

PATENT COOPERATION TREATY

TRANSLATION

From the
INTERNATIONAL SEARCHING AUTHORITY

PCT

WRITTEN OPINION OF THE
INTERNATIONAL SEARCHING AUTHORITY

(PCT Rule 43bis.1)

To:

Date of mailing (day/month/year)	20.12.2016
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Applicant's or agent's file reference PM160006WO1	FOR FURTHER ACTION See paragraph 2 below
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International application No. PCT/JP2016/081628	International filing date (day/month/year) 25.10.2016	Priority date (day/month/year) 05.02.2016
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International Patent Classification (IPC) or both national classification and IPC
G03B21/16 (2006.01) i, G03B21/00 (2006.01) i, H04N9/31 (2006.01) i

Applicant
HITACHI MAXELL, LTD.

1. This opinion contains indications relating to the following items:

- Box No. I Basis of the opinion
- Box No. II Priority
- Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- Box No. IV Lack of unity of invention
- Box No. V Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- Box No. VI Certain documents cited
- Box No. VII Certain defects in the international application
- Box No. VIII Certain observations on the international application

2. **FURTHER ACTION**

If a demand for international preliminary examination is made, this opinion will be considered to be a written opinion of the International Preliminary Examining Authority ("IPEA") except that this does not apply where the applicant chooses an Authority other than this one to be the IPEA and the chosen IPEA has notified the International Bureau under Rule 66.1bis(b) that written opinions of this International Searching Authority will not be so considered.

If this opinion is, as provided above, considered to be a written opinion of the IPEA, the applicant is invited to submit to the IPEA a written reply together, where appropriate, with amendments, before the expiration of 3 months from the date of mailing of Form PCT/ISA/220 or before the expiration of 22 months from the priority date, whichever expires later.

For further options, see Form PCT/ISA/220.

Name and mailing address of the ISA/JP	Date of completion of this opinion	Authorized officer
Facsimile No.		Telephone No.

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Box No. I Basis of this opinion

1. With regard to the **language**, this opinion has been established on the basis of:
 - the international application in the language in which it was filed
 - a translation of the international application into _____, which is the language of a translation furnished for the purposes of international search (Rules 12.3(a) and 23.1(b)).
2. This opinion has been established taking into account the **rectification of an obvious mistake** authorized by or notified to this Authority under Rule 91 (Rule 43bis.1(a))
3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, this opinion has been established on the basis of a sequence listing:
 - a. forming part of the international application as filed:
 - in the form of an Annex C/ST.25 text file.
 - on paper or in the form of an image file.
 - b. furnished together with the international application under PCT Rule 13ter.1(a) for the purposes of international search only in the form of an Annex C/ST.25 text file.
 - c. furnished subsequent to the international filing date for the purposes of international search only:
 - in the form of an Annex C/ST.25 text file (Rule 13ter.1(a)).
 - on paper or in the form of an image file (Rule 13ter.1(b) and Administrative Instructions, Section 713).
4. In addition, in the case that more than one version or copy of a sequence listing has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that forming part of the application as filed or does not go beyond the application as filed, as appropriate, were furnished.
5. Additional comments:

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Box No. V	Reasoned statement under Rule 43bis.1(a)(i) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
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1. Statement			
Novelty (N)	Claims	5-9	YES
	Claims	1-4, 10	NO
Inventive step (IS)	Claims		YES
	Claims	1-10	NO
Industrial applicability (IA)	Claims	1-10	YES
	Claims		NO

2. Citations and explanations:	
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Document 1: US 2014/0092368 A1 (CORETRONIC CORP.) 03
April 2014, paragraphs [0035]-[0041], fig. 2 & CN 103713450 A

Document 2: US 2014/0085612 A1 (CORETRONIC CORP.) 27
March 2014, paragraphs [0024]-[0025], [0030]-[0034], fig. 3, 4 & CN 103698966 A

Document 3: JP 5804522 B2 (NEC DISPLAY SOLUTIONS, LTD.)
04 November 2015, paragraph [0073], fig. 8, 10 & US 2013/0070453 A1, paragraph [0086], fig. 8, 10 & WO 2011/152217 A1 & CN 103069472 A

The invention as in claims 1-2 and 10 lacks novelty and does not involve an inventive step in relation to document 1 cited in the ISR.

Paragraph [0038] of document 1 cited in the ISR describes configuring the distance between a first air intake inlet 227 and a heat sink 244b thermally coupled to a second solid-state light source (red) 242b to be shorter than the distance between the first air intake inlet 227 and other heat sinks 244a (green), 244c (blue)

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due to red LED having the lowest temperature resistance, and indicates that three solid-state light sources 242a-242c are LEDs.

The invention as in claims 3-4 lacks novelty and does not involve an inventive step in relation to document 1 cited in the ISR.

Paragraph [0037] of document 1 cited in the ISR indicates that the solid-state light sources 242a-242c are each thermally coupled to a respective heat sink 244a-244c via a respective heat pipe 246a-246c.

The invention as in claims 5-7 does not involve an inventive step in relation to document 1 and document 3 cited in the ISR.

The manner in which the layout of the heat pipes is configured in the invention disclosed in document 1 is a design matter that could be addressed, as appropriate, by a person skilled in the art. For example, paragraph [0073], fig. 8, and fig. 10 of document 3 cited in the ISR indicate a plurality of flow paths 20 (heat pipes) arranged offset in the vertical direction.

The invention as in claims 8-9 does not involve an inventive step in relation to document 1 and document 3 cited in the ISR.

Fig. 2 of document 1 shows that air inlet/outlets 225, 227 are provided in the same direction as an air introduction path D1 of a fan 260.

The invention as in claims 1-2 and 10 lacks novelty and does not involve an inventive step in relation to

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document 2 cited in the ISR.

Paragraph [0034] of document 2 cited in the ISR describes positioning a heat sink 122a, thermally coupled to a red LED 112a, more toward the upstream side of forced convection air generated by a fan 130 than toward a heat sink 122b for green LED and a heat sink 122c for blue LED due to red LED light sources having the lowest temperature resistance.

The invention as in claims 3-4 does not involve an inventive step in relation to document 2 cited in the ISR.

Paragraph [0031] of document 2 cited in the ISR indicates that the solid-state light sources 112a-112b are each thermally coupled to a respective heat sink 122a-122b via a respective heat pipe 124a-124b. A person skilled in the art could, as appropriate and as necessary, take into account the overall layout, etc., of the invention disclosed in document 2 and configure a solid-state light source 112c to be connected to a heat sink via the appropriate heat pipe.

The invention as in claims 5-7 does not involve an inventive step in relation to document 2 and document 3 cited in the ISR.

The manner in which the layout of the heat pipes is configured in the invention disclosed in document 2 is a design matter that could be addressed, as appropriate, by a person skilled in the art. For example, paragraph [0073], fig. 8, and fig. 10 of document 3 cited in the ISR indicate a plurality of flow paths 20 (heat pipes) arranged offset in the vertical direction.

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The invention as in claims 8-9 does not involve an inventive step in relation to document 2 and document 3 cited in the ISR.

Fig. 3 and 4 of document 2 show that air inlet/outlets are provided in the same direction as an air introduction path of the fan 130.