

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

WESTERN DIGITAL TECHNOLOGIES, INC.,
Petitioner,

v.

LONGITUDE LICENSING LTD.,
Patent Owner.

Case IPR2023-01230
U.S. Patent No. 9,207,701

PATENT OWNER'S SUR-REPLY

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I. Introduction

Patent Owner's Response ("POR"), supported by extensive expert testimony, showed that the Petition's Ground 1 did not identify any plausible motivation to modify Zhang with Javanifard (or to use Zhang as the base reference in the first place).

In Reply, rather than providing any rebuttal expert opinion, Petitioner relies on attorney argument to allege what it calls a "foundational advantage" or "foundational motivation" to combine Zhang with Javanifard—"configurability of stage topology." *See, e.g.*, Reply, 3 ("foundational motivation [of] configurability of stage topology based on design needs"); *id.*, 8 (alleging an "uncontested foundational advantage of... configurability of the stage topology").

The problem for Petitioner, however, is that this purported "foundational advantage" underlying its proposed combination *is not once alleged by the Petition*. *See generally* Petition (not mentioning "topology" or "configurability"); Pet. 19-23 ("Reasons to Combine Zhang and Javanifard" not identifying configurable stage topology as a purported motivation). Accordingly, it is an improper new argument. And given that the Reply presents no expert testimony, it is also unsupported by evidence.

Regarding the Petition's Ground 2, the Board already held that there was no motivation to arrive at a combination of different embodiments of Javanifard that

would “change the principle upon which Javanifard’s circuitry in Figure 2 operates” (Paper No. 7 (“ID”), 47), and the Reply’s attorney argument does nothing to change this conclusion.

Furthermore, for **both** Grounds 1 and 2, the Petition previously relied on the assumption that its combinations would provide only a *single* output voltage in its analysis of limitation [1.3] and claim 2, *regardless* of input voltage. The Reply now explicitly disavows that assumption underlying the Petition’s analysis and provides no motivation under this new theory for its proposed combinations to satisfy limitation [1.3] or claim 2 (for both Grounds 1 and 2). Furthermore, because Petitioner does not explain how multiple *different* output voltages would be switched between in a way that would arrive at the claim requirements, Petitioner fails to establish a reasonable expectation of success.

Accordingly, all challenged claims should be found not unpatentable.

II. The Petition’s Ground 1 theory (and the Reply’s new Ground 1 theory) fails.

A. Petitioner’s improper new alleged “foundational advantage” is unsupported.

As explained in Patent Owner’s Response, the Petition did not provide any discussion of *how* its proposed combination would operate to provide multiple different supply voltages. POR 28-30. The Petition’s only example of how the

combination would be configured to use the selection logic of Javanifard's Table 1 was to "accommodate a **given** output level" (Pet. 33-35, emphases in original) by switching between row 1 and row 3 of Table 1, the Petition's annotation of which is reproduced below.

TABLE 1			
Switch 130	Switch 131	Charge Pump 110	Charge Pump 120
OFF	OFF	ON	OFF
OFF	ON	ON	parallel-coupled to charge pump 110
ON	OFF	ON	series-coupled to charge pump 110
ON	ON	N/A	N/A

a second number of booster stages, the second number being less than first number

a first number of booster stages

EX1006, Javanifard, Table 1, annotated

Pet. 34; *see also* ID, 46-47 (understanding references in the Petition to a "**given** output level" to mean the **same** output level).¹ Furthermore, the **only** configuration change articulated by the Petition is to modify "the number of booster stages of the booster circuitry... to provide the **same** output level, when the charge pump power supply input level increases," such that Javanifard's row 3 would be used when a high input voltage is provided, and row 1 would be used when a low input voltage

¹ All emphases in quotations are added unless otherwise specified.

is provided, such that the output voltage would remain constant under either scenario. Pet. 39-40; *id.* 42-44. The Petition provides no other description of how Javanifard’s Table 1 would be utilized in the proposed combination. *See generally* Pet. 19-61.

Petitioner’s expert Dr. Stiegler also did not provide any details regarding how Zhang-Javanifard would operate in practice to provide ***different*** output voltages. At his deposition Dr. Stiegler identified only paragraphs 120, 122, and 134 of his declaration (Ex. 1003) as “explaining how in [his] proposed combination the switching of [Javanifard’s] Table 1 would operate corresponding to ***different*** desired output voltages.” Ex. 2004, 25:1-9, 25:24-28:9 (acknowledging that he reviewed paragraphs 87 to 142 of his declaration—the entirety of the Petition’s analysis of Ground 1 applicable to claims 1 and 2—in formulating his response). But none of those paragraphs describe operation of his combination according to ***different*** desired output voltages; they each relate to provision of only a ***single*** desired output voltage. *See* Ex. 1003 ¶120 (repeatedly emphasizing providing “a **given output level**” and “providing the same output voltage level for different power supply input levels”) (emphases in original); ¶122 (explaining that Javanifard’s teaching of increasing output voltage would only “appl[y] when the input voltages are the same,” such that “in a design to accommodate ‘a **given output level for **different** charge pump power supply input levels,’ the configuration of row 3 with more**

serially-connected stages provides more voltage boost for a lower power supply input level”) (emphases in original); ¶134 (“[A]s shown in Table 1 below, the number of the booster stages of the booster circuitry is changed (e.g., reduced from 4 to 2) by changing switch 130 from on (row 3) to off (row 1) to provide the *same* output voltage level, when the charge pump power supply input level increases.”). Accordingly, Dr. Stiegler provided no explanation of how the Zhang-Javanifard combination would operate to provide *different* output voltages in a manner that would satisfy claims 1 or 2.

In Reply, Petitioner alleges for the first time that instead of only the *two* configurations relied on in the Petition (use of rows 1 and 3 of Javanifard’s Table 1 when V_{pp} and V_{cc} are selected, respectively), *six* different configurations would be used. The Reply’s illustration of these configurations is reproduced below:

Configuration # of Zhang-Javanifard	Selected Power Supply Source	Boost Circuitry Configuration of Javanifard, Table 1	Output Voltage Level
1	Vcc	Row 1 (two stages series-coupled)	Vout Level 1
2	Vcc	Row 2 (charge pumps 110 and 120 parallel-coupled)	Vout Level 1
3	Vcc	Row 3 (four stages series-coupled, as annotated in green in Table 1 above)	Vout Level 2
4	Vpp	Row 1 (two stages series-coupled, as annotated in red in Table 1 above)	Vout Level 2
5	Vpp	Row 2 (charge pumps 110 and 120 parallel-coupled)	Vout Level 2
6	Vpp	Row 3 (four stages series-coupled)	Vout Level 3

Reply, 6.

This is an improper new theory, as shown by the fact that the Petition’s Ground 1 reasoning does not even *mention* “row 2” of Javanifard’s Table 1, nor does the Petition allege that *any* of the “Configuration #s” shown above would be used other than Configurations 3-4 (to produce the same Vout Level 2 “regardless of the input voltage”). *See* Pet. at 43-44 (emphasis in original); *id.* at 39-40 (“the number of the booster stages of the booster circuitry is changed... by changing switch 130 from on (row 3) to off (row 1) to provide the *same* output voltage level, when the charge pump power supply input level increases [from Vcc to Vpp]”); Consolidated Trial Practice Guide (“CTPG”) at 80-81 (explaining that the Board

will “disregard[] any new issues or belatedly presented evidence that exceeds the proper scope of reply”).

Furthermore, the Reply uses this new theory to further allege a new “motivation” that was allegedly “not contested by PO”—“the configurability of the stage topology... (e.g., configurations 1 and 2), which provides flexibility for various design needs.” Reply, 7; *see also id.*, 1, 2, 3, 8, 9, 11, 12, 21-22 (repeatedly emphasizing configurability of stage topology and alleging that this concept is “foundational” and the “Petition’s fundamental motivation”).

This purported motivation, allegedly the “fundamental motivation” of the Petition (Reply 3), *was not even alleged by the Petition to be a motivation to combine*. *See generally* Petition (not *once* mentioning “topology,” “configurability,” or describing the use of configurations 1 and 2 of Petitioner’s Reply theory); Pet. 19-23 (“Reasons to Combine Zhang and Javanifard” not identifying configurable topology as being a motivation). Of *course*, this purported “foundational advantage”

was “not contested by PO” (*see* Reply, 7)—Petitioner had not even *mentioned* that “advantage” when the POR was submitted.²

This newly alleged motivation merely serves to highlight Petitioner’s improper and hindsight-motivated approach to obviousness. Clearly, Petitioner did not view the configurability of stage topology (e.g., switching between Configurations 1-2) as “foundational” to its theory when it was drafting the Petition, as the Petition did not even *mention* it. However, in Reply, only with the benefit of hindsight of both the patent claims *and* Patent Owner’s Response, Petitioner contends that configurability of stage topology would be a “fundamental motivation” to arrive at the claims of the ’701 Patent. Reply, 3.

² To the extent Petitioner intends to again change tack and argue that this “foundational advantage” is really just about providing different output voltages, neither the Petition nor the Reply explain *how* the combination would operate in practice to produce different output voltages while satisfying the claim requirements. Moreover, there is no dispute that Zhang’s circuit *already* allows configurability to address multiple different voltage outputs as needed, simply by varying the Vref voltage. POR, 14 n.5 (citing Ex. 2003 ¶¶110, 78 n.1).

Petitioner’s improper failure to raise an advantage that was supposedly “foundational” to the Petition’s theory is highly prejudicial to Patent Owner, and directly contrary to the Board’s regulations. *See* CTPG 80-81. And if Petitioner with a paid expert of **greater** than ordinary skill in the art **with** benefit of hindsight could not articulate this “fundamental motivation” in the Petition itself, that is overwhelming evidence that a person of **ordinary** skill in the art **without** the benefit of hindsight would not have recognized this motivation either.³ *See* Ex. 2004, 34:5-9 (Petitioner’s expert acknowledging that he combined the prior art “us[ing] the claim language as a roadmap”).

³ The Reply also alleges that “stage topology... is critical for charge pump design.” Reply 8. Of course, a charge pump has a stage topology, but that does not mean that **configurable** stage topology is critical for all charge pump designs. If it were, Zhang itself would be nonsensical, as Zhang (despite being authored **after** Javanifard) teaches a **fixed** number of stages. And Petitioner does not explain why configurable stage topology would be critical to **Zhang’s** design which aims to produce only a single output voltage (a fact the Petition affirmatively relies on to satisfy the requirements of claim 2—*see* Pet. 42-43).

B. The Reply’s new Ground 1 theory discredits the Petition’s sole motivation to arrive at limitation [1.3] and Claim 2.

As noted above, the Reply presents a new theory that its proposed combination would operate to vary the output voltage. This is a stark departure from the Petition, which alleged that to satisfy limitation [1.3] and claim 2, a POSITA would have ensured the output voltage would stay constant *regardless* of the input voltage. For example, with regards to limitation [1.3], the Petition alleged:

Specifically, as shown in Table 1 below, the number of the booster stages of the booster circuitry is changed (e.g., reduced from 4 to 2) by changing switch 130 from on (row 3) to off (row 1) to provide the same output voltage level, when the charge pump power supply input level increases.

TABLE 1

Switch 130	Switch 131	Charge Pump 110	Charge Pump 120	
OFF	OFF	ON	OFF	<i>a second number of booster stages, the second number being less than first number</i>
OFF	ON	ON	parallel-coupled to charge pump 110	
ON	OFF	ON	series-coupled to charge pump 110	<i>a first number of booster stages</i>
ON	ON	N/A	N/A	



EX1006, Javanifard, Table 1, annotated

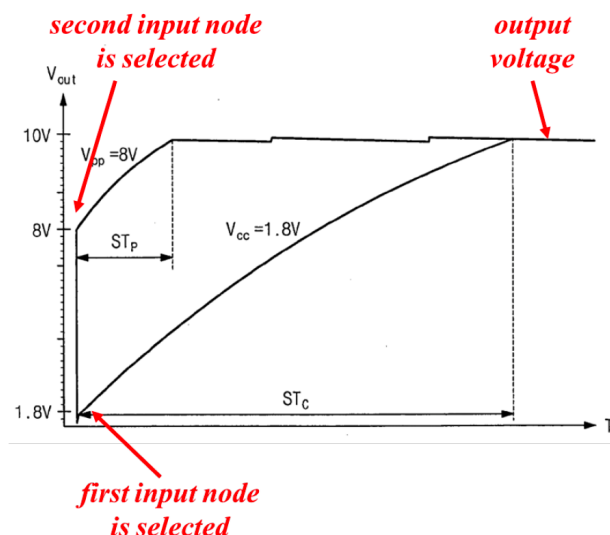
As shown in the figure of Example A of Zhang combined with Javanifard below, in the combination of Zhang and Javanifard, when the selection of the input node is changed to the higher power supply voltage, the booster circuitry is changed from the first number of booster stages (e.g., 4) to the second number of booster stages (e.g., 2), by turning off switch 130.

Pet. 39-40 (yellow highlighting added).

And for claim 2, the Petition re-emphasized that in practice, its combination would operate to ensure the *same* output voltage *regardless* of which input voltage was provided:

First, as shown in FIG. 8 below, Zhang describes that the output voltage (e.g., $V_{out} = 10V$) is the same when the first input node (e.g., $V_{CC} = 1.8V$) is selected and when the second input node (e.g., $V_{PP} = 8V$) is selected.

Fig. 8



EX1005, Zhang, FIG. 8, annotated

Second, Javanifard teaches this element as well. Javanifard describes using its variable charge pump to “accommodate a given output level for different charge pump power supply input levels.” EX1006, Javanifard, 2:21-24; EX1006, Javanifard, 1:8-12 (“providing a charge pump having a variable number as opposed to a fixed number of stages according to charge pump power supply input levels and desired charge pump output levels”); EX1006, Javanifard, 5:59-65 (“the designer can provide a control to the switches that will switch stages in and out, or change the coupling of the stages to ensure the appropriate output voltage from the variable stage charge pump regardless of the input voltage.”).

As such, in the combination of Zhang and Javanifard, a given output level is provided for different charge pump power supply input levels, e.g., by changing the configuration of the variable stage charge pump based on the required output level and the different charge pump power supply levels. Specifically, the output voltage is the same when the first input node is selected (e.g., with a lower input power supply voltage corresponding to a higher number of pump stages) and when the second input node is selected (e.g., with a higher input power supply voltage corresponding to a lower number of power stages).

Pet. 42-44 (yellow highlighting added).

Nowhere in this discussion (or anywhere else in the Petition) does the Petition explain how its combination would operate in practice to do anything other than keep the output voltage the same “regardless of the input voltage.” *See, e.g.*, Pet. 43-44 (emphasis in original); *id.* (“the output voltage is the same when the first input node is selected... and when the second input node is selected”). And as the POR

pointed out, the Petition's limitation [1.3] and claim 2 theories relied on the assumption of a constant output voltage. POR 8-9 (quoting Petition's analysis for limitation [1.3] and claim 2).

However, in Reply, Petitioner abandoned the premise that a POSITA would have maintained a constant output voltage regardless of input voltage, the sole premise underlying the Petition's allegations regarding limitation [1.3] and claim 2. Petitioner's Reply theory newly argues that that analysis was just an "*example*" of how the system might be operated by pointing to the usage of "e.g." as justification (Reply, 7),⁴ and contends that in practice the output voltage *would* vary based on different configurations:

⁴ By Patent Owner's count, the Petition uses the term "e.g." *one hundred times*, even removing "See, e.g." cites from that count. Reliance on exemplary language (particularly when used so extensively) to expand the scope of Petitioner's theories would encourage gamesmanship and would vitiate the requirement of 37 C.F.R. §42.104(b), which requires the *petition* to "[p]rovide a statement of the precise relief requested," including "[h]ow the construed claim is unpatentable."

Configuration # of Zhang-Javanifard	Selected Power Supply Source	Boost Circuitry Configuration of Javanifard, Table 1	Output Voltage Level
1	Vcc	Row 1 (two stages series-coupled)	Vout Level 1
2	Vcc	Row 2 (charge pumps 110 and 120 parallel-coupled)	Vout Level 1
3	Vcc	Row 3 (four stages series-coupled, as annotated in green in Table 1 above)	Vout Level 2
4	Vpp	Row 1 (two stages series-coupled, as annotated in red in Table 1 above)	Vout Level 2
5	Vpp	Row 2 (charge pumps 110 and 120 parallel-coupled)	Vout Level 2
6	Vpp	Row 3 (four stages series-coupled)	Vout Level 3

Reply, 6 (providing the above table of configurations that would purportedly be used in the combination).

However, even the Reply’s new theory fails to explain *how* or *why* Configurations 1-6 in the above table would be used to satisfy limitation [1.3] and claim 2. *See generally* Reply (providing no explanation). For instance, Petitioner provides no motivation to “chang[e] the booster circuitry from the first number of booster stages corresponding to selection of the first input node to the second number of booster stages when the second input node is selected” as required by limitation [1.3], other than the *Petition’s* original (now-disregarded) theory that the combination would “provide the *same* output voltage for different power supply

voltage levels.” Pet. 39-42. Likewise, Petitioner provides no motivations for its combination to practice the requirement of claim 2 other than the *Petition’s* reasoning that (1) Zhang teaches maintaining a constant output voltage regardless of input voltage; and (2) Javanifard teaches “ensur[ing] the appropriate output voltage from the variable stage charge pump regardless of the input voltage.” Pet. 42-44 (emphases in original).

Taking away the assumption underlying Zhang’s teachings and the *Petition’s* original theories for limitation [1.3] and claim 2 (i.e., assumption of a *same* output voltage *regardless* of input voltage), Petitioner provides no motivation to arrive at the claim requirements.

Indeed, in the context of Ground 2 (which did not rely upon Zhang’s teachings of providing only a single output voltage regardless of input voltage), the Board already acknowledged that using two power supplies to provide one output supply voltage (as recited by claim 2 and as the *Petition* explained its combination would operate to satisfy the requirements of claim 1) would not have been obvious. *See ID*, 47 (“[Dr. Stiegler] fails to explain the reason why one of ordinary skill in the art would have used two power supplies to provide only one output supply voltage.”).

The Reply’s *only* substantive allegation regarding either limitation [1.3] or claim 2 is a new argument that claim 2 could be satisfied if there are *two different* “same voltage levels” applicable during two distinct time periods:

Even claim 2 cited by PO only requires that “the output voltage is the same when the first input node is selected and when the second input node is selected,” and does not limit the output voltage to be only a single fixed level. Under claim 2, the output voltage can be *the same voltage level for both input nodes during a first time period*, and *another same voltage level [for both input nodes] during a second time period*.

Reply 27-28. But the Reply does not provide any explanation of how *two different* “same voltage level[s]” for both input nodes would be achieved under its proposed combination (as opposed the Petition’s theory of a *single* “same voltage level” for both input nodes). Nor does Petitioner provide any motivation for a POSITA to arrive at such an implementation. Indeed, such an implementation appears to be *impossible* according to the table provided on page 6 of the Reply (reproduced below):

Configuration # of Zhang- Javanifard	Selected Power Supply Source	Boost Circuitry Configuration of Javanifard, Table 1	Output Voltage Level
1	Vcc	Row 1 (two stages series-coupled)	Vout Level 1
2	Vcc	Row 2 (charge pumps 110 and 120 parallel-coupled)	Vout Level 1
3	Vcc	Row 3 (four stages series-coupled, as annotated in green in Table 1 above)	Vout Level 2
4	Vpp	Row 1 (two stages series-coupled, as annotated in red in Table 1 above)	Vout Level 2
5	Vpp	Row 2 (charge pumps 110 and 120 parallel-coupled)	Vout Level 2
6	Vpp	Row 3 (four stages series-coupled)	Vout Level 3

Reply at 6.

As shown above, there is only a *single* “same voltage level” (Vout Level 2) that can even possibly apply to both input nodes Vcc and Vpp. Vout Level 1 can *only* be achieved when the Vcc input node is selected, and Vout Level 3 can *only* be achieved when the Vpp input node is selected. Thus, the Reply’s new attempt to rely on *two different* “same” output voltage levels applicable to both input nodes at

different time periods is an impossibility, and cannot salvage Petitioner's claim 2 theory.⁵

In sum, Petitioner cannot have it both ways. The Petition's sole rationale for limitation [1.3] and claim 2 was a desire to maintain a *constant* output voltage *regardless* of input voltage. In contrast, the Reply's "foundational" motivation of "configurability of the stage topology" to switch between any of Configurations 1-6 assumes that the output voltage would be used to vary between at least three different voltage levels. *See* Reply at 6-7. Absent any explanation as to *how* or *why* the Zhang-Javanifard combination would switch between Configurations 1-6 in the above table

⁵ The Reply further alleges that "a given output voltage level (e.g., Vout Levels 1, 2 or 3) is not limited to *only a single fixed level*, and could be configured to different given output voltage levels based on different specifications." Reply at 6-7 (emphasis in original). Patent Owner can only speculate what Petitioner means by this assertion, but if it means, for example, that Vout Level 3 could vary such that at various points in operation it could be the same voltage level as Vout Level 2, Petitioner provides absolutely no support for that assertion. Petitioner also provides no explanation whatsoever for *how* or *why* a POSITA would implement such a solution, or how it would satisfy the claim requirements.

in a manner that would satisfy limitation [1.3] and claim 2, Petitioner fails to explain how limitation [1.3] or claim 2 would be obvious even under its improper new Reply theory.

C. Petitioner presents no evidence of reasonable expectation of success.

As Patent Owner's Response explained with supporting expert testimony, the Petition did not explain *how* its "combined system provides *multiple* voltage levels," much less establish a reasonable expectation of success in doing so to arrive at the challenged claims, particularly given the significant differences between Zhang and the Petition's combination which eliminates Zhang's control scheme. POR 28-30; *compare* Pet 27 (citing Ex. 1005, FIG. 4, which provides for Oscillator and Voltage Level Sensing Block control circuitry), *with* Pet. 30 ("Example A" combination, removing that circuitry); Ex. 2003 ¶¶85-91 (opining that "Combining Zhang With Javanifard Produces a Control Problem That Dr. Stiegler Does Not Address," and explaining that with no explanation of how the control and configuration circuitry would operate, there is no evidence supporting a reasonable expectation of success).

Petitioner does not provide any rebuttal expert testimony, and instead provides only attorney argument alleging that other systems used some combination of charge pumps and selectable input voltages. *See* Reply, 13-15. But this fails to address the fact that the Reply's new theory would need some logical control scheme for the system to switch between each of Configurations 1-6 in a manner that would satisfy

the challenged claims. Specifically, as Dr. Jacob testified, “to the extent the Petition’s combination involves the production of many different output levels, the control of such a system would be non-trivial.” Ex. 2003 ¶88.

In Reply, Petitioner acknowledges that its combination *does* involve the production of many different output levels (Reply at 6, implying Vout Levels 1-3 would be used) yet provides no information about how or why these different output levels would be switched to make the system operate in a desirable manner that would arrive at all claim limitations.

Petitioner’s argument that “the ’701 patent itself” was able to achieve the claimed results without the “risk of unanticipated effects” inherent in charge pump design and control only emphasizes Dr. Jacob’s point that some control scheme needs to be spelled out for there to be a reasonable expectation of success. *See* Reply 14-15; Ex. 2003 ¶88. Specifically, the ’701 patent provides an *extensive* disclosure of how its various control switches will operate according to different operating conditions and “in accordance with the power-supply voltage applied.” *See* Ex. 1001 4:24-28; *see, e.g., id.*, 4:49-5:4 (explaining that when “booster 20 generates a boosted voltage,” “the switch element SW2 changes over the number of booster stages in the booster 20 to one stage”); *id.* at 5:5-19 (“The switch element SW2 is switched to the first boosted signal when the switch element SW1 has been switched to the external power supply VDDP1, and the switch element SW2 is switched to

the second boosted signal when the switch element SW1 has been switched to the output (VDLP) of the power-supply step-down unit 10.”); *id.* at 6:6-7:12 (explaining: “Described next will be operation of the booster circuits when the switches SW2 to SW7 in FIG. 2 are changed over in operative association with the switch element SW1 in FIG. 1,” and providing a detailed explanation of the control signaling that manages the switching operations within the circuit); *id.* at 7:20-21 & FIGS. 4A-4B (providing a detailed explanation, complete with a timing diagram, of how the switching circuitry would operate); *id.* at 8:22-58, 9:19-60 & FIG. 5 (providing significant additional detail regarding FIG. 5); *id.* at 10:29-40 (claim 1 providing specific requirements for control of the relevant booster circuitry).

In contrast, the Petition, Reply, and Dr. Stiegler present ***no*** discussion of how a POSITA would have configured the combination’s switching and control logic to operate in practice (other than to maintain only a single, constant voltage output, a solution which Petitioner fails to provide a motivation to pursue under the Reply’s new theory which now involves varying the output voltage).

The fact that the inventors of the ’701 patent provided such a detailed and extensive disclosure regarding control circuitry operation, and that the Reply has presented essentially ***no*** information regarding how or why the various configurations of its combination would be selected to satisfy the challenged claims, highlights the deficiency of the Reply’s theory. Petitioner provides no evidence that

a POSITA would have reasonably expected to succeed in arriving at the claimed invention of the '701 patent *without* the hindsight benefit its teachings, despite what Petitioner's attorneys argue in Reply.

Given that there is undisputed expert testimony that a POSITA would not have reasonably expected to succeed in a combination of Zhang with Javanifard absent some explanation of how the varying output voltages would be adequately controlled (Ex. 2003 ¶¶85-91), the Petition's Ground 1 cannot succeed.

D. Petitioner fails to rebut Patent Owner's expert testimony, including that a POSITA would not have been motivated to use Zhang as the base reference.

Patent Owner's Response provided numerous reasons why the Petition's purported motivations to combine did not actually support its proposed combination, and Patent Owner supported that analysis with a supporting expert declaration. *See generally* Ex. 2003. The Reply presents no rebuttal testimony.

One example unrebutted opinion (of many) is that the Petition failed to show that POSITA would be motivated to make the proposed combination because "Javanifard by itself already accomplishes all of the design goals and benefits that Dr. Stiegler alleges his proposed combination of Zhang and Javanifard would produce." Ex. 2003 ¶106; *see also id.* ¶¶102-111. This is critical, because it is Petitioner's burden to explain its "selection of [the base reference] as the starting

point for its obviousness combination” without reliance on “impermissible hindsight.” Final Written Decision, *DynaEnergetics Europe GmbH v. SWM Int’l, LLC*, IPR2022-01372, Paper 27 at 31 (PTAB Feb. 5, 2024) (“*DynaEnergetics*”) (cited by POR, 33). Petitioner fails to dispute this principle, and fails to provide any evidence that a POSITA seeking to achieve the advantages articulated by *Javanifard* (as the Petition alleged would be the motivation) would have started with *Zhang* rather than Javanifard itself. *See id.* at 32 (“Yonghong’s principle of rotating detonating cords is not a persuasive reason to begin the obviousness analysis with Yonghong because Schacherer already teaches a rotating detonation cord.”).

In place of rebuttal evidence, Petitioner argues that Dr. Jacob’s testimony should be disregarded based on an (ironically conclusory) assertion that his testimony was “conclusory.” *See Reply* at 10. But Dr. Jacob’s testimony makes clear that his opinions are **not** conclusory. *See, e.g.*, Ex. 2003 ¶¶77-80 (addressing the alleged “disadvantages” discussed in Javanifard, including ones not even addressed in the Petition, and explaining why a POSITA wouldn’t have believed these to be applicable to Zhang); ¶¶102-111 (explaining **why** the Zhang-Javanifard combination would not be viewed as desirable to a POSITA seeking the Petition’s stated goals).

Furthermore, Dr. Jacob’s opinions are actually *opinions by an expert*. *See Ex. 1029* at 21:20-23 (testifying that he authored “all the technical stuff” in his report). That should go without saying, but it’s in stark contrast to the opinions of Dr.

Stiegler, who testified that “*to the best of [his] recollection*” he wrote “*some portions of some paragraphs*” of his technical analysis. Ex. 2004, 35:18-36:6; *see also id.* 44:11-22 (testifying that while he “believe[d] so,” he could not actually recall “whether *any* of the opinions of invalidity presented in [his] declaration[] were opinions that [he] came up with originally rather than opinions that [his] attorneys provided to [him]”).

Furthermore, a comparison of Dr. Stiegler’s declaration to the Petition shows that the vast majority of the Stiegler declaration merely parrots the exact language of the Petition. *Compare, e.g.,* Pet. 44 (“Specifically, the output voltage is the same when the first input node is selected (e.g., with a lower input power supply voltage corresponding to a higher number of pump stages) and when the second input node is selected (e.g., with a higher input power supply voltage corresponding to a lower number of power stages).”), *with* Ex. 1003 ¶141 (exactly the same text). And Dr. Stiegler’s testimony that he “use[d] the claim language as a roadmap to determine what aspects of the various embodiments [to] combine[] together” is further evidence of Petitioner’s failure to justify its selection of the base reference without

reliance on “impermissible hindsight” as the law requires. Ex. 2004 at 31:7-34:9;⁶ *DynaEnergetics* at 31.

Petitioner’s other attacks on Patent Owner’s expert are equally meritless. For instance, the Reply falsely alleges that Dr. Jacob had “no real-world charge pump design experience.” Reply, 10. To the contrary, Dr. Jacob explained how he built and designed charge pumps at various different levels, as Petitioner’s *own counsel* acknowledged during questioning:

11		Q. What is your understanding of circuit design?
12		A. Build a circuit.

...

⁶ The Reply weakly points to testimony on redirect that supposedly clarified what “Dr. Stiegler, who is not an attorney... meant by using the claim language as a roadmap.” Reply, 19. But as the POR explained, Dr. Stiegler refused to answer if “[his] attorney [told] him how to answer the questions she just asked [him].” POR 35-37 (quoting Ex. 2004, 39:10-40:10). Thus, while *Dr. Stiegler* is not an attorney, Dr. Stiegler could not testify under oath that his explanation of what “using the claim language as a roadmap” meant was not *scripted by* an attorney.

3 Q. What is the circuit -- process of circuit
4 design for a charge pump for you?
5 A. It depends on what you -- what level you want.
6 I've built them at the breadboard level. I've built
7 them at the circuit design level that you see before
8 you, transistors and whatnot. I have designed them at
9 the block -- block-and-arrow level as well.
10 Q. Did you use any tools for joining the
11 schematics of a charge pump during your design?
12 A. Yes.

Ex. 1029, 41:11-42:23 (highlighting added). Furthermore, Petitioner's proposed level of skill does not even require "real-world charge pump design experience" (Pet. 4), and Petitioner does not even allege that Dr. Stiegler has more such experience.

The Reply further alleges that Dr. Jacob "denied that power loss is related to the performance of charge pump[s]" (Reply at 10), but his testimony was that the specific techniques of *measuring* power loss are "not related to the performance of the charge pump." Ex. 1029 at 37:24-38:10. Indeed, Dr. Jacob earlier *mentioned* power loss as relevant to "performance of the charge pump" (*id.* at 36:25-37:6), and when he was asked whether "power loss" was "related to the performance of the charge pump," he asked for additional clarification about "which charge pump are we talking about"; counsel for Petitioner declined to clarify. *Id.* 38:11-15.

In sum, Patent Owner's arguments are supported by extensive expert opinions authored by Dr. Jacob, whereas the Petitioner's Reply arguments are supported only by attorney argument that provides no reason to discount Dr. Jacob's opinions.⁷

III. The Petition's Ground 2 theory (and the Reply's new Ground 2 theory) fails.

A. The Petition provides no non-hindsight motivation to combine Javanifard's embodiments in the proposed manner.

The Board already held that there was no motivation to arrive at a combination of different embodiments of Javanifard that would "change the principle upon which Javanifard's circuitry in Figure 2 operates." ID, 47. The Reply contends that this is acceptable because the Reply now contends that *Figure 1* (or Figure 3)⁸ is the

⁷ The Reply's footnote assertion that Zhang-Javanifard would have had advantages over Javanifard alone is an improper new argument; furthermore, the Reply provides no evidentiary support for any conclusion that a POSITA would have recognized these attorney arguments as motivating Petitioner's combination. *See* Reply 19 n.1; *see DynaEnergetics* at 37.

⁸ The Petition and Reply identify no relevant distinction between whether Figure 1 or Figure 3 is used, and the Reply's discussion relates primarily to Figure 1.

“primary” embodiment (the *Petition* did not specify which embodiment was “primary” or “secondary”). However, to allow Petitioner to retroactively identify one embodiment as “primary” would elevate form over substance; indeed, the Federal Circuit’s guidance regarding “principle of operation” is not limited to primary references. *See Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 F. App’x 755, 757 (Fed. Cir. 2015) (“[O]bviousness is a question of law based on several underlying factual findings,” including what a reference teaches and *whether proposed modifications would change a reference’s “principle of operation”*) (cleaned up).

Furthermore, Petitioner needs to justify using Javanifard’s Figure 1 as the base embodiment (rather than Figure 2, which provides a far more complete disclosure). *See generally* POR 33 (citing *DynaEnergetics* at 31). In *DynaEnergetics*, the Board found that Petitioner’s theory relied on impermissible hindsight because “Petitioner [did] not identify teachings from [the base reference] that would have been valuable to a POSITA whose goal it was to provide select-fire operation”). Like in *DynaEnergetics*, Petitioner does not explain why Figure 1 would have been the starting point for a system that required multiple input voltages; accordingly, the use of Figure 1 “as the starting point for its obviousness combination is based on impermissible hindsight.” *Id.*; Ex. 2003 ¶¶133-140 (explaining why a POSITA

would not have wanted to combine Figures 1 or 3 with Figure 2 in the proposed manner).

The conclusion that Petitioner's theory is based on improper hindsight is further supported by Petitioner's expert, who explained that he decided to combine Javanifard's embodiments in the proposed manner because the '701 patent claims as much and he used those claims "as a roadmap." Ex. 2004, 31:7-34:9. Of course, a POSITA would not have had that same hindsight motivation to focus on the voltage selection aspect of Figure 2 to the exclusion of all of the other teachings associated with Figure 2. Indeed, as Dr. Jacob explained (and Petitioner does not meaningfully dispute), "it is clear that Javanifard's Figure 2 *by itself* accomplished all of the design goals and benefits that Dr. Stiegler alleges his proposed combination would produce." Ex. 2003 ¶137; *see DynaEnergetics* at 32.

Finally, Petitioner's reliance on *Intel Corp. v. PACT XPP SCHWEIZ AG*, 61 F.4th 1373, 1381 (Fed. Cir. 2023), is inapposite. In that case, the proposed combination addressed a "problem" in the base reference (*id.*), whereas here the base reference (Javanifard) considered in its entirety *already* teaches how the charge pumps should be configured within a broader system to accomplish the Petition's alleged design goals. *See* Ex. 1006, FIG. 2. And as noted above, there is no non-hindsight reason for Javanifard's FIG. 1 to be the "primary embodiment." *DynaEnergetics* at 31-32.

B. The Reply’s new Ground 2 theory cannot satisfy the requirements of limitation [1.3] or Claim 2 and lacks reasonable expectation of success.

As explained in POR (and acknowledged by the ID), the Petition’s Ground 2 combination operated to provide only a single output voltage. POR, 46-47; ID, 46-47.

However, in Reply, Petitioner contends that its combination did *not* provide “only a single level of voltage output” (without identifying *any* discussion in the Petition that even *allegedly* supports output of multiple different voltages). Reply, 27. For the same reasons as the Reply’s new Ground 1 theory, the Reply’s Ground 2 theory fails to identify a motivation to arrive at the requirements of limitation [1.3] or Claim 2, if the assumption underlying the Petition’s analysis of these limitations (i.e., the assumption that the output voltage should not vary) is stripped away. *See* Pet. 79-81 (relying on provision of the “same output voltage” as disclosing limitation [1.3]); *id.* 81 (merely incorporating the Petition’s Ground 1 analysis for its Ground 2, claim 2 analysis).

Furthermore, the Reply’s new Ground 2 theory is essentially indistinguishable from its new Ground 1 theory, in that it alleges numerous different output voltages with no explanation of how these output voltages would actually be switched

between in practice. As explained above with respect to Ground 1, Petitioner fails to establish a reasonable expectation of success for such a proposal.⁹

IV. Conclusion

For the reasons expressed above and in Patent Owner's Response, all challenged claims should be found not unpatentable.

⁹ The Reply also confusingly alleges that its proposed combination would have had a reasonable expectation of success because a *different* implementation of Javanifard (not alleged to satisfy the claim requirements) would have reasonably been expected to succeed. *See* Reply, 30 n.4. However, unlike *Petitioner's* combination, that *different* combination would have used the operational modes disclosed for Javanifard's FIG. 2. *See generally* EX. 1006, 6:61-8:44 (explaining *how* FIG. 2 would be used to provide multiple output voltages in accordance with multiple input voltages).

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CERTIFICATION REGARDING WORD COUNT

Pursuant to 37 C.F.R. §42.24(d), Patent Owner certifies that there are 5,431 words in the paper excluding the portions exempted under 37 C.F.R. §42.24(a)(1).

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CERTIFICATE OF SERVICE (37 C.F.R. § 42.6(e)(1))

The undersigned hereby certifies that the above document was served on August 30, 2024, by filing this document through the Patent Trial and Appeal Case Tracking System as well as delivering a copy via electronic mail upon the following attorneys of record for the Petitioner:

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