

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

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|------------------------------------------|---|--------------------------------|
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| Inventors: Robert A. Medwick, Glen Stark | § | 110797-0018-652                |
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| Former Group Art Unit: 2622              | § | Electronics Co., Ltd.; Samsung |
| Former Examiner: D. Ometz; K. Jerabekz   | § | Electronics America, Inc.;     |
|                                          | § | Samsung Semiconductor, Inc.    |

For: STROBE LIGHTING SYSTEM FOR DIGITAL IMAGES

MAIL STOP PATENT BOARD  
Patent Trial and Appeal Board  
United States Patent and Trademark Office  
Post Office Box 1450  
Alexandria, Virginia 22313-1450

**PETITION FOR INTER PARTES REVIEW OF  
UNITED STATES PATENT NO. 7,092,029**

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## LIST OF EXHIBITS

| <b>Exhibit</b> | <b>Description</b>                                                                                                       |
|----------------|--------------------------------------------------------------------------------------------------------------------------|
| Ex.1001        | U.S. Patent No. 7,092,029                                                                                                |
| Ex.1002        | U.S. Patent No. 7,092,029 File History                                                                                   |
| Ex.1003        | U.S. Prov. Appl. No. 60/192,008                                                                                          |
| Ex.1004        | U.S. Patent No. 6,195,127 (“Sugimoto”)                                                                                   |
| Ex.1005        | Japanese Patent Appl. No. H11-119288 (“Shimada”)                                                                         |
| Ex.1006        | U.S. Patent No. 5,257,063 (“Ishimaru”)                                                                                   |
| Ex.1007        | Japanese Patent Appl. No. H01-289925 (“Nakajima”)                                                                        |
| Ex.1008        | U.S. Patent No. 5,987,261 (“Sugahara”)                                                                                   |
| Ex.1009        | U.S. Patent No. 5,652,929 (“Yasukawa”)                                                                                   |
| Ex.1010        | U.S. Patent No. 6,426,775 (“Kurokawa”)                                                                                   |
| Ex.1011        | U.S. Patent No. 4,484,807 (“Kataoka”)                                                                                    |
| Ex.1012        | Electronic Flash, Strobe; Harold E. Edgerton (2d ed. MIT Press 1979)                                                     |
| Ex.1013        | Electronic Flash; Jack Neubart (Silver Pixel Press 1997)                                                                 |
| Ex.1014        | Fundamentals of Electronic Imaging Systems: Some Aspects of Image Processing, W.F. Schreiber, (3 <sup>rd</sup> ed. 1993) |
| Ex.1015        | Canon EOS Elan II Instructions; English Edition (1995)                                                                   |
| Ex.1016        | Kodak DCS 500 Series Digital Cameras User’s Guide (2000)                                                                 |
| Ex.1017        | Canon Speedlite 380EX Instructions; English Edition (1995)                                                               |
| Ex.1018        | Canon Flash Work: Taking Great Pictures with Canon Speedlites (1999)                                                     |
| Ex.1019        | Kodak Pro DCS 520 Review, Phil Askey (February 1999)                                                                     |
| Ex.1020        | Magic Lanterns Guides: Nikon SB-25 Flash System (1993)                                                                   |
| Ex.1021        | Nikon D1 Camera Instruction Manual                                                                                       |
| Ex.1022        | Press Release – Nikon D1 Camera (June 15, 1999)                                                                          |
| Ex.1023        | Nikon D1 Camera Brochure (August 22, 2000)                                                                               |
| Ex.1024        | Nikon Speedlight SB-28DX Instruction Manual                                                                              |
| Ex.1025        | Press Release - Nikon SB-28DX (June 15, 1999)                                                                            |
| Ex.1026        | Minolta Maxxum Flash Program Flash 5400HS Instruction Manual (1993)                                                      |
| Ex.1027        | Minolta Dynax 9/Maxxum 9 Instruction Manual (1999)                                                                       |
| Ex.1028        | Popular Photography (March 1999)                                                                                         |
| Ex.1029        | SLR: Nikon Takes a Giant Step Forward with New N90 AF SLR, Popular Photography (October 1992)                            |
| Ex.1030        | Nikon N90 Instruction Manual                                                                                             |
| Ex.1031        | Magic Lanterns Guides: Nikon SB-28 AF Speedlite (1999)                                                                   |

|         |                                                                  |
|---------|------------------------------------------------------------------|
| Ex.1032 | Joint Submission of Disputed Claim Terms, Case No. 4:14-cv-00371 |
| Ex.1033 | Declaration of Kenneth Parulski                                  |
| Ex.1034 | Declaration of William M. Serra                                  |

Pursuant to §§ 311-319 and Rule § 42,<sup>1</sup> the undersigned, on behalf of and acting in a representative capacity for Samsung Electronics Co., Ltd., Samsung Electronics America, Inc. (SEA), and Samsung Semiconductor, Inc. (collectively “Petitioner”), hereby petitions for inter partes review of claims 1, 6, 7, 14, and 16 (“Challenged Claims”) of U.S. Pat. No. 7,092,029 (“the ’029 Patent”), issued to ESS Technology, Inc. (“ESS”). Petitioner asserts there is a reasonable likelihood that at least one of these claims is unpatentable and respectfully requests review of, and judgment against, the Challenged Claims as unpatentable under § 103.

## **I. INTRODUCTION**

By March 24, 2000, the priority date of the ’029 Patent, photographers had known for years that, when taking pictures with a flash, they could use a “pre-flash” to measure the luminance level of the subject they wanted to photograph, and could use that information to determine the correct emission of the main flash. Photographers had also been well aware that, in doing so, they could “weight” particular areas of the image to make sure the part of the picture they cared about was illuminated correctly. Indeed, as detailed herein, by March of 2000, many major camera manufacturers—including Canon, Nikon, and Minolta—had flash control systems available for sale in the United States that did exactly this. And, unsurprisingly—given that these systems had been advertised around the world for years—

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<sup>1</sup> Section cites are to 35 U.S.C. or 37 C.F.R., and emphasis is added unless noted.

Persons of Ordinary Skill in the Art (POSITAs) were similarly aware of these techniques. Thus, the '029 Patent claims nothing new or non-obvious, and the applicants did not disclose to the Examiner much prior art—including references cited herein—relevant to their application.

The '029 Patent relates to “a strobe lighting system used in the capturing of for [sic] digital images.” Ex.1001 1:14-15. In simplest terms, the specification purports to relate to the use, in photography, of a “preparatory light” (pre-flash) before the “supplemental strobe” (main flash), together with analysis of the “preparatory image” captured when using the pre-flash, to set the duration of (and so the amount of light emitted during) the main flash to ensure correct illumination. The specification describes “an approach to determine an average preparatory luminance based on the preparatory image data and weighting at least a subset of the prepara-

|   |   |   |   |   |   |   |   |   |   |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 0 | 1 | 2 | 4 | 4 | 2 | 1 | 0 | 0 | 0 |
| 0 | 1 | 4 | 8 | 8 | 4 | 1 | 0 | 0 | 0 |
| 0 | 1 | 4 | 8 | 8 | 4 | 1 | 0 | 0 | 0 |
| 0 | 1 | 2 | 4 | 4 | 2 | 1 | 0 | 0 | 0 |
| 0 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |
| 0 | 1 | 2 | 2 | 2 | 2 | 1 | 0 | 0 | 0 |

Luminance Weighting Table  
FIG. 9

tory image data.... The duration of the supplemental strobe is adjusted based on the weighting of the luminance of the preparatory image....” See Ex.1001 2:21-32.

The specification states that “a system is needed to generate supplemental light that accords more weight to an area of interest of the image” and depicts a “luminance weighting table” used to determine the weighting. Id. 2:15-17, Fig. 9. Further, in order to determine the appropriate duration of the main flash, the '029 specification invokes the use of a “look-up table” (“LUT”)

(which is different from the luminance weighting table above) correlating “power values” and associated “image strobe durations” in order to look up the “strobe duration for the strobe by accessing the look-up table ... in accordance with a relationship between the average image weighted luminance and a target luminance . . .” Id. 9:8-11.

But there is nothing new in the Challenged Claims. The supposed “invention” was at minimum obvious before the earliest March 24, 2000 priority date listed on the '029 Patent. See, e.g., Ex.1033 ¶¶ 85-86; 117-18. According to the file history, the independent claims were allowed over the prior art on the basis of a single limitation directed to a LUT.<sup>2</sup> However, even this limitation was well known. Indeed, Japanese Pat. App. No. H11-119288 (“Shimada”), one of two primary references cited in this petition, read in light of a POSITA’s knowledge, renders obvious all limitations of the Challenged Claims. And even if it is argued that some further disclosure is required, all limitations of the Challenged Claims are certainly obvious over the combinations of Shimada, U.S. Pat. No. 6,195,127 (“Sugimoto”), and the other art cited herein, together with the knowledge of a POSITA.

Shimada discloses a camera system and method for determining the duration

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<sup>2</sup> During prosecution, the Examiner found that Sugimoto disclosed all but one limitation in each of the independent Challenged Claims. Ex.1002 at 194-99.

of the “main flash” by generating a “pre-flash,” receiving the reflected light for that pre-flash with an “imaging element,” and performing photometry (the measuring of image luminance) on only a portion of the preparatory image in order to weight the image data. See Ex.1005 ¶ 31. Shimada further details the use of a LUT (correlating emitted light and flash duration) to determine the main flash duration. See id. Sugimoto, the second primary reference, discloses a camera system and method for determining the duration of the “major light emission” (the “proper flash duration”) by acquiring an image while generating a “preliminary light-emission” and weighting the image data according to a luminance “weighting amount table.” See Ex.1004 11:3-46.

As demonstrated below, every element of the Challenged Claims has been disclosed in the prior art. The claims are nothing more than a routine and predictable combination of these well-known elements. Thus, Petitioner respectfully requests that the Board find each of the Challenged Claims invalid under § 103.

## II. MANDATORY NOTICES UNDER § 42.8

**Samsung is the Real Party in Interest Under § 42.8(b)(1).** The real parties-in-interest are Petitioners Samsung Electronics Co., Ltd.; Samsung Electronics America, Inc.; and Samsung Semiconductor, Inc.

**Related Matters Under Rule § 42.8(b)(2).** Imperium IP Holdings (Cayman), Ltd. (“Imperium”) has asserted claims 1, 6, 7, 14, and 16 of the ’029 Patent

against Petitioner in Imperium IP Holdings (Cayman) v. Samsung Electronics Co., et al., Case No. 4:14-cv-00371 (ALM) (E.D.T.X., filed June 9, 2014) (“EDTX”).<sup>3</sup>

**Lead and Back-Up Counsel Under Rules 42.8(b)(3) and (4).** Lead and backup counsel, and service information are designated in the signature block.

### III. PETITIONER HAS STANDING

#### A. Grounds for Standing Under § 42.104(a)

Petitioner certifies pursuant to 37 C.F.R. § 42.104(a) that the '029 Patent is eligible for (and that Petitioner is not barred or estopped from requesting) inter partes review. Petitioner was served with a Complaint asserting infringement of the '029 Patent on or after June 9, 2014, and neither Petitioner nor any other real party-in-interest, nor privy of Petitioner, was served with a complaint before that date, or has initiated a civil action challenging validity of the '029 Patent.

#### B. Claims and Statutory Grounds Under §§ 42.22 and 42.104(b)

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<sup>3</sup> In EDTX, Imperium sued Petitioners, along with Samsung Telecommunications America, LLC (“STA”) and Samsung Techwin Co., LTD. and Samsung Opto-Electronics America, Inc. (together “Techwin”). On Jan. 1, 2015, STA merged with SEA, and ceased to exist as a separate corporate entity. See EDTX, Dkt. No. 67. The EDTX court severed Imperium’s case against Techwin, following briefing establishing that Techwin and Petitioners are separate parties. See id, Dkt. No. 66. Techwin is not a privy of a Petitioner or a party-in-interest in this proceeding.

Petitioner requests inter partes review of claims 1, 6, 7, 14, and 16 and asserts that these claims are unpatentable as follows: **Ground 1:** Claims 1, 6, 7, 14, and 16 are obvious under § 103 over Shimada in view of the knowledge of a POSITA; **Ground 2:** Claims 1, 6, 7, 14, and 16 are obvious under § 103 over Shimada in view of Sugimoto, and U.S. Pat. No. 6,426,775 (“Kurokawa”), in further view of the knowledge of a POSITA; **Ground 3:** Claims 1, 6, 7, 14, and 16 are obvious under § 103 over Sugimoto in view of Shimada, in further view of the knowledge of a POSITA; and **Ground 4:** Claims 1, 6, 7, 14, and 16 are obvious under § 103 over Sugimoto in view of Kurokawa,<sup>4</sup> in further view of the knowledge of a POSITA. (Only Sugimoto was considered during earlier prosecution, and never in the combinations relied on herein.) §§ V.C.6 and V.D.3 below provide claim charts specifying how the prior art renders obvious claims 1, 6, 7, 14, and 16. In further support of the proposed grounds of rejection, the Declaration of technical expert Kenneth Parulski is attached as Ex.1033.

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<sup>4</sup> Petitioner is not aware of any evidence suggesting Imperium could swear behind Shimada, which is prior art under at least § 102(a). Regardless, if Imperium attempts to do so, Kurokawa together with the knowledge of a POSITA similarly discloses the limitations in the claims that: (1) are disclosed by Shimada; and (2) applicants added to overcome the Examiner’s rejection in view of Sugimoto.

#### **IV. SUMMARY OF THE '029 PATENT AND ITS FIELD**

##### **A. Overview of the '029 Patent**

The '029 Patent describes a camera system and method for adjusting the emission of a flash in order to obtain proper image exposure. Ex.1001 Abstract; Ex.1033 ¶¶ 51-59. The Challenged Claims are generally directed to components or steps for adjusting image lighting by capturing a preparatory image after generating a preparatory flash for a predetermined amount of time, weighting the luminance data of the preparatory image, determining the average preparatory image luminance, and generating a supplemental strobe duration based on the weighted average preparatory image luminance. *Id.* cl. 1, 7, 14. The Challenged Claims further require generating or accessing a LUT that associates image strobe durations and power values. *Id.* The supplemental strobe duration is obtained by determining an image power value based on the weighted average luminance of the preparatory image and a target luminance. The LUT is then referred to, to find the strobe duration corresponding to this power value. *Id.* 9:18-35. The '029 Patent states that the adjustment of image lighting according to the alleged invention enhances the overall visual quality of the exposed digital image. Ex.1001 2:29-32. However, all elements of the Challenged Claims were well known before March 24, 2000, and the claimed combination would at minimum have been obvious to a POSITA.

##### **B. Overview of the '029 Patent Prosecution History**

The application was filed March 22, 2001, claiming priority to U.S. Prov. App. No. 60/192,008, filed March 24, 2000. As the provisional admits, “prior art method[s]” to adjust lighting existed wherein “a preparatory image is generated and an average value of the preparatory image data is calculated. The duration of the supplemental light is determined based on the average value of the image data.” Ex.1003 p. 11:32-12:2; see also Ex.1001 2:1-8. Applicants’ original claims were directed to such a method and apparatus, but the Examiner rejected prosecution claims 1-3 and 7-9 under § 102(e) as anticipated by Sugimoto (Ex.1004) and claims 14-16 as obvious over Sugimoto in view of U.S. Pat. 5,987,261 (“Sugahara”)<sup>5</sup> (Ex.1008), and objected to claims 4-6, 10-13, and 17 as being dependent upon a rejected claim. Ex.1002 at 196-200. The Examiner recognized a motivation to combine Sugimoto and Sugahara: “Sugahara reveals that it is well known in the art to store the time of the actual light in a LUT (See col. 4, lines 1-33). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Sugimoto’s device by implementing Sugahara’s teachings in an effort to consistently and quickly obtain an appropriate amount of light.” Id. at 198.

Applicants made an unsuccessful attempt to overcome the Examiner’s rejection by amending the claims to require a “single” preparatory image, arguing that

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<sup>5</sup> Sugahara and Shimada have similar disclosures and identical named inventors.

Sugimoto disclosed use of multiple preparatory images. Id. at 171-77, 185-87.

When this failed, Applicants further amended the claims to include a limitation directed to generating (cls. 1, 7) or accessing (cl. 14) a look-up table, with the LUT storing power values and associated image strobe durations including preparatory power values and associated preparatory image strobe durations. Id. at 95-101; 109-10. The Examiner subsequently allowed the claims. See id. at 9.

### **C. Overview of the Field of the Claimed Invention**

As noted, by March 24, 2000, photographers knew that they could use information generated from a pre-flash to measure the luminance level of the scene they wanted to photograph to determine the correct emission of the main flash—and that they could “weight” particular portions of the scene to illuminate properly the desired part of the image. Such flash control systems had been in use since the 1990s in commercially available cameras from such major camera manufacturers as Canon, Nikon, Kodak, and Minolta. See Ex. 1015 at 82-85; Ex.1033 ¶ 24-33. As but one example, cameras equipped with Canon’s “Evaluative Through the Lens” (“E-TTL”) System, such as the Canon EOS Elan II, coupled with a Canon Speedlite 380EX flash (both available in 1995), operated by emitting a test pre-flash to obtain an initial flash exposure reading using one metering sensors. See Ex.1017 at 2, 10, 11, 14; Ex.1033 ¶ 43. The exposure reading was then used to compute the main flash output. See Ex.1017 at 10 (“Immediately before the shutter

is released, the Speedlite fires a test preflash. After obtaining a flash exposure reading with the preflash, the Speedlite fires the main flash accordingly....”); see also Ex.1033 ¶¶ 32, 44-45 (Canon); ¶¶ 32, 39-42 (Nikon); ¶ 33 (Minolta).

In the late 1990s, camera manufacturers developed these established techniques further as they began to shift to digital SLRs. Ex.1033 ¶¶ 34-50. One example of such a system (introduced in 1998) was the Canon D2000/Kodak DCS520 equipped with a Canon Speedlite 380EX practicing Canon’s E-TTL system. See, e.g., Ex.1016 at 164 (“E-TTL uses the camera’s evaluative metering sensor to analyze and compare ambient light exposure values with illumination reflected from the subject by the preflash. This data is used to calculate and store the flash output required for optimum exposure of the main subject....”); Ex.1033 ¶ 44. Another example was the Nikon D1 camera with the Speedlight SB-28DX external flash, offered for sale in or about 1999, which utilized Nikon’s “Digital Through the Lens” (“D-TTL”) system. See Ex.1021 at 107 (“[This system] emits a series of nearly invisible preflashes (monitor preflashes) that are reflected from objects in all areas of the frame and picked up by the camera’s five-segment TTL multi sensor.... Based on this information, the flash output level is automatically compensated to balance flash output with ambient light.”).

Prior to March 24, 2000, the techniques described by the Challenged Claims were also described in many publications. Indeed, the concept of using a pre-flash

to adjust main flash emission was widespread in patent publications. One such patent is Sugahara, titled “Strobe Device” and filed Sept. 9, 1998. Ex.1008. Sugahara describes a camera system including an image sensor, A/D converter, memory, and flash controller that generates a fixed amount of preparatory light a plurality of times to set an amount of actual light to be generated for the main exposure. Id. at Abstract; Fig. 1, 2. Sugahara further describes determining the main flash duration by referencing a LUT correlating flash duration and desired amount of emitted light. See id. at 6:48-58. Another example is U.S. Pat. No. 5,652,929 (“Camera Having Through-the-Lens Automatic Light Adjustment Control Device,” filed Sept. 1, 1995), which describes “multi-light adjustment technology” using pre-flash emission prior to a main flash as known in the prior art. See Ex.1009 1:30-55. And, of course, similar disclosures were also in patents including Sugimoto and Kurokawa. See Ex.1004 1:56-2:8; Ex.1010 2:25-36.

And it was not simply the general concept of using a pre-flash to determine the main flash that was well known in the art. The other claimed components of the ’029 Patent, including the use of a weighting operation to emphasize certain portions of the preliminary image and generation and use of a LUT correlating flash durations and associated power values, were also well understood.

For example, with respect to the use of a weighting operation, the multi-zone, pre-flash luminance metering sensor of the Canon E-TTL system was

“linked to the camera’s multiple focusing points so that the metering is weighted at the point where focus is achieved (where the main subject is assumed to be).”

Ex.1018 at 9 (left col.); see also Ex.1015 at 49 (“Centerweighted averaging metering: The metering is weighted at the center and then averaged for the entire scene.”). The Nikon D-TTL system performed the same way. See Ex.1021 at vi (“Center-weighted metering: The camera measures light in the entire frame, but assigns the greatest weight to a circular area in the center of the viewfinder...”).

And, of course, Sugimoto disclosed this element. See Ex.1004 3:11-25, 6:62-67.

The generation and use of a LUT correlating flash durations and associated power values was similarly well known. See e.g., Ex.1033 ¶¶ 28-31. As discussed above, Sugahara discloses the use of a LUT correlating flash durations with emitted light. See Ex.1008 at 6:48-58. As another example, Japanese Pat. App. No. H01-289925 (“Nakajima”), Ex.1007, pub. Nov. 21, 1989, discloses a camera system in which a LUT is used to determine the main strobe duration on the basis of data obtained from a pre-flash light emission. Ex.1007 at 16-17. The LUT is comprised of proportions of light emission—relative to 100% emission—associated with respective flash times. See id. at 17-18; Fig. 5. After calculating the relative amount of emitted light needed for proper image exposure based on pre-flash image luminance data, the system refers to the LUT to obtain the corresponding main flash duration. Id. Nakajima provides that the LUT is used to compensate for the

non-linearity of light emission intensity of a flash over time. Id. 17; Fig. 4. And the obvious point that a LUT could correlate a pre-flash of predetermined duration with light output was similarly disclosed. See Ex.1010 5:66-6:4; Ex.1033 ¶ 101. Another example, U.S. Pat. No. 5,257,063, titled “Flashing Controller,” issued Oct., 1993, teaches generating a LUT prior to camera manufacturing by measuring changes in light quantity of a strobe emission relative to strobe duration and storing this information in memory. See Ex.1006 6:13-30; 17:18-22; Ex.1033 ¶ 31.

These examples and additional art (below §§ V.C.1-3) show that the “invention” of the Challenged Claims was widely described before the priority date. The Challenged Claims are invalid under § 103. See generally Ex.1033 ¶¶ 85-157.

**V. THERE IS A REASONABLE LIKELIHOOD THAT PETITIONER WILL PREVAIL WITH RESPECT TO AT LEAST ONE CLAIM**

Petitioner submits there is at least “a reasonable likelihood that the petitioner[] would prevail with respect to at least 1 of the claims challenged in the petition.” § 314(a). Indeed, these claims are obvious under the four stated Grounds.

**A. Claim Construction Under § 42.104(b)(3)**

Pursuant to § 42.100(b), for the purposes of this review, the claim language is construed such that it is “given its broadest reasonable construction in light of the specification of the patent in which it appears.” The parties in EDTX have proposed constructions for disputed terms in the Challenged Claims and have agreed to constructions for others. Ex.1032. Petitioner believes its proposed constructions

are appropriate, but does not believe that any of these constructions has any impact or bearing on the analysis set forth in this Petition.<sup>6</sup> See also Ex.1033 ¶ 60.

In EDTX, Samsung has argued that the term “preparatory light for a predetermined preparatory duration” (cls. 1, 7, 14) should be construed as “preliminary strobe activation for a set duration.” Id. The title (“Strobe Lighting System...”) and specification makes clear that the preparatory light is from a strobe, and is being generated by activation of the strobe. See Ex.1001 Abstract; 7:1-29; 7:46-65. Ex.1032. Moreover, the “preparatory light” is clearly emitted as a preliminary step, before determination of the supplemental strobe duration. See, e.g., id. at Fig. 5.

In EDTX, Samsung has also argued that two terms (“average image luminance” (cl. 6) and “weighting table that stores the luminance weighting” (cl. 16))

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<sup>6</sup> For purposes of this Petition, Petitioner interprets all other terms in accordance with their plain and ordinary meaning under the required broadest reasonable interpretation consistent with the specification of the '029 patent in view of a POSITA's knowledge. Because the claim construction standard at the PTO is different than litigation, see In re Am. Acad. of Sci. Tech Ctr., 367 F.3d 1359, 1364, 1369 (Fed. Cir. 2004); MPEP § 2111, Petitioner reserves the right to argue in litigation constructions for any term as appropriate to that proceeding.

are indefinite for lack of antecedent basis.<sup>7</sup> See Ex.1032 at 21. Imperium has argued these terms are not indefinite and should be given their plain and ordinary meaning, and in the alternative should be construed as “average luminance of the preparatory image” and “luminance weighting table that stores the luminance weighting” respectively. Id. As Imperium has taken the position that the phrases are not indefinite and that its alternative constructions are correct even under the narrower standard applicable in litigation, see Am. Acad. of Sci. Tech at 1369, it must agree and is in no position to dispute that the broadest reasonable interpretation applicable for review purposes must at least include its constructions in EDTX. For review purposes only, to the extent the Board believes construction is possible, and to allow an analysis of the '029 Patent under § 103, Petitioner submits that the constructions proposed by Imperium in EDTX may be adopted here.

**B. Level of Ordinary Skill in the Art and State of the Art**

Petitioner submits that the applicable person of ordinary skill in the art would have a minimum of: (1) a Bachelor’s degree in Electrical Engineering, Physics, or related field; and (2) 4 or more years of industry experience engineering or designing imaging devices. With respect to (2), a person of ordinary skill

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<sup>7</sup> Samsung initially argued that a third term, “generating a supplemental strobe duration” (cls. 1, 7), was indefinite, but has agreed to accept Imperium’s proposed “plain and ordinary meaning” reading.

may have equivalent industry experience, such as research or laboratory experience, see Ex.1033 ¶ 20. This person would also be acquainted with the basic concepts of amateur photography.

**C. Grounds 1 and 2**

**1. Overview of Shimada**

Shimada (“Strobe Device,” filed Oct. 9, 1997, pub. April 30, 1999) is prior art under at least § 102(a). Ex.1005; Ex.1033 ¶¶ 66-72. Shimada discloses a camera system that creates a preliminary exposure of a photographic subject using a pre-flash of the strobe prior to the main photographic exposure. See Ex.1005 ¶ 12, cl.

1. The system performs photometry (i.e., measurement of the image luminance value) on the preliminary image data in order to determine an average image data

| Relative Amount of Emitted Light | Flash Time |
|----------------------------------|------------|
| 1.409                            | 22.7       |
| 1.507                            | 23         |
| 1.613                            | 23.6       |
| 1.726                            | 24.5       |
| 1.847                            | 25.23267   |
| 1.978                            | 25.87895   |
| 2.114                            | 26.57048   |
| 2.262                            | 27.31041   |
| 2.420                            | 28.22237   |
| 2.590                            | 29.23915   |
| 2.771                            | 30.32689   |
| 2.965                            | 31.49077   |
| 3.173                            | 32.73613   |
| 3.395                            | 34.06866   |
| 3.632                            | 35.49446   |
| 3.887                            | 37.02007   |
| 4.159                            | 39.64042   |
| 4.450                            | 42.49861   |
| 4.761                            | 45.55688   |
| 5.095                            | 48.27519   |
| 5.451                            | 49.68896   |
| 5.833                            | 51.20168   |
| 6.241                            | 52.8203    |
| 6.678                            | 54.55222   |
| 7.146                            | 56.40538   |
| 7.646                            | 58.38825   |
| 8.181                            | 61.25008   |
| 8.754                            | 64.63439   |
| 9.368                            | 68.25537   |
| 10.022                           | 72.09688   |
| 10.723                           | 75.19533   |
| 11.474                           | 78.51066   |
| 12.277                           | 82.05808   |
| 13.137                           | 85.85381   |
| 14.056                           | 89.91524   |
| 15.040                           | 94.26098   |
| 16.093                           | 98.97294   |
| 17.220                           | 104.6994   |
| 18.425                           | 110.8267   |
| 19.715                           | 117.3829   |
| 21.095                           | 124.398    |
| 22.571                           | 131.8947   |
| 24.151                           | 139.9      |
| 25.842                           | 148.4656   |
| 27.651                           | 157.6309   |
| 29.588                           | 167.4877   |
| 31.657                           | 177.931    |
| 33.873                           | 189.1589   |
| 36.245                           | 201.1726   |
| 38.782                           | 219.3629   |
| 41.496                           | 239.7233   |
| 44.401                           | 260.509    |
| 47.509                           | 283.8196   |
| 50.835                           | 308.762    |
| 54.393                           | 360        |
| 58.201                           | 408        |
| 62.275                           | 467        |
| 66.634                           | 523        |
| 71.299                           | 622        |
| 76.290                           | 710        |
| 81.630                           | 871        |
| 87.344                           | 1161       |
| 93.458                           | 1878       |
| 100.000                          | 4050       |

value, which in turn is used to compute the necessary amount of emitted light of a main flash for proper exposure of the subject. See *id.* ¶¶ 20, 25-27, 31, cl. 1.

Photometry of the pre-flash image in Shimada is performed by dividing the image sensor into 64 areas. See *id.* ¶¶ 30, 49. Shimada further describes a means for detecting the presence of backlighting in the image by comparing the average luminance value of the four center areas

of the image and the average luminance value of the outside areas. See *id.* ¶ 49.

Shimada teaches performing photometry for only the central four areas if a back-light is detected; in a non-backlit state, a wider area is subject to photometry to determine the average image data value. See id. ¶ 50.

Shimada further teaches calculating a relative amount of light, S, needed for the main flash for proper exposure based on the pre-flash image data value. See id. ¶¶ 37-45. Shimada then teaches the use of a LUT comprised of empirically-determined relative light values associated with flash time durations in order to identify the main flash duration corresponding to that desired amount of relative light. See id. ¶¶ 7, 31-36; Table 1.

Shimada recognizes that its LUT is advantageous because it accounts for the non-linear relationship between flash intensity and flash duration. See id. ¶¶ 6, 33-34; Fig. 3. Shimada further recognizes that its LUT, arranged in a geometric sequence, is advantageous over prior art LUTs arranged in arithmetic sequence because, in arithmetic sequences, the precision required for controlling the amount of light becomes unnecessarily high as the relative amount of emitted light becomes larger. See id. ¶¶ 35-36. (These advantages are similarly disclosed by the '029 patentees when discussing the LUT of the '029 Patent. See Ex.1001 11:1-19.)

## 2. Overview of Sugimoto

Sugimoto (“Digital Camera, Having a Flash Unit, Which Determines Proper Flash Duration Through an Assessment of Image Luminance and, Where Needed,

a Preliminary Flash Emission,” filed July 16, 1997, issued Feb. 27, 2001) is prior art under at least § 102(e). See Ex.1004; Ex.1033 ¶¶ 73-78. The stated object of Sugimoto is to provide “a digital camera capable of precisely calculating a major light-emission element of a flash lamp.” Ex.1004 1:49-52. Sugimoto discloses a digital camera system that first exposes preliminary images without light-emission of the flash lamp, and then (if the system determines that a suitable exposure cannot be obtained at a minimum shutter speed) exposes second preliminary images with a preliminary light emission. See id. 9:53-10:5; Fig. 7, 8. The system calculates the major light-emission amount (i.e., main flash) by evaluating the luminance of these preliminary images. See id. 2:9. Luminance evaluation values of preliminary images are determined by obtaining luminance data from pixel blocks of the image sensor. See id. 5:58-6:16. This data is then input into a weighting operation according to a weighting table. See id. 6:17-31; Fig. 5, 6. The weighting table is divided into 265 areas, each area corresponding to a set of pixel blocks from the image sensor and having a weighting value. See id. 6:32-43; Fig. 5, 6. The luminance data of the entire image is weighted, integrated, and normalized to calculate a luminance evaluation value. Id. 7:29-40. By applying the weighting operation to the luminance data, it is possible to emphasize the luminance level of a portion of the image, such as the center portion, when determining the luminance evaluation value. Id. 6:54-67. In the case of a preliminary exposure with a prelimi-

nary light emission, the luminance evaluation value,  $Y_s$ , is subtracted from a target evaluation value to determine a luminance shortage value,  $U$ . This value is divided by  $Y_s$  and multiplied by the preliminary light emission amount,  $P$ , in order to calculate the major light-emission amount,  $Q$ , for the main exposure. Id. 10:45-53; 10:62-11:2, 11:10-27.

### 3. Overview of Kurokawa

Kurokawa, “Image Pickup Apparatus with Distance Measurement Depend-

FIG. 3

| G.No. | LIGHT EMISSION TIME |
|-------|---------------------|
| 0.53  | 10                  |
| 2.35  | 30                  |
| 3.76  | 60                  |
| 4.91  | 100                 |
| 6.34  | 180                 |
| 7.46  | 300                 |
| 8.34  | 500                 |
| 8.78  | 700                 |
| 9.03  | 1000                |
| 9.19  | 2000                |

UNIT  
G.No.: ISO 100 - m  
LIGHT EMISSION TIME: [  $\mu$  sec ]

ent on Object Lighting Condition,” filed Sept. 16, 1996 and is-

sued July 30, 2002, is prior art to the '029 Patent under at least

§ 102(e). See Ex.1033 ¶¶ 79-84. Kurokawa teaches a camera

system that utilizes a fixed (i.e., predetermined) preliminary light

emission along with a LUT in order to determine the optimum

flash time for the main exposure. See Ex.1010 2:10-36, 5:47-6:4.

The system takes luminance and distance measurements of the

subject to determine whether a flash emission is necessary. If it is, the camera

emits a preliminary light for a fixed duration to obtain a fixed quantity of emitted

light, and exposes a preliminary image. The luminance of the image exposed by

Kurokawa’s solid-state image sensor is determined and used to generate a guide

number corresponding to a suitable exposure level of the main image. See id. 5:47-

65; see also 2:10-36. Subsequently, the system refers to a LUT comprised of guide

numbers and flash durations. Id. 5:66-6:12; Fig. 3. The main flash duration corresponding to the calculated guide number is selected from this table, and the main image is exposed at this flash duration. Id.

#### 4. Motivation to Combine Shimada with Sugimoto

A POSITA would have been motivated and found it obvious to implement Sugimoto's teachings of using luminance weightings in adjusting flash operation in implementing Shimada's camera system. See, e.g., Ex.1033 ¶¶ 87-93; 105-07; 110; 116. As an initial matter, Shimada and Sugimoto have overlapping disclosures and similar purposes. The explicit teachings of both relate to improved methods of flash photography, and in particular involve calculating the duration of a main flash by using a pre-flash, measuring the luminance from a pre-flash, and determining the main flash duration based on the luminance of the preparatory image. See, e.g., Ex.1005 Abstract; Ex.1004 1:56-2:8, 11:13-46. These teachings confirm a motivation to combine.<sup>8</sup> See Ex.1033 ¶¶ 87, 88. In particular, Shimada presents a

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<sup>8</sup> A closely related motivation to combine based on explicit teachings and similar purpose was observed by the Examiner, who during prosecution of the '029 application determined it would have been obvious to combine Sugimoto with Sugahara (which has a similar disclosure to Shimada and shares identical named patentees), noting it would have been obvious "to modify Sugimoto's device by implementing Sugahara's teachings in an effort to consistently and quickly obtain an appropriate

problem (accurately determining the proper duration and output of the main flash when there is backlighting), and provides an incomplete solution (fully weighting or considering the pre-flash data only from the center portions of the image but ignoring the remainder of the image). See id. ¶ 89. Sugimoto provides a more advantageous solution (partially weighting the center or any other area of interest of the image, and also even when there is backlighting, taking into consideration the luminance of other areas of the image that are not in the center). See id. ¶¶ 90-91.

Shimada teaches that (1) backlighting represents a problem because using luminance data equally from all portions of a backlit image results in underexposure, Ex.1005 ¶ 51, and (2) this problem can be addressed by using luminance data from (i.e., performing photometry on) only a subset of the area of the image (e.g., the center 4 out of 64 portions of the image), id. ¶¶ 50-56. However, Shimada's solution to the backlighting problem uses data from only the image center (i.e., weighting the center at 100% and everything else at 0%). See Ex.1033 ¶ 87, 89. Sugimoto provides an advantageous method in which, instead of entirely discounting outer portions of the image and relying only on luminance data from the center, the system provides for a set weighting to be applied to additional portions of the image. See, e.g., Ex.1004 6:62-67 ("By subjecting the weighting operation to the amount of light." Ex.1002 at 198.

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luminance data in accordance with the weighting amount data K, it is possible to perform center emphasis photometry that a luminance level of the center of the screen is considered to be the most important and the luminance level of a surrounding area is also sufficiently considered.”); see also id. 7:1-21; 11:66-12:7; Ex.1033 ¶¶ 91, 92. Moreover, Sugimoto’s luminance weighting table accounts for the possibility that the desired area of interest may not be in the center of the image, providing additional advantageous flexibility. See, e.g., Ex.1004:7:1-21; see also Ex.1033 ¶ 92.

While problems solved by Shimada and Sugimoto are similar, Sugimoto’s solution to the problem of backlighting has advantages over Shimada’s that a POSITA would recognize, and thus a POSITA would have been motivated to use the advantageous teachings of Sugimoto in implementing the method of weighting image luminances in Shimada. See Ex.1033 ¶¶ 92-93.

### **5. Motivation to Combine Shimada with Kurokawa**

A POSITA would also have been motivated and found it obvious to implement Kurokawa’s explicit teaching of using a pre-flash of a predetermined duration in the camera system of Shimada. See Ex.1033 ¶¶ 94-100. Again, Shimada and Kurokawa have overlapping disclosures and similar purpose. Both explicitly relate to improved methods of flash photography, and in particular involve calculating the duration of a main flash by using a pre-flash, measuring the measuring the lu-

minance from a pre-flash, determining the main flash duration based on the average luminance of the preparatory image, and using a LUT correlating flash output and flash duration, see, e.g., Ex.1005 Abstract, ¶¶ 31-33; Ex.1010 Abstract, 5:47-6:4, confirming a motivation to combine the two references. See Ex.1033 ¶¶ 94-95.

More specifically, a POSITA would have been motivated to implement Kurokawa's advantageous teaching of a predetermined preparatory flash duration in the camera system of Shimada for several reasons. See id. First, Shimada teaches that a main flash can be controlled with high precision by a system that uses calculations based on the intensity and reflected value of a pre-flash. See, e.g., Ex.1005 [Solution]; ¶¶ 7, 12, 26-27. Second, Shimada teaches that the relationship between flash intensity and flash time is "a non-linear relationship," such that "it is not possible to determine the relationship between the flash time and the amount of emitted light in a functional manner," so that the camera system of Shimada uses the LUT correlating flash output and flash time to calculate the main flash. See, e.g., id. ¶¶ 6, 33. And third, Shimada teaches that the pre-flash is set for a shorter duration than is the main flash. See, e.g., id. ¶¶ 59-63, Fig. 5. In order to determine the duration (which equates to the output) of the main flash using the LUT in Shimada, it is necessary to know the output of the pre-flash. See Ex.1033 ¶ 98. As Shimada's teachings regarding the use of a LUT, see Ex.1005 ¶¶ 6, 33, make clear, and as a POSITA would have known, see id., one method of setting the amount of light of a

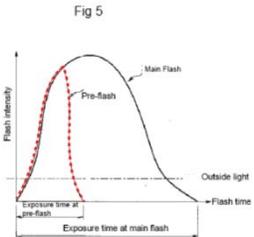
flash is to adjust the duration of the flash.

Kurokawa provides an advantageous means of setting the output of the pre-flash by setting its duration, which Kurokawa teaches has particular benefits. See, e.g., Ex.1010 7:28-30; 7:21-23; see also Ex.1033 ¶¶ 97, 102-03. In particular, Kurokawa teaches that using a pre-flash of predetermined duration is advantageous (i.e., “a great advantage in respect to the cost of manufacture and development of products,” Ex.1010 5:35-47; 7:19-45), because it means that there is a need for only one type of LUT (i.e., a table correlating flash duration and flash output), and the system “obviates the necessity of any additional detecting circuit ... and any table or any related formula for deciding the light emission time according to the remaining charging voltage,” id. 7:39-43. Moreover, Kurokawa teaches that it is advantageous to use a predetermined pre-flash duration in order to provide a fixed amount of preliminary light that is smaller than the amount at full flash, such that the discharge voltage is minimized and the remaining charging voltage of the flash is kept constant after the pre-flash, in order to obviate the need for a camera with more than one look-up table or a voltage detecting circuit. This results in “a great advantage in respect to the cost of manufacture and development of products.” See id. 7:43-44; see also Ex.1033 ¶ 97.

Shimada similarly discloses setting a preliminary light emission amount smaller than the amount of emission at main flash, but does not explicitly describe

the means for accomplishing this emission. See also Ex.1033 ¶ 98. When implementing the pre-flash step of Shimada, a POSITA would have been motivated to employ Kurokawa’s beneficial teaching of using a predetermined pre-flash duration to obtain a fixed amount of preparatory light in order to obtain the advantages described above of using a predetermined pre-flash duration that results in a smaller emission than the amount of light at full flash. See id. ¶¶ 98-99.

**6. Grounds 1 and 2 Claim Chart for Claims 1, 6, 7, 14, and 16**

| cl. 1                                                                                 | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|---------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p><b>1.</b> A method of adjusting image lighting, the method comprising:</p>         | <p><b>Shimada discloses a method of adjusting image lighting.</b> <u>See, e.g., Ex.1005 Fig. 2; ¶ 31</u> (“The method for <u>computing the amount of emitted light of a main flash</u> in the Step S7 will be explained here .... [T]he method described below is used to determine a relative amount of emitted light on the basis of an average value VM for image data corresponding to a proper exposure, and an average value VP for image data obtained by performing a pre-flash for an arbitrary subject, and in addition, a LUT (Table 1) representing the relationship between the relative amount of emitted light and the flash time is stored beforehand in storage means as a file, and the flash time of a main flash is determined by referring thereto ....”; <u>see also id.</u> ¶ 12; <b>Ex.1033 ¶ 101, pp. 120-22.</b></p>                                                                                                                                                                                                                                                                                                                                                      |
| <p>[1-1] generating a preparatory light for a predetermined preparatory duration;</p> | <p><b>Shimada teaches generating a preparatory light (e.g., pre-flash) for a predetermined preparatory duration (e.g., “a prescribed amount of emitted light”).</b> <u>See, e.g., Ex.1005 ¶ 1</u> (“The present invention relates to a strobe device, and in particular, to a <u>strobe device for performing a pre-flash for radiating an auxiliary light toward a subject prior to taking a photograph,</u> and setting an amount of light for a main flash.”); ¶ 7 (“That is, the relationship between a <u>prescribed amount of emitted light</u> (a relative amount of emitted light) and a flash time is tabulated on the basis of a full flash (100% flash), and the flash time of the strobe is controlled by referring to the table for a flash time that corresponds to the relative amount of emitted light necessary to obtain the proper exposure com-</p> <div style="display: flex; align-items: flex-start;">  <div style="margin-left: 20px;"> <p>Flash Intensity</p> <p>Flash time</p> <p>Exposure time at pre-flash</p> <p>Exposure time at main flash</p> <p>Outside light</p> </div> </div> |

| cl. 1                                                                   | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                         | <p>puted on the basis of a pre-flash.”); <b>Fig. 5<sup>9</sup></b>; <u>see also id.</u> ¶¶ <b>2, 34, 38, 42-45, 63; Ex.1033 ¶ 101, pp. 122-25.</b></p> <p><b>Kurokawa teaches generating</b> (e.g., “making”) <b>a preparatory light</b> (e.g., “first light emission”) <b>for a predetermined preparatory duration</b> (e.g., “predetermined period of time”).<sup>10</sup> <u>See, e.g., Ex.1010 Abstract</u> (“[T]he control part ... causes the light emission part to emit light for a predetermined period of time...”); <b>4:62-5:17</b> (“[A] preliminary exposure is performed by making a first light emission for a predetermined period of time...”); <b>9:28-45</b>; <u>see also id.</u> <b>2:10-37; 7:19-23; 10:56-64; cls. 1, 2; Ex.1033 ¶ 102, pp. 125-33.</b></p> |
| [1-2]<br>capturing<br>a preparatory<br>image<br>while<br>generating the | <p><b>Shimada teaches capturing a preparatory image</b> (e.g. exposure of the CCD performed under pre-flash) <b>while generating the preparatory light</b> (e.g., pre-flash), <b>wherein the preparatory image is represented by preparatory image data</b> (e.g., “image data from pre-flash”; “a preflash is performed”; “image data is stored in the memory 7”). <u>See, e.g., Ex.1005 Fig. 2; ¶ 12</u> (“A first strobe device of the present invention comprises: <u>pre-flash radiating means</u> for performing a pre-flash . . .; <u>an imaging element for receiving a pre-flash by the pre-flash</u>”).</p>                                                                                                                                                              |

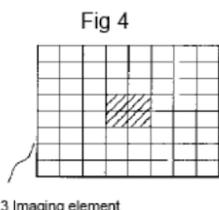
<sup>9</sup> All red text and markings are added. It would have been at minimum obvious to a POSITA, who would recognize that flashes have known outputs, to generate a “set” amount of light in the pre-flash as described at least in Ex.1005 Fig. 5 ¶ 63, by generating the pre-flash for a predetermined duration. See Ex.1033 ¶ 101, p. 122.

<sup>10</sup> To the extent it is argued that further disclosure is required to render obvious using a predetermined preparatory duration for the pre-flash, a POSITA would have been motivated to employ Kurokawa’s express teaching of a predetermined preparatory duration in the camera system of Shimada. See § V.C.5, supra; see also Ex.1033 ¶¶ 94-100, pp. 125-33.

| cl. 1                                                                                             | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>preparatory light, wherein the preparatory image is represented by preparatory image data;</p> | <div style="display: flex; align-items: center;"> <div style="flex: 1;"> <p style="text-align: center;">Fig 2</p> <pre> graph TD     S2[Set amplification factor (m)] --&gt; S3[Pre-flash]     S3 --&gt; S4[A/D conversion]     S4 --&gt; S5[Store image data]     S5 --&gt; S6[Compute average value (V1)]             </pre> </div> <div style="flex: 1; padding-left: 20px;"> <p><u>radiating means and performing photoelectric conversion on a light that is reflected by a photographic subject...</u>”); ¶ 26 (“As illustrated in FIG. 2, when the release switch 15 is ON (Step S1), the CPU 8 sets the amplification factor <math>m</math> (Step S2), and a <u>pre-flash is performed</u> under the control of the CPU 8 at this amplification factor <math>m</math> (Step S3). Thereafter, an A/D conversion is performed by the A/D circuit 6 (Step S4), and <u>the image data is stored in the memory 7</u> (Step S5).”); see also <u>id.</u> ¶¶ 24, 27; Ex.1033 ¶ 103, pp. 133-35.</p> </div> </div> |
| <p>[1-3] determining an average preparatory image luminance of the preparatory</p>                | <p><b>Shimada teaches determining an average preparatory image luminance of the preparatory image</b> (e.g., “image data average value <math>V1</math>”) <b>based on the preparatory image data</b> (e.g., “image data stored in the memory 7”) <b>and weighting at least a subset of the preparatory image data</b> (e.g., “photometry is performed using the central four areas” of an image divided into 64 areas).<sup>11, 12</sup> See, e.g., Ex.1005 Fig. 4; ¶ 49 (“Photometric means ... <u>divides the entire screen of the CCD 3 into 64 areas</u>, and data in which the respective pixel data is averaged in a hard-wired manner for each area is determined using the imaging element. Then, backlight detection is performed by judging that there is a back-</p>                                                                                                                                                                                                                                    |

<sup>11</sup> A POSITA would understand that “photometry” refers to the measuring of image luminance values. See, e.g., Ex.1014 at 3-4; Ex.1033 ¶ 67.

<sup>12</sup> To the extent it is argued that Shimada does not disclose “weighting at least a subset of the preparatory image data” in its selection of a photometric area less than the 64 regions of the image for calculating the luminance value, it would have been at minimum obvious to a POSITA to use such weighting because such selection is at least the equivalent of weighting a subset. See Ex.1033 ¶ 104; pp. 137-38.

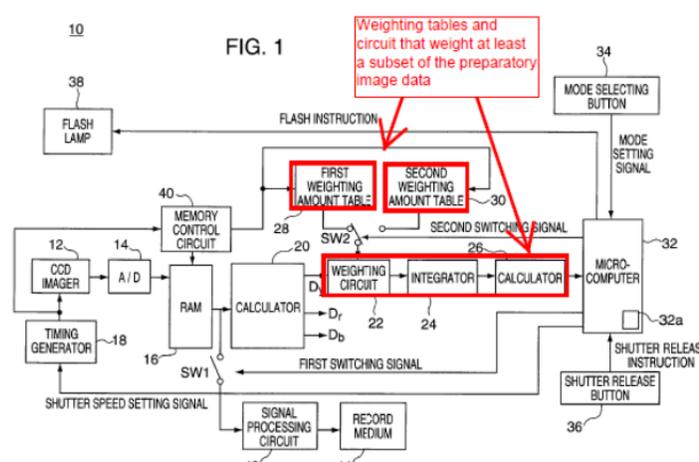
| cl. 1                                                                                        | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>tory image based on the preparatory image data and weighting at least a subset of the</p> | <p>light when the ratio between the image data average value of four areas in the center of the area that has been divided into 64 parts as shown in FIG. 4 (indicated by the shaded portion) and the image data average value for the areas outside this area is a value equal to or less than [sic] a prescribed value.”); ¶ 50 (“[W]hen a photographic subject is in a backlit state, <u>photometry is performed using the central four areas, but when the photographic subject is in a normal state other than a backlit state, photometry is performed for a wider area.</u>”); <u>see also id.</u> ¶¶ 27, 30; <b>Ex.1033 ¶ 104, pp. 135-38.</b><sup>13, 14</sup></p> <div style="text-align: center;">  <p>Fig 4</p> <p>3 Imaging element</p> </div> |

<sup>13</sup> Shimada teaches that “photometry for natural light alone and for the pre-flash may be performed by dividing the entire screen into 64 areas.” An average value of the preparatory image luminance data is determined based on weightings of subsets of preparatory image luminance data. See, e.g., Ex.1005 ¶¶ 30, 49-50 (when backlight is detected, weighting only the 4 center areas and discounting the outer 60; when no backlight, weighting more than these 4 regions); Ex.1033 p. 137.

<sup>14</sup> To the extent it is argued that Shimada does not disclose this limitation, a POSITA would have been motivated to implement Shimada using Sugimoto’s teachings of a predefined weighting table at least because both Shimada and Sugimoto disclose measuring the luminance of the center portion of an image when the image is backlit, and (as discussed in § V.C.4, supra) Sugimoto teaches the advantageous use of a predefined weighting table to accomplish this goal. See, e.g., Ex.1005 ¶¶ 49-50; Ex.1004 6:54-7:21; Ex.1033 ¶¶ 88-93, 105, pp. 138-48; § V.C.4, supra.

| cl. 1                   | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|-------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| preparatory image data; | <b>Sugimoto teaches determining an average preparatory image luminance of the preparatory image</b> (e.g., “luminance evaluation value $V_y$ in the preliminary light emission” and/or “preliminary light-emission luminance evaluation value $Y_s$ ”) <b>based on the preparatory image data</b> (e.g., image data from the CCD imager exposed during the preliminary light-emission) <b>and weighting at least a subset of the preparatory image data</b> (e.g., luminance data $D_y$ weighed by weighting circuit 22 in annotated Fig. 1 and luminance weighting tables in Figs. 5, 6). <sup>15</sup> See, e.g., <b>Ex.1004 Fig. 1, 5, 6; 9:1-25</b> (“[T]he image |

<sup>15</sup> Preliminary light-emission luminance evaluation value  $Y_s$  is an average preparatory image luminance because  $Y_s$  is the “luminance evaluation value  $V_y$  in the preliminary light-emission,” and  $V_y$  is the integration of the weighted values divided by the total sum of the weighting amount data—that is, a weighted average of  $D_y$ . Ex.1004 11:9-13. Specifically, Sugimoto teaches that weighting circuit 22 applies either a first or second weighting table with luminance weightings (weighting amount data  $K$ ) to  $D_y$ . See, e.g., *id.* Figs. 1, 5, and 6 (disclosing weighting tables as elements 28 and 30). The integrator 24 integrates (sums) the output of the weighting circuit 22 and the calculator 26 divides the output of the integrator 24 by the sum of the weighting amount data. See, e.g., *id.* 7:29-40; Fig. 1. Therefore, the preliminary light-emission luminance evaluation value  $Y_s$  is “based on the preparatory image data and weighting at least a subset of the preparatory image data” (preliminary light-emission luminance data  $D_y$ ). Accordingly, Sugimoto’s derivation of preliminary light-emission luminance evaluation value  $Y_s$  discloses this

| cl. 1                                                                                           | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
|-------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                 | <p>data generated by this exposure is written into the RAM 16, thereafter, the calculator 20 calculates the luminance data and the color difference data on the basis of the image data. <u>Only the luminance data <math>D_y</math> is subjected to the weighting operation in the weighting circuit 22 in accordance with the weighting amount data <math>K</math> stored in the first weighting amount table 28, whereby the luminance data, having attached importance to the center of the screen, is obtained. The integrator 24 digitally integrates the luminance data equal to 1 frame, and the accumulator 26 divides the integrated value by the total sum of the weighting amount data, whereby the luminance evaluation value <math>V_y</math> is calculated attaching importance to the center of the screen....</u> ”); <b>6:17-7:21; 7:29-41; 3:11-25; 11:3-13; 13:44-58; Ex.1033 ¶ 105; pp. 138-48.</b></p>  <p>The diagram, labeled FIG. 1, illustrates a camera system. It includes a Flash Lamp (38) connected to a Flash Instruction input. A Mode Selecting Button (34) provides a Mode Setting Signal to a Micro-Computer (32). A Shutter Release Button (36) provides a Shutter Release Instruction to the Micro-Computer. The Micro-Computer (32) is connected to a Memory Control Circuit (40), which manages data flow between RAM (16) and various processing blocks. A Timing Generator (18) provides a Shutter Speed Setting Signal to the RAM (16). A CCD Imager (12) outputs image data to an A/D converter (14), which then feeds into the RAM (16). The RAM (16) outputs data to a Calculator (20). The Calculator (20) is connected to a Weighting Circuit (22), which in turn is connected to an Integrator (24) and another Calculator (26). The Weighting Circuit (22) receives data from the RAM (16) and is controlled by a First Switching Signal (28) and a Second Switching Signal (30). The Integrator (24) and Calculator (26) are also controlled by these signals. The Weighting Circuit (22) is associated with a First Weighting Amount Table (28) and a Second Weighting Amount Table (30). The Micro-Computer (32) also controls a Signal Processing Circuit (42) and a Record Medium (44). A Shutter Release Instruction (32a) is sent from the Micro-Computer (32) to the Shutter Release Button (36).</p> |
| <p>[1-4] generat- ing a supple- mental strobe duration based on the aver- age pre- paratory</p> | <p><b>Shimada teaches generating a supplemental strobe duration (e.g., “flash time of a main flash”) based on the average preparatory image luminance (e.g., pre-flash image data average value <math>V_1</math>) and lumi- nance weightings (e.g., photometry of an area of the image less than the entire area). See, e.g., Ex.1005 ¶ 31 (“[F]or computing the amount of emitted light of a main flash ... determine a relative amount of emit- ted light on the basis of an average value <math>V_M</math> for image data corre- sponding to a proper exposure, and an average value <math>V_P</math> for image data obtained by performing a pre-flash for an arbitrary subject, and in addi- tion, a LUT (Table 1) representing the relationship between the relative amount of emitted light and the flash time is stored beforehand in stor-</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

limitation. See Ex.1033 ¶¶ 77-78, pp. 138-39.

| cl. 1                                                             | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| image<br>lumi-<br>nance<br>and lu-<br>minance<br>weight-<br>ings; | age means as a file, and the flash time of a main flash is determined by referring thereto to decide the actual amount of emitted light.”); ¶¶ 49, 50, 55; <u>see also id.</u> Table 1; Fig. 4; ¶¶ 6-7, 32; 37-45; Ex.1033 ¶ 106, pp. 148-52. <sup>16</sup><br><br><b>Sugimoto<sup>17</sup> teaches generating a supplemental strobe duration (e.g., the duration associated with major light-emission amount Q) based on the average preparatory image luminance (e.g., preliminary light-emission luminance evaluation value Ys) and luminance weightings</b> |

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<sup>16</sup> Shimada discloses generating a main flash duration (“flash time”) based on average values of the preparatory image luminance data and luminance weightings (as described in n.13, supra). Specifically, the duration is selected from the times tabulated in the right column of Table 1 by calculating the relative amount of emitted light, S, based on the pre-flash image data average value VP and an image data average value VM corresponding to proper exposure. See, e.g., Ex.1005 Table 1; ¶¶ 31-32, 37-45; see also ¶¶ 49-56; element 1-3; Ex.1033 ¶ 106, p. 148.

<sup>17</sup> To the extent it is argued that Shimada does not disclose this limitation, for the reasons discussed, see § V.C.4, supra, a POSITA would at minimum have been motivated to implement Shimada’s camera system using Sugimoto’s teachings of the use of luminance weighting. See Ex.1033 ¶¶ 87-93, 107, pp. 156-59.

| cl. 1                                                   | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
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|                                                         | <p>(e.g., weighting amount data K).<sup>18</sup> <u>See, e.g., Ex.1004 10:45-11:46</u> (“[T]he microcomputer 32 regards the luminance evaluation value <math>V_y</math> in the preliminary light-emission as a preliminary light-emission luminance evaluation value <math>Y_s</math> in a step S43. Thereafter, the microcomputer 32 calculates a major light-emission amount <math>Q</math> of the flash lamp 38 in the major light-emission in accordance with a following equation in a step S45. <math>Q=(U/Y_s) \times P</math>. In this equation, by dividing the shortage amount <math>U</math> of the luminance by the preliminary light-emission luminance evaluation value <math>Y_s</math>, how many times of the evaluation value obtained by one preliminary light-emission is necessary to supplement the shortage amount is calculated, and furthermore, by multiplying the light-emission amount in the preliminary light-emission with a magnification calculated, the major light-emission amount <math>Q</math> is finally obtained.... [T]he microcomputer 32 outputs the flash instruction for the major light-emission to the flash lamp 38, and the flash lamp 38 emits the light during the exposure of the CCD imager 12 by a period equal to the major light-emission amount <math>Q</math> in a step S51.”); <u>see also id. 7:29-40; 13:44-58; Ex.1033 ¶ 107, pp. 133-59.</u></p> |
| [1-5] and generating a look-up table storing associated | <p><b>Shimada teaches generating</b> (e.g., determining “via experimentation beforehand” and storing in memory) <b>a look-up table</b> (e.g., look up table LUT) <b>storing associated image strobe durations</b> (e.g., flash time) <b>and power values</b> (e.g., relative amount of emitted light <math>S</math>) <b>including a preparatory image strobe duration</b> (e.g., flash time for pre-flash) <b>and associated preparatory power value</b> (e.g., relative amount of emitted light for pre-flash).<sup>19, 20, 21</sup> <u>See, e.g., Ex.1005 Table 1 (¶ 32); ¶ 6</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

<sup>18</sup> Sugimoto’s microcomputer determines the strobe duration needed to generate the proper amount of light ( $Q$ ), which is based on the average preparatory image luminance ( $Y_s$ ) and luminance weightings ( $K$ ). See, e.g., id. 11:14-46; see also element 1-3. Duration is thus based on  $Y_s$  and  $K$ . See Ex.1033 ¶ 78, p. 153.

<sup>19</sup> A POSITA would have understood that the existence of a LUT necessarily, and thus inherently, requires generation of that LUT. Ex.1033 ¶ 108, pp. 160-61. To the

| cl. 1                                           | Prior Art                                                                                                                                                                                                                                                                                                                                                                        |
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| ed image<br>strobe<br>durations<br>and<br>power | (“[T]echnical means <u>for using a table in which the relationship between the flash time and the amount of emitted light has been determined via experimentation beforehand, and obtaining the desired amount of emitted light by controlling the flash time</u> has been proposed.”); ¶ 34<br>(“[T]he flash time of the strobe is controlled <u>by storing beforehand as a</u> |

extent it is argued any further disclosure is required, it would at minimum have been obvious to a POSITA in light of the use of a LUT in Shimada to generate such a LUT. Ex.1033 ¶ 108, pp. 160-61.

<sup>20</sup> To the extent it is argued that Shimada does not disclose a LUT containing a preparatory image strobe duration and associated preparatory power value, it would at minimum have been obvious to a POSITA in light of Shimada’s disclosure of fixed factor K and a LUT storing paired values for amount of emitted light and flash time, both stored in memory, and a “set” amount of light at pre-flash, to include the preparatory power value and preparatory duration in the LUT. See Ex.1033 ¶ 108, p. 161; Ex.1005 ¶¶ 32-35 42-45.

<sup>21</sup> Specifically, Shimada discloses a LUT that is determined experimentally and stored in memory. See, e.g., Ex.1005 ¶¶ 6, 32, 34. The LUT stores, as entries, power values (e.g., S) and associated image strobe durations (e.g., flash times) required for obtaining the power value. See, e.g., id. ¶¶ 34, 44, 45. The relative amount of emitted light S is expressed as a percentage of the full flash light emission. See, e.g., id.; ¶¶ 7, 34; Ex.1033 ¶¶ 69, 70, 109, pp. 160-61.

| cl. 1                                                                                        | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| values including a preparatory image strobe duration and associated preparatory power value. | <u>file in storage means a LUT which represents the relationship between a relative amount of emitted light ... and a flash time required for obtaining the prescribed amount of emitted light, and referring to the LUT for a flash time that corresponds to the relative amount of emitted light required to obtain the proper exposure computed on the basis of a pre-flash.</u> Actually, the amount of emitted light in a full flash at main flash time is regarded as 100%, and the relative amount of emitted light is expressed as a percentage thereof.”); ¶ 39 (“Alternatively, the LUT illustrated in Table 1 is a table that shows the relationship between a relative amount of emitted light based on a full flash, and a flash time.”); ¶¶ 8, 42; see also id. ¶¶ 4-5, 7, 37-38, 43-45; Ex.1033 ¶ 108, pp. 160-64. |
| cl. 6                                                                                        | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 6. The method of claim 1 further comprising:                                                 | <u>See claim 1.</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| accessing the look-up table based on the average image luminance.                            | <b>Shimada teaches accessing the look-up table</b> (e.g., look up table LUT) <b>based on the average image luminance</b> (e.g., VP). See, e.g., element 1-5 <sup>22</sup> ; Ex.1005 Table 1; ¶¶ 6-7; 32; 41; 45; Ex.1033 ¶ 109, pp. 165-66.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| cl. 7                                                                                        | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 7. A memory having machine readable instructions for execution by a processor to adjust im-  | <b>Shimada discloses a memory</b> (e.g., ROM 16) <b>having machine readable instructions for execution by a processor</b> (e.g., CPU 8) <b>to adjust image lighting.</b> See, e.g., element 1, above; see also Ex.1005 Fig. 1, ¶ 20; Ex.1033 ¶ 110, pp. 166-68. <sup>23</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

<sup>22</sup> The LUT is based on the relative amount of emitted light S which is calculated using the average preparatory image luminance VP. See, e.g., Ex.1005 ¶¶ 42-45; Ex.1033 p. 165.

<sup>23</sup> As Shimada teaches use of a processor to calculate the main flash using the preparatory image captured after pre-flash, Shimada necessarily, and thus inherently

| cl. 7                                                                                                                                  | Prior Art                                                                                                                                                                                                                                                                                                                                |
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| <p>age lighting, the memory comprising:</p>                                                                                            | <p>Fig 1</p>                                                                                                                                                                                                                                                                                                                             |
| <p>[7-1] a first set of machine readable instructions for acquiring a preparatory image while generating a preparatory light for a</p> | <p><b>Shimada discloses machine readable instructions<sup>24</sup> for acquiring a preparatory image (e.g. exposure of the CCD performed under pre-flash) while generating the preparatory light (e.g., pre-flash), for a predetermined preparatory duration. See, e.g., elements 1-1 and 1-2, above; Ex.1033 ¶ 110, pp. 168-69.</b></p> |

discloses machine readable instructions (including instructions for performing the task of adjusting image lighting, as well as all other elements of Claim 7) for execution by the processor. See, e.g., element 1, above; see also Ex.1005 Fig. 1. Indeed, the only way for a processor to perform the claimed functionality would be using such instructions (code). Alternatively, using such instructions would at minimum have been obvious to a POSITA. See Ex.1033 ¶ 110, pp. 166-67.

<sup>24</sup> See n.23, supra (re: machine-readable instructions).

| cl. 7                                                                                                                                                                                                                                           | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| predetermined preparatory duration;                                                                                                                                                                                                             | <b>Kurokawa teaches machine readable instructions<sup>25</sup> for acquiring a preparatory image</b> (e.g., exposure of the solid-state image sensor) <b>while generating</b> (e.g., “making”) <b>a preparatory light</b> (e.g., “first light emission”) <b>for a predetermined preparatory duration</b> (e.g., “predetermined period of time”). <u>See, e.g.,</u> elements 1-1 and 1-2, above; <b>Ex.1033 ¶ 110, pp. 169-73.</b> <sup>26</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| [7-2] a second set of machine readable instructions for determining an average preparatory image luminance based on preparatory image data associated with the preparatory image and weighting at least a subset of the preparatory image data; | <b>Shimada discloses machine readable instructions for determining an average preparatory image luminance</b> (e.g., “image data average value V1” and/or “image data average value VP obtained as a result of the above-described pre-flash that was actually performed”) <b>based on preparatory image data associated with the preparatory image</b> (e.g. exposure of the CCD performed under pre-flash) <b>and weighting at least a subset of the preparatory image data</b> (e.g., “photometry is performed using the central four areas” of an image divided into 64 areas). <u>See, e.g.,</u> element 1-3, above; <b>Ex.1033 ¶ 110, pp. 173-75.</b> <sup>27</sup><br><br><b>Sugimoto discloses machine readable instructions for determining an average preparatory image luminance</b> (e.g., “luminance evaluation value Vy in the preliminary light emission” and/or “preliminary light-emission luminance evaluation value Ys”) <b>based on preparatory image data associated with the preparatory image</b> (e.g., “luminance data |

<sup>25</sup> As Kurokawa teaches use of a processor to calculate main flash on the basis of the preparatory image, for the same reasons as in n.23, supra, and n.53, infra, a POSITA would understand that Kurokawa inherently discloses machine readable instructions for execution by the processor. See, also, e.g., Ex.1033 ¶¶ 111, p. 170.

<sup>26</sup> See n.10, supra (re: motivation to combine).

<sup>27</sup> See n.23, supra (re: machine-readable instructions).

| cl. 7                                                                                                                                                                       | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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|                                                                                                                                                                             | Dy” and/or “color data R, G, B”; image data is obtained by the Analog-to-Digital (A/D) converter) <b>and weighting at least a subset of the preparatory image data</b> (e.g., luminance data Dy weighed by weighting circuit 22 in annotated Fig. 1 and luminance weighting tables in Fig. 5, 6). <sup>28, 29</sup> <u>See, e.g.,</u> element 1-3, above; <b>Ex.1033 ¶ 110, pp. 175-80.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| [7-3] a third set of machine readable instructions for generating a supplemental strobe duration based on the average preparatory image luminance and luminance weightings; | <p><b>Shimada discloses machine readable instructions for generating a supplemental strobe duration</b> (e.g., “flash time of a main flash corresponding to the relative amount of emitted light computed by the relative-amount-of-emitted-light computing means”) <b>based on the average preparatory image luminance</b> (e.g., pre-flash image data average value V1) <b>and luminance weightings</b> (e.g., photometry of an area of the image less than the entire area). <u>See, e.g.,</u> element 1-4, above; <b>Ex.1033 ¶ 110, pp. 180-81.</b><sup>30</sup></p> <p><b>Sugimoto</b><sup>31</sup> <b>discloses machine readable instructions for generating a supplemental strobe duration</b> (e.g., duration associated with major light-emission amount Q) <b>based on the average preparatory image luminance</b> (e.g., preliminary light-emission luminance evaluation value Ys) <b>and luminance weightings</b> (e.g., weighting amount data K). <u>See, e.g.,</u> element 1-4, above; <b>Ex.1033 ¶ 110, pp. 181-85.</b></p> |

<sup>28</sup> See n.14, supra (re: motivation to combine).

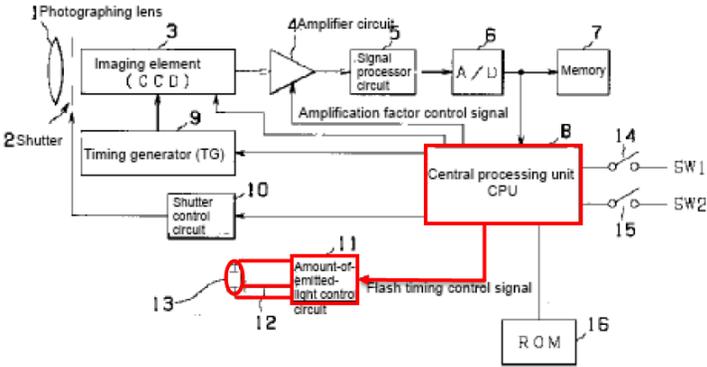
<sup>29</sup> For the same reasons identified in n.53, infra, a POSITA would understand that Sugimoto inherently discloses machine readable instructions for execution by the processor, or, alternatively, that using such instructions would have been obvious to a POSITA. See also e.g., Ex.1033 ¶ 146.

<sup>30</sup> See n.23, supra (re: machine-readable instructions).

<sup>31</sup> See n.14, supra (re: motivation to combine); n.29, supra (instructions).

| cl. 7                                                                                                                                                                                                                                          | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
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| <p>[7-4] and a set of machine readable instructions for generating a look-up table that stores associated image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value.</p> | <p><b>Shimada discloses machine readable instructions for generating</b> (e.g., determining experimentally and storing beforehand in memory) <b>a look-up table</b> (e.g., look up table LUT) <b>that stores associated image strobe durations</b> (e.g., flash time) <b>and power values</b> (e.g., relative amount of emitted light S) <b>including a preparatory image strobe duration</b> (flash time for pre-flash) <b>and associated preparatory power value</b> (relative amount of emitted light for pre-flash). <u>See</u> element 1-5, above; <b>Ex.1033 ¶ 110, pp. 185-88.</b><sup>32</sup></p> |
| cl. 14                                                                                                                                                                                                                                         | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <p><b>14.</b> A digital imaging system comprising:</p>                                                                                                                                                                                         | <p><b>Shimada discloses a digital imaging system</b> (e.g., a photography system utilizing an imaging element 3, CPU 5, and employing digital data 6). <u>See, e.g., Ex.1005 Fig. 1; Ex.1005 Fig. 1; ¶¶ 12, 20; ¶ 31; Ex.1033 ¶ 111, pp. 188-91.</u></p> <div style="text-align: center;"> <p>Fig 1</p> </div>                                                                                                                                                                                                                                                                                             |
| <p>[14-1] a processor electrically connected to a strobe;</p>                                                                                                                                                                                  | <p><b>Shimada discloses a processor</b> (e.g. CPU 8) <b>electrically connected</b> (e.g., illustrated by interconnect line between items 8 and 13) <b>to a strobe</b> (e.g., strobe flash tube 13). <u>See, e.g., Ex.1005 Fig. 1; ¶ 20</u> (“a central processing unit (CPU) 8 for calculating an amount of emitted light of a strobe flash tube 13 on the basis of an output signal from either the A/D circuit 3 or memory 7,</p>                                                                                                                                                                        |

<sup>32</sup> See n.23, supra (re: machine-readable instructions).

| cl. 14                                                                                                                                                                                                                                                                                                    | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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|                                                                                                                                                                                                                                                                                                           | <p>and for driving and controlling the component parts of the strobe device.”); <b>Ex.1033 ¶ 111, pp. 191-92.</b></p> <p style="text-align: center;">Fig 1</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <p>[14-2] an image sensor coupled to a memory, where a supplemental strobe duration stored in the memory is generated from a preparatory image received at the processor from the image sensor when the strobe is activated to generate a preparatory light for a predetermined preparatory duration;</p> | <p><b>Shimada discloses an image sensor (e.g., imaging element (CCD) 3) coupled (e.g., illustrated by interconnect lines between items 3, 7, and 16) to a memory (e.g., ROM 16), where a supplemental strobe duration (e.g., flash time) stored in the memory (e.g., ROM 16) is generated from a preparatory image (e.g., VP) received at the processor (e.g., CPU 8) from the image sensor when the strobe is activated to generate a preparatory light (e.g., pre-flash) for a predetermined preparatory duration (e.g., “a prescribed amount of emitted light”). See, e.g., Ex.1005 Fig. 1; ¶ 20; elements 1-4 and 1-5, above; Ex.1033 ¶ 112, pp. 192-97.</b></p> <p><b>Kurokawa discloses an image sensor (e.g., “solid-state image sensor”) coupled (e.g., illustrated by interconnect lines between items 4 and 10) to a memory (e.g., “memory part”), where a supplemental strobe duration (e.g., “light emission time for the second light emission”) stored in the memory is generated from a preparatory image received at the processor (e.g., “overall control and computing part”) from the image sensor (e.g., “solid-state image sensor”) when the strobe is activated to generate a preparatory light (e.g., “first light emission”) for a predetermined preparatory duration (e.g., “predetermined period of time”). See, e.g., elements 1-1, 1-5 and 7-4, above;<sup>33</sup></b></p> |

<sup>33</sup> See n.10, *supra* (re: motivation to combine); see also Ex.1033 ¶¶ 94-100, 113.

| cl. 14                                                                                                                                                                                                           | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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|                                                                                                                                                                                                                  | <u>see also Fig. 1; Ex.1033 ¶ 113, pp. 197-201.</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| [14-3] wherein the processor accesses a look-up table in the memory that stores image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value. | <b>Shimada discloses an imaging system wherein the processor (e.g., CPU) accesses a look-up table (e.g., look-up table LUT) in the memory that stores image strobe durations (e.g., flash time) and power values (e.g., relative amount of emitted light S) including a preparatory image strobe duration (e.g., flash time for pre-flash) and an associated preparatory power value (e.g., relative amount of emitted light for pre-flash).<sup>34</sup> See, e.g., elements 1-5 and 14-2, above.<sup>35</sup> See, e.g., Ex.1005 at Table 1 (¶ 32); ¶ 31 (“[A] LUT (Table 1) representing the relationship between the relative amount of emitted light and the flash time is stored beforehand in storage means as a file, and the flash time of a main flash is determined by referring thereto to decide the actual amount of emitted light.”); ¶ 34 (“[T]he flash time of the strobe is controlled by ... referring to the LUT for a flash time that corresponds to the relative amount of emitted light required to obtain the proper exposure computed on the basis of a pre-flash. Actually, the amount of emitted light in a full flash at main flash time is regarded as 100%, and the relative amount of</b> |

<sup>34</sup> See n.19, *supra*; see also Ex.1033 ¶ 114.

<sup>35</sup> Shimada discloses a LUT stored in memory, storing associated image strobe durations (flash times) and power values (S). See, e.g., Ex.1005 ¶¶ 32, 34, 44-45.

Relative amount of emitted light S is expressed as a percentage of the full flash emission. The LUT stores, as entries, a power value S and an associated flash duration (flash time) required for obtaining the power value S. Id. ¶ 34. During camera exposure, the processor accesses the LUT to obtain the “flash time that corresponds to the relative amount emitted light required to obtain the proper exposure computed on the basis of a pre-flash.” Id. ¶ 34; see also id. ¶¶ 37-45, pp. 201-02.

|                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                 |
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| <b>cl. 14</b>                                                             | <b>Prior Art</b>                                                                                                                                                                                                                                                                                                                                                                                                |
|                                                                           | emitted light is expressed as a percentage thereof.”); ¶¶ 39; 42-45; 4-7; 32; 37-38; Ex.1033 ¶ 114, pp. 201-05.                                                                                                                                                                                                                                                                                                 |
| <b>Claim 16</b>                                                           | <b>Prior Art</b>                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>16.</b> The digital image system of claim 14                           | <u>See, e.g.</u> , claim 14.                                                                                                                                                                                                                                                                                                                                                                                    |
| [16-1] wherein the memory has a weighting table that stores the luminance | <p><b>Shimada<sup>36</sup> discloses that the memory (e.g., ROM 16) has a weighting table that stores the luminance weighting (e.g., center weightings or outer weightings). <u>See, e.g.</u>, element 1-3, above; Ex.1005 ¶ 34; Ex.1033 ¶ 115, pp. 205-07.</b></p> <p><b>Sugimoto discloses a memory (e.g., memory control circuit) that has a weighting table (e.g., first 28 and second 30 weighting</b></p> |

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<sup>36</sup> To the extent it is argued that Shimada does not disclose a memory with “a weighting table that stores the luminance weighting,” this limitation is at minimum obvious in view of the knowledge of a POSITA. See Ex.1033 ¶ 115. Specifically, Shimada discloses a preparatory image partitioned into 64 regions and backlight detection performed using the ratio of a center weighting, which uses only the four center regions, and an outer weighting, which uses only the outer 60 regions. A POSITA would have understood that Shimada’s disclosure of “processing only the signals of the required photometric area,” could advantageously be accomplished by a memory having “luminance weighting tables” which enable the CPU to identify the shaded portion and the wider area, and would have found this to be an obvious and straightforward implementation choice. See id; Ex.1033 p. 206.

| Claim 16   | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
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| weighting. | amount tables) <b>that stores the luminance weighting</b> (e.g., weighting amount data K). <sup>37</sup> <u>See, e.g., Ex.1004 Fig. 1, 5, 6; 6:17-31</u> (“[L]uminance data Dy ... is inputted to a weighting circuit 22.... [which] subjects the luminance data to a weighting operation Dy <u>in accordance with weighting amount data K held in a first weighting amount table 28 or a second weighting amount table 30.</u> ”). <u>See also id. 13:44-58; Ex.1033 ¶ 116, pp. 207-13.</u> |

**D. Grounds 3 and 4**

**1. Motivation to Combine Sugimoto with Shimada**

A POSITA would have been motivated and found it obvious to implement Sugimoto’s camera system and associated methods of flash operation using Shimada’s teachings regarding using a LUT associating relative light emissions with strobe durations in order to arrive at the strobe duration which would effectuate the desired light emission amount for a main flash. This motivation is confirmed by, for example, the references’ overlapping disclosures and similar purposes discussed above in § V.C.4, and by Sugimoto’s teaching of an advantageous method (using a LUT) of carrying out a critical step (calculating the main flash duration and firing the main flash) that is expressly disclosed by Sugimoto but without specifying a particular means of carrying out that step. See Ex.1033 ¶ 121. More specif-

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<sup>37</sup> To the extent it is argued that Shimada does not disclose this limitation, at minimum, Shimada in view of Sugimoto renders this element obvious. See Ex.1033 ¶¶ 87-93, 116, pp. 208-13.

ically, Sugimoto does not explicitly identify the means of determining “a period equal to the major light-emission amount Q,” Ex.1004 11:39-46, but there are only a relatively small, finite number of identified, predictable solutions for practically and effectively obtaining the strobe duration corresponding to a desired quantity of light from a strobe, see Ex.1033 ¶ 122. One such solution is to use an empirical LUT as expressly disclosed in Shimada. See id.; see also Ex.1005 ¶¶ 33-35.<sup>38</sup> Accordingly, a POSITA would have been motivated and found it obvious and straightforward to employ Shimada’s teachings of using a LUT as a means of deriving the necessary strobe duration for the emission of a desired quantity of light as described by Sugimoto. See Ex.1033 ¶ 122; see also § V.C.4, supra; n.8, supra.

## 2. Motivation to Combine Sugimoto with Kurokawa

A POSITA would have been motivated to implement Sugimoto’s camera and flash system using Kurokawa’s teachings regarding both using a pre-flash of a predetermined duration and using a LUT in order to arrive at the proper main flash duration. See Ex.1033 ¶¶ 124-32. First, Sugimoto and Kurokawa have overlapping disclosures and similar purposes. The explicit teachings of both relate to improved methods of flash photography, and in particular involve: (1) calculating the dura-

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<sup>38</sup> A second solution would be to use an algorithm. See Ex.1033 ¶ 122. But, as Shimada teaches, the flash intensity profile of a strobe is non-linear, potentially making an algorithm too complex or impractical. See Ex.1005 ¶ 6; Ex.1033 ¶ 122.

tion of a main flash by using a pre-flash on the basis of the luminance of the preparatory image; (2) a pre-flash duration that is less than the main flash duration; and (3) capturing less light in the pre-flash than in the main flash. See, e.g., Ex.1004 Abstract, 1:56-2:9, Fig. 13A; Ex.1010 Abstract; 2:52-57; 5:47-6:4. This confirms a motivation to combine the teachings of these references in implementing systems involving their overlapping subject matter. See Ex.1033 ¶ 125.

More specifically, a POSITA would have been motivated to employ Kurokawa's advantageous teachings of the use of a predetermined pre-flash duration in implementing the camera system of Sugimoto based on Sugimoto's disclosures that: (1) an object of the invention is to provide a means of "precisely calculating a major light-emission element of a flash lamp," Ex.1004 1:49-52; and (2) there is a direct relationship between flash output and flash time, such that "the longer the light-emission period is, the larger the light-emission amount is," id. 7:57-60. To determine the duration (which corresponds to the output) of the main flash, it is necessary to know the output of the pre-flash. See Ex.1033 ¶ 126. As Sugimoto makes clear, see Ex.1004 7:57-60, and as a POSITA would have known, see Ex.1033 ¶ 126, one method of setting the amount of light is to set the flash duration as described in Kurokawa.

A POSITA also would have been motivated to employ Kurokawa's teachings of the use of a LUT in implementing Sugimoto's system because, as discussed,

supra at V.D.1, Sugimoto presents a critical step (calculating the main flash duration and firing the main flash) without identifying an explicit means of carrying it out, while Kurokawa provides an advantageous and helpful method of carrying out this step (by using a LUT).<sup>39</sup> See Ex.1033 ¶ 130. More specifically, Sugimoto does not explicitly identify the means of determining “a period equal to the major light-emission amount Q,” Ex.1004 11:39-46, but there are only a relatively small, finite number of identified, predictable solutions for practically and effectively obtaining the strobe duration corresponding to a desired quantity of light from a strobe, see Ex.1033 ¶ 131. One such solution is to use an empirical LUT as expressly disclosed in Kurokawa. See id.; see also Ex. 1010 at 5:66-6:4, Fig. 3; n. 38, supra. Accordingly, a POSITA would have been motivated and found it obvious and straightforward to employ Kurokawa’s teachings of using a LUT as a means of deriving the necessary the strobe duration for the emission of a desired quantity of light as described by Sugimoto. See Ex.1033 ¶ 131.

Additionally, Kurokawa provides an advantageous means of setting the output of the pre-flash by setting duration. See, e.g., Ex.1010 7:28-30; 7:21-23). Indeed, a POSITA would have known, consistent with the teachings of Kurokawa,

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<sup>39</sup> A POSITA would also have been motivated to make this combination for at least the same reasons as described in § V.D.1, supra. See Ex.1033 ¶¶ 119-23.

that using a pre-flash of predetermined duration is advantageous (i.e., “a great advantage in respect to the cost of manufacture and development of products,” id. 5:35-47; 7:19-45), because it means that there is a need for only one type of LUT (i.e., a table correlating flash duration and flash output), and the system “obviates the necessity of any additional detecting circuit ... and any table or any related formula for deciding the light emission time according to the remaining charging voltage,” id. 7:39-43. Moreover, Kurokawa teaches that it is advantageous to use a predetermined pre-flash duration in order to provide a fixed amount of preliminary light that is smaller than the amount at full flash, such that the discharge voltage is minimized and the remaining charging voltage of the flash is kept constant after the pre-flash, in order to obviate the need for a camera with more than one look-up table or a voltage detecting circuit. See id. 7:33-43. When implementing the pre-flash step of Sugimoto, a POSITA would thus have been motivated to employ Kurokawa’s teaching of advantageously using a predetermined pre-flash duration to improve the system of Sugimoto. See Ex.1033 ¶ 127.

**3. Grounds 3 and 4 Claim Charts for Claims 1, 6, 7, 14, and 16**

| Claim 1                                            | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. A method of adjusting image lighting, the meth- | <b>Sugimoto teaches a method of adjusting image lighting (e.g., determines proper flash duration). <u>See, e.g., Ex.1004 Figs. 7-12</u> (disclosing method for calculating major light emission amount Q in steps S1-S45); <b>Figs. 10-12; Title</b> (“Digital camera, having a flash unit, <u>which determines proper flash duration through an assessment of image luminance</u> and, where needed, a preliminary flash emis-</b> |

| Claim 1                                                                        | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| od comprising:                                                                 | sion.”); <b>Abstract</b> (“A digital camera includes a flash lamp and a CCD imager.... The microcomputer succeedingly makes the flash lamp perform a preliminary light-emission, and exposes the CCD imager by 1/1500 seconds. The calculator evaluates the luminance evaluation value on the basis of the luminance signal ... calculates a major light-emission amount....”); <u>see also Ex.1033 pp. 215-17.</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| [1-1] generating a preparatory light for a predetermined preparatory duration; | <p><b>Sugimoto teaches generating a preparatory light</b> (e.g., “preliminary light-emission”) <b>for a predetermined preparatory duration</b> (e.g., preliminary light-emission in the amount P).<sup>40</sup> <u>See e.g., Ex.1004 at 10:62-11:2</u> (“If the flash lamp 38 receives the flash instruction for the <u>preliminary light-emission, the flash lamp 38 emits the light ...</u> during the exposure of the CCD imager 12. In addition, this light-emission state is called as the preliminary light-emission state that <u>the light-emission is preliminarily performed before the major light-emission</u> described later.”); <u>see also id. 11:41-46; Ex.1033 ¶ 133, pp. 217-19.</u></p> <p><b>Kurokawa<sup>41</sup> teaches generating</b> (e.g., “making”) <b>a preparatory light</b> (e.g., “first light emission”) <b>for a predetermined preparatory</b></p> |

<sup>40</sup> It would have been obvious to a POSITA, who would have known that flashes have known outputs (and that “the longer the light-emission period is, the larger the light-emission amount is,” Ex.1004 7:57-60; see also id. 10:67-11:2), that one way of generating a pre-flash to emit a “set” amount of light would be to generate the pre-flash for a predetermined duration. See Ex.1033 ¶ 133, p. 218.

<sup>41</sup> To the extent it is argued that Sugimoto does not disclose this limitation, a POSITA would at minimum have been motivated and found it obvious to employ Kurokawa’s teachings of predetermined preparatory duration in implementing the system of Sugimoto. See § V.D.2, supra; Ex.1033 ¶¶ 125-29, 134, pp. 221-23.

| Claim 1                                                                                                                                                    | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                                                            | <p><b>duration</b> (e.g., “predetermined period of time”). <u>See, e.g., Ex.1010 Abstract</u> (“[T]he control part...causes the light emission part to emit light for a predetermined period of time...”); <b>4:62-5:17</b> (“[A] preliminary exposure is performed by <u>making a first light emission for a predetermined period of time...</u>”); <b>7:19-23</b>; <b>9:28-45</b>; <u>see also id. 2:10-37; 10:56-64; cls. 1, 2; Ex.1033 ¶ 134, pp. 219-23.</u></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <p>[1-2] capturing a preparatory image while generating the preparatory light, wherein the preparatory image is represented by preparatory image data;</p> | <p><b>Sugimoto teaches capturing a preparatory image</b> (e.g., exposure of the CCD imager 12 during preliminary light-emission) <b>while generating the preparatory light</b> (e.g., “preliminary light-emission”), <b>wherein the preparatory image is represented by preparatory image data</b> (e.g., “luminance data <math>D_y</math>” and/or “color data R, G, B”; image data is obtained by the Analog-to-Digital (A/D) converter). <u>See, e.g., Ex.1004 5:34-39</u> (“[A]n A/D converter...<u>successively digitizes the image signal outputted from the CCD imager 12...</u>and an output of the A/D converter 14 is sequentially written to a RAM 16 as <u>image data.</u>”); <b>10:58-11:13</b> (“If the flash lamp 38 receives the flash instruction for the preliminary light-emission, the flash lamp 38 emits the light such as the light-emission amount becomes P during the exposure of the CCD imager 12.... <u>the image data obtained is written into the RAM 16.</u>”); <u>see also id. 5:57-6:31; 7:29-40; 9:1-14; Ex.1033 ¶ 135, pp. 223-26.</u></p> |
| <p>[1-3] determining an average preparatory image luminance of the preparatory</p>                                                                         | <p><b>Sugimoto teaches determining an average preparatory image luminance of the preparatory image</b> (e.g., “luminance evaluation value <math>V_y</math> in the preliminary light emission” and/or “preliminary light-emission luminance evaluation value <math>Y_s</math>”) <b>based on the preparatory image data</b> (e.g., image data from the CCD imager exposed during the preliminary light-emission) <b>and weighting at least a subset of the preparatory image data</b> (e.g., luminance data <math>D_y</math> weighed by weighting circuit 22 in annotated Fig. 1 and luminance weighting tables in Figs. 5, 6).<sup>42</sup> <u>See, e.g., Ex.1004 Fig. 1 (excerpt), 5, 6; 9:1-25</u> (“[T]he image data generated by this exposure is written</p>                                                                                                                                                                                                                                                                                                              |

<sup>42</sup> See n.15, supra; Ex.1033 ¶ 136, p. 226.

| Claim 1                                                                                                         | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>image based on the preparatory image data and weighting at least a subset of the preparatory image data;</p> | <p>into the RAM 16, thereafter, the calculator 20 calculates the luminance data and the color difference data on the basis of the image data. Only the luminance data <math>D_y</math> is subjected to the weighting operation in the weighting circuit 22 in accordance with the weighting amount data <math>K</math> stored in the first weighting amount table 28, whereby the luminance data, having attached importance to the center of the screen, is obtained. The integrator 24 digitally integrates the luminance data equal to 1 frame, and the accumulator 26 divides the integrated value by the total sum of the weighting amount data, whereby the luminance evaluation value <math>V_y</math> is calculated attaching importance to the center of the screen....”); <b>6:17-7:21; 7:29-41; Fig. 6; 3:11-25; 11:3-13; 13:44-58; Ex.1033 ¶ 136, pp. 226-32.</b></p> <div style="text-align: center;"> <p style="color: red; font-size: small;">Weighting tables and circuit that weight at least a subset of the preparatory image data</p> </div> |
| <p>[1-4] generating a supplemental strobe duration based on the average preparatory image luminance and</p>     | <p><b>Sugimoto teaches generating a supplemental strobe duration</b> (e.g., the duration associated with major light-emission amount <math>Q</math>) <b>based on the average preparatory image luminance</b> (e.g., “preliminary light-emission luminance evaluation value <math>Y_s</math>”) <b>and luminance weightings</b> (e.g., “weighting amount data <math>K</math>”).<sup>43</sup> See, e.g., <b>Ex.1004 11:42-46</b> (“[T]he microcomputer 32 outputs the flash instruction for the major light-emission to the flash lamp 38, and the flash lamp 38 emits the light during the exposure of the CCD imager 12 by a period equal to the major light-emission amount <math>Q</math>....”); <b>10:45-11:46</b> (“...The microcomputer 32 regards the luminance evaluation value <math>V_y</math> in the preliminary light-emission as a preliminary light-emission luminance evaluation value <math>Y_s</math> in a step S43. Thereafter, the microcomputer 32 calculates a major light-emission amount</p>                                                |

<sup>43</sup> Sugimoto teaches generating a supplemental strobe duration (e.g., major light-emission amount  $Q$ ) based on average preparatory image luminance (e.g.,  $Y_s$ ) and luminance weightings (e.g.,  $K$ ). See, e.g., Ex.1004 11:14-46; element 1-3, above; Ex.1033 ¶ 137, p. 223.

| Claim 1                                                                                                                                                                           | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| lumi-<br>nance<br>weight-<br>ings;                                                                                                                                                | Q of the flash lamp 38 in the major light-emission in accordance with a following equation in a step S45. $Q=(U/Y_s) \times P$ . In this equation, by dividing the shortage amount U of the luminance by the preliminary light-emission luminance evaluation value $Y_s$ , how many times of the evaluation value obtained by one preliminary light-emission is necessary to supplement the shortage amount is calculated, and furthermore, by multiplying the light-emission amount in the preliminary light-emission with a magnification calculated, the major light-emission amount Q is finally obtained.... On the other hand, the microcomputer 32 outputs the flash instruction for the major light-emission to the flash lamp 38, and the flash lamp 38 emits the light during the exposure of the CCD imager 12 by a period equal to the major light-emission amount Q in a step S51.”); <u>see also id.</u> <b>7:29-40; 13:44-58; Ex.1033 ¶ 137, pp. 232-36.</b>                                                                                                                                       |
| [1-5] and<br>generat-<br>ing a<br>look-up<br>table stor-<br>ing asso-<br>ciated<br>image<br>strobe du-<br>rations<br>and pow-<br>er values<br>including<br>a prepara-<br>tory im- | <b>Shimada<sup>44</sup> teaches generating</b> (e.g., determining experimentally and storing beforehand in memory) <b>a look-up table</b> (e.g., look up table LUT) <b>storing associated image strobe durations</b> (e.g., “flash time”) <b>and power values</b> (e.g., relative amount of emitted light S) <b>including a preparatory image strobe duration</b> (e.g., flash time for pre-flash) <b>and associated preparatory power value</b> (e.g., relative amount of emitted light for pre-flash). <sup>45</sup> <u>See, e.g., Ex.1005 at Table 1 (¶ 32); ¶ 6</u> (“[T]echnical means for using a table in which the relationship between the flash time and the amount of emitted light has been determined via experimentation beforehand, and obtaining the desired amount of emitted light by controlling the flash time has been proposed.”); <b>¶ 34</b> (“[T]he flash time of the strobe is controlled by storing beforehand as a file in storage means a LUT which represents the relationship between a relative amount of emitted light...and a flash time...and referring to the LUT for a flash |

<sup>44</sup> For reasons discussed above, a POSITA would have been motivated to employ the LUT of Shimada in implementing the camera system of Sugimoto. See § V.D.1, supra; see also n.8, supra (re: motivation to combine); Ex.1033 pp. 242-44.

<sup>45</sup> See n.19, supra; see also Ex.1033 ¶¶ 120-23, 139-40, pp. 237-38.

| Claim 1                                                            | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>age strobe duration and associated preparatory power value.</p> | <p>time....”); ¶¶ 39; 42; <u>see also id.</u> ¶¶ 4-5, 7, 37-38, 43-45; Ex.1033 ¶¶ 138-40, pp. 236-44.<sup>46, 47</sup></p> <p><b>Kurokawa discloses generating a look-up table</b> (e.g., “table of guide numbers and light emission times”) <b>storing associated image strobe durations</b> (e.g., light emission times”) <b>and power values</b> (e.g., “guide numbers”) <b>including a preparatory image strobe duration and associated preparatory power value.</b> <u>See, e.g., Ex.1010 Fig. 3; 5:66-6:4</u> (“[O]verall control and computing part 9 computes a light emission time for the second light emission according to the guide number computed at the step S217 by using also a table of guide numbers and light emission times, which is as shown in FIG. 3 indicating the characteristic of the flash emission part 15 in use.”); <b>10:26-39; see also id. 5:47-65; 10:9-25; Fig. 3; Ex.1033 ¶¶ 141-42, pp. 244-50.</b><sup>48, 49</sup></p> |

<sup>46</sup> Shimada discloses a LUT that is determined experimentally and stored in memory. See, e.g., Ex.1005 ¶¶ 6, 32, 34. The LUT stores, as entries, power values (e.g., S) and associated image strobe durations (e.g., flash times) required for obtaining the power value. See, e.g., id.; ¶¶ 34, 44, 45. The relative amount of emitted light S is expressed as a percentage of the full flash light emission. See, e.g., id. ¶¶ 7, 34; Ex.1033 ¶¶ 69, 70, 139, pp. 237-38.

<sup>47</sup> See n.19, supra; see also Ex.1033 ¶¶ 139, pp. 237-38.

<sup>48</sup> At minimum, a POSITA would have been motivated to employ Kurokawa’s teachings of a LUT in implementing Sugimoto’s camera system. See § V.D.2, supra. Further, to the extent that it is argued that Kurokawa does not disclose a LUT “including a preparatory image strobe duration and associated preparatory power

| Claim 6                                                           | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|-------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 6. The method of claim 1 further comprising:                      | <u>See</u> claim 1 above.                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| accessing the look-up table based on the average image luminance. | <p><b>Shimada teaches accessing the look-up table</b> (e.g., “referring to the LUT”) <b>based on the average image luminance</b> (e.g., “the image data average value VP obtained as a result of the . . . pre-flash that was actually performed”). <u>See, e.g.,</u> element 1-5, above; <u>see also</u> Ex.1005 at Table 1; ¶¶ 6-7; 32; 41-45; <b>Ex.1033 ¶¶ 143-44, pp. 250-54.</b><sup>50</sup></p> <p><b>Kurokawa</b><sup>51</sup> <b>teaches accessing the look-up table</b> (e.g.,</p> |

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value,” it would at minimum have been obvious to a POSITA to include the predetermined duration for the preliminary light emission and the associated guide number in the LUT. See Ex.1033 ¶ 129-32, 141, p. 245.

<sup>49</sup> A POSITA would have understood that the existence of a LUT necessarily, and thus inherently, requires generation of that LUT. Ex.1033 ¶¶ 141-42, p. 244. To the extent it is argued any further disclosure is required, it would at minimum have been obvious to a POSITA in light of the use of a LUT in Kurokawa to generate such a LUT. Ex.1033 ¶¶ 141-42, pp. 244-45.

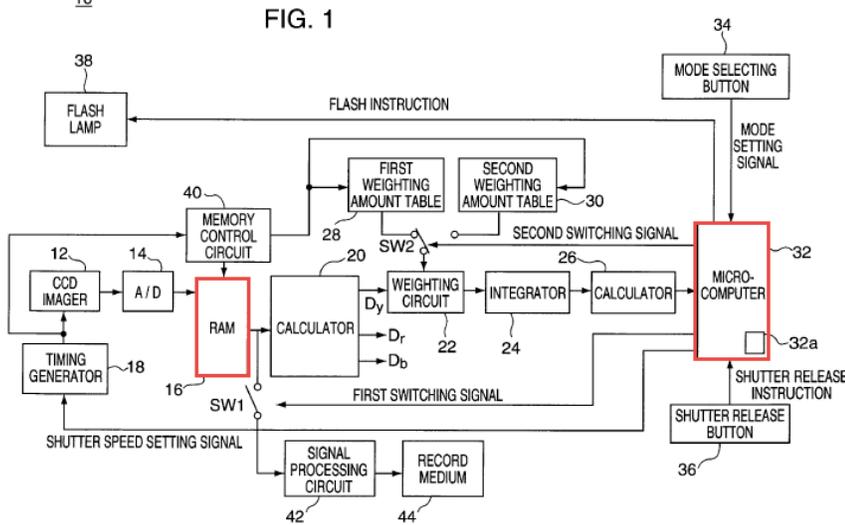
<sup>50</sup> See n.44, supra (re: motivation to combine); see also § V.D.1, supra; Ex. 1033 ¶¶ 120-23, 144, pp. 252-54.

<sup>51</sup> See n.48, supra (re: motivation to combine); see also § V.D.2, supra; Ex. 1033 ¶¶ 124-32, 145, pp. 244-50, 254-57.

| Claim 6                                                                                                                   | Prior Art                                                                                                                                                                                                                                                                                                                                                                       |
|---------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                                                                           | <p>“table of guide numbers and light emission times”) <b>based on the image luminance</b> (e.g., “measured light value”).<sup>52</sup><br/> <u>See, e.g., Ex.1010 at Fig. 3; 5:66- 6:12; 10:26-39; 5:47-65; 10:9-25; Ex.1033 ¶¶ 145, 124-32, pp. 244-50, 254-57.</u></p>                                                                                                        |
| Claim 7                                                                                                                   | Prior Art                                                                                                                                                                                                                                                                                                                                                                       |
| <p><b>7.</b> A memory having machine readable instructions for execution by a processor to adjust image lighting, the</p> | <p><b>Sugimoto discloses a memory</b> (e.g., “RAM 16”; “memory 32a”) <b>having machine readable instructions</b> (e.g., “flash instruction”; “shutter release instruction”) <b>for execution by a processor</b> (e.g., “microcomputer 32”) <b>to adjust image lighting.</b> <u>See, e.g., element 1; Ex.1004 Fig. 1; 8:52-56; 10:58-11:46; see also id. 10:35-44; 6:17-</u></p> |

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<sup>52</sup> Kurokawa discloses calculating the guide number for the main flash exposure from the preparatory image luminance. See Ex.1010 5:47-65. The LUT entry associated with the calculated guide number provides the main flash duration needed to produce a suitable image. See id. 5:66-6:4; see also Ex.1033 ¶ 141; p. 255.

| Claim 7                                                                                                | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| memory comprising:                                                                                     | <p><b>31; 12:28-38; 13:26-37; Ex.1033 ¶ 146, pp. 257-62.</b><sup>53</sup></p>  <p>The diagram, labeled FIG. 1, shows a camera system 10. It includes a flash lamp 38, a mode selecting button 34, a micro-computer 32, a shutter release button 36, a signal processing circuit 42, and a record medium 44. The micro-computer 32 is connected to a memory control circuit 40, which is linked to RAM 16. The RAM 16 is connected to a CCD imager 12, an A/D converter 14, and a timing generator 18. The micro-computer 32 also controls a first weighting amount table 28 and a second weighting amount table 30. It sends a first switching signal to a first calculator 20 and a second switching signal to a second calculator 26. The first calculator 20 outputs signals D<sub>r</sub> and D<sub>b</sub> to a weighting circuit 22, which then feeds into an integrator 24. The second calculator 26 also feeds into the integrator 24. The integrator 24 outputs a signal to a second calculator 26. The micro-computer 32 also receives a shutter release instruction from a shutter release button 36 and sends a flash instruction to the flash lamp 38. A shutter speed setting signal is sent to a timing generator 18. A signal processing circuit 42 is connected to the micro-computer 32 and the record medium 44. Two switches, SW1 and SW2, are used to route signals between the micro-computer and the various tables and calculators.</p> |
| <p>[7-1] a first set of machine readable instructions for acquiring a preparatory image while gen-</p> | <p><b>Sugimoto discloses machine readable instructions for acquiring a preparatory image (e.g., exposure of the CCD imager 12 during preliminary light-emission) while generating the preparatory light (e.g., preliminary light-emission), for a predetermined preparatory duration</b></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

<sup>53</sup> As Sugimoto teaches use of a processor to calculate the main flash, as well as memory and flash and shutter instructions, a POSITA would understand that Sugimoto necessarily, and thus inherently, discloses machine readable instructions (including instructions for performing the task of adjusting image lighting, as well as all other tasks identified in elements of Claim 7) for execution by the processor. See, e.g., element 1, above; see also Ex.1004 Fig. 1. Indeed, the only way for a processor to perform the claimed functionality would be using machine readable instructions (code). Alternatively, using such instructions would have been obvious to a POSITA. See Ex.1033 ¶ 146, pp. 258-59.

| Claim 7                                                                                                                                                                                                                                         | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
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| erating a preparatory light for a predetermined preparatory duration;                                                                                                                                                                           | ( <u>e.g.</u> , preliminary light-emission amount becomes P). <u>See</u> , <u>e.g.</u> , elements 1-1 and 1-2; <b>Ex.1033 ¶ 146, pp. 262-63.</b> <sup>54</sup><br><br><b>Kurokawa teaches machine readable instructions for acquiring a preparatory image</b> ( <u>e.g.</u> , exposure of the solid-state image sensor) <b>while generating</b> ( <u>e.g.</u> , “making”) <b>a preparatory light</b> ( <u>e.g.</u> , “first light emission”) <b>for a predetermined preparatory duration</b> ( <u>e.g.</u> , “predetermined period of time”). <u>See</u> , <u>e.g.</u> , element 1-1, above; <b>Ex.1033 ¶ 146, pp. 263-69.</b> <sup>55</sup>            |
| [7-2] a second set of machine readable instructions for determining an average preparatory image luminance based on preparatory image data associated with the preparatory image and weighting at least a subset of the preparatory image data; | <b>Sugimoto discloses machine readable instructions for determining an average preparatory image luminance</b> ( <u>e.g.</u> , “luminance evaluation value Vy in the preliminary light emission” and/or “preliminary light-emission luminance evaluation value Ys”) <b>based on preparatory image data associated with the preparatory image</b> ( <u>e.g.</u> , “luminance data Dy” and/or “color data R, G, B”; image data is obtained by the Analog-to-Digital (A/D) converter) <b>and weighting at least a subset of the preparatory image data.</b> <u>See</u> , <u>e.g.</u> , element 1-3, above; <b>Ex.1033 ¶ 146, pp. 269-70.</b> <sup>56</sup> |
| [7-3] a third set of machine readable instructions for generating a supplemental strobe duration based on the                                                                                                                                   | <b>Sugimoto discloses machine readable instructions for generating a supplemental strobe duration</b> ( <u>e.g.</u> , the duration associated with major light-emission amount Q) <b>based on the average preparatory image luminance</b> ( <u>e.g.</u> , preliminary light-emission luminance evaluation value Ys) <b>and luminance weightings</b> ( <u>e.g.</u> , weighting                                                                                                                                                                                                                                                                           |

<sup>54</sup> See n.53, supra (re: machine-readable instructions).

<sup>55</sup> See n.41, supra (re: motivation to combine); § V.D.2, supra; n.25, supra.

<sup>56</sup> See n.53, supra (re: machine-readable instructions).

| Claim 7                                                                                                                                                                                                                                 | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| average preparatory image luminance and luminance weightings;                                                                                                                                                                           | amount data K). <u>See, e.g.</u> , element 1-4, above; <b>Ex.1033 ¶ 146, pp. 270-71.</b> <sup>57</sup>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| [7-4] and a set of machine readable instructions for generating a look-up table that stores associated image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value. | <p><b>Shimada discloses machine readable instructions for generating (e.g., determining experimentally and storing beforehand in memory) a look-up table (e.g., look up table LUT) that stores associated image strobe durations (e.g., flash time) and power values (e.g., relative amount of emitted light S) including a preparatory image strobe duration (flash time for pre-flash) and associated preparatory power value (relative amount of emitted light for pre-flash).</b> <u>See, e.g.</u>, 1-5, above; <b>Ex.1033 ¶ 146, pp. 271-76.</b><sup>58</sup></p> <p><b>Kurokawa discloses machine readable instructions for generating a look-up table (e.g., “table of guide numbers and light emission times”) that stores associated image strobe durations (e.g., light emission times”) and power values (e.g., “guide numbers”) including a preparatory image strobe duration and an associated preparatory power value.</b><sup>59</sup> <u>See, e.g.</u>, 1-5, above; <b>Ex.1033 ¶ 146, pp. 276-80.</b></p> |
| Claim 14                                                                                                                                                                                                                                | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>14.</b> A digital imaging system comprising:                                                                                                                                                                                         | <b>Sugimoto discloses a digital imaging system (e.g., photography system utilizing a microcomputer and employing digital data).</b> <u>See, e.g.</u> , <b>Ex.1004 Fig. 1; Title</b> (“Digital camera, having a flash unit, which determines proper flash duration through an assessment of image luminance and, where needed, a preliminary flash emission.”); <b>Abstract; see also Ex.1033 ¶ 147, pp. 280-81.</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| [14-1] a                                                                                                                                                                                                                                | <b>Sugimoto discloses a processor (e.g., microcomputer) electrically</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

<sup>57</sup> See n.53, supra (re: machine-readable instructions).

<sup>58</sup> See n.44, supra (re: motivation to combine); § V.D.1, supra; n.23, supra.

<sup>59</sup> See n.48, supra (re: motivation to combine); § V.D.2, supra; n.25, supra.



| Claim 14                                                                                                          | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>sor when the strobe is activated to generate a preparatory light for a predetermined preparatory duration;</p> | <p><b>ceived at the processor (e.g., CPU 8) from the image sensor when the strobe is activated to generate a preparatory light (e.g., pre-flash) for a predetermined preparatory duration (e.g., “a prescribed amount of emitted light”). See, e.g., Ex.1005 Fig. 1; ¶ 20; element 1-5, above; see also Ex.1033 ¶ 149, pp. 285-93.<sup>61</sup></b></p> <p><b>Kurokawa discloses an image sensor (e.g., “solid-state image sensor”) coupled (e.g., illustrated by interconnect lines between items 4 and 10) to a memory (e.g., “memory part”), where a supplemental strobe duration (e.g., “light emission time for the second light emission”) stored in the memory is generated from a preparatory image received at the processor (e.g., “overall control and computing part”) from the image sensor (e.g., “solid-state image sensor”) when the strobe is activated to generate a preparatory light (e.g., “first light emission”) for a predetermined preparatory duration (e.g., “predetermined period of time”). See, e.g., elements 1-1, 1-5 and 7-4 see also Ex.1033 ¶ 150, pp. 293-98.<sup>62</sup></b></p> |
| <p>[14-3] wherein the processor accesses a look-up table in the memory that stores</p>                            | <p><b>Shimada discloses an imaging system wherein the processor (e.g., CPU) accesses a look-up table (e.g., look-up table LUT) in the memory that stores image strobe durations (e.g., flash time) and power values (e.g., relative amount of emitted light S) including a preparatory image strobe duration (e.g., flash time for pre-flash) and an associated preparatory power value (e.g., relative amount of emitted light for pre-flash).<sup>63</sup> See, e.g., elements 1-5, 1-6, and 14-2, above;<sup>64, 65</sup> Ex.1005 at Table 1 (¶ 32); ¶¶ 31 (“...[A] LUT (Table 1) representing the relationship between the relative amount of emitted light and the flash time is stored beforehand in</b></p>                                                                                                                                                                                                                                                                                                                                                                                                     |

<sup>61</sup> See n.44 supra (re: motiv. to combine); § V.D.2, supra; Ex.1033 ¶ 149.

<sup>62</sup> See n.41, supra (re: motiv. to combine); § V.D.2, supra; Ex.1033 ¶ 150.

<sup>63</sup> See n.19, supra; Ex.1033 ¶ 151.

<sup>64</sup> See, e.g., n.35, supra; Ex.1033 ¶ 151.

<sup>65</sup> See n.44 supra (re: motiv. to combine); § V.D.1, supra; Ex.1033 ¶ 151.

| Claim 14                                                                                                                         | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|----------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| image strobe durations and power values including a preparatory image strobe duration and an associated preparatory power value. | <p>storage means as a file, and the flash time of a main flash is determined by referring thereto to decide the actual amount of emitted light.”); <b>34</b> (“That is, the flash time of the strobe is controlled by...referring to the LUT....”); <b>42; 45</b>; <u>see also id.</u> ¶¶ <b>4-7, 32, 37-38, 43</b>; <b>Ex.1033 ¶ 151, pp. 298-306.</b></p> <p><b>Kurokawa<sup>66, 67</sup> discloses an imaging system wherein the processor (e.g., “solid-state image sensor”) accesses a look-up table (e.g., “table of guide numbers and light emission times”) in the memory (e.g., “memory part”), that stores image strobe durations (e.g., light emission times”) and power values (e.g., “guide numbers”) including a preparatory image strobe duration and an associated preparatory power value. See, e.g., Ex.1010 Fig. 3; 5:66-6:4 (“[T]he overall control and computing part 9 computes a light emission time for the second light emission according to the guide number computed at the step S217 by using also a table of guide numbers and light emission times....”); <u>see also id.</u> 5:47-65; 10:9-25; Ex.1033 ¶¶ 152-54, pp. 306-12.</b></p> |
| Claim 16                                                                                                                         | Prior Art                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 16. The digital image system of claim 14,                                                                                        | <u>See claim 14.</u>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| [16-1] wherein the memory has a weighting table that stores the luminance weighting.                                             | <div style="display: flex; align-items: flex-start;"> <div style="flex: 1;"> <p style="font-size: small;">FIG. 1<br/>FLASH INSTRUCTION<br/>RY RCL SW1<br/>FIRST WEIGHTING AMOUNT TABLE 28<br/>SECOND WEIGHTING AMOUNT TABLE 30<br/>SW2 SECOND SWITCH</p> </div> <div style="flex: 2; padding-left: 10px;"> <p><b>Sugimoto discloses a memory (e.g., memory control circuit) that has a weighting table (e.g., first and second weighting amount tables) that stores the luminance weighting (e.g., weighting amount</b></p> </div> </div>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

<sup>66</sup> It would have been obvious and straightforward to a POSITA to store the predetermined duration for preliminary light emission in the LUT and associate it with a respective guide number, such that a LUT “including a preparatory image strobe duration and associated preparatory power value.” See Ex.1033 ¶ 153, p. 307.

<sup>67</sup> See n.48, supra; see also § V.D.2, supra; Ex.1033 ¶¶ 152-54.

| Claim 16 | Prior Art                                                                                                                                                                                                                                                                                                                           |
|----------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|          | data K). See, e.g., <b>Ex.1004 at Fig. 1</b> (excerpt below), <b>5, 6; 6:17-31</b> (“[W]eighting circuit 22 subjects the luminance data to a weighting operation $D_y$ in accordance with weighting amount data K held in a first weighting amount table....”); see also <u>id.</u> <b>13:44-58; Ex.1033 ¶¶ 155-56, pp. 312-14.</b> |

## VI. CONCLUSION

Because this Petition, if unrebutted, shows that there is a reasonable likelihood that these claims are unpatentable, Petitioner requests this Petition be instituted and the Challenged Claims be found unpatentable and canceled. Per §§ 1.33(c), 42.105, and 42.100, a copy of the present Request, in its entirety, is being served on the Patent Owner at the address of record as reflected in the publicly available records of the PTO as designated in the PAIR system. The Director is hereby authorized to charge any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this proceeding by this firm) to Deposit Account 06-1075, under Order No. 110797-0018-652.

Respectfully submitted by: /J. Steven Baughman/

May 21, 2015

J. Steven Baughman (lead counsel) 47,414 Steven Pepe (backup counsel) 42,069  
Megan F. Raymond, 72,997  
**ROPES & GRAY LLP**  
One Metro Center, 700 12th St.–Ste. 900  
Washington, DC 20005-3948  
P: 202-508-4606 / F: 202-383-8371  
[steven.baughman@ropesgray.com](mailto:steven.baughman@ropesgray.com)  
[megan.raymond@ropesgray.com](mailto:megan.raymond@ropesgray.com)

**ROPES & GRAY LLP**  
1211 Avenue of the Americas  
New York, NY 10036-8704  
P: 212-596-9046/F: 646-728-2660  
[steven.pepe@ropesgray.com](mailto:steven.pepe@ropesgray.com)

Mailing address for all PTAB correspondence: **ROPES & GRAY LLP**  
IPRM – Floor 43, Prudential Tower, 800 Boylston Street, Boston, MA 02199-3600.

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

|                                          |   |                                |
|------------------------------------------|---|--------------------------------|
| United States Patent No.: 7,092,029      | § | Attorney Docket No.:           |
| Inventors: Robert A. Medwick, Glen Stark | § | 110797-0018-652                |
| Formerly Application No.: 09/816,038     | § | Customer No. 28120             |
| Issue Date: Aug. 15, 2006                | § |                                |
| Filing Date: Mar. 22, 2001               | § | Petitioners: Samsung           |
| Former Group Art Unit: 2622              | § | Electronics Co., Ltd.; Samsung |
| Former Examiner: D. Ometz; K. Jerabekz   | § | Electronics America, Inc.;     |
|                                          | § | Samsung Semiconductor, Inc.    |

For: STROBE LIGHTING SYSTEM FOR DIGITAL IMAGES

MAIL STOP PATENT BOARD  
Patent Trial and Appeal Board  
United States Patent and Trademark Office  
Post Office Box 1450  
Alexandria, Virginia 22313-1450

**PETITION FOR INTER PARTES REVIEW OF  
UNITED STATES PATENT NO. 7,092,029**

**CERTIFICATE OF SERVICE**

It is certified that a copy of the following documents has been served in its entirety on the patent owner as provided in 37 CFR § 42.205:

1. Petition For Inter Partes Review of United States Patent No. 7,092,029 Pursuant to 35 U.S.C. § 321, 37 C.F.R. § 42.304 and accompanying exhibits:

| <b>Exhibit</b> | <b>Description</b>                                |
|----------------|---------------------------------------------------|
| Ex.1001        | U.S. Patent No. 7,092,029                         |
| Ex.1002        | U.S. Patent No. 7,092,029 File History            |
| Ex.1003        | U.S. Prov. Appl. No. 60/192,008                   |
| Ex.1004        | U.S. Patent No. 6,195,127 (“Sugimoto”)            |
| Ex.1005        | Japanese Patent Appl. No. H11-119288 (“Shimada”)  |
| Ex.1006        | U.S. Patent No. 5,257,063 (“Ishimaru”)            |
| Ex.1007        | Japanese Patent Appl. No. H01-289925 (“Nakajima”) |

|         |                                                                                                                          |
|---------|--------------------------------------------------------------------------------------------------------------------------|
| Ex.1008 | U.S. Patent No. 5,987,261 (“Sugahara”)                                                                                   |
| Ex.1009 | U.S. Patent No. 5,652,929 (“Yasukawa”)                                                                                   |
| Ex.1010 | U.S. Patent No. 6,426,775 (“Kurokawa”)                                                                                   |
| Ex.1011 | U.S. Patent No. 4,484,807 (“Kataoka”)                                                                                    |
| Ex.1012 | Electronic Flash, Strobe; Harold E. Edgerton (2d ed. MIT Press 1979)                                                     |
| Ex.1013 | Electronic Flash; Jack Neubart (Silver Pixel Press 1997)                                                                 |
| Ex.1014 | Fundamentals of Electronic Imaging Systems: Some Aspects of Image Processing, W.F. Schreiber, (3 <sup>rd</sup> ed. 1993) |
| Ex.1015 | Canon EOS Elan II Instructions; English Edition (1995)                                                                   |
| Ex.1016 | Kodak DCS 500 Series Digital Cameras User’s Guide (2000)                                                                 |
| Ex.1017 | Canon Speedlite 380EX Instructions; English Edition (1995)                                                               |
| Ex.1018 | Canon Flash Work: Taking Great Pictures with Canon Speedlites (1999)                                                     |
| Ex.1019 | Kodak Pro DCS 520 Review, Phil Askey (February 1999)                                                                     |
| Ex.1020 | Magic Lanterns Guides: Nikon SB-25 Flash System (1993)                                                                   |
| Ex.1021 | Nikon D1 Camera Instruction Manual                                                                                       |
| Ex.1022 | Press Release – Nikon D1 Camera (June 15, 1999)                                                                          |
| Ex.1023 | Nikon D1 Camera Brochure (August 22, 2000)                                                                               |
| Ex.1024 | Nikon Speedlight SB-28DX Instruction Manual                                                                              |
| Ex.1025 | Press Release - Nikon SB-28DX (June 15, 1999)                                                                            |
| Ex.1026 | Minolta Maxxum Flash Program Flash 5400HS Instruction Manual (1993)                                                      |
| Ex.1027 | Minolta Dynax 9/Maxxum 9 Instruction Manual (1999)                                                                       |
| Ex.1028 | Popular Photography (March 1999)                                                                                         |
| Ex.1029 | SLR: Nikon Takes a Giant Step Forward with New N90 AF SLR, Popular Photography (October 1992)                            |
| Ex.1030 | Nikon N90 Instruction Manual                                                                                             |
| Ex.1031 | Magic Lanterns Guides: Nikon SB-28 AF Speedlite (1999)                                                                   |
| Ex.1032 | Joint Submission of Disputed Claim Terms, Case No. 4:14-cv-00371                                                         |
| Ex.1033 | Declaration of Kenneth Parulski                                                                                          |
| Ex.1034 | Declaration of William M. Serra                                                                                          |

The copy has been served on May 21, 2015 by causing the aforementioned documents to be deposited in the United States Postal Service as Express Mail postage pre-paid in an envelope addressed to:

Farjami & Farjami LLP  
26522 La Alameda Avenue  
Suite 360  
Mission Viejo, CA 92691

(Label No. EF 070 059 626 US)

Respectfully submitted,

**ROPES & GRAY LLP**

/s/ Megan Raymond  
Megan F. Raymond