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Paper No. 51
Date Entered: February 14, 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SEMICONDUCTOR COMPONENTS INDUSTRIES, LLC d/b/a
ON SEMICONDUCTOR,
Petitioner

v.

POWER INTEGRATIONS, INC.
Patent Owner

Case IPR2016-01589
Patent 6,249,876 B1

Before THOMAS L. GIANNETTI, BRIAN J. McNAMARA and LYNNE E. PETTIGREW, *Administrative Patent Judges*.

McNAMARA, *Administrative Patent Judge*.

FINAL WRITTEN DECISION
35 U.S.C. § 318(a) and
37C.F.R. § 42.73

BACKGROUND

On February 17, 2017, we instituted an *inter partes* review of claims 11, 13–19, and 32 of U. S. Patent No. 6,249,876 B1 ("the '876 Patent"). Paper 15 ("Dec. to Inst."). Patent Owner filed a Patent Owner Response (Paper 23, "PO Resp."), stating that it had filed a statutory disclaimer of claims 11, 13 and 32, leaving only claims 14–19 subject to the challenges on which we instituted this *inter partes* review. PO Resp. 1. Petitioner filed a Petitioner Reply (Paper 31, "Pet. Reply").

Patent Owner also filed a contingent Motion to Amend (Mot. To Amend) (Paper 21), Petitioner filed an opposition (Paper 32, "Opp. To Mot. To Amend"), and Patent Owner filed a reply (Paper 34, "Reply to Opp. To Mot. To Amend)).

On October 23, 2017, we authorized additional briefing to allow the parties to address the implications of a decision by the Court of Appeals for the Federal Circuit in *Aqua Products, Inc. v. Matal*, 872 F.3d 1290 (Fed. Cir. 2017), entered on October 4, 2017. Paper 41. Petitioner filed a Supplemental Opposition to Patent Owner's Motion to Amend (Paper 43, "Supp. Opp. to Mot. To Amend)") and Patent Owner filed a reply (Paper 47, "Reply to Supp. Opp. To Mot. To Amend").

Petitioner filed a Motion to Exclude (Paper 38, "Mot. To Exclude"), Patent Owner filed an opposition (Paper 42, "PO Opp. To Mot. To Exclude"). and Petitioner field a Reply (Paper 44) and Corrected Reply (Paper 45, "Reply to Opp. To Mot. To Exclude").

Patent Owner filed a Motion to Seal (Paper 22) and revised Motion to Seal (Paper 25, "Mot. To Seal") and a corresponding motion for entry of a Protective Order (Paper 26).

A transcript of an oral hearing held on November 15, 2017 (Paper 50, "Hrg. Tr.") has been entered into the record.

We have jurisdiction under 35 U.S.C. § 6. This Final Written Decision is issued pursuant to 35 U.S.C. §318(a). We base our decision on the preponderance of the evidence. 35 U.S.C. § 316(e); 37 C.F.R. § 42.1(d).

Having reviewed the arguments of the parties and the supporting evidence, we conclude that Petitioner has demonstrated by a preponderance of the evidence that the challenged claims are unpatentable. We also deny Patent Owner's Motion to Amend.

THE '876 PATENT (EXHIBIT 1001)

The '876 Patent seeks to reduce electromagnetic interference (EMI) emission in a switched mode power supply (SMPS) by jittering or deviating the switching frequency. Ex. 1001, Abstract, 1:66–67. "The jittering operation smears the switching frequency of the power supply over a wide frequency range and thus spreads the energy outside of the bandwidth measured by EMI measurement equipment." *Id.* at 3:59–62.

The '876 Patent discloses a frequency jittering circuit with an oscillator that generates a varying switching frequency signal in response to a control input provided by a digital to analog (D/A) converter.[1] *Id.* at 2:1–6. A counter connected to the output of the oscillator causes the D/A converter to adjust the control input to vary the switching frequency. *Id.* at 2:7–9. The switching frequency can be generated using a primary current or voltage and cycling one or more secondary current or voltage sources,

[1] In this Decision, and the pleadings, the term "digital to analog converter" is also designated "DAC, "D-A converter," or "D/A converter."

respectively, to generate a secondary current or voltage that varies over time. *Id.* at 2:10–55.

Figure 1 of the ’876 Patent, shown below, is a schematic diagram of a digital frequency jittering device.

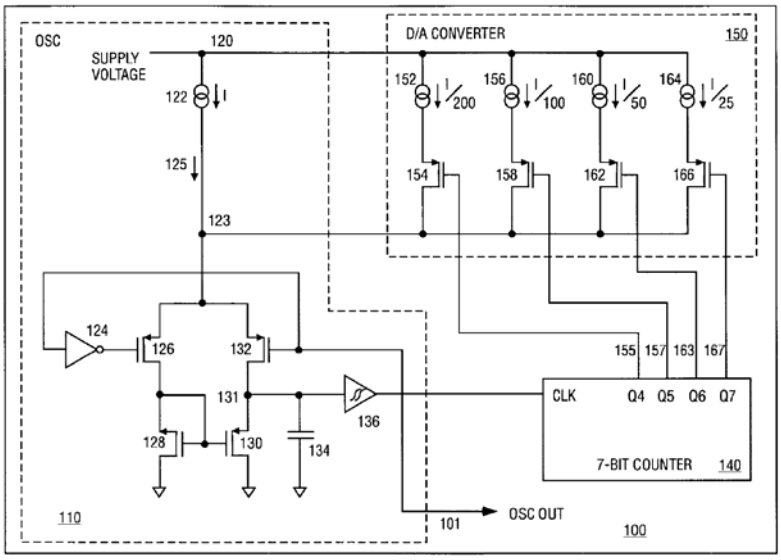

Figure 1 is a schematic of a digital frequency jittering device

As shown in Figure 1 of the ’876 Patent, frequency jittering device 100 includes primary oscillator 110 operating between 100 kHz and 130kHz, seven bit counter 140 clocked by the output of oscillator 110 to represent a particular time interval, and D/A converter 150 driven by outputs Q4–Q7 of counter 140 to present to primary oscillator 110 frequency jittering current sources that vary the oscillator’s frequency. Ex. 1001, 4:27–39. In primary oscillator 110, transistors 126, 128, 130, and 132 form a differential switch. *Id.* at 4:51–52. This differential switch, capacitor 134, inverter 124, current source 122, and comparator 136 form oscillator 110. *Id.* at 4:56–58. The output of comparator 136, i.e., the output of the oscillator, drives the clock input of counter 140. *Id.* at 4:49–51.

D/A converter 150 is shown as current sources 152, 156, 160, and 164, each connected to a transistor switch, 154, 158, 162, and 166, respectively, to provide a binary-weighted fraction of current I when the corresponding transistor switch is closed based on outputs Q4–Q7 of the counter. *Id.* at 4:62–5:21. The drains of transistors 154, 158, 162, and 166 are joined together such that the frequency jittering current sources of D/A converter 150 can be provided to supplement current source 122. *Id.* at 5:24–28. For example, each time output Q4 on line 155 is low, transistor 154 is turned on to inject 1/200th of current I to node 123, so that the total current is 1.005I. *Id.* at 5:36–38. When combinations of outputs Q4–Q7 turn transistors 154, 158, 162, and 166 on, the outputs of the respective current sources are added to the output of main current source 122 to vary the frequency of the primary oscillator by injecting additional current to the main current source 122. *Id.* at 5:49–56. In the embodiment of Figure 1, as the counter counts upward to the maximum count of 128, the peak switching frequency is reached at about 1.075 times the base frequency. *Id.* at 5:61–64. On average, the switching frequency is between 1.03 and 1.04 times the base frequency. *Id.* at 5:65–66. The deviation of the oscillator frequency within a narrow range reduces EMI noise by spreading the energy over a wider frequency range than the bandwidth measured by the EMI test equipment, such that the noise measured by the test equipment is reduced. *Id.* at 5:66–6:5.

ILLUSTRATIVE CLAIMS

In the Patent Owner Response, Patent Owner statutorily disclaimed claims 11, 13, and 32. (PO Resp. 1), leaving claims 14–19 as the remaining subject matter for this Decision. Claim 14 is illustrative and is reproduced

below with the limitations of claim 11 from which claim 14 depends shown in italics:

> 14. The method recited in claim 11 *for generating a switching frequency in a power conversion system, comprising:*
>
> *generating a primary current;*
>
> *cycling one or more secondary current sources to generate a secondary current which varies over time; and*
>
> *combining the secondary current with the primary current to be received at a control input of an oscillator for generating a switching frequency which is varied over time*
>
> wherein the primary current is I and each of the secondary current sources generates a supplemental current lower than I, and further comprising passing the supplemental current to the oscillator control input.

Claim 17 reproduced below is also illustrative

> 17. A method for generating a switching frequency in a power conversion system, comprising:
>
> generating a primary voltage;
>
> cycling one or more secondary voltage sources to generate a secondary voltage which varies over time; and
>
> combining the secondary voltage with the primary voltage to be received at a control input of a voltage-controlled oscillator for generating a switching frequency which is varied over time.

GROUNDS OF INSTITUTION

In our Decision to Institute, we instituted trial on the following challenges to patentability:

Claims 11 and 13 as anticipated by Dobkin[2]—as claims 11 and 13 have been disclaimed, this challenge is not addressed further in this Decision;

Claims 14 and 16 as obvious over Dobkin and Stone[3];

Claim 15 as obvious over the combination of Dobkin, Stone, and Manlove[4];

Claims 17 and 18 as anticipated by Habetler[5];

Claims 17 and 18 as obvious over the combination of Habetler and Marchio[6];

Claim 19 as obvious over the combination of Habetler in view of Marchio and Stone; and

Claim 32 as obvious over the combination of Dobkin, Danstrom, and Grebene—as claim 32 has been disclaimed, this challenge is not addressed further in this Decision.

CLAIM CONSTRUCTION

In our Decision to Institute, we construed the term "cycling one or more secondary current [voltage] sources" to mean *the application of secondary current [voltage] sources to generate a time-varying secondary*

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[2] U.S. Pat. No. 5,929,620, issued Jul. 27, 1999 (Ex. 1004).
[3] D.A. Stone, B. Chambers, D. Howe, *Easing EMC problems in switched mode power converters by random modulation of the PWM carrier frequency*, IEEE 1996 (Ex. 1020).
[4]U.S. Patent No. 5,699,024, issued Dec. 16, 1997 (Ex. 1016).
[5] Thomas Habetler, *Acoustic Noise Reduction in sinusoidal PWM Drives Using a Randomly Modulated Carrier*, IEEE Transactions on Power Electronics, vol. 6, No. 3, July 1991 (Ex. 1019).
[6] European Patent Application EP0321794A2, filed Dec. 8, 1988 (Ex. 1006).

current [voltage] in a manner that repeats over time. Dec. to Inst. 17. As neither party disputes this claim construction, we apply the same construction in this Decision. No other terms require construction.

ANALYSIS OF REMAINING PRIOR ART CHALLENGES

Claims 14 And 16 As Obvious Over Dobkin And Stone

Claim 14 depends from disclaimed independent claim 11, which is drawn to a "method for generating a switching frequency in a power conversion system." The method steps recited in claim 11 are (i) generating a primary current, (ii) cycling one or more secondary current sources to generate a secondary current which varies over time, and (iii) combining the secondary current with the primary current to be received at a control input of an oscillator for generating a switching frequency which is varied over time. In our Decision to Institute, we determined that Petitioner had demonstrated Dobkin discloses each of these limitations, i.e., (i) primary current source 128, (ii) signal generator 302 applying a sawtooth signal to cause current generator 126 to provide a time varying secondary current, and (iii) VCO 104 with current sources 126 and 128 providing current to capacitor 114 that flows through diode connected transistor 130 to produce an oscillator signal that varies linearly from zero to VMAX for each cycle of the oscillator. Dec. to Inst. 19–22. Patent Owner presents no further argument on the limitations recited in claim 11. In view of Patent Owner's disclaimer of claim 11, which supports the presence of the limitations in the prior art, and in view of our analysis in the Decision to Institute, we are persuaded that Petitioner has demonstrated by a preponderance of the evidence that Dobkin discloses these features of independent claim 11 that are incorporated into claim 14.

Claim 14 recites the further limitation "wherein the primary current is I and each of the secondary current sources generates a supplemental current lower than I, and further comprising passing the supplemental current to the oscillator control input." Petitioner explains that in Dobkin, signal generator 302 applies a sawtooth signal to current source 126, causing capacitor 114 to charge more rapidly, or slowly, so that the frequency of VCO 104 varies by a predetermined amount about a central frequency. Pet. 20 (citing Ex. 1004, 5:50–65). Petitioner contends that it would have been obvious to a person of ordinary skill[7] to adapt Dobkin to inject a small range of jitter because Dobkin discloses that constant varying of operational frequency, even over a small range, has a cumulative effect on noise reduction. Pet. 38–39 (citing Ex. 1004, 6:22–25).

Petitioner cites Stone as disclosing injecting a small amount of jitter (frequency variation between 25 kHz and 27 kHz; ratio of $\Delta f/f$=2:25) into a switched mode power supply (SMPS). *Id*. at 39–40 (citing Ex. 1020, Fig. 1b). Petitioner explains that to implement a relaxation oscillator with 2 kHz of jitter and base switching frequency of 25 kHz, the secondary current would be 2/25^{ths} of the primary current, even if only the secondary current were used. *Id.* Petitioner contends that a person of ordinary skill would have been motivated to substitute Stone's small range of jitter into Dobkin's regulator to reduce output ripple. *Id.* at 41 (citing Ex. 1002, Holberg Decl. ¶ 72, stating that a large jitter signal causes undesirable large variations in output voltage).

[7] The parties generally agree on the level of ordinary skill. PO Resp. 10.

Patent Owner contends that Stone fails to disclose the relative values of the primary and secondary currents recited in claims 14 and 16. PO Resp. 32. Patent Owner points out that Stone discloses at least four different frequency variations, two of which have a frequency variation greater than that of the base frequency. *Id*. (citing Ex. 1020, ¶ 50). According to Patent Owner, Petitioner's argument that frequency correlates to current does not explain why a person of ordinary skill would single out one possible frequency variation from Stone, while ignoring the others that teach against claims 14 and 16. *Id*. at 33. Patent Owner further argues that a person of ordinary skill would not have been motivated to combine Stone with Dobkin because Stone is silent on how its random modulation of the PWM signal is accomplished. *Id*. Accordingly, according to Patent Owner, it would not have been clear to a person of ordinary skill how to translate Stone's proposed experimental variation ranges into something that could be applied to the frequency variation circuit of Dobkin, or whether the experiments discussed in Stone, which involve storing data in a memory, would be compatible with Dobkin's circuit that does not use a memory. *Id*.

According to Petitioner, Stone's use of an EPROM to store the modulation sequences for frequency hopping spread spectrum (FHSS) is irrelevant to the proposed combination; Petitioner argues that "[t]he combination merely requires setting the current generated by Dobkin's secondary current source to a range of values that is consistent with Stone's teaching." Pet. Reply 13 (citing Supplemental Declaration of Dr. Douglas Holberg ("Holberg Suppl. Decl.") Ex. 1029 ¶¶ 19–22). Petitioner cites the testimony of its expert witness, Dr. Holberg, for the proposition that such an activity was plainly within the capability of a person of ordinary skill in

1997 and the testimony of Patent Owner's expert Dr. Kelley for the proposition that Stone itself discourages a higher range of jitter, which Petitioner argues is reason for a person of ordinary skill to select the embodiment cited in the Petition. Pet. Reply, 11–12 13–14 (citing Ex. 1029, Holberg Supp. Decl. ¶ 20, Ex. 1030, Transcript of Deposition of Dr. Arthur Kelley ("Kelley Tr.") 65:9–66:2, 6721–68:2). Petitioner notes Patent Owner's witness, Dr. Kelley, testified that, in practice, a secondary signal is always smaller than the primary signal because, if it were not, the result would be "non-functional." *Id*. at 12 (citing Ex. 1030, Kelley Tr., 64:9 – 65:4).

Stone "presents a method of reducing the measured amplitude of the high frequency harmonics, contained in standard fixed frequency PWM [pulse width modulation], by the use of a pseudorandom binary sequence to modulate the PWM carrier." Ex. 1020, 1 (Abstract). Stone discloses that it was already known to apply spectral spreading to switched mode power converters to reduce the amplitude of the peak unwanted spectral energy present in high order harmonics of a PWM waveform, while distributing the energy to additional harmonics. *Id.* at 1. Stone further discloses two known techniques include (i) pre-programming turn-on and turn-off times for a PWM waveform into a memory that can be accessed periodically by a control circuit and (ii) using random timing to modulate the switching sequence to achieve spectral spreading of the high frequency harmonic components. *Id.* Stone's method sequentially hops between a number of discrete carrier frequencies, remaining at any given frequency for only a short period of time. *Id.* at 1–2. Recognizing that the change should only occur at the end of a PWM period, Stone states that the dwell time at each

frequency is a function of the frequency and the number of cycles of the frequency. *Id.* at 2.

Patent Owner's witness, Dr. Kelley, testified "Stone is silent on its implementation, so it doesn't actually tell you any of this is being done with current or any circuit structure." Ex. 1030, Kelley Tr. 68:3–6. We agree. We determine that Stone studies the effect of modulating sequences on the resultant spectral power density of the square edged PWM waveform. Ex. 1020, 2, Figs 1–2. Stone's disclosure of storing the modulation sequence for the frequency hopping spread spectrum in EPROM is not limited to any particular circuit implementation.

Petitioner cites Dobkin as disclosing the relevant implementation—i.e., an implementation that reduces switching noise in a switched power regulator by generating a time varying secondary current to charge a capacitor that causes the output of VCO to vary the switching frequency of the regulator. Ex. 1004, 2:53–3:4. Dobkin varies the switching frequency by a constant amount, e.g., by 50 kHz between 75 kHz and 125 kHz, thereby spreading the noise over a broader spectrum. *Id.* Stone examines the effect of various switching frequency modulations. Referring to Patent Owner's TNY256 device, Dr. Kelley testified, "you jitter somewhere around that baseline, but not very far" and "I think the prior reference Stone suggests varying the frequency very, very widely. And then if you read further on, it sort of confirms what I said about the practical difficulties in doing such an implementation." *Id.* at 66:16–18, 67:21–68:3. Petitioner's witness, Dr. Holberg, agrees with Patent Owner's witness, Dr. Kelley, that Stone identifies potential problems of using large amounts of jitter and asserts that Stone provides a reason for a person of ordinary skill to select the low jitter

embodiment of Stone. Ex. 1029, Holberg Suppl. Decl. ¶ 20 (citing (Ex. 1020, 4). Dr. Holberg further testified that a person of ordinary skill would have been motivated to adapt the magnitude of Dobkin's primary and secondary current sources to implement Stone's example of a small range of jitter. Ex. 1029, Suppl. Holberg Decl. ¶ 21.

In view of the testimony of both Dr. Kelley and Dr. Holberg, we find that Petitioner has demonstrated that a person of ordinary skill would have been motivated to apply the teachings of Stone to jitter by a small amount the switching frequency in a power converter as configured by Dobkin, where the switching frequency is varied by changing a secondary current supplied to a circuit that drives a VCO by an amount less than the primary current.

Claim 16 recites that the largest supplemental current is less than approximately 0.1 of I. As discussed above, Petitioner has demonstrated Stone discloses injecting a small amount of jitter (frequency variation between 25 kHz and 27 kHz; ratio of $\Delta f/f$=2:25) into a switched mode power supply (SMPS). *Id*. at 39–40 (citing Ex. 1020, Fig. 1b). This frequency variation range disclosed by Stone is less than the range of 0.1f as determined by I in Dobkin. Thus, we agree with Petitioner that a person of ordinary skill would have been motivated to combine the features of Dobkin and Stone to implement a method as recited in claim 16.

In view of the foregoing, we are persuaded that the preponderance of the evidence supports Petitioner's position that a person of ordinary skill would have been motivated to combine the teachings of Dobkin and Stone and the limitations of claims 14 and 16 are disclosed by this combination of references. We address objective considerations later in this Decision.

Claim 15 As Obvious Over Dobkin, Stone, And Manlove

Claim 15 depends from claim 14 and recites the further limitation "binary weighting the supplemental current." Petitioner cites Manlove as teaching a relaxation oscillator whose frequency is controlled by adjusting the total current provided by a primary current source and a plurality of binary-weighted secondary current sources forming a digital to analog converter (DAC). Pet. 45–46 (citing Ex. 1016, 6:40–42, Ex. 1002, Holberg Decl. ¶ 79). Patent Owner argues that a person of ordinary skill would not have been motivated to apply the teachings of Manlove to a circuit that seeks to introduce frequency jitter because Manlove's fundamental purpose is to provide a fixed oscillator frequency by using a current calibration circuit to adjust the value of the control current applied to the oscillator. PO Resp. 34–35.

We are not persuaded by Patent Owner's argument. Notwithstanding its goal of maintaining a fixed frequency, Manlove teaches adjusting the frequency by varying the control current applied to the oscillator using a binary weighted DAC. We agree with Petitioner that a person of ordinary skill would have understood that Manlove's DAC would be useful for controlling the frequency of an oscillator and could be applied in a variety of applications where it is desirable to control the oscillator. Pet. Reply 14–15.

Objective Considerations – Claims 14–16

Patent Owner contends that multiple juries, the district courts, and the Federal Circuit have all concluded that the '876 Patent is non-obvious based on evidence that others in the industry could not come up with patented invention, that the patented invention was commercially successful, that Patent Owner received awards for its innovations, and that Petitioner's

predecessor, Fairchild, had reverse engineered, copied, and advertised the patented invention. PO Resp. 36–37.

In order to establish the requisite nexus between claim 14 and objective considerations, Patent Owner cites the Declaration of its expert, Dr. Kelley, to support its contention that Patent Owner's TinySwitch TNY256 product ("TinySwitch") "practices claim 14 of the '876 patent, which corresponds to the current jittering embodiment." *Id.* at 38 (no cite to Dr. Kelley's Declaration, Ex. 2014, is provided). According to Patent Owner, the TinySwitch datasheet states that "Frequency jittering dramatically reduces EMI" and that the frequency is jittered 5 kHz peak-to-peak about a typical frequency of 130 kHz using a digital frequency circuit shown in the TinySwitch schematic. *Id.* at 38–39 (citing Ex. 2013, 1, 3, Ex. 2032, Ex. 2014, Kelley Decl. ¶ 57). Patent Owner argues that each of the limitations in claim 14 is found in the TinySwitch. *Id.* at 39–40.

Petitioner responds that prior litigation concerned only claim 1 of the '876 Patent, and Patent Owner has failed to show a nexus between the secondary considerations and the merits of the subject matter recited in claim 14. Pet. Reply 16–17. Petitioner argues that "any presumption of a nexus in the IPR is overcome by the fact that PO previously attributed the same evidence of secondary considerations to features of Claim 1 that are not present in Claims 14 or 17." *Id.* at 16. Specifically, Petitioner contends that the "digital jitter" feature recited in claim 1 is not recited in claims 14 and 17. *Id.* at 17. Petitioner notes that Patent Owner's Vice President of marketing, David Mathews, and Patent Owner's expert, Dr. Kelley, both agreed that the counter and the digital to analog converter in claim 1 that are not recited in claim 14 make claim 1 digital. *Id.* at 17–18 (citing Ex. 1031,

Transcript of Deposition of David Matthews ("Matthews Tr.") 11:7–12:9; Ex. 1030, Transcript of Deposition of Dr. Arthur Kelley ("Kelley Tr.") 59:20–60:16, 62:15–23). Petitioner further notes that, although Mr. Matthews stated he had no knowledge of patent matters and could not speak to the patent claims (Hrg.. Tr. 43:21–45:24), Dr. Kelley acknowledged that claims 1 and 14 are distinguished from each other because claim 1 recites a counter and a digital to analog converter that are not recited features of claim 14 (Pet. Reply 18). Thus, the very features Patent Owner relies upon to demonstrate non-obviousness of the invention recited in claim 1 are not features of the claims that are the subject of the challenges in this proceeding. In view of the above, we agree that the evidence is insufficient to show a nexus between the claimed subject matter and purported secondary or objective considerations as to claims 14–16.

In consideration of the above, we are persuaded that there is insufficient persuasive evidence of objective considerations of non-obviousness for claim 14 and dependent claims 15 and 16. Having determined that Petitioner has demonstrated all the limitations of claims 14–16 are taught in the prior art and that a person of ordinary skill would have been motivated to combine the references as discussed above, we conclude that Petitioner has shown by a preponderance of the evidence that claims 14 and 16 are unpatentable as obvious over Dobkin and Stone and that claim 15 is unpatentable as obvious over the combination of Dobkin, Stone and Manlove.

Claims 17 and 18 As Anticipated by Habetler

The limitations of the method for generating a switching frequency in a power conversion system recited in claim 17 are the same as those of claim

11, except that for every instance of a current and current source, claim 17 recites a voltage and a voltage source. Petitioner cites Habetler's six-pulse bridge inverter feeding an induction machine in Figure 1 as disclosing a method for generating the switching frequency and power conversion system recited in the preamble of claim 17. Pet. 78. Petitioner provides the following annotated version of Figure 5 of Habetler:

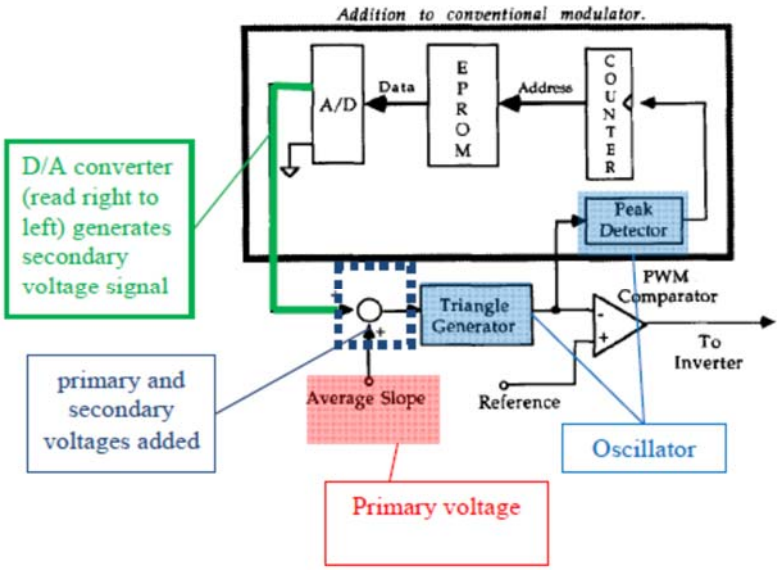

Figure 5 of Habetler as annotated by Petitioner

Id. at 81.

Petitioner cites the "average slope" signal in Figure 5 of Habetler as disclosing that a primary voltage is generated and provided to a summing device commonly known as a voltage summer. *Id.* at 78–79. Petitioner explains that Habetler discloses an EPROM programmed off line to provide a quantity of periodic random numbers that are then sent to the D/A to get the slope of the triangle wave. *Id.* at 80.

Patent Owner argues that Habetler's method of acoustic noise reduction in a sinusoidal PWM drive using a randomly modulated carrier

does not deal with the subject matter of the '876 Patent. PO Resp. 10–11. However, as we noted in our Decision on Institution, claim 17 is not limited to EMI suppression. Dec. to Inst. 34–35.

Patent Owner also argues that because Habetler discloses summing the average slope and the slope value output by a DAC, Habetler strongly suggests that the control input to the triangle generator is a current signal, rather than a voltage as claimed. *Id.* at 12. Further, according to Patent Owner, it is well understood that the slope of a sawtooth signal provided to an oscillator correlates to the current charging and discharging a capacitance, rather than the voltage. *Id.* Patent Owner contrasts Habetler's slope control approach with a trip voltage control approach in which the magnitude of the charge and discharge current are held constant, thereby maintaining a constant slope, and the trip voltage varies. *Id.* at 12–17. Thus, according to Patent Owner, a person of ordinary skill would have understood Habetler's summing of two different signal values at a common node to determine the slope of the triangle wave to sum two different currents, not voltages. *Id.* at 17, 23 (citing Ex. 2014, Kelley Decl. ¶¶ 32, 39–40).

Habetler discloses reducing acoustic noise in an inverter-driven electric machine by spreading out the harmonic spectrum to avoid the concentration of harmonic energy in distinct tones. Ex. 1019, Abstract. Habetler discloses a sinusoidal PWM (pulse width modulated) generator in which a triangle carrier is sinusoidally modulated around frequency ω_c, such that the switching frequency can be maintained within a predetermined range. Ex. 1019, 2–3, Fig. 3. Habetler also discloses randomly modulating the slope of the carrier waveform, for example, by using a peak detector and a sample and hold circuit or a peak detector and a counter to address an

EPROM containing a look up table of *a priori* generated random numbers, such that the repetition rate of the random numbers has no effect on the resulting voltage spectra. *Id.* at 4; Figs. 4–5. Thus, the method disclosed in Habetler corresponds to the method of generating a switching frequency with the control signal to the triangle wave generator cycling through a sequence of values driven by outputs from the EPROM corresponding to counts of the counter, as recited in claim 17 of the '876 Patent.

In the embodiment of Figure 5 of Habetler, an EPROM drives a digital to analog converter whose output is used to get the slope of the triangle wave by being added to the average slope signal. *Id.* Habetler does not state explicitly whether the circuit is implemented by summing currents or voltages to arrive at the control signal driving the triangle wave generator. As noted above, Patent Owner extensively discusses known current-controlled triangle wave generators and argues that the summing notation in Figure 5 indicates that the signals being summed supply a current rather than a voltage to the triangle wave generator. PO Resp. 12–24. Petitioner argues that voltage implementations are known, and that because the notation in Figure 5 is not a standard point linking two segments of a circuit, Habetler suggests that the signals being summed are voltages, as required by claim 17. Pet. Reply 5–6 (citing Ex. 1011, 3:38–55). Petitioner also notes that Figure 5 of Habetler uses the same notation as that used in Figure 4, where the corresponding description of the circuit symbol refers to a sample and hold outputting a voltage to a summer circuit. Pet. Reply 3 (citing Ex. 1002, Holberg Decl. ¶ 129).

Habetler's triangle wave generator in Figure 5 is shown as a "black box" that receives the sum of two signals not identified as either voltages or

currents. Patent Owner argues that Habetler does not anticipate claim 17 because Habetler does not disclose an explicit implementation using voltages and a person of ordinary skill would have understood Habetler to be summing currents. PO Resp. 12–17.

The dispositive question is "whether one skilled in the art would reasonably understand or infer" that a reference teaches or discloses all of the elements of the claimed invention. *In re Baxter Travenol Labs.,* 952 F.2d 388, 390 (Fed. Cir. 1991). A reference can anticipate a claim even if it "d[oes] not expressly spell out" all the limitations arranged or combined as in the claim, if a person of skill in the art, reading the reference, would "at once envisage" the claimed arrangement or combination. *In re Petering,* 301 F.2d 676, 681 (CCPA 1962), *Kennametal, Inc. v. Ingersoll Cutting Tool Co.*, 780 F.3d 1376, 1381 (Fed. Cir. 2015); *see also In re Preda*, 401 F.2d 825, 826 (CCPA 1968) (noting that "in considering the disclosure of a reference, it is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom").

We are persuaded by Petitioner's arguments concerning Habetler. A conventional implementation of a triangle wave generator uses known VCO circuitry that responds to a voltage control signal—Petitioner notes that Danstrom, discussed in the Petition, discloses such an oscillator where internal charging current, and thereby the slope of the triangle wave, is controlled by an input voltage. Pet. Reply 5–6 (citing Ex. 1011, 3:38–55, fig. 2). Patent Owner points out that voltage summing circuits are well-known. PO Resp. 16–17. But the notation in Habetler is not a standard circuit diagram with a junction or node, where the sum of the incoming and

outgoing currents are equal. Instead, Habetler's description of the implementation in Figure 4 explicitly discloses summing voltages using the same notation in Figure 4 that Habetler uses in Figure 5. In view of Habetler's explicit disclosure and use of identical notation in Figures 4 and 5, we agree that in Figure 5 Habetler illustrates a summing block, and that a person of ordinary skill could reasonably infer the use of a well-known voltage summing amplifier to implement this function to supply a control voltage to Habetler's triangle wave generator. Thus, we are persuaded that Petitioner has shown Habetler discloses all the limitations of method claim 17.

Claim 18 recites the further limitation of clocking a counter with the output of the oscillator. Figure 5 of Habetler, as shown in Petitioner's annotations, includes a triangle generator and a peak detector used to clock a counter. Thus, we are persuaded that Petitioner has demonstrated that Habetler discloses the further limitation recited in claim 18.

For these reasons, we find that Petitioner has shown by a preponderance of the evidence that claims 17 and 18 are unpatentable as anticipated by Habetler.

Claims 17 and 18 As Obvious Over The Combination Of Habetler and Marchio

Noting that Habetler contemplates in some applications the EPROM may be programmed to provide a periodic jitter pattern periodic, Petitioner cites Marchio as disclosing an implementation that would provide such a periodic signal and remove the need for the EPROM. Pet. 85–88; Ex. 1019, 4 ("any type of noise can be implemented, including periodic noise"). Patent Owner contends that Marchio discloses generating a fixed frequency triangle wave using a pulse generator, counter, DAC, and a flip-flop for

changing the counter's direction, but that Petitioner has not identified which components in Marchio are the claimed primary and secondary voltage sources or explained where Marchio contemplates combining two different voltages to form the control signal input to the VCO. PO Resp. 27. Patent Owner also argues that Petitioner has not shown any relevance of Habetler and Marchio to EMI problems addressed by claims 17 and 18, because Habetler deals with acoustic noise and Marchio discloses a low frequency triangle wave generator. *Id.* at 27–28.

Noting arguments advanced by Patent Owner in a parallel reexamination proceeding that claim 17 implicitly requires a counter that is coupled directly to a DAC, Petitioner responds that Marchio is cited for its disclosure of a periodic signal generator including a directly coupled counter. Pet. Reply 9 (citing Pet. 84–87). Petitioner notes that Habetler discloses any kind of noise, including periodic noise, can be used to introduce jitter. *Id.* (citing Ex. 1019, 4). Petitioner notes that removing Habetler's ROM, as in Marchio, does not eliminate jitter, but merely limits Habetler to a periodic jitter signal, in appropriate applications that could benefit from a smaller circuit. *Id.* (citing *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 419 (2007), for the proposition that in determining whether the subject matter of a patent claim would have been obvious, neither the particular motivation nor the avowed purpose of the patentee controls). Petitioner argues persuasively that Habetler and Marchio operate at similar frequencies, and a person of ordinary skill would have been encouraged to combine the two references. *Id.* at 10–11. Thus, we agree with Petitioner that the combination of Habetler and Marchio discloses the limitations of claims 17 and 18, and that a person of ordinary skill would have been

motivated to combine these references to arrive at the claimed subject matter.

Claim 19 as obvious over the combination of Habetler in view of Marchio and Stone

Claim 19, which depends from claim 17, recites that each of the secondary voltage sources generates a voltage that is less than the primary voltage and that the method further comprises passing the supplemental voltage to the VCO. Petitioner cites Stone's disclosure of an SMPS with a base frequency of 25kHz and jitter causing the base frequency to vary between 25 kHz and 27 kHz (Δf:f is 2:25). Pet. 89. Petitioner argues that applying this relationship to Habetler, the secondary voltage would be 2/25ths of the primary voltage, i.e., a supplemental voltage that is less than the primary voltage. *Id.* at 89–90.

Patent Owner disputes Petitioner's assertion that frequency corresponds to voltage and contends that Stone fails to disclose secondary voltage sources. PO Resp. 30. Petitioner notes that Patent Owner provides no evidence or technical analysis to support its assertion. Pet. Reply 11. For the reasons discussed above, we are persuaded that Habetler provides sufficient disclosure of this feature.

Patent Owner also argues that Stone discloses at least four different frequency variations, at least two of which have a variation greater than the base frequency, such that Petitioner's selection of one such variation is hindsight. PO Resp. 30–31. Petitioner notes that Patent Owner's expert, Dr. Kelley, testified that Stone discourages using wide ranges of jitter, favoring the narrow range of jitter cited in the Petition. Pet. Reply 11–12 (citing Ex. 1030, Kelley Tr. 65:9–66:2, 67:21–68:2). Dr. Kelley states "Stone suggests varying frequency very, very widely. And then if you read further on, it sort

of confirms what I said about the practical difficulties in doing such an implementation." Ex. 1030, 67:22–68:2. Petitioner also cites Dr. Kelley's testimony, discussed above, that a secondary signal is always smaller than a primary signal. Pet. Reply 12 (citing Ex. 1030, Kelley Tr. 64:9–65:4).

Patent Owner also argues that a person of ordinary skill would not have been motivated to combine the high frequency teachings of Stone with Habetler and Marchio because those low frequency references do not address EMI problems. *Id.* at 31. Patent Owner further argues that because Stone is silent on how its random modulation of the PWM signal is accomplished, it would have been unclear to a person of ordinary skill how to translate Stone's proposed experimental variations into something that could be applied to Habetler. *Id.* (citing Ex. 2014, Kelley Decl. ¶¶ 46–47). We agree with Petitioner that Patent Owner identifies no technical challenges posed by the combination and credit the testimony of Petitioner's expert, Dr. Holberg, that a person of ordinary skill would have been able to select the operating frequencies of Habetler, Marchio, and Stone by choosing the currents and capacitors used in those references. Pet. Reply 12 (citing Ex. 1029, Holberg Suppl. Decl. ¶ 18). In consideration of the above, and focusing our obviousness inquiry on what the references would have conveyed to a person of ordinary skill in the art, we find that the evidence supports a finding that a person of ordinary skill would have understood and had the technical capability to carry out the subject matter of claim 19 based on the teachings of Habetler, Marchio, and Stone.

Objective Considerations – Claims 17–19

Our conclusion above that Petitioner has demonstrated by a preponderance of the evidence that claims 17 and 18 are anticipated by

Habetler is not affected by objective or secondary considerations. Our analysis of claims 17–18 with respect to obviousnessover the combination of Habetler and Marchio and claim 19 with respect to obviousness over the combination of Habetler, Marchio and Stone requires that we address objective considerations of non-obviousness as to the limitations recited in these claims, as well.

To establish a nexus between the subject matter of claims 17–19 and the objective or secondary considerations, Patent Owner contends that "Fairchild's infringing products, specifically, the representative FSD210 chip, meet every limitation of claim 17, which corresponds to the voltage jittering embodiment." PO Resp. 41. We make no assessment concerning whether any product "infringes" any claim of the '876 Patent. However, in the context of secondary considerations, we consider Patent Owner's arguments that the FSD210 embodies the features of claim 17.

According to Patent Owner, Fairchild's FSD210 and FSD210H describe a power switch that generates a switching frequency and includes an integrated PWM controller having a fixed oscillator with frequency modulation for EMI. *Id*. at 42 (citing Ex. 2028, 1; Ex. 2030, 1). The FSD210 data sheet describes feedback control typically performed using an opto-coupler and a KA421 type voltage reference, stating that the feedback voltage is comparable to the internally generated sawtooth wave to control the duty cycle. Ex. 2030, 7.

Patent Owner argues that the FSD210 datasheet shows a primary voltage combined with a secondary voltage to produce a steady increase and decrease in the voltage level of the waveform, thereby increasing and decreasing the trip voltage applied to control the VCO, such that the VCO

generates a switching frequency that changes from 138 kHz to 130 kHz and back again. PO Resp. 44.

Petitioner contends that Patent Owner's analysis "rests on a mistaken understanding of the FSD210 datasheet." Pet. Reply 20. Petitioner states page 43 of the Patent Owner Response includes a reproduction of a figure from the FSD210 datasheet (the "stair-step figure") annotated by Dr. Kelley as "Frequency Input Modulation Waveform," and that Dr. Kelley's improper use of this figure as a voltage signal leads him to make unsupported assertions concerning the use of control voltages in the FSD210. *Id.* at 20–21. According to Petitioner, the stair-step figure does not show control voltages, but only how frequencies change over time. *Id.* (citing Ex. 1029, Holberg Supp. Decl. ¶ 24). According to Dr. Holberg, "[n]othing about this figure [the stair-step figure] provides information about the form of the control signals uses [sic] to vary the frequency in FSD210." Ex. 1029, Holberg Supp. Decl. ¶ 24.

Page 43 of the Patent Owner Response and paragraph 65 of Dr. Kelley's Declaration (Exhibit 2014) include the stair-step figure and another figure that appears in the FSD210 datasheet directly below the stair-step figure. Ex. 2030, 9. Patent Owner and Dr. Kelley annotate this lower figure "VCO Output Waveform." Neither of Dr. Kelley's annotations is found on the FSD210 datasheet. Both the stair-step figure and the figure below it appear on the FSD datasheet in a section labeled "7. Frequency Modulation." Neither of the parties references any discussion of these figures in the FSD210 datasheet.

On the stair-step figure, the x-axis and y-axis are unlabeled. Ex. 2030, 9. The steps are labelled as frequencies stepping monotonically from 138

kHz to 130 kHz over an interval labelled on the horizontal axis as 2ms and returning monotonically from 130 kHz to 138 kHz over what appears to be the same interval. *Id.* "A" points to a frequency step of 138 kHz, "B" points to a frequency step of 134 kHz, and "C" points to a frequency step of 130 kHz. *Id.*

The figure below the stair-step figure illustrates a "sawtooth waveform" crossing a straight line labeled Vfb and drain voltage and current at various times for 138 kHz in a segment labeled "A," for 134 kHz in a segment labeled "B," and 130 kHz in a segment labeled "C." A highlighted portion of the sawtooth waveform reverses from increasing monotonically to decreasing monotonically at successively higher levels above Vfb corresponding to 138 kHz ("A"), 134 kHz ("B") and 130 kHz ("C").

As noted above, Petitioner states that the stair-step figure does not show control voltages, arguing that the stair-step figure shows time on the x-axis and frequency on the y-axis, i.e., how the switching frequency changes over time. Pet. Reply 21; Ex. 2030, 9. Dr. Kelley states that "the voltage level of the Frequency Modulation input at 'A,' corresponds to the level of the primary voltage," noting that "[t]he primary voltage is the trip voltage provided to the oscillator for generating a sawtooth waveform having a frequency of 138 kHz, as shown in the bottom waveform corresponding to 'A.'" Ex. 2014, Kelley Decl. ¶ 65.

In the block diagram on page 1 of the FSD210 datasheet, the internally generated "sawtooth" waveform appears to come from an oscillator (box labelled OSC) that is connected to an element labelled "Frequency Modulation." Ex. 2030, 1. There is no indication in the block diagram, nor does Dr. Kelley cite any description in the FSD210 data sheet,

that informs us how or in what form the "Frequency Modulation" is applied to the oscillator. Dr. Kelley does not state explicitly how he determined that a "trip voltage" is provided to the oscillator for generating a sawtooth waveform at the specified frequencies. Dr. Kelley labels the figure below the stair-step figure a "VCO Output Waveform," but he does not explain how "A" constitutes a trip voltage level or explain where it is measured in the FSD210. Thus, Dr. Kelley's testimony on this point appears to be speculative at best.

We agree with Petitioner that Dr. Kelley's analysis above as to the use of a voltage to generate the specified frequencies is not supported by the stair-step showing only the frequency on the y-axis as a function of time shown on the x-axis. We further find that Dr. Kelley's reference to the figure below the stair-step figure does not provide or explain his testimony concerning a trip voltage operated VCsO.

The implications of the FSD210 datasheet are raised again in the context of Patent Owner's Motion to Amend, in which proposed substitute claim 33 is an amended version of claim 17. Petitioner further notes that Dr. Kelley's testimony concerning the FSD210 as controlling output frequency based on a trip voltage is inconsistent with his testimony in paragraphs 29–31 concerning Habetler, where Dr. Kelley argues that oscillator frequency can be controlled either by voltage or current. Supp. Opp. To Mot. To Amend 9–10.

For these reasons, we are not persuaded that Patent Owner has established a nexus between the FSD210 and the claimed subject matter. Thus, we are not persuaded that Patent Owner has provided sufficient

evidence to support a conclusion that claim 17 and dependent claims 18 and 19 are non-obvious based on objective considerations.

Having determined that the combination of Habetler and Marchio discloses all the limitations of claims 17 and 18, that the combination of Habetler, Mario and Stone disclose all the limitations of claim 19, that a person of ordinary skill would have been motivated to combine the references, and that there is insufficient evidence of objective considerations to support a conclusion of non-obviousness, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 17–19 are unpatentable under 35 U.S.C. § 103.

MOTION TO AMEND

Introduction

In a Motion to Amend, responsive to a ground of unpatentability involved in the trial, a Patent Owner may propose a reasonable number of substitute claims that do not expand the scope of the claim or introduce new matter. 35 U.S.C. § 316(d)(3), 37 C.F.R. § 42.121, *see Aqua Products*, 872 F.3d at 1300–1. A final substantive decision on the patentability of originally issued and amended claims must be based on the entirety of the IPR record, without placing the burden of persuasion on the Patent Owner. *See Aqua Products*, 872 F.3d at 1325–6, 1328.

Patent Owner proposes to substitute claim 33 for claim 17. Proposed substitute claim 33 further limits the step in claim 17 of "cycling one or more secondary voltage sources to generate a secondary voltage which varies over time" to "cycling a counter coupled to one or more [of the] secondary voltage sources to generate a secondary voltage which varies over time." Mot. To Amend 2, 5, 32. Proposed substitute claim 33 also recites

that the switching frequency being varied over time is the switching frequency of the power conversion system. *Id.*

Patent Owner contends that "cycling a counter coupled to one or more voltage sources to generate a secondary voltage which varies over time" is a "narrowing amendment" that is "not disclosed in any reference known to PI." *Id*. at 2 ("[t]his narrowing amendment"), 3 ("[t]he proposed amendments narrow claim 17 by reciting that the 'cycling' is performed by 'a counter coupled to' one or more voltage sources, and by further clarifying that the 'combining' step generates 'the switching frequency of the power conversion system" recited in the claim's preamble).

Petitioner contends that we should deny Patent Owner's Motion to Amend because it is not responsive to a ground of unpatentability involved in the trial. Opp. To Mot. To Amend 1–3. Petitioner notes that Patent Owner proposes the same amendments it proposed in Ex Parte Reexamination 90/008,326 ("the '326 Reexam"), in which a final rejection affirmed by another panel of the Board after remand is now the subject of another appeal to the Federal Circuit. *Id.* at 2. Petitioner further notes that in the '326 Reexam, Patent Owner argued that the language of the proposed amendment was proposed to "*make specific what was implicit or inherent in the scope of the original claims of the '876 patent* as understood by the patent owner and construed by the District Court in concurrent litigation." *Id.* Thus, according to Petitioner, as a clarification of claim 17 rather than a narrowing of claim 17, proposed substitute claim 33 is not responsive to a ground of unpatentability in this trial. *Id.* at 3.

Petitioner's argument on this point is not persuasive. Patent Owner argues that in the reexam it was forced as a practical matter to add the new

language to claim 17, making express subject matter that Patent Owner believed to be implicit or inherent, because the Office disagreed with Patent Owner's position. Reply to Opp. To Mot. To Amend 2. We recognize the inconsistency between Patent Owner's assertion in the '326 Reexam that the new claim language is inherent in the original claim language and its assertion in this proceeding that the new claim language is narrowing. However, the consequences of this inconsistency are not among the issues before us. No one argues that the new claim language enlarges the scope of the claim, as expressly prohibited by the statute. 35 U.S.C. § 316(d)(3). Whether or not proposed substitute claim 33 includes express or inherent features of the original claims, we conclude that based on the evidence and the arguments advanced by the parties, the Motion to Amend addresses the grounds on which we instituted *inter partes* review. Therefore, we decline Petitioner's invitation to deny the Motion to Amend on this basis.

Patent Owner states its asserted level of ordinary skill comports with that asserted by Petitioner's expert Dr. Holberg. Mot. to Amend 10–11. Petitioner does not dispute Patent Owner's contentions as to the level of ordinary skill.

Construction of "coupled to"

Patent Owner provides a table identifying support for each of the claim limitations in original application 09/192,959 ("the '959 Appl."), filed on November 16, 1998. *Id.* at 12–14 (citing Ex. 2021). Petitioner does not dispute that the specification provides written description support for Patent Owner's proposed amendment.

Proposed substitute claim 33 recites that a counter is "coupled to" one or more of the secondary voltages. Patent Owner identifies several portions

of the specification that state the counter is "connected to" the output of the oscillator and the counter outputs are "connected to" a digital-to-analog converter, but the only use of the term "coupled to" is in original claim 1. Patent Owner cannot point to an instance in the specification where the term "coupled to" in proposed substitute claim 33 is otherwise defined or used in the specification.

Patent Owner proposes that, applying the broadest reasonable construction, the term "coupled to" in the expression "cycling a counter **coupled to** one or more secondary voltage sources" should be construed to mean *connected such that voltage, current or control signals pass from one to another*." *Id.* at 4. Petitioner contends that, consistent with all other constructions applied by the Board under the broadest reasonable interpretation standard, we should construe "couple" to mean "to join (electric circuits or devices) into a single electrical circuit." Opp. To Mot. To Amend 5–8.

Patent Owner contends that its proposed construction has been accepted and applied twice by the Federal Circuit to find claims of the '876 Patent valid over the same prior art (Martin and Wang) that is at issue in this proceeding. Reply to Pet.'s Opp. To Mot. To Amend, 3–4 (citing *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.,* 711 F.3d 1348, 1368-69 (Fed. Cir. 2011) ("*Fairchild I*") and *Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc.,* 843 F.3d 1315 (Fed. Cir. 2016) ("*Fairchild II*")). Neither Martin nor Wang is the subject of any of the challenges on which we instituted trial in this *inter partes* review, and the district court does not apply the same broadest reasonable interpretation claim construction that we apply in *inter partes* review.

In *Fairchild I* the Federal Circuit affirmed a jury verdict of non-obviousness on the basis of objective considerations, without explicitly addressing the construction of "coupling." It is worth noting that the Court observed that the Martin patent, which includes an EPROM between the counter and digital-to-analog converter and was cited in the challenged grounds in related proceeding IPR2016-01588, employs "the same principle disclosed in the Power Integrations '876 Patent." *Power Integrations, Inc. v. Fairchild Semiconductor Int'l*, 711 F.3d 1348, 1368 (Fed. Cir. 2013).

In *Fairchild II*, the Federal Circuit characterized an intervening ROM as a decoupling element, stating:

> Martin and Wang [another reference] each disclose a circuit that includes a counter linked to a digital-to-analog converter by way of a ROM. *See* Martin, Fig. 1; Wang at 604. The ROM takes the output of the upstream counter as its input. Martin, 2:22–24; Wang at 604. It then outputs a different, stored value to the digital-to-analog converter. Martin, 2:29–32; Wang at 604. The addition of the ROM thereby ensures that no "voltage, current or control signals pass from" the counter to the digital-to-analog converter. In other words, the ROM "decouples" the counter from the digital-to-analog converter. As such, substantial evidence supports the jury verdict that neither Martin nor Wang anticipates claim 1 or 21. The district court therefore correctly denied Fairchild's JMOL motion.

Power Integrations, Inc. v. Fairchild Semiconductor Int'l, Inc., 843 F.3d 1315, 1329 (Fed. Cir. 2016). *See* Ex. 2018, 19. As discussed further below, Patent Owner's evidence and arguments in this proceeding are conflicted, with Patent Owner arguing that it has always been Patent Owner's position that "coupled to" allows the presence of an intervening elements (Reply to Supp. Opp. To Mot. To Amend 6), but Patent Owner's expert Dr. Kelley testifying

> In every embodiment described in the patent, the counter passes current, voltage, or control signals to the digital to analog converter. For example, each of figures 1 and 6 (portions shown below) of the '876 patent depict the counter 140 and D/A Converter ("DAC") 150 being connected with *no intervening element* that would prevent the counter 140 from passing voltage, current or control signals to the DAC 150. This lack of any such intervening element is consistent with the '876 patent specification, which warns that such "extra components can undesirably increase the size and weight of the power supply and thus the resulting product.

(Ex. 2017, Declaration of Dr. Arthur Kelley In Support of Motion to Amend ("Kelley Mot. To Amend Decl.") ¶ 26 (emphasis added)). In the context of the counter being "coupled to" the secondary voltage sources, Dr. Kelley's testimony appears to assume the absence of intervening elements (at least to the extent that they prevent the counter from passing voltage, current or control signals to the DAC) between the counter and the secondary voltage sources. Dr. Kelley's Declaration In Support Of Patent Owner's Motion to Amend does not specify what, if any, intervening element would not prevent the counter from passing voltage, current or control signals to the DAC, nor what type of signal is a "control signal." Thus, in contrast to *Fairchild II*, it is not clear that the record in this proceeding supports Patent Owner's positions, either as to claim construction or to the application of the facts under Patent Owner's proposed construction.

Petitioner argues that we should apply the same construction we applied in *Semiconductor Components Industries, LLC d/b/a ON Semiconductor v. Power Integrations, Inc.*, Case IPR2015-01588, slip op. at 21 (PTAB Feb. 17, 2017) ("1588 IPR Decision"), in which we did not institute *inter partes* review. In the 1588 IPR Decision, in the context of

claim 1, which is not the subject of this proceeding, after extensive analysis, we declined to adopt Patent Owner's above proposed construction of "coupled to" because, in that proceeding, Patent Owner's construction arguments were not based on the claimed structure that the counter is coupled to the DAC, or on breaking the control function, but on an effort to exclude from the claim only certain unspecified transformations of control signals. 1588 IPR Decision at 21. We noted, for example, that as applied by Patent Owner, some intermediate elements that transform the counter output, such as by inverting and scaling, would satisfy the claim limitation while other intermediate elements, such as a counter connected to a memory that performs the exact same functions, would not satisfy the claim limitation. *Id.* at 20–21. Declining to apply Petitioner's proposed construction as well, we applied the same dictionary-based construction applied by another panel of this Board in a reexamination of the '876 Patent and construed "couple" to mean "to join (electric circuits or devices) into a single electrical circuit" because this construction is not encumbered by functional limitations recited elsewhere in claim 1. *Id.* at 22 (citing *Ex parte Power Integrations, Inc.*, Appeal 2010-011021 (PTAB Dec. 22, 2010)). As we noted in our Decision to Institute, that same panel of the Board applied this same construction after remand by the Court of Appeals for the Federal Circuit to consider whether a construction of this term by a district court, which does not apply the broadest reasonable construction, is consistent with the broadest reasonable interpretation of "coupled." 1588 IPR Decision at 16–18; Ex. 1027. That matter is now on appeal. *See* Ex. 1034.

Until Patent Owner introduced the term "coupled to" in proposed amended claim 33, the construction of this term was not at issue in this

proceeding. Having added "coupled to" to the claims in this proceeding, Patent Owner now argues that our construction in the 1588 IPR Decision is overly broad because: (i) "coupled" already requires that the components be in the same circuit to be operable (Mot. To Amend 5–6), (ii) proposed claim 33 includes language that already requires the counter and secondary voltage sources be in the same circuit "to generate a secondary voltage" (*id.* at 6), (iii) in view of every disclosed embodiment, the specification of the '876 Patent makes clear that "coupled" requires more than the elements simply be in the same circuit, i.e., "Figs. 1 and 6 [] depict the counter 140 and DAC 150 being connected such with no intervening element that would prevent the counter 140 from passing voltage, current or control signals to the DAC 150" (*id.* at 6–8); (iv) the presence of an EPROM between the counter output and the DAC "decouples" the counter and the DAC (*id*. at 8–9); and (v) the coupling between the counter and the secondary voltage sources enables the counter, not some other element, to control the voltage sources (*id*. at 9–10).

As we noted in the 1588 IPR Decision, the term "coupled to" is not used, and therefore is not defined, in the '876 Patent Specification. Referencing Figure 1, the '876 Patent states

> [t]he outputs of the counter 140 are *provided to* a series of frequency jittering current sources 150. The outputs of the series of frequency jittering current sources 150 are presented to the primary oscillator 110 to vary its frequency, as will be described below.

Ex. 1001, 4:34–39; Ex. 2021, 14:9–13[8] (emphasis added). Noting that outputs Q1–Q3 of the counter are not used, the description of Figure 1 further states

> [t]he remaining outputs Q4–Q7 are *connected to* a digital-to-analog (D-to-A) converter 150, which may be implemented as a series of frequency jittering voltage sources or current sources.

Ex. 1001, 4:63–66; Ex. 2021, 14:35–15:3 (emphasis added). Thus, the '876 Patent and the cited application describe the outputs of the counter as being "provided to" the frequency jittering current sources, in a configuration where they "are connected to" the D-to-A converter. However, proposed substitute claim 33 is not limited to a configuration in which the outputs of counter "are connected to a digital to analog (D-to-A) converter" as described in the specification.

Applying the broadest reasonable interpretation, we cannot ignore the distinction between the expression "coupled to" as proposed by Patent Owner, and the term "connected to" as used in the specification, but not used by Patent Owner in proposed substitute claim 33. We determine that "connected to" precludes an intermediate element in the structure, while "coupled to" is a broader term that does not preclude an intermediate element. Indeed, notwithstanding the testimony of its own expert noted above, Patent Owner does not argue that "coupled to" precludes an intermediate element, but instead argues only that there can be no intervening element that would prevent counter 140 from passing voltage, current or control signals to the DAC 150 (Mot. To Amend 6–8), such that the coupling between the counter and the secondary voltage sources enables

[8] Page numbers refer to the page numbers of Exhibit 2021.

the counter, not some other element, to control the voltage sources (*id.* at 9–10). The problem with Patent Owner's formulation of the issue is that, in the absence of a direct connection, there is no definition or description in the '876 Patent of what it means for the counter and not some other element to control the voltage sources.

Patent Owner argues that it "has clearly and consistently asserted that the term 'coupled' allows intervening components so long as they do not break the control relationship between the counter and the secondary voltages (e.g., the DAC)." Reply toOpp. To Mot. To Amend 7. Nevertheless, according to Patent Owner an EPROM with address inputs connected to the counter that, just like the counter, provides a constant and unchanging digital input to the DAC unless and until the counter output changes, somehow "breaks" or "decouples" the control relationship between the counter and the DAC. *Id.*

To the extent that "coupled to" has any meaning at all in this context, neither the '876 Patent nor Patent Owner has defined it. Patent Owner does not distinguish intervening elements that prevent the counter from passing control signals to the DAC from those that do not. In much the same way as we discussed in the 1588 IPR Decision, in this proceeding Patent Owner attempts to incorporate into proposed method claims a seemingly structural limitation that does not limit the claim meaningfully in any way.

For example, citing the description at column 5, lines 49–56 of the '876 Patent that "[t]he counter 140 drives a plurality of current sources to inject additional current to the main current source 122 such that the frequency of the primarily [sic] oscillator is varied," Patent Owner argues that "[t]his is different from other systems, like the prior art, where changes

to the counter do not impact the switching frequency unless an intervening memory is programmed in a certain way." Mot. To Amend 8 (citing Ex. 2017, Declaration of Dr. Arthur Kelley in Support of Motion to Amend ("Kelley Mot. To Amend Decl.") ¶ 26). In prior art systems, such as that cited by Patent Owner, it is not the memory that controls changes to the switching frequency. It is the state of the counter that causes a change to the switching frequency. The intermediate memory is a passive element —it never acts by itself. The intermediate memory does not "break" or "decouple" the control of the D-A converter exercised by the counter. The intermediate memory does change or pass a control signal to the D-A converter unless and until the counter output changes. That the memory is programmed to change the input to the D-A converter in a manner specified by the circuit designer does not change the fact that the voltage or current supplied to the D-A converter is controlled by the output of the counter. Thus, arguably, even under Patent Owner's description, notwithstanding the presence of the EPROM, the counter is "coupled to" the D-A converter because there is no intervening element that prevents the counter from passing control signals to the D-A converter, i.e., the counter is coupled to the D-A converter to control the D-A converter's output. The memory simply provides the D-A converter the signal it is programmed to provide when commanded to do so by the counter.

Neither party argues that the term "coupled to," which appears in claim 1 of the earliest application cited by Patent Owner in support of the Motion to Amend, is indefinite. However, in view of the uncertainties in Patent Owner's construction, we decline to adopt Patent Owner's construction and adopt instead the dictionary-based construction previously

applied by the Board in the '326 Reexam and in the IPR1588 Decision, i.e., we construe "couple" to mean "to join (electric circuits or devices) into a single electrical circuit." We further note that the "coupling" as recited in proposed substitute claim 33 is between the counter and the secondary voltage sources. Thus, although neither the claim nor the specification requires that the coupling be in the form of series, parallel or other circuit of any particular type, for purposes of the proposed substitute claim addressed in this Decision, the coupling requires that the claimed "cycling of the counter coupled to one or more of the secondary voltage sources" must influence the secondary voltage sources.

Nevertheless, as discussed further below, however, based on the evidence in this proceeding, we would reach the same conclusion as to unpatentability under either the construction that we now adopt again or under Patent Owner's construction.

Proposed Substitute Claim 33

In a Motion to Amend, based on the entirety of the IPR record, we assess the patentability of proposed substitute claims without placing the burden of persuasion on the patent owner. *Aqua Products*, 872 F.3d at 1325–6, 1328. In its Supplemental Opposition to Patent Owner's Motion to Amend, Petitioner relies upon arguments it made in its initial Opposition to Patent Owner's Motion to Amend (Paper 32) that, under the proper construction of "coupled to," Habetler anticipates proposed claim 33. Supp. Opp. to Mot. To Amend 1. For this reason, we discount Patent Owner's assertion that Petitioner's Supplemental Opposition "does even attempt to refute Patent Owner's assertions regarding claim 33 appearing in Patent

Owner's Reply to Petitioner's Opposition to the Motion to Amend." Reply to Supp. Opp. To Mot. To Amend, 1–2.

As discussed above, a primary difference between claim 17 and proposed substitute claim 33 is that proposed substitute claim 33 recites that the counter is "coupled to" one or more of the secondary voltage sources to generate the variable secondary voltage. Proposed substitute claim 33 does not recite how the counter is coupled to the one or more secondary voltage sources.

In support of its contention that Habetler anticipates proposed substitute claim 33 and that claim 33 would have been obvious over the combination of Habetler and Marchio, Petitioner provides claim charts similar to those provided in the Petition. Opp. To Mot. To Amend 14–22. All of the elements, except the newly added counter limitation, were addressed previously in this Decision. As to the newly added limitation concerning the counter, Petitioner provides annotated Figure 5 of Habetler showing the counter is joined in a circuit with the DAC by electrical coupling between the counter and the DAC and notes that Habetler's ROM stores a series of values that the DAC converts into a voltage. *Id.* at 15–16. Thus, we agree that Petitioner has demonstrated that Habetler discloses all the limitations of proposed substitute claim 33.

We are also persuaded by Petitioner's argument that the combination of Habetler and Marchio discloses all the elements of proposed substitute claim 33. Opp. To Mot. To Amend 18–22. Marchio discloses a circuit that does not include Habetler's EPROM, directly coupling the counter to the DAC. *Id.* at 20. Petitioner notes that a person of ordinary skill would have been motivated to combine the teachings of Habetler and Marchio because

Habetler's ROM applies either random or periodic jitter and using Marchio's signal generator in Habetler without the ROM implements a periodic jitter, as one embodiment contemplated by Habetler. *Id.* at 19–20. We note that Habetler's description of Figure 5 states that "any type of noise can be implemented, including periodic noise." Ex. 1019, 4. Petitioner provides claim charts demonstrating that all the limitations of proposed substitute claim 33 are disclosed by the combination of Habetler and Marchio. Opp. To Mot. To Amend 13–14, 16–18, 21–22; Supp. Opp. To Mot. To Amend 1–2, 4–5,

Even applying Patent Owner's construction, based on the record in this proceeding, we arrive at the same conclusions. Patent Owner's use of the term "coupled to" in proposed substitute claim 33, as opposed to "connected to" as used in the '876 Patent, does not exclude the use of an intervening memory, rendering the last part of Patent Owner's argument (unless an intervening memory is programmed in a certain way) ineffective at distinguishing proposed claim 33 from the prior art. As discussed above, Patent Owner's citation to Dr. Kelley's testimony concerning the direct connection between the counter and the secondary voltage sources is inconsistent with Patent Owner's argument that it has clearly and consistently argued that "coupled to" allows intervening components so long as they do not break the "control relationship between the counter and the secondary voltages (e.g., the DAC)." Moreover, Dr. Kelley's testimony concerning the "control relationship" supports a conclusion that Habetler discloses all the limitations of proposed substitute claim 33. Dr. Kelley testifies that "the invention's purpose was to create a jitter circuit that varied the switching frequency around a target in a cyclical predictable manner that

minimizes the need for large, external components." Ex. 2017, Kelley Mot. To Amend Decl. ¶ 26. Although a "cyclical predictable manner" and minimization of large, external components are not features recited explicitly in proposed substitute claim 33, Dr. Kelley's testimony and the claim language "cycling a counter" is significant as to the "control relationship" Patent Owner argues is determinative. As Habetler illustrates, the use of an EPROM responsive to a counter satisfies the very goal identified by Dr. Kelley because the EPROM is a simple look-up table whose output is not only highly predictable, it is predetermined absolutely by the memory's programming, i.e., for every output of the counter during its cycle, the voltage or current provided by the memory to the DAC is the same every time that count is reached. If the counter's output does not change, the voltage or current to the DAC does not change. The DAC responds to changes in the output of the counter. Habetler discloses a circuit consistent with Dr. Kelley's testimony that "[t]o achieve this goal, a circuit is provided in which the counter's output controls the digital to analog converter to thereby vary the switching frequency." Ex. 2017, Kelley Mot. To Amend Decl. ¶ 26. Thus, a preponderance of the evidence in this proceeding supports a conclusion that Habetler anticipates proposed substitute claim 33, or that claim 33 would have been obvious over the combination of Habetler and Marchio, which illustrates a direct connection, even under Patent Owner's proposed construction.

Our conclusion concerning Habetler and claim 33 is consistent with the Federal Circuit's analysis in *Fairchild I* in which the court stated that another reference, Martin, which uses an intervening EPROM between the counter and the digital to analog converter, employs "the same principle

disclosed in the Power Integrations '876 Patent." *Power Integrations v. Fairchild*, 711 F.3d at 1368.

In consideration of the above, we deny Patent Owner's Motion to Amend as to proposed substitute claim 33 because a preponderance of the evidence demonstrates that proposed substitute claim 33 is anticipated under 35 U.S.C. § 102 by Habetler and unpatentable under 35 U.S.C. 103 as obvious over the combination of Habetler and Marchio.

Proposed Substitute Claim 34

Proposed substitute claim 34, which depends from proposed substitute claim 33, recites the additional limitation of "clocking a counter with the output of the oscillator." In its Supplemental Opposition to Patent Owner's Motion to Amend, Petitioner contends that proposed substitute claim 34 is anticipated by Habetler. Supp. Opp. To Mot. To Amend, 1–2. Petitioner explains that Habetler's triangle generator and peak detector form a voltage controlled oscillator that is used to clock Habetler's counter. *Id.* Patent Owner contends that Petitioner fails to establish that the output of Habetler's peak detector is an oscillator output or that the combination of Habetler's triangle generator and peak detector is a voltage controlled oscillator. Reply to Supp. Opp. To Mot. To Amend 3–4.

As we discussed earlier in this Decision, the dispositive question is "whether one skilled in the art would reasonably understand or infer" that a reference teaches or discloses all of the elements of the claimed invention. *In re Baxter Travenol Labs.*, 952 F.2d at 390. In our earlier analysis of the record evidence concerning Petitioner's challenge to original claim 17, we found that in view of Habetler's explicit disclosure and Habetler's use of identical notation in Figures 4 and 5, Figure 5 of Habetler illustrates a

summing block, and that a person of ordinary skill reasonably would infer the use of a well-known voltage summing amplifier to implement this function to supply a control voltage to Habetler's triangle wave generator, i.e., Habetler discloses a VCO. Habetler illustrates the output of the triangle wave generator connected to the peak detector to provide a clock signal to the counter. Ex. 1019, Fig. 5. Thus, we are persuaded that the evidence of record demonstrates all the limitations of proposed substitute claim 34 are disclosed by Habetler.

Relying on arguments advanced in its Opposition to Patent Owner's Motion to Amend concerning the combination of Habetler and Marchio relative to proposed substitute claim 33, Petitioner also contends that proposed substitute claim 34 is unpatentable over the combination of Habetler and Marchio. Supp. Opp. To Mot. To Amend, 2. Patent Owner argues that Petitioner ignores arguments in Patent Owner's Motion to Amend that it would not have been obvious to combine Habetler and Marchio because Habetler does not actually disclose "periodic embodiments." Reply to Supp. Opp. To Mot. To Amend 4 (citing Mot. To Amend 11–12). As noted above, however, Habetler's description of Figure 5 states that any type of noise, including periodic noise, can be implemented. Ex. 1019, 4. Thus, we are persuaded that the evidence of record demonstrates that all the limitations of proposed substitute claim 34 are disclosed by the combination of Habetler and Marchio.

Proposed Substitute Claim 35

Proposed substitute claim 35 depends from proposed substitute claim 33 and recites that "the primary voltage is V and each of the secondary voltage sources generates a supplemental voltage lower than V, further

comprising passing the supplemental voltage to the voltage-controlled oscillator." The language of proposed substitute claim 35 mirrors that of original claim 19 previously discussed in this Decision. As with claim 19, Petitioner contends that proposed substitute claim 35 is unpatentable over the combination of Habetler, Marchio, and Stone and advances similar arguments that a person of ordinary skill would have been motivated to adapt Habetler's primary and secondary voltages to achieve a narrow jitter frequency range as taught by Stone. Supp. Opp. To Mot. To Amend 3–7. Patent Owner argues that Petitioner's assertions are based on hindsight. Reply to Supp. Opp. To Mot. To Amend 5. We addressed the substance of the issues in our discussion of claim 19 and, for the same reasons, we find that the record supports a conclusion that a person of ordinary skill would have been motivated to combine the teachings of Habetler, Marchio, and Stone and that the combination discloses all the limitations of proposed substitute claim 35.

Objective Considerations

Petitioner notes that Patent Owner's evidence of secondary considerations for claim 17, to be replaced by substitute claim 33, concerns Patent Owner's contention that the Fairchild FSD210 product embodies the claim. Supp. Opp. to Mot. To Amend 8–9. Citing Dr. Kelley's purported misapplication of the stair-step figure in the FSD210 data sheet (Ex. 2030, 9), Petitioner argues that Patent Owner does not explain why Dr. Kelley cites the stair-step frequencies shown in the figure to indicate the use of control voltages, when in the context of the Habetler, Dr. Kelley argued it was not possible to determine whether the implementation uses voltages or currents. *Id*. at 9–10. Patent Owner contends that Petitioner engages in

"sleight of hand" by discussing only the stair-step figure and not the figure below it on the FAD210 datasheet. Reply to Supp. Opp. To Mot. To Amend 6–7. According to Patent Owner, upon viewing the lower figure, "one sees that the change in frequency corresponds to a change in the voltage trip point of the oscillator." *Id.* at 7. We addressed this issue in our analysis of claim 17, where we determined that Dr. Kelley's testimony does not explain why or how he concludes that the FSD210 is a voltage based oscillator. Patent Owner's arguments in the Motion to Amend add no new information from which we can reach a different conclusion. Thus, we conclude that on the current record, there is insufficient evidence for us to find a nexus between the FSD210 and any of the proposed substitute claims.

Conclusion

In view of the above, we conclude on the basis of all the evidence of record that proposed substitute claims 33 and 34 are anticipated under 35 U.S.C. § 102 by Habetler and would have been obvious under 35 U.S.C. § 103(a) over the combination of Habetler and Marchio. We further conclude that proposed substitute claim 35 is unpatentable under 35 U.S.C. § 103(a) over the combination of Habetler, Marchio and Stone.

In consideration of the above, Patent Owner's Motion to Amend is denied.

MOTION TO EXCLUDE

Petitioner moves to exclude the Declaration of Mr. David Matthews (Ex. 2023), whom Patent Owner presents as a fact witness, for the following reasons: (i) Mr. Matthews' testimony is inadmissible under FRE 602 because it fails to establish that he has the requisite personal knowledge to testify competently on the subject he addresses (Mot. To Exclude 2); (ii) Mr.

Matthews' testimony is inadmissible under FRE 702 to the extent he strays into areas of expert testimony for which he is not qualified (*id*. at 2–3), and (iii) Mr. Matthews' testimony is inadmissible as hearsay under FRE 802 to the extent that he refers to statements or thoughts of customers or refers to testimony of others in prior litigation, or refers to statements by unidentified third parties (*id*. at 3–6). As discussed herein, the evidence of record does not demonstrate the requisite nexus between the subject matter of the remaining challenged claims and the alleged objective or secondary considerations. Thus, we have not considered the implications of Mr. Matthews' testimony and we dismiss Petitioner's Motion to Exclude Ex. 2023 as moot.

Petitioner moves to exclude Exhibits 2024, 2025, 2026, 2027, and 2029 for various reasons. This Decision does not cite to any of these exhibits. Therefore we dismiss Petitioner's Motion to Exclude Exhibits 2024, 2025, 2026, 2027, and 2029 as moot.

STATUTORY BAR UNDER 35 U.S.C. § 315(b)

Patent Owner asserts this Petition is time-barred under 35 U.S.C. § 315(b). PO Resp. 52. Under § 315(b), "[a]n inter partes review may not be instituted if the petition requesting the proceeding is filed more than 1 year after the date on which the petitioner, real party in interest, or privy of the petitioner is served with a complaint alleging infringement of the patent." Our rules implementing this statutory requirement provide that:

> A person who is not the owner of a patent may file with the Office a petition to institute an *inter partes* review of the patent unless: . . . (b) The petition requesting the proceeding is filed more than one year after the date on which the petitioner, the

> petitioner's real party-in-interest, or a privy of the petitioner is served with a complaint alleging infringement of the patent.

37 C.F.R. § 42.101.

On November 18, 2015, Petitioner entered into the Merger Agreement with Fairchild Semiconductor International, Inc. ("Fairchild"). Prelim. Resp. 6; Ex. 2018; Ex. 2025. The Petition was filed on August 11, 2016. The merger was completed five weeks later, on September 19, 2016. Ex. 1054; Paper 9 (Petitioner's Revised Mandatory Notices).

Patent Owner argues institution of this *inter partes* review is barred because Fairchild, now a real party in interest having merged with Petitioner, was served with a complaint more than one year prior to *institution* of this Petition. PO Resp. 52–60. Petitioner responds that "there is no evidence that any party, that would be barred under 35 U.S.C. § 315(b), was a real party in interest, or a privy of Petitioner, on or at any time before the filing date of the Petition." Pet. Reply 26. Petitioner also points out that Patent Owner points to no new evidence or arguments that were not considered and rejected in the Institution Decision. *Id.*

Petitioner maintains that "Fairchild has had no role in the decision to file the Petition, the content of the Petition, or the preparation of this Petition [and] . . . did not contribute in any manner to the funding for this Petition." Pet. 2. Thus, Petitioner contends, Fairchild "is not a real party in interest or a privy of any petitioner." *Id.*

For the reasons presented by Petitioner, we are not persuaded that the Petition should be barred under 35 U.S.C. § 315(b). Panels of the Board have interpreted this statute (and associated rule 37 C.F.R. § 42.101(b)) to mean, "it is only privity relationships up until the time a petition is filed that

matter." *Synopsys, Inc. v. Mentor Graphics Corp.*, Case IPR2012-00042, slip op. at 12 (PTAB Feb. 19, 2014) (Paper 60); *see also ARRIS Group, Inc. v. TQ Delta LLC*, Case IPR2016-00430, slip op. at 6 (PTAB July 1, 2016) (Paper 9). We agree with the reasoning of those decisions.

Patent Owner argues nothing in the statute "implies when privity/RPI status must exist, and general rules of statutory construction indicate that the present includes the future." PO Resp. 53. According to Patent Owner, the "decision point" is the date of institution, not the date of filing. *Id.* at 54. Under Patent Owner's interpretation, we should have denied institution of this Petition because Fairchild, barred under § 315(b), became a real party in interest on September 19, 2016 —several months before our Decision on Institution was entered on February 17, 2017. *Id.* at 53. Patent Owner concedes that it is unaware of any decisions addressing this particular issue. *Id.* at 54.

We are not persuaded by Patent Owner's argument that the result we reached in our Institution Decision is "contrary to statute." PO Resp. 53. We do not perceive any such inconsistency. The statute in question, 35 U.S.C. § 315(b), suggests that privity must exist at the time the complaint was served. There is no allegation of privity at the time the complaint was served on Fairchild, in 2009, or that Petitioner controlled or could have controlled the lawsuit between Fairchild and Patent Owner. *See Aruze Gaming Macau, Ltd. v. MGT Gaming, Inc.*, Case IPR2014-01288, 2015 WL 780607, at *8 (PTAB Feb. 20, 2015) ("In the context of § 315(b), the goal of the preclusion is to prevent successive challenges to a patent by those who previously have had the opportunity to make such challenges in prior

litigation. As such, the focus of our privity inquiry is on the relationship between the parties *during the prior lawsuit*.").

Although not the exclusive factor for establishing privity, control of the requested review procedure is an important factor. Our *Office Patent Trial Practice Guide* explains that "[w]hether a party who is not a named participant in a given proceeding nonetheless constitutes a . . . 'privy' to that proceeding is a highly fact-dependent question." *Office Patent Trial Practice Guide*, 77 Fed. Reg. 48,756, 48,759 (Aug. 14, 2012). "There are multiple factors relevant to the question of whether a non-party may be recognized as a . . . 'privy.'" *Id.* "A common consideration is whether the non-party exercised or could have exercised control over a party's participation in a proceeding." *Id.* However, it is recognized that there is no definitive test regarding the degree of participation required to establish such control and, hence, to establish a privity relationship. *Id.*

In *ARRIS*, the panel determined that patent owner's evidence of an agreement of a future merger was insufficient to show any degree of control over the requested review procedure or even the opportunity to do so. *ARRIS*, IPR2016-00430, slip op. at 7 (Paper 9). Here, we are not persuaded, on the record presented, that Patent Owner's assertions regarding the merger, which was not yet completed at the time of filing this Petition, are sufficient to demonstrate the opportunity for control by Fairchild over this proceeding.

We are similarly unconvinced by Patent Owner's assertion that the result reached is "inconsistent with doctrines of claim preclusion and issue preclusion." PO Resp. 54–57. Patent Owner asserts "prior panels have not considered the interaction of federal preclusion principles with the timing

issue: as noted by the Federal Circuit in *Kloster Speedsteel*, preclusion can arise *after* a complaint is filed." *Id.* at 57 (citing *Kloster Speedsteel AB v. Crucible Inc.*, 793 F.2d 1565, 1583 (Fed. Cir. 1986)). Patent Owner concludes, "[t]his strongly supports that preclusion under 35 U.S.C. § 315(b) should not be limited to the filing date of the petition. Since barred party Fairchild is now an admitted RPI, and was so before institution, this action should be dismissed." *Id.*

We are unconvinced that *Kloster* is apposite here. As Patent Owner recognizes, the preclusion issue in *Kloster* arose in a different setting. Kloster was seeking relief from the scope of an injunction resulting from a judgment of infringement entered by a district court judge against a company it acquired. *Kloster*, 793 F.2d at 1583. The decision turned on the specific language of the injunction entered by the district court, which by its terms applied to "successors in interest and assigns." *Id.* at 1581. Thus, *Kloster* does not address the issue before us, which involves the interpretation of § 315(b) and the determination of whether the time bar applies based on the relationship of the parties to an action after the filing of a petition.

The district court decision in *Astrazeneca UK Ltd. v. Watson Laboratories, Inc.*, 905 F. Supp.2d 596 (D. Del. 2012), relied on by Patent Owner (PO Resp. 64), does not bind this panel; and even if it did, it would not be persuasive on the issue for which it is cited. *Astrazeneca* stands for the proposition that a successor in interest may be precluded from re-litigating in a district court issues already decided in a district court's final judgment. *Astrazeneca*, 905 F.Supp.2d at 603. It sheds no light on the question of whether Petitioner here should be time-barred under § 315(b).

Furthermore, we are not persuaded by Patent Owner's argument that "Fairchild is now an admitted RPI, and was so before institution." PO Resp. 57. This real party in interest argument is separate and apart from the "privity" argument, discussed *supra*. *Aruze Gaming*, 2015 WL 780607, at *5–*6. Although Petitioner admits that Fairchild became a real party in interest after the Petition was filed, Patent Owner provides no persuasive evidence that Fairchild was a real party in interest *before* the Petition was filed. Nor does Patent Owner provide any authority for the proposition that adding a real party in interest post-filing, even one that may have been barred under § 315(b), must result in termination of the *inter partes* review. *See Lumentum Holdings, Inc. v. Capella Photonics, Inc.*, IPR2015-00739, slip op. at 5 (PTAB Mar. 4, 2016) (Paper 38) (precedential) ("The Board's rules further make clear that jurisdiction is not 'lost' the moment a petition no longer identifies 'all real parties in interest,' as required by § 312(a)(2).").

Finally, Patent Owner argues ON Semiconductor filed this Petition "as a proxy for Fairchild." PO Resp. 57–60. This is a new theory that was not presented in the Preliminary Response or in support of Patent Owner's proposed motion in another proceeding seeking broad discovery into the details of the proposed transaction between ON and Fairchild. *ON Semiconductor Corp. v. Power Integrations, Inc.*, Case IPR2016-00809, slip op at 15 (PTAB Sep. 22, 2017)(paper 67, Final Written Decision).[9]

[9] Patent Owner's earlier request for additional discovery in IPR2016-00809 was based on alleged *privity* between Petitioner and Fairchild and did not raise the issue of a *proxy* relationship. *See* IPR809, Ex. 2034. Furthermore, that request was denied because, *inter alia*, Patent Owner failed to provide any evidence, other than mere speculation, that such privity existed. *Id.*,

Patent Owner presents no persuasive evidence to support a conclusion that Petitioner was acting as a proxy for Fairchild when the Petition was filed. Patent Owner provides no evidentiary support for its contention that the twelve petitions filed by Petitioner demonstrate that Petitioner was acting as a proxy.

Another panel has determined a proxy to be a "nominal plaintiff" with "no substantial interest" in the IPR proceeding other than that of its proxy "client." *RPX Corp. v. VirnetX, Inc.*, IPR2014-00171, slip op. at 9 (PTAB July 14, 2014) (Paper 57). In *RPX*, the panel determined that petitioner RPX had no interest in that *inter partes* review proceeding other than that of its underlying proxy client. *See id.* at 4–11. Those are not the facts before us here. Petitioner's multi-billion dollar merger, pending at the time of filing, gave Petitioner a clear interest, independent of Fairchild's, in filing this Petition as well as the others mentioned by Patent Owner. We determine that the "public evidence" relied upon by Patent Owner is insufficient to demonstrate a proxy relationship such that Petitioner was a proxy for Fairchild in filing the Petition.

Accordingly, we determine that 35 U.S.C. § 315(b) does not bar this petition from institution of *inter partes* review.

MOTION TO SEAL

Patent Owner moves for entry of a protective order (Paper 26) different from the Board's Default Protective Order in that it limits the designation of in-house counsel to no more than two individuals. Paper 26,

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Paper 24, 4. The request for additional discovery was not renewed in this proceeding.

Ex. 2033. Patent Owner also moves to seal Exhibit 2032 because it contains confidential schematics for Patent Owner's TNY256 chip ("TinySwitch"). Paper 25, Patent Owner's Revised Motion to Seal ("Mot. To Seal"). Patent Owner notes that disclosure of Exhibit 2032 is likely to cause significant harm to Patent Owner by granting access to highly sensitive and proprietary technical information. Patent Owner's Motions are unopposed.

As the Motion for Entry of a Protective Order and the Motion to Seal are unopposed, they are both GRANTED. Because we do not discuss the details of the TinySwitch schematics, we see no need to seal this Decision.

CONCLUSION

In consideration of the above, Petitioner has demonstrated by a preponderance of the evidence that:

Challenged claims 14 and 16 are unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Dobkin and Stone;

Challenged claim 15 is unpatentable under 35 U.S.C. § 103(a) obvious over the combination of Dobkin, Stone and Manlove;

Challenged claims 17 and 18 are unpatentable under 35 U.S.C. § 102 as anticipated by Habetler;

Challenged claims 17 and 18 are unpatentable as under 35 U.S.C. § 103(a) as obvious over the combination of Habetler and Marchio; and

Challenged claim 19 is unpatentable under 35 U.S.C. § 103(a) as obvious over the combination of Habetler, Marchio and Stone.

As to Patent Owner's Motion to Amend, we conclude the preponderance of the evidence demonstrates that:

Proposed substitute claims 33 and 34 are anticipated under 35 U.S.C. § 102 by Habetler;

Proposed substitute claims 33 and 34 would have been obvious under 35 U.S.C. § 103(a) over the combination of Habetler and Marchio; and

Proposed substitute claim 35 would have been obvious under 35 U.S.C. § 103(a) over the combination of Habetler, Marchio, and Stone.

ORDER

In consideration of the above, it is

ORDERED that claims 14–19 are unpatentable;

FURTHER ORDERED that Patent Owner's Motion to Amend is DENIED;

FURTHER ORDERED that Patent Owner's Motion For Entry of Protective Order executed by the parties is GRANTED;

FURTHER ORDERED that Patent Owner's Unopposed Motion to Seal Exhibit 2032 is GRANTED; and

FURTHER ORDERED, that because this is a final written decision, parties to the proceeding seeking judicial review of the decision must comply with the notice and service requirements of 37 C.F.R. § 90.2.

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