanov et al., US 6,400,207 B1, issued Jun. 4, 2002 (Ex. 1005).

⁵ Stanescu et al., US 6,710,583 B2, issued Mar. 23, 2004 (Ex. 1006).

⁶ Rincon-Mora et al., US 6,046,577, issued Apr. 4, 2000 (Ex. 1013).

⁷ Rincon-Mora, *A Low-Voltage, Low Quiescent Current, Low Drop-Out Regulator* 33 IEEE J. Solid-State Circuits 36 (1998) (Ex. 1014).

III. SUFFICIENCY OF TABLE OF THE GROUNDS

Before addressing the arguments of the Petition, we address several arguments that Patent Owner makes about the form and sufficiency of the Petition’s table of grounds (Pet. 9–10). *See* Prelim. Resp. 28–30, 33–36. These arguments do not provide a reason to deny institution in this proceeding.

First, Patent Owner argues that the table of grounds is misleading because each ground “is just a list of references that purportedly appl[ies] to all 18 claims and fails to identify the actual combinations for each claim.” Prelim. Resp. 28–29 (citing Ex. 37 C.F.R. § 42.104(b); *US Well Servs., LLC v. Halliburton Energy Servs., Inc.*, IPR2022-01164, Paper 11, at 17 (PTAB Dec. 20, 2022)⁸). Patent Owner also claims that there are actually more than just two grounds, and Patent Owner “is unable to reasonably discern all the different grounds Petitioner is pursuing.” *Id.* at 29.

In view of the Petition as a whole, we disagree that the table of grounds is misleading or otherwise in violation of 37 C.F.R. § 42.104(b). Petitioner explains, in the body of its Petition, which references are associated with each claim and each claim limitation. *See* Pet. 15–88.

Finally, Patent Owner argues that Petitioner’s table of grounds “fails to acknowledge its heavy reliance on the purported knowledge of a [person of ordinary skill in the art].” Prelim. Resp. 33–34 (citing Pet. 15–17, 71–74). According to Patent Owner, “[w]hile there is nothing inherently wrong with

⁸ In this case, the panel determined that the body of the petition (not just the table of grounds) failed to articulate an aspect of the petitioner’s argument with sufficient particularity. *See* IPR2022-001164, Paper 11, at 16–17.

relying on the knowledge of a [person of ordinary skill in the art], Petitioner should not force Patent Owner (or the Board) to wade through the Petition to identify when and where Petitioner does so.” *Id.* at 34.

We disagree. Patent Owner has not directed us to any rule or precedent requiring a petitioner to include a reference to background knowledge in its table of grounds. *See, e.g.*, 37 C.F.R. §§ 42.6, 42.8, 42.22, 42.24, 42.104 (setting forth requirements for the contents of a petition).

IV. ANALYSIS OF GROUNDS OF THE PETITION

For the reasons below, we determine that Petitioner has demonstrated a reasonable likelihood that it would prevail in showing that at least one of the challenged claims of the ’074 patent is unpatentable under a ground of the Petition.

A. LEVEL OF ORDINARY SKILL IN THE ART

The level of ordinary skill in the pertinent art at the time of the invention is a factor in how we construe patent claims. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–13 (Fed. Cir. 2005) (en banc). It is also one of the factors we consider when determining whether a patent claim is obvious over the prior art. *See Graham v. John Deere Co. of Kan. City*, 383 U.S. 1, 17–18 (1966).

To assess the level of ordinary skill, we construct a hypothetical “person of ordinary skill in the art,” from whose vantage point we assess obviousness and claim interpretation. *See In re Rouffet*, 149 F.3d 1350, 1357 (Fed. Cir. 1998). This legal construct “presumes that all prior art references

in the field of the invention are available to this hypothetical skilled artisan.” *Id.* (citing *In re Carlson*, 983 F.2d 1032, 1038 (Fed. Cir. 1993)).

Relying on Dr. Chen’s testimony, Petitioner argues that a person of ordinary skill in the art would have had “a Master’s Degree in Electrical Engineering, or alternatively a Bachelor’s Degree in Electrical Engineering and two years of experience working on analog circuit design.” Pet. 9 (citing Ex. 1002 ¶ 38).

At this stage, Petitioner’s argument is uncontested, and it appears to be supported by the types of problems and solutions in the ’074 patent. *See, e.g.*, Ex. 1001, 1:25–2:44. Thus, we adopt the formulation preliminarily for this decision.

B. CLAIM CONSTRUCTION

In an *inter partes* review, we construe a patent claim “using the same claim construction standard that would be used to construe the claim in a civil action under 35 U.S.C. 282(b).” 37 C.F.R. § 42.100(b). This generally includes “construing the claim in accordance with the ordinary and customary meaning of such claim as understood by one of ordinary skill in the art and the prosecution history pertaining to the patent.” *Id.* The ordinary and customary meaning of a claim term “is its meaning to the ordinary artisan after reading the entire patent,” and “as of the effective filing date of the patent application.” *Phillips*, 415 F.3d at 1313, 1321.

Our rules also require us to consider “[a]ny prior claim construction determination concerning a term of the claim in a civil action . . . that is timely made of record in the *inter partes* review proceeding.” 37 C.F.R. § 42.100(b).

In the Petition, Petitioner states that for some limitations it applies claim constructions that correspond to constructions it expects Patent Owner to assert. *See* Pet. 20 n.2. After Patent Owner filed its Preliminary Response, Petitioner notified us that the district court in the parallel district court litigation issued a claim construction order interpreting two terms relevant to this proceeding, as shown below:

Claim Term	District Court's Construction
“an enable/disable function to enable/disable the biasing circuit for reducing standby current” (claim 1)	Not subject to 35 U.S.C. § 112(f)
“wherein the gm-boost circuit enables the current buffer driver to have large gm value” (claim 4)	“wherein the gm boost circuit increases the gm value of the current buffer driver to be sufficiently large to provide pole-splitting”

Paper 9, 1–2; *accord* Ex. 1020, 1–2.⁹

Because neither party has argued at this stage that the district-court constructions should be modified or elaborated for this proceeding, and the constructions appear reasonable, we adopt them for this decision. We also take judicial notice of the district court’s Memorandum supporting the claim construction order. Ex. 3001.¹⁰

We do not need to construe any other claim terms explicitly to decide whether or not to institute *inter partes* review. To the extent that the

⁹ The district court also determined that claims 8 and 9 were not indefinite. Paper 9, 2; *accord* Ex. 1020, 2; *see* 35 U.S.C. § 311(b).

¹⁰ Aptiv appears to have mistakenly submitted a claim-construction memorandum from *Microchip Technology Inc. v. Aptiv Services, LLC*, No. 23-cv-00307 (D. Del. filed Mar. 20, 2023), which does not appear to involve claims from the ’074 patent. *See* Ex. 1021.

meanings of claim terms (e.g., *current buffer driver*, see *infra* Section IV.C.4(c)), are disputed, we discuss the terms below in the context of the prior art. See *Realtime Data, LLC v. Iancu*, 912 F.3d 1368, 1375 (Fed. Cir. 2019) (“The Board is required to construe ‘only those terms . . . that are in controversy, and only to the extent necessary to resolve the controversy.’” (quoting *Vivid Techs., Inc. v. Am. Sci & Eng’g, Inc.*, 200 F.3d 795, 803 (Fed. Cir. 1999))).

Patent Owner takes issue with Petitioner’s handling of claim-construction issues in its Petition. Patent Owner argues that it “cannot fairly discern what terms Petitioner is construing (either expressly or impliedly), what Petitioner’s constructions actually are, or even what claim interpretation standard Petitioner is using.” Prelim. Resp. 37–39.

Patent Owner also states that Petitioner argued in district court that several claims, including claim 1, are indefinite, but has not explained how the prior-art grounds could be valid if the claims are indefinite. *Id.* at 36–37 & nn.7–8 (citing Ex. 2002, 12–16; *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 812–14 (Fed. Cir. 2021)).

The Federal Circuit, though, has stated that indefiniteness “does not necessarily preclude the Board from addressing the patentability of the claims on section 102 and 103 grounds.” *Samsung Elecs. Am., Inc. v. Prisua Eng’g Corp.*, 948 F.3d 1342, 1353 (Fed. Cir. 2020). “The indefiniteness of a limitation . . . precludes a patentability determination *only when* the *indefiniteness renders it logically impossible* for the Board to reach” a determination of the patentability of a claim on the presented prior-art grounds. *Intel Corp. v. Qualcomm Inc.*, 21 F.4th 801, 813 (Fed. Cir. 2021) (emphasis added). Here, we see no evidence at this stage of such a logical

impossibility.

Also, rule 37 C.F.R. § 42.104(b)(3) “does not require Petitioner to express its subjective agreement regarding correctness of its proffered claim constructions or to take ownership of those constructions.” *Western Digital Corp. v. SPEX Techs.*, IPR2018-00084, Paper 14 at 11 (PTAB Apr. 25, 2018). Here, Petitioner explains that the claims do not invoke 112, sixth paragraph. Pet. 21–22. At this stage, this is undisputed, and as discussed below, we determine that Petitioner has sufficiently shown that the claims are unpatentable under this interpretation.

We also disagree that the Petition fails to provide Patent Owner with adequate notice of Petitioner’s claim-construction positions. The Petition clearly conveys that, for purposes of this proceeding, Petitioner is not arguing indefiniteness. To the extent that any claim construction issues are present, in its substantive analysis Petitioner argues that the challenged claims are unpatentable even under Patent Owner’s expected proposed constructions in light of the parallel district-court proceeding. *See* Pet. 16–17, 20–22 & nn.2–3, 26–27, 31, 36–38, 46–48, 58, 62, 70–71, 75, 83–84. We address these claim constructions issues in our analysis of the parties’ contentions and determine at this stage that Petitioner has sufficiently met its burden of particularity.

Finally, Patent Owner points out that in in his declaration, Dr. Chen expresses an incorrect understanding that claims are construed according to the “broadest reasonable construction” standard, which is no longer applicable in the Board’s post-grant proceedings. *Id.* at 39–43 & n.42; *see* 37 C.F.R. § 42.100(b). However, it appears at this stage that Petitioner relies on Dr. Chen’s expertise to interpret the prior art and the ’074 specification, but

not to interpret the claim language. *See, e.g.*, Pet. 16–17, 20–22, 26–27, 31, 36–38, 46–48, 58, 62, 70–71, 75, 83–84. Thus, this error does not affect our determination of whether Petitioner is reasonably likely to prevail with respect to at least one of the challenged claims.

C. GROUND BASED ON AL-SHYOUKH, IVANOV, AND STANESCU

Petitioner argues that the challenged claims are unpatentable under 35 U.S.C. § 103 as obvious over Al-Shyoukh in view of Ivanov and Stanescu. Pet. 9–52.

A claim is unpatentable under § 103 if the differences between the claimed subject matter and the prior art are “such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). When a ground in a petition is based on a combination of references, we consider “whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue.” *Id.* at 418 (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

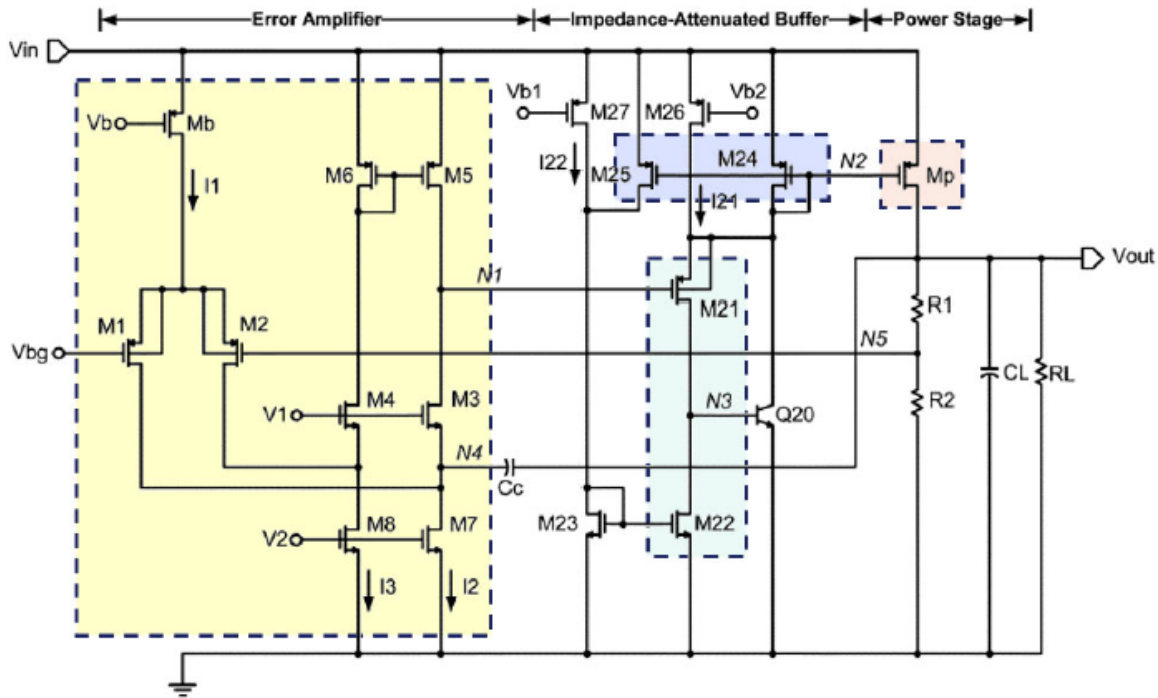
We base our obviousness inquiry on factual considerations including (1) the scope and content of the prior art, (2) any differences between the claimed subject matter and the prior art, (3) the level of skill in the art, and (4) any objective indicia of obviousness or non-obviousness that may be in evidence. *See Graham*, 383 U.S. at 17–18. At this stage, no evidence of objective indicia of obviousness or non-obviousness has been made of record.

Considering these factors, we determine for the reasons discussed below that Petitioner has shown a reasonable likelihood that at least one claim would have been obvious over Al-Shyoukh in view of Ivanov and Stanescu.

1. Overview of Al-Shyoukh

Al-Shyoukh describes an LDO to manage power in portable devices. Ex. 1004, 1732. The LDO employs current-buffer compensation so that “only a single pole is realized within the unity-gain frequency and a good phase margin is achieved for the entire load current range with a small compensation capacitor.” *Id.* at 1733. In an “intermediate buffer stage,” the g_m (transconductance) is increased to allow the pole at the output of the current buffer “to be located at frequencies much higher than the unity-gain frequency of the LDO regulation loop.” *Id.*

The LDO is depicted in Figure 8, reproduced below with annotations by Petitioner:



Pet. 11; *accord* Ex. 1004, 1738. Figure 8 is a circuit diagram divided into three portions from left to right: error amplifier, impedance-attenuated buffer, and power stage.

As Petitioner indicates by its yellow box on the left of the diagram, the error amplifier includes transistors M1 to M8, and it has, as one of its inputs, reference voltage V_{bg} . *Id.* On the right of the circuit diagram is the power stage, which includes pass device Mp annotated by Petitioner in pink, and has input N2 and output Vout (the voltage output of the LDO). *Id.* at 1735. There is also a feedback line (N5) from the power stage back to the error amplifier.

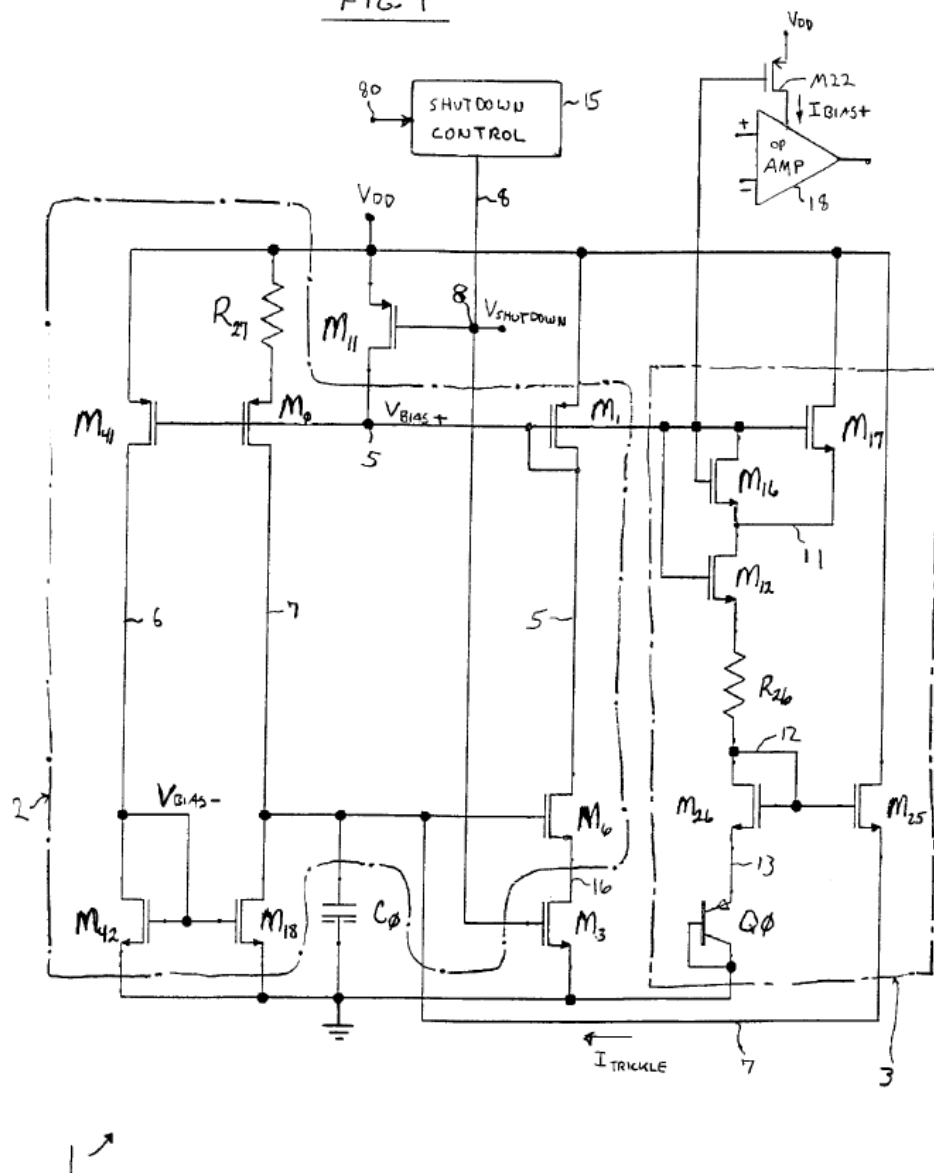
Between the error amplifier and the power stage is the impedance-attenuated buffer, with input N1 from the error amplifier and output N2 to the power stage. Among other transistors, the buffer includes source-

follower transistor M21, part of a box that Petitioner highlights in cyan. Ex. 1004, 1734. Within the buffer, pMOS transistors M24 and M25 (which Petitioner highlights in blue) and npn transistor Q20 “realize dynamically-biased shunt feedback to [increase g_m] under different load current conditions.” *Id.* at 1734.

2. *Overview of Ivanov*

Ivanov discloses “a fast disable/enable bias control circuit that is very suitable for fast disabling and subsequent fast enabling of the bias circuitry of . . . various circuits, such as high-speed CMOS operational amplifiers usable in applications such as voltage regulators.” Ex. 1005, 6:47–52. This is illustrated in Figure 1, reproduced below:

FIG. 1



As shown in Figure 1, bias-control circuit 1 includes bias core circuit 2 and fast-startup circuit 3. Ex. 1005, 1:20–21. Bias core circuit 2 is “coupled between V_{DD} and ground” and produces V_{BIAS+} (conductor 5) and V_{BIAS-} (conductor 6) when bias core circuit 2 is active. *Id.* at 3:54–56, 3:65–4:3, 4:26–33. V_{BIAS+} (conductor 5) “typically is applied to the gates of one or more P-channel current mirror transistors of bias circuitry associated with an electronic circuit, such as CMOS amplifier 18.” *Id.* at 3:56–59.

Bias-control circuit 1 is activated by shutdown control circuit 15 which “ordinarily would simply be a buffer circuit . . . having its output connected to conductor 8 and its input connected to an external conductor 80 on which a user applies an external control signal to disable/enable bias control circuit [1].” Ex. 1005, 4:20–25.

3. *Overview of Stanescu*

Petitioner only relies on Stanescu for dependent claim 11. *See* Pet. 41–44. Stanescu describes an LDO comprising “an error amplifier having a first input coupled to a reference voltage; a voltage follower coupled to an output of the error amplifier; a pass device; and a feedback network.” Ex. 1006, code (57). Instead of a buffer as was known in the prior art, Stanescu teaches using “a unity-gain-configured wide-band [operational transconductance amplifier (OTA)].” *Id.* at 5:36–38.

Because we focus on independent claim 1 for this decision, and Petitioner’s argument for dependent claim 11 is uncontested at this stage, we need not consider Stanescu in our decision to institute *inter partes* review.

4. *Claim 1*

(a) Preamble

The preamble of claim 1 recites “[a] voltage regulator.” Ex. 1001, 6:2.

Petitioner argues that “Al-Shyoukh discloses a ‘low-dropout regulator,’ which is a voltage regulator.” Pet. 15 (citing Ex. 1004, code (57)). Patent Owner does not contest this argument. *See* Prelim. Resp.

At this stage, we agree with Petitioner that Al-Shyoukh discloses the preamble, so we need not decide whether the preamble is limiting.

(b) Limitation 1[a]

Limitation 1[a] recites that the claimed voltage regulator comprises “an operational amplifier.” Ex. 1001, 6:3.

Petitioner argues that a person of ordinary skill in the art would have understood that the error amplifier in Al-Shyoukh’s LDO is an operational amplifier, and that “[o]perational amplifiers were . . . a conventional design for an error amplifier.” Pet. 15–16 (citing Ex. 1004, 1738, 1741, Fig. 8; x. 1002 ¶¶ 50–52).

Patent Owner does not contest this argument, except to argue that Petitioner’s argument is inconsistent with its argument in district court that the term “operational amplifier” lacks written-description support in the specification. Prelim. Resp. 42 n.10. Because invalidity for lack of written description is outside the scope of an *inter partes* review, we decline to address that question, which also has no bearing on whether Al-Shyoukh discloses an operational amplifier. *See* 35 U.S.C. § 311(b).

Thus, at this stage, we agree with Petitioner that Al-Shyoukh discloses limitation 1[a], for the reasons given in the Petition.

(c) Limitation 1[b]

Limitation 1[b] recites that the claimed voltage regulator comprises “a gm enhanced current buffer driver.” Ex. 1001, 6:4.

Petitioner argues that “Al-Shyoukh’s buffer driver discloses this limitation.” Pet. 16. According to Petitioner, “Al-Shyoukh’s buffer is ‘gm enhanced’ because it receives a gm boost from a current feedback circuit comprising M₂₄ and M₂₅.” *Id.* (citing Ex. 1004, 1733–35, Figs. 3, 4, 8; Ex. 1002 ¶ 53); *see also* Pet. 12–13 (arguing that, in Al-Shyoukh’s LDO,

when a load is placed on pass device M_p , “the voltages at nodes N_1 and N_2 drop, increasing the source-gate voltage of M_{24} , increasing current through M_{24} , which is mirrored through M_{25} , increasing current through M_{21} (via M_{22} and M_{23}), and thus increasing transconductance g_{m21} ” (citing Ex. 1004, 1734–35; Ex. 1002 ¶¶ 46–47)).

Petitioner notes that the ’074 patent describes its buffer driver as a “source follower” that results in a low-impedance output to allow pole separation. Pet. 16–17 (citing Ex. 1001, 3:57, 4:64–5:1). Relying on Dr. Chen’s testimony, Petitioner argues that a person of ordinary skill in the art “would . . . have understood the patent to be using what was conventionally known as a *voltage* buffer.” Pet. 17 (citing Ex. 1002 ¶ 54). Petitioner contends that Al-Shyoukh’s buffer driver is equivalent to the one described in the ’074 patent, as Al-Shyoukh’s buffer driver produces a low-impedance output, operates as a “source follower,” and separates a parasitic pole associated with buffer output N_2 from the dominant pole associated with output V_{out} of the LDO. *Id.* (citing Ex. 1004, 17:34–35; Ex. 1002 ¶ 55).

Patent Owner counters that Petitioner’s argument effectively rewrites the claim, which clearly recites a “current buffer.” Prelim. Resp. 42–43 (citing Ex. 2006, 28). According to Patent Owner, Petitioner has failed to meet its burden of showing that claim 1 departs from the ordinary and customary meaning of its terms. *Id.* at 43 (citing *Thorner v. Sony Computer Entm’t Am. LLC*, 669 F.3d 1362, 1365 (Fed. Cir. 2012); *Hill-Rom Servs., Inc. v. Stryker Corp.*, 755 F.3d 1367, 1371 (Fed. Cir. 2014)).

We need not address whether there is evidence of an intent to depart from the ordinary and customary meaning of the term “current buffer driver” because Petitioner also relies on its alternative argument that, whatever the

meaning of *current buffer driver* is, Al-Shyoukh discloses it in the same way that the '074 patent discloses it. Pet. 17 (citing Ex. 1004, 1734–35; Ex. 1002 ¶ 55).

Patent Owner contends that this alternative argument is improper because it is the claims, not the specification, that defines a claimed invention. Prelim. Resp. 44, 46–47 (citing *Brassica Prot. Prods. LLC v. Sunrise Farms*, 301 F.3d 1343, 1349 (Fed. Cir. 2002); *Johnson & Johnston Assocs. v. R.E. Serv. Co.*, 285 F.3d 1046, 1052 (Fed. Cir. 2002); *CommScope Techs. LLC v. Dali Wireless Inc.*, 10 F.4th 1289, 1295 (Fed. Cir. 2021); *Siemens Med. Sols. USA, Inc. v. Saint-Gobain Ceramics & Plastics, Inc.*, 637 F.3d 1269, 1282 (Fed. Cir. 2011)).

Although we agree that the claims define the invention, we do not ignore the specification when construing the ordinary and customary meaning of a claim term. *See Phillips*, 415 F.3d at 1313 (the ordinary and customary meaning of a claim term “is its meaning to the ordinary artisan after reading the entire patent”). Here, the '074 patent appears to use the terms *current buffer driver*, *current driver*, or *current buffer* to refer to the driver it discloses—which has a low impedance output and separates the pole associated with the output driver from the pole associated with the buffer output. Ex. 1001, 3:57, 4:4–14, 4:64–5:1.

Patent Owner asserts that the buffer driver disclosed in the '074 patent specification's is consistent with what it contends is the ordinary and customary meaning of the term *current buffer driver*. *See* Prelim. Resp. 44–45 (citing Ex. 1001, 3:31, 3:57, 4:4–5, 4:11–13, 4:57–67) (“[I]t is certainly possible, as the '074 specification discloses, to have a low output impedance current buffer.”). The dispute appears to be one of nomenclature rather than

substance. As Dr. Chen explains, the subject matter in the '074 patent Specification that supports Patent Owner's claim to a "current buffer" corresponds to the subject matter in Al-Shyoukh that Petitioner contends a person of ordinary skill in the art "would have recognized as a *voltage* buffer." *See* Ex. 1004 ¶¶ 45–54 (noting that "low output impedance was conventionally understood to be a characteristic of voltage buffers, in contrast with current buffers, which have high output impedance.").

Patent Owner also argues that, during prosecution of the '074 patent, the Examiner rejected a claim reciting a "current buffer driver" over Xi,¹¹ but the applicant argued that Xi disclosed a "voltage buffer" and the Examiner did not maintain a Xi-based rejection in the next office action. Prelim. Resp. 45–46 (citing Ex. 2005, 69, 97, 105–115; *accord* Ex. 1003, 145, 130, 102–112).

The applicant's argument in response to Xi is not simply that it disclosed a voltage buffer, but that it comprises an operational amplifier in which the output is connected directly to the inverting input, so that "the output of [the] operational amplifier . . . will be the same voltage as the input voltage." Ex. 1003, 130. According to the applicant, "[a] current fed into the operational amplifier cannot be buffered by such a circuit. In fact, due to the high impedance at the input of operational amplifier . . . , there is basically no input current flowing into the buffer." *Id.* Based on our preliminary analysis, this distinction does not appear to apply to either the '074 patent or Al-Shyoukh. *See* Ex. 1001, Fig. 3B; Ex. 1004, Fig. 8; Indeed, the Examiner's next step was to reject the claims as being anticipated by Al-

¹¹ Xi, US 6,246,221 B1, issued June 12, 2001 (Ex. 2004).

Shyoukh, finding that it disclosed “a gm enhanced current buffer driver (e.g., the circuits comprising M21–M27, see Fig. 8 in view of Fig[s]. 4–5).” *Id.* at 104–105. The applicant did not challenge this finding on the record. *See id.* at 93–98.

We determine that Petitioner has sufficiently shown, at this stage, that Al-Shyoukh, in view of Ivanov, teaches limitation 1[b] for the reasons outlined in the Petition.

(d) Limitation 1[c]

Limitation 1[c] recites that the claimed voltage regulator comprises “a biasing circuit coupled to the current buffer driver to set a biasing ratio for gm-boost of the current buffer driver.” Ex. 1001, 6:5–6.

Petitioner argues that “Al-Shyoukh’s LDO uses a biasing circuit coupled to the buffer driver to set a voltage V_{b1} at the gate of transistor M₂₇, providing a bias current I_{22} that is mirrored across transistors M₂₃ and M₂₂ to set a biasing ratio for gm-boost of the current buffer driver.” Pet. 17 (citing Ex. 1004, Fig. 8; Ex. 1002 ¶¶ 56–58). According to Petitioner, Al-Shyoukh’s biasing circuit operates the same way as the biasing circuit in the ’074 patent. Pet. 17–19 (citing Ex. 1001, 5:13–24, Fig. 3B; Ex. 1004, 1734, Fig. 8; Ex. 1002 ¶¶ 56–57).

Alternatively, “to the extent Patent Owner argues that ‘biasing ratio’ should be understood to mean a ratio of current that the current buffer draws from DC relative to the current feedback circuit,” Petitioner argues that Al-Shyoukh discloses this ratio. Pet. 20–21 & n.2 (citing Ex. 1004, Fig. 8; Ex. 1002 ¶ 59).

Patent Owner does not currently contest these arguments. *See Prelim. Resp.* At this stage, we find Petitioner’s arguments sufficiently persuasive.

(e) Limitation 1[d]

Limitation 1[d] recites that the claimed voltage regulator comprises “an enable/disable function to enable/disable the biasing circuit for reducing standby current.” Ex. 1001, 6:7–8.

In the parallel district court proceeding, Petitioner argued that this limitation was indefinite because it was subject to 35 U.S.C. § 112 para. 6 and the '074 patent failed to disclose sufficient corresponding structure. *See* Ex. 3001, 9. However, in its Petition, Petitioner adopts what it understands to be Patent Owner’s claim-construction in the parallel proceeding: “that 1[d] is not a means-plus-function element under [§ 112 paragraph 6], and to the extent it is, the claimed function is to enable/disable the biasing circuit for reducing standby current, and the corresponding structure is the signal input line at node M in Figure 3.” Pet. 21–22.

Assuming that limitation 1[d] does not invoke § 112 paragraph 6, Petitioner argues that “Al-Shyoukh discloses inputs from a biasing circuit into its LDO but does not specify a design,” but Ivanov discloses a specific design for implementing the recited enable/disable function, and a person of ordinary skill in the art would have had reason to incorporate Ivanov’s design into Al-Shyoukh’s LDO. Pet. 22–26 (citing Ex. 1004, 1732; Ex. 1005, 1:6–18, 3:43–49, 3:54–63, 4:26–33, 5:19–25, 6:7–22, 6:47–54, Figs. 1, 2; Ex. 1002 ¶¶ 60–70).

Alternatively, if limitation 1[d] invokes § 112 paragraph 6 and Patent Owner is correct that the corresponding structure is the signal input line at node M in Figure 3 of the '074 patent, Petitioner argues that this structure is identical to Ivanov’s input line 8. Pet. 26 (citing Ex. 1001, Figs. 1, 3; Ex. 1002 ¶ 69).

In response, Patent Owner first argues that Petitioner “makes no attempt to explain how the Board could apply the prior art Grounds to the ‘enable/disable’ limitation if the claim is indefinite, as Petitioner contends.” Prelim. Resp. 48–49.

As we discuss above, the district court in the parallel proceeding held that Petitioner did not meet its burden of showing that any claims were indefinite. Ex. 1020, 1–2; Ex. 3001, 9. *See supra* Section IV.B. We decline to revisit the district court’s decision. *See* 35 U.S.C. § 311(b). Thus, it would have been unnecessary and futile for Petitioner to have argued in the Petition that limitation 1[d] is indefinite.

Next, Patent Owner argues that under its alternative construction, assuming that limitation 1[d] invokes § 112 paragraph 6 (similar to an argument that Petitioner also made in district court), Petitioner “again makes no attempt to map the prior art Grounds to the ‘enable/disable’ limitation.” Prelim. Resp. 49 (citing Ex. 2003, 12; 37 C.F.R. § 42.104(b)(3); *Williamson v. Citrix Online, LLC*, 792 F.3d 1339 (Fed. Cir. 2015); PTAB Consolidated Trial Practice Guide, 45 (Nov. 2019), <https://www.uspto.gov/TrialPracticeGuideConsolidated>).

We need not consider Petitioner’s alternative argument in this decision, because the district court held that limitation 1[d] is not subject to § 112 paragraph 6. Ex. 3001, 9–12. Because neither party contests the district court’s conclusion at this stage of this proceeding, and we find it reasonable, we will preliminarily adopt that conclusion.

Next, Patent Owner argues that it was improper for Petitioner to assume in its Petition that limitation 1[d] does not invoke § 112 paragraph 6, while simultaneously arguing the opposite in district court and failing to

disclose this to the Board. *See* Prelim. Resp. 49–51 (citing *Facebook, Inc. v. Sound View Innovations, LLC*, IPR2017-00998, Paper 13, at 11, 17–18 (PTAB Sept. 5, 2017)).

We disagree. In *Facebook v. Sound View Innovations*, the panel suggested, without holding, that the petitioner might have breached its duty of candor not to inform the Board of its argument in district court that the claim invoked § 112 paragraph 6, while taking an inconsistent position before the Board. *See* IPR2017-00998, Paper 13, at 18 & n.12. The situation in the present case is different, however, because Petitioner presented alternative arguments in its Petition, including an argument that limitation 1[d] invokes § 112 paragraph 6, which is consistent with its argument in district court.

Moreover, in light of the district court’s determination that limitation 1[d] does not invoke § 112 paragraph 6—which is consistent with Petitioner’s main argument, and which we preliminarily adopt for this decision—Patent Owner has not shown that it suffered any prejudice because of Petitioner’s arguments or lack of arguments in this proceeding.

We determine that Petitioner has sufficiently shown, at this stage, that Al-Shyoukh discloses limitation 1[d] for the reasons outlined in the Petition.

(f) Limitations 1[e]–[g]

Limitations 1[e]–[g] recite that the claimed voltage regulator comprises “an output power driver, wherein the current buffer driver is coupled between the operational amplifier and the output power driver; a current feedback circuit coupled between the output power driver and the current buffer driver; and a feedback loop coupled between the output power driver and the operational amplifier.” Ex.1001, 6:10–16.

Petitioner argues that Al-Shyoukh discloses these limitations. Pet. 27–29 (citing Ex. 1004, 1732, Fig. 8; Ex. 1002 ¶¶ 71–73). Patent Owner does not contest these arguments at this stage. *See* Prelim. Resp.

We determine that Petitioner has sufficiently shown, at this stage, that Al-Shyoukh discloses limitations 1[e]–[g] for the reasons outlined in the Petition.

(g) Conclusion as to claim 1.

For the above reasons, we determine that Petitioner has shown, sufficiently at this stage, that the combination of Al-Shyoukh and Ivanov teaches all the limitations of claim 1, and that a person of ordinary skill in the art would have had reason and ability to incorporate Ivanov’s enable/disable function in Al-Shyoukh LDO. We therefore determine that Petitioner is reasonably likely to prevail in showing that claim 1 is unpatentable under § 103 based on Al-Shyoukh in view of Ivanov, with or without the further teachings of Stanescu relevant to claim 11.

5. *Other Claims*

Because Petitioner has shown a reasonable likelihood of prevailing with respect to claim 1 as discussed above, we will institute on all claims and all grounds raised in the Petition. *See* 37 C.F.R. § 42.108(a). Although we do not address dependent claims 2–18 in detail, for the benefit of the parties, we provide our preliminary views on the disputed issues regarding these claims.

First, Patent Owner argues that in the parallel district court proceeding, Petitioner argued that claims 4 and 8–10 were indefinite, and that Petitioner’s failure to disclose this to the Board is improper. *See* Prelim.

Resp. 53–56. Similarly, for claim 14, Patent Owner argues that Petitioner seems to imply that the claim is indefinite, but proceeds on the basis of a claim construction that Patent Owner has never taken either in this proceeding or in district court. Prelim. Resp. 56–57 & n.12 (citing Pet. 46–47).

As we discuss above, the district court in the parallel proceeding held that Petitioner did not meet its burden of showing that any claims were indefinite. Ex. 1020, 1–2; Ex. 3001, 9. *See supra* Section IV.B. We decline to revisit that decision. *See* 35 U.S.C. § 311(b). Patent Owner has not shown that it has been prejudiced by Petitioner’s failure to make or disclose an argument in this proceeding that the district court rejected, and that would have been futile if made in this proceeding.

Patent Owner also argues that the Petition is deficient because the argument for dependent claim 11 relies on “Al-Shyoukh as modified by Stanescu,” without mentioning Ivanov, which Petitioner relies on for its argument for limitation 1[d]. Prelim. Resp. 29 (quoting Pet. 41).

Although Petitioner’s specific argument for claim 11 does not mention Ivanov, the Petition as a whole does not lack clarity that Petitioner’s argument for claim 11 also relies on the arguments for parent claim 1, including the Ivanov-based arguments for limitation 1[d].

Thus, we decline to deny institution because of Patent Owner’s arguments as to claims 4, 8–11, or 14.

D. GROUND BASED ON RINCON-MORA, THE RINCON-MORA PAPER, AL-SHYOUKH, IVANOV, AND STANESCU

Because Petitioner has shown a reasonable likelihood of prevailing with respect to claim 1 on the first ground based on Al-Shyoukh, Ivanov, and

Stanescu, we need not address the second ground of the petition based in part on Rincon-Mora and the Rincon-Mora Paper. *See* 37 C.F.R. § 42.108(a). However, we provide our preliminary view as to Patent Owner’s arguments directed specifically to this ground.

Patent Owner also argues that Petitioner improperly treats Rincon-Mora and the Rincon-Mora Paper (and for two of the dependent claims, a related Ph.D. thesis by Rincon-Mora¹²) as a single prior-art system, without identifying which is the primary reference and without providing a motivation to combine the Rincon-Mora references. *See* Prelim. Resp. 30–33.¹³

We disagree that Petitioner has failed to provide a motivation to combine Rincon-Mora with the Rincon-Mora Paper. Relying on Dr. Chen’s testimony, Petitioner argues that “[b]ecause the Rincon-Mora Paper discloses substantially the same LDO, a [person of ordinary skill in the art] implementing the LDO would have considered both of the Rincon-Mora References to understand the invention.” Pet. 56 (citing Ex. 1002 ¶ 137). Which reference is primary does not appear to affect Petitioner’s argument. *See Schwendimann v. Neenah, Inc.*, 82 F.4th 1371, 1384 (Fed. Cir. 2023).

¹² Rincon-Mora, *Current Efficient, Low Voltage, Low Drop-Out Regulators* (Nov. 1996) (Ph.D. thesis, Georgia Institute of Technology) (Ex. 1015).

¹³ Alternatively, Patent Owner argues that a patent challenger cannot rely on two references, under these circumstances, without providing a motivation to combine. *See* Prelim. Resp. 31–32 (citing *IOENGINE, LLC v. Paypal Holdings, Inc.*, 607 F. Supp. 3d 464, 518–19 (D. Del. 2022)). We need not decide this issue because Petitioner has articulated a reason to combine the two Rincon-Mora references.

At this stage, we find sufficiently persuasive Petitioner’s argument that the Rincon-Mora Paper describes an LDO that is structurally the same as the one that Rincon-Mora describes, and this would have been sufficient motivation to combine the teachings of the two references. *See* Ex. 1002 ¶ 137; *compare* Ex. 1013, Figs. 2, 3, *with* Ex. 1014, 36 (Fig. 1), 37 (Fig. 2). Although Petitioner also relies on the Rincon-Mora Ph.D. thesis for claims 5 and 16, Petitioner appears to use this reference as evidence of the general knowledge of a person of ordinary skill in the art, rather than as part of the combination. *See* Pet. 72, 85.

Patent Owner also argues that Petitioner “relies on the combination of the Rincon-Mora patent, possibly the Rincon-Mora Paper, and Ivanov for claim 1” (Prelim. Resp. 30 (citing Pet. 57–69)), but for claim 9 the Petition “invokes Al-Shyoukh” (*id.* (quoting Pet. 78)) and for claim 11, Petitioner relies on “Rincon-Mora as modified by Stanescu” (*id.* (citing Pet. 76)).

Although Petitioner’s specific arguments for claims 9 and 11 do not mention Ivanov, the Petition as a whole does not lack clarity that Petitioner’s arguments for claims 9 and 11 also rely on the arguments for parent claim 1, including Rincon-Mora, the Rincon-Mora Paper, and their combination with Ivanov in the argument for limitation 1[d].

Patent Owner also, once again, challenges Petitioner’s proposed construction of “current buffer driver,” but as we address above, we disagree with that argument. Prelim. Resp. 47; *see supra* section IV.C.4(c).

Thus, at this stage we disagree with the arguments Patent Owner has made for the second ground of the Petition.

V. DISCRETIONARY DENIAL

A. DENIAL UNDER 35 U.S.C. § 314(a)

Under 35 U.S.C. § 314(a), institution of *inter partes* review is discretionary. *See Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1367 (Fed. Cir. 2016); *see also* 35 U.S.C. § 314(a). In *Amazon Inc. v. Fintiv, Inc.*, IPR2020-00019, Paper 11 (PTAB Mar. 20, 2020) (precedential), the Board provided six non-exclusive factors for determining “whether efficiency, fairness, and the merits support the exercise of authority to deny institution in view of an earlier trial date in the parallel proceeding.” *Id.* at 6. These factors are as follows:

1. whether the court granted a stay or evidence exists that one may be granted if a proceeding is instituted;
2. proximity of the court’s trial date to the Board’s projected statutory deadline for a final written decision;
3. investment in the parallel proceeding by the court and the parties;
4. overlap between issues raised in the petition and in the parallel proceeding;
5. whether the petitioner and the defendant in the parallel proceeding are the same party; and
6. other circumstances that impact the Board’s exercise of discretion, including the merits.

Id. at 5–6.

In evaluating these factors, we take a holistic view of whether efficiency and integrity of the system are best served by denying or instituting review. *Id.* at 6. The Director has also issued interim guidance to the Board on applying the factors. *See* Katherine K. Vidal, Interim Procedure for Discretionary Denials in AIA Post-Grant Proceedings with Parallel

District Court Litigation (June 21, 2022) 9, https://www.uspto.gov/sites/default/files/documents/interim_proc_discretionary_denials_aia_parallel_district_court_litigation_memo_20220621_.pdf (“Interim Procedure”).

Patent Owner argues that “the majority of the *Fintiv* factors favor denial (or are neutral) and the Board should exercise its discretion under § 314(a) to deny institution.” Prelim. Resp. 61. In particular, Patent Owner contends that there is no stay in the district court litigation (factor 1); no trial date has been set (factor 2); the parties and court have made significant investments in the district court action such as the exchange of infringement and invalidity contentions, claim construction proceedings, and significant discovery (factor 3); the cases assert substantially the same art, including Al-Shyoukh, Rincon-Mora, the Rincon-Mora Paper, and Stanescu, and Petitioner has not entered a stipulation to remove overlap between the proceedings (factor 4); the parties are the same (factor 5); and Patent Owner has alleged substantial defects and shortcomings in the Petition (factor 6).

Of the first five *Fintiv* factors, we consider factor 2 (proximity to trial in the parallel case) most significant under these circumstances. Here, the trial date has not been set. *See* Prelim. Resp. 58. Thus, factor 2 weighs heavily against discretionary denial.

The other factors do not outweigh the second factor. As to factor 1, there is no evidence as to whether there will be a stay in the parallel case, so we regard this factor as neutral. As to factor 3, there has been substantial activity in the parallel case, but overall, the proceeding is in its early stages, so we regard this factor as weighing only moderately in favor of discretionary denial. As to factor 4, there is some overlap as to the asserted references, but it does not appear that Petitioner has included Ivanov—a key

secondary reference in this proceeding—in its preliminary invalidity contentions. *See* Ex. 2006, 6–8. So factor 4 weighs somewhat but not heavily in favor of discretionary denial. As to factor 5, the parties in the parallel proceeding are not different from the parties here, so we regard this factor as neutral.

As to *Fintiv* factor 6, we have considered Patent Owner’s arguments about alleged substantial defects and shortcomings of the Petition, and we do not find them persuasive at this stage. *See, e.g., supra* Sections III, IV.B, IV.C.5, IV.D.

For the above reasons, we determine that the efficiency and integrity of the patent system are best served by instituting *inter partes* review, and we decline to deny institution discretionarily under 35 U.S.C. § 314(a).

B. DENIAL UNDER 35 U.S.C. § 325(d)

Section 325(d) provides that, “[i]n determining whether to institute or order [an *inter partes* review], the Director^[14] may take into account whether, and reject the petition or request because, the same or substantially the same prior art or arguments previously were presented to the Office.” In evaluating this question, we use a two-part framework, first determining “whether the same or substantially the same art previously was presented to the Office or whether the same or substantially the same arguments previously were presented to the Office.” *Advanced Bionics, LLC v. MED-EL Elektromedizinische Geräte GmbH*, IPR2019-01469, Paper 6 at 8 (PTAB

¹⁴ The Director has delegated this determination to us under 37 C.F.R. § 42.4(a).

Feb. 13, 2020) (precedential). If either condition of the first part of the framework is satisfied, then we determine, second, “whether the petitioner has demonstrated that the Office erred in a manner material to the patentability of challenged claims.” *Id.*

The two-part *Advanced Bionics* framework involves weighing the following nonexclusive factors:

- (a) the similarities and material differences between the asserted art and the prior art involved during examination;
- (b) the cumulative nature of the asserted art and the prior art evaluated during examination;
- (c) the extent to which the asserted art was evaluated during examination, including whether the prior art was the basis for rejection;
- (d) the extent of the overlap between the arguments made during examination and the manner in which Petitioner relies on the prior art or Patent Owner distinguishes the prior art;
- (e) whether Petitioner has pointed out sufficiently how the Examiner erred in its evaluation of the asserted prior art; and
- (f) the extent to which additional evidence and facts presented in the Petition warrant reconsideration of the prior art or arguments.

Becton, Dickinson & Co. v. B. Braun Melsungen AG, IPR2017-01586, Paper 8 at 17–18 (PTAB Dec. 15, 2017) (precedential as to § III.C.5, para. 1) (formatting altered); *see also Advanced Bionics*, Paper 6 at 9–11 (noting that the Board considers the *Becton, Dickinson* factors in an *Advanced Bionics* analysis).

Petitioner argues that § 325(d) does not apply because, “[a]lthough Al-Shyoukh was before the [E]xaminer during prosecution, . . . Ivanov was not before the [E]xaminer and disclosed the limitation [the applicant] added to

overcome Al-Shyoukh,” and is not cumulative to other references. Pet. 13–14 (citing Ex. 1003, 94, 109). Thus, Petitioner argues that the first part of the *Advanced Bionics* framework is not satisfied.

Alternatively, if we were to find that Ivanov is cumulative to another reference, Petitioner argues that the Examiner erred by failing to issue a rejection relying on the prior-art disclosure of the recited “enable/disable function” of limitation 1[d]. Pet. 14–15.

In response, Patent Owner argues that the first part of the *Advanced Bionics* framework is not satisfied because Al-Shyoukh was the basis of a rejection, and although Ivanov was not before the examiner, Huang,¹⁵ which is allegedly cumulative to Ivanov, was before the examiner. Prelim. Resp. 5–14; *see also id.* at 14–26 (discussing and distinguishing non-precedential PTAB decisions). In particular, Patent Owner argues that Huang “contains ‘substantially the same’ disclosure . . . vis-à-vis an ‘enable/disable’ signal as that in Ivanov relied on by Petitioner.” *Id.* at 8–9 (citing Ex. 1005, 1:6–9, 1:12–18, 3:43–49, 3:54–63, 4:26–33, 5:19–25, 6:7–22, 6:47–52, Figs. 1, 2; Ex. 2001, code (57), 1:6–9, 2:3–16, 2:59–64, 3:7–18, Fig. 2A); *see also id.* at 9–12 (comparing Ivanov’s alleged enable/disable function with that of Huang).

According to Patent Owner, Huang appeared on an early information disclosure statement and the Examiner was aware of it throughout prosecution. Prelim. Resp. 12–13 (citing Ex. 2005, 47).

Patent Owner also argues that, although Petitioner only relies on Stanescu for claim 11 (reciting that “the current buffer driver is an

¹⁵ Huang, US 7,312,598 B1, issued Dec. 25, 2007 (Ex. 2001).

operational transconductance amplifier (OTA)”), Stanescu is cumulative to Xi, which was the subject of a rejection and describes the recited OTA.

Prelim. Resp. 13–14 (quoting Ex. 1001, 14:44–45) (citing Pet. 41; Ex. 2004, 4:24–29; Ex. 2005, 69).

We need not decide whether Ivanov or Stanescu is cumulative to art that was before the Examiner during prosecution because we determine, under the second part of the *Advanced Bionics* analysis, that the Examiner materially erred by failing to consider Al-Shyoukh in view of Ivanov or a reference cumulative to Ivanov. As we discuss above, we find sufficiently persuasive, at this stage, Petitioner’s arguments for incorporating Ivanov’s enable/disable function into Al-Shyoukh’s LDO. *See supra* Section IV.C.4(e).

Regarding the second part of the *Advanced Bionics* analysis, Patent Owner argues that Petitioner “does not even contend that the Examiner overlooked or erred regarding Al-Shyoukh And the Petition is silent concerning Huang. Prelim. Resp. 17. According to Patent Owner, Huang appears on the face of the ’074 patent and “the Examiner initialed the [information disclosure statement], confirming that he had considered Huang.” *Id.* at 17–18 (citing Ex. 1001, 1; Ex. 2005, 47, 69). Patent Owner also argues that Huang had appeared on an international search report in a related PCT application¹⁶ as one of four listed references, and the report identified Huang’s Figure 2A which according to Patent Owner also shows

¹⁶ The related PCT application, PCT/US2014/023962, claims priority to the application that issued as the ’074 patent. *See* WO 2014/159507 A2, code (30) (published Oct. 2, 2014).

the alleged enable/disable function of limitation 1[d] to the same extent as Ivanov. *Id.* at 18–19 & n.3 (citing Ex. 2005, 51, 53).

Patent Owner also argues that the Examiner used Huang’s patent number as a search term for some prior-art searches. Prelim. Resp. 20–21 (citing Ex. 2005, 82, 118, 122, 145, 149).

Thus, Patent Owner argues that “it is highly unlikely that the Examiner ‘overlooked’ Huang or otherwise materially erred vis-à-vis Huang’s enable/disable disclosure Rather, the logical conclusion is that the Examiner did his job, considered Huang for all it teaches, and allowed the claims.” Prelim. Resp. 20–21; *see also id.* at 21–25 (discussing and distinguishing non-precedential PTAB decisions including *Google LLC v. Valtrus Innovations Ltd.*, IPR2022-01197, Paper 18, 18–28 (PTAB Jun. 13, 2023)).

According to our precedent, “if the record of the Office’s previous consideration of the art is not well developed . . . , then a petitioner may show the Office erred by overlooking something persuasive under [Becton, Dickinson] factors (e) and (f).” *Advanced Bionics*, Paper 6 at 10; *see also Keysight Techs., Inc. v. Centripetal Networks, Inc.*, IPR2022-01421, Paper 14 (PTAB Aug. 24, 2023) (vacating a Board decision denying institution where the examiner considered references but never provided any discussion, analysis, or other findings, and the petition provided a sufficient argument on the merits, which the examiner misapprehended or overlooked). Here, in evaluating *Becton, Dickinson* factor (c), we determine that the Examiner’s reasoning with respect to Huang is not well developed and was not the basis for a rejection. We also determine, for reasons we discuss more fully above, that Petitioner has sufficiently shown at this stage that the

Examiner materially erred by overlooking the combination of Al-Shyoukh and a reference such as Ivanov (e.g., Huang, according to Patent Owner) as applied to limitation 1[e] (*Becton, Dickinson* factor (e)), and that the Petition presents additional evidence and facts, including testimony by Dr. Chen, that warrant reconsideration of Al-Shyoukh in view of Ivanov (*Becton, Dickinson* factor (f)). *See supra* Section IV.C.4(e).

Because we determine that the *Advanced Bionics* analysis is satisfied as to the first ground of the Petition based on the combination of Al-Shyoukh and Ivanov, we need not address Patent Owner's § 325(d) argument for the second ground based on the premise that Rincon-Mora is allegedly cumulative to Al-Shyoukh. *See* Pet. 25–27. To the extent that these two references are cumulative, our *Advanced Bionics* analysis would weigh against denial of institution on the second ground for the same reasons as the first ground.

For the above reasons, we decline to deny institution discretionarily under § 325(d).

VI. CONCLUSION

For the reasons set forth above, Petitioner has shown that there is a reasonable likelihood it would prevail with respect to at least one of the claims challenged in the Petition, and we institute trial on all asserted grounds and all challenged claims. *See* 37 C.F.R. § 42.108(a).

VII. ORDER

It is

ORDERED that, pursuant to 35 U.S.C. § 314(a), an *inter partes* review of claims 1–18 of the '074 patent is instituted with respect to all the grounds set forth in the Petition; and

FURTHER ORDERED that pursuant to 35 U.S.C. § 314(c) and 37 C.F.R. § 42.4, *inter partes* review of the '074 patent commences on the entry date of this Order, and the Board hereby gives notice of the institution of a trial.

IPR2024-00646
Patent 9,471,074 B2

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