

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

VICOR CORPORATION,
Petitioner,

v.

DELTA ELECTRONICS, Inc.,
Patent Owner.

Case IPR2024-00704
Patent 8,711,580

**PETITIONER'S PRELIMINARY REPLY TO PATENT OWNER'S
PRELIMINARY RESPONSE**

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PETITIONER’S UPDATED EXHIBIT LIST

VICOR-1001	U.S. Patent No. 8,711,580 to Jinfa Zhang, et al. (“the ’580 Patent”)
VICOR-1002	Excerpts from the Prosecution History of the ’580 Patent (“the Prosecution History”)
VICOR-1003	Declaration of R. Jacob Baker, Ph.D., P.E.
VICOR-1004	First Amended Complaint, <i>Delta Electronics, Inc. v. Vicor Corporation</i> 1-23-cv-01246, D. Del., filed January 26, 2024
VICOR-1005	Ex 3 to First Amended Complaint (“Infringement Allegations”)
VICOR-1006	P048F048T24AL Datasheet (2006) (“PRM Datasheet” or “Datasheet”)
VICOR-1007	United States Patent No. 6,674,272 to Hwang (“Hwang”)
VICOR-1008	“FPA White Paper: Factorized Power Architecture and VI Chips, Flexible, High Performance Power Systems Solutions,” 2007 (“White Paper”)
VICOR-1009	2007 Home page for vicorpower.com
VICOR-1010	2007 Technical Documents page at vicorpower.com
VICOR-1011	2007 Datasheet page at vicorpower.com
VICOR-1012	2007 VI Chip Datasheets page at vicorpower.com
VICOR-1013	2007 VI Chips page at vicorpower.com
VICOR-1014	2007 White papers page at vicorpower.com
VICOR-1015	2008 HTML version of FPA White Paper at vicorpower.com
VICOR-1016	U.S. Patent No. 6,934,166 to Vinciarelli et al. (“Vinciarelli-166”)

VICOR-1017	P048F048T24AL Datasheet Version Retrieved in 2024
VICOR-1018	White Paper Version Retrieved in 2024
VICOR-1019	Declaration of Mark Crane
VICOR-1020	“Factorized-Power Module Completes Basic Picture,” Electronic Design, Nov 15, 2004 (“Electronic Design article”)
VICOR-1021	“Stays Pending IPR In Del. District Courts Are Here To Stay,” March 11, 2022 (“Delaware Stay article”)
VICOR-1022	Transcript of Board Call held August 6, 2024

**I. Ground 1 Establishes Unpatentability Under Patent Owner’s
“Constructions” Provided in the POPR**

A. “[when]/[that] the resonant converter generates [the] / [an] over-current”

Patent Owner asserts that the term “when” refers to the occurrence of a specific condition, an “over-current” generated by the resonant converter. POPR,

5. This point is undisputed. But Patent Owner offers no further narrowing construction for the term “over-current” or for any other phrase in the claim.

Patent Owner then argues that the Patent Owner’s Apparent Constructions in the Petition allegedly “removes the condition of the resonant converter generating an overcurrent.” POPR, 6. That is incorrect. Under Patent Owner’s Apparent Construction—which reflects how Patent Owner applies the claims in litigation—“overcurrent in the PRM [buck converter]—thusly—equates to an overcurrent in the VTM [resonant converter], and control of the PRM overcurrent also controls the VTM overcurrent.” VICOR-1005, 7 (emphasis added). Moreover, nothing in Patent Owner’s proposed construction in the POPR precludes this equating of overcurrent in the buck converter with overcurrent in the resonant converter,

Patent Owner further argues that “Petitioner takes out any requirement of feedback that is plainly necessary in the claims of the ’580 Patent.” This statement is incorrect. First, the word “feedback” is not in the claims nor in the POPR’s proposed claim construction. Second, the Petition does identify feedback, namely determining (either directly or indirectly) the buck converter output current and

using this determined current to control the duty cycle of the buck converter modulator to prevent overcurrent. Petition, 28 (PRM “enforces a current limit based on its own output current,”), 29 (“Hwang discloses a current limiting technique ... in which, if ‘excessive output current is detected’ the circuit is ‘controlled to reduce the switching duty cycle.’”). Third, to the extent that Patent Owner intended to limit the claims to feedback **from the output of the VTM**, such a requirement is not part of the POPR’s proposed claim construction and is also inconsistent with Patent Owner’s infringement contentions, which rely on sensing the current in the buck converter (PRM), not the resonant converter (VTM). VICOR-1005, 7 (“When the **internal** sensed current [of the PRM] crosses the current limit threshold the current limit will be activated”).

Thus, Patent Owner is attempting to have its cake and eat it too—Patent Owner offers exceedingly vague “constructions,” and then presents arguments not supported by its constructions. Given that Petitioner cannot respond to any clarifying statement in Patent Owner’s sur-reply, Petitioner submits that the Board should apply Patent Owner’s Apparent Constructions at institution and invite Patent Owner to provide concrete narrowing constructions in its POR if it truly believes that the constructions in Ground 1 of the Petition are incorrect.

B. The Remaining “Constructions”

The remaining “claim constructions” provided in the POPR are similar non-constructions. Patent Owner simply repeats the claim language and asserts the

Patent Owner Apparent Constructions are incorrect, without providing a competing narrowing construction. Patent Owner's arguments are inconsistent with its infringement contentions and the non-constructions in the POPR. Accordingly, the Petition's Patent Owner's Apparent Constructions should be applied. Patent Owner may clarify its claim construction positions in its Patent Owner Response.

II. Hwang Is Not Cumulative of the Art Before the Examiner

The Petition relies on Hwang as providing the teaching of a current limiting circuit in a buck converter that reduces the duty cycle of the PWM to reduce the output voltage and thus the output current. Petition, 19-23. The Petition quotes Hwang: **"The duty cycle is limited to an amount that is related to a degree to which the output current is excessive."** Petition, 23 (emphasis added).

The Joshi reference before the Examiner did not teach current limiting, but instead taught converter shut down. The applicant distinguished Joshi on the basis that Joshi detected a fault condition (excessive current) and shut down the converter in response to the fault (and not duty cycle reduction). POPR, 24.

Hwang operates like the challenged patent, and not like Joshi. Hwang maintains a constant current by decreasing the duty cycle of the converter (as the bold text of the quote above confirms). The Petition states (and Petitioner's expert confirms): "Hwang teaches that a current limiter may be implemented by reducing the duty cycle of the switching regulator, which will reduce both the output voltage and the output current." Petition, 23 (*citing* VICOR-1003, ¶88).

Patent Owner's contrary characterization of Hwang must be rejected, as disputes of fact are resolved in Petitioner's favor. Regardless, Patent Owner's statement that Hwang shuts down its PWM is demonstrably incorrect. First, it contradicts the text from Hwang cited in the Petition—a fact that the POPR ignores. Second, it mispresents the circuit in Hwang.

Patent Owner's misunderstanding concerns the operation of flip flop 114 in FIG. 1. Patent Owner suggests that when comparator 122 sets flip flop 114, the PWM shuts down. POPR, 19 (“Hwang turns off the system”), 21 (discussing flip flop 114). This is incorrect. On the contrary, flip flop 114 will open the power switch SW1 for the remainder of the cycle, and at the next cycle (and every cycle), **flip flop 114 is reset**. Hwang, 3:9-19. When the current drops below the current limit threshold, the periodic reset signal turns the power switch back on. This may happen on the very next cycle in the case of a “soft short” or a few cycles later in the case of a “hard short.” In either case, the duty cycle is reduced. In addition, the duty cycle of the pulses are further reduced by flip flop 128 for some period of time after the over-current is detected. *See* Hwang, FIG. 1, 5:6-20. If necessary, Petitioner will provide a supplemental declaration of Dr. Baker confirming the operation of Hwang's circuit in response to the POR.

III. Ground 2 is Based on the Ordinary Meaning of the Claims

As is clearly stated in the Petition, Ground 1 is based on Patent Owner's Apparent Construction and Ground 2 is based on the ordinary meaning of the claim

terms. *See* Petition, 46 (explaining the differences between Ground 1 and Ground 2). Thus, Ground 2 relies on the VTM feeding back an output current signal to the controller in the PRM to limit current based on VTM over-current. *Id.* The Ground relies on Figure 9 of the White Paper where the feedback loop in the combination includes sensing the current from the output of the VTM. Petition, 55. Accordingly, PO's statement that "Petitioner formulates its *entire Petition* on what it perceives to be Patent Owner's construction" is incorrect. POPR, 1 (emphasis added). Ground 2 applies the ordinary meaning.

IV. There Is No "Objective Evidence of Non-Obviousness"

Objective indicia are "economic and motivational" issues that may shed light on the question of obviousness. *Graham v. John Deere Co.*, 383 U.S. 1, 17-18 (1966). Conclusory statements in a patent's specification do not constitute objective factual evidence. Rather, actual data must be presented. *See In re Soni*, 54 F.3d 746, 750 (Fed. Cir. 1995). Patent Owner's expert merely cites to the patent specification and fails to consider the art of record, or the fact that Patent Owner effectively accuses the prior art, and thus the patent could not be "contrary to the conventional wisdom." POPR, 57.

V. Conclusion

For the reasons stated in the Petition and for these reasons, the Challenged Claims are unpatentable.

Respectfully submitted,

Dated: August 20, 2024

/Steven Katz/

Steven Katz, Reg. No. 43,706

Lawrence Kolodney, Reg. No. 43,807

Ryan O'Connor, Reg. No. 60,254

Fish & Richardson P.C.

60 South Sixth Street, Suite 3200

Minneapolis, MN 55402

T: 202-783-5070

F: 877-769-7945

Attorneys for Petitioner

CERTIFICATE OF SERVICE

Pursuant to 37 CFR §§ 42.6(e)(1) and 42.6(e)(4)(iii), the undersigned certifies that on August 20, 2024, a complete and entire copy of this Petitioner's Reply to Patent Owner's Response and accompanying exhibits were provided by email to the Patent Owner by serving the email correspondence addresses of record as follows:

John P. Schnurer
Miguel Bombach
Yun (Louise) Lu
PERKINS COIE LLP
11452 El Camino Real, Suite 300
San Diego, CA 92130

Email: Delta-Vicor-IPRs@perkinscoie.com

/Anastasia Renard/
Anastasia Renard
Fish & Richardson P.C.
60 South Sixth Street, Suite 3200
Minneapolis, MN 55402
renard@fr.com