

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VICOR CORPORATION,
Petitioner,

v.

DELTA ELECTRONICS, INC.,
Patent Owner.

IPR2024-00704
Patent 8,711,580 B2

Before THU A. DANG, NATHAN A. ENGELS, and
SHEILA F. McSHANE, *Administrative Patent Judges*.

ENGELS, *Administrative Patent Judge*.

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

I. INTRODUCTION

A. Background

Vicor Corporation (“Petitioner”) filed a Petition requesting an *inter partes* review of claims 1–3, 9–11, 13, 17, and 18 of U.S. Patent No. 8,711,580 B2 (Ex. 1001, “the ’580 patent”). Paper 2, 1 (“Pet.”). Delta Electronics, Inc. (“Patent Owner”) filed a Preliminary Response. Paper 6 (“Prelim. Resp.”).

After Patent Owner filed its Preliminary Response, Petitioner e-mailed the Board to request authorization to file a preliminary reply to the Preliminary Response, and Patent Owner e-mailed its opposition to Petitioner’s request. Ex. 3001. The Board held a conference call with the parties to discuss Petitioner’s request, and a transcript of the conference call is in the record. Ex. 1049.

With our authorization, Petitioner filed a Reply to Patent Owner’s Preliminary Response (Paper 9 (“Prelim. Reply”)) and Patent Owner filed a Preliminary Sur-reply to Petitioner’s Preliminary Reply (Paper 10 (“Prelim. Sur-reply”)).

An *inter partes* review may not be instituted unless it is determined that “the information presented in the petition . . . 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 (2018). For the reasons below, we determine the information presented in the Petition does not show a reasonable likelihood that Petitioner will prevail in showing the unpatentability of at least one claim of the ’580 patent, and we do not institute *inter partes* review.

B. Real Parties in Interest

The parties listed above are the only real parties in interest identified in the record. Pet. 67; Paper 4, 2.

C. Related Proceedings

The parties state that the '580 patent is the subject of *Delta Electronics, Inc. v. Victor Corporation*, No. 1:23-cv-01246 (D. Del). Pet. 67; Paper 4, 2.

D. The '580 Patent (Ex. 1001)

The '580 patent is titled “Resonant Conversion System with Over-current Protection Processes.” Ex. 1001, code (54). Among other things, the '580 patent describes a DC-DC conversion system that includes a buck converter and a resonant converter, as depicted in its Figure 7, copied below.

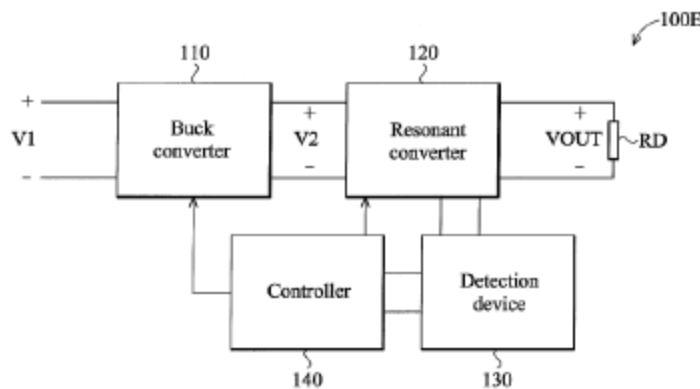


FIG. 7

Figure 7 of the '580 patent depicts buck converter 110 providing voltage V2 to resonant converter 120, with detection device 130 connected to resonant converter 120 and to controller 140. Ex. 1001, 6:30–61. Detection device 130 detects signals corresponding to the output current of resonant converter 120 and output voltage VOUT of resonant converter 120. Ex. 1001, 6:37–40. The '580 patent describes as an example that “[w]hen the signal corresponding to the output current of the resonant converter 120 is higher

than the reference value and/or the output voltage VOUT of the resonant converter 120 is lower than another reference value, the controller 140 can determine that the resonant conversion system is over-loaded, short-circuited or at startup.” Ex. 1001, 6:44–50.

E. Representative Claim

Of the challenged claims, claims 1, 10, 13, and 17 are independent claims. Claim 1 is reproduced below with labels added corresponding to those referenced in the Petition.

[1pre] A resonant conversion system, comprising:

- [1a] a resonant converter, receiving an input voltage to generate an output voltage;
- [1b] a buck converter, providing the input voltage and controlling the input voltage for performing an over-current protection process; and
- [1c] a first controller, decreasing a duty cycle of a switching device of the buck converter to decrease the input voltage received by the resonant converter, when the resonant converter generates the over-current,
- [1d] [i] wherein, when an output current exceeds a first predetermined current, the first controller determines that the resonant converter generates the over-current, and [ii] restricts the output current of the resonant converter in the first predetermined current or in a second predetermined current higher than the first predetermined current.

F. Asserted Challenges to Patentability

Petitioner presents the following grounds of unpatentability (Pet. 4):

Claim(s) Challenged	35 U.S.C. §	References/Basis
13, 911, 13, 1718	103 ¹	PRM Datasheet, ² Hwang, ³ White Paper, ⁴ Electronic Design ⁵
1–3, 9–11, 13, 1718	103	White Paper, Hwang

II. DISCUSSION

A. Obviousness

Under 35 U.S.C. § 103, a claim is unpatentable as obvious if “the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious before the effective filing date of the claimed invention to a person having ordinary skill in the art to which the claimed invention pertains.” *See KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007). We resolve the question of obviousness based on underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the prior art and the claims; (3) the level of skill in the art; and (4) when in evidence, objective

¹ The ’430 patent’s earliest priority date falls before the Leahy-Smith America Invents Act (“AIA”), Pub. L. No. 112–29, 125 Stat. 284 (2011), took effect. Thus, we apply the pre-AIA version of § 103.

² VI Chip-PRM-AL Pre-Regulator Module, P048F048T24AL, Vicor Corporation, 2006. Ex. 1006.

³ US 6,674,272 B2; issued Jan. 6, 2004. Ex. 1007.

⁴ “FPA White Paper: Factorized Power Architecture and VI Chips, Flexible, High Performance Power Systems Solutions,” Vicor Corporation, 2007. Ex. 1008.

⁵ Tuite, Don, “Factorized-Power Module Completes Basic Picture,” *Electronic Design*, Nov. 15, 2004. Ex. 1020.

indicia of nonobviousness. *See Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17–18 (1966).

B. Level of Ordinary Skill in the Art

We review the grounds of unpatentability in view of the understanding of a person of ordinary skill in the art at the time of the invention. *Graham*, 383 U.S. at 13, 17. Petitioner contends a person of ordinary skill would have had “(1) at least a bachelor’s degree in electrical engineering or a related field, and (2) at least two years of industry experience in the field of power engineering.” Pet. 11 (citing Ex. 1003 ¶¶ 41–42). Patent Owner does not specifically address the level of ordinary skill.

At this stage, Petitioner’s proposal appears consistent with the problems and solutions in the ’580 patent and prior art of record and is supported by expert testimony. We note, however, that the open-ended language “at least” expands the ranges of education and experience indefinitely with no upper bound. Upon this preliminary record and for the purposes of institution, we adopt Petitioner’s definition of the level of skill with the exception that we delete the words “at least.”

C. The “Over-current” Limitations

We address what Petitioner terms the “over-current” limitations (Pet. 7–8) because these limitations are dispositive.

First, quoting claim language, Petitioner summarizes the claims’ requirements: “[t]he patent claims require that certain things occur *when a ‘resonant converter generates’ an ‘over-current’* (or ‘has generated’ an ‘over-current’).” Pet. 6–7 (emphasis added). Similarly, Petitioner states “[t]he claims all require that the buck converter respond to *an ‘over-current’*

condition in the resonant converter by decreasing the input voltage of the resonant convert.” Pet. 7 (emphasis added). And again, Petitioner states “[t]he ‘over-current’ limitations require that the buck converter adjust its duty cycle when the **resonant converter** generates an over-current.” Pet. 9 (emphasis in original).

1. Petitioner’s Ground 1

Petitioner’s Ground 1 does not purport to correctly construe the “over-current” limitations. Petitioner’s Ground 1 instead construes the “over-current” limitations under what Petitioner calls “Patent Owner’s Apparent Construction” (e.g., Pet. 10, 28–31, 35, 39, 40) or “Patent Owner’s Assumed Construction” (e.g., Pet. 30, 31, 42, 44–46), citing Patent Owner’s district-court “Infringement Allegations” (Ex. 1005). *See* Ex. 1022, 7:17–18 (Petitioner’s counsel stating “Ground 1 is essentially based on what we read [Patent Owner’s] infringement contentions to be”).

According to Petitioner, “under Patent Owner’s Apparent Construction, the [challenged claims] are met when the output voltage of a PRM [Pre-regulator Module]⁶ (or other buck converter) provides the input voltage to a VTM [Voltage Transformation Module] (or other resonant converter that provides an output current proportional to the input current), and the PRM (or other buck converter) detects that its output current has reached a set current limit.” Pet. 10. Stating the interpretation applied in Ground 1 differently, Petitioner asserts that “Ground 1 relies on the PRM’s

⁶ According to Petitioner, “Patent Owner has accused a specific arrangement of specific Vicor power conversion products—Vicor’s Pre-Regulation Module (PRMTM) and Vicor’s Voltage Transformation Module (VTMTM)” of infringing at least claim 1 of the ’580 patent. Pet. 1–2.

own current limit functionality that is based on the **PRM's** current limit set-point, *which is set independent of the current-handling capability of the downstream VTM* pursuant to the Patent Owner's Assumed Construction (based on its infringement allegations in the co-pending litigation)." Pet. 46 (*italics added*); *see* Pet. 28 (addressing limitation [1c]; stating "[u]nder Patent Owner's Apparent Construction, the clause 'when the resonant converter generates an over-current' is met when the PRM detects that its output current exceeds a current limit threshold (see Claim Construction section).")

Fatal to Petitioner's Ground 1, Petitioner does not establish that such interpretations are appropriate. Controlling law requires construing claims in an *inter partes* review 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), including 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. 37 C.F.R. § 42.100(b) (2021). "In determining the meaning of [a] disputed claim limitation, we look principally to the intrinsic evidence of record, examining the claim language itself, the written description, and the prosecution history, if in evidence." *DePuy Spine, Inc. v. Medtronic Sofamor Danek, Inc.*, 469 F.3d 1005, 1014 (Fed. Cir. 2006) (citing *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312–17 (Fed. Cir. 2005) (*en banc*)).

The Petition does not even purport to apply this controlling law with its Ground 1. In fact, Petitioner acknowledges that its Ground 1 does not apply a "proper" claim construction, describing Ground 1 in contrast to Ground 2 as follows: "Ground 1 is essentially based on what we read their

infringement contentions to be, . . . Ground 2 [applies] what we view as the proper construction of the patent.” Ex. 1022, 7:17–8:16. Accordingly, based on this record, we determine Petitioner has not supported the claim interpretations on which its Ground 1 relies, and Petitioner therefore has not shown a reasonable likelihood that it would prevail in its challenge asserted as Ground 1.

2. *Petitioner’s Ground 2*

Petitioner’s Ground 2 is also fatally flawed. Petitioner describes its Ground 2 as follows:

This Ground establishes that it would have been obvious to modify the operation of the PRM to base its current limit threshold on the VTM’s current handling capability, and thus the current limit would be based on whether the VTM has exceeded predetermined current threshold specified for the VTM. In other words, this ground uses the VTM’s over-current threshold rather than the PRM’s current limit threshold to control the PRM current limit.

Pet. 46.

But Petitioner states that in the combination presented in Ground 2, “a skilled artisan would have set the current limit threshold based on the current-handling capability of the VTM to protect the VTM from over-current.” Pet. 49–50. “In this circumstance, *the PRM would never reach an over-current condition*. Rather, *the PRM would operate within its normal range*.” Pet. 50 (citing Ex. 1003 ¶ 144) (emphasis added).

But Petitioner’s description of the proposed combination—in which “the PRM would never reach an over-current condition”—cannot be reconciled with Petitioner’s showings for the “over-current” limitations, which require, e.g., “when the resonant converter generates the over-current”

(limitation [1c]). For example, for limitation [1c], Petitioner states “when the VTM exceeds its normal operating current, the PRM (with a duty cycle current limiter as taught by Hwang) would reduce its duty cycle, which would reduce its output voltage and output current, and thus reduce the input voltage and current to the VTM.” Pet. 55–56 (citing Ex. 1003 ¶ 158). But Petitioner and its declarant both state that in the combination proposed in Ground 2, “the PRM would never reach an over-current conduction.” Pet. 50; Ex. 1003 ¶ 144; *see* Pet. 59 (addressing similar language in limitation [1c]), 61 (addressing limitation [13c]), 63 (addressing limitation [17d]). Petitioner does not explain how those positions can be reconciled, nor does Petitioner adequately explain, much less support, a claim interpretation that would be satisfied by a proposed combination in which the resonant converter never generates an over-current. Accordingly, we determine Petitioner has not shown a reasonable likelihood that it would prevail in the challenges presented as Petitioner’s Ground 2.

D. Conclusion

On the current record, we determine Petitioner has not shown a reasonable likelihood that it will prevail in its challenge to at least one claim of the ’580 patent. Accordingly, we do not institute an *inter partes* review of the ’480 patent.

ORDER

In consideration of the foregoing, it is hereby:

ORDERED that the Petition is *denied* and we do not institute an *inter partes* review.

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