

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SUNSPEC ALLIANCE,
Petitioner,

v.

TIGO ENERGY, INC.,
Patent Owner

Case IPR2023-01175
Patent No. 9,966,848 B2

PATENT OWNER PRELIMINARY RESPONSE

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I. Introduction

Patent Owner Tigo Energy, Inc. submits this Patent Owner Preliminary Response (POPR) regarding U.S. Patent No. 9,966,848 (the “’848 patent”). For the below reasons, the Board should find Petitioner has failed to show any of claims 1-20 (the “Challenged Claims”) unpatentable.

Petitioner offers three grounds of unpatentability, all of which hinge on a finding that Mieth (Ex-1002) expressly or inherently discloses “a micro-controller”—a requirement of all claims of the ’848 patent. Mieth does not expressly disclose a micro-controller, and a micro-controller is not inherently present in Mieth. Thus, all three of Petitioner’s ground are fatally defective.

Petitioner’s Ground 1 relies on anticipation, yet Petitioner concedes that Mieth does not disclose the claimed “micro-controller.” While Petitioner argues that Mieth’s load (20) meets the “micro-controller” requirement of the claims, Petitioner acknowledges that a “load” is generic:

“Mieth discloses a load 20 that is powered by the second output of the power supply apparatus 19 (second stage power converter). A PHOSITA would understand that a load in a circuit can be or include a micro-controller, as such the load 20 is analogous to the claimed micro-controller (dashed-orange), as shown in Fig.1(annotated-1D) below. Ex.1007, ¶¶ 102-103; Ex.1014, 1180, Fig.5.” (Petition at 23

(emphasis added).)¹

This passage shows that Petitioner failed to identify an express disclosure of a micro-controller in Mieth, instead relying on Mieth’s “load 20.” Since a generic load is not a micro-controller, Petitioner must be relying on inherency. But inherency requires that the claimed feature is necessarily present in the prior art. “A claim limitation is inherent in the prior art if it is necessarily present in the prior art, not merely probably or possibly present.” *Akamai Techs., Inc. v. Cable & Wireless Internet Servs., Inc.*, 344 F.3d 1186, 1192 (Fed. Cir. 2003) (citing *Rosco, Inc. v. Mirror Lite, Co.*, 304 F.3d 1373, 1380 (Fed. Cir. 2002)). Petitioner admits that Mieth’s generic load is not necessarily a micro-controller and could potentially be other things.² (Petition at 22 (“a load in a circuit can be or include a micro-controller”).) Further, Petitioner states that “the load 20 is **analogous** to the claimed micro-controller,” not that the load 20 is necessarily a micro-controller. (*Id.*) Accordingly, Ground 1 fails because Petitioner cannot show anticipation.

¹ See also, related IPR2023-01133, where Petitioner acknowledges that Mieth’s “load” is a generic term. (IPR2023-01133, Petition at 22-23.)

² Patent Owner does not concede Mieth can or should be read to allow for a micro-controller. Patent Owner is simply pointing out that, by Petitioner’s own arguments, Petitioner cannot prevail on inherency.

Petitioner's other two grounds fail to cure the missing micro-controller issue of Ground 1. For Ground 2, Petitioner proposes a combination of Mieth and Balogh (Ex-1003), but continues to rely solely on its argument that Mieth discloses a micro-controller as per Ground 1. (Petition at 19, 53-72.) Ground 3 only addresses dependent claims based on the Liu reference (Ex-1005). (Petition at 19, 73-84.) Accordingly, all of Petitioner's grounds are defective and the Board should reject Petitioner's challenge.

II. The '848 Patent

A. Overview

The '848 patent is owned by Tigo Energy, Inc., a California company that designs and manufactures electronics for solar power production. (Ex-1001 at 1 (73).) The '848 patent addresses a significant problem in the industry relating to the morning start-up of panel-powered electronic systems that led to problematic "unstable or even meta-stable modes" in the systems' micro-controllers:

"One of the problematic aspects of operating a controller in a solar power environment is the unreliability of the power source during the early morning hours as well as during late evening hours, when faint blue light allows the panel to generate a high voltage, but presents barely enough current to properly operate. As a result, circuits often create a 'false start' in which the voltages appear to be there, but as soon as the controller becomes active there is a drop or brown out or power outage, leading to the undesirable occurrence of

unstable or even meta-stable modes, which may occur more frequently for small processors.” (Ex-1001 at 8:8-18 (emphasis added).)

To address this and other issues, the inventor of the ’848 patent conceived of a power supply having first and second stage converters that allow for a stable start-up and without a premature powering of the micro-controller:

“The power supply includes: a first stage having an input connected to a voltage from a photovoltaic panel and an output providing a first voltage different from the voltage from the photovoltaic panel; and a second stage connected to the output of the first stage, the second stage supplying power at a second voltage to a micro-controller, where the output of the first stage is turned on and stable for a period of time before the second stage is turned on to supply the power at the second voltage to the micro-controller.” (Ex-1001 1:55-63 (emphasis added).)

The claims of the ’848 patent seek to protect at least this important breakthrough.

B. Priority Date

The ’848 patent claims priority through a series of non-provisional U.S. patent applications to two provisional U.S. patent applications. (Ex. 1001 at 1-2 ((60) and (63)).) Petitioner argues the ’848 patent is not entitled to claim priority to the provisional patent applications. (Petition at 10.) Patent Owner currently takes no position on Petitioner’s priority date argument because the Board should reject Petitioner’s challenge for other reasons, as shown herein.

C. Prosecution History

The application that resulted in the '848 patent received a first action allowance. However, a parent to the '848 patent was extensively examined as explained in the claim construction section, below. (*See also* Ex-2001.)

D. The Related IPRs Include The Same “Micro-Controller” Defect

Patent Owner notes that Petitioner has filed IPRs against two other family members of this case:

- IPR2023-01133 – U.S. Patent No. 10,333,405
- IPR2023-00879 – U.S. Patent No. 9,584,021

Petitioner relies upon Mieth in those petitions and the same defective micro-controller arguments.

Patent Owner further notes that all of the above-identified patents (i.e., the '848 patent, the '405 patent, and the '021 patent) are the subject of co-pending litigation in *Tigo Energy Inc. v. SMA Solar Technology America LLC*, 22-915-VAC (D. Del.).

III. Claim Construction

For purposes of this POPR, Patent Owner submits that the Board need not construe any claim terms because Petitioner failed to show Mieth discloses the micro-controller requirement of the claims under any reasonable construction. *Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.*, 868 F.3d 1013, 1017

(Fed. Cir. 2017) (citing *Vivid Techs., Inc. v. Am. Sci.*, 200 F.3d 795, 803 (Fed. Cir. 2000) (“only those terms need be construed that are in controversy, and only to the extent necessary to resolve the controversy”)).

Patent Owner also takes no position on Petitioner’s claim construction arguments as they are unnecessary to resolve this dispute. Nonetheless, Petitioner’s assertion that “[n]o prosecution history exists that addresses the construction of the claim language at issue” is plainly false. (Petition at 19.) Petitioner failed to address the extensive prosecution history of the first member of this patent family, U.S. Patent No. 9,143,036, which received five office actions and was allowed only after extensive amendments were presented by Patent Owner. (*See* Ex-2001 at 271-287 (first action), 259-266 (first response), 232-248 (second action), 222-230 (second response), 182-201 (third action), 166-176 (third response), 131-150 (fourth action), 120-129 (fourth response), 70-93 (fifth action), 53-64 (fifth response), 20-28 (notice of allowance).) Importantly, Patent Owner’s prosecution responses included several arguments regarding first and second stage power converters, including how they differ from mere capacitors. (*Id.* at 59-63, 126-128, 172-175, and 227-229.) As such, Petitioner has failed to analyze the relevant prosecution history to determine the meaning of the terms “first stage power converter” and “second stage power converter,” even though it was required to do so. *Trading Techs. Int’l, Inc. v. Open E Cry, LLC*, 728 F.3d 1309, 1323 (Fed. Cir. 2012) (“the prosecution history

regarding a particular limitation in one patent is presumed to inform the later use of that same limitation in related patents, ‘unless otherwise compelled.’”)

IV. The Person of Ordinary Skill in the Art (“POSITA”)

Petitioner asserts a POSITA “would have had a bachelor’s degree in electrical engineering, or a similar discipline and at least two years of design experience with circuit design.” (Petition at 20.) Patent Owner disputes this definition at least because it excludes individuals with higher education and less experience. Nonetheless, the Board need not resolve this dispute because the Petition fails to disclose a micro-controller under any reasonable POSITA definition.

V. Ground 1: Mieth Does Not Disclose A “Micro-Controller”

The ’848 patent includes three independent claims (1, 10 and 19), all of which recite “a micro-controller.” (Ex-1001 at 11:11, 12:9, 13:10-11.) Petitioner argues Mieth anticipates independent claims 1 and 10. (Petition at 19-20.)³ To prevail on a showing of anticipation, Petitioner must show that the four corners of Mieth discloses “each and every element as set forth in the claim...either expressly or inherently.” *Verdegaal Bros. v. Union Oil Co. of California*, 814 F.2d 628, 631

³ Claim 19 is challenged in Ground 2 but likewise fails because Petitioner presents the same defective “micro-controller” arguments it presents for claims 1 and 10. *See* Section VI, *infra*.

(1981); *Finisar Corp. v. DirecTV Group, Inc.*, 523 F.3d 1323, 1334 (Fed. Cir. 2008); *Spansion, Inc. v. Int’l Trade Comm’n*, 629 F.3d 1331, 1356 (Fed. Cir. 2010). The Petition fails to meet this standard.

Specifically, as explained previously, Petitioner presents the following argument that Mieth’s load (20) discloses the “micro-controller” of claim 1:

“Mieth discloses a load 20 that is powered by the second output of the power supply apparatus 19 (second stage power converter). A PHOSITA would understand that a load in a circuit can be or include a micro-controller, as such the load 20 is analogous to the claimed micro-controller (dashed-orange), as shown in Fig.1(annotated-1D) below. Ex.1007,¶¶102-103;Ex.1014,1180,Fig.5.” (Petition at 23 (emphasis added).)

The excerpt above admits that Mieth does not expressly disclose a “micro-controller.” It acknowledges that a “load” could be a micro-controller but also admits that the “load” could be other things.⁴ Additionally, Petitioner presents no argument that any other portion of Mieth discloses the claimed micro-controller. Accordingly, Petitioner can only prevail on its anticipation grounds if Mieth’s “load 20” inherently discloses a micro-controller—Petitioner concedes that it does not.

⁴ As mentioned previously, Petitioner admits in a related IPR that Mieth’s “load 20” is a generic term. (IPR2023-01133, Petition at 22-23.)

To prevail on a showing of inherent anticipation, a Petitioner must show that “the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.” *In re Robertson*, 169 F.3d 743, 745 (Fed. Cir. 1999) (emphasis added); *Continental Can Co., U.S.A. v. Monsanto Co.*, 948 F.2d 1264, 1268-69 (Fed. Cir. 1991); *Novartis Pharms. Corp. v. Accord Healthcare, Inc.*, 38 F.4th 1013, 1017 (Fed. Cir. 2022). Petitioner cannot meet this standard, as Petitioner admits “a PHOSITA would understand that a load in a circuit **can be or include** a micro-controller.” (Petition at 23 (emphasis added).) By stating the load 20 “can be” a micro-controller, Petitioner concedes that load 20 is not necessarily a micro-controller. Petitioner also alleges that “the load 20 is **analogous** to the claimed micro-controller.” (*Id.* (emphasis added).) Petitioner’s “analogous to” argument likewise fails because the relevant inquiry for anticipation is whether the missing component is necessarily present in the reference, not whether the component disclosed is “analogous to” the missing component.

It is unsurprising Petitioner relies on inherency because Mieth fails to disclose any micro-controller. Mieth’s descriptions of “load” 20 are reproduced below:

“Circuit arrangement for supplying power to ***an electrical load*** from

an electrical energy source with fluctuating performance.” (Ex-1002 at 1:19-21 (emphasis added).)⁵

“Circuit arrangement for supplying 5 power to *an electrical load (20)* from an electrical energy source with fluctuating performance, having a device for adapting the power consumption to the yield of the energy sources and having an apparatus for generating an auxiliary voltage.” (*Id.* at 1:23-28 (emphasis added).)

“1. A circuit arrangement for supplying power to *an electrical load (20, 20a)* from an electrical energy source with fluctuating performance, a power supply apparatus (19, 19a), which is connected by way of a supply voltage input to the energy source and is routed by way of its output *to a load (20, 20a)*, having a device, which contains an actuator and an open-loop and/or closed-loop control apparatus for controlling the actuator, for adapting the power consumption to the yield of the energy source, and an auxiliary voltage input (e2, e3) of the power supply apparatus (19, 19a) being connected to an apparatus for generating an auxiliary voltage supplied with power from the energy source” (*Id.* at 2:1-15 (emphasis added).)

“Circuit arrangement for supplying power to an electrical load from

⁵ As noted in emails exchanged between the parties and Board on October 18, 2023, Petitioner’s original Ex-1002 was incorrectly paginated and was, therefore, expunged. (Ex-3001.) Thus, Patent Owner’s citations to Ex-1002 are to the new, correctly paginated version filed with the PTAB on October 19, 2023.

an electrical energy source with fluctuating performance.” (*Id.* at 4:25-27 (emphasis added).)

“Figs 1 and 2 depict circuit arrangements for supplying power to *an electrical load* from a solar generator.” (*Id.* at 8:8-9 (emphasis added).)

“The circuit arrangement shown in Fig. 1 serves to supply power to *the electrical load 20* from the solar generator 1, i.e. from an electrical energy source with fluctuating performance.” (*Id.* at 8:20-23 (emphasis added).)

“The power supply apparatus 19, in particular designed as a DC-DC voltage converter or charging converter, is connected by way of its supply voltage input e1 to the solar generator 1 and is routed by way of its output *to the load 20.*” (*Id.* at 8:29-33 (emphasis added).)

As shown, Mieth’s load is never described as being related to a controller, micro-controller or the like, confirming Petitioner’s reliance on inherency.

In sum, Petitioner failed to show Mieth expressly discloses the claimed micro-controller, and Petitioner admits Mieth does not inherently (necessarily) include the claimed micro-controller. Thus, Petitioner’s allegation that claim 1 is anticipated is fatally deficient. Petitioner’s allegation that Claim 10 is anticipated is also fatally deficient because it merely adopts the same defective micro-controller arguments presented for claim 1. (Petition at 50 (“Mieth discloses the micro-controller of [10E] for at least the same reasons Mieth discloses the micro-controller of [1D] as described in §VII.A.1.iv. Ex.1007,¶163.”).)

For at least these reasons, the Board should reject Petitioner's anticipation challenge of Ground 1.

VI. Grounds 2-3: Neither Balogh Nor Liu Cure The Micro-Controller Deficiency of Ground 1

Petitioner's Ground 2 relies on a combination of Mieth and Balogh and only in relation to the "first stage power converter" limitation of the claims. (Petition at 53-54 ("To the extent it is argued that Mieth does not teach the first stage power converter (e.g., elements [1B] and [10B]), Balogh discloses a first stage power converter as set forth in elements [1B] and [10B].").) In other words, Petitioner proposes combining Mieth and Balogh,⁶ but not in a way that impacts Petitioner's arguments regarding the micro-controller limitation of claims 1 and 10:

"As discussed in §VII.A.1 Mieth discloses claim 1. As discussed in §VII.B.1.i, Mieth in combination with Balogh disclose feature [1B], thus MiethBalogh also teach all the elements [1A]-[1H] of claim 1. Additionally, for the same reasons, Mieth-Balogh teach all of claims 4, 5, and 7-9." (Petition at 60.)

"As discussed in §VII.A.7 Mieth discloses claim 10. As discussed in §VII.B.2.i, Mieth in combination with Balogh discloses feature [10B], thus MiethBalogh also teach all the elements [10A]-[10H] of claim 10. Additionally, Mieth teaches claims 13-14, and 16-18 as

⁶ Patent Owner does not address Petitioner's rationale for combining these references herein but reserves the right to do so if needed/appropriate in the future.

discussed in §VII.A.8-§VII.A.12; therefore for the same reasons,
Mieth-Balogh teaches claims 13-14, and 16-18.” (Petition at 61.)

As explained previously, Mieth fails to disclose any micro-controller, so Petitioner’s
Ground 2 arguments for claims 1 and 10 fail for the same reasons as Ground 1.

Petitioner’s Ground 2, claim 19 arguments are no different, relying on the
same defective micro-controller arguments of Ground 1:

“Mieth discloses that the power supply apparatus 19 connected to the
bipolar transistor 16 (blue-second stage power converter) generates
an output voltage to a load 20. Ex.1002,11:14-16,12:21-
30;Ex.1007,¶200. As shown in Fig.1(annotated19F), the output of
the power supply apparatus 19 is analogous to the claimed supplying
power at a third voltage. Ex.1002,8:29-35;Ex.1007,¶200. The load
20 of Mieth receives the output of the power supply apparatus 19. Id.
A PHOSITA would understand that a load in a circuit can be or
include a micro-controller, as such, the load 20 is analogous to the
claimed micro-controller (dashed-orange). Ex.1007,¶200.”
(Petition at 66-67 (emphasis added).)

Again, as explained previously, Mieth fails to expressly or inherently disclose a
micro-controller, Petitioner’s Ground 2 arguments surrounding independent claim
19 also fail.

Ground 3 cannot save Petitioner’s case. Here, Petitioner proposes adding Liu
for dependent claims s 2, 3, 6, 11, 12, and 15 only. (Petition at 19, 73.) The Board
need not address Ground 3 because it fails to cure the deficiencies of Grounds 1 and

2.

VII. Conclusion

For at least the above reasons, Petitioner has failed to show any Challenged Claim is unpatentable and the Petition should be rejected.

Respectfully submitted,

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CERTIFICATE OF WORD COUNT

The undersigned certifies that the word count in this Patent Owner Preliminary Response is 2,907 words, as counted by the word-processing program Microsoft Word for Office 365 used to generate this Petition, where such word count excludes the table of contents, table of authorities, mandatory notices, certificate of service, appendix of exhibits, and this certificate of word count. This Petition is in compliance with the 14,000 word limit set forth in 37 C.F.R. § 42.24(c).

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