UNITED STATES PATENT AND TRADEMARK OFFICE
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BEFORE THE PATENT TRIAL AND APPEAL BOARD
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LG ELECTRONICS, INC.,
Petitioner,

v.

ATI TECHNOLOGIES ULC,
Patent Owner
_____

Case IPR2015-00330
Patent 7,327,369 B2
_____

Before JONI Y. CHANG, BRIAN J. McNAMARA, and JAMES B. ARPIN,
Administrative Patent Judges.

ARPIN, *Administrative Patent Judge*.

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

I.   BACKGROUND

On July 10, 2015, we instituted an *inter partes* review of claims 1 and 2 ("the challenged claims") of U. S. Patent No. 7,327,369 B2 (Ex. 1001, "the '369 patent"). Paper 13 ("Dec. to Inst."), 19. ATI Technologies ULC ("Patent Owner") filed a redacted and an un-redacted Patent Owner Response and a Motion to Seal. Papers 21, 20, and 19, respectively.[1] LG Electronics, Inc. ("Petitioner") filed an Opposition to Patent Owner's Motion to Seal (Paper 25), Petitioner's own Motion to Seal (Paper 27), and an un-redacted and a redacted Reply (Papers 28 and 29, respectively).[2] We authorized Patent Owner to file a Sur-Reply. Paper 32. Patent Owner filed duplicate Sur-Replies (Papers 36 and 37) on February 9, 2016. Petitioner also filed a Motion to Exclude Evidence (Paper 39), in response to which Patent Owner filed an Opposition (Paper 40), to which Petitioner replied (Paper 41).

Neither party requested an oral hearing for this *inter partes* review. Patent Owner explained that "Patent Owner has not requested oral hearing for IPR2015-00330, because the *only* issues raised in that IPR are issues on antedating the applied references." *LG Electronics, Inc. v. ATI Technologies ULC*, IPR2015-00326, Paper 40, 1–2 (emphasis added). Nevertheless, the transcript of the oral hearing for *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, is entered into the record for this *inter partes* review. *See* Paper 42 ("Tr.") 4:16–19 ("This is the oral hearing for IPR2015-00325 involving Patent 7,742,053. This also, since it involves the same issue as in IPR2015-00326 and 330, so the

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[1] Unless otherwise noted, all references herein are to Patent Owner's un-redacted Patent Owner Response, Paper 20 ("PO Resp.").
[2] Unless otherwise noted, all references herein are to Petitioner's un-redacted Reply, Paper 28 ("Reply").

transcript for this oral hearing will be usable across all three cases as to the antedating issue.").

We have jurisdiction under 35 U.S.C. § 6(c). 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 challenged claims 1 and 2 of the '369 patent are unpatentable.

A. *Applied References and Declaration*

Petitioner relies upon the following references and declaration in support of the instituted ground for challenging the claims 1 and 2 of the '369 patent:

Exhibit	References and Declaration
1003	Declaration of Nader Bagherzadeh, Ph.D.
1004	Patent No. US 7,015,913 B1 to Lindholm *et al.* ("Lindholm")
1007	OpenGL Graphics System: A Specification Version 1.4 ("OpenGL")

B. *Asserted Grounds of Unpatentability*

We instituted review of the challenged claims as unpatentable on the following asserted ground:

Claims	Basis	References
1 and 2	35 U.S.C. § 103(a)	Lindholm (Ex. 1004) and OpenGL (Ex. 1007)

Pet. 11, 13–31.

C. *Related Matters*

The '369 patent is the subject of a patent infringement lawsuit brought by Patent Owner against Petitioner in *Advanced Micro Devices, Inc. v. LG Electronics, Inc.*, Case No. 3:14-cv-01012-SI (N.D. Calif. 2014). Petitioner has

filed other petitions for *inter parte* review of related patents. *See LG Electronics, Inc. v. ATI Technologies ULC,* IPR2015-00325; *LG Electronics, Inc. v. ATI Technologies ULC*, IPR2015-00326.

   D. The '369 Patent

   In computer graphics systems, a three-dimensional shape is represented by a collection of simple polygons called "primitives." Ex. 1001, col. 1, ll. 18–22. Primitives are formed by the interconnection of individual pixels. *Id.* at col. 1, ll. 22–23. Color and texture are applied to the individual pixels that comprise the shape based on their location within the primitive and the primitive's orientation relative to the generated shape. *Id.* at col. 1, ll. 23–26.

   A three-dimensional shape represented by a wireframe collection of primitives is transformed into colored images by two graphics-processing operations: (i) vertex operations and (ii) pixel operations. Prelim. Resp. 2 (citing Ex. 1001, col. 1, ll. 18–64). To orient the wireframe model as desired, matrix transformations applied to vertices V_x, V_y, and V_z of the primitives generate new vertices $V_{x'}$ $V_{y'}$, and $V_{z'}$, which then are translated into pixels to generate a rendered object that can be displayed as a two-dimensional image. *Id.* at 3 (citing Ex. 1001, col. 1, ll. 36–49). Pixel operations performed on each pixel of the rendered object determine the pixel's color and appearance. *Id.* (citing Ex. 1001, col. 1, ll. 56–60).

   Conventional graphics processors include "shaders" that specify how and with what corresponding attributes a final image is generated on a screen or other device. Ex. 1001, col. 1, l. 56–col. 2, l. 4. Conventional graphics processors require both a vertex shader and a pixel shader to render an object. *Id.* at col. 1, ll. 60–63. A vertex shader accepts as inputs the data representing the vertices V_x, V_y, and V_z; applies the matrix transformation; and provides angularly-oriented

vertices $V_{x'}$, $V_{y'}$, and $V_{z'}$. A pixel shader operating at the pixel level provides the color value associated with each pixel of the rendered object. *Id.* at col. 1, ll. 56–60.

The '369 patent employs a unified shader capable of performing both vertex operations and pixel operations. *Id.* at col. 2, ll. 62–64. A multiplexer may receive vertex data at a first input and pixel parameter data and attribute data from a rasterization engine at a second input. *Id.* at col. 3, l. 66–col. 4, l. 4. In response to a control signal, an arbiter circuit selects one of a plurality of inputs for processing, and a shader coupled to the arbiter performs vertex operations or pixel operations based on the selected one of the inputs. *Id.* at col. 2, ll. 49–55. A control signal generated by the arbiter determines which of the two multiplexer inputs is provided to the unified shader. *Id.* at col 4, ll. 4–8. According to an arbitration scheme implemented in the arbiter, vertex data at the first input is transmitted to the unified shader if there are sufficient resources available in the unified shader to operate on the vertex data; otherwise, interpolated pixel data on the second multiplexer input is passed to the unified shader. *Id.* at col. 4, ll. 8–14.

The unified shader includes a general purpose register for storing the plurality of selected inputs, "a sequencer for storing logical and arithmetic instructions used to perform vertex and pixel manipulation operations, and a processor capable of executing both floating point arithmetic and logical operations on the selected inputs according to the instructions maintained[, e.g., stored,] in the sequencer." *Id.* at col. 2, ll. 56–62. According to the arbitration scheme, if the general purpose register in the unified shader does not have sufficient space to store incoming vertex data, the arbiter does not transmit the vertex data. *Id.* at col. 4, ll. 8–14. Instead, instructions for pixel calculation operations are carried out in the unified shader until enough registers become

available to perform vertex operations. *Id.* at col. 5, ll. 33–40. When vertex data is transmitted to the unified shader, the resulting vertex data is transferred to a render back end block that converts the resulting vertex data to a format suitable for display. *Id.* at col. 5, ll. 60–65.

E. Challenged Claims

Independent claim 1, which is drawn to a graphics processor, and claim 2, which is dependent from claim 1, are reproduced below:

> 1. A graphics processor, comprising:
>
> an arbiter circuit for selecting one of a plurality of inputs in response to a control signal;
>
> a shader, coupled to the arbiter circuit, operative to process the selected one of the plurality of inputs, the shader including means for performing vertex operations and pixel operations, and performing one of the vertex operations or pixel operations based on the selected one of the plurality of inputs,
>
> wherein the shader provides [an] appearance attribute; a vertex storage block for maintaining vertex information;
>
> wherein the vertex storage block further includes a parameter cache operative to maintain appearance attribute data for a corresponding vertex and a position cache operative to maintain position data for a corresponding vertex; and
>
> wherein the appearance attribute is color, and the color is associated with a corresponding pixel when the selected one of the plurality inputs is pixel data.
>
> 2. The graphics processor of claim 1 wherein the appearance attribute is position, and the position attribute is associated with

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> a corresponding vertex when the selected one of the plurality
> of inputs is vertex data.

Ex. 1001, col. 6, ll. 42–64.[3]

II.   ANALYSIS

A. Overview

Petitioner asserts that claims 1 and 2 of the '369 patent are rendered obvious by the combined teachings of Lindholm and OpenGL. Pet. 11; *see* Dec. to Inst. 19. A claim is unpatentable under 35 U.S.C. § 103(a) if the differences between the claimed subject matter and the prior art are "such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains." *KSR Int'l Co. v. Teleflex Inc.*, 550 U.S. 398, 418–21 (2007). We resolve the question of obviousness on the basis of underlying factual determinations, including: (1) the scope and content of the prior art; (2) any differences between the claimed subject matter and the prior art; (3) the level of skill in the art;[4] and (4) objective evidence of nonobviousness, i.e., secondary considerations.[5] *See Graham v. John Deere Co.*, 383 U.S. 1, 17–18 (1966).

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[3] In the Decision to Institute, we construed certain claim terms. Dec. to Inst. 6–10. Neither party contests those constructions. *See* Paper 14, 3.

[4] Petitioner and Patent Owner rely on substantially similar assessments of the level of ordinary skill in the relevant art. Ex. 1003 ¶ 46; Ex. 2003 ¶ 29. Each of Petitioner's and Patent Owner's declarants appear to exceed the qualifications required for a person of ordinary skill in the relevant art under either assessment (*see* Ex. 1003 ¶¶ 3–8; Ex. 2003 ¶¶ 5–19, 28), and we credit their testimony as to the assessment of the level of ordinary skill in the art.

[5] Patent Owner does not contend that objective evidence of nonobviousness, i.e., secondary considerations, demonstrate that claim 1 or 2 of the '369 patent is not obvious over the combined teachings of Lindholm and OpenGL. *See* PO Resp. 1– 3; *see also* Paper 14, 3 ("[A]ny arguments for patentability not raised in the [Patent Owner's] response will be deemed waived."). Although not identified as such, if

B. Obviousness Over Lindholm and OpenGL

During the oral hearing for IPR2015-00326, Patent Owner conceded that, if it failed to antedate Lindholm, the claims challenged based on Lindholm, alone or in combination with OpenGL or another reference, in that case are unpatentable. *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00326, Paper 48, 25:24–26:7 ("[T]he *only* basis for patentability with respect to grounds 1 through 3 is the antedating of Lindholm[.]" (emphasis added)); *see LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00326, Ex. 2126, slide 2 (Ground 2). In view of Patent Owner's stated reason for declining to request an oral hearing in the instant proceeding, we understand this concession to apply equally to the sole ground at issue here. PO Resp. 1 ("The challenged claims are patentable over the combination of Lindholm and Open GL *because Lindholm is not prior art.*" (emphasis added)); *see LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00326, Paper 40, 1–2.

All of the members of the panel in this proceeding participated in the oral hearing in the related case, IPR2015-00325, during which Patent Owner's arguments concerning antedating of Lindholm were heard. *See* Tr. 4:16–19. Patent Owner relies on the same evidence and substantially the same arguments in the instant proceeding and in IPR2015-00325, in support of its efforts to antedate Lindholm. *Compare, e.g., LG Electronics, Inc. v. ATI Technologies ULC*, Case

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we were to consider Patent Owner's comments about the incorporation of the Xenos chip into the Xbox 360® device as an attempt to introduce evidence of secondary considerations, e.g., commercial success, industry praise, or long-felt, but unmet need (*see* PO Resp. 14–18); because the Xenos chip was fabricated by others and includes modifications to Patent Owner's design introduced by others, this evidence would lack the required nexus to the challenged claims (*see id*. at 15; Tr. 81:19–82:13).

IPR2015-00330, Paper 20, iv–ix, 18–30 *with LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, Paper 21, v–x, 15–29; *see LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00326, Paper 20, v–x, 20–32 (presenting the same evidence and substantially the same arguments with respect to the antedating of Lindholm). In the Final Written Decision in IPR2015-00325, the Board determined that Patent Owner had not antedated Lindholm. *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, slip op. at 12–53 (PTAB April 14, 2016) (Paper 62). To the extent necessary, we incorporate here the discussion of the antedating of Lindholm from the Final Written Decision of IPR2015-00325 by reference. *Id*. In view of the determination that Patent Owner has not antedated Lindholm,[6] in view of Patent Owner's concession, and in the absence of other arguments distinguishing claim 1 or 2 of the '369 patent over the combined teachings of Lindholm and OpenGL, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 2 of the '369 patent are unpatentable as rendered obvious under 35 U.S.C. § 103(a) over the combined teachings of Lindholm and OpenGL.[7] Pet. 13–31; *see* Dec. to Inst. 6–18.

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[6] The Board addressed the arguments presented in Patent Owner's Sur-Reply (Paper 36) in connection with Patent Owner's arguments attempting to antedate Lindholm in IPR2015-00325. *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, slip op. at 24 (PTAB April 14, 2016) (Paper 62) ("We also are not persuaded by ATI's argument that the inventive process for the claimed invention ended after chip design, 'so it is logical that RTL is a valid reduction to practice.'").

[7] In the Patent Owner Response, Patent Owner only argues that Lindholm is not prior art to the challenged claims. *See* PO Resp. 3 ("Thus, based on either an *actual* or *constructive* reduction to practice, Lindholm is not prior art. Claims 1 and 2 are, therefore, patentable."). In the Scheduling Order for this proceeding, we cautioned Patent Owner "that any arguments for patentability not raised in the

III.   MOTION TO EXCLUDE

Petitioner's Motion to Exclude Evidence is substantially similar to those filed in IPR2015-00325 and IPR2015-00326, in which Petitioner sought to exclude evidence concerning Patent Owner's efforts to antedate Lindholm. Paper 39, 1–2 (seeking to exclude all of portions of Exhibits 2005, 2007, 2009–2018, 2020–2042, 2053–2071, and 2093–2118). Having decided the issue concerning the antedating of Lindholm in Petitioner's favor in each of IPR2015-00325 and IPR2015-00326, the Board dismissed Petitioner's Motion to Exclude Evidence as moot. *See id*. at 5 n.1. For the same reasons, we *dismiss* Petitioner's Motion to Exclude Evidence in this proceeding as moot.

IV.   MOTIONS TO SEAL

Patent Owner moved to seal portions of its Patent Owner Response (Paper 20) and all of Exhibits 2007, 2009–2018, 2020–2072, and 2093–2118 on the basis that these exhibits and related argument in the Patent Owner Response concern the development of its shader. Paper 19 ("Patent Owner's Motion to Seal"), 3–6. Patent Owner also moved to seal all or portions of Exhibits 2003, 2005, and 2006 on the basis that these declarations relate to the development of its shader, to register-transfer level ("RTL") source code and technical specifications, or to the invention date of the graphics processor recited in the challenged claims of the '369 patent. *Id*. at 6–8. Pending a ruling on Patent Owner's Motion to Seal, Petitioner moved to seal its Reply and Exhibits 1013, 1015–1020, 1022, 1033–1041, and 1044. Paper 27 ("Petitioner's Motion to Seal"), 1–2.

The Board addressed substantially similar issues raised in the parties' Motions to Seal in IPR2015-00325. *See* Petitioner's Motion to Seal 3 ("Exhibits

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response will be deemed waived." Paper 14, 3.

1016–1018, 1022, 1033, and 1036–1038 are the declarations that ATI's witnesses submitted in this proceeding, as well as the declarations ATI submitted for the same witnesses in related proceedings IPR2015-00325 and IPR2015-00326."). In deciding Patent Owner's First and Second Motions to Seal in IPR2015-00325, the Board observed that the Final Written Decision in that proceeding addressed nearly all of the documents Patent Owner sought to seal. *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, slip op. at 7 (PTAB April 14, 2016) (Paper 63) (Denial of Patent Owner's Motion to Seal). Balancing the public interest in maintaining a complete and understandable record, the Board denied Patent Owner's and Petitioner's Motions to Seal in IPR2015-00325. *Id.*; *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325 slip op. at 2 (PTAB April 14, 2016) (Paper 64). Although the Board authorized each party to file a request for rehearing or a motion to expunge certain documents within one week of our ruling in IPR2015-00325, no such request or motion was filed. *See LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, slip op. at 7–8 (PTAB April 14, 2016) (Paper 63); *LG Electronics, Inc. v. ATI Technologies ULC*, Case IPR2015-00325, slip op. at 2–3 (PTAB April 14, 2016) (Paper 64).

The documents that the parties seek to seal in this proceeding cover substantially the same subject matter as that addressed in IPR2015-00325, and we reach the same conclusion regarding the Motions to Seal in this proceeding. For that reason, we *deny* both Patent Owner's Motion to Seal (Paper 19) and Petitioner's Motion to Seal (Paper 27).[8]

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[8] We further note that, to the extent the same documents that the parties seek to seal in the instant proceeding have been made available to the public in IPR2015-00325, the parties' Motions to Seal in the instant proceeding are moot.

V.   CONCLUSION

Having determined in IPR2015-00325 that Patent Owner failed to antedate Lindholm, we conclude that Petitioner has demonstrated by a preponderance of the evidence that claims 1 and 2 of the '369 patent are unpatentable as obvious under 35 U.S.C. § 103(a) over the combined teachings of Lindholm and OpenGL. We also *dismiss* as moot Petitioner's Motion to Exclude Evidence and *deny* all Motions to Seal.

VI.   ORDER

In consideration of the above, it is

ORDERED that claims 1 and 2 of the '369 patent are unpatentable as rendered obvious over the combined teachings of Lindholm and OpenGL;

FURTHER ORDERED that Petitioner's Motion to Exclude Evidence is *dismissed* as moot;

FURTHER ORDERED that Patent Owner's Motion to Seal is *denied*;

FURTHER ORDERED that Petitioner's Motion to Seal is *denied*; 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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