

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

SAMSUNG DISPLAY CO., LTD; SAMSUNG ELECTRONICS CO., LTD.; and
SAMSUNG ELECTRONICS AMERICA, INC.,
Petitioner

v.

POLARIS POWERLED TECHNOLOGIES, LLC,
Patent Owner

Case IPR2023-00771
U.S. Patent No. 7,259,521

PATENT OWNER'S SUR-REPLY

Mail Stop "PATENT BOARD"
Patent Trial and Appeal Board
U.S. Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450

TABLE OF CONTENTS

I.	INTRODUCTION	1
II.	GROUND 1 AND 2: KIM DOES NOT DISCLOSE OR RENDER OBVIOUS A VIDEO DRIVER THAT GENERATES THE CLAIMED VIDEO DRIVE SIGNAL.	3
A.	The Reply misrepresents the POR’s discussion of video drivers and generating a video drive signal.....	3
B.	Kim’s pixel circuit does not “ <i>generat[e] a video drive signal.</i> ”	4
C.	Kim’s pixel circuit is not a video driver.....	6
D.	Drawing a bigger box to include Kim’s data driver 300 does not address Kim’s shortcomings.	8
E.	Petitioner’s argument regarding variations in the positive power supply voltage over time is self-contradictory.	10
III.	GROUND 3: HAYAFUJI DOES NOT ANTICIPATE CLAIMS 1 OR 2.	10
A.	Limitation [1-A]: Hayafuji does not disclose a video drive signal that is referenced to the positive power supply voltage.	10
B.	Limitation [1-C]: Hayafuji does not disclose a current drive voltage that is independent of the positive power supply voltage.	12
C.	Claim 2: Hayafuji’s video drive signal is not indicative of the sum or difference between the power supply voltage and the video signal....	14
IV.	GROUND 4: HAYAFUJI DOES NOT RENDER OBVIOUS CLAIMS 1, 2, 3, OR 5.....	15
A.	Petitioner’s proposed modifications to Hayafuji would not have been obvious.	15
B.	The Board should not consider Petitioner’s impermissible new Reply arguments and should reject them because they are based on impermissible hindsight.	16
C.	Dr. Kattamis’s supplemental declaration mischaracterizes his deposition testimony.	18
D.	Hayafuji does not render obvious a current mode isolator circuit.	19
V.	GROUND 5: STEER DOES NOT RENDER OBVIOUS CLAIMS 1-3.	20
A.	Steer’s alleged video drive signal is based on the feedback current and therefore not referenced to the positive power supply voltage.	20

B.	Steer's alleged video driver provides non-unity gain and, therefore, the alleged video drive signal is not referenced to the positive power supply voltage.....	22
VI.	CONCLUSION.....	22

PATENT OWNER'S EXHIBIT LIST

Exhibit No.	Description
2001	Declaration of Thomas L. Credelle
2002	<i>Curriculum Vitae</i> of Thomas L. Credelle
2003	R. Dawson, et al., "The impact of the transient response of organic light emitting diodes on the design of active matrix OLED displays," IEEE ELEC. DEV. MTG. DIGEST (1998) ("Dawson")
2004	Declaration of Andrew G. Hamill in Support of Motion for <i>Pro Hac Vice</i> Admission
2005	Kim et al, "A 10-bit Linear R-string DAC Architecture for Mobile Full HD AMOLED Driver ICs," SID DIGEST OF TECHNICAL PAPERS (2013)
2006	Excerpts from Cristaldi, Liquid Crystal Display Drivers, Springer (2009)
2007	Excerpts from Tusujimura, OLED Displays, Fundamentals and Applications, Wiley (2012)
2008	Introduction to DDIC (Display Driver IC), Utmel Electronic, accessible at https://www.utmel.com/blog/categories/integrated%20circuit/introduction-to-ddic-display-driver-ic (last accessed January 22, 2024)
2009	AMOLED DDIC-SR6541, Square Route, accessible at https://squareroute.co.jp/square-route/amoled-ddic-sr6541/ (last accessed January 22, 2024)
2010	Onoyama, "0.5-inch XGA Micro-OLED Display on a Silicon Backplane with High-Definition Technologies," SID DIGEST OF TECHNICAL PAPERS (2012)
2011	Second Declaration of Thomas L. Credelle
2012	Transcript of January 19, 2024 Deposition of Alex Z. Kattamis, Ph.D., P.E.

Exhibit No.	Description
2013	Supplemental Declaration of Thomas L. Credelle (<i>served not filed</i>)
2014	Complete copy of Cristaldi, Liquid Crystal Display Drivers, Springer (2009) (EX2006) (<i>served not filed</i>)
2015	Complete copy of Tusujimura, OLED Displays, Fundamentals and Applications, Wiley (2012) (<i>served not filed</i>)
2016	Supplemental Declaration of Andrew G. Hamill (<i>served not filed</i>)
2017	Transcript of June 4, 2024 Deposition of Alex Z. Kattamis, Ph.D., P.E.

I. INTRODUCTION

The Board should find claims 1-5 and 7 of U.S. Patent No. 7,259,521 (“the ’521 patent,” EX1001) patentable. All of Petitioner’s proposed grounds are deficient.

First, Petitioner incorrectly argues that, in the Kim reference, the pixel circuit, which controls the pixels of the display, is “generating a video drive signal” as required by the challenged claims. But this is contrary to the ’521 patent and the understanding in the art of a pixel circuit. As Patent Owner explains, in an AMOLED system, a video driver, not the pixel circuit, generates the video signal. The pixel circuit, which controls the pixels of the display, can only *receive* a video drive signal. It cannot generate a video drive signal. Kim’s pixel circuit is no different in this regard. Petitioner attempts to salvage its theory by arguing that the ’521 patent teaches that the claimed video driver can be part of the “AMOLED display panel.” However, Petitioner’s argument does not change the fact that Kim’s pixel circuit is not a video driver and does not generate a video drive signal. Even if the video driver is part of the entire AMOLED display panel, the pixel circuit and video driver would still be separate components with the pixel circuit being downstream of the video driver and *receiving not generating* the video drive signal.

Second, Petitioner argues that Hayafuji's use of a high-pass filter and addition circuit designed to compensate for a specific type of ripple introduced by a DC-DC converter anticipates the claims. But this is contrary to the claim language, which requires referencing the video drive signal *to the positive power supply voltage*, not to a specific type of ripple voltage. And Petitioner's obviousness arguments improperly rely on proposed modifications to Hayafuji that are so extensive that they amount to change in the fundamental design and operation of the system and therefore cannot support a finding of obviousness.

Third, Petitioner argues that Steer's current feedback system meets the claims. However, the alleged video drive signal of Steer is a function of the current supplied to the current feedback system, not the positive power supply voltage. Furthermore, Steer's system is not even intended to address power supply voltage fluctuations, but is instead designed to provide per-pixel compensation for differences in drive transistor characteristics.

For these reasons, the Board should reject Petitioner's arguments and confirm the patentability of the challenged claims.

II. GROUNDS 1 AND 2: KIM DOES NOT DISCLOSE OR RENDER OBVIOUS A VIDEO DRIVER THAT GENERATES THE CLAIMED VIDEO DRIVE SIGNAL.

A. The Reply misrepresents the POR's discussion of video drivers and generating a video drive signal.

Petitioner argues in its Reply that Patent Owner has proposed a construction of “video driver” that includes shifting, converting to analog, and amplifying. Reply, 13. This is false. Patent Owner never proposed any such construction. Rather, the passage of the POR that Petitioner cites to advance its flawed argument is part of a discussion providing background information on video drivers and video drive signals and **not** a proposed construction of any claim term.

For example, the cited passage discussing video drivers refers to a “*usually digital* video signal,” indicating that the video signal could be either digital or analog. POR, 13-14 (emphasis added). This statement does not argue for a construction of “video driver” requiring digital to analog conversion.

Similarly, the POR does **not** propose a requirement that generating a video drive signal requires introducing amplification that involves gain. Rather, the POR discusses a specific example from the den Boer textbook where amplifiers are used to reduce impedance rather than introduce voltage gain:

One of ordinary skill in the art would also have understood that a video driver would use amplifiers, among other components, to generate a drive signal. . . . For example, *the video driver disclosed in den Boer uses output buffers to reduce the output impedance of the*

output channels in order to drive the data lines that connect to the pixel circuits.

POR, 15-16 (citing EX2011 ¶88; emphasis added).

The POR cites Mr. Credelle’s expert declaration, which further explains that output buffers include amplifiers and are used to reduce impedance by increasing the current of the video drive signal:

For example, *the video driver disclosed in den Boer uses output buffers to reduce the output impedance* of the output channels in order to drive the data lines that connect to the pixel circuits. EX1011, 97-98. *Output buffers typically include amplifiers to drive current onto the data lines* as illustrated in the Figure below from the Cristaldi textbook on LCD video drivers.

EX2011, ¶88 (emphasis added). Thus, the POR never argues that amplification including gain is required for a “video driver.” Petitioner’s argument is just a red herring.

In sum, the discussion of video drivers and video drive signals, including the citations to the den Boer and Cristaldi textbooks, are not a proposed construction. It is background information regarding the knowledge of a POSITA.

B. Kim’s pixel circuit does not “*generat[e] a video drive signal.*”

Petitioner argues that the POR “cherry picks” a quote from the ’521 patent’s discussion of the prior art with respect to generating a video drive signal. Reply, 14. The passage in question is, however, highly relevant because it informs the

disclosure of each of the embodiments. The POR explains that “the ’521 patent describes generating a video drive signal as, among other things, receiving a video signal from a video source, such as an image processor, and shifting it ‘*to bring the DC range of the analog video signal to within the range of the AMOLED display panel.*’” POR, 15 (quoting EX1001, 1:56-2:12 (emphasis added)). This quote from the ’521 patent’s discussion of the prior art is *not* performed by a pixel circuit because the voltage has to be shifted to a level that can drive the pixel circuit’s transistors prior to being transmitted to the pixel circuits. POR, 14, 16-17; EX2011 ¶¶48, 89. The ’521 patent’s embodiments then disclose novel circuits that perform this level shifting function in ways that generate a video drive signal that is referenced to the positive power supply voltage of the AMOLED display. EX1001, 4:7-5:5, 5:38-6:7, 6:45-7:8. Thus, a POSITA would understand that the claimed “video driver” that generates a video drive signal is not part of the pixel circuits. EX2011, ¶¶89-90.

Because Kim’s alleged video driver is part of the pixel circuit, the level shifting function that is at the core of generating a video drive signal must take place in a different component. Kim’s pixel circuit, therefore, does not generate the claimed video drive signal.

C. Kim’s pixel circuit is not a video driver.

The POR explains how the ’521 patent’s video driver maps to the functionality provided by the video drivers, rather than pixel circuits, in AMOLED systems. POR, 19-27. Because in AMOLED systems, video drivers and pixel circuits are always and indisputably distinct components, Kim’s pixel circuit cannot be the claimed “video driver.” EX2011, ¶92.

Indeed, as evidence, the POR cites the passage in the ’521 patent’s specification that states “[t]he invention relates to [sic] video driver for AMOLED displays and, in particular, to a video driver for AMOLED displays that is capable of isolating the pixel circuit from power supply voltage variations.” EX1001, 1:6-9; EX2011, ¶¶94-95. Petitioner argues that “isolating the pixel circuit from power supply voltage variations” does not mean that the video driver is separate from the pixel circuit. Reply, 11-13. Contrary to Petitioner’s argument, the actual language of this passage provides that the video driver is a separate and distinct component upstream of the pixel circuit that can isolate the pixel circuit from the power supply voltage. POR, 22. Petitioner’s argument makes little sense because, if the video driver was part of the pixel circuit, then it could not perform the function of “isolating the pixel circuit from power supply voltage variations.” EX1001, 1:6-9. Notably, Petitioner has not advanced an alternative interpretation.

Petitioner also incorrectly argues that the specification contradicts an interpretation of the video driver being distinct from the pixel circuit because it states that the video driver can be integrated into the “AMOLED display panel.” Reply, 12 (citing EX1001, 3:67-4:1, 7:52-59, 7:59-62, 7:62-66). Petitioner’s argument is incorrect and unsupported. None of the cited sections of the ’521 patent describe that the video driver can be part of the pixel circuit. Rather, as the POR explains, the specification states that the video driver can be incorporated into the AMOLED display panel, which does not mean that the video driver is part of the pixel circuits. POR, 25; EX2011, ¶¶99-102. As Mr. Credelle explained, in an AMOLED display system, video drivers and pixel circuits are distinct components, even if they are part of a single integrated circuit or otherwise connected. EX2011, ¶100. This again is consistent with the ’521 patent’s description of “the invention” as the “video driver” must be a distinct component to isolate the pixel circuit: “The invention relates to [sic] video driver for AMOLED displays and, in particular, to a video driver for AMOLED displays that is capable of isolating the pixel circuit from power supply voltage variations.” EX1001, 1:6-9.

Petitioner also argues that interpreting claim 1 to include an amplifier would render the “amplifier” recited in claims 2, 4, 6, and 8 superfluous. Reply, 14. But the dependent claims require specific amplifier configurations, and thus

Petitioner's claim differentiation argument fails to establish that claim 1 does not require an amplifier.

D. Drawing a bigger box to include Kim's data driver 300 does not address Kim's shortcomings.

Petitioner argues that "PO's expert admitted that Kim would include the claimed video drive signal" and that "Kim would still read onto the claims by drawing the 'video driver' box bigger to include Kim's data driver 300 together with the previously-identified circuitry." Reply, 16. Petitioner's assertions are, again, false. And they do not make sense in the context of an AMOLED display.

First, neither Patent Owner nor Patent Owner's expert stated that Kim discloses the *claimed* "video drive signal." Kim does disclose a "video drive signal" that is transmitted from the data driver to the pixel circuits, a feature common to all AMOLED display systems. See EX1016, 117:23-118:8. However, the *claimed* video drive signal is referenced to the positive power supply voltage of the AMOLED display. At no point did Mr. Credelle state that the signal output by Kim's data drive 300 is referenced to the positive power supply voltage.

Second, no matter how Petitioner draws the video driver box, the video drive signal that is output by Kim's data driver 300 is not referenced to the positive power supply voltage. There is no disclosure at all in Kim regarding how the video drive signal is generated. The entirety of Kim's description of the signal generated by data drive 300 is that "data driver 300 applies the data voltage that corresponds

to video signals to the data lines D_1 through D_m .” EX1007, ¶47. This is merely the operation of a conventional video driver. EX2011, ¶92. Thus, Kim does not disclose a video driver that generates a “video drive signal” that is “referenced to the positive power supply voltage.”

Third, this is a new argument improperly raised for the first time in Petitioner’s Reply and should be disregarded by the Board. Petitioner’s reliance on *Axonics Inc. v. Medtronic, Inc.* is inapt. That ruling was limited to situations where the Patent Owner engaged in “sandbagging” by arguing for a certain claim construction in its response that it had not previously advanced. 75 F.4th 1374, 1384 (Fed. Cir. 2023) (“We hold that where a patent owner in an IPR first proposes a claim construction in a patent owner response, a petitioner must be given the opportunity in its reply to argue and present evidence of anticipation or obviousness under the new construction[.]”). In contrast to the facts in *Axonics*, here Patent Owner did not propose a new claim construction; rather, Patent Owner argues that Kim’s pixel circuit does not satisfy the express requirement of claim 1 that the “video driver” generate a “video drive signal.” POR, 13-19. Furthermore, Patent Owner advanced this argument at the POPR stage, thus it was not a new argument in the POR. POPR, 25-31.

E. Petitioner’s argument regarding variations in the positive power supply voltage over time is self-contradictory.

Petitioner argues that the POR’s argument regarding variations in the power supply voltage over time would apply to any AMOLED display system. Reply, 2-11. Petitioner’s argument alleges that Patent Owner’s argument is flawed because active matrix displays have two phases: (1) a programming phase in which a data voltage is written to a capacitor in the pixel circuits, and (2) an emission phase in which the drive transistor provides a current to the OLED pixel element that is proportional to the data voltage. Reply, 3-7. However, the Petitioner’s Reply contradicts this argument by admitting that both experts agree that AMOLED displays operate in this manner. Reply, 2. Additionally, Petitioner’s argument does not address the fact that Kim’s pixel circuit does not generate a video drive signal and is not a video driver, as the claims require. *See* Sections II.B-C, *supra*.

III. GROUND 3: HAYAFUJI DOES NOT ANTICIPATE CLAIMS 1 OR 2.

A. Limitation [1-A]: Hayafuji does not disclose a video drive signal that is referenced to the positive power supply voltage.

Petitioner argues that adding *only the ripple component* of the positive power supply voltage to the video signal results in an alleged video drive signal that is referenced to the positive power supply voltage. Reply, 16-17. Petitioner relies on the ’521 patent’s third embodiment to argue that incorporating *any portion* of the positive power supply voltage satisfies the “referenced to” limitation. *Id.* This is incorrect for at least two reasons.

First, Petitioner’s argument that adding only a single component of the positive power supply voltage, the ripple component, is directly contrary to the claim language “the video signal and referenced to a positive power supply voltage of the AMOLED display panel,” which plainly requires that the video signal be referenced to the *entire* positive power supply voltage of the AMOLED display panel *not* just some component.

Second, Petitioner’s argument that the ’521 patent teaches that the video drive signal is “referenced to” the power supply voltage as long as *any* component of the power supply voltage is incorporated into the video drive signal grossly mischaracterizes the ’521 patent’s third embodiment. The type of voltage noise that is not accounted for in the video drive signal of this embodiment is very specific and not always present. It is only noise that is introduced after the clamping circuit’s capacitor is charged and before it is reprogrammed in the next blanking interval. EX1001, 7:9-20. This does not always occur, thus the ’521 specification explains that this video driver design “does *not necessarily* remove noise or glitches in the power supply voltage from impacting the video drive signal.” *Id.*, 7:9-12 (emphasis added). Therefore, in some instances noise and glitches are accounted for in the video drive signal. Even though noise or glitches may occur, the video drive signal is still referenced to the positive power supply voltage, unlike Hayafuji where only a ripple voltage is considered. Thus, in the

'521 patent's third embodiment, components of the power supply voltage that are not incorporated into the video drive signal are the exception rather than the rule. In contrast, Hayafuji teaches the inverse, where only a very specific type of voltage disturbance——ripple—is accounted for in the video drive signal. EX2011, ¶128. Hayafuji's ripple voltage is not representative of the positive power supply voltage.

Third, as Petitioner's expert admits, the video drive signal of the third embodiment incorporates the entire positive power supply voltage VDD at the time the capacitor of the clamping circuit is charged. EX2017, 15:10-18; EX1001, 6:61-7:8. The video drive signal is generated by adding the voltage stored on the capacitor of the clamping circuit to the video signal Video.DAC. EX1001, 7:2-8. Therefore, the video drive signal includes any drift or noise that are part of VDD at the time the power supply was charged to the capacitor. No part of the power supply voltage is filtered out or omitted. Hayafuji, in contrast, only uses the voltage ripple component of the power supply voltage, not the entire power supply voltage, in generating the video drive signal.

B. Limitation [1-C]: Hayafuji does not disclose a current drive voltage that is independent of the positive power supply voltage.

Limitation [1-C] recites "the drive current being proportional to a current drive voltage being indicative of the video signal and independent of the positive power supply voltage." Petitioner's arguments in reply fail to establish that Hayafuji discloses this limitation.

Petitioner argues that V_{DC} is required to be part of the current drive voltage because that portion is necessary for device operation. Reply, 19. Petitioner cites Patent Owner's expert's deposition testimony and further elaborates that "if the power supply voltage went below the threshold voltage of the relevant transistors, the display would cease to function at all." Reply, 19 (citing EX1016, 177:20-178:8). But Petitioner conflates the power supply voltage and the current drive voltage, which are two different things. The current drive voltage is the difference between the voltages applied to the gate and source terminals of the drive transistor, often denoted by the following equation: $V_{GS} = V_{gate} - V_{source}$. See EX1015, ¶237. The value of V_{GS} determines how much current flows to the OLED pixel element. *Id.* In contrast, the power supply voltage is applied to the source terminal of the drive transistor. Mr. Credelle's deposition testimony that the power supply voltage cannot drop below a certain level does not apply to the *difference between* the voltages at the gate and source terminals. EX1016, 177:20-178:8.

Petitioner also argues that the current drive voltage is sufficiently independent of the power supply voltage if the ripple component cancels out because the current drive voltage of the '521 patent's third embodiment does not cancel out noise that occurs in between blanking intervals. Reply, 18-19. The third embodiment, however, does not set such a low bar. The '521 patent's third embodiment cancels out all undesirable voltage fluctuations except for one specific

type (noise that occurs in between blanking intervals). In contrast, Hayafuji's circuit only cancels out one specific type of undesirable voltage fluctuation (ripple). As Patent Owner explained in its Response, the current drive voltage of Hayafuji is accurately depicted by the following equation:

$$\begin{aligned} V_{GS} &= V_{DC} + V_{ri} + V_{drift} + V_{noise} - V_{data} - V_{ri} \\ &= V_{DC} + V_{drift} + V_{noise} - V_{data} \end{aligned}$$

POR, 40; EX2011, ¶140. This illustrates that the current drive voltage is not independent of several components of the power supply voltage, including V_{DC} , V_{drift} , and V_{noise} . Accordingly, Hayafuji does not disclose “the drive current being proportional to a current drive voltage being indicative of the video signal and independent of the positive power supply voltage,” as recited in limitation [1-C].

C. Claim 2: Hayafuji's video drive signal is not indicative of the sum or difference between the power supply voltage and the video signal.

In its Reply, Petitioner argues that claim 2 does not require the DC component of the power supply voltage. Reply, 20. However, the claim explicitly recites “wherein the video drive signal is indicative of the sum of or the difference between the *positive power supply voltage* and the video signal.” Hayafuji sums only the ripple component and the video signal and therefore does not disclose “the sum of or the difference between the *positive power supply voltage* and the video

signal” as the ripple voltage is **not** the “positive power supply voltage.” EX2011, ¶¶128-130.

IV. GROUND 4: HAYAFUJI DOES NOT RENDER OBVIOUS CLAIMS 1, 2, 3, OR 5.

A. Petitioner’s proposed modifications to Hayafuji would not have been obvious.

In its Reply, Petitioner attempts to bolster its argument for why a POSITA would modify Hayafuji as proposed. But these arguments still fall short.

Petitioner argues that its proposed modifications do not render Hayafuji inoperable for its intended purpose because they purportedly expand Hayafuji’s functionality such that both ripple and non-ripple positive power supply voltage variations are addressed. Reply, 20-21; EX1015, ¶¶320-324, 331. Petitioner further argues that Hayafuji does not teach away from removing non-ripple power supply voltage variations and that Hayafuji teaches that all non-stable components of the power supply voltage are desirable to remove. Reply, 21. Additionally, Dr. Kattamis argues that removing the ripple extraction circuit would have been obvious because it is a “clearly over-constrictive functional block.” EX1015, ¶322.

These arguments gloss over the fact that Hayafuji expressly states that its purpose is *only* to address a specific type of power supply voltage variation: ripple generated by a DC-DC converter. EX1006, ¶28. There is no discussion in Hayafuji regarding the desirability of removing any other non-stable components of the

power supply voltage. Thus, removing the components of Hayafuji's design that were intended to address voltage ripple and replacing them wholesale with circuits that address voltage variations more broadly completely rewrites the Hayafuji reference and impermissibly changes the basic principles under which Hayafuji was designed to operate. *Plas-Pak Indus., Inc. v. Sulzer Mixpac AG*, 600 App'x. 755, 758 (Fed. Cir. 2015) ("However, combinations that change the 'basic principles under which the [prior art] was designed to operate,' *In re Ratti*, 49 CCPA 976, 270 F.2d 810, 813 (1959) . . . may fail to support a conclusion of obviousness.").

B. The Board should not consider Petitioner's impermissible new Reply arguments and should reject them because they are based on impermissible hindsight.

In an attempt to revamp its flawed explanation for why a POSITA would have made the wholesale changes to Hayafuji that are proposed in the Petition, Petitioner's Reply introduces new arguments for alleging why a POSITA would have replaced the addition circuit of Hayafuji with a differential amplifier circuit. Reply, 21 (citing EX1015, ¶¶326-333). Specifically, Petitioner and Dr. Kattamis argue that, because the voltages in Hayafuji's circuit can be expressed algebraically, a POSITA would have been motivated to manipulate the intended behavior of the circuit algebraically to arrive at expressions that utilize mathematical operations that can be implemented by standard op amp circuits.

EX1015, ¶¶328-329. Dr. Kattamis then argues that, based on algebra, a POSITA would have been motivated to remove the addition circuit and replace it with a differential amplifier circuit. EX1015, ¶¶329-330.

The Board should not consider Petitioner's and Dr. Kattamis's new and untimely invalidity theories. "A reply may only respond to arguments raised in the corresponding opposition, patent owner preliminary response, patent owner response, or decision on institution." 37 C.F.R. § 42.23; *Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1369 (Fed. Cir. 2016) ("It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify 'with particularity' the 'evidence that supports the grounds for the challenge to each claim.'"); *AMC Multi-Cinema, Inc. v. Fall Line Pats., LLC*, No. 2021-1051, 2021 WL 4470062, at *7 (Fed. Cir. Sept. 30, 2021) (affirming Board's decision not to consider "a change of legal argument, not fairly understood to have been adequately presented in the relevant section of the petition itself.").

Here, there is no dispute that these are new arguments. *Dr. Kattamis admitted that these arguments were not in his original declaration.* EX2017, 18:21-22:20, 22:21-26:2, 26:3-27:14 (admitting that the arguments in paragraphs 328-330 of his supplemental declaration were not in his original declaration). Therefore, the Board should disregard these new arguments.

Even if the Board considers these new arguments, Dr. Kattamis's tortured analysis to redesign Hayafuji to satisfy the claimed invention is the epitome of impermissible hindsight that courts routinely caution against when evaluating obviousness. *See, e.g., KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 421 (2007) ("A factfinder should be aware, of course, of the distortion caused by hindsight bias and must be cautious of arguments reliant upon ex post reasoning."); *see also InTouch Techs., Inc v. VGO Commc'ns, Inc.*, 751 F3d 1327, 1348 (Fed. Cir. 2014) (rejecting "conclusory references to [an expert's] belief that one of ordinary skill in the art *could* combine [certain] references, not that they *would* have been motivated to do so."); *TQ Delta LLC v. Cisco Sys., Inc.*, 942 F.3d 1352, 1359-60 (Fed. Cir. 2019). That Petitioner proposes such a drastic redesign of Hayafuji, using the '521 patent as a roadmap, undermines Petitioner's theory that the claims would have been obvious over Hayafuji.

C. Dr. Kattamis's supplemental declaration mischaracterizes his deposition testimony.

Dr. Kattamis disputes that he testified in his first deposition that using the positive power supply would not have been obvious and argues that he was merely explaining that using a voltage that exceeded the positive power supply voltage would be inappropriate. EX1015, ¶¶332-333. However, the context of Dr. Kattamis's deposition testimony was the formula in the '521 patent where $v(t) = VDD - \text{Video.DAC}$. EX2012, 73:5-22. Thus, the formula shows the video drive

signal being *lower*, not higher, than the positive power supply voltage. Dr.

Kattamis's post-hoc explanation in his Supplemental Declaration, therefore, does not make sense.

D. Hayafuji does not render obvious a current mode isolator circuit.

As discussed above, the modifications proposed by Dr. Kattamis would not have been obvious and therefore, would not render obvious claim 5, which depends from claim 2.

Furthermore, in its Reply, Petitioner presents another new argument that was not in its Petition, alleging that “*whether or not Hayafuji is modified*, a POSA would recognize that [Hayafuji's] circuitry, including transistor Q3 is a current mode isolator circuit.” Reply, 22 (emphasis added). The Petition, with respect to Ground 4, claim 5, relied *only on the modified* version of Hayafuji. Pet., 78 (“Therefore, consistent with the Gr.4,Cl.[3] analysis, and Figures, 6, 9, and 10 (combined/modified/annotated) below, a POSA would find obvious, in view of Hayafuji, the video driver comprises a current mode isolator circuit . . .”). The Board should, therefore, disregard Petitioner's argument that Hayafuji without modifications renders claim 5 obvious as an improper new argument. *Intelligent Bio-Sys.*, 821 F.3d at 1369 (“It is of the utmost importance that petitioners in the IPR proceedings adhere to the requirement that the initial petition identify ‘with particularity’ the “evidence that supports the grounds for the challenge to each

claim.”); *AMC Multi-Cinema*, 2021 WL 4470062, at *7 (affirming Board’s decision not to consider “a change of legal argument, not fairly understood to have been adequately presented in the relevant section of the petition itself.”).

V. GROUND 5: STEER DOES NOT RENDER OBVIOUS CLAIMS 1-3.

A. Steer’s alleged video drive signal is based on the feedback current and therefore not referenced to the positive power supply voltage.

Steer teaches a system in which “current feedback is used during pixel programming so that any effects of differences between characteristics of the drive transistor of different pixels are avoided.” EX1008, 7:30-32. Petitioner argues in its Reply that Steer’s alleged video drive signal is referenced to the positive power supply voltage despite being a function of the current being fed into the feedback system. Reply, 25. Petitioner does not dispute that the alleged video driver (comparator circuit 50) does not compare the video signal with the positive power supply voltage. *Id.* Instead, it compares the video signal with V43, which is the sum of the positive power supply voltage (V_{supply}) and $R46 \cdot I$. EX2011, ¶¶165-171. As a result, the video drive signal is **not** referenced to the positive power supply voltage and is instead “a function of the current drawn from the current-measurement supply line.” EX1008, 9:12-13; EX2011, ¶171; POR, 62-65.

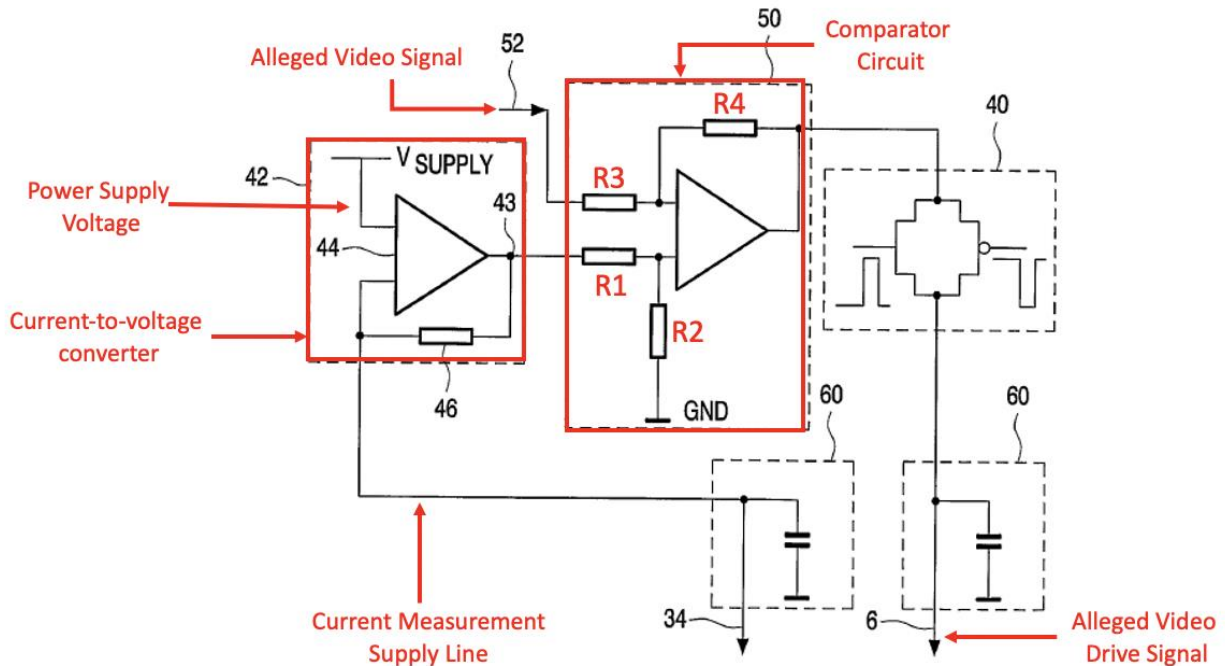


Fig.4

EX1008, FIG. 4 (annotated).

Petitioner argues that there are instances when the feedback current is zero and therefore is not a factor in determining the video drive signal. Reply, 23-25. Dr. Kattamis identified the beginning of the pixel circuit programming phase and during discharge of the pixel circuit's capacitor. EX1015, ¶¶392-394. However, as Mr. Credelle explained, these instances do not correspond to the use of the video drive signal to program the pixel circuit. EX2011, ¶168. Therefore, they are irrelevant to voltage driving the display.

B. Steer's alleged video driver provides non-unity gain and, therefore, the alleged video drive signal is not referenced to the positive power supply voltage.

In the POR, Patent Owner explained that the output of Steer's alleged video driver introduces non-unity gain and, therefore, the alleged video drive signal is not referenced to the positive power supply voltage. POR, 66-67; EX2011, ¶¶172-175. Petitioner argues that Steer does not disclose that the alleged video driver (comparator circuit 50) introduces non-unity gain. Reply, 23-25. This is incorrect. In the following passage, Steer explains that an additional amplifier can be used to lower the gain of comparator 50:

The comparator section 50 may include an integrating amplifier at its output (not shown in Figure 4). This can further improve the stability of the feedback loop and *permit a lower gain to be employed* in the amplifier of the comparator, and provide better threshold compensation in practical implementations.

EX1008, 10:20-25 (emphasis added). This statement describes that comparator 50 introduces some gain, but the amount of gain can be lowered with the use of an additional integrating amplifier. EX2011, ¶190.

VI. CONCLUSION

Petitioner failed to meet its burden to show that any of the challenged claims are unpatentable.

Respectfully submitted,

KRAMER ALBERTI LIM & TONKOVICH LLP

/ *Sal Lim* /

Sal Lim
Registration No. 45,706
Lead Attorney for Patent Owner

Date: June 10, 2024

577 Airport Boulevard, Suite 250
Burlingame, California 94010
(650) 825-4300

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

1. This Patent Owner Sur-Reply complies with the type-volume limitation of 5,600 words, comprising 4,876 words, excluding the parts exempted by 37 C.F.R. § 42.24(c).
2. This Patent Owner Sur-Reply complies with the general format requirements of 37 C.F.R. § 42.6(a) and has been prepared using Microsoft® Word 2016 in 14-point Times New Roman font.

Respectfully submitted,

KRAMER ALBERTI LIM & TONKOVICH LLP

/ *Sal Lim* /

Sal Lim
Registration No. 45,706
Lead Attorney for Patent Owner

Date: June 10, 2024

577 Airport Boulevard, Suite 250
Burlingame, California 94010
(650) 825-4300

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

I certify that the above-captioned **PATENT OWNER SUR-REPLY** and Exhibit 2017 were served in their entireties on June 10, 2024, upon the following parties via electronic mail:

Eliot D. Williams (Lead Counsel)
Neil Sirota (Back-up Counsel)
Mark Oda (Back-up Counsel)
Lance Goodman (Back-up Counsel)
BAKER BOTTS L.L.P.
eliot.williams@bakerbotts.com
neil.sirota@bakerbotts.com
mark.oda@bakerbotts.com
lance.goodman@bakerbotts.com

William M. Fink (Back-up Counsel)
Benjamin Haber (Back-up Counsel)
O'MELVENY & MYERS LLP
tfink@omm.com
bhaber@omm.com

Respectfully submitted,

KRAMER ALBERTI LIM & TONKOVICH LLP

/ *Sal Lim* /

Sal Lim
Registration No. 45,706
Lead Attorney for Patent Owner

Date: June 10, 2024

577 Airport Boulevard, Suite 250
Burlingame, California 94010
(650) 825-4300