

UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE PATENT TRIAL AND APPEAL BOARD

SMA SOLAR TECHNOLOGY AMERICA, LLC,
Petitioner,

v.

TIGO ENERGY, INC.,
Patent Owner.

Case: IPR2023-00879
U.S. Patent No. 9,584,021 B2

PATENT OWNER RESPONSE

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TABLE OF EXHIBITS

Exhibit	Description
2001	Declaration of Stephen Ullmer ISO Unopposed Motion to Appear <i>Pro Hac Vice</i>
2002	Prosecution History of U.S. Patent No. 9,143,036
2003	Decision Denying Institution of <i>Inter Partes</i> Review, IPR2023-01175 Patent 9,966,848, Paper 12 (January 22, 2024) (“848ID”)
2004	Decision Denying Institution of <i>Inter Partes</i> Review, IPR2023-01133 Patent 10,333,405, Paper 10 (January 12, 2024) (“405ID”)
2005	Transcript of January 18, 2024 Remote Videoconference Deposition of Douglas R. Holberg, Ph.D.
2006	Gordon McComb and Earl Boysen, <i>Electronics for Dummies</i> , Wiley Publishing (2005) (“Electronics-for-Dummies”) ISBN 0-7645-7660-7 2004107905
2007	John Clayton Rawlins, <i>Basic AC Circuits</i> , 2d. ed., Newnes Press (2000) (“Rawlins”) ISBN-0-7506-7173-4 TK454 .R39 2000
2008	Darren Ashby, <i>Electrical Engineering 101</i> , 2d. ed., Newnes Press (2009) (“EE101”) ISBN 978-1-85617-506-7 TK146.A75 2009 2008045182
2009	Daniel W. Hart, <i>Power Electronics</i> , McGraw-Hill (2011) (“Hart”) ISBN 978-0-07-338067-4 TK7881.15 H373 2010 2009047266

Table of Authorities

Cases

<i>ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.</i> , 694 F.3d 1312 (Fed. Cir. 2012)	19, 39
<i>Apple Inc. v. MPH Techs. Oy</i> , 28 F.4th 254 (Fed. Cir. 2022)	27
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<i>Finisar Corp. v. DirecTV Group, Inc.</i> , 523 F.3d 1323 (Fed. Cir. 2008)	12
<i>Gaus v. Conair Corp.</i> , 363 F.3d 1284 (Fed. Cir. 2004)	33
<i>In re Nuvasive, Inc.</i> , 842 F.3d 1376 (Fed. Cir. 2016)	40
<i>In re Robertson</i> , 169 F.3d 743 (Fed. Cir. 1999)	15
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<i>Intendis GMBH v. Glenmark Pharm. Inc., USA</i> , 822 F.3d 1355 (Fed. Cir. 2016)	39
<i>InTouch Techs., Inc. v. VGO Commc'ns</i> , 751 F.3d 1327 (Fed. Cir. 2014)	19, 39
<i>Medtronic, Inc. v. Teleflex Innovations SARL</i> , 70 F.4th 1331 (Fed. Cir. 2023)	36
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<i>Nidec Motor Corp. v. Zhongshan Broad Ocean Motor Co.</i> , 868 F.3d 1013 (Fed. Cir. 2017)	7
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<i>Samsung Elecs. Co. v. Elm 3DS Innovations, LLC</i> , 925 F.3d 1373 (Fed. Cir. 2019)	41
<i>Spansion, Inc. v. Int’l Trade Comm’n</i> , 629 F.3d 1331 (Fed. Cir. 2010)	12
<i>TQ Delta, LLC v. Cisco Sys.</i> , 942 F.3d 1352 (Fed. Cir. 2019)	27
<i>Trading Techs. Int’l, Inc. v. Open E Cry, LLC</i> , 728 F.3d 1309 (Fed. Cir. 2012)	8
<i>TriMed, Inc. v. Stryker Corp.</i> , 608 F.3d 1333 (Fed. Cir. 2010)	40
<i>Verdegaal Bros. v. Union Oil Co. of Cal.</i> , 814 F.2d 628 (1981)	12
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I. Introduction

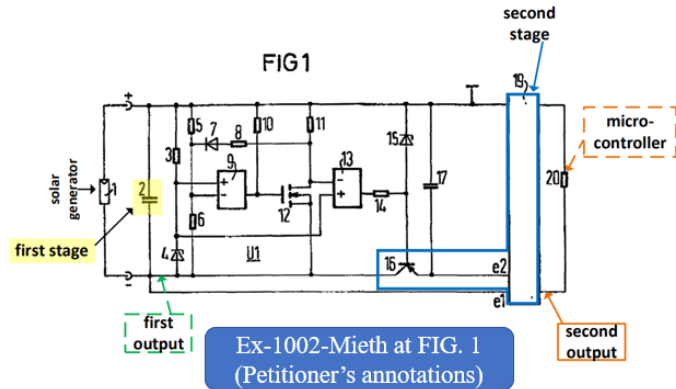
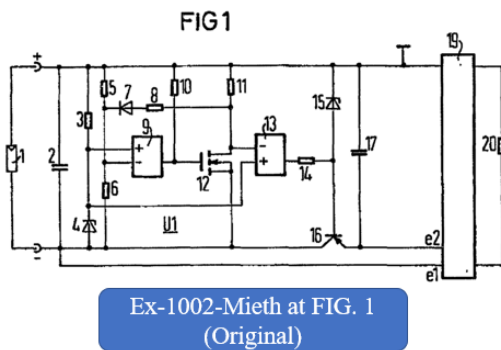
Patent Owner Tigo Energy, Inc. (“Tigo” or “Patentee”) submits this Patent Owner Response (POR) regarding U.S. Patent No. 9,584,021 (Ex-1001, the “’021 patent”).

Petitioner offers four grounds of unpatentability, all of which hinge on finding that Mieth (Ex-1002) expressly or inherently discloses “a micro-controller”—a requirement of all claims of the ’021 patent. Mieth does not expressly disclose a micro-controller, and a micro-controller is not inherently present in Mieth. Thus, all of Petitioner’s ground are fatally defective.

In particular, Petitioner relies on Mieth’s “load 20” and contends this load is “analogous to” a microcontroller:

“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).” (Petition at 25 (Petitioner’s emphasis removed, Patentee’s emphasis added).)

While Petitioner annotated Mieth’s FIG. 1 with a “micro-controller” label as shown below, that label is not in the original figure:



(See Petition at 26.) Contrary to Petitioner's argument and annotations, Mieth does not expressly or inherently disclose a micro-controller. (See, e.g., Ex-1002-Mieth at 1:19-21, 1:23-28, 2:1-15, 4:25-27, 8:8-9, 8:20-23, 8:29-33).)

The Board has considered this issue in two related IPRs and sided with Patentee in both cases. (Ex-2004-405ID at 10 ("Patent Owner correctly observes that Mieth does not expressly disclose a micro-controller"), 10-11 (agreeing that "Petitioner fails to show Mieth inherently discloses the claimed micro-controller"), 11 (rejecting Petitioner's argument by analogy: "We are not persuaded that Petitioner's 'analogous to' argument comports with the standard for anticipation"), 12 (noting that Petitioner's obviousness arguments rely on the same reasoning as its anticipation arguments, which "do not cure the deficiency in Petitioner's argument and evidence"); see also Ex-2003-848ID at 11-14.) Section IV.A shows the same microcontroller issue is dispositive here.

Petitioner's Grounds fail for several additional reasons. The anticipation Grounds (Ground A and part of Ground B) fail because Petitioner relies on a simple

capacitor in Mieth for power conversion limitations (defined in §IV.B). Petitioner and its expert misinterpret these limitations, which a capacitor does not meet.

The obviousness Grounds (the remainder of Ground B as well as Grounds C-D) also fall short. For example, §IV.C shows that each obviousness Ground combines Mieth and Balogh, but Petitioner fails to argue that this combination meets all of the claim limitations.

II. The '021 Patent

Patentee Tigo is a California company that designs and manufactures electronics for solar systems. (Ex-1001 at 1 (73).) The '021 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 8:4-14 (emphasis added).)

To address this and other issues, the inventor 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 at 1:51-59 (emphasis added).)

The claims of the '021 patent seek to protect at least this important breakthrough.

A. Priority Date

The '021 patent is a continuation of non-provisional U.S. Patent App. No. 12/787,205, filed May 25, 2010 (now U.S. Patent No. 9,143,036, “the '036 patent”), which claims priority to two provisional applications the earliest of which was filed September 2, 2009. (Ex-1001 at 1-2 ((60), (63))).) Petitioner generically argues the '021 patent is not entitled to claim priority to the provisional patent applications without citing any specific evidence. (Petition at 10.) Patentee disagrees, but the Board need not resolve that dispute because Petitioner’s challenge is defective irrespective of whether the '021 patent is entitled to a September 2, 2009 priority

date. *See* PTAB Consolidated Trial Practice Guide (Nov. 2019) at 86 (“[A] final written decision will address the issues necessary for resolving the proceeding.”)

B. 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 22.) Patentee takes no issue with this level of skill except to note that a person may qualify as a POSITA with more education and less experience or vice versa. Nonetheless, the Board need not resolve that potential dispute because the Petition is defective under any reasonable definition of a POSITA.

C. Prosecution History

No substantive office actions were issued during prosecution of the ’021 patent. (*See* Ex-1006.) However, the parent to the ’021 patent (the ’036 patent) was extensively examined.¹ (*See* Ex-2002.) Petitioner ignores this portion of the relevant prosecution history.

D. Related IPRs included the same “micro-controller” defect

Several U.S. patents claim priority to the ’021 patent, including U.S. Patent No. 9,996,848 (“the ’405 patent”) and U.S. Patent No. 10,333,405 (“the ’405

¹ The prosecution of the ’036 patent is addressed in the *Claim Construction* section, below.

patent”). Petitioner filed IPRs against these two patents, both of which were rejected by the Board; trial was not instituted in either IPR proceeding. (Exs-2003-04.)

The arguments in this Petition closely track the arguments raised in the petitions against the ’848 patent and the ’405 patent. The Grounds in each proceeding are as follows:

IPR	Grounds	Basis
IPR2023-00879 (this IPR)	Ground A: Mieth	§102
	Ground B: Mieth, Balogh	§§102/103
	Ground C: Mieth, Balogh, Nishi	§103
	Ground D: Mieth, Balogh, Liu	§103
IPR2023-01133 (US10,333,405) [the “405-IPR”]	Ground A: Mieth	§102
	Ground B: Mieth, Balogh	§103
	Ground C: Mieth, Balogh, Liu	§103
IPR2023-01175 (US9,966,848) [the “848-IPR”]	Ground A: Mieth	§102
	Ground B: Mieth, Balogh	§103
	Ground C: Mieth, Balogh, Liu	§103

Patentee did not file a preliminary response in this proceeding, and the Board instituted review on November 6, 2023.

Patentee did file preliminary responses in the 405-IPR and the 848-IPR, and those responses focused on Petitioner’s inadequate reliance on Mieth for microcontroller limitations. The Board agreed that Mieth does not disclose or render obvious a microcontroller and denied institution in both proceedings. (Ex-2004-405ID at 10-14; Ex-2003-848ID at 11-15.)

The ’848, ’405 patent, and ’021 patent are the subject of co-pending litigation in *Tigo Energy Inc. v. SMA Solar Technology America LLC*, 22-915-VAC (D. Del.)

(hereinafter “the Delaware Litigation”).

III. Claim Construction

Petitioner failed to show Mieth discloses the micro-controller requirement of the claims under any reasonable construction, and thus this IPR can be resolved without deciding any claim construction issues. *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”)).

Patentee notes that a claim construction opinion and order issued in the Delaware Litigation in the time period between the filing of the Petition and this POR. Petitioner filed the opinion and order as Exhibits 1016-17. Neither the parties nor the Delaware Court addressed the term “micro-controller” in the Delaware Litigation. (*Id.*) Though there appears to be no need to construe any claims in this proceeding, Patentee does not take issue with the Delaware court’s constructions and references the constructions regarding power conversion from the Delaware

Litigation in the arguments below where applicable.² (*See* §IV.B.)

Patentee takes no position on Petitioner’s claim construction argument regarding a “stage,” as it is unnecessary to resolve this dispute. (Petition at 21-22.) Nonetheless, Petitioner’s assertion that “[n]o prosecution history exists that addresses the construction of the claim language at issue” is incorrect. (*Id.* at 22.) As mentioned in §II.B regarding prosecution history, the ’021 Patent is a continuation of the ’036 patent. The ’036 patent was subject to extensive prosecution, received five office actions, and was allowed only after extensive amendments. (*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).) Petitioner failed to analyze the relevant prosecution history to determine the meaning of the terms “first stage power converter” and “second stage power converter.” *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

² Patentee submits that the most efficient way to address the dispute is to discuss claim construction in the context of Petitioner’s invalidity arguments rather than in a separate claim construction section.

related patents, ‘unless otherwise compelled.’”)

IV. Argument

The Petition identifies its grounds in several ways, first via table:

Ground	Prior Art	Claims Challenged
A	Mieth	1-7, 9
B	Mieth in view Balogh	1, 8, 10-12, 15-18, 20
C	Mieth in view of Balogh and Nishi	13-14
D	Mieth in view of Balogh and Liu	19

(Petition at 20.) Ground A alleges anticipation based on Mieth. (Petition at 23-50.)

Ground B is a mixed ground entitled “Anticipation/obviousness of claims 1, 8, 10-12, 15-18, and 20 in view of Mieth and Balogh” that appears to argue that Mieth anticipates some additional claims (claims 10-12, 15-18, and 20). (*See* Petition at 50-78.) Ground B also includes obviousness arguments that were not identified in the table or heading, namely that Mieth in view of Balogh allegedly renders obvious claims 2-7 and 9. (Petition at 50; *See id.* at 50-78.) The Board treated Ground B as an obviousness challenge after noting that the ambiguous heading for Ground B “does not provide a precise statement of the relief requested, as required by our rules.” (ID at 17 n.9.) Out of an abundance of caution, Patentee addresses both anticipation and obvious arguments contained in Ground B even though it is unclear what Petitioner is asserting. *But see Netflix, Inc. v. DivX, LLC*, 84 F.4th 1371, 1377

(Fed. Cir. 2023) (“a petitioner may not rely on a vague, generic, and/or meandering petition...it is the petitioner’s burden to present a clear argument”).

None of Petitioner’s grounds anticipate or render obvious any Challenged Claim, as explained in detail below. For clarity, Patentee identifies the claims and grounds at issue in each argument below, given the ambiguity in Petitioner’s identifications.

A. Grounds A-D (Claims 1-20): Mieth does not disclose “a micro-controller” and thus all of Petitioner’s invalidity arguments fail

Every Ground in the Petition fails because Mieth’s “load” does not expressly or inherently disclose the claimed “microcontroller” required by every challenged independent claim. This same issue was dispositive in the 405-IPR and the 848-IPR, where the Board declined to institute in both cases. (Ex-2003-848ID at 11-15; Ex-2004-405ID at 10-14.)

1. Petitioner exclusively relies on Mieth’s “load 20” for the “micro-controller” limitations in the challenged independent claims

The ’021 patent includes three independent claims (1, 10, and 18), each of which requires “a micro-controller:”

- [1D] “the second stage powered by the first output has a second output for a micro-controller” (see also limitations 1E-1G);
- [10E] “a micro-controller powered by the second output; a switchable load” (see also limitations 10F-10I);

- [18E] “a micro-controller” (see also limitations 18H-18I).

These limitations are addressed in Grounds A and B of the Petition. Grounds C-D deal only with dependent claims 13-14 and 19 such that these Grounds fail for the same reasons as Grounds A-B.

In its analysis of the independent claims, Petitioner exclusively relies on Mieth’s “load 20” for the micro-controller, as shown in the exemplary citations below:

- Ground A, 1D: “[T]he load 20 is analogous to the claimed microcontroller (dashed-orange). ... Thus, Mieth teaches [1D].” (Petition at 26);
- Ground B, 1D: “[A] PHOSITA would have known to combine the cascaded power converter architecture of Balogh for high DC applications (e.g., 48V or 80V solar panel modules) to realize an appropriate intermediate voltage for the switchable load and load 20 of Mieth.” (*Id.* at 52);
- Ground B, 10E: “[10E] is analogous to the micro-controller of [1D] and the switchable load of [1E], and thus Mieth-Balogh disclose [10E] for at least the same reasons Mieth discloses [1D],[1E] as described in §VII.A.1.iv., §VII.B.1., and §VII.A.1.v.” (*Id.* at 60);
- Ground B, 18E: “[18E] is analogous to the micro-controller of [1D]. Thus, Mieth or Mieth-Balogh disclose [18E] for at least the same reasons Mieth discloses [1D] described in §VII.A.1.iv.” (*Id.* at 71.)

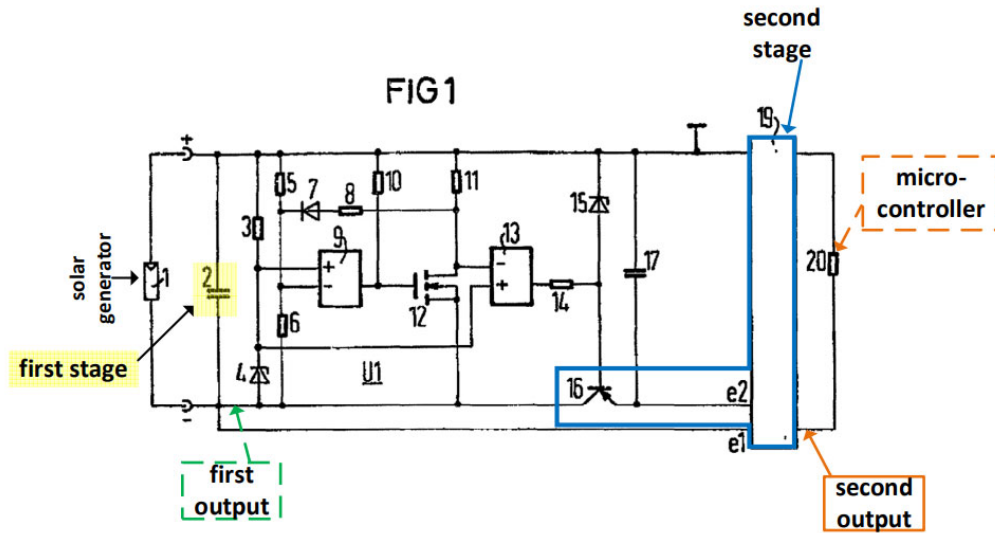
Petitioner does not rely on any disclosure other than Mieth's "load 20" as the claimed microcontroller.

2. Mieth does not expressly disclose the claimed "micro-controller"

To prevail on a showing of anticipation for any claim, Petitioner must show that Mieth expressly or inherently discloses every element of at least one of the independent claims. *Verdegaal Bros. v. Union Oil Co. of Cal.*, 814 F.2d 628, 631 (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). Petitioner cannot meet this standard, because Mieth's "load 20" does not expressly or inherently disclose a micro-controller.

Petitioner argues that Mieth's load (20) discloses the "micro-controller" of claim 1:

"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 microcontroller (dashed-orange).



Ex.1002, Fig.1(annotated-1D.1)

Thus, Mieth teaches [1D].” (Petition at 25-26 (emphasis and internal citations omitted).)

The excerpt above proves that Mieth does not expressly disclose a “micro-controller.” Indeed, by relying on a theory that a load is “analogous” to a micro-controller or *could be* a micro-controller Petitioner effectively admits there is no express disclosure of a micro-controller in Mieth. (Petition at 25-26.) The Board agreed in both the 848-IPR and the 405-IPR:

“We agree with Patent Owner that Petitioner fails to show Mieth expressly discloses the claimed micro-controller. Petitioner relies on Mieth’s load 20 (Pet. 23, 50), but Patent Owner correctly observes that Mieth does not expressly disclose a micro-controller. Prelim. Resp. 9–11 (citing Ex. 1002, 1:19–21, 1:23–28, 2:1–15, 4:25–27, 8:8–9, 8:20–23, 8:29–33).” (Ex-2003-848ID at 11-12; *see* Ex-2004-405ID at 10.)

A POSITA would not reach a different conclusion. Mieth's descriptions of "load 20" are reproduced below, none of which expressly disclose a microcontroller:

"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).)

"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 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. Thus, Mieth does not expressly disclose a micro-controller.

3. Mieth does not inherently disclose the claimed “micro-controller”

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).

Once again, Petitioner’s own arguments show that Mieth fails to inherently disclose a micro-controller. By stating that Mieth’s load “*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.* at 26 (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. The Board agreed. (Ex-2004-405ID at 10-11; Ex-2003-848ID at 11-13.) Indeed, it is undisputed that the “load” can be other things. For example, Mieth explains that a “preliminary load (11)” in FIG. 1 is “resistor 11.” (Ex-1002-Mieth at 12:14-19 (“...the increased preliminary load formed by the resistor 11 is in effect.”); Ex-2005-Holberg-Dep. at 28:5-11³.)

For at least these reasons, the Board should reject Ground A.

4. Ground B does not cure the microcontroller defect

³ “Q And if we look down at Figure 1, the preliminary load that you are referring to, I think that is callout 11; is that right?

A That is correct.

Q And callout 11, that is just a resist[o]r; is that right?

A That is correct.”

Ground B relies on anticipation or obviousness based on Mieth in view of Balogh. (Petition at 20, 50-77.) In both instances, Petitioner relies exclusively on Mieth’s “load 20” as the alleged microcontroller. In particular, Petitioner’s proposed obviousness combination for claim 1 only relates to replacing alleged power conversion stages in Mieth with cascaded power converters from Balogh and does not propose any modification to Mieth’s “load 20.” For example, the Petition states that “a PHOSITA would have known to combine the cascaded power converter architecture of Balogh for high DC applications ... to realize an appropriate intermediate voltage for the switchable load and load 20 of Mieth.” (Petition at 52 (emphasis added).) At no point in the Petition’s discussion of the proposed Mieth-Balogh combination—which it summarizes by arguing that “a PHOSITA...would know that the capacitor 2 and the power supply apparatus 19 of Mieth could be the cascaded converters as disclosed by Balogh”—is there any proposal to modify Mieth’s “load 20.” (See Petition at 52-55.)

Petitioner’s analysis for the microcontroller limitations of independent claims 10 and 18 relies on Mieth for the same reasons provided for claim 1, again without relying on a microcontroller (or any comparable element) from Balogh or otherwise supplementing its position regarding Mieth. (See, e.g., Petition at 60 (“[10E] is analogous to the micro-controller of [1D] and the switchable load of [1E], and thus Mieth-Balogh disclose [10E] for at least the same reasons Mieth discloses [1D],[1E]”))

as described in §VII.A.1.iv., §VII.B.1., and §VII.A.1.v.”) (emphasis added); 71 (“[18E] is analogous to the micro-controller of [1D]. Thus, Mieth or Mieth-Balogh disclose [18E] for at least the same reasons Mieth discloses [1D] described in §VII.A.1.iv.”) (emphasis added).)

The Board agreed in other IPRs that Petitioner’s obviousness grounds fail to set forth any new basis regarding an alleged disclosure of a micro-controller:

“Petitioner relies on the same reasoning as it presents for anticipation and has not provided any argument or evidence as to why Mieth might disclose or suggest the claimed micro-controller under an obviousness standard. For example, Petitioner and its declarant provide no reasoning to support their conclusory assertion that Mieth’s load 20 “can be or include a micro-controller.” Nor do Petitioner’s arguments present any reasoning as to why Balogh, or Mieth-Balogh, might disclose or suggest the claimed micro-controller. On this record, Petitioner’s obviousness arguments fail to meet Petitioner’s burden of demonstrating that the prior art discloses or suggests the claimed microcontroller.” (Ex-2004-848ID at 14; *see also* Ex-2003-405ID at 12-13.)

Nothing in the record of this proceeding warrants changing the Board’s analysis.

Finally, the Petition lacks any explanation or analysis regarding its application of Mieth and other references to the microcontroller limitations beyond the conclusory statement that Mieth’s load “can be or include” a microcontroller. (*E.g.*, Petition at 26.) The mere possibility that a generic load “can be or include” a

microcontroller is insufficient for obviousness purposes. *InTouch Techs., Inc. v. VGO Commc'ns*, 751 F.3d 1327, 1352 (Fed. Cir. 2014) (explaining that testimony directed to a belief that a POSITA “could combine these references, not that they would have been motivated to do so” and focusing on “what a skilled artisan could accomplish” was not the relevant inquiry); *ActiveVideo Networks, Inc. v. Verizon Commc'ns, Inc.*, 694 F.3d 1312, 1327 (Fed. Cir. 2012) (“[T]he expert’s testimony on obviousness was essentially a conclusory statement that a person of ordinary skill in the art would have known, based on the ‘modular’ nature of the claimed components, how to combine any of a number of references to achieve the claimed inventions. This is not sufficient and is fraught with hindsight bias.”).

B. Grounds A-B (Claims 1-7, 9-12, 15-18, 20): Petitioner’s anticipation arguments also fail because Mieth’s “capacitor 2” is not a power converter

Every independent claim requires a “first stage” that either “converts power” or is a “power converter”—for ease of reference, Patentee refers to these limitations as the “Power Converter” limitations. (Ex-1001 at Claims 1, 10, 18.) Petitioner’s anticipation arguments fail because they repeatedly rely on a single capacitor in Mieth to disclose the Power Converter limitations.

1. All of Petitioner’s anticipation arguments map the Power Converter limitations to Mieth’s “capacitor 2”

The independent claims each include a Power Converter limitation:

- [1C] “wherein the first stage converts power from a direct current

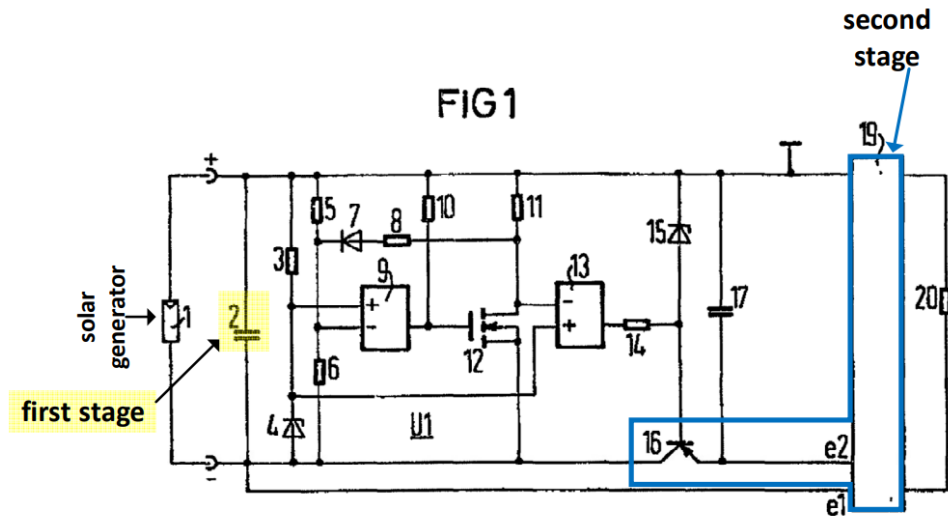
input into a first output”

- [10C] “a first stage power converter configured to convert the direct current input into a first output”
- [18C] “a first stage power converter connected to the photovoltaic panel to generate a first output from the direct current input”

Petitioner’s reliance on “capacitor 2” for the Power Converter limitations begins with limitation 1B, where Petitioner identifies “capacitor 2” as meeting the “first stage” requirements of the claim:

“Mieth discloses a capacitor 2 (yellow) in parallel with the solar generator 1, and a power supply apparatus 19 connected to a bipolar transistor 16 (blue). The capacitor 2 is analogous to the first stage and the power supply apparatus 19 connected to the bipolar transistor 16 is analogous to the second stage of the claimed power supply.” (Petition at 23 (yellow emphasis in original; internal citations omitted).)

The yellow highlighting referenced in the excerpt above is provided in Petitioner’s annotated version of Mieth’s FIG. 1:

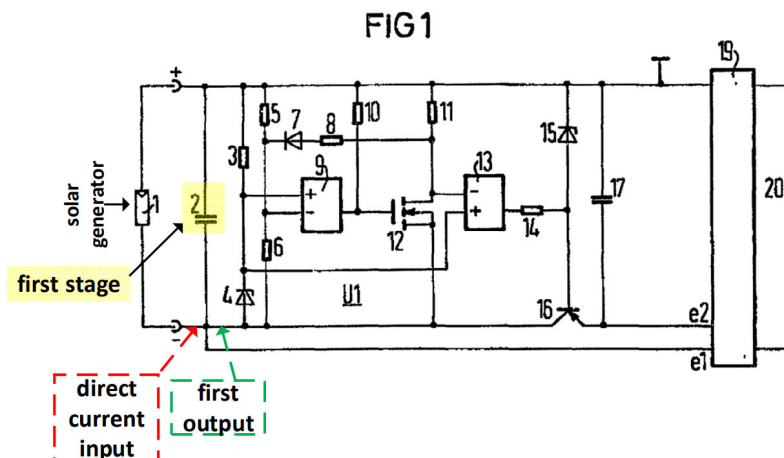


Ex.1002, Fig.1(annotated-1B)

(Petition at 24.)

Petitioner next argues with respect to the Power Converter limitation of claim 1 that a parallel capacitor converts power:

“The first stage of Mieth is a parallel capacitor 2 which a PHOSITA would understand converts power associated with the direct current input into a first output (dashed-green).



Ex.1002, Fig.1 (annotated-1C)

Thus, Mieth teaches [1C].” (Petition at 24-25 (emphasis added).)

The Petition continues to argue that Mieth’s “capacitor 2” meets the “first stage” limitation of claim 1 throughout its analysis. (*E.g.*, Petition at 26, 27, 30, 31, and 32 (all referring to “capacitor 2” as the alleged “first stage”); *see* Ex-2005-Holberg-Dep. at 30:24-32:8 (Petitioner’s declarant agreeing that he did not rely on anything other than the capacitor for the “first stage” in Ground A).)

In Ground B, Petitioner continues to argue “capacitor 2” meets the “first stage” limitations of the claims:

- “The circuit of Mieth discloses a capacitor 2 (yellow) connected in parallel with solar generator 1 in Fig.1 (annotated-[10C]).” (Petition at 57);
- “[18C] is analogous to [10C]. Thus, Mieth or Mieth-Balogh disclose [18C] for at least the same reasons described in §VII.B.3.iii [regarding limitation 1C].” (Petition at 70.)

(*See also* Petition at 58 & 70 (referring back to §VII.A.1.iii, which relates to 1C).)

A capacitor does not “convert power” (claim 1) and is not a “power converter” (claims 10, 18). Since Petitioner relied solely on a capacitor for the Power Converter limitations, its anticipation arguments fail.

2. The specification confirms simple capacitors are not power converters

The specification confirms that the Power Converter limitations do not read on a simple capacitor as most aptly demonstrated by its differentiation between

capacitors and power converters (like buck converters). For example, the specification explains that a capacitor is a component of the buck converters illustrated in the '021 patent's figures:

“The buck converter (301) has: MOSFET (302), diode (305), inductor (306), resistors (308, 309, 310), capacitor (307), MOSFET (303), and control (304). The buck converter (311) has: MOSFET (312), diode (325), inductor (327), capacitor (328) and control (314). Various known converters can be used to replace the voltage conversion portion of the buck converters (301 and 311), such [as] MOSFET (302), diode (305), inductor (306) and capacitor (307) in the buck converter (301), or MOSFET (312), diode (325), inductor (327) and capacitor (328) in the buck converter (311). Therefore, the details shown in buck converter (303) and buck converter (311) are merely illustrative, and other types of buck converters known in the art may be used.” (Ex-1001 at 5:14-24 (emphasis added).)

The specification further explains that a buck converter steps-down a higher input voltage to a lower output voltage. (Ex-1001 at 4:51-52; *see also* Ex-2005-Holberg-Dep. at 34:20-23⁴.) Conversely, in this context a capacitor stores energy. (Ex-1001 at 4:54-60 (indicating that a capacitor is “charged by buck converter (301)”); 10:37-41 (noting that there may be alternatives to using a capacitor as “primary energy

⁴ “Q. And can you explain what a buck converter does?

A. A buck converter converts a higher voltage to a lower voltage.”

storage”).) The fact that the buck converter is handling voltage conversion while a capacitor is merely storing energy demonstrates that a simple capacitor is not a power converter.

3. Dr. Holberg’s admissions during cross-examination show that Petitioner applied an unjustifiably broad interpretation of the Power Converter limitations

Dr. Holberg’s cross-examination testimony confirms Patentee’s interpretation: capacitors are not power converters. *First*, Dr. Holberg admitted that a capacitor is not a step-up converter or step-down converter:

Q. “In your opinion, a capacitor is not a step-down converter; is that right?”

A. No.

Q. Is a capacitor a step-up converter?

A. Not in the context of – for both the questions, step-down and step-up in the context of switch mode power supplies, then no. As the term is applied, step-up and step-down and switch mode power supplies, a capacitor would be neither of those.”

(Ex-2005-Holberg-Dep. at 47:1-11.)

Second, Dr. Holberg acknowledged that capacitors ideally do not dissipate power:

“Q Does a capacitor dissipate power?”

A No, not real power, not ideally. Real capacitors do. They actually can get hot, but ideally no”

(*Id.* at 51:21-24.)

Third, Dr. Holberg never explains how a capacitor “converts” power. In his declaration, Dr. Holberg simply characterizes a capacitor as “analogous to” a power converter, and offers a conclusory statement that he understands a capacitor “converts power associated with the direct current input into a first output.” (Ex-1007-Holberg at ¶103.) During cross-examination, Dr. Holberg admitted that, to be consistent with that opinion, he must consider *anything* that dissipates power a power converter. At the end of a series of questions, Dr. Holberg was asked:

“Q So can you think of anything that dissipates power that you would not consider a power converter in the context of the ’021 patent?

A Not offhand. You said that dissipates power?

Q Correct

A Yes, not offhand.” (Ex-2005-Holberg at 42:6-15.)

Leading up to that testimony, Dr. Holberg testified that resistors (*id.* at 38:20-39:13), diodes (*id.* at 39:23-40:8), Zener diodes (*id.* at 40:22-24), inductors (40:25-41:4), and transistors (*id.* at 41:5-9) are all power converters. Dr. Holberg also testified that incandescent light bulbs, long copper wires, and switches are power converters. (*Id.* at 41:10-42:8.) Dr. Holberg’s interpretation of “power converter” as including all these things is unreasonable and inconsistent with the specification.

Capacitors and converters are routinely characterized differently by those of ordinary skill. Capacitors store energy and impede voltage changes without

converting voltage, whereas converters are power electronics circuits that convert voltage or current. For example, a power electronics textbook explains the term “converter” as follows: “Power electronics circuits convert one type or level of a voltage or current waveform to another and are hence called *converters*.” (Ex-2009-Hart at 1 (emphasis in original).) This textbook further shows that a capacitor is often a component in a converter but is not itself a converter. (*E.g.*, Ex-2009-Hart at 198-211 (describing a “Buck Converter” circuit topologies that down-convert voltage and include a capacitor); 211-20 (describing the “Boost Converter” circuit topologies that up-convert voltage and include a capacitor); 25-26 (explaining that capacitors store energy). Other literature demonstrates that capacitors store energy and impede voltage changes, but are not power converters. (*E.g.* Ex-2006-Electronics-for-Dummies at 24 (“Capacitance is the ability to store a charge in an electric field. This stored charge has the effect of making decreases or increases of voltage more gradual. You can use components called capacitors to provide this property in many circuits.”); *id.* at 25 (“a capacitor resists changes in voltage.”); Ex-2007-Rawlins at 17 (“Capacitors, like resistors, do not amplify or increase voltage or current. However, they perform a unique function by storing an electrical charge. This has the effect of opposing any changes in voltage.”) (emphasis added); Ex-2008-EE101 at 13 (“Capacitors impede a change in voltage, as the rule goes.”); 31 (“What was the rule of thumb for a capacitor? Capacitors impede a change in

The '021 patent's Power Converter limitations cannot be interpreted so broadly as to cover a capacitor when Dr. Holberg himself concedes that a capacitor ideally does not dissipate power (applying his own unduly broad view of power conversion without any supporting evidence) or perform any step-up or step-down power conversion. The Board should reject Dr. Holberg's conclusory and unsupported interpretation. *TQ Delta, LLC v. Cisco Sys.*, 942 F.3d 1352, 1361-63 (Fed. Cir. 2019) (reversing the Board's invalidity determination where it relied on unsupported and conclusory expert testimony); *see id.* at 1358-60 (compiling cases); *Apple Inc. v. MPH Techs. Oy*, 28 F.4th 254, 262 (Fed. Cir. 2022) (explaining that the Board was “free to reject Apple's expert's testimony based on a lack of factual support”); *see also Belden Inc. v. Berk-Tek LLC*, 805 F.3d 1064, 1079 (Fed. Cir. 2015) (“No rule requires...an expert guiding the Board as to how it should read prior art.”).

4. Patentee's interpretation is also confirmed by Petitioner's contention that a POSITA would combine Mieth's one-converter system with Balogh to create a two-converter system

Petitioner's Ground B obviousness arguments also prove Mieth's “capacitor 2” fails to meet the Power Converter limitation. Specifically, Petitioner's alleged motivation for modifying Mieth in view of Balogh in Ground 2 is based on the desire to create a system with two power converters instead of one. Accordingly, Petitioner

replaces Mieth's "capacitor 2" with the first of Balogh's two cascaded power converters:

"Based on Balogh, a PHOSITA would understand that cascaded converters are commonly used to provide input to output power conversion that is not optimally implemented in a single converter. ...Thus, the purpose of the first stage and the second stage was previously described by Balogh, that is to provide input and output power conversion that is not optimally implemented in a single converter, for example, in high DC voltage applications. As such, a PHOSITA, at the time of filing, would know that the capacitor 2 and the power supply apparatus 19 of Mieth could be the cascaded converters as disclosed by Balogh." (Petition at 54-55, internal citations omitted and emphasis removed.)

As shown, Petitioner proposes moving from a one-converter system (Mieth) to a two-converter system (Mieth-Balogh) by replacing Mieth's "capacitor 2" with a power converter. Thus, Petitioner's own combination rationale effectively admits that Mieth's capacitor is not a power converter.

5. The Delaware Litigation shows that the parties agreed on a construction for the Power Converter limitations that does not cover a simple capacitor:⁵

⁵ To be clear, Patentee is not contending other constructions are irrelevant—Patentee is simply noting that these constructions further show that a capacitor is not a power converter in the context of the claims of the '021 patent.

The parties in this IPR agreed on the following constructions in the Delaware Litigation:

Term	Agreed Construction
“Power supply...converts power”	A power electronics circuit that converts one type or level of a voltage or current waveform to another
“Power converter”	A power electronics circuit that converts one type or level of a voltage or current waveform to another

(Ex-1017 at 4.) This agreed construction comes directly from page 1 of the Hart power electronics text that was cited above (in §IV.B.3): “Power electronics circuits convert one type or level of a voltage or current waveform to another and are hence called *converters*.” (Ex-2009-Hart at 1 (emphasis in original).) Per these agreed constructions, a single component (a capacitor, in particular) is not a power converter because it is not a “power electronics circuit.” As explained previously in §IV.B.2, and as demonstrated by the Hart textbook, power converter circuits often include a capacitor, but the capacitor itself would never be characterized as a power converter and a capacitor itself does not convert voltage or current. (Ex-1001 at 4:51-52 (showing that a “capacitor” is a component of a “buck converter”), Ex-2009-Hart at 198-220 (describing buck and boost converters)). For example, the Hart textbook illustrates a synchronous buck converter topology as follows:

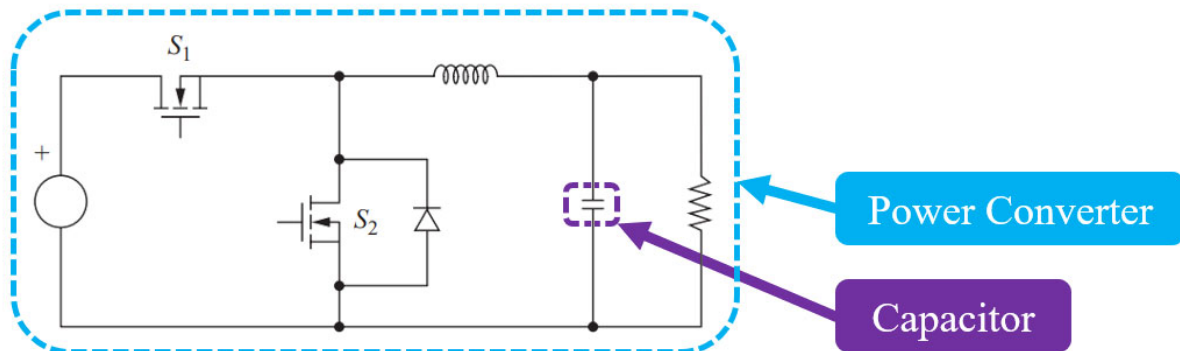


Figure 6-7 A synchronous buck converter. The MOSFET S_2 carries the inductor current when S_1 is off to provide a lower voltage drop than a diode.

(*Id.* at 208 (blue/purple annotations by Patentee).) A capacitor is simply a routine building block that may be used in a circuit, including power converter circuits, as Petitioner’s declarant admits. (Ex-2005-Holberg-Dep. at 21:1-10.) Thus, Petitioner’s argument fails because it is inconsistent with agreed constructions in the Delaware Litigation.

6. Petitioner also misapplies the plain claim language to a capacitor in parallel with a solar power input source

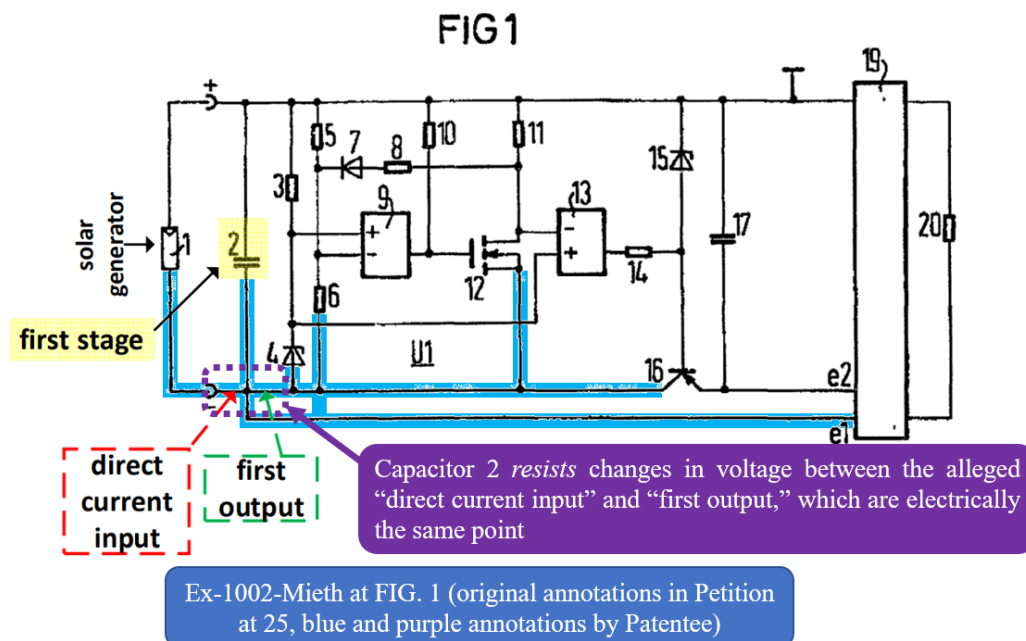
The claim language in the ’021 patent also confirms that a capacitor is not a power converter by distinguishing between converters and capacitors. Specifically, claims 18 and 19 distinguish between “power converter” stages that “convert” power and a power “absorption” circuit that uses a capacitor:

Independent Claim 18	Dependent Claim 19
[18A] 18. A system to supply power, the system comprising: ...	[19A] The system of claim 18, wherein the power absorption circuit includes a capacitor coupled to the first output;
[18C] a first stage power converter connected to the photovoltaic panel to	[19B] and the threshold allows the

generate a <u>first output</u> from the direct current input; [18D] a <u>second stage power converter</u> connected to convert the first output to a second output; ... [18F] a power absorption circuit....	<u>capacitor to power the second stage to operate the micro-controller for a predetermined period of time <u>even without the output of the first stage.</u></u>
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(Ex-1001 at Claims 18-19 (emphasis added).) As shown, a “first stage power converter” converts power, and that power is used to charge a capacitor.

Petitioner also misapplies the claim language to Mieth when it suggests Mieth’s “capacitor 2” has an “input” from Mieth’s solar generator 1 on one side and a “first output” on the other side. (Petition at 24-25.) In fact, Petitioner’s argument identifies a single electrical node in the Mieth’s circuit (the entire blue-highlighted portion of the circuit is the same electrical node and has the same voltage):



The capacitor in the figure above does not convert voltage at its input to another voltage at its output—the “direct current input” and “first output” labels above are at the exact same voltage and are electrically connected to the exact same lead of “capacitor 2.” Unlike the claimed power converter (i.e., “a power electronics circuit that converts one type or level of a voltage or current waveform to another,” Ex-2009-Hart at 1), a capacitor stores energy as a function of voltage and tries to keep its voltage at a constant level. Stated differently, a capacitor absorbs energy or supplies energy in an effort to resist changes in its voltage. (Ex-2006-Electronics-For-Dummies at 24; *see id.* at 25; Ex-2007-Rawlins at 17; Ex-2008-EE101 at 13; 31.) That functionality facilitates the operation of the system of claim 19. In particular, the capacitor recited in claim 19 is part of a power absorption circuit that absorbs power output from the first stage and, if sufficiently charged, can discharge that stored energy to maintain power for the second stage for a predetermined period of time. Although Petitioner tries to interpret a capacitor as a power converter in some instances and as part of a power absorption circuit in others,⁶ the claim

⁶ Compare Petition at 70 (relying on “capacitor 2,” “capacitor 2 converts power and thus Mieth teaches a first stage power converter, which is anticipatory of claim 10” [Petition at 58] by reference back to limitation 10C) with Petition at 84-85 (“Since reservoir capacitor 58 (orange) is charged from the first output of input stage 50,

language shows that a power converter is different from a capacitor. *Becton, Dickinson & Co. v. Tyco Healthcare Grp., LP*, 616 F.3d 1249, 1254 (Fed. Cir. 2010) (“Where a claim lists elements separately, ‘the clear implication of the claim language’ is that those elements are ‘distinct component[s]’ of the patent invention.”) (alteration in original, quoting *Gaus v. Conair Corp.*, 363 F.3d 1284, 1288 (Fed. Cir. 2004)).

In sum, the Power Converter limitations do not read on a simple capacitor, such as Mieth’s “capacitor 2,” and for this additional reason Petitioner has failed to show anticipation of any claims as per Ground A or the anticipation portion of Ground B.

C. Ground B (All Claims): Petitioner’s combination of Mieth and Balogh does not disclose or render obvious the claimed “control circuit” or the corresponding method steps of the independent claims

1. Ground B relies on replacing elements of Mieth with Balogh’s cascaded buck converters

Ground B attempts to show that each independent claim is obvious over Mieth and Balogh. The proposed combination is predicated on replacing Mieth’s

reservoir capacitor 58 absorbs the first output of input stage 50 and is analogous to the claimed power absorption circuit includes a capacitor coupled to the first output.”) (emphasis and colored text removed).)

“capacitor 2” (the alleged “first stage” discussed above) and Mieth’s “power supply apparatus 19” and “bipolar transistor 16” (the alleged “second stage”⁷) with Balogh’s “cascaded step-down converters”:

“[W]hile the capacitor 2 discussed in §VII.A.1.ii-§VII.A.1.iv. (see Fig. 1(annotated-1D.1) above) is analogous to the claimed first stage, and the bipolar transistor 16/power supply apparatus 19 is analogous to the claimed second stage, Balogh discloses a cascaded converter arrangement having an isolated DCDC converter followed by a post regulator circuit that reads on the claimed first and second stages, respectively.

Balogh’s isolated DC-DC converter (analogous to the first stage-yellow) and post regulator circuit (analogous to the second stage-blue) are cascaded step-down converters and are shown in Fig.1D(annotated-1D.2).

⁷ Petition at 23 (“The capacitor 2 is analogous to the first stage and the power supply apparatus 19 connected to the bipolar transistor 16 is analogous to the second stage of the claimed power supply.”) (emphasis removed).

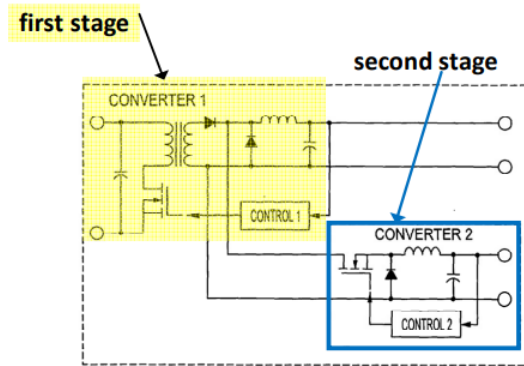


FIG. 1D
PRIOR ART

Ex.1003, Fig.1D(annotated-1D.2)

(Petition at 53-55 (internal citations omitted, emphasis added).)

The Petition then argues that a “PHOSITA, at the time of filing, would know that the capacitor 2 and the power supply apparatus 19 of Mieth could be the cascaded converters as disclosed by Balogh.” (Petition at 55 (emphasis added).) As explained herein, a petitioner cannot carry its burden of proving obviousness merely by suggesting that a POSITA “could” exchange elements in one reference for another. (See §IV.C.3) That problem is even worse here because Petitioner does not address entire limitations in its obviousness grounds.

2. Grounds B-D fail because they do not explain how the proposed combination meets limitations 1E-1G or the corresponding limitations of claims 10 and 18.

Petitioner argues that its “Mieth-Balogh” combination discloses limitations 1B-1D, but Petitioner entirely ignores limitations 1E-1G. (See Petition at 50-55 (discussing the proposed combination and limitations 1B-1D only, before moving on to dependent claims).) The same issue permeates Petitioner’s analysis for the

other two independent claims. Petitioner's failure to address all limitations is fatal. *Netflix*, 84 F.4th at 1377.

Even if the Board assumes that Petitioner is relying on its Ground A arguments regarding limitations 1E-1G, Ground B still fails because those arguments are illogical in the context of Grounds B-D. Specifically, Balogh's cascaded power converters are controlled differently than Mieth's "capacitor 2" (the alleged "first stage") and "bipolar transistor 16"/"power supply 19" (the alleged "second stage"). Dr. Holberg confirmed that the cascaded buck converters he relied on from Balogh's FIG. 1D each have their own independent control circuits and would likely be controlled by pulse-width modulation. (Ex-2005-Holberg-Dep. at 58:17-59:2, 53:11-54:1.) As such, the circuitry for controlling Balogh's converters would need to be different than the circuitry used in Mieth. Thus, the elements in Mieth that Petitioner identifies in Ground A as meeting steps 1E-1G would not work in the proposed Mieth-Balogh combination.⁸ Since Petitioner did not provide any argument or discussion as to how the combination would meet steps 1E-1G of the claim, Petitioner cannot show that claim 1 or any of its dependents are obvious. In *Medtronic, Inc. v. Teleflex Innovations SARL*, the Federal Circuit explained that hindsight was used to recreate the invention where a complete redesign was required.

⁸ This is true even setting aside the fact that Mieth does not control "capacitor 2."

70 F.4th 1331, 1347 (Fed. Cir. 2023). That reasoning applies here: Petitioner's combination proposes a complete redesign of the "stages" of Mieth, without even explaining what would be required to operate the replacement elements.

The control circuitry issue is just one of the problems created by Petitioner's failure to address limitations 1E-1G. A second problem is that Petitioner's proposed combination replaces Mieth's "bipolar transistor 16" and "power supply 19" with Balogh's "converter 2." In Ground A, the replaced components were relied on to meet limitations 1E-1G. (*See, e.g.*, Petition at 28 (noting with respect to limitation 1E that "power supply 19" is not powered by the first stage under certain circumstances because "transistor 16" is "off"); 30 (describing similar functionality with respect to limitation 1F); 33 (relying on "transistor 16" as the element that performs the "instructing" step).) Petitioner cannot remove elements in its proposed combination for limitations 1B-1D, then rely on those removed components for later limitations. In other words, several elements in Mieth that Petitioner identifies in Ground A as meeting steps 1E-1G do not even exist in the proposed Mieth-Balogh combination. Thus, Petitioner's failure to explain how its proposed combination meets limitations 1E-1G is fatal to its obviousness arguments.

Petitioner has the same problem in claim 10. For limitation 10F, Petitioner relies on its argument for limitation 1E: "[10F] is essentially the same as [1E], as such, Mieth-Balogh disclose [10F] just as Mieth discloses [1E]." (Petition at 60.)

Petitioner never presents an argument for how the Mieth-Balogh combination discloses limitation 1E. That is fatal because as explained above, (a) Mieth's circuitry cannot control Balogh's cascaded buck converters (for example because Mieth does not have a PWM or similar controller that could operate Balogh's converters) and (b) Petitioner's proposed combination removed elements from Mieth that it relied on with respect to element 1E.

These problems persist through the rest of claim 10 as well. Petitioner contends that limitations 10G, 10H, and 10I map to 1G, but it did not make an obviousness argument about limitation 1G. (*See* Petition at 61-62.)

Petitioner's analysis for the final independent claim fail for similar reasons. Unlike the other independent claims, Petitioner presents arguments for limitations 18G-18H. (*See* Petition at 71-77.) In this analysis, Petitioner repeatedly relies on Mieth's "transistor 16" and ultimately concludes that Mieth discloses limitations 18G-18H. (Petition at 73-77.) This argument does not save Petitioner; instead, it confirms that the problems described above apply to claim 18 as well. Specifically, in the proposed Mieth-Balogh combination, Petitioner proposes removing "transistor 16" and replacing it with one of Balogh's two buck converters. Petitioner's argument fails because it relies on elements that were removed in its proposed combination. Finally, Petitioner contends that limitation 18I maps to limitation 1G, but it did not make an obviousness argument about limitation 1G.

Accordingly, Petitioner's obviousness arguments fail across Grounds B-D and none of the Challenged Claims are obvious.

3. The obviousness combinations in Grounds B-D lack rational underpinnings

The Petition relies on three different proposed combinations (Mieth-Balogh, Mieth-Balogh-Nishi, and Mieth-Balogh-Liu) across Grounds B-D. These proposed combinations do not support a finding of obviousness because they lack rational underpinnings. Instead, Petitioner and its expert restate generic obviousness rationales that lack the specificity needed to show that a POSITA would have combined these references. *Intendis GMBH v. Glenmark Pharm. Inc., USA*, 822 F.3d 1355, 1366 (Fed. Cir. 2016) (affirming district court's determination that technical expert's "cursory statement was insufficient to meet" patent challenger's burden of showing there is a motivation to combine the prior art); *InTouch Techs.*, 751 F.3d at 1352; *ActiveVideo Networks*, 694 F.3d at 1327.

Petitioner suggests that a POSITA would make the Mieth-Balogh combination to accommodate "input to output power conversion that is not optimally implemented in a single converter." (Petition at 52-54.) Although this is a high-level rationale for combining the two references, it is not supported by any explanation of why that rationale actually applies: there is no argument that the power conversion needed here is the sort of power conversion that is not optimally implemented in a

single converter. (*See, e.g.*, Petition at 53-54 (stating without reasoning or analysis that this combination would be made “according to known methods to yield predictable results,” that a POSITA “had the skills, knowledge, and motivation to carry out the combination,” “would have reasonably expected success in combining Mieth and Balogh,” and “would have appreciated the benefit(s)”; *id.* (suggesting that “there would have been no undue technical hurdles” and that “such a combination would have been a simple modification to Mieth’s system, readily accomplished by a PHOSITA.”).) *In re Nuvasive, Inc.*, 842 F.3d 1376, 1383 (Fed. Cir. 2016), (“‘conclusory statements’ alone are insufficient and, instead, the finding must be supported by a ‘reasoned explanation’”); *TriMed, Inc. v. Stryker Corp.*, 608 F.3d 1333, 1343 (Fed. Cir. 2010) (“Merely saying that an invention is a logical, commonsense solution to a known problem does not make it so.”); *In re Van Os*, 844 F.3d 1359, 1361 (Fed. Cir. 2017) (“[A] conclusory assertion with no explanation is inadequate to support a finding that there would have been a motivation to combine.”)

Likewise, Petitioner’s repeated suggestions that some elements “could be” or are “analogous to” other elements are conclusory statements that cannot satisfy Petitioner’s burden of proof. (*See, e.g.*, Petition at 54-55 (“the capacitor 2 and the power supply apparatus 19 of Mieth could be the cascaded converters as disclosed by Balogh.”); 53 (“Balogh’s isolated DC-DC converter (analogous to the first stage-

yellow) and post regulator circuit (analogous to the second stage-blue) are cascaded step-down converters....”).) *Samsung Elecs. Co. v. Elm 3DS Innovations, LLC*, 925 F.3d 1373, 1381 (Fed. Cir. 2019) (affirming the Board’s finding that the petitioner did not adequately explain how one dielectric material “could ‘easily be used in place of’” another). Thus, Petitioner’s obviousness arguments in Ground B fail.

Grounds C and D require the same combination of Mieth and Balogh, further in view of other references. Since Petitioner failed to articulate a sufficient rationale for combining Mieth and Balogh in Ground B, Grounds C-D fail for the same reasons.

D. Grounds C-D (Claims 13-14, 19): Grounds C-D cannot remedy the deficiencies regarding the independent claims

Petitioner’s Grounds C-D rely on combining Mieth, Balogh, and one of Nishi or Liu. These Grounds cannot save Petitioner’s case. Petitioner proposes adding Nishi only for claims 13-14, and Liu only for claim 19. (Petition at 78 & 83 (relying on Mieth and Balogh for claim 12 [“Claim 12 is taught by Mieth-Balogh”] before concluding that Mieth-Balogh-Nishi disclose the features of dependent claims 13-14); 83 & 88 (relying on Mieth and Balogh for claim 18 [“Claim 18 is taught by the combination of Mieth and Balogh”] before concluding that Mieth-Balogh-Liu disclose the features of claim 19.) Thus, the Board need not address Grounds C-D because both fail to cure the deficiencies with respect to the independent claims at issue in Ground B.

V. Conclusion

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

Dated: February 2, 2024

Respectfully submitted:

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CERTIFICATION OF WORD COUNT UNDER 37 C.F.R. §42.24(d)

Patent Owner certifies that the word count in this Patent Owner Response is 8,324 words, as counted by the word-processing program (Microsoft® Word for Microsoft 365 MSO Microsoft Word for Office 365) used to generate this Patent Owner Response, 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 Patent Owner Response complies with the 14,000 word limit set forth in 37 C.F.R. §42.24(c)(1).

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§ 42.6(e)—CERTIFICATION OF SERVICE

In accordance with § 42.6(e)(1), the undersigned certifies that on the 2nd day of February, 2024, the above **PATENT OWNER RESPONSE** was served, via electronic mail, upon the following counsel for Petitioner:

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