

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

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**LYNK LABS, INC.,**  
*Appellant*

v.

**SAMSUNG ELECTRONICS CO., LTD.,**  
*Appellee*

**DERRICK BRENT, ACTING UNDER SECRETARY  
OF COMMERCE FOR INTELLECTUAL PROPERTY  
AND ACTING DIRECTOR OF THE UNITED  
STATES PATENT AND TRADEMARK OFFICE,**  
*Intervenor*

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2023-2346

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Appeal from the United States Patent and Trademark  
Office, Patent Trial and Appeal Board in No. IPR2022-  
00149.

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Decided: January 14, 2025

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Before LOURIE, PROST, and STARK, *Circuit Judges*.

PROST, *Circuit Judge*.

Lynk Labs, Inc. (“Lynk Labs”) appeals from a final written decision of the Patent Trial and Appeal Board (“Board”) in an inter partes review (“IPR”) determining claims 7–13 and 15–17 of U.S. Patent No. 10,687,400 (“the ’400 patent”) unpatentable. We affirm.

This case presents the question of when a published patent application is deemed prior art in an IPR—can it be as of the application’s filing date, or only as of the application’s publication? As explained below, we agree with the Board that it is the former: under the statutory provisions applicable here, a published patent application can be deemed prior art in an IPR as of the application’s filing date. And, because we otherwise see no error in the Board’s unpatentability determinations, we affirm.

## BACKGROUND

### I

The ’400 patent “generally relates to light emitting diodes (‘LEDs’) and LED drivers” and more “specifically relates to alternating current (‘AC’) driven LEDs, LED circuits, and AC drive circuits and methods.” ’400 patent col. 1 ll. 45–48 (cleaned up). The specification explains that “LED based lighting may be used for general lighting, specialty lighting, signs[,] and decoration such as for

Christmas tree lighting.” *Id.* at col. 2 ll. 8–11. The claims recite lighting systems with various LED circuit configurations. For example, independent claim 7 recites:

A lighting system comprising:

an LED circuit array comprising an LED circuit comprising a plurality of LEDs connected in series;

a capacitor;

a bridge rectifier configured to receive an input AC voltage from a mains power source;

a driver connected to the bridge rectifier and configured to provide a rectified output AC voltage to the LED circuit array;

wherein a forward voltage of the LEDs of the LED circuit array matches the rectified input AC voltage output of the driver; and

wherein the LED circuit array, the capacitor, the bridge rectifier, and the driver are all mounted on a single substrate.

*Id.* at claim 7.

## II

In November 2021, Samsung Electronics Co., Ltd. (“Samsung”) filed a petition for IPR of the ’400 patent, challenging claims 7–20 as unpatentable for obviousness under 35 U.S.C. § 103. Lynk Labs then statutorily disclaimed claims 14 and 18–20, leaving only claims 7–13 and 15–17 subject to the IPR.

Relevant here are Samsung’s first six grounds of unpatentability, each of which relied on U.S. Patent Application Publication No. 2004/0206970 (“Martin”) and which together encompassed claims 7–13 and 17. *See Samsung Elecs. Co. v. Lynk Labs, Inc.*, IPR2022-00149, Paper 33,

at 68 (P.T.A.B. June 26, 2023) (“*Final Written Decision*”); J.A. 1867–79 (Martin).

The Martin application was filed before the ’400 patent’s priority date but was published only after that date. Specifically, Martin was filed on April 16, 2003; the ’400 patent’s priority date is February 25, 2004;<sup>1</sup> and Martin was published on October 21, 2004. Martin was later abandoned and never matured into a patent.

Across Samsung’s first six grounds of unpatentability, the Board determined claims 7–13 and 17 unpatentable for obviousness. *See Final Written Decision*, at 68. After rejecting Lynk Labs’ argument that Martin could not serve as prior art to the ’400 patent in an IPR, the Board determined that each of the claims at issue in this appeal would have been obvious in view of Martin and at least one other reference. Five of the six grounds at issue rely on Nerone<sup>2</sup> as the primary reference in view of at least Martin, and the Board relied on the combination of Nerone and Martin to determine claims 7–13 unpatentable.<sup>3</sup> *Id.*

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<sup>1</sup> Lynk Labs maintains that the ’400 patent’s priority date is its earliest effective filing date of February 25, 2004, *see, e.g.*, Appellant’s Br. 57, and Samsung assumed as much for purposes of the IPR, *see* J.A. 6049. For purposes of this opinion, we will likewise treat the ’400 patent’s priority date as February 25, 2004.

<sup>2</sup> U.S. Patent No. 6,411,045 (“Nerone”), J.A. 2253–61.

<sup>3</sup> Lynk Labs’ only challenge as to claim 17 is its argument that Martin could not serve as prior art to the ’400 patent in the IPR. Across Samsung’s eighth and ninth grounds of unpatentability—neither of which relied on Martin—the Board determined that claims 15 and 16 are unpatentable for obviousness, and Lynk Labs does not

Lynk Labs timely appealed. We have jurisdiction under 28 U.S.C. § 1295(a)(4)(A).

#### DISCUSSION

“Statutory interpretation is an issue of law that we review de novo.” *Facebook, Inc. v. Windy City Innovations, LLC*, 973 F.3d 1321, 1330 (Fed. Cir. 2020). “We review claim construction de novo and review any subsidiary factual findings based on extrinsic evidence for substantial evidence.” *ParkerVision, Inc. v. Vidal*, 88 F.4th 969, 975 (Fed. Cir. 2023) (cleaned up). “We review the Board’s legal determination of obviousness de novo and its factual findings for substantial evidence.” *Outdry Techs. Corp. v. Geox S.p.A.*, 859 F.3d 1364, 1367 (Fed. Cir. 2017). “Substantial evidence is such relevant evidence as a reasonable mind might accept as adequate to support a conclusion.” *Intel Corp. v. PACT XPP Schweiz AG*, 61 F.4th 1373, 1378 (Fed. Cir. 2023) (cleaned up).

Lynk Labs raises three main arguments on appeal: (1) Martin could not serve as prior art to the ’400 patent in an IPR because, although Martin was filed before the ’400 patent’s priority date, it was published (and thus became publicly accessible) only thereafter; (2) the Board erred in construing “an LED circuit comprising a plurality of LEDs connected in series” as recited in claim 7; and (3) the Board erred in construing “a forward voltage of the LEDs of the LED circuit array matches the rectified input AC voltage output of the driver” as recited in claim 7. As to the two claim-construction arguments, Lynk Labs further argues that, under what it views as the proper constructions, claim 7 (and thus dependent claims 8–13) would not have been obvious. We address each argument in turn.

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appeal those determinations. Samsung’s seventh ground relied on Martin but resulted in a patentability determination favorable to Lynk Labs.

## I

## A

An IPR petitioner may challenge a patent “only on a ground that could be raised under [35 U.S.C. §§] 102 or 103 and *only on the basis of prior art consisting of patents or printed publications.*” 35 U.S.C. § 311(b) (emphasis added).

Lynk Labs agrees that Martin is a “printed publication.”<sup>4</sup> Indeed, it is. “The touchstone of whether a reference constitutes a printed publication is public accessibility.” *Weber, Inc. v. Provisur Techs., Inc.*, 92 F.4th 1059, 1067 (Fed. Cir. 2024); *see also In re Klopfenstein*, 380 F.3d 1345, 1348 (Fed. Cir. 2004) (observing that, “for something to be considered a ‘printed publication[,]’ ‘the key inquiry is whether or not a reference has been made ‘publicly accessible’”). And there is no dispute that Martin, a published patent application, is publicly accessible.<sup>5</sup>

Although Lynk Labs agrees that Martin is a “printed publication,” it argues that Martin is not a “*prior art . . . printed publication*” as to the ’400 patent. *See* Appellant’s Br. 57 (quoting § 311(b) (emphasis in original)). In support, Lynk Labs points to cases—contemplating books,

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<sup>4</sup> *See* Oral Arg. at 2:00–30, No. 23-2346 (“A published patent application is a printed publication as of some date.”), [https://oralarguments.cafc.uscourts.gov/default.aspx?fl=23-2346\\_10102024.mp3](https://oralarguments.cafc.uscourts.gov/default.aspx?fl=23-2346_10102024.mp3).

<sup>5</sup> There can be little doubt that published patent applications are publicly accessible within the meaning of our precedent. *See, e.g.*, 37 C.F.R. § 1.11(a) (providing that “[t]he specification, drawings, and all papers relating to the file of” a “published application . . . are open to inspection by the public”); *see also* Manual of Patent Examining Procedure § 1128 (addressing electronic availability of published patent applications).

articles, or the like—that analyzed prior-art status under § 102(a) or (b). Section 102(a) bars patentability if the claimed invention was “described in a printed publication . . . *before the invention thereof* by the applicant for patent,” whereas § 102(b) does so if the claimed invention was “described in a printed publication . . . *more than one year prior to the date of the application for patent* in the United States.” § 102(a), (b) (emphasis added).<sup>6</sup> And the cases Lynk Labs cites stand for the proposition that, to be a prior art printed publication as to a given patent under one of these subsections, the reference at issue must have been publicly accessible *before* the date indicated in those subsections (here, for the ’400 patent, that relevant date is its priority date). *See, e.g., Voter Verified, Inc. v. Premier Election Sols., Inc.*, 698 F.3d 1374, 1380 (Fed. Cir. 2012) (“When considering whether a given reference qualifies as a prior art printed publication [under § 102(b)], the key inquiry is whether the reference was made sufficiently accessible to the public interested in the art before the critical date.” (cleaned up)); *see also VidStream LLC v. Twitter, Inc.*, 981 F.3d 1060, 1066 (Fed. Cir. 2020) (evaluating a reference’s status as a prior art printed publication under § 102(a) and concluding that “[t]he evidence well supports the Board’s finding that [the reference] was published and publicly accessible before the [challenged patent’s] . . . priority date”). So, the argument goes: because Martin became publicly accessible only as of its October 21, 2004 publication date, and because the ’400 patent’s priority date is February 25, 2004, Martin cannot be a “prior art . . . printed publication[]” under § 311(b) as to the ’400 patent.

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<sup>6</sup> The parties do not dispute that pre-Leahy Smith America Invents Act (“AIA”) § 102 applies here. *See* AIA, Pub. L. No. 112-29, sec. 3(n), 125 Stat. 284, 293 (2011). Our references to § 102 therefore refer to pre-AIA § 102.

The main problem with Lynk Labs’ argument is that, unlike § 102(a) or (b), and unlike books, articles, or other types of printed publications, Congress created—in § 102(e)(1)—a special rule for *published patent applications*. Specifically, § 102(e) states (in relevant part):

A person shall be entitled to a patent *unless*—

...

(e) the invention was described in—

(1) *an application for patent, published under [35 U.S.C. §] 122(b), by another filed in the United States before the invention by the applicant for patent . . . or*

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent . . . .

§ 102(e) (emphasis added). Thus, a U.S.-filed patent application “published under [§] 122(b)” serves as prior art to a claimed invention if the application was “*filed . . . before the [claimed] invention.*” *Id.* § 102(e)(1) (emphasis added).<sup>7</sup> In other words, under § 102(e)(1), even if a patent application was *published* after a claimed invention, it may serve as prior art to the invention if the application was *filed* before the invention.

Returning now to the issue at hand, we note that Martin—a published patent application—is a “printed

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<sup>7</sup> The parties do not dispute that Martin was published “under [§] 122(b)” and was “filed in the United States.” *See* § 102(e)(1). General statements in this opinion concerning published patent applications assume that these (or any other applicable) publication and filing requirements of § 102(e)(1) are met.



publication,” as both sides agree. And § 311(b) permits IPR unpatentability challenges “on the basis of prior art consisting of patents or printed publications.” Under § 102(e)(1), published patent applications, like Martin, are deemed prior art as of their filing date. Therefore, Martin—having been filed before the ’400 patent’s priority date—is a prior art printed publication as to the ’400 patent. Stated generally: because a published patent application is a “printed publication,” § 102(e)(1) treats *this* type of printed publication as prior art as of a time before it became publicly accessible—i.e., as of its filing date.

Lynk Labs finds it anomalous that a printed publication could be deemed a “prior art” printed publication even before it *became* a printed publication (i.e., became publicly accessible). But it does not dispute that a patent can be deemed a “prior art” patent even before it *became* a patent. Specifically, under the neighboring, similarly worded provision of § 102(e)(2), “a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent” serves as prior art to the claimed invention. Lynk Labs does not dispute that, due to § 102(e)(2), an IPR challenge under § 311(b) can include as a “prior art . . . patent[]” a patent that did not *become* a patent until after the challenged patent’s priority date. *See* Reply Br. 27; Oral Arg. at 11:23–41; *see also* *Becton, Dickinson & Co. v. Baxter Corp. Englewood*, 998 F.3d 1337, 1345 & n.7 (Fed. Cir. 2021). Given § 102(e)(1) and (e)(2), Lynk Labs has no satisfactory explanation as to why patent applications that are later published (and thus become printed publications) should have a prior-art status different from patent applications that later become patents.

Lynk Labs further argues that, because § 102 refers to “printed publication[s]” in subsections (a) and (b) and “application[s] for patent, published under [§] 122(b)” in subsection (e)(1), those two terms must mean completely distinct things, such that the former cannot include the

latter. *See* Appellant’s Br. 60–61.<sup>8</sup> Even setting aside the tension between this argument and Lynk Labs’ concession that Martin *is* a printed publication, this argument is unpersuasive. It simply does not follow that two different terms must mean completely distinct things. One could be a specific instance of a general term. For example, “lion” and “mammal” are different terms with different meanings, but those meanings are not completely distinct; a lion is just a specific type of mammal. Similarly, here, we think it plain enough that an “application for patent, published under [§] 122(b)” is just a specific type of “printed publication.” Merely observing that § 102 uses both terms—“printed publication” and “application for patent, published under [§] 122(b)” —does not overcome this natural reading. Nor does this observation alone show that, in the context of § 311(b), “printed publications” *excludes* from its scope published patent applications and the specific prior-art rule of § 102(e)(1).

In sum, a published patent application is, by its literal terms, a “printed publication.” So, when § 311(b) permits IPR challenges based upon “prior art . . . printed publications,” it includes within its literal scope challenges based upon a published patent application. And, by virtue of § 102(e)(1), a published patent application—this *specific* type of “printed publication”—is deemed prior art as of its filing date. Therefore, the plain language of §§ 311(b) and 102(e)(1) permits IPR challenges based upon published patent applications, and such published patent applications can be deemed prior art in IPRs as of their filing date.

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<sup>8</sup> In advancing this argument, Lynk Labs tends to refer to the § 102(e)(1) language only as “application[s] for patent,” *see* Appellant’s Br. 60–61—omitting that the language further includes: “application[s] for patent, *published* under [§] 122(b).” § 102(e)(1) (emphasis added).

## B

Lynk Labs’ contrary position relies mostly on the historical context behind § 311(b). Upon analyzing that context, however, we conclude that it only adds further support for the plain-language interpretation set forth above. We first describe the history of relevant legislation before analyzing both it and Lynk Labs’ arguments.

## 1

The phrase “patents or printed publications” first appeared as a limitation on the types of references that could be used in post-grant proceedings in 1980, with the introduction of reexamination proceedings.

Well before 1980, however, the term “printed publication” appeared in § 102. Again, § 102(a) barred patentability if the claimed invention was “described in a printed publication . . . before the invention thereof by the applicant for patent.” § 102(a) (1952). And § 102(b) did the same if the claimed invention was “described in a printed publication . . . more than one year prior to the date of the application for patent in the United States.” § 102(b) (1952).

In 1980, Congress created procedures for reexamination of issued patents. An Act to Amend the Patent and Trademark Laws, Pub. L. No. 96-517, 94 Stat. 3015 (1980) (“1980 Patent Act”). This statute set forth the requirements for ex parte reexaminations, stating that “[a]ny person at any time may file a request for reexamination by the [U.S. Patent and Trademark Office (“PTO”)] of any claim of a patent *on the basis of any prior art cited under the provisions of section 301 of this title.*” 1980 Patent Act, § 302, 94 Stat. at 3015 (emphasis added). Section 301, in turn, identified “prior art consisting of patents or printed publications”—the same phrase that § 311(b) uses today. *Compare id.* § 301, 94 Stat. at 3015, *with* AIA, sec. 6(a), § 311, 125 Stat. at 299. The stated intent for this limitation was

to allow the PTO to evaluate “patents and printed materials, matters which are normally handled by patent examiners,” while excluding “[c]hallenges to validity on other grounds (e.g., public uses or sales)[, which] would remain the province of the courts.” S.R. No. 96-617, at 2 (1980); *see also Qualcomm Inc. v. Apple Inc.*, 24 F.4th 1367, 1376 (Fed. Cir. 2022) (“The congressional purpose in restricting reexamination to *printed documents*, 35 U.S.C. § 301, was to provide a cheaper and less time-consuming alternative to challenge patent validity on certain issues.” (emphasis added) (cleaned up)). For example, prior art in the form of sales and public use often requires substantial discovery or fact finding into how the alleged prior-art product at issue operates, how it was formed, what it comprises, and the circumstances surrounding the alleged sale or use. Patents and printed publications, on the other hand, generally do not require such additional discovery or fact finding.

In 1999, Congress added three relevant provisions in the American Inventors Protection Act (“AIPA”). Pub. L. No. 106-113, app. I, tit. IV, 113 Stat. 1501, 1501A-552 (1999). First, it created the inter partes reexamination procedure, which, like the ex parte reexamination created in 1980, provided for challenges “on the basis of any prior art cited under the provisions of section 301”—i.e., prior art consisting of “patents and printed publications.” AIPA, sec. 4604(a), § 311(a), 113 Stat. at 1501A-567. Second, Congress—for the first time—provided for the publication of patent applications. Subject to certain exceptions, “each application for a patent shall be published . . . promptly after the expiration of a period of 18 months from the earliest filing date for which a benefit is sought under this title.” AIPA, sec. 4502(a), § 122(b)(1)(A), 113 Stat. at 1501A-561. Before this provision’s enactment in 1999, patent applications were not published. And third, Congress—in a provision titled “Prior Art Effect of Published Applications”—established, in § 102(e)(1), a rule for *when* this specific form of reference would be deemed prior art: a published patent

application would be deemed prior art if it was “filed . . . before the invention by the applicant for patent.” *See* AIPA, sec. 4505, § 102(e)(1), 113 Stat. at 1501A-565.

Finally, in 2011, Congress passed the AIA with various provisions going into effect in 2012 and 2013. One such provision was the creation of the IPR, which replaced inter partes reexamination. *See* AIA, sec. 6(a), § 311, 125 Stat. at 299. In creating this new proceeding, Congress again used the same phrase “consisting of patents and printed publications” as was used in the 1980 Patent Act and left unchanged in the AIPA. *Id.* § 311(b), 125 Stat. at 299.

## 2

Lynk Labs argues that, when Congress established published patent applications as prior art in § 102(e)(1) and—in the same enactment—permitted inter partes reexaminations (and later, IPRs) upon only “printed publications,” Congress was transplanting the legal term “printed publication” from case law along with that case law’s “old soil.” *See* Appellant’s Br. 61, 64 (citing *Taggart v. Lorenzen*, 587 U.S. 554, 560 (2019) (“When a statutory term is obviously transplanted from another legal source, it brings the old soil with it.” (cleaned up))). Lynk Labs further argues that this “old soil” means that patent applications can *never* be “printed publications”—full stop. It also suggests, more modestly, that these cases mean that a reference can be a prior art “printed publication” only if it was publicly accessible *before* the relevant date associated with the challenged patent. With that understanding, Lynk Labs concludes that “printed publications” as used in § 311(b) *excludes* from its scope published patent applications treated as prior art under § 102(e)(1), given that the latter do not have to be publicly accessible beforehand to be considered prior art. As we explain below, although we agree that “printed publication” carried with it some “old soil,” we disagree with Lynk Labs’ ultimate conclusion.

At the outset, we note that much of Lynk Labs’ “old soil” case law predates when patent applications were published. *See* AIPA, sec. 4502(a), § 122(b)(1)(A), 113 Stat. at 1501A-561. Unsurprisingly, then, these cases do not address published patent applications or the special prior-art rule that Congress prescribed in § 102(e)(1). Instead, they address either *unpublished* patent applications or printed publications such as books, articles, or the like under § 102(a) or (b). These cases must therefore be understood in context when ascertaining the scope of “printed publications” in § 311(b) and whether that term excludes published patent applications treated as prior art under § 102(e)(1).

With this context in mind, we deem unavailing Lynk Labs’ reliance on older cases to show that patent applications can *never* be “printed publications.” For example, Lynk Labs quotes *Brown v. Guild*, 90 U.S. 181 (1874), as saying that a “mere application for patent” is not a “printed publication.” Appellant’s Br. 60 (quoting *Brown*, 90 U.S. at 211). It also cites other cases to similar effect. *See id.* at 60–61 (citing *Interurban Ry. & Terminal Co. v. Westinghouse Elec. & Mfg. Co.*, 186 F. 166, 168 (6th Cir. 1911) (observing that “[a]bandoned applications for patents” cannot “be classed among printed publications, for they . . . are not published by the [PTO]” (cleaned up))). But, as even some of this cited language explains, the reason “mere” patent applications were not deemed printed publications is that, at the time, *they were not published at all*. These cases therefore do not speak to the question here: whether, *once patent applications started being published*, they could be considered prior art “printed publications” (with the special prior-art rule of § 102(e)(1) applied).

Lynk Labs separately argues—and we agree—that, because case law interpreted “printed publication” to mean a reference that is publicly accessible, Congress carried forth this “old soil” interpretation of “printed publications” when it defined the scope of challenges available for

reexaminations and IPRs. *See, e.g., In re Bayer*, 568 F.2d 1357, 1359 (CCPA 1978) (“[T]he dispositive issue is whether [the reference], by virtue of its accessibility . . . , is a ‘publication’ within the meaning of [§ 102(b)].”); *see also In re Lister*, 583 F.3d 1307, 1311 (Fed. Cir. 2009) (“In order to qualify as a printed publication within the meaning of § 102, a reference ‘must have been sufficiently accessible to the public interested in the art.’” (quoting *In re Cronyn*, 890 F.2d 1158, 1160 (Fed. Cir. 1989))). The problem for Lynk Labs, however, is that this definition of “printed publications” would include published patent applications, since the latter are publicly accessible. So, while we agree with Lynk Labs that Congress carried forth the “old soil” requirement of public accessibility for the term “printed publications,” this observation only confirms that published patent applications qualify as “printed publications.”

Lynk Labs further maintains that case law concerning § 102(a) or (b) “printed publication[s]” grafted upon that term not *only* a requirement that they be publicly accessible, but also *when* they must have been publicly accessible in order to be treated as prior art. We disagree. The “when” issue in these cases was controlled by other, temporal language in these subsections—in § 102(a), “*described in a printed publication . . . before the invention thereof by the applicant for patent,*” § 102(a) (emphasis added); and in § 102(b), “*described in a printed publication . . . more than one year prior to the date of the application for patent in the United States,*” § 102(b) (emphasis added).

For example, our cases have concluded that, for something to have been “described in a printed publication” so as to constitute a patentability bar under § 102(a) or (b), the reference must have been publicly accessible before the dates specified in those subsections. *See In re Hall*, 781 F.2d 897, 899 (Fed. Cir. 1986) (“The proponent of the [§ 102(b)] bar must show that *prior to the critical date* the

reference was sufficiently accessible, at least to the public interested in the art . . . .” (emphasis added)); *see also Vid-Stream*, 981 F.3d at 1066 (“The evidence well supports the Board’s finding [under § 102(a)] that [the reference] was published and publicly accessible *before the [challenged patent’s] . . . priority date.*” (emphasis added)); *Samsung El-ecs. Co. v. Infobridge Pte. Ltd.*, 929 F.3d 1363, 1370 (Fed. Cir. 2019) (reasoning that, “even if” a reference had met the public accessibility requirement, because of the timing, “it would not establish that [the reference] could serve as prior art here”); *Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 772 (Fed. Cir. 2018) (explaining that public accessibility is the “touchstone in determining whether a reference constitutes a ‘printed publication,’” and then noting the Board’s finding that the reference “was not publicly accessible *before the critical date*” (emphasis added) (cleaned up)); *Voter Verified*, 698 F.3d at 1380 (“When considering whether a given reference qualifies as a *prior art* printed publication [under § 102(b)], the key inquiry is whether the reference was made sufficiently accessible to the public interested in the art *before the critical date.*” (emphasis added) (cleaned up)).

Again, however, this “when” issue for prior-art status is dictated by the above-quoted temporal language from § 102—not the meaning of “printed publication” itself, which is otherwise temporally agnostic. Put differently: whether, and how, something that qualifies as a “printed publication” is considered *prior art* depends on other statutory language.

That the term “printed publication” does not, itself, carry with it any temporal prior-art-status requirement is also clear when parsing § 102’s text. This is for at least two reasons. First, if “printed publication” inherently has its own temporal requirement, and if the term means the same thing throughout § 102, one difficulty immediately appears: § 102(a) and (b) have different temporal requirements (“before the invention” vs. “more than one year prior



to the date of the [patent] application”). Therefore, the term “printed publication” cannot both (1) have its own, specific baked-in temporal requirement *and* (2) mean the same thing throughout § 102. The “normal presumption” is that “when Congress uses a term in multiple places within a single statute, the term bears a consistent meaning throughout.” *Azar v. Allina Health Servs.*, 587 U.S. 566, 576 (2019). Thus, it is far more likely that the term “printed publication” itself does not have its own, baked-in temporal requirement, and that instead, whatever temporal requirement exists is drawn from the other language in § 102(a) or (b) (which is the most natural reading anyway). Second, and relatedly, if “printed publication” inherently has its own temporal requirement, § 102(a) and (b) would be confusing, redundant, or both. For example, substituting for “printed publication” the words “a reference publicly accessible before the invention” would yield the following in § 102(a):

A person shall be entitled to a patent unless—

...

(a) the invention was . . . described in [a reference publicly accessible before the invention] . . . before the invention . . . .

Our case law provides no reason, and we see none, why “printed publication”—an otherwise temporally agnostic term—should be interpreted to introduce such textual difficulties.<sup>9</sup>

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<sup>9</sup> We appreciate that some of our cases include language suggesting that the definition of a “printed publication” itself includes a temporal requirement concerning public accessibility. For example, in *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560 (Fed. Cir. 1988), we said:

Accordingly, case law concerning “printed publications” in the § 102(a) or (b) context—addressing the term in view of other language in *those* provisions—did not prevent Congress from setting up a different timing framework for a printed publication in § 102(e)(1). Unlike § 102(a) or (b), § 102(e)(1) bars patentability if the claimed invention was “described in . . . an application for patent, published under [§] 122(b)” that was “*filed in the United States before the invention by the applicant for patent.*” § 102(e)(1) (emphasis added). By its explicit terms, it bars patentability based on a published patent application if that application was filed before the invention. This language does not mean that a published patent application is not a “printed publication” within the meaning of the “old soil”; it is indeed a “printed publication,” given that it is publicly accessible. This language simply means that Congress chose to afford published patent applications *a prior-*

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“The statutory phrase ‘printed publication’ has been interpreted to mean that before the critical date the reference must have been sufficiently accessible to the public interested in the art . . . .” *Id.* at 1568. Yet that same sentence continued: “[D]issemination and public accessibility are the keys to the legal determination whether a prior art reference was ‘published,’” *id.*—thus conveying that whether something is a “printed publication” does not, itself, carry with it any temporal requirement. Moreover, *Constant* cited *Hall* for this proposition, and *Hall* distinguished between the question of public accessibility and *when*, for § 102(b) purposes, the reference was publicly accessible. *See Hall*, 781 F.2d at 899 (observing that “public accessibility” is “the touchstone in determining whether a reference constitutes a ‘printed publication’ bar under [§ 102(b)]” and noting that “[t]he proponent of the [§ 102(b)] bar must show that *prior to the critical date* the reference was *sufficiently accessible*, at least to the public interested in the art” (emphasis added)).

*art effect* different from the effect given to printed publications in § 102(a) and (b). See AIPA, sec. 4505, 113 Stat. at 1501A-565 (“Prior Art Effect of Published Applications”). And case law confronting different statutory provisions having materially different language does not permit us to ignore Congress’s choice in that regard.

Having concluded that the plain language of § 102(e)(1) supports our interpretation of § 311(b) and that there is no persuasive support in § 311(b)’s historical context for Lynk Labs’ interpretation, we note finally that treating published patent applications (with the special prior-art rule of § 102(e)(1) applied) as available prior art under § 311(b) is fully consistent with the “congressional purpose in restricting reexamination”—and later, IPRs—to printed documents. See *Qualcomm*, 24 F.4th at 1376 (cleaned up). Again, that purpose was “to provide a cheaper and less time-consuming alternative to challenge patent validity on certain issues.” *Id.* (cleaned up). With this purpose in mind, Congress discussed a broad division between prior art that may be asserted in these post-grant proceedings and prior art that may not: printed documents versus sale and public use, respectively. See S.R. No. 96-617, at 2. The former are the types of references that “are normally handled by patent examiners,” *id.*, while the latter often require substantial discovery or factfinding as to, among other things, the circumstances surrounding the alleged sale or use. Published patent applications clearly fall into the former category.<sup>10</sup> In fact, as official PTO publications,

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<sup>10</sup> Indeed, it is undisputed that § 102(e)(1) prior art (i.e., published patent applications) may be used as prior art in a district court proceeding. See Appellant’s Br. 60 (“[Section] 102(e)(1) [prior art] may be asserted in (for example) infringement litigation.”). Following Lynk Labs’ argument to its conclusion would place an artificial

published patent applications would create even less need for discovery or factfinding than some other alleged printed publications. *Cf. Klopfenstein*, 380 F.3d at 1347 (addressing dispute over public accessibility of a printed slide presentation); *Hall*, 781 F.2d at 897 (same for doctoral thesis). Treating published patent applications (with the special prior-art rule of § 102(e)(1) applied) as available prior art under § 311(b) is thus fully consistent with Congress’s purpose in limiting the types of patentability challenges in IPRs.

Accordingly, for the foregoing reasons, we conclude that §§ 311(b) and 102(e)(1) permit IPR challenges based upon published patent applications, and such published patent applications can be deemed prior art in IPRs as of their filing date. Therefore, Martin was properly deemed prior art to the ’400 patent in this IPR.

## II

Having concluded that Martin may be used as the basis of Samsung’s IPR, we turn to the merits of the Board’s decision. Lynk Labs argues that the Board misconstrued the plain and ordinary meaning of two limitations in claim 7 of the ’400 patent: (1) “an LED circuit comprising a plurality of LEDs connected in series”; and (2) “a forward voltage of the LEDs of the LED circuit array matches the rectified input AC voltage output of the driver.” Lynk Labs also argues that the Board made factual errors in its evaluations of the prior art. We address Lynk Labs’ arguments as to

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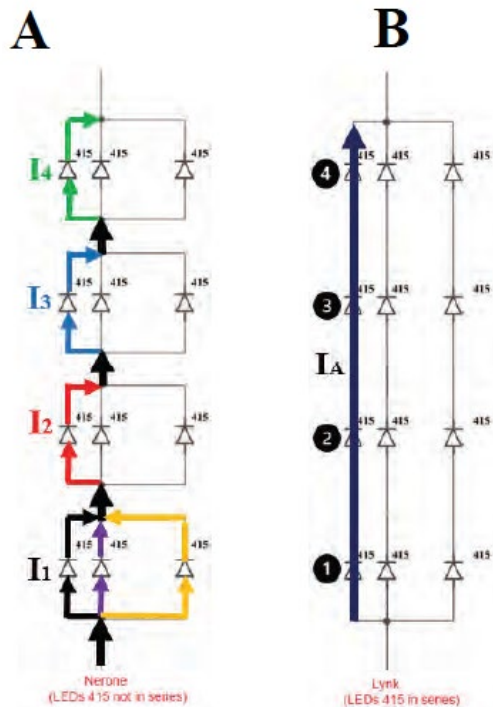
constraint on the types of prior art that may be asserted in an IPR versus that which may be asserted in a district court. We see no reason why Congress would have created such a distinction, particularly for published patent applications which, as stated above, do not fall into the category of prior art that generally requires extensive discovery or fact finding.

each limitation's construction, and the associated factual disputes, in turn.

#### A

With respect to the first limitation, Lynk Labs argues that the term “a plurality of LEDs connected in series” means “a plurality of *individual* LEDs connected in series” and not “a plurality of LED *circuits* connected in series.” Under the plain and ordinary meaning of the term, we conclude that “a plurality of LEDs connected in series” may include either a plurality of individual LEDs or a plurality of LED circuits connected in series because both include a “plurality of LEDs.” We therefore agree with the Board's construction and the Board's conclusion that Nerone teaches this claim limitation.

An electrical circuit may connect electrical components (like LEDs) either in parallel or in series. Electrical components connected end-to-end are connected *in series*, and the electrical current flows through the LEDs. In diagram B below, the four LEDs covered by the group encompassed by I<sub>A</sub> are connected in series. Electrical components are “connected *in parallel* when they connect to the same point (or node),” and the current flow is divided between them. Appellee's Br. 3. In diagram A below, the three LEDs level with “I<sub>1</sub>” are connected in parallel, and the black, purple, and gold lines show current flow divided between them. In simpler terms, diagram B shows *individual* LEDs connected in series, whereas diagram A shows *groups* of LEDs connected in series.



Appellant's Br. 17 (citing J.A. 6325).

The claim language recites “a plurality of LEDs connected in series.” ’400 patent claim 7. This term is found only in claims 1 and 7; nowhere is this exact phrase used or defined in the specification. The specification includes examples of both individual and groups of LEDs connected in series. *See, e.g., id.* at Fig. 14 (showing a plurality of parallel-connected LEDs, with each group of LEDs connected in series); *see also id.* at Figs. 21, 24; *id.* at 9:63–66. The disclosures in the specification lead us to conclude that the plain and ordinary meaning of “a plurality of LEDs connected in series” may include individual LEDs connected in series or groups of LEDs connected in series because both include a “plurality of LEDs” connected in series. *See Malvern Panalytical Inc. v. TA Instruments-Waters LLC*, 85 F.4th 1365, 1373–74 (Fed. Cir. 2023) (concluding that

the absence of limiting disclosures in the specification supported a broad claim construction).

We agree with the Board that Lynk Labs' construction limiting the term to just "individual LEDs" connected in series is "largely based on rewriting this limitation." *Final Written Decision*, at 22. And while other claims may be more specific, such that they only include one circuit configuration, that is not determinative of how we construe broader claims. See '400 patent claim 14 (claiming "a plurality of LED circuits connected in parallel"). For the reasons above, we agree with the Board's construction of "a plurality of LEDs connected in series."

Lynk Labs' arguments as to whether the prior art discloses "a plurality of LEDs connected in series" is premised on the Board's allegedly erroneous construction of this term. Because we conclude that the Board did not err in construing the term, no dispute remains as to whether the prior art discloses this limitation. Indeed, it is undisputed that the prior art, Nerone, teaches a series of circuits, where the LEDs are connected in parallel within each circuit. See Appellant's Br. 18 ("Diagram A illustrates that while groups of LEDs in Nerone may be connected in series with other groups of LEDs, there are no LEDs that are connected in series with other LEDs." (emphases omitted)); see also *Final Written Decision*, at 22 ("Patent Owner admits that 'Nerone confirms that each of the four groups 410 is in series.'" (quoting Lynk Labs' Patent Owner Response at 26)). Therefore, we conclude that substantial evidence supports the Board's finding that Nerone discloses this claim limitation.

## B

With respect to the second disputed limitation, Lynk Labs argues that the Board misconstrued claim 7's limitation that recites "a forward voltage of the LEDs of the LED circuit array matches the rectified input AC voltage output of the driver." Specifically, Lynk Labs argues that the

Board erred by (1) misconstruing “matches” and (2) reading “rectified” out of the claim. We disagree with both arguments.

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Claim 7 recites “a forward voltage of the LEDs of the LED circuit array *matches* the rectified input AC voltage output of the driver.” ’400 patent claim 7 (emphasis added). The parties did not propose a claim construction for this term before the Board; instead, each party agreed that the terms in the challenged claims should be given their plain and ordinary meaning. *See Final Written Decision*, at 9–10. Lynk Labs argues that the plain and ordinary meaning of “matches” means “equivalent.” Appellant’s Br. 38–39. Samsung argues, and the Board agreed, that the limitation, in view of the specification, “encompasses ‘the rectified input AC voltage output of the driver’ that *is less than* ‘a forward voltage of the LEDs of the LED circuit.’” Appellee’s Br. 40 (quoting *Final Written Decision*, at 36) (emphasis altered from original). Based on the intrinsic record, we agree with Samsung and the Board.

The parties identify three parts of the specification that bear on the scope of this limitation. First, in the “Background of the Invention” section, the patent explains that prior-art reference “Allen discloses that for the forward voltage to be ‘matched,’ in each series block, the peak input voltage must be *less than or equal to* the sum of the maximum forward voltages for each series block in order to prevent over-driving.” ’400 patent col. 2 ll. 31–35 (emphasis added). Second, in the “Summary of the Invention” section, the patent states: “[A]nother form of the invention is an LED circuit comprising opposing parallel series strings of LEDs connected together and driven direct with a high frequency AC voltage *equal to or less than* to total series voltage drop of the opposing parallel series strings of LEDs within the LED circuit.” *Id.* col. 9 ll. 48–53. Third, in the “Detailed Description of Preferred Embodiments” section,



the specification provides a single example of a circuit configuration that describes a specific voltage source, LEDs with a particular forward voltage, diodes with a specific voltage, and an approximate number of LEDs. *Id.* col. 17 ll. 1–7. Lynk Labs relies on this example as mathematically demonstrating equivalence between the “forward voltage of the LEDs of the LED circuit array” and “the rectified input AC voltage output of the driver.” See Appellant’s Br. 42–43.

Lynk Labs argues that the first quote does not define “match” but instead is an embodiment from prior-art reference Allen. But even “prior art cited in a patent . . . constitutes intrinsic evidence.” *V-Formation, Inc. v. Benetton Grp. SpA*, 401 F.3d 1307, 1311 (Fed. Cir. 2005) (citation omitted). Therefore, this first quote is relevant intrinsic evidence of the meaning of “matches” in the art.

Lynk Labs argues that the second quote does not refer to or define “matches.” But this argument is inconsistent with Lynk Labs’ prior reliance on this passage for construing “matches”:

[T]he [’400 patent,] column 9, lines 48 through 52, that passage describes LEDs connected together and driven direct with a high frequency AC voltage *equal to or less than* the total series voltage drop of the opposing parallel series strings of LEDs. So here we have support for the voltage drop being equal to. It’s described here as equal to or less than, but there is support, of course, for equal to.

J.A. 6531 ll. 20–25 (quoting IPR oral hearing) (emphasis added). Additionally, the definition of “matched” from Allen is substantively the same as the disclosed embodiment in the “Summary of the Invention.” *Compare* ’400 patent col. 2 ll. 31–35 (“for the forward voltage to be ‘matched,’ in each series block, the peak input voltage must be *less than or equal to* the sum of the maximum forward voltages” (emphasis added)), *with id.* col 9 ll. 48–52 (“a high frequency

AC voltage *equal to or less than* to total series voltage drop” (emphasis added)). Therefore, this second quote is also relevant intrinsic evidence of the meaning of “matches” in the art.

With respect to the third quote, Lynk Labs argues that this example mathematically demonstrates equivalence. *See* Appellant’s Br. 42–43 (calculating the voltage output of the driver after the bridge rectifier at 114 V and the total forward voltage drop as 114 V). Samsung does not dispute the example provided in the specification results in a forward voltage of the LEDs of the LED circuit array that *equals* the rectified input AC voltage output of the driver. We also view this passage as relevant intrinsic evidence.

These passages, taken together, support a plain and ordinary meaning in light of the specification that includes both equivalence and a “rectified input AC voltage output of the driver *that is less than* a forward voltage of the LEDs of the LED circuit.” *Final Written Decision*, at 36 (cleaned up) (emphasis added). Not once but twice, the specification explains the relationship between the rectified input AC voltage output and the forward voltage in the same manner as including “less than or equal to.” *See Grace Instruments Indus., LLC v. Chandler Instruments Co.*, 57 F.4th 1001, 1010 (Fed. Cir. 2023) (construing term in line with the implications from the specification). And a single example that falls within the “equal to” part of the relationship does not contradict the meaning of “matches” in other parts of the specification. Thus, we conclude that the Board did not err in its construction of “matches.”<sup>11</sup>

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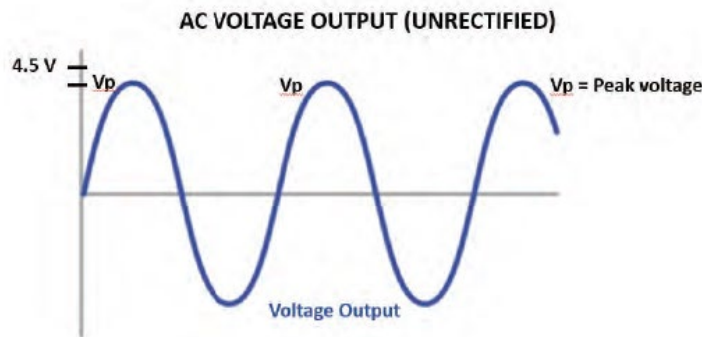
<sup>11</sup> Lynk Labs argues that Samsung’s failure to set forth a numerical value for the “matches” limitation is “an error of law.” Appellant’s Br. 53–57. But Lynk Labs sets forth no law that requires a numerical value under these

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Lynk Labs further argues that the Board’s construction of “a forward voltage of the LEDs of the LED circuit array matches the *rectified* input AC voltage output of the driver” reads out the word “rectified.” We disagree.

While framed as a claim construction dispute, Lynk Labs’ argument is based on what Martin does and does not disclose. See Appellant’s Br. 48 (“The Board went on to hold that Martin’s teaching of an *unrectified* AC voltage output that is less than the forward voltage of the LEDs meets [this] limitation . . . . In so doing, the Board erred by effectively construing [this] limitation [incorrectly] . . . .” (emphasis in original)); *id.* at 50 (“Martin only discloses . . . .”); *id.* (“Martin discloses . . . .”); *id.* (“Martin does not teach or suggest . . . .”); *id.* (“Martin as applied to Nerone does not meet [this] limitation.”); *id.* (“Martin discloses selecting . . . .”). This is not a dispute about claim construction but a dispute as to whether Martin discloses “the *rectified* input AC voltage output of the driver.”

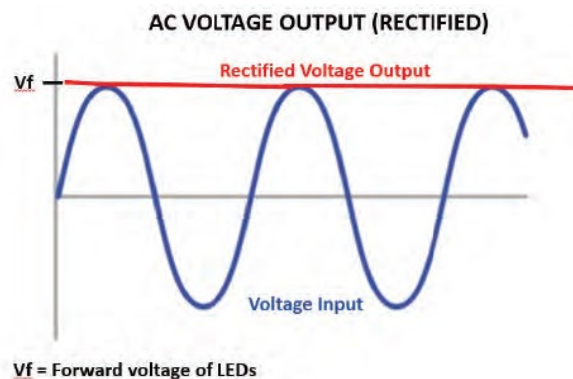
An unrectified voltage has an alternating, wave-like voltage, like the one in the image below.




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circumstances. Nor are we aware of any. We therefore disagree that this was an error.

Appellant's Br. 51 (citing J.A. 175–76). A rectified voltage has a continuous voltage, depicted by the red line labelled “rectified voltage output” in the image below.



Appellant's Br. 52 (citing J.A. 175–76). Lynk Labs explains that an unrectified voltage results in light being emitted when voltage is positive but not when voltage is negative, while a rectified voltage delivers a constant emission of light. Appellant's Br. 51–52.

The Board relied on Samsung's expert testimony that “a person of ordinary skill in the art would have taken into consideration the number of LEDs and the total voltage drop of the LED circuit when designing and implementing” a circuit. J.A. 244; *Final Written Decision*, at 36–37. “[A] person of ordinary skill in the art would have used these factors to apply the teachings of Martin to configure Nerone's circuitry so that ‘the forward voltage of the series-connected LEDs [] approximately match[es] the rectified AC voltage output of the . . . LED driver circuit.’” *Final Written Decision*, at 37. Further, Samsung argued that “matching the input voltage to the forward voltage of the LEDs had become a matter of routine optimization.” *Id.* (citing Samsung's Petition, at 19). Samsung supported this assertion with expert testimony, which was corroborated

by references Cross<sup>12</sup> and Martin. *Id.* In other words, the Board was persuaded by Samsung’s testimony that the knowledge of a person of ordinary skill in the art included the routine optimization of “matching” a “rectified input AC voltage output of the driver” to the “forward voltage of the LEDs of the LED circuit array.” *Final Written Decision*, at 36–38.

“A person of ordinary skill in the art is also a person of ordinary creativity . . . .” *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007). And Samsung’s argument was based on the knowledge of a person of ordinary skill in the art, as explained above. Therefore, even if Lynk Labs is correct that Martin does not *explicitly* disclose determining the forward voltage of the LEDs based on the peak voltage of a rectified voltage, that is of no consequence based on the facts and argument before us. Lynk Labs apparently conceded that “Figure 5 of Martin discloses LEDs driven by a *rectified* AC voltage.” *Final Written Decision*, at 32 (emphasis added). Lynk Labs also did not dispute that Nerone discloses configurations where a rectified AC voltage is provided to LEDs. *Id.* at 36–39. And Lynk Labs did not dispute that a person of ordinary skill in the art would have considered several factors “when designing Nerone’s circuitry to satisfy the ‘matching’ requirement of [this] limitation.” *Id.* at 36; *see also id.* at 36–38. Therefore, like the Board, we are persuaded that “the combined teachings of Nerone and Martin teach or suggest [this] limitation,” *id.* at 38, particularly in light of the knowledge of a person of ordinary skill in the art.

For these reasons, we affirm the Board’s determination that claim 7 would have been obvious in view of Nerone and Martin. *Final Written Decision*, at 68. And because claims 8–13 depend from claim 7, and Lynk Labs makes no

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<sup>12</sup> U.S. Patent Application Pub. No. 2003/0102810 (“Cross”), J.A. 4162–74.

separate argument for these dependent claims, we also affirm the Board's determination that claims 8–13 would have been obvious.

CONCLUSION

We have considered Lynk Labs' remaining arguments and find them unpersuasive. For the foregoing reasons, we affirm the Board's conclusion that claims 7–13 and 17 are unpatentable.

**AFFIRMED**