Paper No. 28

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

APPLE INC.,
Petitioner,

v.

RESONANT SYSTEMS, INC.,
Patent Owner.

Case No. IPR2024-00806
U.S. Patent No. 9,941,830

PATENT OWNER'S SUR-REPLY

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PATENT OWNER'S EXHIBIT LIST

Exhibit No	*Description*
2001	Defendant Apple Inc.'s Proposed Claim Constructions, (*Resonant Systems, Inc. v. Apple Inc.*, Case No. 23-cv-00077-ADA (W.D. Tex.))
2002	Court's Claim Construction Order (*Resonant Systems, Inc. v. Apple Inc.*, Case No. 23-cv-00077-ADA (W.D. Tex.), Dkt. 91)
2003	Defendant Apple Inc.'s Opening Claim Construction Brief (*Resonant Systems, Inc. v. Apple Inc.*, Case No. 23-cv-00077-ADA (W.D. Tex.), Dkt. 75)
2004	Order Modifying Scheduling Order (*Resonant Systems, Inc. v. Apple Inc.*, Case No. 23-cv-00077-ADA (W.D. Tex.), Dkt. 57)
2005	Federal Court Management Statistics, Western District of Texas, 2018-2023
2006	Excerpt of Plaintiff's Infringement Contentions (*Resonant Systems, Inc. v. Apple Inc.*, Case No. 23-cv-00077-ADA (W.D. Tex.))
2007	Excerpt of Defendant's Final Invalidity Contentions (*Resonant Systems, Inc. v. Apple Inc.*, Case No. 23-cv-00077-ADA (W.D. Tex.))
2008	[Reserved]
2009	Declaration of Keith W. Goossen, Ph.D.
2010	Curriculum Vitae of Keith W. Goossen, Ph.D.
2011	Transcript of Deposition of Blake Hannaford, Ph.D., Jan. 27, 2025
2012	Transcript of Deposition of Blake Hannaford, Ph.D., Jan. 28, 2025
2013	Transcript of Deposition of Blake Hannaford, Ph.D., Jan. 29, 2025
2014	Excerpt of CRC Handbook of Chemistry and Physics (52nd Ed. 1964)
2015	"Why do ferromagnetic materials channel magnetic field lines?," Physics Stack Exchange, *available at* https://physics.stackexchange.com/questions/129782/why-do-ferromagnetic-materials-channel-magnetic-field-lines

Exhibit No	*Description*
2016	"Quality Factor (Q)" in Smith, J.O., *Introduction to Digital Filters with Audio Applications*, *available at* http://ccrma.stanford.edu/~jos/filters/Partial_Fraction_Expansion.htm
2017	Texas Instruments Precision Designs: Verified Design SLAU508, "Analog Pulse Width Modulation," by John Caldwell
2018	Declaration of Paul A. Kroeger in Support of *Pro Hac Vice* Recognition on Behalf of Patent Owner Resonant Systems, Inc.
2019	Declaration of Christian W. Conkle in Support of *Pro Hac Vice* Recognition on Behalf of Patent Owner Resonant Systems, Inc.
2020	Transcript of Deposition of Blake Hannaford, Ph.D., June 23, 2025
2021	Transcript of Deposition of Blake Hannaford, Ph.D., June 24, 2025

I. INTRODUCTION

Apple successfully argued in district court for a means-plus-function construction of the term "control component" that requires an algorithm including numerous specific steps from Figures 7A–C of the '830 patent. In its Institution Decision, the Board adopted the district court's construction. The Petition failed to show that its prior art combinations satisfied each of the steps required by this construction, including but not limited to the "output d" of step 708 and the "output p" of step 762.

While the Reply changes the prior art mapping and cites to new teachings never mentioned in the Petition, it still fails to remedy this error. Again, it fails to show that the prior art combinations satisfy each of the required algorithm steps, including both steps 708 and 762. In particular, it fails to show that the "output d" and "output p" occur separately, on different iterations of the Figure 7A loop, as required by the algorithm of the Board's construction. Accordingly, all grounds of this IPR should be rejected and the validity of the challenged claims affirmed.

In addition, Apple has failed to show a POSITA would have been motivated to use a paramagnetic material such as aluminum for the "magnetic" casing of Wakuda and for that additional reason has failed to demonstrate that claim 14 is obvious under any ground.

II. ARGUMENT

A. Grounds 1A–1F: All Claims

The Response explained in detail how Grounds 1A-1F failed to establish obviousness of any challenged claim. (Response at 14–30.) The Reply fails to address these grounds or respond to these arguments at all, apparently acquiescing in the fact these Grounds all should be rejected. Accordingly, this surreply will not further address these Grounds, but rather refers the Board to the arguments made in the Response.

B. Grounds 2A–2C: All Claims

As the Response explained, the means-plus-function construction of the "control component" term requires both a directional output d and a separate output p to the power supply. (Response at 20.) This is expressly required by the means-plus-function construction that Apple advanced in the Petition:

> This Petition treats "control component" in claims 1 and 19 as including one of the switches shown in Figures 5A-6 and described at 5:52-6:5, 6:9-16 and the processor (also referred to as microprocessor, microcontroller, or CPU) that performs the algorithm shown in Figures 7A-7C and described at 6:52-8:40.

(Petition at 4.) It is also expressly required by the similar construction adopted by the district court in the Apple Litigation and by the Board in its institution decision:

> **Structure:** a microcontroller, a processor, a microprocessor, or a CPU that performs the algorithm shown in Steps 706 through 716 in Figure 7A, with reference to all steps shown in Figure 7B other than Step 734 and all steps shown in Figure 7C, or the algorithm described in the corresponding text, *See, e.g.*, 7:20–7:34, 7:42–7:52, 7:60–8:40, and equivalents thereof.

(Paper 11 at 13.)

These constructions each require step 708 of Figure 7A, which sets "d = –d" and outputs d. ('830 patent, Fig. 7A.) These constructions also each require step 762 of Figure 7C, which is labeled "compute output p to power supply; output p to power supply." ('830 patent, Fig. 7C, 8:26–30 ("Next, in step **762**, the routine "control" computes an output value p corresponding to the currently selected strength, stored in the variable strength, and outputs the value p to the power supply so that the power supply outputs an appropriate current to the coil.") Importantly, the "output p" of step 762 is a part of Figure 7C, which in turn is called in step 716 of Figure 7A. ('830 patent at 8:20–21.) Accordingly, step 762 only occurs if the result of steps 706 and 710 are both "N" and the result of step 715 is "Y," while the "output d" of step 708 only occurs if the result of step 706 is "N":

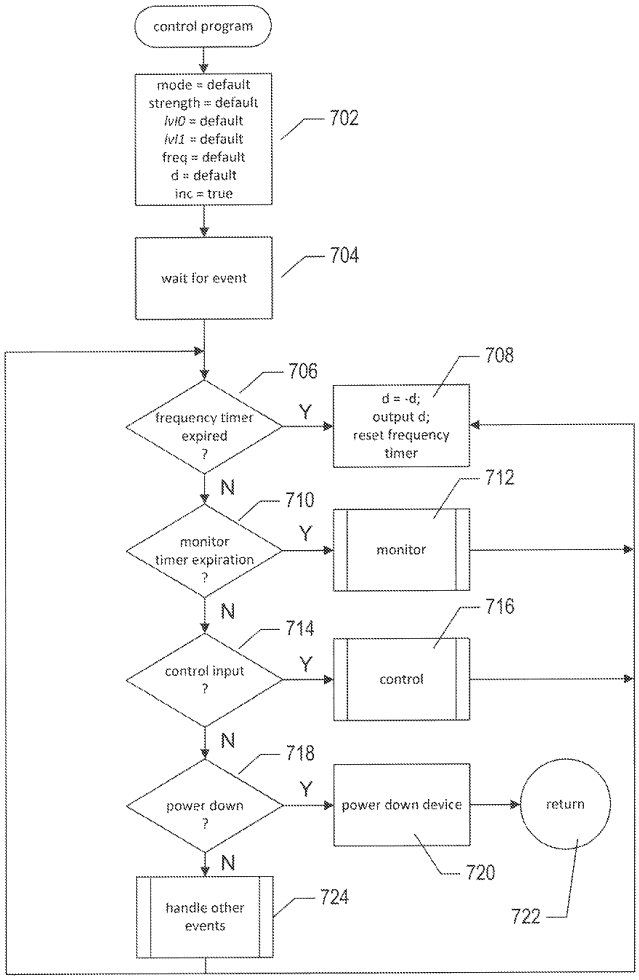


FIG. 7A

('830 patent, Fig. 7A.) Accordingly, the "output d" and "output p" steps must occur at different iterations of the Figure 7A loop, not simultaneously in a single output.

Nowhere does the Petition attempt to show that the combinations in Grounds 2A-2C teach all of the required steps of the means-plus-function algorithm, including steps 708 and 762. In particular, the Petition's analysis of the Ground 2A combination with respect to the Figure 7A-C algorithm only

addresses steps 702, 704, 712, 714, 718 and 736–752. (Petition at 63–72.) The Petition is silent on other required steps, including steps 708 and 762—which fact alone should be sufficient to reject these grounds under those constructions.

The Reply abandons certain positions taken in the Petition. For example, the Petition stated that "a POSITA would have understood that actuator drive circuit 16 corresponds to, or is coupled to, a power supply." (Petition at 14.) The Reply abandons the "coupled to" theory, instead saying that "the Petition identifies Gregorio's "actuator drive circuit" ***as the claimed power supply***." (Reply at 1 (emphasis added).)

The Petition also offered an alternative theory for the power supply, pointing to "current generator 422" and saying "Gregorio also describes "current generator 422" as a power supply to convert a pulse to current that flows into LRA 18." (Petition at 14.) The Response explained that current generator 422 and its associated alternative embodiment failed to satisfy the challenged claim limitations. (Response at 16–19.) The Reply fails to address these arguments and is utterly silent on the "current generator 422" theory of the power supply limitation.

The Reply also presents new theories, based upon teachings that were never cited in the Petition. For example, the Reply states that "Gregorio's control component outputs both the desired direction 'd' and the desired power 'p.'" (Reply at 8–9.) The Petition said nothing about Gregorio's control component outputting a "desired direction." Further, the Reply points to "Gregario's drive signal 504" as purportedly satisfying claim limitations. (Reply at 6–7.) Signal 504 was never cited in the Petition.

These new theories, set forth for the first time in the Reply, cannot form the basis for invalidating claims. Rather, the petitioner has the burden to clearly set forth the basis for its challenges in the petition. *Harmonic Inc. v. Avid Tech., Inc.*, 815 F.3d 1356, 1363 (Fed. Cir. 2016) (citing 35 U.S.C. § 312(a)(3) as "requiring IPR petitions to identify 'with particularity ... the evidence that supports the grounds for the challenge to each claim'"); *Ariosa Diagnostics v. Verinata Health, Inc.*, 805 F.3d 1359, 1367 (Fed. Cir. 2015) ("We see no error in the Board's rejection of [petitioner's] reliance, in its Reply submissions, on previously unidentified portions of a prior-art reference to make a meaningfully distinct contention."); *Wasica Finance GMBH v. Continental Auto. Systems*, 853 F.3d 1272, 1286 (Fed. Cir. 2017) (holding that new arguments in a reply brief are "foreclosed by statute, our precedent, and Board guidelines").

These new arguments are a "meaningfully distinct contention" from those made in the petition raised for the first time in a reply, which the Federal Circuit has repeatedly held the Board has properly refused to consider. *Yita LLC v. MacNeil IP LLC*, 69 F.4th 1356, 1367 (Fed. Cir. 2023) (affirming rejection of argument in reply about "what a relevant artisan would have found obvious to modify," where the petition only argued about what the reference actually teaches); *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1370 (Fed. Cir. 2016) (same).

Even if these untimely new theories were to be considered, however, they fail to demonstrate obviousness. The Reply fails to show that the combinations in those grounds satisfy both steps 708 and 762, along with all of the other required steps of '337 patent Figures 7A–C. Nowhere does Gregario teach separately outputting d and p signals at separate steps of the algorithm as required by the means-plus-function corresponding structures proposed by Apple and adopted in the Board's Institution Decision. To the contrary, the Reply points to the output of a single drive signal 504 of Gregario, which control both direction and current. (Reply at 6–7.)

C. Ground 2B: Claim 14

The Response explained in detail why the Petition fails to establish a POSITA would have been motivated to use "a paramagnetic material such as

aluminum" as the "magnetic" casing of Wakuda. (Response at 21–29.) The Reply fails to show otherwise.

The Reply quotes from the teachings of the '830 patent itself, as allegedly contrasting with Resonant's arguments. (Reply at 11–12.) But the quoted material actually supports the positions taken in the Response:

> When introduced into a magnetic field, paramagnetic materials provide a lower-resistance path for magnetic flux, providing that they have ***adequate permeability and size*** to avoid saturation. Paramagnetic materials of ***appropriate permeability and size*** reduce the reluctance of a magnetic circuit and can therefore allow a magnetic field to more efficiently perform more work.

('830 patent at 14:4–19 (emphasis added).) As the Reply points out, "a paramagnetic material such as aluminum" lacks adequate or appropriate permeability. Rather, aluminum has a permeability of approximately 1.000022, only trivially greater than that of a vacuum or air and far less than the permeabilities in the thousands typical of high-permeability materials. (Response at 27–29; Ex. 2009, ¶¶ 142–144.)

The purported benefits of aluminum in terms of weight, corrosion resistance or electrical and thermal properties do not overcome this fact. Aluminum or a material with comparably small permeability would have an effect on the magnetic flux that is imperceptibly different from that of air and would

not concentrate the magnetic flux lines of Wakuda by more than a trivial degree. (Ex. 2009, ¶¶ 137–145.) It would not produce the magnetic flux paths depicted in Wakuda Figure 1B. (*Id.*) Since it would entirely fail to have the magnetic function required of the casing in Wakuda, these other purported benefits are immaterial and would not motivate its use as the casing Wakuda. (*Id.*)

The cases cited on page 15 of the Reply do not rescue Apple's obviousness theories. First, the *Epstein* case concerns the standard for enablement, not obviousness. *In re Epstein*, 32 F.3d 1559, 1568 (Fed. Cir. 1994). More generally, Resonant's argument against the use of aluminum as the Wakuda casing material is not an argument that a POSITA would not have been aware of aluminum or its properties or that a POSITA would not have had knowledge required to select between possible materials. Rather, Resonant's argument is that a POSITA ***would have known*** the magnetic properties of aluminum and precisely because of that knowledge, would have known that aluminum lacked the magnetic properties required of the "magnetic" casing in Wakuda and thus would not have been motivated to use it for that purpose.

The Response explained in detail how Apple's own cited exhibits demonstrate that a POSITA would not have considered aluminum or similar paramagnetic materials for the "magnetic" casing of Wakuda. (Response at 21–

29.) The Reply attempts to rebut this showing by carefully parsing these exhibits for every example of a qualification such as "most," "usually," or "if desired." (Reply at 16–20.) But in an IPR, "the burden of persuasion is on the petitioner to prove 'unpatentability by a preponderance of the evidence,' 35 U.S.C. § 316(e), and that burden never shifts to the patentee." *Dynamic Drinkware, LLC v. National Graphics, Inc.*, 800 F.3d 1375, 1378 (Fed. Cir. 2015). A petitioner does not meet its affirmative burden by showing that its own affirmative evidence is equivocal or that its relevant statements are qualified.

The unrebutted evidence shows that a POSITA would understand that aluminum or a similar paramagnetic material would lack an "adequate" or "appropriate" permeability, would have only a trivial effect on the magnetic flux paths in Wakuda, and would thus fail to function in the way Wakuda's "magnetic" casing has to function. For these reasons, Apple has failed to show a POSITA would have been motivated to combine references in a way that satisfies claim 14, under Ground 2B or any other ground, and the validity of this claim should be affirmed.

III. CONCLUSION

For the reasons set forth above, Resonant Systems respectfully requests that the Board affirm the validity of all challenged claims.

Dated: July 8, 2025

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CERTIFICATE OF WORD COUNT

I certify that there are 2,031 words in this paper, excluding the portions exempted under 37 C.F.R. § 42.24(a)(1), according to the word count tool in Microsoft Word.

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CERTIFICATE OF SERVICE

I hereby certify that "Patent Owner's Sur-Reply" was served on July 8, 2025 by email sent to:

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