

**UNITED STATES PATENT AND TRADEMARK OFFICE**

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**BEFORE THE PATENT TRIAL AND APPEAL BOARD**

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CORETRONIC CORPORATION and  
OPTOMA CORPORATION,

Petitioners,

v.

MAXELL, LTD.,  
Patent Owner

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**Case: IPR2025-00474**

**U.S. Patent No. 8,593,580**

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**PATENT OWNER RESPONSE  
TO PETITION FOR *INTER PARTES* REVIEW  
OF U.S. PATENT NO. 8,593,580**

Mail Stop **Patent Board**  
Patent Trial and Appeal Board  
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## PATENT OWNER’S EXHIBIT LIST

| Exhibit No. | Description                                                                                                                                                                   |
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| EX2001      | Complaint, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex. Jul. 9, 2024) (“Complaint”)                                                 |
| EX2002      | First Amended Docket Control Order, <i>Maxell, Ltd. v. Coretronic Corp.</i> , No. <b>5:24-cv-00088-RWS-JBB</b> (E.D. Tex.) (Dkt. 65) (January 7, 2025)                        |
| EX2003      | Order Denying Motion to Transfer, <i>Maxell, Ltd. v. Coretronic Corp.</i> , No. <b>5:24-cv-00088-RWS-JBB</b> (E.D. Tex.) (Dkt. 85) (March 25, 2025)                           |
| EX2004      | Order Granting Motion to Dismiss, <i>Optoma Technology, Inc. v. Maxell, Ltd.</i> , No. 3:24-cv-08147-TLT (N.D. Cal.) (Dkt. 58) (March 14, 2025)                               |
| EX2005      | Plaintiff’s Preliminary Election of Asserted Claims, <i>Maxell, Ltd. v. Coretronic Corp.</i> , No. <b>5:24-cv-00088-RWS-JBB</b> (E.D. Tex.) (Dkt. 78) (March 11, 2025)        |
| EX2006      | Defendants’ Invalidity Contentions, <i>Optoma Technology, Inc. v. Maxell, Ltd.</i> , No. 3:24-cv-08147-TLT (N.D. Cal.) (served on December 27, 2024).                         |
| EX2007      | Defendants’ Preliminary Election of Asserted Prior Art, <i>Maxell, Ltd. v. Coretronic Corp.</i> , No. <b>5:24-cv-00088-RWS-JBB</b> (E.D. Tex.) (served on March 25, 2025)     |
| EX2008      | Preliminary Constructions, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (May 9, 2025)                                              |
| EX2009      | P.R. 4-3 Joint Claim Construction and Prehearing Statement, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 74) (Feb. 18, 2025) |
| EX2010      | Defendants’ Responsive Claim Construction Brief, <i>Maxell, Ltd. v. Coretronic Corp., et al.</i> , No. 5:24-cv-00088-RWS-JBB (E.D. Tex.) (Dkt. 86) (Apr. 08, 2025)            |

## LISTING OF CHALLENGED CLAIMS<sup>1</sup>

| Claim Element | Claim Text                                                                                                                                                                                                                                   |
|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [1.0]         | A projection-type image display device comprising:                                                                                                                                                                                           |
| [1.1]         | a light source, including a solid-state light emitting element for emitting an excitation light therein, configured to emit white lights including a light emitting from a fluorescent substance, which is excited by said excitation light; |
| [1.2]         | a light separation optic system, configured to separate the white lights from said light source into red-color (R), green-color (G) and blue-color (B);                                                                                      |
| [1.3]         | a light modulation means, configured to make light-modulation on a respective one of the lights of the R, G and B separated, depending on a video signal; and                                                                                |
| [1.4]         | a projection means, configured to enlargedly project a respective one of optical images, which are formed by said light modulation means, wherein                                                                                            |
| [1.5]         | said fluorescent substance has plural numbers of concave portions on a surface, upon which said excitation light is incident.                                                                                                                |

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<sup>1</sup> For convenience purposes only, Patent Owner adopts for this Preliminary Response a numbering of claim elements advanced by Petitioner in the Petition. Patent Owner does not concede the appropriateness of such grouping and numbering of claim elements.

| <b>Claim Element</b> | <b>Claim Text</b>                                                                                                                                                                                                                                                                                  |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [3.0/3.1]            | The projection-type display apparatus, as described in the claim 1, wherein the emitting light are the lights in a wavelength region having a complementary color relationship with said excitation light with respect to a white color.                                                           |
| [4.0/4.1]            | The projection-type display apparatus, as described in the claim 3, wherein said solid-state light emitting element is a semiconductor laser element.                                                                                                                                              |
| [5.0/5.1]            | The projection-type display apparatus, as described in the claim 4, wherein said excitation light is the B-color light, and said emitting light is a yellow-color (Y) light.                                                                                                                       |
| [8.0/8.1]            | The projection-type display apparatus, as described in the claim 1, wherein said white lights are lights, which are almost in parallel.                                                                                                                                                            |
| [9.0/9.1]            | The projection-type display apparatus, as described in the claim 1, wherein each of said light modulation means is any one of a transmission-type liquid crystal panel, a reflection-type liquid crystal panel and a digital mirror device (DMD) made by aligning plural numbers of micro-mirrors. |

| <b>Claim Element</b> | <b>Claim Text</b>                                                                                                                                                                                                                            |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [32.0]               | A projection-type display apparatus, comprising:                                                                                                                                                                                             |
| [32.1]               | a light source, including a solid-state light emitting element for emitting an excitation light therein, configured to emit white lights including a light emitting from a fluorescent substance, which is excited by said excitation light; |
| [32.2]               | a light separation optic system, configured to separate the white lights from said light source into red-color (R), green-color (G) and blue-color (B);                                                                                      |
| [32.3]               | a light modulation means, configured to make light-modulation on a respective one of the lights of the R, G and B separated, depending on a video signal; and                                                                                |
| [32.4]               | a projection means, configured to enlargedly project a respective one of optical images, which are formed by said light modulation means, wherein                                                                                            |
| [32.5]               | said fluorescent substance has a concave portion, an excitation light incident side opening is larger than a bottom surface portion thereof, on a surface, upon which said excitation light is incident.                                     |

| <b>Claim Element</b> | <b>Claim Text</b>                                                                                                                                                                                                                         |
|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| [33.0/33.1]          | The projection-type display apparatus, as described in the claim 32, wherein the emitting light are the lights in a wavelength region having a complementary color relationship with said excitation light with respect to a white color. |
| [34.0/34.1]          | The projection-type display apparatus, as described in the claim 33, wherein said solid-state light emitting element is a semiconductor laser element.                                                                                    |
| [35.0/35.1]          | The projection-type display apparatus, as described in the claim 34, wherein said excitation light is the B-color light, and said emitting light is a yellow-color (Y) light.                                                             |
| [38.0/38.1]          | The projection-type display apparatus, as described in the claim 32, wherein said white light are lights, which are almost in parallel.                                                                                                   |

## **I. INTRODUCTION**

Patent Owner Maxell, Ltd. ("Patent Owner") respectfully requests that the Board deny institution because Petitioners, Coretronic Corporation and Optoma Corporation (collectively "Petitioners"), have failed to demonstrate a reasonable likelihood of success on the grounds submitted in its Petition for challenging the patentability of claims 1, 3-5, 8-9, 32-35, and 38 (the "challenged claims") of U.S. Patent No. 8,593,580 ("the '580 Patent").

None of the cited references alone or in combination disclose or suggest the arrangement of each limitation of the challenged claims. Moreover, the Petition is filled with conclusory statements that fail to demonstrate a reasonable likelihood of success on any ground and are neither bolstered nor supported by declaration of Jose Sasian, Ph.D., which parrots Petitioner's conclusory statements without additional analysis or evidence. *See* 37 C.F.R. §42.65(a) ("Expert testimony that does not disclose the underlying facts or data on which the opinion is based is entitled to little or no weight.").

For at least these reasons, Petitioner has failed to meet its burden of showing a reasonable likelihood of prevailing. Accordingly, the Board should deny Petitioner's request to institute inter partes review.

## **II. BACKGROUND AND SCOPE OF THE PROCEEDING**

### **A. Overview of the '580 Patent**

The '580 Patent, which claims priority to February 5, 2010, is directed to solving the problem of a diminishing lifetime of high-pressure mercury lamps when used as the light source device. *See, e.g.*, EX1001 at 2:17-23. Around the time of invention, conventional projectors substituted solid-state light sources for mercury lamps, but these devices lacked a point-like light source of white color light with the necessary amount of intensity. *Id.* at 2:44-61. This made devices at the time ill-suited to users' needs.

With these shortcomings in mind, the inventors of the '580 Patent set out to solve this problem. The result of these efforts, disclosed in the '580 Patent, improves over conventional devices by detailing a projection-type display apparatus with a solid-state light source (e.g., LEDs and lasers) capable of generating sufficient power to prevent performance deterioration (e.g., white-balance and/or color shading). *Id.* Conventional devices failed because they employed "a large number" of light sources "within a relatively large area," which could not build up a point-like light source of white color light having a necessary amount or intensity of lights. *Id.* at 2:46-55. Thus, '580 Patent's inventors developed a system using nearly point-like solid state light sources having sufficient power to resolve these issues. *Id.* at Abstract, 2:44-61.

**B. Patent Prosecution History**

U.S. Patent Application No. 14/240,799, which ultimately issued as the '580 Patent on April 26, 2016, was filed on May 10, 2013, as the continuation of application No. 12/898,763, filed on October 6, 2010 (and now issued as U.S. Patent No. 8,462,296). The '580 Patent claims priority to Japanese Application No. 2010-023911, filed on February 5, 2010.

**C. Summary of Petitioner's Proposed Grounds for Unpatentability**

Petitioner alleges that the challenged claims are unpatentable based on eight grounds. *See* Pet. at 11-12. The alleged invalidity grounds are summarized as follows:

| Ground | Patent Claims          | Type of Challenge          | Primary Reference | Secondary Reference(s) |
|--------|------------------------|----------------------------|-------------------|------------------------|
| 1      | 1, 3-5, 8-9, 32-35, 38 | pre-AIA 35 U.S.C. § 103(a) | Ishino            | Erchak                 |
| 2      | 1, 3-9, 32-38          | pre-AIA 35 U.S.C. § 103(a) | Ishino            | Li '415, Erchak        |
| 3      | 10, 18                 | pre-AIA 35 U.S.C. § 103(a) | Ishino            | Li '415                |
| 4      | 11, 17                 | pre-AIA 35 U.S.C. § 103(a) | Ishino            | Li '415, Bakker        |
| 5      | 1, 3-5, 8-9, 32-35, 38 | pre-AIA 35 U.S.C. § 103(a) | Uchiyama          | Erchak                 |
| 6      | 1, 3-9, 32-38          | pre-AIA 35 U.S.C. § 103(a) | Uchiyama          | Erchak                 |
| 7      | 10, 18                 | pre-AIA 35 U.S.C. § 103(a) | Uchiyama          | Li '415                |
| 8      | 11, 17                 | pre-AIA 35 U.S.C. § 103(a) | Uchiyama          | Li '415, Bakker        |

### **III. LEVEL OF ORDINARY SKILL**

A person of ordinary skill in the art ("POSITA") would have had a Bachelor of Science degree in Electrical Engineering, Physics, Optics or an equivalent degree, and at least one year of industrial field experience working in the field of optical engineering, optical design, or a related field. Additional education and/or industrial field experience may provide a substitute for one of the qualifications of a POSITA.

Contrary to the Petitioners' and Dr. Sasian's position regarding a POSITA, the technology disclosed in the '580 Patent does not require (1) a POSITA to have a Ph.D. in electrical engineering, physics, optical sciences, optical engineering, or a related scientific or engineering field, and at least one to two years of work or research experience in optical engineering, optical design, or a related field or (2) a Bachelor's degree in one of the foregoing areas and at least three to four years of work or research experience in optical engineering, optical design, optoelectronics, or a related field. Therefore, should the Board institute review of '580 Patent, Patent Owner's definition of POSITA should be adopted.

### **IV. CLAIM CONSTRUCTION**

For the purposes of the preliminary response, Patent Owner adopts the position that, unless argued differently below, terms should be given their plain and ordinary meaning.

**A. Constructions in the District Court Litigation**

**1. “light separation optic system” (Claims 1, 10, 32)**

| <b>Term</b>                                                     | <b>Maxell's Construction</b>                                                                                                                           | <b>Petitioner and Dr. Sasian's Construction</b>                                                                           | <b>Preliminary Construction in the District Court Litigation</b> |
|-----------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|
| “light separation optic system”<br><br>(EX1001, cls. 1, 10, 32) | Plain and ordinary meaning, for example, a collection of one or more optic units configured to separate light into different colors<br><br>(EX2008, 2) | Light separation optic system 30 and its equivalents, as described in the '580 Patent's specification<br><br>(Pet. at 24) | Plain and ordinary meaning<br><br>(EX2008, 2)                    |

The District Court adopted the plain and ordinary meaning of “light separation optic system” in its preliminary construction. EX2008, 2. Thus, to the extent that construction of “light separation optic system” is necessary, the Board should adopt the Court's preliminary construction.

2. “light modulation means” (Claims 1, 9, 10, 18, 32)

| Term                                             | Maxell's Construction                                                                                                                                                                                                                                                                                                                               | Petitioner and Dr. Sasian's Construction                                                                                                                                                                                                                                                                                                                                              | Preliminary Construction in the District Court Litigation                                                                                                                                         |
|--------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “light modulation means”<br>(EX1001, cls. 7, 37) | <p>Governed by pre-AIA 35 U.S.C. § 112 ¶ 6</p> <p><u>Function:</u><br/> making light-modulation on a respective one of the lights of the R, G and B separated, depending on a video signal</p> <p><u>Structure:</u> image display element such as a liquid crystal panel or a digital mirror device, and equivalents thereof</p> <p>(EX2008, 3)</p> | <p>“This is a means-plus-function element and should be interpreted as covering the corresponding structure described in the specification and equivalents thereof.”</p> <p><u>Function:</u> N/A</p> <p><u>Structure:</u> set of three panels, one for each separated color light, each panel having one of these three structures, and equivalents thereof</p> <p>Pet. at 24-25.</p> | <p><u>Function:</u> making light-modulation on a respective one of the lights of the R, G and B separated, depending on a video signal</p> <p><u>Structure:</u><br/> Argue</p> <p>(EX2008, 3)</p> |

In the District Court Litigation, both Petitioners and Patent Owner agreed “light modulation means” is a means-plus-function term but disagreed as to the function and structure. EX2008, 3. The Court adopted Patent Owner's construction for function: “making light-modulation on a respective one of the lights of the R, G and B separated, depending on a video signal.” *Id.* Thus, the Court is likely to also adopt Patent Owner's construction for structure.

**3. “light flux capturing means” (Claims 7, 37)**

| <b>Term</b>                                          | <b>Maxell’s Construction</b>                                                                                                                                                                                                                                         | <b>Petitioner and Dr. Sasian’s Construction</b>                                                                                                                                                                                                                                                                                                                                                                             | <b>Preliminary Construction in the District Court Litigation</b>                                                                         |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| “light flux capturing means”<br>(EX1001, cls. 7, 37) | Governed by pre-AIA 35 U.S.C. § 112 ¶ 6<br><br><u>Function</u> : capturing light flux<br><br><u>Structure</u> : a lens, a mirror, or a combination of lenses and/or mirrors that captures at least some portion of light, and equivalents thereof<br><br>(EX2008, 3) | If the Court determines that this term is amenable to construction, then Defendants propose that “light flux capturing means” be construed as a means plus function term with the following function and structure:<br><br><u>Function</u> : directing white light from the light source<br><br><u>Structure</u> : reflection surface, such as a mirror, having a focus point and equivalents thereof<br><br>Pet. at 42-43. | <u>Function</u> : directing light<br><br><u>Structure</u> : a reflection surface<br><br>OR<br><br>one or more mirrors<br><br>(EX2008, 3) |

In the District Court Litigation, Petitioners and Patent Owner agreed “light flux capturing means” is a means-plus function term, and the Court interpreted the function as “directing light” and the structure as either (1) “a reflection surface” or

(2) “one or more mirrors.” EX2008, 3. Regarding the two structure alternatives, the Board should adopt the second. “A reflection surface” implies there can only be one surface, but such an interpretation would directly contradict the ’580 Patent, which explicitly contemplates at least one embodiment employing more than one reflection surface (e.g., a separation mirror and a reflection mirror) to capture light flux. EX1001 at 7:57-8:11, 8:37-65. Thus, the Board should ensure consistency with the District Court and the ’580 Patent specification by construing the term’s (1) function as “directing light” and (2) structure as “one or more mirrors.” *See id.*

**B. Constructions Absent from the District Court Litigation**

**1. “separation mirror” (Claim 10)**

| <b>Term</b>         | <b>Maxell’s Construction</b> | <b>Petitioner and Dr. Sasian’s Construction</b>                                                                                                                                      |
|---------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| “separation mirror” | Plain and ordinary meaning   | If the Court determines that this term is amenable to construction, then Defendants propose that “separation mirror” be construed to encompass a dichroic mirror.<br><br>Pet. at 50. |

In the corresponding District Court litigation, Petitioners initially argued the Court should interpret “separation mirror” as an means-plus-function term because Petitioners claimed the ’580 Patent failed to disclose the term’s structure. EX2009,

6-7. Petitioners later admitted the term's plain and ordinary applies. EX2010, 15. Here however, Petitioners renewed their argument that "separation mirror" is a means-plus function term but claim its structure is a dichroic mirror. Pet. at 50. Petitioners' proposed construction is, therefore, inconsistent with its prior arguments in the District Court litigation. EX2009, 6-7. Petitioner further fails to identify the term's function. Pet. at 50. Thus, the Board should adopt Patent Owner's construction and interpret the term as its plain and ordinary meaning.

**2. "almost reflect[s]" and "almost passing" (Claim 11)**

| <b>Terms</b>                             | <b>Maxell's Construction</b> | <b>Petitioner and Dr. Sasian's Construction</b>                                                                                                                                                  |
|------------------------------------------|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| "almost reflect[s]" and "almost passing" | Plain and ordinary meaning   | The terms are ambiguous, but "to the extent [they] are amenable to construction, [they] are interpreted to mean 'reflects nearly all' and 'passing nearly all' respectively."<br><br>Pet. at 55. |

Petitioners fail to demonstrate that "almost reflect[s]" and "almost passing" are ambiguous. Pet. at 55 (citing EX1005, ¶ 54). In proposing these constructions, Petitioners solely rely on one paragraph of their expert's declaration without any further analysis. EX1004 at ¶ 54. Further, Petitioners' construction is fundamentally

flawed because it is inconsistent with the claim language and the specifications of the '580 Patent. *See* EX1001, Fig. 4.

## **V. LEGAL STANDARD**

Under 35 U.S.C. § 102(a) (pre-AIA), an issued patent is invalid if “the invention [therein] was . . . described in a printed publication . . . before the invention thereof by the applicant.” This statute “embodies the concept of novelty—if a device or process has been previously invented (and disclosed to the public), then it is not new, and therefore the claimed invention is ‘anticipated’ by the prior invention.” *Net MoneyIN, Inc. v. VeriSign, Inc.*, 545 F.3d 1359, 1369 (Fed. Cir. 2008). To anticipate, “the prior art reference . . . must not only disclose all elements of the claim within the four corners of the document, but must also disclose those elements ‘arranged as in the claim.’” *Id.* (citing *Connell v. Sears Roebuck & Co.*, 722 F.2d 1542, 1548 (Fed. Cir. 1983)).

A claim is also not patentable if the differences between the claim and the prior art are such that the subject matter as a whole would have been obvious to a POSITA at the time of the invention. 35 U.S.C. § 103(a) (pre-AIA). Obviousness requires assessing (1) the “level of ordinary skill in the pertinent art,” (2) the “scope and content of the prior art,” (3) the “differences between the prior art and the claims at issue,” and (4) “secondary considerations” of non-obviousness such as “commercial success, long felt but unsolved needs, failure of others, etc.” *KSR Int’l*

*Co. v. Teleflex Inc.*, 550 U.S. 398, 406 (2007) (quoting *Graham v. John Deere Co. of Kansas City*, 383 U.S. 1, 17-18 (1966)).

It is the petitioner's burden to prove unpatentability, *E.I DuPont de Nemours & Co. v. Synvina C.V.*, 904 F.3d 996, 1007 (Fed. Cir. 2018), and "to demonstrate both 'that a skilled artisan would have been motivated to combine the teachings of the prior art references to achieve the claimed invention, and that the skilled artisan would have had a reasonable expectation of success in doing so.'" *Intelligent Bio-Systems, Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1367-68 (Fed. Cir. 2016) (quotations and citations omitted). However, a petitioner must first show that all of the claimed elements are disclosed in the prior art. *See Medichem, S.A. v. Rolabo, S.L.*, 437 F.3d 1157, 1164 (Fed. Cir. 2006) (considering motivation to combine and reasonable expectation of success only "if all the elements of an invention are found in a combination of prior art references").

**VI. THE PETITION DOES NOT SHOW A REASONABLE LIKELIHOOD OF PREVAILING WITH RESPECT TO ANY CHALLENGED CLAIM**

**A. GROUND 1: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 1, 3-5, 8-9, 32-35, AND 38 ARE RENDERED OBVIOUS BY THE COMBINATION OF ISHINO AND ERCHAK**

Petitioners have failed to show by a preponderance of the evidence that Ishino in view of Erchak teaches each and every element of at least claims 1, 3-5, 8-9, 32-

35, and 38. Specifically, Ishino in combination with Erchak does not teach elements [1.1], [1.3], [1.5], [32.1], and [32.3].

**1. Petitioners Have Failed to Establish that a POSITA Would Combine Ishino and Erchak**

For Ground 1, Petitioners rely on Ishino and Erchak. Pet. at 15. Petitioners' rationales for combining Ishino and Erchak are deficient.

Petitioner fails to establish that a person of ordinary skill in the art ("POSITA") would have been motivated to combine Ishino and Erchak to arrive at the claimed invention. The references disclose fundamentally different optical architectures directed to distinct technical problems. Ishino describes a light bulb-based system with no dichroic mirror and no mechanism for managing excitation and fluorescent emission light paths. Erchak discloses LED-based semiconductor devices, but does not employ a dichroic mirror configured to both transmit excitation light and reflect fluorescent light, as required by the claims. The dual-function dichroic mirror in the claimed projector system enables precise spectral separation and efficient collection of fluorescent emission—a functionality absent from both references.

Moreover, Ishino and Erchak address different technical problems and operate within incompatible design frameworks. Ishino focuses on improving general illumination with broadband light sources, while Erchak addresses compact display

integration. Neither reference contemplates or suggests the complex wavelength-selective optics of the claimed invention. A POSITA would not have had a reason to combine these teachings, nor would such a combination yield the claimed optical structure without extensive modification. Additionally, both Ishino's reliance on broadband incandescent light and Erchak's emphasis on integrated waveguides teach away from incorporating free-space dichroic elements for dual-path light management. For these reasons, Petitioner's proposed combination is grounded in impermissible hindsight and lacks a sufficient evidentiary basis.

**2. Petitioners Have Failed to Establish that Claim Limitation [1.1]/[32.1] Would Have Been Obvious by Ishino in View of Erchak.**

Petitioners fail to show that the Ishino-Erchak combination discloses or renders obvious claim element [1.1]/[32.1], which recites "a light source, including a solid-state light emitting element for emitting an excitation light therein, configured to emit white lights including a light emitting from a fluorescent substance, which is excited by said excitation light." See EX1001, cl. 1, 32.

Petitioners' primary reference for Ground 1, Ishino, fails to disclose two components required by claim element [1.1]/[32.1]. Pet. at 22-23. First, Ishino makes no reference to a solid-state light emitting element (e.g., LED, laser). *Id.* Rather, Petitioners admit that Ishino discloses a lamp-based light source. See Pet. at 22 (citing EX1005, [0056]-[0057]). Second, Ishino lacks a fluorescent substance to

emit white light. *Id.* Because Ishino employs a lamp based light source, it already emits white light, abrogating any need for a fluorescent substance that can convert light of another color into white light. *See* EX1005, [0002], [0056]-[0057].

Erchak fails to cure the deficiencies of Ishino. Erchak only describes a solid-state light source configured to emit white light. EX1006, 3:44-4:11. Erchak does not disclose a projection display apparatus employing a solid-state light source. *Id.* As stated above, the POSITA would lack any motivation to combine the solid-state light source described in Erchak because previous attempts struggled with producing a point-like light source. *See* Section VI.A.1.

For at least the foregoing reasons, Petitioners fail to establish that claim limitation [1.1]/[32.1] would have been obvious based on Ishino and Erchak.

**3. Petitioners Have Failed to Establish that Claim Limitation [1.3]/[32.3] Would Have Been Obvious By Ishino in View of Erchak**

Petitioner fails to show that the Ishino-Erchak combination discloses or renders obvious claim element [1.3]/[32.3], which recites “a light modulation means, configured to make light-modulation on a respective one of the lights of the R, G and B separated, depending on a video signal.” EX1001 at cl. 1.

Both parties agree that “light modulation means” is a means-plus-function term. *See* Pet. at 25; Section IV.A.2. Again, in the District Court Litigation, the Court adopted Patent Owner's construction of the term's function: “making light-

modulation on a respective one of the lights of the R, G and B separated, depending on a video signal.” See Section IV.A.2. Yet, Petitioners, fail to establish that Ishino discloses such a function. Pet. at 25-26. Petitioners only describe the structures associated with “light modulation means” (e.g., liquid crystal panel, DMD). *Id.*

For at least the foregoing reasons, Petitioners fail to establish that claim limitation [1.3]/[32.3] would have been obvious based on Ishino and Erchak.

**4. Petitioners Have Failed to Establish that Claim Limitation [1.5]/[32.5] Would Have Been Obvious By Ishino in View of Erchak**

Petitioner fails to show that the Ishino-Erchak combination discloses or renders obvious claim element [1.5], which recites “wherein said fluorescent substance has **plural numbers of concave portions** on a surface, upon which said excitation light is incident.” EX1001 at cl. 1 (emphasis added).

Ishino lacks any mention of a fluorescent substance altogether, and Erchak makes no reference to a plural number of concave portions on its fluorescent surface. Petitioners argue that Erchak discloses a fluorescent substance with a plurality of concave portions but rely entirely on Dr. Sasian's declaration for this shaky proposition. Pet. at 27-28. Yet, the declaration lacks any explanation of Dr. Sasian's rationale or even any citation to Erchak. EX1004, ¶¶ 122-127. Instead, Petitioners cite only to ¶ 122, which simply recites the language of claim element [1.5] verbatim. Pet. at 27; EX1004, ¶ 122 (“Erchak discloses said fluorescent substance has plural

numbers of concave portions on a surface, upon which said excitation light is incident.”). While Erchak discloses a fluorescent substance, it only discloses a fluorescent substance (e.g., wavelength-converting region) wherein the entire substance has a “parabolic shape.” EX1004, ¶ 125; EX1006, 15:52-58. Thus, Erchak lacks any discussion of a plural number of concave portions on a surface of said fluorescent substance. *Id.*

For at least the foregoing reasons, Petitioners fail to establish that claim limitation [1.5] would have been obvious based on Ishino and Erchak.

**5. Petitioners Have Failed to Establish that Claims 3-5, 8, and 9 Would Have Been Obvious By Ishino in View of Erchak**

As Claims 3-5, 8, and 9 depend on claim 1, Petitioner's analysis of these dependent claims also suffer from the same deficiencies. *See* Sections VI.A.1, VI.A.2, VI.A.3.

**6. Petitioners Have Failed to Establish that Claims 32-35 and 38 Would Have Been Obvious By Ishino in View of Erchak**

Petitioners fail to show that Ishino in view of Erchak discloses claim elements [32.1] and [32.3]. *See* Sections VI.A.1-3. Claims 33-35 and 38 depend on Claim 32; thus, they also suffer the same deficiencies. *Id.*

**B. GROUND 2: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 1, 3-9, AND 32-38 ARE RENDERED OBVIOUS BY THE COMBINATION OF ISHINO, LI, AND ERCHAK**

Petitioners have failed to show by a preponderance of the evidence that Ishino in view of Li and Erchak teaches each and every element of claims 1, 3-9, and 32-38. Specifically, Ishino in combination with Li and Erchak does not teach elements [1.1], [1.3], [1.5], [32.1], and [32.3].

While Petitioner forwards Li '415 as an alternative to Erchak, the Combination of Ishino, Li '415, and Erchak still fails to cure the disclosure deficiencies with respect to claim elements [1.1], [1.3], [1.5], [32.1], and [32.3]. *See* Sections VI.A. Again, Ishino lacks a solid-state light source and a fluorescent substance, required respectively by each of the afore mentioned elements. *Id.* Further, Erchak cannot cure these deficiencies because Petitioners fail to establish that a POSITA would be motivated to combine Erchak and Li. *See* Section VI.A.1. Even combined, Ishino and Erchak still fail to teach claim element [1.5], which requires **a plural number** of concave portions on said fluorescent substance. *See* Section VI.A.4.

Petitioners admit that Li '415, like Erchak, discloses a solid-state light source emitting white light. Pet. at 37. Still, a POSITA would lack the motivation to combine Li '415 for the same reasons discussed regarding Erchak. *See* Section VI.A.1. Petitioners nonetheless rely solely on Ishino for their arguments as to claim

elements [1.3] and [32.3] and Erchak for their arguments as to claim element [1.5]. Pet. at 39. Thus, the addition of Li '415 does nothing for curing these deficiencies in Claims 1 and 32. *Id.* As Claims 3-9 and 33-38 depend on Claims 1 and 32 respectively, Petitioners' analysis of the remaining claims in Ground 2 also fails. *See id.*

**C. GROUND 3: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 10 AND 18 ARE RENDERED OBVIOUS BY THE COMBINATION OF ISHINO AND LI**

Petitioners have failed to show by a preponderance of the evidence that Ishino in view of Li teaches each and every element of claims 10 and 18. Specifically, Ishino in combination with Li does not teach elements [10.1] and [10.3].

**1. Petitioners Have Failed to Establish that a POSITA Would Combine Ishino and Li '415**

Petitioner's proposed combination of Li '415 and Ishino is improperly grounded in hindsight and fails to provide a sufficient rationale for combining these disparate references in a manner that would yield the claimed separation mirror.

The claimed separation mirror must be disposed between the solid-state light source and the fluorescent substance, and must be configured to both pass excitation light toward the fluorescent substance and reflect fluorescent light thereon. Neither Ishino nor Li '415 discloses or suggests this structure or functionality, and a POSITA would not be motivated to combine them to achieve it.

Ishino employs a light bulb-based architecture without any solid-state light sources, without a fluorescent substance, and without any dichroic mirror. There is no structure or optical path in Ishino capable of supporting the required interaction between excitation light and fluorescent emission through a dichroic mirror. Adding such a configuration to Ishino would require complete redesign, not a routine or predictable modification.

Li '415, while disclosing a dichroic filter, uses it for an entirely different purpose: to divide excitation light into two paths for imaging or microscopy applications—not to manage the round-trip passage of excitation and fluorescent emission between a solid-state light source and a fluorescent substance as required by the claims. Li '415's dichroic filter is not disposed between a solid-state emitter and a fluorescent substance in the manner required by the claims, nor is it configured to perform the dual-pass/reflective functionality recited.

Furthermore, Ishino lacks the necessary solid-state light source and fluorescent substance entirely; thus, a POSITA would have no reasonable expectation of success in attempting to combine Li's unrelated dichroic arrangement with Ishino's incompatible system. The proposed combination is not suggested by the prior art and would require substantial redesign guided only by improper hindsight of the challenged claims.

**2. Petitioners Have Failed to Establish that Claim Elements [10.1] and [10.5] Would Have Been Obvious By Ishino in View of Li '415**

Petitioners fail to show a likelihood of prevailing with respect to Ishino in view of Li '415. Petitioners' primary reference for Ground 3, Ishino, fails to disclose a solid-state light source and a fluorescent substance emitting white light, as required by claim elements [10.1] and [10.5]. *See* Section VI.A.2. Even assuming a motivation to combine the references existed at the time of invention, combining Ishino and Li '415 is not a simple substitution and its result are not easily predictable. Dr. Sasian failed to demonstrate that a combination of Ishino and Li '415 are compatible that such simple substitute of parts in the projector would result in an operable system. EX1004, ¶ 218. For instance, Dr. Sasian's declaration lacks any simulation or modeling to demonstrate how the lenses in these systems operate upon substitution of the light sources. *Id.* Moreover, Petitioners argue "separation mirror," as used in claim element [10.5], is a means-plus-function term but fail to define the function. *See* Pet. at 50. Petitioners only claim the structure should encompass a dichroic mirror without mentioning the corresponding function. *Id.* Thus, Li '415 fails to cure Ishino's deficiencies with respect to claim elements [10.1] and [10.5].

For at least the foregoing reasons, Petitioners fail to establish that Claim 10 would have been obvious based on Ishino and Erchak. Further, Claim 18 depends

from Claim 10, rendering Petitioners' invalidity arguments for Claim 18 similarly deficient. *See id.*

**D. GROUND 4: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 11 AND 17 ARE RENDERED OBVIOUS BY THE COMBINATION OF ISHINO, LI, AND BAKKER**

Petitioners have failed to show by a preponderance of the evidence that Ishino in view of Li and Bakker teaches each and every element of claims 11 and 17. Because Claims 11 and 17 depend on Claim 10, which is deficient for the reasons stated above, Petitioners' invalidity arguments as to Claims 11 and 17 are similarly deficient. *See* Section VI.C.

**E. GROUND 5: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 1, 3-5, 8-9, 32-35, AND 38 ARE RENDERED OBVIOUS BY THE COMBINATION OF UCHIYAMA AND ERCHAK**

Petitioners have failed to show by a preponderance of the evidence that Uchiyama in view of Erchak teaches each and every element of claims 1, 3-5, 8-9, 32-35, and 38. Specifically, Uchiyama in combination with Erchak does not teach elements [1.1], [1.3], [1.5], [32.1], and [32.3]. *See* Sections VI.A.1, VI.A.2, VI.A.3, VI.A.4, and VI.A.6.

Petitioner's proposed combination of Uchiyama and Erchak suffers from the same fundamental deficiencies as its combination of Ishino and Erchak, and fails for similar reasons. Like Ishino, Uchiyama is a light bulb-based projection system that

lacks any solid-state light source, fluorescent substance, or dichroic mirror configured as required by the claims. It addresses problems specific to broadband bulb-based projection, and its architecture is incompatible with the solid-state fluorescent projection system recited in the claims.

Uchiyama's optical system does not include a dichroic mirror disposed between a solid-state light source and a fluorescent substance, nor does it perform the dual functionality of passing excitation light toward a fluorescent substance and reflecting fluorescent light back through the projection optics. There is no disclosure or suggestion in Uchiyama of managing such an optical path.

Erchak, while disclosing LED-based structures, likewise fails to disclose or suggest the required dichroic configuration, and focuses on compact integrated emitter structures—not projector systems with free-space optical components or fluorescent emission collection. A POSITA would not look to Erchak to solve any problem in Uchiyama, nor would such a combination result in the claimed configuration.

Furthermore, combining a bulb-based architecture (Uchiyama) with an LED-based microdisplay architecture (Erchak) requires substantial redesign of the system architecture, as these technologies involve incompatible design constraints and address different technical problems. The proposed combination is not a simple

substitution of known equivalents, but rather a hindsight-driven reconstruction requiring impermissible knowledge of the claims.

Thus, for the same reasons that the Ishino and Erchak combination is deficient, so too is Uchiyama and Erchak an improper and unsupported combination that would not result in the claimed invention. Petitioners invalidity arguments for Claims 1 and 32, therefore, fail because Erchak cannot cure the similar deficiencies exhibited in Ishino and Uchiyama. *See* Sections VI.A.1, VI.A.2, VI.A.3, VI.A.4, and VI.A.6. As Claims 3-5 and 8-9 depend on Claim 1, they are deficient for the same reasons. *See id.*

**F. GROUND 6: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 1, 3-9, AND 32-38 ARE RENDERED OBVIOUS BY THE COMBINATION OF UCHIYAMA, LI, AND ERCHAK**

Petitioners have failed to show by a preponderance of the evidence that Uchiyama in view of Li and Erchak teaches each and every element of claims 1, 3-9, and 32-38. Specifically, Uchiyama in combination with Li and Erchak does not teach elements [1.1], [1.3], [1.5], [32.1], and [32.3]. *See* Sections VI.A.1, VI.A.2, VI.A.3, VI.A.4, and VI.A.6. Petitioners' invalidity arguments for Claims 1 and 32 in light of Uchiyama, Li, and Erchak fail for the same reasons Petitioners' arguments fail for Claims 1 and 32 in light of Ishino, Li, and Erchak. *Id.*

Specifically, Petitioner's proposed combination of Uchiyama, Li, and Erchak is an improper hindsight-driven reconstruction of the claimed invention, not a routine or predictable combination of teachings from the prior art.

Uchiyama remains a bulb-based projector, lacking a solid-state light source and optimized for broadband lamp-based illumination—not for fluorescence-based projection. Retrofitting Uchiyama to adopt a solid-state fluorescent architecture as in the claims would require wholesale redesign of the optical engine and light path.

While Li discloses a dichroic mirror disposed between a solid-state light source and a fluorescent substance, it does so in the context of microscopy / imaging, not projection. Li's system is designed to manage high-efficiency light collection over small fields of view, not to achieve the uniform, high-intensity, large-field projection performance required in a projector. The geometry, optical path design, and tradeoffs in Li are entirely different from those needed for a projector. Li does not teach or suggest how to implement its architecture in a projector optical engine, nor how to adapt its light collection and projection path for that use.

Erchak, meanwhile, remains a microdisplay reference and offers no teaching on building a projection system with the required architecture. Combining Li's microscopy-based dichroic system with a bulb-based projector and a microdisplay system would require extensive redesign across all subsystems—solid-state light

integration, light engine geometry, thermal management, projection optics—none of which is taught or suggested by the prior art.

A POSITA would not have had a reasonable expectation of success in combining these disparate references to achieve the claimed projector system. The proposed combination is guided by hindsight, not by any teaching or motivation in the prior art.

Thus, Petitioners' invalidity arguments are still deficient as to Claims 1 and 32. *Id.* Further, Claims 3-9 and 33-38 depend on Claims 1 and 32 respectively, rendering them similarly deficient. *Id.*

**G. GROUND 7: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 10 AND 18 ARE RENDERED OBVIOUS BY THE COMBINATION OF UCHIYAMA AND LI**

Petitioners have failed to show by a preponderance of the evidence that Uchiyama in view of Li teaches each and every element of Claims 10 and 18. Petitioners' invalidity arguments for Claim 10 in light of Uchiyama and Li fail for the same reasons Petitioners' arguments fail Claim 10 in light of Ishino and Li. *See* Section VI.C. Further, Claim 18 depends from Claim 10, rendering Petitioners' invalidity arguments for Claim 18 similarly deficient. *See id.*

In particular, Petitioner's combination of Uchiyama and Li in Ground 7 fails for similar reasons as described above.

Uchiyama remains a bulb-based projector that is fundamentally incompatible with the solid-state fluorescent architecture recited in the claims. While Li discloses a dichroic mirror disposed between a solid-state light source and a fluorescent substance, it does so in a microscopy or imaging context—not for a projector. The technical requirements and optical design constraints for microscopy (high collection efficiency in a small, often single-point field of view) are entirely different from those for uniform, large-area projection onto a screen.

Li's architecture is not designed for the high throughput, high uniformity, wide-angle light management required in a projector light engine. Nor does Li disclose or suggest how to adapt its system for such a purpose. Combining Li's imaging-based optical path with Uchiyama's bulb-based projector architecture would require extensive redesign, and a POSITA would not reasonably expect success in doing so based on the teachings of the prior art.

Thus, Petitioner's proposed combination remains an improper hindsight-driven attempt to piece together disparate systems to reconstruct the challenged claims.

**H. GROUND 8: PETITIONERS HAVE FAILED TO ESTABLISH THAT CLAIMS 11 AND 17 ARE RENDERED OBVIOUS BY THE COMBINATION OF UCHIYAMA, LI, AND BAKKER**

Petitioners have failed to show by a preponderance of the evidence that Uchiyama in view of Li and Bakker teaches each and every element of claims 11

and 17. Petitioners' invalidity arguments for Claim 10 in light of Uchiyama, Li, and Bakker fail for the same reasons Petitioners' arguments fail for Claim 10 in light of Ishino, Li, and Bakker. *See* Section VI.D.

Because Claims 11 and 17 depend on Claim 10, Petitioners' invalidity arguments are similarly deficient. *See id.*

## **VII. CONCLUSION**

For at least the foregoing reasons, the Board should deny institution of the Petition.

Dated: June 10, 2025

Respectfully submitted,

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**CERTIFICATE OF SERVICE**

I hereby certify that on this 10th day of June, 2025, a copy of the attached Patent Owner Response To Petition For Inter Partes Review, together with all exhibits was served by electronic mail to the attorneys of record, at the following addresses:

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**CERTIFICATION PURSUANT TO 37 C.F.R. § 42.24(d)**

Pursuant 37 CFR 42.24(d), the undersigned certifies that this Preliminary Response and complies with the type-volume limitation of 37 CFR §42.24(a). The word count application of the word processing program used to prepare this Preliminary Response indicates that the Preliminary Response contains 5,539 words, excluding the parts of the brief exempted by 37 C.F.R. § 42.24(a).

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