PTO/SB/17 (03-13)
Approved for use through 11/30/2020. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995 no persons are required to respond to a collection of information unless it displays a valid OMB control number.

FEE TRANSMITTAL

Complete if known	
Application Number	
Filing Date	2017-12-28
First Named Inventor	Hyun Lee
Examiner Name	
Art Unit	
Practitioner Docket No.	N3044.10014US06

☐ Applicant asserts small entity status. See 37 CFR 1.27.

☐ Applicant certifies micro entity status. See 37 CFR 1.29. Form PTO/SB/15A or B or equivalent must either be enclosed or have been submitted previously.

TOTAL AMOUNT OF PAYMENT ($) 1600

METHOD OF PAYMENT (check all that apply)

☐ Check ☐ Credit Card ☐ Money Order ☐ None ☐ Other (please identify): _____

☑ Deposit Account Deposit Account Number: 505394 Deposit Account Name: Maschoff Brennan

For the above-identified deposit account, the Director is hereby authorized to (check all that apply):

☑ Charge fee(s) indicated below ☐ Charge fee(s) indicated below, **except for the filing fee**

☐ Charge any additional fee(s) or underpayment of fee(s) under 37 CFR 1.16 and 1.17 ☑ Credit any overpayment of fee(s)

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

FEE CALCULATION

1. BASIC FILING, SEARCH, AND EXAMINATION FEES (U = undiscounted fee; S = small entity fee; M = micro entity fee)

	FILING FEES			SEARCH FEES			EXAMINATION FEES			
Application Type	**U ($)**	**S ($)**	**M ($)**	**U ($)**	**S ($)**	**M ($)**	**U ($)**	**S ($)**	**M ($)**	**Fees Paid ($)**
Utility	280	140*	70	600	300	150	720	360	180	1600.00
Design	180	90	45	120	60	30	460	230	115	
Plant	180	90	45	380	190	95	580	290	145	
Reissue	280	140	70	600	300	150	2,160	1,080	540	
Provisional	260	130	65	0	0	0	0	0	0	

* The $140 small entity status filing fee for a utility application is further reduced to $70 for a small entity status applicant who files the application via EFS-Web.

2. EXCESS CLAIM FEES

Fee Description	**Undiscounted Fee ($)**	**Small Entity Fee ($)**	**Micro Entity Fee ($)**
Each claim over 20 (including Reissues)	80	40	20
Each independent claim over 3 (including Reissues)	420	210	105
Multiple dependent claims	780	390	195

Total Claims		**Extra Claims**		**Fee ($)**		**Fee Paid ($)**
7	-20 or HP =	0	x	0	=	0

HP = highest number of total claims paid for, if greater than 20.

Indep. Claims		**Extra Claims**		**Fee ($)**		**Fee Paid ($)**
0	-3 or HP =	0	x	0	=	0

HP = highest number of independent claims paid for, if greater than 3.

Multiple Dependent Claims	**Fee ($)**	**Fee Paid ($)**

3. APPLICATION SIZE FEE

If the specification and drawings exceed 100 sheets of paper (excluding electronically filed sequence or computer listings under 37 CFR 1.52(e)), the application size fee due is $400 ($200 for small entity) ($100 for micro entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).

Total Sheets		**Extra Sheets**		**Number of each additional 50 or fraction thereof**		**Fee ($)**		**Fee Paid ($)**
22	- 100 =	0	/ 50 =	0 (round **up** to a whole number)	x	0	=	0

4. OTHER FEE(S)

	Fees Paid ($)
Non-English specification, $130 fee (no small or micro entity discount)	0
Non-electronic filing fee under 37 CFR 1.16(t) for a utility application, $400 fee ($200 small or micro entity)	0
Other (e.g., late filing surcharge): _____	0

SUBMITTED BY

Signature	/Jaime J. Zheng/	Registration No. (Attorney/Agent) 51167	Telephone
Name (Print/Type)	Jaime J. Zheng		Date 2017-12-28

This collection of information is required by 37 CFR 1.136. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Privacy Act Statement

The **Privacy Act of 1974 (P.L. 93-579)** requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (*i.e.*, GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	N3044.10014US06
	Application Number	
Title of Invention	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United States Patent and Trademark Office as outlined in 37 CFR 1.76.
This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2:

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1 — Remove

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Hyun		Lee	

Residence Information (Select One) ● US Residency ○ Non US Residency ○ Active US Military Service

City	Ladera Ranch	State/Province	CA	Country of Residence	US

Mailing Address of Inventor:

Address 1	21 Thalia
Address 2	

City	Ladera Ranch	State/Province	CA
Postal Code	92694	Country	US

All Inventors Must Be Listed - Additional Inventor Information blocks may be generated within this form by selecting the **Add** button. Add

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ **An Address is being provided for the correspondence Information of this application.**

Customer Number	79141		
Email Address	Docket@mabr.com	Add Email	Remove Email
Email Address	JZheng@mabr.com	Add Email	Remove Email

Application Information:

Title of the Invention	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER		
Attorney Docket Number	N3044.10014US06	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	3	Suggested Figure for Publication (if any)	

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	Application Number	
Title of Invention	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	

Filing By Reference:

Only complete this section when filing an application by reference under 35 U.S.C. 111(c) and 37 CFR 1.57(a). Do not complete this section if application papers including a specification and any drawings are being filed. Any domestic benefit or foreign priority information must be provided in the appropriate section(s) below (i.e., "Domestic Benefit/National Stage Information" and "Foreign Priority Information").

For the purposes of a filing date under 37 CFR 1.53(b), the description and any drawings of the present application are replaced by this reference to the previously filed application, subject to conditions and requirements of 37 CFR 1.57(a).

Application number of the previously filed application	Filing date (YYYY-MM-DD)	Intellectual Property Authority or Country

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32).
Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	● Customer Number	US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	71141		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, 365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing benefit claim information in the Application Data Sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.
When referring to the current application, please leave the "Application Number" field blank.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
	Continuation of	15/088155	2016-04-01

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	N3044.10014US06
	Application Number	
Title of Invention	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
15/088155	Continuation of	13/942721	2013-07-16	9311116	2016-04-12

Prior Application Status	Patented	Remove

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)	Patent Number	Issue Date (YYYY-MM-DD)
13/942721	Continuation of	12/815339	2010-06-14	8489837	2013-07-16

Prior Application Status	Expired	Remove

Application Number	Continuity Type	Prior Application Number	Filing or 371(c) Date (YYYY-MM-DD)
12/815339	Claims benefit of provisional	61/186799	2009-06-12

Additional Domestic Benefit/National Stage Data may be generated within this form by selecting the **Add** button. Add

Foreign Priority Information:

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX)[i] the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

Remove

Application Number	Country[i]	Filing Date (YYYY-MM-DD)	Access Code[i] (if applicable)

Additional Foreign Priority Data may be generated within this form by selecting the **Add** button. Add

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications

☐ This application (1) claims priority to or the benefit of an application filed before March 16, 2013 and (2) also contains, or contained at any time, a claim to a claimed invention that has an effective filing date on or after March 16, 2013.
NOTE: By providing this statement under 37 CFR 1.55 or 1.78, this application, with a filing date on or after March 16, 2013, will be examined under the first inventor to file provisions of the AIA.

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Authorization or Opt-Out of Authorization to Permit Access:

When this Application Data Sheet is properly signed and filed with the application, applicant has provided written authority to permit a participating foreign intellectual property (IP) office access to the instant application-as-filed (see paragraph A in subsection 1 below) and the European Patent Office (EPO) access to any search results from the instant application (see paragraph B in subsection 1 below).

Should applicant choose not to provide an authorization identified in subsection 1 below, applicant **must opt-out** of the authorization by checking the corresponding box A or B or both in subsection 2 below.

NOTE: This section of the Application Data Sheet is **ONLY** reviewed and processed with the **INITIAL** filing of an application. After the initial filing of an application, an Application Data Sheet cannot be used to provide or rescind authorization for access by a foreign IP office(s). Instead, Form PTO/SB/39 or PTO/SB/69 must be used as appropriate.

1. Authorization to Permit Access by a Foreign Intellectual Property Office(s)

A. Priority Document Exchange (PDX) - Unless box A in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the State Intellectual Property Office of the People's Republic of China (SIPO), the World Intellectual Property Organization (WIPO), and any other foreign intellectual property office participating with the USPTO in a bilateral or multilateral priority document exchange agreement in which a foreign application claiming priority to the instant patent application is filed, access to: (1) the instant patent application-as-filed and its related bibliographic data, (2) any foreign or domestic application to which priority or benefit is claimed by the instant application and its related bibliographic data, and (3) the date of filing of this Authorization. See 37 CFR 1.14(h)(1).

B. Search Results from U.S. Application to EPO - Unless box B in subsection 2 (opt-out of authorization) is checked, the undersigned hereby **grants the USPTO authority** to provide the EPO access to the bibliographic data and search results from the instant patent application when a European patent application claiming priority to the instant patent application is filed. See 37 CFR 1.14(h)(2).

The applicant is reminded that the EPO's Rule 141(1) EPC (European Patent Convention) requires applicants to submit a copy of search results from the instant application without delay in a European patent application that claims priority to the instant application.

2. Opt-Out of Authorizations to Permit Access by a Foreign Intellectual Property Office(s)

☐ A. Applicant **DOES NOT** authorize the USPTO to permit a participating foreign IP office access to the instant application-as-filed. If this box is checked, the USPTO will not be providing a participating foreign IP office with any documents and information identified in subsection 1A above.

☐ B. Applicant **DOES NOT** authorize the USPTO to transmit to the EPO any search results from the instant patent application. If this box is checked, the USPTO will not be providing the EPO with search results from the instant application.

NOTE: Once the application has published or is otherwise publicly available, the USPTO may provide access to the application in accordance with 37 CFR 1.14.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	N3044.10014US06
	Application Number	
Title of Invention	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1 Remove

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

Clear

Assignee	Legal Representative under 35 U.S.C. 117	Joint Inventor
Person to whom the inventor is obligated to assign.	Person who shows sufficient proprietary interest	

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Name of the Deceased or Legally Incapacitated Inventor:

If the Applicant is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Applicant:

Address 1			
Address 2			
City		**State/Province**	
Country		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Applicant Data may be generated within this form by selecting the Add button. Add

Assignee Information including Non-Applicant Assignee Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	N3044.10014US06
	Application Number	
Title of Invention	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	

Assignee 1

Complete this section if assignee information, including non-applicant assignee information, is desired to be included on the patent application publication. An assignee-applicant identified in the "Applicant Information" section will appear on the patent application publication as an applicant. For an assignee-applicant, complete this section only if identification as an assignee is also desired on the patent application publication.

Remove

If the Assignee or Non-Applicant Assignee is an Organization check here. ☐

Prefix	**Given Name**	Middle Name	**Family Name**	Suffix

Mailing Address Information For Assignee including Non-Applicant Assignee:

Address 1			
Address 2			
City		**State/Province**	
Country i		Postal Code	
Phone Number		Fax Number	
Email Address			

Additional Assignee or Non-Applicant Assignee Data may be generated within this form by selecting the Add button. Add

Signature:

Remove

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b). **However, if this Application Data Sheet is submitted with the INITIAL filing of the application and either box A or B is not checked in subsection 2 of the "Authorization or Opt-Out of Authorization to Permit Access" section, then this form must also be signed in accordance with 37 CFR 1.14(c).**

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Jaime J. Zheng/			Date (YYYY-MM-DD)	2017-12-28
First Name	Jaime J.	Last Name	Zheng	Registration Number	51167

Additional Signature may be generated within this form by selecting the Add button. Add

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Samsung Electronics Co., Ltd.
Ex. 1096, p. 9

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1 The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C. 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether the Freedom of Information Act requires disclosure of these records.

2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.

3 A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.

4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).

5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent CooperationTreaty.

6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).

7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.

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Samsung Electronics Co., Ltd.
Ex. 1096, p. 10

Customer No. 79141
Attorney Docket No.: NETL.062C1A

COMBINED DECLARATION AND ASSIGNMENT FOR UTILITY OR DESIGN APPLICATION

Title of Invention	SYSTEMS AND METHODS FOR HANDSHAKING WITH A MEMORY MODULE

DECLARATION

As a below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application, or

■ United States application or PCT international application number 13/942,721 filed on July 16, 2013.

The above-identified application was made or authorized to be made by me.

I believe that I am the original inventor or an original joint inventor of a claimed invention in the application.

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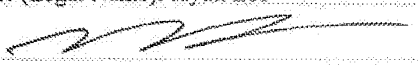
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First Inventor (Legal Name): Hyun Lee

Signature:  Date: 10/9/2013

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A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

CROSS-REFERENCE TO RELATED APPLICATIONS

[0001] This application is a continuation of U.S. App. No. 15/088,155, filed April 1, 2015, to be issued as U.S. Pat. No. 9,858,218 on January 2, 2018, which is a continuation of U.S. App. No. 13/942,721, filed July 16, 2013, now U.S. Pat. No. 9,311,116, which is a continuation of U.S. App. No. 12/815,339, filed June 14, 2010, now U.S. Pat. No. 8,489,837, which claims the benefit of priority from U.S. Provisional App. No. 61/186,799, filed June 12, 2009, each of which is incorporated in its entirety by reference herein.

FIELD OF THE DISCLOSURE

[0002] The present disclosure relates to the operation of memory modules. Specifically, the present disclosure relates to systems and methods for handshaking with a memory module during or upon completion of initialization.

BACKGROUND OF THE DISCLOSURE

[0003] Memory subsystems such as memory modules are generally involved in the initialization procedure for computer systems, including servers, personal computers, and the like. For example, during system-wide initialization, the memory subsystems may undergo internal initialization procedures, or the system memory controller may otherwise interact with the memory subsystems during the initialization procedure. As part of this interaction, the system memory controller may request that the memory subsystem perform one or more requested tasks during system initialization.

SUMMARY

[0004] According to certain aspects, a memory module is coupled to a memory controller of a host computer system via an interface. The interface includes data, address and control signal pins and an output pin in addition to the data, address and control signal pins. The memory module receives a first command from the memory controller via the address and control signal pins, and enters a first mode in response to the first command. The memory module in the first mode responds to at

least one initialization sequence, and sends a first output signal via the output pin to indicate a status of the at least one initialization sequence to the memory controller. The memory module enters a second mode in which the memory module performs memory operations including memory read/write operations according to an industry standard. During the read/write operations, the memory module communicates data with the memory controller via the data signal pins in response to second memory commands received via the address and control signal pins. The memory module may output a second output signal related to the read/write operations via the output pin.

[0005] According to certain aspects, a memory module is coupled to a memory controller of a host computer system via an interface. The interface includes data, address and control signal pins and an output pin in addition to the data, address and control signal pins. The memory module performs an internal procedure in a first mode in response to a first command from the memory controller whereby the memory controller hands off control of the internal procedure to the first memory module. The memory module sends a first output signal via the output pin to indicate a status of the internal procedure to the memory controller. The memory module enters a second mode in which the memory module performs standard operations including one or more of memory read/write, pre-charge, refresh operations according to an industry standard. The memory module may output a second output signal related to the standard operations via the output pin.

[0006] In another aspect, a memory module is operable in a first mode and in a second mode. The memory module operates according to an industry standard in the second mode by performing standard operations including memory read/write operations in response to address and control signals from a memory controller of a host computer system. The memory module comprises a standard interface including data, address and control signal pins and an output pin in addition to the data, address and control signal pins. The memory module enters the first mode in response to a first command from the memory controller, in which the memory module responds to at least one initialization sequence. The memory module further comprises a notification circuit to output a notification signal indicating a status of the at least one initialization sequence to the memory controller via the output pin.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] Figure 1 shows an example host computer system including an example memory module

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configured to perform handshaking with a memory controller of the host computer system according to certain embodiments described herein.

[0008] Figure 2 shows an example host computer system including example first and second memory modules configured to perform handshaking with a system memory controller of the host computer system according to certain embodiments described herein.

[0009] Figure 3 shows a host computer system including example first and second memory modules configured to perform handshaking with a memory controller of the host system, where the notification circuits of the first and second memory modules have another example configuration according to certain embodiments described herein.

[0010] Figure 4 and Figure 5 show example methods of using at least one memory module according to certain embodiments described herein.

DETAILED DESCRIPTION

[0011] Existing initialization schemes have certain inefficiencies which lead to wasted time and expense. Thus, there is a need to reduce the time and complexity involved in system memory controller interactions with memory subsystems during initialization. Certain embodiments described herein advantageously satisfy at least a portion of this need by providing a system and method which utilizes a feedback path from a memory subsystem such as a memory module to a system memory controller, such as a Memory Controller Hub (MCH) of a computer system during initialization.

[0012] In general, there is no existing method of handshaking between the MCH (e.g., system memory controller) and a memory subsystem (e.g., memory module) during initialization. For example, in conventional systems, the system memory controller does not monitor the error-out signal from the memory subsystem. This causes the MCH to perform blind execution. In a typical server (e.g., an Intel or AMD or other chipset based server), the lack of any handshaking between the MCH and the memory subsystem during the server initialization period has not been a serious issue since the MCH generally has complete control over the initialization procedure. However, one possible configuration for LR-DIMM (Load Reduced DIMM) includes the MCH handing over one or more parts of the initialization operation sequence to the memory subsystem. This raises an unprecedented issue not addressed in conventional systems because, in such proposed

configurations, the system can benefit from the MCH handshaking with the memory subsystem controller, as described more fully below.

[0013] Such an LR-DIMM configuration may have the MCH inserting a waiting period of predetermined length during which the MCH is idle and the memory subsystem controller undergoes initialization. However, one shortcoming of this LR-DIMM configuration would be that it requires the MCH to be in standby (idle, or wait) while the memory subsystem controller completes its task. Under such an arrangement, since the time to complete a task can be dependent on the density, speed and configuration of the memory subsystem, and these parameters may be unknown to the MCH, the MCH may have to insert a single, predetermined standby period. In addition, if there are multiple occasions that the MCH needs to hand off control to the memory subsystem controller, the required MCH wait periods can be different from one occasion to another, and it complicates the correlation between the MCH and the memory subsystem controller. For example, the MCH according to such a scheme may give control to the local memory controller of a memory subsystem (e.g., memory module) for execution of a training sequence. The MCH may wait for a pre-determined period of time and then assume that the local memory controller has completed the training sequence. However, depending on the memory subsystem parameters (e.g., memory capacity, speed, number of ranks, etc.), the time for actually completing the training sequence may vary and may be longer or shorter than predetermined period of time.

[0014] In general, handshaking can be implemented in at least two ways; polling and notifying. In the polling method, the MCH reads a status register in the memory subsystem controller to find out if the memory subsystem controller has completed the required or requested operation. For example, a status register may be read out through a serial interface such as System Management Bus (SMBus). However, a register polling method is generally inefficient because the system memory controller does not know exactly when the memory subsystem will have completed the required or requested operation. Thus, the system memory controller may wait longer than necessary to poll the memory subsystem, thereby delaying the overall initialization process. Additionally, the problem may be compounded because multiple training sequences or other initialization sequences may be run on the memory subsystem during a particular initialization period, resulting in accumulation of such unnecessary delays. Moreover, polling generally involves scheduling polling intervals during which the system memory controller is not performing other operations, resulting in further inefficiency.

[0015] Alternatively, the notifying method is an advantageous handshaking method between the MCH and the memory subsystem controller. According to a notifying method, the memory subsystem controller sends a signal to the MCH when the memory subsystem controller completes the required or requested operation. This method allows the MCH to execute one or more independent commands while it is waiting for a notification signal from the memory subsystem controller.

[0016] Certain embodiments described herein provide a method of establishing a handshake mechanism based on notification signaling. In certain embodiments, this mechanism can be implemented by adding a new interface (notifying) signal between the MCH and the memory subsystem controller, or by adding an additional functionality to an existing, non-timing critical signal without altering the memory subsystem hardware. In either case, the interface between the MCH and the memory subsystem controller of certain embodiments can be an open drain signaling from the memory subsystem controller to the MCH, although a variety of other configurations are possible. As will be appreciated by persons skilled in the art, the terms MCH, system memory controller, and memory subsystem are used generally interchangeable throughout this disclosure, and the terms memory module, memory subsystem controller, and local memory controller are used generally interchangeably throughout this disclosure.

[0017] FIG. 1 illustrates an example host computer system 16 including an example memory module 10 according to certain embodiments described herein. The memory module 10 can comprise at least one output 12 configured to be operatively coupled to a system memory controller 14 of the host computer system 16. In certain embodiments, the memory module 10 is configured to operate in at least two modes comprising an initialization mode during which the memory module 10 executes at least one initialization sequence, and an operational mode. The memory module 10 may further include a controller circuit 18. In some embodiments, the controller circuit 18 is configured to cause the memory module 10 to enter the initialization mode. The memory module 10 can further include a notification circuit 20 configured to drive the at least one output 12 while the memory module 10 is in the initialization mode to provide at least one notification signal to the memory controller 14 indicating at least one status of the at least one initialization sequence.

[0018] The memory module 10 may comprise a printed-circuit board (PCB) 22. In certain

embodiments, the memory module 10 has a memory capacity of 512-MB, 1-GB, 2-GB, 4-GB, 8-GB, 16-GB, or higher. Other memory capacities are also compatible with certain embodiments described herein. In addition, memory modules 10 having widths of 4 bytes, 8 bytes, 16 bytes, 32 bytes, or 32 bits, 64 bits, 128 bits, 256 bits, as well as other widths (in bytes or in bits), are compatible with embodiments described herein. The PCB 22 can have an industry-standard form factor. For example, the PCB 22 can have a low profile (LP) form factor with a height of 30 millimeters and a width of 133.35 millimeters. In certain other embodiments, the PCB 20 has a very high profile (VHP) form factor with a height of 50 millimeters or more. In certain other embodiments, the PCB 22 has a very low profile (VLP) form factor with a height of 18.3 millimeters. Other form factors including, but not limited to, small-outline (SO-DIMM), unbuffered (UDIMM), registered (RDIMM), fully-buffered (FBDIMM), mini-DIMM, mini-RDIMM, VLP mini-DIMM, micro-DIMM, and SRAM DIMM are also compatible with certain embodiments described herein. In other embodiments, certain non-DIMM form factors are possible such as, for example, single in-line memory module (SIMM), multi-media card (MMC), and small computer system interface (SCSI).

[0019] In certain embodiments, the memory module 10 is operatively coupled to (e.g., in electrical communication with) the host computer system 16. In certain other embodiments, the memory module 10 may communicate with the host computer system 16 using some other type of communication, such as, for example, optical communication. Examples of host computer systems 16 include, but are not limited to, blade servers, 1U servers, personal computers (PCs), and other applications in which space is constrained or limited. The PCB 22 can comprise an interface (not shown) that is configured to be in electrical communication with the host computer system 16. For example, the interface can comprise a plurality of edge connections which fit into a corresponding slot connector of the host system 16. The interface of certain embodiments provides a conduit for power voltage as well as data, address, and control signals between the memory module 10 and the host system 16. For example, the interface can comprise a standard 240-pin DDR2 edge connector. The at least one output 12 may be routed over the interface, for example.

[0020] The memory module 10 may also comprise one or more memory elements (not shown), such as dynamic random-access memory (DRAM) elements, for example. Types of DRAM elements compatible with certain embodiments described herein include, but are not limited to, DDR, DDR2, DDR3, DDR4, and synchronous DRAM (SDRAM). In addition, memory elements

having bit widths of 4, 8, 16, 32, as well as other bit widths, are compatible with certain embodiments described herein. Memory elements compatible with certain embodiments described herein have packaging which include, but are not limited to, thin small-outline package (TSOP), ball-grid-array (BGA), fine-pitch BGA (FBGA), micro-BGA (μBGA), mini-BGA (mBGA), and chip-scale packaging (CSP). In certain embodiments, the memory module 10 may also include one or more non-volatile memory elements, such as one or more flash memory elements. Types of flash memory elements compatible with certain embodiments described herein include, but are not limited to, NOR flash, NAND flash, ONE-NAND flash, and multi-level cell (MLC).

[0021] The controller circuit 18 of certain embodiments generally controls the operation of the memory module 10. For example, the controller circuit 18 may control the memory elements of the memory module 10 and/or communicate with the system memory controller 14. For example, the controller circuit 18 may receive and process address and command signals (e.g., read, write commands) from the system memory controller 14 and transmit appropriate address and commands to the memory elements in response. See, e.g., U.S. Pat. Appl. Publ. Nos. 2006/0062047 A1 and 2006/0262586 A1, each of which is incorporated in its entirety by reference herein. In certain embodiments, the controller circuit 18 comprises a local memory controller. Additionally, depending on the architecture of the memory module 10, such as for an FB-DIMM, the controller circuit 18 may comprise an advanced memory buffer (AMB). The controller circuit 18 can comprise one or more of a field-programmable gate array (FPGA), a programmable-logic device (PLD), an application-specific integrated circuit (ASIC), a custom-designed semiconductor device, and a complex programmable logic device (CPLD), for example. In certain embodiments, the controller circuit 18 comprises various discrete electrical elements, while in certain other embodiments, the controller circuit 18 comprises one or more integrated circuits.

[0022] As discussed, the memory module 10 is configured to operate in at least two modes comprising an initialization mode during which the memory module 10 executes at least one initialization sequence, and an operational mode. In one embodiment, for example, the at least one initialization sequence may comprise one or more training sequences. The initialization sequence (e.g., comprising one or more training sequences) may be initiated by the system memory controller 14. In some embodiments, the controller circuit 18 is configured to cause the memory module 10 to enter the initialization mode. For example, the controller circuit 18 may be configured to execute a routine implementing the at least one initialization sequence when the

appropriate signal or command is received from the memory controller 14 or is otherwise received from the host computer system 16 (e.g., upon receipt of a reset signal).

[0023] In certain embodiments, for example, the computer system 16 is coupled to a plurality of memory modules 10, 26 including the memory module 10 and at least a second memory module 26, and the memory controller 14 (e.g., MCH) trains each module 10, 26 separately, in series. In one example scenario, the memory controller 14 issues a first command to the memory module 10, and, in response, the memory module 10 executes an initialization sequence (e.g., one or more training sequences). Upon completion of the initialization sequence, the first memory module 10 advantageously issues a notification to the memory controller 14 in accordance with embodiments described herein. In response, the memory controller 14 issues a second command, this time to the memory module 26, and, in response, the memory module 26 executes an initialization sequence (e.g., one or more training sequences). Upon completion of the initialization sequence, the second memory module 26, similar to the first memory module 10, advantageously issues a notification to the memory controller 14 in accordance with embodiments described herein. In response, where there are more than two memory modules 10, 26, the memory controller 14 issues a third command to a third memory module (not shown), and so forth. One example computer system 16 capable of implementing such a scenario is configured to execute an Intel Basic Input/Output System (BIOS), and comprises a plurality of memory modules 10, 26 having an LRDIMM configuration. In such an example system, the Intel BIOS causes the system memory controller 14 to initialize the LRDIMM memory modules 10, 26 serially.

[0024] The operational mode is the normal mode of the memory module 10. For example, during the operational mode, the memory module 10 is generally accessed by the system memory controller 14 of the host computer 16 during standard computer operation not associated with initialization. For example, the system memory controller 14 may cause the memory module 10 to perform standard operations such as memory read/write, pre-charge, refresh, etc., while in operational mode, although it will be appreciated that one or more of these operations can also be performed by the memory module 10 while in initialization mode in certain embodiments.

[0025] The notification circuit 20 can be configured to drive the at least one output 12, while the memory module 10 is in the initialization mode or after the memory module 10 completes one or more initialization sequences, to provide the at least one notification signal to the memory

controller 14 indicating at least one status of the at least one initialization sequence. While shown in FIGS. 1-3 as forming a part of the controller circuit 18, the notification circuit 20 may be a physically and/or logically separate circuit in certain embodiments. While a variety of configurations are possible, the notification circuit 20 may comprise one or more transistors, one or more logic elements (e.g., AND, OR, NOR, NAND, XOR gates, and the like), or a combination thereof. In some embodiments, the notification circuit 20 may additionally or alternatively comprise one or more of an FPGA, PLD, CPLD, ASIC, custom-designed semiconductor device, discrete electrical elements, and an integrated circuit.

[0026] The at least one status of certain embodiments comprises completion of the at least one initialization sequence, such that the at least one notification signal is indicative of the completion of the at least one initialization sequence. The at least one status of certain embodiments comprises execution of the at least one initialization sequence. For example, the at least one status may indicate that the at least one initialization sequence is currently being executed. In some embodiments, the at least one status may provide an indication that a certain task has been completed by the memory module 10, such as a training task requested by the system memory controller 14. In certain embodiments, the notification circuit 20 can be configured to drive the at least one output 12 to a first state indicative of execution of the at least one initialization sequence or to a second state indicative of completion of the at least one initialization sequence. As one example, the first state may be a high or low logic level, and the second state may be a high impedance state. In another case, the first state is a high or low logic level, and the second state is the inverse logic level of the first state.

[0027] The at least one output 12 of certain embodiments is configured to be operatively coupled to at least one interrupt of the system memory controller 14, and the system memory controller 14 is responsive to the at least one notification signal indicating completion of the at least one initialization sequence. For example, the system memory controller 14 may trigger execution of an interrupt routine upon receipt of the notification signal on the output 12. The interrupt routine generally executes the appropriate operations for the at least one status indicated by the at least one notification signal. For example, if the at least one status indicates that the at least one initialization sequence is complete, execution of the interrupt routine may cause the system memory controller 14 to notify the host computer system 16 that the system initialization, or a portion thereof, is completed. In one embodiment, for example, the execution of the interrupt

routine causes the system memory controller 14 to initiate a subsequent training sequence for the memory module 10 or on another memory module connected to the host system 16. For example, in one embodiment, a central processing unit (CPU) of the host system 16 (not shown) enters a "Wait" state after issuing a command to the memory module 10 to enter the initialization mode. Receipt of the at least one notification signal on the output 12 triggers execution of the interrupt routine, which interrupts the CPU, causing the "Wait" state to be aborted and allowing the host system 16 to continue operation. In this manner, generation of the interrupt on the at least one output 12 can allow completion of the at least one initialization sequence to receive generally immediate attention from the CPU and/or memory controller 14 of the host system 16. As will be appreciated, the CPU and memory controller 14 of the host system 16 may comprise separate modules, or may alternatively comprise a single integrated module, depending on the architecture of the host system 16 chip-set.

[0028] In certain embodiments, execution of the interrupt routine causes the system memory controller 14 to cause the memory module 10 to exit the initialization mode and to enter the operational mode. In another embodiment, the memory module 10 automatically enters the operational mode upon completion of the at least one initialization sequence without intervention from the memory controller 14.

[0029] In some embodiments, the at least one output 12 is operated in conformance with a standard (e.g., an industry standard) when the memory module 10 is in the operational mode, but is not operated in conformance with the standard when the memory module 10 is in the initialization mode. An example of a standard in accordance with certain embodiments described herein is one or more of the industry standard promulgated by the Joint Electronic Devices Engineering Counsel (JEDEC). For example, the operation and behavior of the at least one output 12 may conform to an industry standard when the memory module 10 is in the operational mode, but the operation and behavior of the at least one output 12 may not conform to the industry standard when the memory module 10 is in the initialization mode. Because the at least one output 12 does not conform to the standard during initialization mode, an existing (e.g., JEDEC-specified) pin may be utilized to provide the at least one notification signal to the system memory controller 14 from the memory module 10 during the initialization mode. In one embodiment, for example, the at least one output 12 comprises an error-out pin of the memory module 10. In conventional systems, the operation of the error-out pin is undefined by the standard during initialization. However, in

certain embodiments described herein, during the operational mode, the error-out pin may be used according a conventional industry standard (e.g., a JEDEC standard) to indicate a parity error has occurred in the memory module 10. During the initialization mode, the error-out pin can be used to transmit the at least one notification signal to the system memory controller 14.

[0030] It is advantageous to use the error-out pin for initialization status notification according to certain embodiments because the error-out pin can be asserted by the memory module 10 independent from system memory controller 14 requests or commands. Also, because the error-out pin is a JEDEC-specified pin, design cost and complexity are reduced because additional pin-outs and interrupt design changes can be avoided (e.g., in cases where such changes in hardware or chipset may not be feasible to provide the at least one status to the system memory controller 14). However, in certain other embodiments, providing the at least one status may be implemented by adding one or more pins to the system memory controller 14 (e.g., MCH) and to the controller circuit 18 (e.g., local memory controller), thereby utilizing changes in hardware or the chipset.

[0031] Moreover, the error-out pin may be coupled to an interrupt of the system memory controller 14 (e.g., according to the JEDEC standard). Thus, where the error-out pin is used, from the system point of view in accordance with certain embodiments, the notification of completion of the required or requested task from the memory module 10 (e.g., by the local memory controller) generates an interrupt communicated to the system during the initialization period and indicative of completion of the required or requested task. Assertion of the same pin during normal (non-initialization) operation upon an error occurring, on the other hand, generates an interrupt communicated to the system during the normal operation indicative of the occurrence of the error condition. Thus, in certain embodiments, the error-out pin and corresponding signal memory module 10 can be used to support the notifying function and to provide the at least one status generally without changing hardware. Certain other such embodiments involve modifying the basic input/output system (BIOS) or other programming change. For example, the BIOS may be modified to indicate to the system memory controller 14 how to respond to the notification signal (e.g., to the error_out signal or the interrupt corresponding thereto).

[0032] In certain other embodiments, the at least one output 12 may include other existing (e.g., JEDEC specified) pins instead of, or in addition to, the error-out pin. In yet other configurations, at least one additional (e.g., non-JEDEC specified) pin may be employed. In general, any pin not

otherwise active during the initialization mode may be used (e.g., high-order address pins, read/write pins, data pins, etc.).

[0033] The at least one output 12 can further be configured to be operatively coupled to at least one second output 24 of a second memory module 26 in some embodiments, as schematically illustrated in FIGS. 1-3. The second memory module 26 may be generally similar in structure and function to the memory module 10, and may comprise a controller circuit 28 and a notification circuit 30, for example. The second memory module 26 may be generally identical to the first memory module 10, or may have a different memory capacity, form factor, etc., than the first memory module 10. More than two such memory modules may be present in certain embodiments. As described above, the second memory module 26 can be configured to operate in at least two modes comprising an initialization mode during which the second memory module 26 executes at least one initialization sequence, and an operational mode. For example, the initialization and operational modes may be similar to those describe above in relation to the first memory module 10.

[0034] The second memory module 26 can also be configured to drive the at least one second output 24 to a third state indicative of execution of at least one initialization sequence of the second memory module 26 or to a fourth state indicative of completion of the at least one initialization sequence of the second memory module 26. Additionally, in some embodiments, the at least one first output 12 of the first memory module 10 and the at least one second output 24 of the second memory module 26 are operatively coupled together by a bus 32 which is also operatively coupled to at least one input 34 of the system memory controller 14. In other embodiments (not shown), the at least one first output 12 and the at least one second output 24 are not coupled together, and are coupled to two separate inputs of the system memory controller 14.

[0035] FIG. 2 shows an example host computer system 16 including example first and second memory modules 10, 26. As shown, the notification circuits 20, 30 of the first and second memory modules 10, 26 each comprise at least one transistor 36, 38. The at least one transistor 36, 38 can be in an open-drain configuration, as shown, although other configurations are possible. In certain such embodiments, the first state of the at least one first output 12 is a first logic level, the second state of the at least one first output 12 is a high-impedance state, the third state of the at least one second output 24 is the first logic level, and the fourth state of the at least one second output 24 is

the high-impedance state. In the illustrated example, while the at least one initialization sequence is in progress, the first and second memory modules 10, 26 drive the gates of the respective transistors 36, 38 high. Thus, the transistors 36, 38 are respectively low impedance while the memory modules 10, 26 are executing each section of the initialization sequence, thereby pulling the first and second outputs 12, 24 low. Thus, the first state and the third state are low logic levels (ground) in the example configuration. Also, because the first and second outputs 12, 24 are coupled together by the bus 32, if the at least one initialization sequence of either one of the first and second memory modules 10, 26 are in progress, the bus 32 will be pulled to a low logic level.

[0036] As each of the two memory modules 10, 26 completes its at least one initialization sequence, it can drive the corresponding at least one first and second outputs 12, 24 respectively to a high impedance state, For example, once the at least one initialization sequence on each of the first and second memory modules 10, 26 is completed, the first and second memory modules 10, 26 can drive the gates of the respective transistors 36, 38 low, resulting in a high-impedance state on the at least one first and second outputs 12, 24 causing the bus 32 to be pulled high by the system memory controller 14. Accordingly, only once the at least one initialization sequence of both the first and second memory modules 10, 26 are complete, the bus 32 will be pulled high by the internal pull-up configuration 40 of the system memory controller 14. The second state and the fourth state are therefore high-impedance values in the example embodiment. Thus, the system memory controller 14 can monitor the value on the bus 32 via the first input 34 to determine when both of the memory modules 10, 26 have completed the at least one initialization sequence. As discussed, in other configurations the at least one first and second outputs 12, 24 may be received on separate inputs of the system memory controller 14, and the status of the at least one initialization sequence of each memory module 10, 26 may be monitored independently.

[0037] As discussed above, in certain embodiments in which more than one memory module 10, 26 is connected to the system memory controller 14, each memory module 10, 26 or associated controller circuit 18 (e.g., local memory controller) causes the corresponding notification circuit 20, 30 to drive the at least one output 12, 24 to the high impedance state from the low impedance state when it completes the requested or required operation. Thus, in certain such embodiments, the system memory controller 14 (e.g., MCH) can only pull the notifying signal high when all memory modules 10, 26 or associated controller circuits (e.g., local memory controllers) have completed the required or requested operation (e.g., initialization sequence). This configuration

allows the system memory controller 14 (e.g., MCH) to work with a non-homogenous memory subsystem. For example, the system memory controller 14 may be able to monitor the progress of multiple memory modules 10, 26 including a mix of DIMMs or other memory modules having differing characteristics, such as DIMM density, rank configurations, DRAM density, speed, DRAM configuration, etc.

[0038] Additionally, the at least one output 12 of the first memory module 10 and the at least one second output 24 of the second memory module 26 are configured to be operatively coupled to at least one interrupt of the system memory controller 14 in certain embodiments. In certain such embodiments, the system memory controller 14 can be responsive to the second state of the first memory module 10 and the fourth state of the second memory module 26 by triggering execution of an interrupt routine by a processor of the system memory controller 14. For example, in the example system of FIG. 2, when the bus 32 is pulled high by the pull-up configuration 40 indicating the second state of the first memory module 10 and the fourth state of the second memory module 26, the system memory controller 14 triggers execution of the interrupt routine.

[0039] In some embodiments, in which the at least one first output 12 and the at least one second output 24 are operatively coupled to separate inputs of the system memory controller 14, the at least one first output 12 and the at least out second output 24 may be operatively coupled to two separate interrupts. For example, the system memory controller 14 may be responsive to the second state of the first memory module 10 by triggering execution of a first interrupt routine associated with a first interrupt, and may be responsive to the fourth state of the second memory module 26 by triggering execution of a second interrupt routine associated with the second interrupt. In yet other embodiments, the separate inputs of the memory controller 14 are internally operatively coupled to the same interrupt, or are operatively coupled to separate interrupts which trigger the same interrupt routine.

[0040] FIG. 3 shows a host computer system 16 including an example memory module 10 where the notification circuit 20 of the memory module 10 has another example configuration in accordance with certain embodiments described herein. In the example configuration of FIG. 3, the at least one first output 12 is operatively coupled to an error-out pin of the memory module 10, and a multiplexor 42 drives the transistor 36 with either of a task_in_progress signal 44 or an error signal 46 (e.g., parity error signal). In one embodiment, for example, the multiplexor 42 may be

configured to drive the transistor 36 with the task_in_progress signal 44 when the memory module 10 is in the initialization mode or is executing the at least one initialization sequence, and with the error signal 46 when the memory module 10 is in the operational mode. Thus, the memory module 10 can be advantageously configured to both perform the standard (e.g., JEDEC-specified) error reporting functionality via the error-out pin during the operational mode and provide the status notification functionality during the system initialization mode, as described herein. As shown in FIG. 3, a second memory module 26 including a similar configuration can also be operatively coupled to the host computer system 16. In certain embodiments, the at least one second output 24 of the second memory module 26 can be operatively coupled to the at least one first output 12 by the bus 32, as described above (e.g., with respect to FIG. 2).

[0041] FIG. 4 shows an example method 100 of using the at least one memory module 10 in accordance with certain embodiments described herein. While the description below of the method 100 refers to structure shown in FIGS. 1-3, other structures may also be used in accordance with certain embodiments described herein. At block 102, the method 100 of certain embodiments comprises providing a first memory module 10 comprising at least one first output 12 operatively coupled to a memory controller 14 of a host computer system 16. The first memory module 10 can be configured to operate in at least two modes comprising an initialization mode during which the first memory module 10 executes at least one initialization sequence, and an operational mode. For example, the at least one initialization sequence may comprise one or more steps of a series of steps associated with an initialization procedure of the host computer system 16.

[0042] At block 104, the method 100 in some embodiments comprises causing the first memory module 10 to enter the initialization mode. At block 106, the method 100 of certain embodiments comprises driving the at least one first output 12 to a first state while the memory module 10 executes the at least one initialization sequence. Upon completion of the at least one initialization sequence, the method of certain embodiments comprises driving the at least one first output 12 to a second state different than the first state. In certain embodiments, the first state is a first logic level and the second state is a high impedance state. Additionally, in certain embodiments, the at least one first output 12 is operatively coupled to at least one interrupt of the memory controller 14 such that driving the at least one output 12 to the second state triggers the memory controller to execute an interrupt routine.

[0043] In certain embodiments, the at least one output 12 is operated in conformance with JEDEC standard when the first memory module 10 is in the operational mode, but is not operated in conformance with the JEDEC standard when the first memory module 10 is in the initialization mode. The at least one first output 12 of certain embodiments include an error-out pin of the first memory module, for example.

[0044] The method 100 can further include providing a second memory module 26 comprising at least one second output 24 operatively coupled to the memory controller 14. The second memory module 26 can be configured to operate in one of at least two modes comprising an initialization mode, during which the second memory module 26 executes at least one initialization sequence, and an operational mode. The method 100 can further include causing the second memory module 26 to enter the initialization mode. In certain embodiments, the method 100 also includes driving the at least one second output 24 of the second memory module 26 to a third state while the second memory module 26 executes the at least one initialization sequence. Upon completion of the at least one initialization sequence, the method 100 can further include driving the at least one second output 24 of the second memory module 26 to a fourth state different from the third state.

[0045] In certain embodiments, the at least one first output 12 of the first memory module 10 and the at least one second output 24 of the second memory module 26 are operatively coupled together by a bus 32 which is also operatively coupled to at least one input 34 of the memory controller 14. In certain other embodiments, the at least one first output 12 of the first memory module 10 is operatively coupled to a first input 34 of the memory controller 14 and the at least one second output 24 of the second memory module 26 is operatively coupled to a second input (not shown) of the memory controller 14.

[0046] FIG. 5 shows another example method 200 of using at least one memory module 10 in accordance with certain embodiments described herein. At block 202, the method 200 may include providing a memory module 10 comprising at least one output 12 operatively coupled to a memory controller 14 of a host computer system 16. The memory module 10 may be configured to operate in at least two modes comprising an initialization mode, during which the memory module 10 executes at least one initialization sequence, and an operational mode.

[0047] The method 200 can further include causing the memory module 10 to enter the initialization mode at block 204. At block 206, the method 200 can include receiving a notification

signal from the at least one output 12 of the memory module 10. The notification signal may indicate that the memory module 10 has completed the initialization sequence, for example. In certain embodiments, the method 200 further comprises executing an interrupt routine by the memory controller 14 in response to the notification signal.

TERMINOLOGY/ALTERNATIVE EMBODIMENTS

[0048] Embodiments have been described in connection with the accompanying drawings. However, it should be understood that the figures are not drawn to scale. Distances, angles, etc. are merely illustrative and do not necessarily bear an exact relationship to actual dimensions and layout of the devices illustrated. In addition, the foregoing embodiments have been described at a level of detail to allow one of ordinary skill in the art to make and use the devices, systems, etc. described herein. A wide variety of variation is possible. Components, elements, and/or steps can be altered, added, removed, or rearranged. While certain embodiments have been explicitly described, other embodiments will become apparent to those of ordinary skill in the art based on this disclosure.

[0049] Conditional language used herein, such as, among others, "can," "could," "might," "may," "e.g.," and the like, unless specifically stated otherwise, or otherwise understood within the context as used, is generally intended to convey that certain embodiments include, while other embodiments do not include, certain features, elements and/or states. Thus, such conditional language is not generally intended to imply that features, elements and/or states are in any way required for one or more embodiments or that one or more embodiments necessarily include logic for deciding, with or without author input or prompting, whether these features, elements and/or states are included or are to be performed in any particular embodiment.

[0050] Depending on the embodiment, certain acts, events, or functions of any of the methods described herein can be performed in a different sequence, can be added, merged, or left out all together (e.g., not all described acts or events are necessary for the practice of the method). Moreover, in certain embodiments, acts or events can be performed concurrently, e.g., through multi-threaded processing, interrupt processing, or multiple processors or processor cores, rather than sequentially.

[0051] The various illustrative logical blocks, modules, circuits, and algorithm steps described in connection with the embodiments disclosed herein can be implemented as electronic hardware,

computer software, or combinations of both. To clearly illustrate this interchangeability of hardware and software, various illustrative components, blocks, modules, circuits, and steps have been described above generally in terms of their functionality. Whether such functionality is implemented as hardware or software depends upon the particular application and design constraints imposed on the overall system. The described functionality can be implemented in varying ways for each particular application, but such implementation decisions should not be interpreted as causing a departure from the scope of the disclosure.

[0052] The various illustrative logical blocks, modules, and circuits described in connection with the embodiments disclosed herein can be implemented or performed with a general purpose processor, a digital signal processor (DSP), an application specific integrated circuit (ASIC), a field programmable gate array (FPGA) or other programmable logic device, discrete gate or transistor logic, discrete hardware components, or any combination thereof designed to perform the functions described herein. A general purpose processor can be a microprocessor, but in the alternative, the processor can be any conventional processor, controller, microcontroller, or state machine. A processor can also be implemented as a combination of computing devices, e.g., a combination of a DSP and a microprocessor, a plurality of microprocessors, one or more microprocessors in conjunction with a DSP core, or any other such configuration.

[0053] The blocks of the methods and algorithms described in connection with the embodiments disclosed herein can be embodied directly in hardware, in a software module executed by a processor, or in a combination of the two. A software module can reside in RAM memory, flash memory, ROM memory, EPROM memory, EEPROM memory, registers, a hard disk, a removable disk, a CD-ROM, or any other form of computer-readable storage medium known in the art. An exemplary storage medium is coupled to a processor such that the processor can read information from, and write information to, the storage medium. In the alternative, the storage medium can be integral to the processor. The processor and the storage medium can reside in an ASIC. The ASIC can reside in a user terminal. In the alternative, the processor and the storage medium can reside as discrete components in a user terminal.

[0054] Certain embodiments described herein are compatible with a memory system including memory devices with various attributes (see, e.g., FIGS. 2 and 3). For example, the memory system of certain embodiments may include various data slice sizes (e.g., two, four, eight, or 16 bit data

slices) and corresponding memories (e.g., memories having two, four, eight, or 16 bit data widths).

[0055] Although certain embodiments and examples are discussed above, it is understood that the inventive subject matter extends beyond the specifically disclosed embodiments to other alternative embodiments and/or uses of the invention and obvious modifications and equivalents thereof. It is intended that the scope of the inventions disclosed herein should not be limited by the particular disclosed embodiments. Thus, for example, in any method or process disclosed herein, the acts or operations making up the method/process may be performed in any suitable sequence and are not necessarily limited to any particular disclosed sequence.

[0056] Various aspects and advantages of the embodiments have been described where appropriate. It is to be understood that not necessarily all such aspects or advantages may be achieved in accordance with any particular embodiment. Thus, for example, it should be recognized that the various embodiments may be carried out in a manner that achieves or optimizes one advantage or group of advantages as taught herein without necessarily achieving other aspects or advantages as may be taught or suggested herein.

WHAT IS CLAIMED IS:

1. A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection; and

wherein the memory module is operable in at least a first mode and a second mode;

wherein the memory module in the first mode is configured to perform one or more memory read or write operations by communicating data signals via the first edge connections in response to address and command signals received via the second edge connections, wherein the memory module in the second mode is configured to be trained with one or more training sequences while the first edge connections are not active;

wherein the module controller is configured to receive via the second edge connections the address and command signals associated with the one or more memory read or write operations and to control the dynamic random access memory elements in accordance with the address and command signals, and wherein the module controller is further configured to output via the open drain output and the error edge connection a signal indicating a parity error having occurred while the memory module is in the first mode;

wherein the module controller is further configured to handshake with the memory controller about the one or more training sequences via the open drain output and the error edge connection while the memory module is in the second mode.

2. The memory module of claim 1, wherein the module controller comprises an integrated circuit.

3. The memory module of claim 1, wherein the module controller includes a notification circuit comprising one or more transistors each having an open drain coupled to the open drain output.

4. The memory module of claim 3, wherein the module controller handshake with the memory controller by using the notification circuit to drive a gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

5. The memory module of claim 4, wherein the notification circuit is configured the parity error signal by driving the gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

6. The memory module of claim 4, wherein the notification circuit includes one or more OR logic elements.

7. The memory module of claim 1, wherein the module controller is configured to drive a notification signal to indicate a status of the one or more training sequences.

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A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

ABSTRACT OF THE DISCLOSURE

According to certain aspects, a memory module is coupled to a memory controller of a host computer system via an interface. The memory module is operable in at least a second mode and a first mode. The memory module in the second mode is configured to be trained with one or more training sequences initiated by the memory controller. The memory module in the first mode is configured to perform one or more memory read or write operations not associated with the one or more training sequences by communicating data signals with the memory module. The memory module is configurable to handshake with the memory controller about the one or more training sequences during the second mode.

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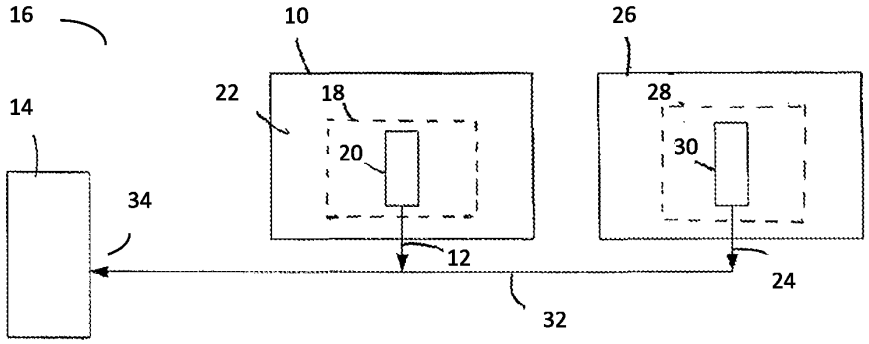


Figure 1

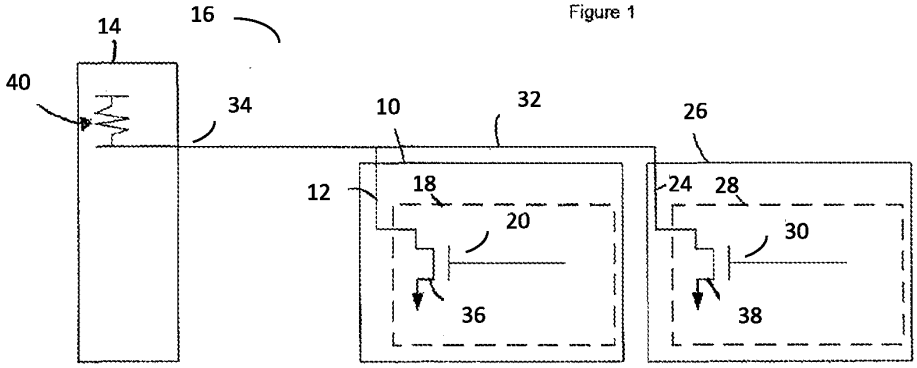


Figure 2

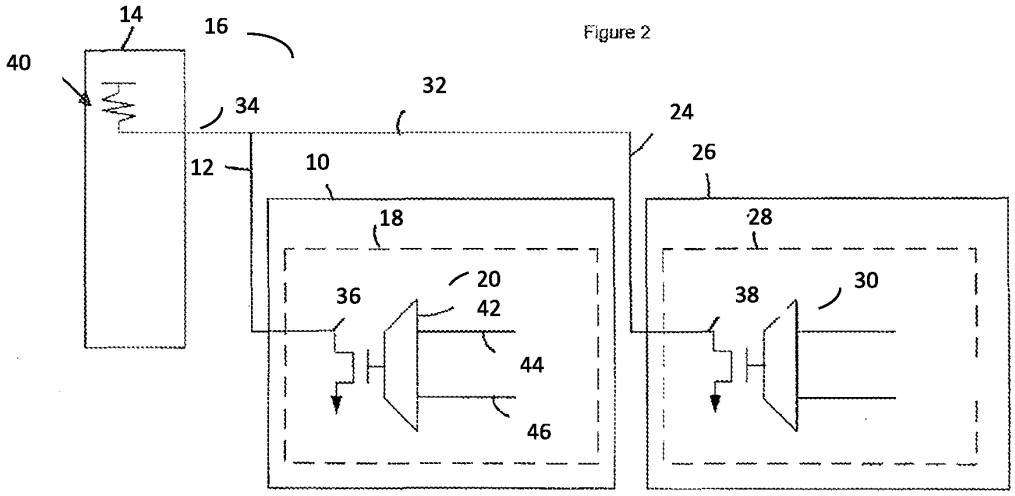


Figure 3

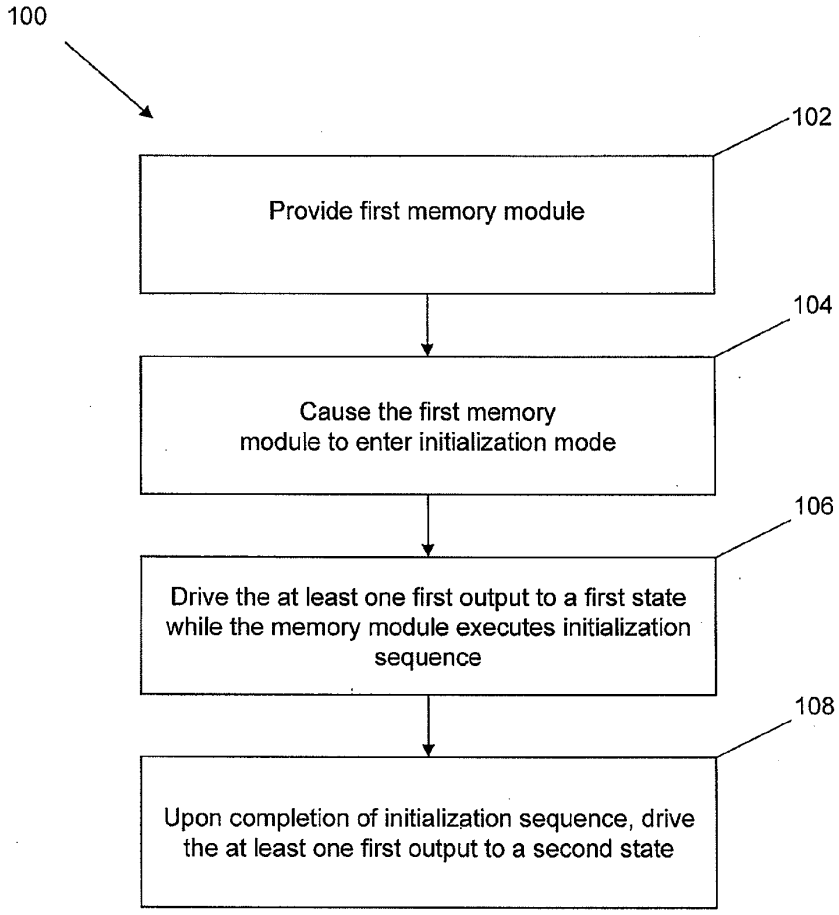

100
102
Provide first memory module
104
Cause the first memory module to enter initialization mode
106
Drive the at least one first output to a first state while the memory module executes initialization sequence
108
Upon completion of initialization sequence, drive the at least one first output to a second state

Figure 4

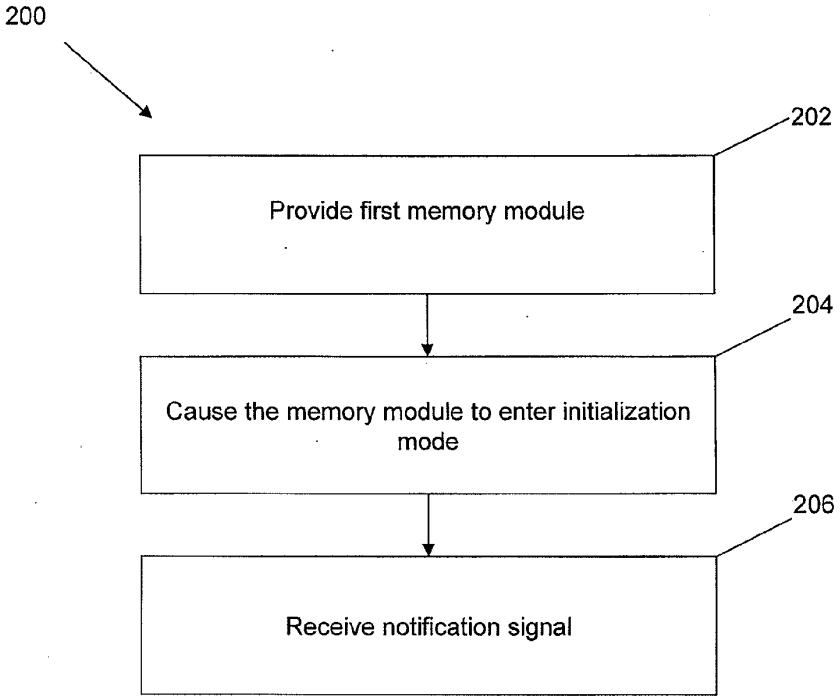

200
202
Provide first memory module
204
Cause the memory module to enter initialization mode
206
Receive notification signal

Figure 5

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng/Maria Nadal
Attorney Docket Number:	N3044.10014US06

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	280	280
UTILITY SEARCH FEE	1111	1	600	600
UTILITY EXAMINATION FEE	1311	1	720	720
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1600**

Electronic Acknowledgement Receipt

EFS ID:	31361279
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	A MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/Maria Nadal
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	N3044.10014US06
Receipt Date:	28-DEC-2017
Filing Date:	
Time Stamp:	21:18:31
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Fee Worksheet (SB06)	N3044_10014US06_FEE_TRANSMITTAL.pdf	270566 65ec016e3bb91e8f4aa5adab96a854bfb208101a	no	2

Warnings:

Information:					
2	Application Data Sheet	N3044-10014US06_ADS.pdf	1823220 24022042b685477a7d9d98eb877523e6d23ae13a	no	8
Warnings:					
Information:					
3	Oath or Declaration filed	N3044_10014US05_OATH.pdf	275727 0f589c64d7c9a718653f328752ffcf42a3997a4d	no	2
Warnings:					
Information:					
4		N3044-10014US06_CON_APPLICATION.pdf	161489 0cf096cdd531e0f59c3cdaa2495ed88c114031b2	yes	22

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Specification	1	19
	Claims	20	21
	Abstract	22	22

Warnings:					
Information:					
5	Drawings-only black and white line drawings	N3044-10014US06_DRAWINGS.pdf	448415 b89da83ef323e9269b36f780185ad623c893204f	no	3
Warnings:					
Information:					
6	Fee Worksheet (SB06)	fee-info.pdf	35023 31b6633ef8cc03342e7b8a3c3adb4d22b549417d	no	2
Warnings:					
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		Total Files Size (in bytes):	3014440		

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New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/857,553	12/28/2017	2139	0.00	N3044.10014US06	7	1

CONFIRMATION NO. 5811

FILING RECEIPT

79141
Jamie J. Zheng, Ph.D Esq.
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1389 Center Drive
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OC000000098372287

Date Mailed: 01/25/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

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Applicant(s)

Hyun Lee, Ladera Ranch, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/088,155 04/01/2016 PAT 9667001
which is a CON of 13/942,721 07/16/2013 PAT 9311116
which is a CON of 12/815,339 06/14/2010 PAT 8489837
which claims benefit of 61/186,799 06/12/2009

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

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If Required, Foreign Filing License Granted: 01/23/2018

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/857,553**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Preliminary Class

711

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/857,553

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	7 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	N3044.10014US06

CONFIRMATION NO. 5811

79141
Jamie J. Zheng, Ph.D Esq.
MASCHOFF BRENNAN
1389 Center Drive
Suite 300
Park City, UT 84098

FORMALITIES LETTER

OC000000096872288

Date Mailed: 01/25/2018

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. No entity status discount is in effect. If applicant is qualified for small entity status, a written assertion of small entity status must be submitted to establish small entity status. (See 37 CFR 1.27). If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **300** basic filing fee.
- $ **160** surcharge.
- $ **660** search fee.
- $ **760** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **1880** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

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For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

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Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/hachristian/

Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

CORRECTED ADS FORM

Application Number	15857553
Title of Invention	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Inventor Information

****If no data is shown, no data has been corrected****

	Data of Record	Updated Data
Order Number		
Name		
Residence Information		
Residency		
City		
State		
Country of Residence		
Mailing Address of Inventor		
Address 1		
Address 2		
City,State/Province, Postal Code		
Country		

Corrected ADS 1.0

Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

Application Information

	Data of Record	Updated Data
Title of Invention	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	
Attorney Docket Number	N3044.10014US06	
Entity Type	Regular Undiscounted	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S. C. 119(e) or 120, and 37 CFR 1.78(a).

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	15857553	
	Continuity Type	CON	
	Prior Application Number	~~15088155~~	15088115
	Filing Date (YYYY-MM-DD)	2016-04-01	
	Patent Number	~~9667001~~	9858218
	Issue Date (YYYY-MM-DD)	~~2017-05-30~~	2018-01-02

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	~~15088155~~	15088115
	Continuity Type	CON	
	Prior Application Number	13942721	
	Filing Date (YYYY-MM-DD)	2013-07-16	
	Patent Number	9311116	
	Issue Date (YYYY-MM-DD)	2016-04-12	

		Data of Record	Updated Data
	Prior Application Status	patented	
	Application Number	13942721	
	Continuity Type	CON	
	Prior Application Number	12815339	
	Filing Date (YYYY-MM-DD)	2010-06-14	
	Patent Number	8489837	
	Issue Date (YYYY-MM-DD)	2013-07-16	

		Data of Record	Updated Data
	Prior Application Status	~~pending~~	expired
	Application Number	12815339	
	Continuity Type	PRO	
	Prior Application Number	61186799	
	Filing Date (YYYY-MM-DD)	2009-06-12	
	Patent Number		
	Issue Date (YYYY-MM-DD)	0001-01-01	

Corrected ADS 1.0

Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

Foreign Priority Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

	Data of Record	Updated Data
Applicant Type		
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is		
Name of the Deceased or Legally Incapacitated Inventor		
Applicant is an Organization		
Name		
Organization Name		
Address 1		

Corrected ADS 1.0

Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		
Organization Name		

Mailing Address

Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		

Email Address		

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Jamie J. Zheng, Reg. No. 51167/	Registration Number	51167
First Name	Jamie	Last Name	Zheng

Samsung Electronics Co., Ltd.
Ex. 1096, p. 54

PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of	Hyun Lee	
Application No.:	15/857,553	Art Unit 2139
Filed:	December 28, 2017	
Conf. No.:	5811	
For:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	
Examiner:	*Unassigned*	
Customer No.:	79141	
Attorney Docket No.:	N3044.10014US06	

PRELIMINARY AMENDMENT

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Commissioner:

Applicants respectfully request entry of the following preliminary amendment.

Amendments to the Specification begin on page 2 of this paper. **Remarks** begin on page 3 of this paper.

Samsung Electronics Co., Ltd.
Ex. 1096, p. 55

AMENDMENTS TO THE SPECIFICATION

Please replace paragraph [0001] with the following amended paragraph:

[0001] This application is a continuation of U.S. App. No. ~~15/088,155~~ 15/088,115, filed April 1, ~~2015~~ 2016, to be issued as U.S. Pat. No. 9858218 on January 2, 2018, which is a continuation of U.S. App. No. 13/942,721, filed July 16, 2013, now U.S. Pat. No. 9,311,116, which is a continuation of U.S. App. No. 12/815,339, filed June 14, 2010, now U.S. Pat. No. 8,489,837, which claims the benefit of priority from U.S. Provisional App. No. 61/186,799, filed June 12, 2009, each of which is incorporated in its entirety by reference herein.

Samsung Electronics Co., Ltd.
Ex. 1096, p. 56

REMARKS

The amendments herein have been made not in response to any rejection or objection posed by the Examiner. The foregoing amendment amends paragraph [0001] in the specification Applicant respectfully requests entry of the amendments herein prior to examination of the application and favorable consideration of the pending claims.

In the event that Examiner finds remaining impediment to a prompt allowance of this application that may be clarified through a telephone interview or overcome by an Examiner's Amendment, Examiner is requested to contact the undersigned attorney.

Dated this 13th day of February, 2018.

Respectfully submitted,

/Jamie J. Zheng, Reg. no. 51167/

JAMIE J. ZHENG
Registration No. 51,167
Attorney for Applicant
Telephone No. (650) 521-4828

Samsung Electronics Co., Ltd.
Ex. 1096, p. 57

Electronic Acknowledgement Receipt

EFS ID:	31781030
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	
Customer Number:	79141
Filer:	Jamie Jie Zheng/Brian Gonzalez
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	N3044.10014US06
Receipt Date:	13-FEB-2018
Filing Date:	28-DEC-2017
Time Stamp:	16:45:47
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet to update/ correct info	CorrectedADS.pdf	82681 67094c554530b740fb85983d1093c2d21c98e5cf	no	6

Warnings:

Information:					
2	Transmittal Letter	2018-02-13_Preliminary-Amendment_N3044-10014US06.pdf	446265 a9993941579fcc76832744be514a7946c8e40e10	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	528946		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Document Code: IMIS

Notice of Fee Due

Application Number: 15857553 Date: 02/14/18

Fees are due for the application or document dated 12/28/17 The payment was not collectable for the reason indicated below.

Note: If the fee due is for any of the filing fees, the surcharge for late payment of the filing fees is now due as well.

- ☐ Insufficient payment by check or money order.
- ☐ No authorization to charge a deposit account.
- ☐ Invalid deposit account number .
- ☑ User name not listed in deposit account 505394 at 12:57 p.m. (time).
- ☐ Insufficient funds in deposit account at . (time).
- ☐ Insufficient payment by credit card.
- ☐ Declined credit card _____:_____ (time).

Fee code(s) to be applied:	1011	$ 280
	1111	$ 600
	1311	$ 720
		$
		$
		$
		$
Amount in holding fee code:		$
		$

Total remaining due from applicant: $ 1600

RAM Operator cvorachack

Rev. 04/10/2013

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	N3044.10014US06

CONFIRMATION NO. 5811

79141
Jamie J. Zheng, Ph.D Esq.
MASCHOFF BRENNAN
1389 Center Drive
Suite 300
Park City, UT 84098

FORMALITIES LETTER

OC000000097537036

Date Mailed: 02/22/2018

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. No entity status discount is in effect. If applicant is qualified for small entity status, a written assertion of small entity status must be submitted to establish small entity status. (See 37 CFR 1.27). If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **300** basic filing fee.
- $ **160** surcharge.
- $ **660** search fee.
- $ **760** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **1880** TOTAL FEE BALANCE DUE.

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Commissioner for Patents
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/hteffera/

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/857,553

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	7 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 460 =	0.00
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MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.

** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".

*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".

The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

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United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	N3044.10014US06

CONFIRMATION NO. 5811

79141
Jamie J. Zheng, Ph.D Esq.
MASCHOFF BRENNAN
1389 Center Drive
Suite 300
Park City, UT 84098

WITHDRAWAL NOTICE

OC000000097432133

Date Mailed: 02/22/2018

Letter Regarding a New Notice and/or the Status of the Application

If a new notice or Filing Receipt is enclosed, applicant may disregard the previous notice mailed on 01/25/2018. The time period for reply runs from the mail date of the new notice. Within the time period for reply, applicant is required to file a reply in compliance with the requirements set forth in the new notice to avoid abandonment of the application.

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web. https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at **1-866-217-9197** or visit our website at http://www.uspto.gov/ebc.

If the reply is not filed electronically via EFS-Web, the reply must be accompanied by a copy of the new notice.

If the Office previously granted a petition to withdraw the holding of abandonment or a petition to revive under 37 CFR 1.137, the status of the application has been returned to pending status.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/hteffera/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/857,553	12/28/2017	2139	0.00	N3044.10014US06	7	1

CONFIRMATION NO. 5811

FILING RECEIPT

79141
Jamie J. Zheng, Ph.D Esq.
MASCHOFF BRENNAN
1389 Center Drive
Suite 300
Park City, UT 84098

OC000000097537035

Date Mailed: 02/22/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Hyun Lee, Ladera Ranch, CA;

Applicant(s)

Hyun Lee, Ladera Ranch, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/088,115 04/01/2016 PAT 9858218
which is a CON of 13/942,721 07/16/2013 PAT 9311116
which is a CON of 12/815,339 06/14/2010 PAT 8489837
which claims benefit of 61/186,799 06/12/2009

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/23/2018

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The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/857,553**

Projected Publication Date: To Be Determined - pending completion of Missing Parts

Non-Publication Request: No

Early Publication Request: No

Title

MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Preliminary Class

711

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

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Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

Electronically filed June 21, 2018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2139
Filed:	December 28, 2017	Examiner:	TBD
For:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No:	129980-5066-US

RESPONSE TO THE NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION
WITH PETITION FOR EXTENSION OF TIME

Mail Stop: MISSING PARTS
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In response to the Notice to File Missing Parts mailed February 22, 2018, enclosed is the Notice to File Missing Parts of Nonprovisional Application for the above-identified application. The fee for the late oath or declaration surcharge is estimated to be $160.

Also enclosed please find a Fee Transmittal Form setting forth the calculation for the statutory basic filing, search and examination fees, together with the excess claim fees due in this matter. The fees calculated for the statutory basic filing, search and examination fees together with the excess claim fees and application size fee (if applicable) are estimated to be $1720.

Petition for Extension of Time under 37 CFR 1.136. It is respectfully requested that the time for response to the Notice to File Missing Parts dated February 22, 2018 be extended for a period of two months from April 22, 2018 to June 22, 2018.

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Ex. 1096, p. 68

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

Respectfully submitted,

Date: June 21, 2018

/ Jamie J. Zheng / 51167

Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	N3044.10014US06

CONFIRMATION NO. 5811

79141
Jamie J. Zheng, Ph.D Esq.
MASCHOFF BRENNAN
1389 Center Drive
Suite 300
Park City, UT 84098

FORMALITIES LETTER

OC000000097537036

Date Mailed: 02/22/2018

NOTICE TO FILE MISSING PARTS OF NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

Filing Date Granted

Items Required To Avoid Abandonment:

An application number and filing date have been accorded to this application. The item(s) indicated below, however, are missing. Applicant is given **TWO MONTHS** from the date of this Notice within which to file all required items below to avoid abandonment. Extensions of time may be obtained by filing a petition accompanied by the extension fee under the provisions of 37 CFR 1.136(a).

- The statutory basic filing fee is missing.
- The application search fee must be submitted.
- The application examination fee must be submitted.
- Surcharge as set forth in 37 CFR 1.16(f) must be submitted.
  The surcharge is due for any one of:
  - late submission of the basic filing fee, search fee, or examination fee,
  - late submission of inventor's oath or declaration,
  - filing an application that does not contain at least one claim on filing, or
  - submission of an application filed by reference to a previously filed application.

SUMMARY OF FEES DUE:

The fee(s) required within **TWO MONTHS** from the date of this Notice to avoid abandonment is/are itemized below. No entity status discount is in effect. If applicant is qualified for small entity status, a written assertion of small entity status must be submitted to establish small entity status. (See 37 CFR 1.27). If applicant is qualified for micro entity status, an acceptable Certification of Micro Entity Status must be submitted to establish micro entity status. (See 37 CFR 1.29 and forms PTO/SB/15A and 15B.)

- $ **300** basic filing fee.
- $ **160** surcharge.
- $ **660** search fee.
- $ **760** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **1880** TOTAL FEE BALANCE DUE.

Replies must be received in the USPTO within the set time period or must include a proper Certificate of Mailing or Transmission under 37 CFR 1.8 with a mailing or transmission date within the set time period. For more information and a suggested format, see Form PTO/SB/92 and MPEP 512.

Replies should be mailed to:

Mail Stop Missing Parts
Commissioner for Patents
P.O. Box 1450
Alexandria VA 22313-1450

Registered users of EFS-Web may alternatively submit their reply to this notice via EFS-Web, including a copy of this Notice and selecting the document description "Applicant response to Pre-Exam Formalities Notice". https://sportal.uspto.gov/authenticate/AuthenticateUserLocalEPF.html

For more information about EFS-Web please call the USPTO Electronic Business Center at 1-866-217-9197 or visit our website at http://www.uspto.gov/ebc.

If you are not using EFS-Web to submit your reply, you must include a copy of this notice.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/hteffera/

Electronic Patent Application Fee Transmittal

Application Number:	15857553
Filing Date:	28-Dec-2017
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng/Lata Olivier
Attorney Docket Number:	129980-5066US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
UTILITY APPLICATION FILING	1011	1	300	300
UTILITY SEARCH FEE	1111	1	660	660
UTILITY EXAMINATION FEE	1311	1	760	760
Pages:				
Claims:				
Miscellaneous-Filing:				
LATE FILING FEE FOR OATH OR DECLARATION	1051	1	160	160
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Extension - 2 months with $0 paid	1252	1	600	600
Miscellaneous:				
		Total in USD ($)		**2480**

Electronic Acknowledgement Receipt

EFS ID:	32968713
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	129980-5066US
Receipt Date:	21-JUN-2018
Filing Date:	28-DEC-2017
Time Stamp:	18:48:57
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$2480
RAM confirmation Number	062218INTEFSW00005363500310
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Applicant Response to Pre-Exam Formalities Notice	129980_5066US_RES.pdf	620450 08ca7ab3bec13d5de65299d74af6f0d7a7764135	no	4
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	39415 7fc217f9080b456fdd3c7618e85d5810cac293f5	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	659865		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/857,553	12/28/2017	2139	1880	129980-5066US	7	1

CONFIRMATION NO. 5811

UPDATED FILING RECEIPT

79141
Morgan Lewis Bockius LLP / Jamie Zheng Ph.D.
1400 Page Mill Road
Palo Alto, CA 94304

OC000000100521435

Date Mailed: 07/06/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Hyun Lee, Ladera Ranch, CA;

Applicant(s)

Hyun Lee, Ladera Ranch, CA;

Power of Attorney: None

Domestic Priority data as claimed by applicant

This application is a CON of 15/088,115 04/01/2016 PAT 9858218
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Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/23/2018

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Ex. 1096, p. 76

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/857,553**

Projected Publication Date: 10/11/2018

Non-Publication Request: No

Early Publication Request: No
Title

MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Preliminary Class

711

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

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SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/857,553

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A			N/A	300
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A			N/A	660
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A			N/A	760
TOTAL CLAIMS (37 CFR 1.16(i))	7 minus 20 =	*			OR	x 100 =	0.00
INDEPENDENT CLAIMS (37 CFR 1.16(h))	1 minus 3 =	*				x 460 =	0.00
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).						0.00
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))							0.00
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL			TOTAL	1720

APPLICATION AS AMENDED - PART II

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
AMENDMENT A	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)	OR	RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
	Application Size Fee (37 CFR 1.16(s))									
	FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
						TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

79141 7590 08/28/2018

Morgan Lewis Bockius LLP / Jamie Zheng Ph.D.
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER	
CHERY, MARDOCHEE	

ART UNIT	PAPER NUMBER
2133	

NOTIFICATION DATE	DELIVERY MODE
08/28/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

padocketingdepartment@morganlewis.com
vskliba@morganlewis.com

Office Action Summary	Application No. 15/857,553	Applicant(s) Lee, Hyun	
	Examiner MARDOCHEE CHERY	Art Unit 2133	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☑ Responsive to communication(s) filed on 12/28/17.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL.** 2b) ☑ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5) ☑ Claim(s) 1-7 is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6) ☐ Claim(s) _____ is/are allowed.

7) ☑ Claim(s) 1-7 is/are rejected.

8) ☐ Claim(s) _____ is/are objected to.

9) ☐ Claim(s) _____ are subject to restriction and/or election requirement

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to **PPHfeedback@uspto.gov.**

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☐ All b)☐ Some** c)☐ None of the:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date _____.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date _____.

4) ☐ Other: _____.

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DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on nonstatutory double patenting provided the reference application or patent either is shown to be commonly owned with the examined application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. See MPEP § 717.02 for applications subject to examination under the first inventor to file provisions of the AIA as explained in MPEP § 2159. See MPEP §§ 706.02(l)(1) - 706.02(l)(3) for applications not subject to examination under the first inventor to file provisions of the AIA. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO Internet website contains terminal disclaimer forms which may be used. Please visit www.uspto.gov/patent/patents-forms. The filing date of the application in which the form is filed

determines what form (e.g., PTO/SB/25, PTO/SB/26, PTO/AIA/25, or PTO/AIA/26) should be used. A web-based eTerminal Disclaimer may be filled out completely online using web-screens. An eTerminal Disclaimer that meets all requirements is auto-processed and approved immediately upon submission. For more information about eTerminal Disclaimers, refer to www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

3. Claims 1-7 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 8489837; claims 1-20 of U.S. Patent No. 9311116; and claims 1-22 of U.S. Patent No. 9858218. Although the claims at issue are not identical, they are not patentably distinct from each other because the pending claims make obvious the claims of the issued patents and vice versa.

4. "A later patent claim is not patentably distinct from an earlier patent claim if the later claim is obvious over, or **anticipated by**, the earlier claim. In re Longi, 759 F.2d at 896, 225 USPQ at 651 (affirming a holding of obviousness-type double patenting because the claims at issue were obvious over claims in four prior art patents); In re Berg, 140 F.3d at 1437, 46 USPQ2d at 1233 (Fed. Cir. 1998) (affirming a holding of obviousness-type double patenting where a patent application claim to a genus is anticipated by a patent claim to a species within that genus). " ELI LILLY AND COMPANY v BARR LABORATORIES, INC., United States Court of Appeals for the Federal Circuit, ON PETITION FOR REHEARING EN BANC (DECIDED: May 30, 2001).

Conclusion

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARDOCHEE CHERY whose telephone number is (571)272-4246. The examiner can normally be reached on 900-500.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Jared RUtz** can be reached at **(571)272-5535**. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

August 22, 2018

/MARDOCHEE CHERY/
Primary Examiner, Art Unit 2133

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

CPC - Searched*		
Symbol	Date	Examiner

CPC Combination Sets - Searched*		
Symbol	Date	Examiner

US Classification - Searched*			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST Search	08/22/2018	MC

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner

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Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

CLAIMS										
☐ Claims renumbered in the same order as presented by applicant					☐ CPA		☐ T.D.		☐ R.1.47	
CLAIM		**DATE**								
Final	Original									

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L2	14	("9858218" "9311116" "8489837").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:23
L3	0	2 and edge near3 connect$3 near5 ("not" "don't" "doesn't") near2 (active activat$3)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:31
L4	14	(handshak$3 hand-shak$3) near3 memory near5 controller near5 host	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:32
L5	78	(handshak$3 hand-shak$3 (signal near3 (coordinat$3 arbitrat$3))) near7 memory near7 controller near7 host	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:32
L6	66	controller near5 (open near2 drain near2 (I/O output))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:32
L7	6	L6 and ((parity error) near5 (signal bit check))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:32
L8	53	(controller hub switch channel) with (open near2 drain) with controller with (host computer node engine)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:33
L9	4	(controller hub switch channel) with (open near2 drain) with controller with (host computer node engine) and (parity ECC redundancy (correct$3 near2 code))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:33
L10	29963	(controller microcontroller micro-controller) same (memory $3RAM) with	US-PGPUB; USPAT;	OR	ON	2018/08/22 17:34

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		(read write pre-charg$3 precharg$3 refresh$3) and (transistor $3FET drain$3) same (controller device microcontroller micro-controller) and drain$3	USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
L11	48	L10 and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:34
L12	24	L11 and (open$3 near2 drain)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:34
L13	12	L12 AND ((G11C5/00 OR G11C16/26 OR G11C2029/4402 OR G11C29/78 OR G11C7/1066).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/08/22 17:34

8/ 22/ 2018 5:43:51 PM
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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	129980-5066US

CONFIRMATION NO. 5811

79141
Morgan Lewis Bockius LLP (PA)-J. Zheng
1400 Page Mill Road
Palo Alto, CA 94304

PUBLICATION NOTICE

OC000000102972446

Title:MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Publication No.US-2018-0293193-A1
Publication Date:10/11/2018

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

Office of Data Managment, Application Assistance Unit (571) 272-4000, or (571) 272-4200, or 1-888-786-0101

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Ex. 1096, p. 89

Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

CORRECTED ADS FORM

Application Number	15857553
Title of Invention	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Inventor Information

****If no data is shown, no data has been corrected****

	Data of Record	Updated Data
Order Number		
Name		
Residence Information		
Residency		
City		
State		
Country of Residence		
Mailing Address of Inventor		
Address 1		
Address 2		
City,State/Province, Postal Code		
Country		

Corrected ADS 1.0

Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

Application Information

	Data of Record	Updated Data
Title of Invention	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	
Attorney Docket Number	129980-5066US	
Entity Type	Regular Undiscounted	

Domestic Benefit/National Stage Information

****If no data is shown, no data has been corrected****

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121,365(c), or 386(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S. C. 119(e) or 120, and 37 CFR 1.78(a).

		Data of Record	Updated Data
	Prior Application Status		
	Application Number		
	Continuity Type		
	Prior Application Number		
	Filing Date (YYYY-MM-DD)		
	Patent Number		
	Issue Date (YYYY-MM-DD)		

Foreign Priority Information

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Document Description: Application Data Sheet to update/correct info
Doc Code: ADS.CORR

****If no data is shown, no data has been corrected****

This section allows for the applicant to claim priority to a foreign application. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55. When priority is claimed to a foreign application that is eligible for retrieval under the priority document exchange program (PDX) the information will be used by the Office to automatically attempt retrieval pursuant to 37 CFR 1.55(i)(1) and (2). Under the PDX program, applicant bears the ultimate responsibility for ensuring that a copy of the foreign application is received by the Office from the participating foreign intellectual property office, or a certified copy of the foreign priority application is filed, within the time period specified in 37 CFR 1.55(g)(1).

		Data of Record	Updated Data
	Application Number		
	Country		
	Filing Date		
	Access Code		

Applicant Information

****If no data is shown, no data has been corrected****
Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

	Data of Record	Updated Data
Applicant Type		ASG
If applicant is the legal representative, indicate the authority to file the patent application, the inventor is		
Name of the Deceased or Legally Incapacitated Inventor		
Applicant is an Organization		Yes
Name		
Organization Name		Netlist, Inc.
Address 1		175 Technology
Address 2		Suite 150

Corrected ADS 1.0

City,State/Province,Postal Code		Irvine CA 92618
Country		US
Phone Number		
Fax Number		
Email Address		

Assignee Information including Non-Applicant Assignee Information

****If no data is shown, no data has been corrected****
Providing this information in the application data sheet does not substitute for compliance with any requirement of part 3 of Title 37 of the CFR to have an assignment recorded in the Office

	Data of Record	Updated Data
Order		
Applicant is an Organization		
Name		
Organization Name		
Mailing Address		
Address 1		
Address 2		
City,State/Province,Postal Code		
Country		
Phone Number		
Fax Number		
Email Address		

Corrected ADS 1.0

Signature

NOTE: This Application Data Sheet must be signed in accordance with 37 CFR 1.33(b).

This Application Data Sheet **must** be signed by a patent practitioner if one or more of the applicants is a **juristic entity** (e.g., corporation or association). If the applicant is two or more joint inventors, this form must be signed by a patent practitioner, **all** joint inventors who are the applicant, or one or more joint inventor-applicants who have been given power of attorney (e.g., see USPTO Form PTO/AIA/81) on behalf of **all** joint inventor-applicants.

See 37 CFR 1.4(d) for the manner of making signatures and certifications.

Signature	/Jamie J. Zheng/	Registration Number	51167
First Name	Jamie J.	Last Name	Zheng

Electronically filed November 28, 2018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun LEE	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	CHERY, MARDOCHEE
For:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No.:	129980-5066-US

MISCELLANEOUS COMMUNICATION

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicants concurrently submit with this Communication a Supplemental Application Data Sheet which has been updated to the extent:

1. Applicant Information has been added.

No other information on the Application Data Sheet has been changed or added.

Applicants respectfully request an updated filing receipt be mailed to Applicant.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

Respectfully submitted,

Date: November 28, 2018

/Jamie J. Zheng/ 51,167

Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

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Electronic Acknowledgement Receipt

EFS ID:	34428357
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	129980-5066US
Receipt Date:	28-NOV-2018
Filing Date:	28-DEC-2017
Time Stamp:	20:46:18
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Application Data Sheet to update/ correct info	CorrectedADS.pdf	65566 0405d38fb0db5f914d0df54a86fe83dedc2d3f3b	no	5

Warnings:

Information:					
2	Transmittal Letter	129980_5066US_MIS_COM.pdf	86122 7c73965859d3aef7c20f413a2a267d8c8e25f8d8	no	1
Warnings:					
Information:					
		Total Files Size (in bytes):	151688		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Electronically filed November 28, 2018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	Chery, Mardochee
For:	*MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER*	Attorney Docket No.:	129980-5066-US
		Date:	November 28, 2018

RESPONSE TO OFFICE ACTION AND INTERVIEW SUMMARY

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

The enclosed Amendment is in response to the Office Action dated August 28, 2018 for the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

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Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Original) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection; and

wherein the memory module is operable in at least a first mode and a second mode;

wherein the memory module in the first mode is configured to perform one or more memory read or write operations by communicating data signals via the first edge connections in response to address and command signals received via the second edge connections, wherein the memory module in the second mode is configured to be trained with one or more training sequences while the first edge connections are not active;

wherein the module controller is configured to receive via the second edge connections the address and command signals associated with the one or more memory read or write operations and to control the dynamic random access memory elements in accordance with the address and command signals, and wherein the module controller is further configured to output via the open drain output and the error edge connection a signal indicating a parity error having occurred while the memory module is in the first mode;

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wherein the module controller is further configured to handshake with the memory controller about the one or more training sequences via the open drain output and the error edge connection while the memory module is in the second mode.

2. (Original) The memory module of claim 1, wherein the module controller comprises an integrated circuit.

3. (Original) The memory module of claim 1, wherein the module controller includes a notification circuit comprising one or more transistors each having an open drain coupled to the open drain output.

4. (Currently Amended) The memory module of claim 3, wherein the module controller is configured to handshake with the memory controller by using the notification circuit to drive a gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

5. (Currently Amended) The memory module of claim 4, wherein the notification circuit is configured to output the parity error signal by driving the gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

6. (Original) The memory module of claim 4, wherein the notification circuit includes one or more OR logic elements.

7. (Currently Amended) The memory module of claim 1, wherein the module controller is configured to drive a notification signal to indicate a status of the one or more training sequences while the memory module is in the second mode.

8. (New) The memory module of claim 1, wherein the second edge connections include one or more read/write pins that are not active while the memory module is in the second mode.

9. (New) The memory module of claim 1, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is in the second mode.

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10. (New) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection; and

wherein the memory module is operable in at least a first mode in which the memory module is configured to perform one or more memory read or write operations by communicating data signals via the first edge connections in response to address and command signals received via the second edge connections, and a second mode in which at least the first edge connections are not active and the memory module is configured to be trained with one or more training sequences;

wherein the module controller is configured to receive via the second edge connections the address and command signals associated with the one or more memory read or write operations and to control the dynamic random access memory elements in accordance with the address and command signals, and wherein the module controller is further configured to output via the open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module while the memory module is in the first mode;

wherein the module controller is further configured to handshake with the memory controller by outputting a signal related to the one or more training sequences via the open drain output and the error edge connection while the memory module is in the second mode.

11. (New) The memory module of claim 10, wherein the module controller comprises an integrated circuit.

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12. (New) The memory module of claim 12, wherein the module controller includes a notification circuit having one or more transistors each having an open drain coupled to the open drain output, wherein the module controller is configured to handshake with the memory controller by using the notification circuit to drive a gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground, and wherein the notification circuit is configured to output the parity error signal by driving the gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

13. (New) The memory module of claim 12, wherein the notification circuit includes one or more OR logic elements.

14. (New) The memory module of claim 10, wherein the module controller is configured to drive a notification signal to indicate a status of the one or more training sequences while the memory module is in the second mode.

15. (New) The memory module of claim 10, wherein the second edge connections include one or more read/write pins that are not active while the memory module is in the second mode.

16. (New) The memory module of claim 10, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is in the second mode.

17. (New) A method of operating a memory module coupled with a memory controller of a host system, the memory module including a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections, the memory module further including dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections, the method comprising:

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controlling the dynamic random access memory elements to communicate data signals corresponding to one or more read or write operations via the first edge connections in response to address and command signals received by the memory module via the second edge connections;

outputting via an open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module while the memory module is configured to perform the one or more memory read or write operation;

training the memory module with one or more training sequences, wherein at least the first edge connections are not active while the memory module is trained with the one or more training sequences; and

outputting via the open drain output and the error edge connection a signal related to the one or more training sequences to handshake with the memory controller about the one or more training sequences.

18. (New) The method of claim 17, wherein the second edge connections include one or more read/write pins that are not active while the memory module is trained with the one or more training sequences.

19. (New) The method of claim 17, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is trained with the one or more training sequences.

20. (New) The method of claim 17, wherein the memory module includes a notification circuit having one or more transistors each having an open drain coupled to the open drain output, wherein outputting via an open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module comprises driving a gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground, and wherein outputting a signal related to the one or more training sequences comprises driving a gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

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REMARKS

This amendment responds to the office action mailed August 28, 2018. In the office action the Examiner:

A. rejected claims 1-7 on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 8,489,837, claims 1-20 of U.S. Patent No. 9,311,116, and claims 1-22 of U.S. Patent No. 9,858,218.

REMARKS CONCERNING CLAIMS

Claims 4, 5, and 7 have been amended.

Claims 8-20 have been added.

Support for the amendments can be found throughout the specification and drawings of the application as filed. No new matter has been added.

With respect to all amendments, Applicant has not dedicated or abandoned any unclaimed subject matter. Moreover, Applicant has not acquiesced to any characterizations of the invention, nor any rejections or objections of the claims, made by the Examiner. Moreover, the Applicant hereby rescinds any prior disclaimer of claim scope, to the extent they exist, made during the prosecution of this application or made during the prosecution of any patent or other related patents/applications, and advises the Examiner that any such previous disclaimers and the cited references that they were made to avoid may need to be revisited.

After entry of this amendment, the pending claims are: claims 1-20.

REMARKS CONCERNING DOUBLE PATENTING REJECTIONS

A. Rejection of claims 1-7 on the ground of nonstatutory double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 8,489,837, claims 1-20 of U.S. 9,311,116, and claims 1-22 of U.S. Patent No. 9,858,218

Applicant submits herewith a terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d), which should overcome any actual or provisional rejection based on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-18 of U.S. Patent No. 8,489,837, claims 1-20 of U.S. Patent No. 9,311,116, and claims 1-22 of U.S. Patent No. 9,858,218.

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Applicant's filing of the terminal disclaimer is for the sole purpose of advancing prosecution. It should not be understood as implying that Applicant agrees with the rejection of claims 1-28 on the ground of nonstatutory double patenting as being unpatentable over over claims 1-18 of U.S. Patent No. 8,489,837, claims 1-20 of U.S. Patent No. 9,311,116, and claims 1-22 of U.S. Patent No. 9,858,218.

B. New claims 8-20

New claims 8-9 depend from claim 1 and include further limitations in addition to the limitations in claim 1. Therefore, new claims 8-9 are patentable for at least the same reasons claim 1 is patentable.

New claims 10-16 and 17-20 are believed to be patentable.

CONCLUDING REMARKS

By responding in the foregoing remarks only to particular positions asserted by the examiner, the Applicant does not necessarily acquiesce in other positions that have not been explicitly addressed. In addition, the Applicant's arguments for the patentability of a claim should not be understood as implying that no other reasons for the patentability of that claim exist.

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: November 28, 2018

/Jamie J. Zheng/ 51,167

Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
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Phone: (650) 843-4000

Samsung Electronics Co., Ltd.
Ex. 1096, p. 105

Electronically filed November 28, 2018

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	CHERY, MARDOCHEE
For:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No.:	129980-5066-US

TERMINAL DISCLAIMER

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Applicant, **Netlist, Inc.**, is the assignee of the entire **100%** right, title and interest in and to the above identified application by virtue of assignments recorded on November 15, 2017 at reel/frame 044140 / 0019.

Applicant hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the above identified application which would extend beyond the expiration date of the full statutory term of U.S. Patent No. 8,489,837, (the "prior patent"), which issued on July 16, 2013, U.S. Patent No. 9,311,116, (the "prior patent"), which issued on April 12, 2016, and, U.S. Patent No. 9,858,218, (the "prior patent"), which issued on January 2, 2018 as the term of said prior patents are presently shortened by any terminal disclaimer. Applicant hereby agrees that any patent so granted on the above identified application shall be enforceable only for and during such period that it and the prior patent are commonly owned.

Applicant further agrees that this agreement is to run with any patent granted on the above identified application and is to be binding upon the grantee, its successors, or assigns.

Applicant does not disclaim any terminal part of the term of any patent granted on the

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above identified application that would extend to the expiration date of the full statutory term of said prior patent, "as the term of said prior patent is presently shortened by any terminal disclaimer," in the event that said prior patent later expires for failure to pay a maintenance fee, is held unenforceable, is found invalid by a court of competent jurisdiction, is statutorily disclaimed in whole or terminally disclaimed under 37 C.F.R. 1.321, has all claims canceled by a reexamination certificate, is reissued, or is otherwise terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

The undersigned is empowered to act on behalf of and as a representative of **Netlist, Inc.**. The undersigned is an attorney of record.

I hereby acknowledge that any willful false statements made are punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

The fee under 37 CFR 1.20(d) is $160. The Commissioner is authorized to charge any required fees or credit any overpayments to our Deposit Account No. 50-0310 (order no. 129980-5066-US).

Signed this 28 day of November, 2013

By: _____

Jamie J. Zheng (Reg. No. 51,167)
Attorney of Record for Assignee, Netlist, Inc.
Telephone Number: 650-843-4000

Electronic Patent Application Fee Transmittal

Application Number:	15857553
Filing Date:	28-Dec-2017
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
STATUTORY OR TERMINAL DISCLAIMER	1814	1	160	160
		Total in USD ($)		**160**

Electronic Acknowledgement Receipt

EFS ID:	34428536
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	129980-5066US
Receipt Date:	28-NOV-2018
Filing Date:	28-DEC-2017
Time Stamp:	20:47:56
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$160
RAM confirmation Number	112918INTEFSW00019436500310
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		129980_5066US_RESPONSE_TD_POA.pdf	676508 cb26dd4c6e4acdad025f14c2388e6792bb0dbcdc	yes	12

Multipart Description/PDF files in .zip description

Document Description	Start	End
Amendment/Req. Reconsideration-After Non-Final Reject	1	1
Claims	2	6
Applicant Arguments/Remarks Made in an Amendment	7	8
Power of Attorney	9	10
Terminal Disclaimer Filed	11	12

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	30549 7e4c7002db26865fa9e9754b1b21408833a1a997	no	2

Warnings:

Information:

Total Files Size (in bytes):	707057

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Doc Code: PA..
Document Description: Power of Attorney

PTO/AIA/82A (07-13)
Approved for use through 01/31/2018. OMB 0651-0035
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TRANSMITTAL FOR POWER OF ATTORNEY TO ONE OR MORE REGISTERED PRACTITIONERS

NOTE: This form is to be submitted with the Power of Attorney by Applicant form (PTO/AIA/82B) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5, unless the application number and filing date are identified in the Power of Attorney by Applicant form. If neither form PTO/AIA/82A nor form PTO/AIA82B identifies the application to which the Power of Attorney is directed, the Power of Attorney will not be recognized in the application.

Application Number	15/857,553
Filing Date	December 28, 2017
First Named Inventor	Hyun Lee
Title	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
Art Unit	2133
Examiner Name	CHERY, MARDOCHEE
Attorney Docket Number	129980-5066-US

SIGNATURE of Applicant or Patent Practitioner

Signature	/Jamie J. Zheng/	Date (Optional)	November 28, 2018
Name	Jamie J. Zheng	Registration Number	51167
Title (if Applicant is a juristic entity)			
Applicant Name (if Applicant is a juristic entity)			

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4(d) for signature requirements and certifications. If more than one applicant, use multiple forms.

☑ *Total of 1 forms are submitted.

This collection of information is required by 37 CFR 1.131, 1.32, and 1.33. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 3 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

GENERAL POWER OF ATTORNEY BY APPLICANT FOR UNITED STATES PATENT

I hereby revoke all previous powers of attorney given in the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent).

I hereby appoint the practitioner associated with the following Customer Number :

79141

as my/our attorney or agent, and to transact all business in the United States Patent and Trademark Office in connection with the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent).

Please recognize or change the **correspondence address** for the application referenced in the attached transmittal letter to the address associated with the above-mentioned **Customer Number.**

I am the Applicant:

☐ Inventor or Joint Inventor

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor

■ Assignee or Person to Whom the Inventor is Under an Obligation to Assign

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is currently being filed in this document)

SIGNATURE of Applicant for Patent

Signature		Date: January 9, 2013
Name	**Gail Sasaki**	
Title	Vice President and Chief Financial Officer	
Company	Netlist, Inc.	

Note: Signature - this form must be signed by the Applicant or a person authorized to act on behalf of Applicant.

Submit multiple forms for more than one signature
Total of __ forms are submitted.

PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/857,553	Filing Date 12/28/2017	☐ To be Mailed

ENTITY: ☒ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED – PART I

	(Column 1)	(Column 2)		
FOR	NUMBER FILED	NUMBER EXTRA	RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*	X $ =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*	X $ =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	

APPLICATION AS AMENDED – PART II

AMENDMENT	11/28/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0	X $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	0

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=	X $ =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=	X $ =	
	☐ Application Size Fee (37 CFR 1.16(s))						
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))						
						TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.

LIE
CAROL BARNES

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

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Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	15/857,553	LEE, HYUN	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 11/28/18	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:
Lawana Hixon

U.S. Patent and Trademark Office

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UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	129980-5066US

CONFIRMATION NO. 5811

79141
Morgan Lewis Bockius LLP (PA)-J. Zheng
1400 Page Mill Road
Palo Alto, CA 94304

POA ACCEPTANCE LETTER

OC000000104176419

Date Mailed: 12/03/2018

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 11/28/2018.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/sstephanos/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/857,553	12/28/2017	2133	1880	129980-5066US	7	1

CONFIRMATION NO. 5811

CORRECTED FILING RECEIPT

79141
Morgan Lewis Bockius LLP (PA)-J. Zheng
1400 Page Mill Road
Palo Alto, CA 94304

OC000000104176401

Date Mailed: 12/03/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Hyun Lee, Ladera Ranch, CA;

Applicant(s)

Netlist, Inc., Irvine, CA;

Power of Attorney: The patent practitioners associated with Customer Number 79141

Domestic Priority data as claimed by applicant

This application is a CON of 15/088,115 04/01/2016 PAT 9858218
which is a CON of 13/942,721 07/16/2013 PAT 9311116
which is a CON of 12/815,339 06/14/2010 PAT 8489837
which claims benefit of 61/186,799 06/12/2009

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/23/2018

Samsung Electronics Co., Ltd.
Ex. 1096, p. 118

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/857,553**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

Preliminary Class

711

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Ex. 1096, p. 119

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

79141 7590 02/06/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER
CHERY, MARDOCHEE

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 02/06/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

TITLE OF INVENTION: MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	05/06/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

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PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

79141 7590 02/06/2019
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

TITLE OF INVENTION: MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	05/06/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHERY, MARDOCHEE	2133	711-154000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

79141 7590 02/06/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER	
CHERY, MARDOCHEE	
ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 02/06/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Samsung Electronics Co., Ltd.
Ex. 1096, p. 123

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/857,553	Applicant(s) Lee, Hyun	
	Examiner MARDOCHEE CHERY	Art Unit 2133	AIA Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the reply filed 11/28/2018.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-20 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	2/03/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 125

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

CPC - Searched*		
Symbol	Date	Examiner
G11C5/00 G11C16/26 G11C2029/4402 G11C29/78 G11C7/1066	02/03/2019	MC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
G11C5/00 G11C16/26 G11C2029/4402 G11C29/78 G11C7/1066	02/03/2019	MC

US Classification - Searched*			
Class	Subclass	Date	Examiner
711	154	02/03/2019	MC

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST Search	08/22/2018	MC
EAST Updated	02/03/2019	MC

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	See attached	02/03/2019	MC

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	02/04/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 126

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	1694	F	2013-01-01
G11C	/	5	/	04	I	2013-01-01
G11C	/	7	/	1063	I	2013-01-01
G06F	/	13	/	1668	I	2013-01-01
G06F	/	9	/	445	I	2013-01-01
G06F	/	13	/	24	I	2013-01-01
G06F	/	3	/	0619	I	2013-01-01
G06F	/	3	/	0632	I	2013-01-01
G06F	/	3	/	0659	I	2013-01-01
G06F	/	3	/	0673	I	2013-01-01
G06F	/	11	/	1068	I	2013-01-01
G11C	/	29	/	52	I	2013-01-01
G06F	/	12	/	0646	I	2013-01-01
G11C	/	2207	/	2254	A	2013-01-01
G11C	/	5	/	00	A	2013-01-01
G11C	/	7	/	1066	A	2013-01-01
G11C	/	16	/	26	A	2013-01-01
G11C	/	29	/	78	A	2013-01-01
G11C	/	2029	/	4402	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	04 February 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190204

Samsung Electronics Co., Ltd.
Ex. 1096, p. 127

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

INTERNATIONAL CLASSIFICATION				
CLAIMED				
	/		/	

NON-CLAIMED				
	/		/	

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
711	154

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	04 February 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190204

Samsung Electronics Co., Ltd.
Ex. 1096, p. 128

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19										
	2		11		20										
	3		12												
	4		13												
	5		14												
	6		15												
	7		16												
	8		17												
	9		18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	04 February 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190204

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BIB DATA SHEET

CONFIRMATION NO. 5811

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
15/857,553	12/28/2017	711	2133	129980-5066US

APPLICANTS
Netlist, Inc., Irvine, CA;

INVENTORS
Hyun Lee, Ladera Ranch, CA;

**** CONTINUING DATA ***************************
This application is a CON of 15/088,115 04/01/2016 PAT 9858218
which is a CON of 13/942,721 07/16/2013 PAT 9311116
which is a CON of 12/815,339 06/14/2010 PAT 8489837
which claims benefit of 61/186,799 06/12/2009

**** FOREIGN APPLICATIONS ***************************

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED ****
01/23/2018

Foreign Priority claimed ☐ Yes ☑ No 35 USC 119(a-d) conditions met ☐ Yes ☑ No Verified and Acknowledged /MARDOCHEE CHERY/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		CA	3	7	1

ADDRESS
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304
UNITED STATES

TITLE
MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

FILING FEE RECEIVED		
1880	FEES: Authority has been given in Paper No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ All Fees ☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	83	(handshak$3 hand-shak$3 (signal near3 (coordinat$3 arbitrat$3))) near7 memory near7 controller near7 host	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 00:59
L2	73	controller near5 (open near2 drain near2 (I/O output))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 00:59
L3	12	L2 and ((parity error) near5 (signal bit check))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 00:59
L4	31208	(controller microcontroller micro-controller) same (memory $3RAM) with (read write pre-charg$3 precharg$3 refresh$3) and (transistor $3FET drain$3) same (controller device microcontroller micro-controller) and drain$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L5	50	L4 and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L6	25	L5 and (open$3 near2 drain)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L7	13	L6 AND ((G11C5/00 OR G11C16/26 OR G11C2029/4402 OR G11C29/78 OR G11C7/1066).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L8	31208	(controller microcontroller micro-controller) same (memory $3RAM) with (read write pre-charg$3 precharg$3 refresh$3) and (transistor $3FET drain$3) same (controller device microcontroller micro-controller) and drain$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00

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L9	50	L8 and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L10	25	L9 and (open$3 near2 drain)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L11	13	L10 AND ((G11C5/00 OR G11C16/26 OR G11C2029/4402 OR G11C29/78 OR G11C7/1066).CPC.)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:00
L12	14	L10 and @ad<"20090612"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:01
L13	56	(controller hub switch channel) with (open near2 drain) with controller with (host computer node engine)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:01
L14	31	L13 and @ad<"20090612"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:01
L15	3	L14 and (parity ECC redundancy error (correct$3 near2 code))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:01
L16	2	(controller hub switch channel) with (open near2 drain) with controller with (host computer node engine) same (parity ECC redundancy (correct$3 near2 code))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:01
L17	73	controller near5 (open near2 drain near2 (I/O output))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:02
L18	12	L17 and ((parity error) near5 (signal bit check))	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:02

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L19	83	(handshak$3 hand-shak$3 (signal near3 (coordinat$3 arbitrat$3))) near7 memory near7 controller near7 host	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:02
L20	10	L19 and (initializ$5 POST BIOS boot$3 start$3) near3 mode	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/02/04 01:02

2/ 4/ 2019 1:04:05 AM
C:\ Users\ mchery\ Documents\ EAST\ Workspaces\ 13942721.wsp

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Ex. 1096, p. 133

EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L21	0	((controller circuit configured cause memory module enter$3 initialization mode in response command host computer system memory module execut$3 at least one initialization sequence during initialization mode) and (at least one output$3 defin$3 function operational mode according to industry standard but undefined industry standard initialization mode) and (notification circuit output$3 notification signal indicat$3 status initialization mode memory controller via least output$4)).clm.	USPAT	SAME	ON	2019/02/04 01:02

2/ 4/ 2019 1:03:40 AM
C:\ Users\ mchery\ Documents\ EAST\ Workspaces\ 13942721.wsp

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Electronic Acknowledgement Receipt

EFS ID:	35272387
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/Edith Fuentes
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066US
Receipt Date:	01-MAR-2019
Filing Date:	28-DEC-2017
Time Stamp:	20:07:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	IPR2017-00548_12-30-2016-Power-of-Attorney-of-Petitioners.pdf	449308 a3518e6475ce33f9bf2aca44473171b37c1f3496	no	3

Warnings:

Information:					
2	Non Patent Literature	IPR2017-00548-12815339-8489837-File-History.pdf	5030503 72ed776070adaca9c84ee0758fe00c3dcaafdefc	no	134
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Information:					
3	Non Patent Literature	IPR2017-00548-Alpert-Camelback-Computer.pdf	926928 e84aaf03ef8c141b9b4435ed41ca91d8d7a5f933	no	9
Warnings:					
The page size in the PDF is too large. The pages should be 8.5 x 11 or A4. If this PDF is submitted, the pages will be resized upon entry into the Image File Wrapper and may affect subsequent processing					
Information:					
4	Non Patent Literature	IPR2017-00548-61186799-Provisional-Application.pdf	462707 574d94090a1d19e6f26ba1267cfb83caaf4c0ce6	no	9
Warnings:					
Information:					
5	Non Patent Literature	IPR2017-00548-Notice-of-Filing-Date-Accorded-to-Petition.pdf	225870 f4418f878292a07dbe24b6f331cd9c299a96c212	no	5
Warnings:					
Information:					
6	Non Patent Literature	IPR2017-00548-Patent-Owners-Power-of-Attorney.pdf	252442 47ed9c4312635a65d0516460ef5cc0a3f094971e	no	2
Warnings:					
Information:					
7	Non Patent Literature	IPR2017-00548-Decision.pdf	208208 b02fc5efb6b2bbf4ff9b88dc563d4246f0ae8a3c	no	16
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8	Non Patent Literature	IPR2017-00548-549-Scheduling-Order.pdf	107710 548d05f744ae2f7a85204536f0cdc1e092ac8fe6	no	7
Warnings:					

Information:					
9	Non Patent Literature	IPR2017-00548-Notice-of-Deposition-of-Dr-Donald-Alpert.pdf	132191 5cca3346c111a5b413f88850c5dbcd82cac92bfc	no	3
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Information:					
10	Non Patent Literature	IPR2017-00548-Joint-Notice-of-Stipulation.pdf	31629 cadc9e9b86dd4b07115bbd53d0997e9408597067	no	3
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11	Non Patent Literature	IPR2017-00548-Patent-Owner-Response.pdf	268050 90524293666ceb9cbb0e4a84659e872bc8dfb92b	no	35
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12	Non Patent Literature	IPR2017-00548-Deposition-of-Robert-Murphy.pdf	8525315 0e137fb8f6f80d22c9c1c50aed2828dcb79f693b	no	188
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13	Non Patent Literature	IPR2017-00548-Petitioner-Reply-to-Patent-Owner-Response.pdf	291020 51ece8e7b245a6d978d3fe64852453acd7d28ccf	no	32
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14	Non Patent Literature	IPR2017-00548-Patent-Owner-Updated-Mandatory-Notices.pdf	108033 4c1655c977d0abd91b780dda8614ba10a75d9afe	no	3
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15	Non Patent Literature	IPR2017-00548-Patent-Owner-Request-for-Oral-Argument.pdf	112458 285593013549d5fe7ea86a1c34cdb20765601137	no	4
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16	Non Patent Literature	IPR2017-00548-Petitioner-Request-for-Oral-Argument.pdf	102335 3c412929021bf02a896a918d21be980536f2d644	no	4
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17	Non Patent Literature	IPR2017-00548-Petitioner-Motion-to-Exclude.pdf	164211 a31451d8609da771513faae4a77c00bef05d7e3d	no	11
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18	Non Patent Literature	IPR2017-00548-Patent-Owner-Opposition-to-Motion-to-Exclude.pdf	164983 eda65d0ab31058700e2976d26925a4b5525a7859	no	16
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19	Non Patent Literature	IPR2016-00548-Order-TrialHearing.pdf	91564 eca6d700e96f17e0d3dfe581c1e95ee9e06120eb	no	5
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20	Non Patent Literature	IPR2017-00548-Petitioner-Reply-Support-of-Motion-to-Exclude.pdf	156483 d48cebe4d38d0fb9982a1f0d511f2a45f15a3a8f	no	9
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21	Non Patent Literature	IPR2017-00548-Petitioners-Updated-Exhibit-List.pdf	107116 272c10871b8412dab7240dfa175cf21fe29d8b4a	no	4
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22	Non Patent Literature	IPR2017-00548-Patent-Owner-Updated-Exhibit-List.pdf	115357 1e268bc65a921d9c18a48ce2458ec4f066918e57	no	4
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23	Non Patent Literature	IPR2017-00548-Petitioners-Demonstratives.pdf	13986917 00c6eb1cb709be5cff45d03d162dfa307d456342	no	66
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24	Non Patent Literature	IPR2017-00548-Demonstratives-of-Patent-Owner-Exhibit-2012.pdf	1668602 f868a4e9c654fea2455c1aaeec23e87f40a8ecb9	no	24
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25	Non Patent Literature	IPR2017-00548-Record-of-Oral-Hearing-2-14-18.pdf	553009 272e572a7c0f7a1aed3d9ff9ace4168f60ef289a	no	116
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26	Non Patent Literature	IPR2017-00548-Final-Written-Decision.pdf	250564 3f8a7f7731d2ea384360ec8cf9c611e431098a96	no	18
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27	Non Patent Literature	IPR2018-00303_Petition_InterPartes_Review_of_US_9535623_filed_DEC142017.pdf	8060851 7a4140cd14536e8782a0fe75f5304f63661b0a15	no	79
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28	Non Patent Literature	IPR2018-00303_PO_Preliminary_Response_filed_MAR192018.pdf	10098892 e02ca1c3891c5cce3ab89f3325669dff34833496	no	59
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29	Non Patent Literature	IPR2018-00303_PO_Objections_to_Petition_Evidence_filed_JUN82018.pdf	434632 95fe46c754c4c644f9931b7f4afcfcb15fa8187c	no	4
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30	Non Patent Literature	IPR2018-00303_Petitioners_Objections_To_Evidence_filed_JUN82018.pdf	838958 504a4ec9e75fa13d38a6f5d60a090bb4d2171a69	no	6
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32	Non Patent Literature	IPR2018-00303_Petitioners_Objection_to_Evidence_filed_AUG212018.pdf	301533 a6ae321eae1914f404e241f01af2d2a89a0a9b45	no	4
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33	Non Patent Literature	IPR2018-00303_Petitioners_Reply_to_PO_Response_filed_NOV92018.pdf	3005600 ba18db802ba56221192222af2e954ab664e0920e	no	34
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34	Non Patent Literature	IPR2018-00303_PO_Objections_To_Reply_Evidence_filed_NOV192018.pdf	669786 9a16e404e409775987d5fd584c8def21512290d9	no	8
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35	Non Patent Literature	IPR2018-00303_Petitioners_Motion_to_Exclude_filed_NOV302018.pdf	569476 24e28369d8612f7edf6c7ac8e1c1f537da3d1fc9	no	8
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37	Non Patent Literature	IPR2018-00303_PO_Request_For_Oral_Argument_filed_NOV302018.pdf	262808 f68d83eb2685bddee40444ad5926cd0fbf05b293	no	4
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38	Non Patent Literature	IPR2018-00303_PO_Submission_Of_ITC_CCO_filed_NOV302018.pdf	537162 40be584d33831cdcb66e2eb25eef4e5bc825ed1b	no	4
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39	Non Patent Literature	IPR2018-00303_PO_Motion_To_Exclude_filed_NOV302018.pdf	676039 0850a4e6484024023e7b02cd88a23c3e9df40e46	no	9
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40	Non Patent Literature	IPR2018-00303_Petitioners_Opp_to_PO_Motion_filed_DEC142018.pdf	900716 d92225226cd61b91c95bf46072e4b79414c085b5	no	11
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41	Non Patent Literature	IPR2018-00303_PO_Opposition_to_Petitioners_Motion_filed_DEC142018.pdf	1408158 dddc34618af8b5f0f12919e56303d793f8dde825	no	15
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42	Non Patent Literature	IPR2018-00303_Petitioners_Reply_ISO_Motion_filed_DEC212018.pdf	560840 4f43b3071a67a4d8da745a181f308bbf1a1b9427	no	7
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43	Non Patent Literature	IPR2018-00303_PO_Reply_Petitioner_Opp_Motion_filed_DEC212018.pdf	117879 28a8f1e90d81c3e00085aac4715437b97d660386	no	10
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44	Non Patent Literature	IPR2018-00303_PO_Demonstratives_filed_FEB42019.pdf	9166325 1e752115def84c97bb6fcf7914363a878dd1224b	no	35
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45	Non Patent Literature	IPR2018-00303_Petitioners_Demonstratives_filed_FEB42019.pdf	5846270 49626fa7b4511a7dc2ccadb95ac0a8a13bed750f	no	70
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46	Non Patent Literature	IPR2018-00303_Notice_of_Accord_Filing_Date-Defective_filed_DEC192017.pdf	496766 396c88ad5d47e974c7e68c875e280b2f74e656bd	no	6
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47	Non Patent Literature	IPR2018-00303_Notice_of_Accepting_Corrected_Petition_filed_DEC192017.pdf	156044 978062ac2023a0b43fe11e993987946c7d11b49b	no	3
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48	Non Patent Literature	IPR2018-00303_Trial_Instituted_Document_filed_MAY242018.pdf	2000611 77ccca5ad110c6dd7178d879640efb856e9505f3	no	18
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49	Non Patent Literature	IPR2018-00303_Conduct_of_the_Proceeding_37CFR425_filed_NOV302018.pdf	554369 858f39c32621abb7c68e99b694e24e5079823700	no	3
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50	Non Patent Literature	IPR2018-00303_Order-Trial_Hearing-37_CFR_4270_filed_JAN162019.pdf	182644 a01061bcb79b385f061b0d1fd5c85a3fb32312d4	no	2
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51	Non Patent Literature	IPR2018-00303_Hearing_Transcript_filed_FEB262019.pdf	4947118 bf9e1ed7637dd90268ef76be6f595a8809f27ba4	no	50
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52	Non Patent Literature	IPR2018-00303_EXHIBITS_2001_Exhibit_2001_filed_MAR192018.pdf	8321848 a3d3c2ea403823dd8a096da96b1b712b44aa3470	no	71
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53	Non Patent Literature	IPR2018-00303_EXHIBITS_2002_Exhibit_2002_filed_MAR192018.pdf	3778320 c9ff1069e03bfb3fe2d132da32ebf5f78cd74279	no	40
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54	Non Patent Literature	IPR2018-00303_EXHIBITS_2003_Exhibit_2003_filed_MAR192018.pdf	1049446 a70124dda1b3e8878760ebefaa57f1d73af79c51	no	14
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55	Non Patent Literature	IPR2018-00303_EXHIBITS_2004_Exhibit_2004_filed_MAR192018.pdf	3256276 beab575c0d4390dbb6946fe045cb2ac44e9163dd	no	10
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56	Non Patent Literature	IPR2018-00303_EXHIBITS_2005_Exhibit_2005_filed_AUG102018.pdf	8444070 23bccfd740f93116f0cf2ee205e68d6bd3d6e48e	no	76
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57	Non Patent Literature	IPR2018-00303_EXHIBITS_2006_Exhibit_2006_filed_AUG102018.pdf	19172197 fef49347b9151cbf8c7b54eb525bc3b9a2c23bad	no	218
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58	Non Patent Literature	IPR2018-00303_EXHIBITS_2007_Exhibit_2007_filed_AUG102018.pdf	3435499 5e02caa4c426fcb8c3961f7cc639132bf5a4d05d	no	23
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60	Non Patent Literature	IPR2018-00303_EXHIBITS_2009_Exhibit_2009_filed_AUG102018.pdf	2861121 56638ea245df5760bc0bb156cb547aa6fbf01656	no	10
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Information:					
		Total Files Size (in bytes):	144091360		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Address to:
Mail Stop RCE
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Electronically filed	March 1, 2019
Application Number	15/857,553
Filing Date	December 28, 2017
First Named Inventor	Hyun Lee
Art Unit	2133
Examiner Name	Chery, Mardochee
Attorney Docket No.	129980-5066US

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application.

1. Submission required under 37 C.F.R. § 1.114

NOTE: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

a. ☐ Previously submitted. If a final Office Action is outstanding, any amendments filed after the final Office Action may be considered as a submission.
   i. ☐ Request for non-entry of amendment: Please **do not** entered the amendment submitted on _____
   ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed _____
   iii. ☐ Other _____
b. ☒ Enclosed
   i. ☒ Amendment/Reply
   ii. ☐ Affidavit(s)/Declaration(s)
   iii. ☒ Information Disclosure Statement (IDS)
   iv. ☐ Other _____

2. Miscellaneous
   a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) required)
   b. ☐ Other _____

3. Fees — The RCE fee under 37 C.F.R. § 1.17(e) is required by 37 C.F.R. § 1.114 when the RCE is filed.
   a. ☒ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).
      i. ☒ (1st request) RCE fee required under 37 C.F.R. § 1.17(e)(1), estimated to be $1300 (large entity) or $650 (small entity)
      ii. ☐ (2nd or subsequent request) RCE fee required under 37 C.F.R. § 1.17(e)(2), estimated to be $1900 (large entity) or $950 (small entity)
      iii. ☐ Extension of time fee required under 37 C.F.R. §§ 1.136 and 1.17, estimated to be $ for a month(s) extension, the request for which is being made herewith
      iv. ☐ Other _____

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print/Type)	Jamie J. Zheng	*Registration No. (Attorney/Agent)*	51,167
Signature	/Jamie J. Zheng/	*Date*	March 1, 2019

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or by facsimile transmitted to fax no. 1-703- to the U.S. Patent and Trademark Office on the date indicated below.

Name (Print/Type)		*Registration No. (Attorney/Agent)*	
Signature		*Date*	

DB2/ 35990604.1

Electronically filed March 1, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	Chery, Mardochee
For:	*MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER*	Attorney Docket No.:	129980-5066-US
		Date:	March 1, 2019

AMENDMENT AND REQUEST FOR CONTINUED EXAMINATION

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

Applicant files herewith an Amendment and Request for Continued Examination for the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

IN THE SPECIFICATION

Please replace the Title of the application with the following:

~~MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER~~ MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE

Please replace the Abstract of the Disclosure with the following:

According to certain aspects, a memory module is coupled to a memory controller of a host computer system via an interface. The memory module is operable in at least a second mode and a first mode. The memory module in the second mode is configured to be trained with one or more training sequences initiated by the memory controller. The memory module in the first mode is configured to perform one or more memory read or write operations not associated with the one or more training sequences by communicating data signals with the memory module. The memory module has an output pin via which the memory module output a signal indicating a parity error having occurred while the memory module is in the first mode, and via which the memory module output a signal related to the one or more training sequences in the second mode ~~is configurable to handshake with the memory controller about the one or more training sequences during the second mode~~.

Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection; and

wherein the memory module is operable in at least a first mode and a second mode;

wherein the memory module in the first mode is ~~configured~~ configurable to perform one or more memory read or write operations by communicating data signals via the first edge connections in response to address and command signals received via the second edge connections, wherein the memory module in the second mode is not accessed by the memory controller for memory read or write operations, and wherein the memory module in the second mode is configurable to undergo training ~~configured to be trained~~ with one or more training sequences while the first edge connections are not active;

wherein the module controller is configurable ~~configured~~ to receive via the second edge connections the address and command signals associated with the one or more memory read or write operations and to control the dynamic random access memory elements in accordance with the address and command signals, and wherein the module controller is further configurable

~~configured~~ to output via the open drain output and the error edge connection a signal indicating a parity error having occurred while the memory module is in the first mode;

wherein the module controller is further configurable to provide information related to ~~configured to handshake with the memory controller about~~ the one or more training sequences by outputting a signal via the open drain output and the error edge connection while the memory module is in the second mode.

2. (Original) The memory module of claim 1, wherein the module controller comprises an integrated circuit.

3. (Original) The memory module of claim 1, wherein the module controller includes a notification circuit comprising one or more transistors each having an open drain coupled to the open drain output.

4. (Currently Amended) The memory module of claim 3, wherein the module controller is ~~configured to handshake with~~ configurable to output to the memory controller the signal related to the one or more training sequences by driving ~~by using the notification circuit to drive~~ a gate of each of the one or more transistors from a first logic level to a second logic level ~~to a logic high level to provide a low impedance path between the open drain output to ground~~.

5. (Currently Amended) The memory module of claim 4, wherein the ~~notification circuit~~ module controller is configurable ~~is configured~~ to output the parity error signal by driving the gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

6. (Currently Amended) The memory module of claim 5 ~~4~~, wherein the notification circuit includes one or more ~~OR~~ logic elements selected from the group consisting of AND, OR, NOR, NAND, and XOR gates.

7. (Currently Amended) The memory module of claim 1, wherein the module controller is ~~configured to drive a notification~~ configurable to output the signal related to ~~indicate a status of~~ the one or more training sequences by driving the open drain output from a first logic state to a second logic state ~~while the memory module is in the second mode~~.

8. (Previously Presented) The memory module of claim 1, wherein the second edge connections include one or more read/write pins that are not active while the memory module is in the second mode.

9. (Currently Amended) The memory module of claim 8 ~~1~~, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is in the second mode.

10. (Currently Amended) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection; and

wherein the memory module is operable in at least a first mode in which the memory module is configurable ~~configured~~ to perform one or more memory read or write operations by communicating data signals via the first edge connections in response to address and command signals received via the second edge connections, and a second mode in which at least the first edge connections are not active and the memory module is not accessed by the memory controller for memory read or write operations, and wherein the memory module in the second mode is configurable to undergo training ~~configured to be trained~~ with one or more training sequences;

wherein the module controller is configurable ~~configured~~ to receive via the second edge connections the address and command signals associated with the one or more memory read or write operations and to control the dynamic random access memory elements in accordance with

the address and command signals, and wherein the module controller is further configurable ~~configured~~ to output via the open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module while the memory module is in the first mode;

wherein the module controller is further ~~configured to handshake with~~ configurable to output to the memory controller ~~by outputting~~ a signal related to the one or more training sequences via the open drain output and the error edge connection while the memory module is in the second mode.

11. (Previously Presented) The memory module of claim 10, wherein the module controller comprises an integrated circuit.

12. (Currently Amended) The memory module of claim 10 ~~12~~, wherein the module controller includes a notification circuit having one or more transistors each having an open drain coupled to the open drain output, wherein the module controller is ~~configured to handshake with the memory controller by using the notification circuit to drive~~ configurable to output to the memory controller the signal related to the one or more training sequences by driving a gate of each of the one or more transistors from a first logic level to a second logic level ~~to a logic high level to provide a low impedance path between the open drain output to ground~~, and wherein the notification circuit is configurable ~~configured~~ to output the parity error signal by driving the gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground.

13. (Currently Amended) The memory module of claim 12, wherein the notification circuit includes one or more ~~OR~~ logic elements selected from the group consisting of AND, OR, NOR, NAND, and XOR gates.

14. (Currently Amended) The memory module of claim 10, wherein the module controller is ~~configured to drive a notification signal to indicate a status of~~ configurable to output the signal related to the one or more training sequences by driving the open drain output from a first logic state to a second logic state ~~while the memory module is in the second mode~~.

15. (Previously Presented) The memory module of claim 10, wherein the second edge connections include one or more read/write pins that are not active while the memory module is in the second mode.

16. (Previously Presented) The memory module of claim 10, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is in the second mode.

17. (Currently Amended) A method of operating a memory module coupled with a memory controller of a host system, the memory module including a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections, the memory module further including dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections, the method comprising:

controlling the dynamic random access memory elements to communicate data signals corresponding to one or more read or write operations via the first edge connections in response to address and command signals received by the memory module via the second edge connections;

outputting via an open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module while the memory module is configured to perform the one or more memory read or write operation;

training the memory module with one or more training sequences, wherein at least the first edge connections are not active while the memory module is trained with the one or more training sequences; and

outputting via the open drain output and the error edge connection a signal <u>to provide information</u> related to the one or more training sequences to ~~handshake with~~ the memory controller <u>while the memory module is not accessed by the memory controller for read or write operation</u> ~~about the one or more training sequences~~.

18. (Previously Presented) The method of claim 17, wherein the second edge connections include one or more read/write pins that are not active while the memory module is trained with the one or more training sequences.

19. (Currently Amended) The method of claim 18~~17~~, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is trained with the one or more training sequences.

20. (Currently Amended) The method of claim 17, wherein the memory module includes a notification circuit having one or more transistors each having an open drain coupled to the open drain output, wherein outputting via an open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module comprises driving a gate of each of the one or more transistors to a logic high level to provide a low impedance path between the open drain output to ground, and wherein outputting a signal to provide information related to the one or more training sequences comprises driving a gate of each of the one or more transistors from a first logic level to a second logic level ~~to a logic high level to provide a low impedance path between the open drain output to ground~~.

REMARKS

This amendment is filed with a Request for Continued Examination.

REMARKS CONCERNING CLAIMS

Claims 1, 4-7, 9-10, 12-14, 17 and 19-20 have been amended.

Support for the amendments can be found throughout the specification and drawings of the application as filed. No new matter has been added.

With respect to all amendments, Applicant has not dedicated or abandoned any unclaimed subject matter. Moreover, Applicant has not acquiesced to any characterizations of the invention, nor any rejections or objections of the claims, made by the Examiner. Moreover, the Applicant hereby rescinds any prior disclaimer of claim scope, to the extent they exist, made during the prosecution of this application or made during the prosecution of any patent or other related patents/applications, and advises the Examiner that any such previous disclaimers and the cited references that they were made to avoid may need to be revisited.

After entry of this amendment, the pending claims are: claims 1-20.

CONCLUDING REMARKS

In light of the above amendments and remarks, the Applicant respectfully requests that the Examiner reconsider this application with a view towards allowance. The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: March 1, 2019

/Jamie J. Zheng/ 51,167

Jamie J. Zheng (Reg. No.)

MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
Phone: (650) 843-4000

Electronically filed March 1, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	Chery, Mardochee
For:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No.:	129980-5066-US

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the duty of disclosure provisions of 37 C.F.R. §1.56, there is hereby provided certain information which the Examiner may consider material to the examination of the subject U.S. patent application. It is requested that the Examiner make this information of record if it is deemed material to the examination of the application.

1. Enclosures accompanying this Information Disclosure Statement are:

1a. ☒ A list of all patents, publications, applications, or other information submitted for consideration by the office.

1b. A legible copy of:

☐ Each foreign patent;

☐ Each publication or that portion which caused it to be listed on the PTO-1449;

☐ For each cited pending U.S. application, the application specification including the claims, and any drawing of the application, or portion of the application which caused it to be listed on the PTO-1449 including any claims directed to that portion;

☒ all other information or portion which caused it to be listed on the PTO-1449.

1c. ☐ An English language copy of search report(s) from a counterpart foreign application or PCT International Search Report.

1d. ☐ Explanations of relevancy (ATTACHMENT 1(d), hereto) or English language

abstracts of the non-English language publications.

2. ☒ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(b):

☐ Within three months of the filing date of a national application other than a continued prosecution application under §1.53(d);

☐ Within three months of the date of entry of the national stage as set forth in §1.491 in an international application;

☐ Before the mailing of the first Office action on the merits;

☒ Before the mailing of a first Office action after the filing of a request for continued examination under §1.114.

3. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(c) after the period specified in 37 C.F.R. §1.97(b), but before the mailing date of any of a final action under 37 C.F.R. §1.113, a notice of allowance under 37 C.F.R. §1.311 or an action that otherwise closes prosecution in the application.

(Check either Item 3a, 3b, 3c or 3d)

3a. ☐ The Certification Statement in Item 5 below is applicable. Accordingly, no fee is required.

3b. ☐ The $240 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

3c. ☐ The $120 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

3d. ☐ The $60 (micro entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

(Items 3b or 3c to be checked if any reference known for more than 3 months)

4. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(d) after the period specified in 37 C.F.R. §1.97(c), but on or before the date of payment of the issue fee.

(Check Item 4a, and 4b, 4c or 4d)

4a. ☐ The Certification Statement in Item 5 below is applicable.

4b. ☐ The $240 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

4c. ☐ The $120 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account

Samsung Electronics Co., Ltd.
Ex. 1096, p. 156

No. 50-0310 (order no.).

4d. ☐ The $60 (micro entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

5. ☐ Certification Statement (applicable if Item 3a or Item 4a is checked)

(Check either Item 5a, 5b, 5c or 5d)

5a. ☐ In accordance with 37 C.F.R. §1.97(e)(1), it is certified that each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement.

5b. ☐ In accordance with 37 C.F.R. §1.97(e)(2), it is certified that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this information disclosure statement.

5c. ☐ Each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.

5d. ☐ Pursuant to 37 C.F.R. §1.704(d), each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.

6. ☒ Copies of each cited U.S. patent and each U.S. patent application publication are not enclosed pursuant to the USPTO OG Notice dated 05 August 2003 waiving the requirement under 37 C.F.R. 1.98(a)(2)(i) for U.S. patent applications filed after June 30, 2003.

7. ☒ This application is a continuation application under 37 C.F.R. §1.53(b) or (d).

(Check appropriate Items 7a, 7b and/or 7c)

7a. ☐ A Petition to Withdraw from issue under 37 C.F.R. §1.313(b)(5) is concurrently filed herewith.

7b. ☒ Copies of publications listed on Form PTO-1449 from prior application Serial Nos. **15/088,115**, filed on **April 1, 2016**; **13/942,721**, filed on **July 16, 2013** and **12/815,339**, filed on **June 14, 2010**, of which this application claims priority under 35 U.S.C. §120, are not being submitted pursuant to 37 C.F.R. §1.98(d).

7c. ☒ Copies of the publications listed on the attached Form PTO-1449 that were not previously cited in prior application Serial Nos. **15/088,115**, filed on **April 1, 2016**; **13/942,721**, filed on **July 16, 2013** and **12/815,339**, filed on **June 14, 2010**, are provided herewith.

8. ☐ This is a Supplemental Information Disclosure Statement. (Check Item 8a)

8a. ☐ This Supplemental Information Disclosure Statement under 37 C.F.R. §1.97(f) supplements the Information Disclosure Statement filed on . A bona fide attempt was made to comply with 37 C.F.R. §1.98, but inadvertent omissions were made. These omissions have been corrected herein. Accordingly, additional time is requested so that this Supplemental Information Disclosure Statement can be considered as if properly filed on .

9. ☐ In accordance with 37 C.F.R. §1.98, a concise explanation of what is presently understood to be the relevance of each non-English language publication is:

(Check Item 9a, 9b, or 9c)

9a. ☐ satisfied because all non-English language publications were cited on the enclosed English language copy of the PCT International Search Report or the search report from a counterpart foreign application indicating the degree of relevance found by the foreign office.

9b. ☐ set forth in the application.

9c. ☐ enclosed as an attachment hereto.

10. ☒ The Commissioner is authorized to charge any additional fee required or credit any overpayment for this Information Disclosure Statement and/or Petition to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

11. ☒ No admission is made that the information cited in this Statement is, or is considered to be, material to patentability nor a representation that a search has been made (other than a search report of a foreign counterpart application or PCT International Search Report if submitted herewith). 37 C.F.R. §§1.97(g) and (h).

Respectfully submitted,

Date: March 1, 2019

/Jamie J. Zheng/ 51,167

Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	1	of	8	Attorney Docket Number	***129980-5066-US***

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.[1]	Document Number Number - Kind Code[2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
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		3,560,935	02-02-1971	Beers	
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Examiner Signature		Date Considered	

DB2/ 35663151.1

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				***Electronically filed March 1, 2019***	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	2	of	8	Attorney Docket Number	***129980-5066-US***

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Examiner Initials	Cite No.	Foreign Patent Document Country Code[3] – Number[4] - Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published
		Inter partes review Case No. IPR2017-00548, Petition For Inter Partes Review Of U.S. Patent No. 8,489,837, filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Power of Attorney of Petitioners, filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1002 "File History", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1003 "Declaration of Donald Alpert", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1004 "Camelback Computer Architecture", filed December 30, 2016.

Examiner Signature		Date Considered	

DB2/ 35663151.1

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				***Electronically filed March 1, 2019***	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	3	of	8	Attorney Docket Number	***129980-5066-US***

		Inter partes review Case No. IPR2017-00548, Exhibit 1006 "Provisional-Application-61186799", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1010 "5400 MCH Datasheet", filed December 30, 2016
		Inter partes review Case No. IPR2017-00548, Exhibit 1011 "Microsoft Computer Dictionary (5th Ed. 2002)", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Notice of Filing Date Accorded to Petition, Mailing date January 9, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Mandatory Notices, filed January 20, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Power of Attorney, filed January 20, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Preliminary Response filed April 9, 2017.
		Inter partes review Case No. IPR2017-00548, Trial Instituted document dated May 15, 2017.
		Inter partes review Case No. IPR2017-00548, Decision, entered May 15, 2017.
		Inter partes review Case No. IPR2017-00548, Scheduling Order, entered May 15, 2017.
		Inter partes review Case No. IPR2017-00548, Notice of Deposition of Dr. Donald Alpert, filed July 31, 2017.
		Inter partes review Case No. IPR2017-00548, Joint Notice of Stipulation to Adjust Schedule, filed August 7, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Response, filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2001 - Declaration Of Robert J. Murphy, filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2002 - DEPOSITION OF DONALD ALPERT, Ph.D. filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2003 - Defendants' Opening Claim Construction Brief filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2004 - PLAINTIFF NETLIST, NC.'S OPENING CLAIM CONSTRUCTION BRIEF filed September 6, 2017.

Examiner Signature		Date Considered	

DB2/ 35663151.1

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				***Electronically filed March 1, 2019***	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	4	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2005 - PLAINTIFF NETLIST, NC.'S AMENDED OPENING CLAIM CONSTRUCTION BRIEF filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2006 - DEFENDANTS' REPLY CLAIM CONSTRUCTION BRIEF filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2007 - PLAINTIFF NETLIST, NC.'S RESPONSIVE CLAIM CONSTRUCTION BRIEF filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2008 - UNITED STATES INTERNATIONAL TRADE COMMISSION Open Sessions filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2009 - Computer Desktop Encyclopedia September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Petitioner's Objections to Evidence, filed September 13, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Notice of Deposition of Robert J. Murphy, filed September 25, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Deposition of Robert J. Murphy, filed December 11, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Petitioner's Reply to Patent Owner's Response, filed December 13, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Updated Mandatory Notices, filed January 3, 2018.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Request for Oral Argument, filed January 9, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Request for Oral Argument, filed January 9, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Motion to Exclude, filed January 9, 2018.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Opposition to Petitioner's Motion to Exclude, filed January 23, 2018.
		Inter partes review Case No. IPR2017-00548, Order, Trial Hearing, entered January 25, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Reply in Support of Its Motion to Exclude, filed January 30, 2018.

Examiner Signature		Date Considered	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				***Electronically filed March 1, 2019***	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	5	of	8	Attorney Docket Number	***129980-5066-US***

		Inter partes review Case No. IPR2017-00548, Petitioner's Updated Exhibit List, filed February 9, 2018.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Updated Exhibit List, filed February 9, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Demonstratives, filed February 9, 2018.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2012 – Demonstratives of Patent Owner Netlist, Inc., filed February 9, 2018.
		Inter partes review Case No. IPR2017-00548, Record of Oral Hearing, held February 14, 2018.
		Inter partes review Case No. IPR2017-00548, Final Written Decision, entered May 3, 2018.
		Lee, Office Action, US15/088,115, 20MAY2016, 10 pgs.
		Lee, Office Action, US15/088,115, 16JUN2017, 9 pgs.
		Lee, Notice of Allowance, US15/088,115, 12OCT2017, 5 pgs.
		Lee, Office Action, US13/942,721, 22MAY2015, 6 pgs.
		Lee, Final Office Action, US13/942,721, 16NOV2015, 6 pgs.
		Lee, Notice of Allowance, US13/942,721, 24FEB2016, 5 pgs.
		Lee, Office Action, US12/815,339, 14SEP2012, 14 pgs.
		Lee, Notice of Allowance, US12/815,339, 20MAR2013, 6 pgs.
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petition for Inter Partes Review of U.S. Patent No. 9,535,623, filed December,14,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, PO Preliminary Response, filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Objections to Petition Evidence, filed June, 8,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Objections To Evidence, filed June, 8,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Response, filed August,10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioner's Objection to Evidence, filed August, 21,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Reply to Patent Owner's Response, filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Objections To Reply Evidence, filed November, 19,2018

Examiner Signature		Date Considered	

DB2/ 35663151.1

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				***Electronically filed March 1, 2019***	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	6	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners Motion to Exclude, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Request for Oral Argument, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Request For Oral Argument, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Submission Of ITC Claim Construction Order, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Motion To Exclude, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners Opposition to Patent Owner's Motion to Exclude, filed December, 14,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Opposition to Petitioner's Motion to Exclude Evidence, filed December, 14,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Reply in Support of its Motion to Exclude, filed December, 21,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Reply To Petitioner Opposition To Motion To Exclude, filed December, 21,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Demonstratives, filed February, 4,2019
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Demonstratives, filed February, 4,2019
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Notice of Accord Filing Date - Defective Petition, filed December, 19,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Notice of Accepting Corrected Petition, filed December, 19,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Trial Instituted Document, filed May, 24,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Conduct of the Proceeding 37 C.F.R. § 42.5, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Order - Trial Hearing - 37 CFR 42.70, filed January 16, 2019
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Hearing Transcript, filed February, 26,2019

Examiner Signature		Date Considered	

DB2/ 35663151.1

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	7	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2001, 'Exhibit 2001,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2002, 'Exhibit 2002,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2003, 'Exhibit 2003,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2004, 'Exhibit 2004,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2005, 'Exhibit 2005,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2006, 'Exhibit 2006,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2007, 'Exhibit 2007,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2008, 'Exhibit 2008,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2009, 'Exhibit 2009,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2010, 'Exhibit 2010,' filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1025, '337-TA-1023, Initial Determination (Excerpts),' filed December, 14,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1026, 'Murphy Deposition Transcript in IPR2017-00548 (837 Patent),' filed December, 14,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1028, 'Patent Owner's Dictionary (Exhibit 2009 in IPR2017-00548),' filed December, 14,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1003, 'Declaration of Donald Alpert,' filed December, 4,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1003, 'Corrected Declaration of Donald Alpert,' filed December, 19,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1030, 'Declaration of Brian Nester PHV,' filed October, 18,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1032, 'Annotated Page 37 of Ex. 2005,' filed November, 9,2018

Examiner Signature		Date Considered	

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				***Electronically filed March 1, 2019***	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	8	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1034, 'ITC Expert Report of Robert Mr. Murphy Regarding 623 Patent (Public Version),' filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1033, 'Annotated Page 18 of Ex. 2005,' filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1035, 'Mr. Murphy 623 IPR Deposition Transcript (October 25, 2018),' filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1036, 'Mr. Murphy 623 ITC Deposition Transcript (October 19, 2018),' filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1037, 'JEDEC Standard (JESD79-3),' filed November, 9,2018

Examiner Signature		Date Considered	

Electronic Patent Application Fee Transmittal

Application Number:	15857553
Filing Date:	28-Dec-2017
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng/Edith Fuentes
Attorney Docket Number:	129980-5066US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
RCE- 1ST REQUEST	1801	1	1300	1300
		Total in USD ($)		**1300**

Electronic Acknowledgement Receipt

EFS ID:	35293422
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/Edith Fuentes
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066US
Receipt Date:	01-MAR-2019
Filing Date:	28-DEC-2017
Time Stamp:	20:12:33
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$1300
RAM confirmation Number	030419INTEFSW00005867500310
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Non Patent Literature	IPR2018-00303_EXHIBITS_2010_Exhibit_2010_filed_NOV302018.pdf	19884146 a082ad8a1b203cd43548f48b88947118150454 52	no	144
Warnings:					
Information:					
2	Non Patent Literature	IPR2018-00303_EXHIBITS_1025_337TA1023_Initial_Determ_filed_DEC142017.pdf	11557822 704a21503979569c78c415675480fbf01ff76 49d	no	206
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3	Non Patent Literature	IPR2018-00303_EXHIBITS_1026_Murphy_Dep_Transcript_filed_DEC142017.pdf	18235567 18afe33e3f16cc0f372cb889bf16ebe0f170f 161	no	187
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4	Non Patent Literature	IPR2018-00303_EXHIBITS_1028_PO_Dictionary_filed_DEC142017.pdf	988695 2f32193bfc00ee76d29ae5a9bcd889725026c243	no	3
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Information:					
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Warnings:					
Information:					
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12	Non Patent Literature	IPR2018-00303_EXHIBITS_1036_filed_NOV92018.pdf	14764917 b7ab15730ffd2544bb736bdc5d7018363225c6fa	no	161
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Information:					
13	Non Patent Literature	IPR2018-00303_EXHIBITS_1037_filed_NOV92018.pdf	14590347 ce1e896da22fc443c4823cadc61ad9a3918b1ff8	no	188
Warnings:					
Information:					

14	Request for Continued Examination (RCE)	129980-5066US_RCE.pdf	147296 cf76a1e5a758a6cf809f80aac3eeeb6dfd38a3b0	no	1
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Information:					
15		129980-5066_Preliminary_Amendment_RCE_2019-03-01.pdf	138714 5c156b257df84f6f60bcc9951972dc66048 30c89	yes	9

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Amendment Submitted/Entered with Filing of CPA/RCE	1	1
	Specification	2	2
	Claims	3	8
	Applicant Arguments/Remarks Made in an Amendment	9	9

Warnings:					
Information:					
16		129980-5066US_IDS.pdf	204197 a12bbbdd9cc2b1be1b6c0b62f083c4de9fdf8627	yes	12

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	4
	Information Disclosure Statement (IDS) Form (SB08)	5	12

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Information:					
17	Fee Worksheet (SB06)	fee-info.pdf	30490 93170ef2318fec492e2ec118443f9cbd07ccea47	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	106163496	

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/857,553	Filing Date 12/28/2017	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	03/01/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 20	Minus	** 20	= 0		x $100 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $460 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	0

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/SHEILA D CHAPMAN/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 21, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	1	of	1	Attorney Docket Number	***129980-5066-US***

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.[1]	Document Number Number - Kind Code[2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document Country Code[3] – Number[4] - Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

NON PATENT LITERATURE DOCUMENTS		
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Final Written Decision, filed March 21, 2019

Examiner Signature		Date Considered	

DB2/ 35663151.1

Electronically filed March 21, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	Chery, Mardochee
For:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No.:	129980-5066-US

INFORMATION DISCLOSURE STATEMENT

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

In accordance with the duty of disclosure provisions of 37 C.F.R. §1.56, there is hereby provided certain information which the Examiner may consider material to the examination of the subject U.S. patent application. It is requested that the Examiner make this information of record if it is deemed material to the examination of the application.

1. Enclosures accompanying this Information Disclosure Statement are:

1a. ☒ A list of all patents, publications, applications, or other information submitted for consideration by the office.

1b. A legible copy of:

☐ Each foreign patent;

☐ Each publication or that portion which caused it to be listed on the PTO-1449;

☐ For each cited pending U.S. application, the application specification including the claims, and any drawing of the application, or portion of the application which caused it to be listed on the PTO-1449 including any claims directed to that portion;

☒ all other information or portion which caused it to be listed on the PTO-1449.

1c. ☐ An English language copy of search report(s) from a counterpart foreign application or PCT International Search Report.

1d. ☐ Explanations of relevancy (ATTACHMENT 1(d), hereto) or English language

abstracts of the non-English language publications.

2. ☒ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(b):

☐ Within three months of the filing date of a national application other than a continued prosecution application under §1.53(d);

☐ Within three months of the date of entry of the national stage as set forth in §1.491 in an international application;

☐ Before the mailing of the first Office action on the merits;

☒ Before the mailing of a first Office action after the filing of a request for continued examination under §1.114.

3. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(c) after the period specified in 37 C.F.R. §1.97(b), but before the mailing date of any of a final action under 37 C.F.R. §1.113, a notice of allowance under 37 C.F.R. §1.311 or an action that otherwise closes prosecution in the application.

(Check either Item 3a, 3b, 3c or 3d)

3a. ☐ The Certification Statement in Item 5 below is applicable. Accordingly, no fee is required.

3b. ☐ The $240 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

3c. ☐ The $120 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

3d. ☐ The $60 (micro entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

(Items 3b or 3c to be checked if any reference known for more than 3 months)

4. ☐ This Information Disclosure Statement is filed under 37 C.F.R. §1.97(d) after the period specified in 37 C.F.R. §1.97(c), but on or before the date of payment of the issue fee.

(Check Item 4a, and 4b, 4c or 4d)

4a. ☐ The Certification Statement in Item 5 below is applicable.

4b. ☐ The $240 (large entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

4c. ☐ The $120 (small entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account

No. 50-0310 (order no.).

4d. ☐ The $60 (micro entity) fee set forth in 37 C.F.R. §1.17(p) in accordance with 37 C.F.R. §1.97(c) is to be charged to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no.).

5. ☐ Certification Statement (applicable if Item 3a or Item 4a is checked)

(Check either Item 5a, 5b, 5c or 5d)

5a. ☐ In accordance with 37 C.F.R. §1.97(e)(1), it is certified that each item of information contained in this information disclosure statement was first cited in a communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of this Information Disclosure Statement.

5b. ☐ In accordance with 37 C.F.R. §1.97(e)(2), it is certified that no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 C.F.R. §1.56(c) more than three months prior to the filing of this information disclosure statement.

5c. ☐ Each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.

5d. ☐ Pursuant to 37 C.F.R. §1.704(d), each item of information contained in this information disclosure statement was cited in a communication from a foreign patent office in a counterpart application, and the communication was not **received** by any individual designated in 37 C.F.R. §1.56(c) more than thirty days prior to the filing of this information disclosure statement.

6. ☐ Copies of each cited U.S. patent and each U.S. patent application publication are not enclosed pursuant to the USPTO OG Notice dated 05 August 2003 waiving the requirement under 37 C.F.R. 1.98(a)(2)(i) for U.S. patent applications filed after June 30, 2003.

7. ☐ This application is a continuation application under 37 C.F.R. §1.53(b) or (d).

(Check appropriate Items 7a, 7b and/or 7c)

7a. ☐ A Petition to Withdraw from issue under 37 C.F.R. §1.313(b)(5) is concurrently filed herewith.

7b. ☐ Copies of publications listed on Form PTO-1449 from prior application Serial No. , filed on , of which this application claims priority under 35 U.S.C. §120, are not being submitted pursuant to 37 C.F.R. §1.98(d).

7c. ☐ Copies of the publications listed on the attached Form PTO-1449 that were not

previously cited in prior application Serial No. , filed on , are provided herewith.

8. ☐ This is a Supplemental Information Disclosure Statement. (Check Item 8a)

8a. ☐ This Supplemental Information Disclosure Statement under 37 C.F.R. §1.97(f) supplements the Information Disclosure Statement filed on . A bona fide attempt was made to comply with 37 C.F.R. §1.98, but inadvertent omissions were made. These omissions have been corrected herein. Accordingly, additional time is requested so that this Supplemental Information Disclosure Statement can be considered as if properly filed on .

9. ☐ In accordance with 37 C.F.R. §1.98, a concise explanation of what is presently understood to be the relevance of each non-English language publication is:

(Check Item 9a, 9b, or 9c)

9a. ☐ satisfied because all non-English language publications were cited on the enclosed English language copy of the PCT International Search Report or the search report from a counterpart foreign application indicating the degree of relevance found by the foreign office.

9b. ☐ set forth in the application.

9c. ☐ enclosed as an attachment hereto.

10. ☒ The Commissioner is authorized to charge any additional fee required or credit any overpayment for this Information Disclosure Statement and/or Petition to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

11. ☒ No admission is made that the information cited in this Statement is, or is considered to be, material to patentability nor a representation that a search has been made (other than a search report of a foreign counterpart application or PCT International Search Report if submitted herewith). 37 C.F.R. §§1.97(g) and (h).

Respectfully submitted,

Date: March 21, 2019

51,167
Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

Electronic Acknowledgement Receipt

EFS ID:	35497647
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/Edith Fuentes
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066US
Receipt Date:	21-MAR-2019
Filing Date:	28-DEC-2017
Time Stamp:	20:40:25
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		129980-5066US_IDS.pdf	257028 ba7fc593ce72ee1f60d2321401 1499a5f01d5816	yes	5

	Multipart Description/PDF files in .zip description				
	Document Description		**Start**	**End**	
	Information Disclosure Statement (IDS) Form (SB08)		5	5	
	Transmittal Letter		1	4	
Warnings:					
Information:					
2	Non Patent Literature	IPR2018-00303_Final-Written-Decision_21MAR2019.pdf	408339 a12f0fa2e306324aee3fa93202aacb6dc0d6444e	no	25
Warnings:					
Information:					
		Total Files Size (in bytes):	665367		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

79141 7590 03/29/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER
CHERY, MARDOCHEE

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 03/29/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

TITLE OF INVENTION: MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	07/01/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

Samsung Electronics Co., Ltd.
Ex. 1096, p. 182

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), by mail or fax, or via EFS-Web.

By mail, send to: Mail Stop ISSUE FEE
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

79141 7590 03/29/2019
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

TITLE OF INVENTION: MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	07/01/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHERY, MARDOCHEE	2133	711-154000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

Samsung Electronics Co., Ltd.
Ex. 1096, p. 183

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

79141 7590 03/29/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER	
CHERY, MARDOCHEE	
ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 03/29/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Samsung Electronics Co., Ltd.
Ex. 1096, p. 184

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/857,553	Applicant(s) Lee, Hyun	
	Examiner MARDOCHEE CHERY	Art Unit 2133	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the RCE filed 03/01/2019.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-20 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☑ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 03/01/2019.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☑ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	03/15/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 186

DETAILED ACTION

Notice of Pre-AIA or AIA Status

1. The present application is being examined under the pre-AIA first to invent provisions.

Information Disclosure Statement

2. Applicant's Information Disclosure Statement, filed on 03/01/2019 has been received, and entered into the record.

However, it is impractical for the examiner to review the references thoroughly with the number of references cited. By initializing each of the cited references on the accompanying 1449 forms, the examiner is merely acknowledging the submission of the cited references and merely indicating that only a cursory review has been made of the cited references.

MPEP § 2004.13 states: It is desirable to avoid the submission of long lists of documents if it can be avoided. Eliminate clearly irrelevant and marginally pertinent cumulative information. If a long list is submitted, highlight those documents which have been specifically brought to applicant's attention and/or are known to be of most significance. See Penn Yan Boats, Inc. v. Sea Lark Boats, Inc., 359 F. Supp. 948, 175 USPQ 260 (S.D. Fla. 1972), aft 'd, 479 F.2d 1338, 178 USPQ 577 (Sth Cir. 1973), cert. denied, 414 U.S. 874 (1974). But cf. Molins PLC v. Textron Inc., 48 F.3d 1172, 33 USPQ2d 1823 (Fed. Cir. 1995).

Further, it should be noted that an applicant's duty of disclosure of material and information is not satisfied by presenting a patent examiner with "a mountain of largely irrelevant material from which he is presumed to have been able, with his experience and with adequate time, to have found the critical [material]. It ignores the real world conditions under which examiners work." Rohm & Haas Co. v. Crystal Chemical co., 722 F.2d 1556, 1573 [220 USPQ 289] (Fed. Cir. 1983), cert. Denied, 469 U.S. 851 (1984). Patent applicant has a duty not just to disclose pertinent prior art references but to make a disclosure in such a way as not to "bury" it within other disclosures of less relevant prior art; see Golden

Valley Microwave Foods Inc. v. Weaver Popcorn Co. Inc., 24 USPQ2d 180i (N~D. Ind. 1992); Molins PLC v. Textron Inc., 26 USPQ2d 1889, at 1899 (D.Del 1992); Penn Yan Boats, Inc. v. Sea Lark Boats, Inc. et al., 175 USPQ 260, at 272 (S.D. FI. 1972).

Conclusion

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARDOCHEE CHERY whose telephone number is (571)272-4246. The examiner can normally be reached on 900-500.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, **Jared Rutz** can be reached on **(571)272-5535**. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

March 15, 2019

/MARDOCHEE CHERY/
Primary Examiner, Art Unit 2133

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	1694	F	2013-01-01
G11C	/	5	/	04	I	2013-01-01
G11C	/	7	/	1063	I	2013-01-01
G06F	/	13	/	1668	I	2013-01-01
G06F	/	9	/	445	I	2013-01-01
G06F	/	13	/	24	I	2013-01-01
G06F	/	3	/	0619	I	2013-01-01
G06F	/	3	/	0632	I	2013-01-01
G06F	/	3	/	0659	I	2013-01-01
G06F	/	3	/	0673	I	2013-01-01
G06F	/	11	/	1068	I	2013-01-01
G11C	/	29	/	52	I	2013-01-01
G06F	/	12	/	0646	I	2013-01-01
G11C	/	2207	/	2254	A	2013-01-01
G11C	/	5	/	00	A	2013-01-01
G11C	/	7	/	1066	A	2013-01-01
G11C	/	16	/	26	A	2013-01-01
G11C	/	29	/	78	A	2013-01-01
G11C	/	2029	/	4402	A	2013-01-01

CPC Combination Sets								
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	20	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	15 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190315

Samsung Electronics Co., Ltd.
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Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

INTERNATIONAL CLASSIFICATION					
CLAIMED					
	/		/		
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	**SUBCLASS**
711	154

CROSS REFERENCES(S)						
CLASS	**SUBCLASS (ONE SUBCLASS PER BLOCK)**					

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	15 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190315

Samsung Electronics Co., Ltd.
Ex. 1096, p. 191

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19										
	2		11		20										
	3		12												
	4		13												
	5		14												
	6		15												
	7		16												
	8		17												
	9		18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	20	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	15 March 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190315

Samsung Electronics Co., Ltd.
Ex. 1096, p. 192

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

CPC - Searched*		
Symbol	Date	Examiner
G11C5/00 G11C16/26 G11C2029/4402 G11C29/78 G11C7/1066	02/03/2019	MC

CPC Combination Sets - Searched*		
Symbol	Date	Examiner
G11C5/00 G11C16/26 G11C2029/4402 G11C29/78 G11C7/1066	02/03/2019	MC

US Classification - Searched*			
Class	Subclass	Date	Examiner
711	154	02/03/2019	MC

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	Date	Examiner
EAST Search	08/22/2018	MC
EAST Updated	02/03/2019	MC
EAST Updated	03/15/2019	MC

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	See attached	02/03/2019	MC

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	02/04/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 193

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	1	of	8	Attorney Docket Number	***129980-5066-US***

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.[1]	Document Number Number - Kind Code[2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		3,414,781	12-03-1968	Dill	
		3,560,935	02-02-1971	Beers	
		4,672,570	06-09-1987	Benken	
		5,388,074	02-07-1995	Buckenmaier	
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		2005/0071580 A1	03-31-2005	LeClerg et al.	

Examiner Signature		Date Considered	

DB2/ 35663151.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C/

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	2	of	8	Attorney Docket Number	***129980-5066-US***

		2005/0193161 A1	09-01-2005	Lee et al.	
		2006/0062047 A1	03-23-2006	Bhakta et al.	
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FOREIGN PATENT DOCUMENTS

Examiner Initials	Cite No.	Foreign Patent Document Country Code[3] – Number[4] - Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published
		Inter partes review Case No. IPR2017-00548, Petition For Inter Partes Review Of U.S. Patent No. 8,489,837, filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Power of Attorney of Petitioners, filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1002 "File History", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1003 "Declaration of Donald Alpert", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1004 "Camelback Computer Architecture", filed December 30, 2016.

Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

DB2/ 35663151.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	3	of	8	Attorney Docket Number	***129980-5066-US***

		Inter partes review Case No. IPR2017-00548, Exhibit 1006 "Provisional-Application-61186799", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Exhibit 1010 "5400 MCH Datasheet", filed December 30, 2016
		Inter partes review Case No. IPR2017-00548, Exhibit 1011 "Microsoft Computer Dictionary (5th Ed. 2002)", filed December 30, 2016.
		Inter partes review Case No. IPR2017-00548, Notice of Filing Date Accorded to Petition, Mailing date January 9, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Mandatory Notices, filed January 20, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Power of Attorney, filed January 20, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Preliminary Response filed April 9, 2017.
		Inter partes review Case No. IPR2017-00548, Trial Instituted document dated May 15, 2017.
		Inter partes review Case No. IPR2017-00548, Decision, entered May 15, 2017.
		Inter partes review Case No. IPR2017-00548, Scheduling Order, entered May 15, 2017.
		Inter partes review Case No. IPR2017-00548, Notice of Deposition of Dr. Donald Alpert, filed July 31, 2017.
		Inter partes review Case No. IPR2017-00548, Joint Notice of Stipulation to Adjust Schedule, filed August 7, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Response, filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2001 - Declaration Of Robert J. Murphy, filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2002 - DEPOSITION OF DONALD ALPERT, Ph.D. filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2003 - Defendants' Opening Claim Construction Brief filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2004 - PLAINTIFF NETLIST, NC.'S OPENING CLAIM CONSTRUCTION BRIEF filed September 6, 2017.

Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

DB2/ 35663151.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	4	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2005 - PLAINTIFF NETLIST, NC.'S AMENDED OPENING CLAIM CONSTRUCTION BRIEF filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2006 - DEFENDANTS' REPLY CLAIM CONSTRUCTION BRIEF filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2007 - PLAINTIFF NETLIST, NC.'S RESPONSIVE CLAIM CONSTRUCTION BRIEF filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2008 - UNITED STATES INTERNATIONAL TRADE COMMISSION Open Sessions filed September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2009 - Computer Desktop Encyclopedia September 6, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Petitioner's Objections to Evidence, filed September 13, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Notice of Deposition of Robert J. Murphy, filed September 25, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Deposition of Robert J. Murphy, filed December 11, 2017.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Petitioner's Reply to Patent Owner's Response, filed December 13, 2017.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Updated Mandatory Notices, filed January 3, 2018.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Request for Oral Argument, filed January 9, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Request for Oral Argument, filed January 9, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Motion to Exclude, filed January 9, 2018.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Opposition to Petitioner's Motion to Exclude, filed January 23, 2018.
		Inter partes review Case No. IPR2017-00548, Order, Trial Hearing, entered January 25, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Reply in Support of Its Motion to Exclude, filed January 30, 2018.

Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

DB2/ 35663151.1

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /M.C/

INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	5	of	8	Attorney Docket Number	***129980-5066-US***

		Inter partes review Case No. IPR2017-00548, Petitioner's Updated Exhibit List, filed February 9, 2018.
		Inter partes review Case No. IPR2017-00548, Patent Owner's Updated Exhibit List, filed February 9, 2018.
		Inter partes review Case No. IPR2017-00548, Petitioner's Demonstratives, filed February 9, 2018.
		Inter Partes Review of U.S. Patent No. 8,489,837, Case No. IPR2017-00548, Exhibit 2012 – Demonstratives of Patent Owner Netlist, Inc., filed February 9, 2018.
		Inter partes review Case No. IPR2017-00548, Record of Oral Hearing, held February 14, 2018.
		Inter partes review Case No. IPR2017-00548, Final Written Decision, entered May 3, 2018.
		Lee, Office Action, US15/088,115, 20MAY2016, 10 pgs.
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		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Objections to Petition Evidence, filed June, 8,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Objections To Evidence, filed June, 8,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Response, filed August,10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioner's Objection to Evidence, filed August, 21,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Reply to Patent Owner's Response, filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Objections To Reply Evidence, filed November, 19,2018

Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	6	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners Motion to Exclude, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Request for Oral Argument, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Request For Oral Argument, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Submission Of ITC Claim Construction Order, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Motion To Exclude, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners Opposition to Patent Owner's Motion to Exclude, filed December, 14,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner's Opposition to Petitioner's Motion to Exclude Evidence, filed December, 14,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Reply in Support of its Motion to Exclude, filed December, 21,2018
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		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Patent Owner Demonstratives, filed February, 4,2019
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Petitioners' Demonstratives, filed February, 4,2019
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Notice of Accord Filing Date - Defective Petition, filed December, 19,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Notice of Accepting Corrected Petition, filed December, 19,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Trial Instituted Document, filed May, 24,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Conduct of the Proceeding 37 C.F.R. § 42.5, filed November, 30,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Order - Trial Hearing - 37 CFR 42.70, filed January 16, 2019
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Hearing Transcript, filed February, 26,2019

Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	7	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2001, 'Exhibit 2001,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2002, 'Exhibit 2002,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2003, 'Exhibit 2003,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2004, 'Exhibit 2004,' filed March, 19,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2005, 'Exhibit 2005,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2006, 'Exhibit 2006,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2007, 'Exhibit 2007,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2008, 'Exhibit 2008,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2009, 'Exhibit 2009,' filed August, 10,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 2010, 'Exhibit 2010,' filed November, 30,2018
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		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1003, 'Declaration of Donald Alpert,' filed December, 4,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1003, 'Corrected Declaration of Donald Alpert,' filed December, 19,2017
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1030, 'Declaration of Brian Nester PHV,' filed October, 18,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1032, 'Annotated Page 37 of Ex. 2005,' filed November, 9,2018

Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 1, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	8	of	8	Attorney Docket Number	***129980-5066-US***

		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1034, 'ITC Expert Report of Robert Mr. Murphy Regarding 623 Patent (Public Version),' filed November, 9,2018
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, EXHIBITS 1033, 'Annotated Page 18 of Ex. 2005,' filed November, 9,2018
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Examiner Signature	/MARDOCHEE CHERY/	Date Considered	03/15/2019

DB2/ 35663151.1

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	142	("3414781" "3560935" "4672570" "5388074" "5438536" "5511152" "5450576" "5606662" "5684979" "5835733" "6693840" "6754787" "6763437" "6886109" "7024518" "7065688" "7093115" "7155579" "7221699" "7266633" "7489163" "7525860" "7539909" "7568130" "7586350" "7647467" "7757101" "8074034" "8139430" "8359521" "8429493" "20030115427" "20050071580" "20050193161" "200600062047" "20060262586" "20070091702" "20070136523" "20070214347" "20080098277" "20080147897" "20080155378" "20080256281" "20090119464" "20100005218" "20100042778" "20100142383" "20100202240" "20110022789").pn.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/03/15 13:19
L2	7	1 and (controller microcontroller micro-controller) same (memory $3RAM) with (read write pre-charg$3 precharg$3 refresh$3) and (transistor $3FET drain$3) same (controller device microcontroller micro-controller) and drain$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/03/15 13:19
L3	714	"2" and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/03/15 13:20
L4	4	1 and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/03/15 13:20
L5	6	2 and (open$3 near2 drain)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/03/15 13:20

3/15/2019 1:23:20 PM
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Ex. 1096, p. 203

Doc Code: ECOMM.AUTH/ECOMM.WTDW
Doc Description: Internet Communications Authorized/Internet Communications Authorization Withdrawn

PTO/SB/439 (11-15)

AUTHORIZATION FOR INTERNET COMMUNICATIONS IN A PATENT APPLICATION OR REQUEST TO WITHDRAW AUTHORIZATION FOR INTERNET COMMUNICATIONS		
	Application No.	15/857,553
	Filing Date	December 28, 2017
	First Named Inventor	Hyun Lee
	Art Unit	2133
	Examiner Name	CHERY, MARDOCHEE
	Practitioner Docket No.	129980-5066-US

To: Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I. To authorize permission for Internet Communications.

☑ Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via video conferencing, instant messaging, or electronic mail. I understand that a copy of these communications will be made of record in the application file. (MPEP 502.03)

II. To withdraw authorization for Internet Communications.

☐ The authorization given on _____, to the USPTO to communicate with the undersigned and any practitioner in accordance with 37 CFR 1.33 and 37 CFR 1.34 concerning any subject matter of this application via Internet communications such as video conferencing, instant messaging, or electronic mail is hereby withdrawn. I understand that the withdrawal is effective when approved rather than when received.

I am the

☐ applicant.

☑ attorney or agent of record. Registration number 51,167.

☐ attorney or agent acting under 37 CFR 1.34. Registration number _____.

/Jamie J. Zheng/ — Signature

May 15, 2019 — Date

Jamie J. Zheng — Typed or printed name

(650) 843-7249 — Telephone Number

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Juristic entities must be represented by a patent practitioner (see 37 CFR 1.31, which is applicable to any paper filed on or after September 16, 2012, that is presented on behalf of a juristic entity, regardless of application filing date). Submit multiple forms if more than one signature is required, see below*.

☑ * Total of 1 forms are submitted.

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The information provided by you in this form will be subject to the following routine uses:

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8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
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Electronic Acknowledgement Receipt

EFS ID:	36025900
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/S. Olivier
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066US
Receipt Date:	15-MAY-2019
Filing Date:	28-DEC-2017
Time Stamp:	18:25:59
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Internet Communications Authorized	129980_5066US_Internet_authorization.PDF	100105 08cbd1106f475ae963af6f9f9be0174c1c6dfb2e	no	2

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This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/857,553	12/28/2017	2133	1880	129980-5066US	7	1

CONFIRMATION NO. 5811

CORRECTED FILING RECEIPT

79141
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

OC000000108460991

Date Mailed: 05/28/2019

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

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Inventor(s)

Hyun Lee, Ladera Ranch, CA;

Applicant(s)

Netlist, Inc., Irvine, CA;

Power of Attorney: The patent practitioners associated with Customer Number 79141

Domestic Priority data as claimed by applicant

This application is a CON of 15/088,115 04/01/2016 PAT 9858218
which is a CON of 13/942,721 07/16/2013 PAT 9311116
which is a CON of 12/815,339 06/14/2010 PAT 8489837
which claims benefit of 61/186,799 06/12/2009

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/23/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/857,553**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE

Preliminary Class

711

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

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Title 37, Code of Federal Regulations, 5.11 & 5.15

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The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

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UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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P.O. Box 1450
Alexandria, Virginia 22313-1450
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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066US	5811

79141 7590 05/29/2019
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER
CHERY, MARDOCHEE

ART UNIT	PAPER NUMBER
2133	

NOTIFICATION DATE	DELIVERY MODE
05/29/2019	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

padocketingdepartment@morganlewis.com
vskliba@morganlewis.com

UNITED STATES PATENT AND TRADEMARK OFFICE

Commissioner for Patents
United States Patent and Trademark Office
P.O. Box 1450
Alexandria, VA 22313-1450
www.uspto.gov

Application No. : 15857553
Applicant : Lee
Filing Date : 12/28/2017
Date Mailed : 05/29/2019

NOTICE TO FILE CORRECTED APPLICATION PAPERS

Notice of Allowance Mailed

This application has been accorded an Allowance Date and is being prepared for issuance. The application, however, is incomplete for the reason below.

Applicant is given two (2) months from the mail date of this Notice within which to respond. This time period for reply is extendable under 37 CFR 1.136(a) for only TWO additional MONTHS.

The application is not in compliance with 37 CFR 1.46(c), as indicated in the attachment. The request under § 1.46(c)(1) to correct or update the name of the applicant or the request under § 1.46(c)(2) to change the applicant was improper and was mistakenly accepted by the Office.

If applicant fails to respond within the above-identified time period and in accordance with the attachment, the Office record will be changed to show the applicant information that was established prior to the filing of the request under § 1.46(c), a corrected application filing receipt showing the previously established applicant information will be sent to the applicant, and the previously established applicant information will be printed on the patent.

A copy of this notice MUST be returned with the reply. Please address response to "Mail Stop Issue Fee, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450".

/Heather Laughrey/
Publication Branch
Office of Data Management
(571) 272-4200

Application No. 15857553

APPLICATION FILED ON OR AFTER SEPTEMBER 16, 2012,
NOT IN COMPLIANCE WITH 37 CFR 1.46(c)

The § 1.46(c) request identified below was improper for the reason(s) indicated below and was mistakenly accepted by the Office. The corrected/updated applicant name or the change of applicant was mistakenly printed on the application filing receipt dated 12/03/2018.

The request filed under § 1.46(c)(1)[1] to **correct or update the name of the applicant** or under § 1.46(c)(2) to **change the applicant** was improper for the reason(s) indicated below:

- ☐ No application data sheet under § 1.76 specifying the correct or updated name of the applicant in the applicant information section in accordance with § 1.76(c)(2) was filed.
- ☐ An application data sheet was filed but it did not comply with § 1.76(c)(2) in that underlining was not used for insertions and/or strike-through or brackets was not used for text removed.
- ☐ An application data sheet was filed but it was not signed.
- ☐ An application data sheet was filed and signed but it was not signed in accordance with §1.76(e) and §1.33(b).
- ☐ Other:

The request filed 11/28/2018 under § 1.46(c)(2)[2] to **change the applicant** was improper for the reason(s) indicated below:

- ☒ No statement under §3.73(c) was filed.
- ☐ A statement under § 3.73(c) was filed but it did not identify the assignee as required by § 3.73(c)(1).
- ☐ A statement under § 3.73(c) was filed but it neither provided documentary evidence of chain of title in accordance with § 3.73(c)(1)(i) nor provided a statement specifying the location (reel and frame number) in the Office's assignment records of such documentary evidence of chain of title.
- ☐ A statement under § 3.73(c) was filed but it did not include the statement as required by § 3.73(d)(1).
- ☐ A statement under § 3.73(c) was filed but it was not signed.
- ☐ A statement under § 3.73(c) was filed and signed but it was not signed in accordance with § 3.73(d)(2) or (d)(3)
- ☐ Other:

Depending on the request above, a timely response to this notice must include one of the following:

[1]For 1.46(c)(1): A compliant application data sheet
[2]For 1.46(c)(2): A compliant application data sheet and a compliant § 3.73(c) statement

It should also include a transmittal letter requesting that the Office continue to recognize the applicant information as printed on the above-identified application filing receipt and that the Office print the patent accordingly.

GENERAL POWER OF ATTORNEY BY APPLICANT FOR UNITED STATES PATENT

I hereby revoke all previous powers of attorney given in the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent).

I hereby appoint the practitioner associated with the following Customer Number :

79141

as my/our attorney or agent, and to transact all business in the United States Patent and Trademark Office in connection with the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent).

Please recognize or change the **correspondence address** for the application referenced in the attached transmittal letter to the address associated with the above-mentioned **Customer Number.**

I am the Applicant:

☐ Inventor or Joint Inventor

☐ Legal Representative of a Deceased or Legally Incapacitated Inventor

■ Assignee or Person to Whom the Inventor is Under an Obligation to Assign

☐ Person Who Otherwise Shows Sufficient Proprietary Interest (e.g., a petition under 37 CFR 1.46(b)(2) was granted in the application or is currently being filed in this document)

SIGNATURE of Applicant for Patent

Signature		Date: January 9, 2013
Name	**Gail Sasaki**	
Title	Vice President and Chief Financial Officer	
Company	Netlist, Inc.	

Note: Signature - this form must be signed by the Applicant or a person authorized to act on behalf of Applicant.

Submit multiple forms for more than one signature
Total of __ forms are submitted.

Electronically filed June 4, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit	2133
Filed:	December 28, 2017	Examiner:	Chery, Mardochee
For:	TITLE OF INVENTION: MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No.:	129980-5066-US

STATEMENT UNDER 37 C.F.R. § 3.73(c)

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Netlist, Inc., a corporation, states that it is the assignee of the entire right, title and interest in the patent application/patent identified above by virtue of an assignment from the inventor(s) of the parent of the patent application/patent identified above.

The assignment was recorded in the United States Patent and Trademark Office on November 15, 2017 at Reel 044140, Frame 0019, or for which a copy thereof is attached.

The undersigned is authorized to act on behalf of the assignee.

Date: June 4, 2019

/Jamie J. Zheng/ 51,167
Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

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Ex. 1096, p. 216

Electronically filed: June 4, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of: Hyun Lee		Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
	December 28, 2017	Examiner:	CHERY, MARDOCHEE
Filed: For:	TITLE OF INVENTION: MEMORY MODULE CONFIGURABLE TO HANDSHAKE WITH A MEMORY CONTROLLER	Attorney Docket No.:	129980-5066-US

RESPONSE TO NOTICE TO FILE CORRECTED APPLICATION PAPERS

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

The enclosed Amendment is being filed to address informalities identified on a Notice To File Corrected Application Papers dated May 29, 2019 (the "Notice").

Applicant believes that no additional fees are necessitated by the present Amendment, however, if any such fees are due, the Commissioner is hereby authorized to charge them to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

REMARKS

Statement under §3.73(c) is attached with a copy of the power of attorney as filed November 28, 2018.

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CONCLUDING REMARKS

Entry of this amendment is respectfully requested.

The Examiner may contact the undersigned attorney by email (Jamie.zheng@morganlewis.com) or by telephone (650.843.7249) to arrange a suitable time for discussing any remaining items.

Respectfully submitted,

Date: June 4, 2018

/ Jamie J. Zheng / 51167

Jamie J. Zheng (Reg. No.)
MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
(650) 843-4000

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Electronic Acknowledgement Receipt

EFS ID:	36202250
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/S. Olivier
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066US
Receipt Date:	04-JUN-2019
Filing Date:	28-DEC-2017
Time Stamp:	18:43:27
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		129980_5066US_STMT_POA.pdf	146529 9b9e4aa5f72a34bd6b48281cf3806ec1f990265 4	yes	2

	Multipart Description/PDF files in .zip description				
	Document Description		Start	End	
	Power of Attorney		2	2	
	Assignee showing of ownership per 37 CFR 3.73		1	1	
Warnings:					
Information:					
2	Power of Attorney	129980_5066US_Response.pdf	117293 22aefcdf9bc0cb262584f96b179c8c279ff0eff1	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	263822		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/857,553	12/28/2017	Hyun Lee	129980-5066-US

CONFIRMATION NO. 5811

79141
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

POA ACCEPTANCE LETTER

OC000000108695313

Date Mailed: 06/06/2019

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 06/04/2019.

The Power of Attorney in this application is accepted. Correspondence in this application will be mailed to the above address as provided by 37 CFR 1.33.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/kpowell/

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REQUEST FOR CONTINUED EXAMINATION (RCE) TRANSMITTAL

Address to:
Mail Stop RCE
Commissioner of Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Electronically filed	July 1, 2019
Application Number	15/857,553
Filing Date	December 28, 2017
First Named Inventor	Hyun Lee
Art Unit	2133
Examiner Name	CHERY, MARDOCHEE
Attorney Docket No.	129980-5066-US

This is a Request for Continued Examination (RCE) under 37 C.F.R. § 1.114 of the above-identified application. Request for Continued Examination (RCE) practice under 37 CFR 1.114 does not apply to any utility or plant application filed prior to June 8, 1995, or to any design application.

1. Submission required under 37 C.F.R. § 1.114

NOTE: If the RCE is proper, any previously filed unentered amendments and amendments enclosed with the RCE will be entered in the order in which they were filed unless applicant instructs otherwise. If applicant does not wish to have any previously filed unentered amendment(s) entered, applicant must request non-entry of such amendment(s).

a. ☐ Previously submitted. If a final Office Action is outstanding, any amendments filed after the final Office Action may be considered as a submission.
   i. ☐ Request for non-entry of amendment: Please **do not** entered the amendment submitted on _____
   ii. ☐ Consider the arguments in the Appeal Brief or Reply Brief previously filed _____
   iii. ☐ Other _____

b. ☒ Enclosed
   i. ☒ Amendment/Reply
   ii. ☐ Affidavit(s)/Declaration(s)
   iii. ☐ Information Disclosure Statement (IDS)
   iv. ☐ Other _____

2. Miscellaneous

a. ☐ Suspension of action on the above-identified application is requested under 37 C.F.R. § 1.103(c) for a period of _____ months. (Period of suspension shall not exceed 3 months; Fee under 37 C.F.R. § 1.17(i) required)

b. ☐ Other _____

3. Fees — The RCE fee under 37 C.F.R. § 1.17(e) is required by 37 C.F.R. § 1.114 when the RCE is filed.

a. ☒ The Director is hereby authorized to charge the following fees, any underpayment of fees, or credit any overpayments, to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).
   i. ☐ (1st request) RCE fee required under 37 C.F.R. § 1.17(e)(1), estimated to be $1300 (large entity) or $650 (small entity)
   ii. ☒ (2nd or subsequent request) RCE fee required under 37 C.F.R. § 1.17(e)(2), estimated to be **$1900 (large entity)** or $950 (small entity)
   iii. ☐ Extension of time fee required under 37 C.F.R. §§ 1.136 and 1.17, estimated to be $ for a month(s) extension, the request for which is being made herewith
   iv. ☒ Other Extra claim fees

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT REQUIRED

Name (Print/Type)	Jamie J. Zheng	*Registration No. (Attorney/Agent)*	51,167
Signature	/ Jamie J. Zheng /	*Date*	July 1, 2019

CERTIFICATE OF MAILING OR TRANSMISSION

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Mail Stop RCE, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, or by facsimile transmitted to fax no. 1-703- to the U.S. Patent and Trademark Office on the date indicated below.

Name (Print/Type)		*Registration No. (Attorney/Agent)*	
Signature		*Date*	

Electronically filed July 1, 2019

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application of:	Hyun Lee	Confirmation No.:	5811
Serial No.:	15/857,553	Art Unit:	2133
Filed:	December 28, 2017	Examiner:	Chery, Mardochee
For:	*MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE*	Attorney Docket No.: 129980-5066-US Date: July 1, 2019	

AMENDMENT AND REQUEST FOR CONTINUED EXAMINATION

Mail Stop: Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

Applicant files herewith an Amendment and Request for Continued Examination in the above identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Morgan, Lewis & Bockius LLP Deposit Account No. 50-0310 (order no. 129980-5066-US).

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Amendments to the Claims

The following listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and ~~command~~ control signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board ~~and configurable to communicate data signals with the memory controller via the first edge connections~~;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection; and

wherein the memory module is ~~operable~~ configurable to operate in any of at least a first mode and a second mode;

wherein the memory module in the first mode is configurable to perform one or more normal memory read or write operations by communicating data signals via the first edge connections in response to address and control ~~command~~ signals received via the second edge connections, wherein the memory module in the second mode is not accessed by the memory controller for normal memory read or write operations, and wherein the memory module in the second mode is ~~configurable to undergo training with~~ configurable to perform operations related to one or more training sequences ~~while the first edge connections are not active~~;

wherein the module controller is configurable to receive via the second edge connections the address and ~~command~~ control signals associated with the one or more normal memory read or write operations ~~and to control~~, wherein the dynamic random access memory elements are configurable to communicate data signals with the memory controller via the first edge

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Ex. 1096, p. 224

connections in accordance with the address and ~~command~~ control signals, and wherein the module controller is further configurable to output via the open drain output and the error edge connection a signal indicating a parity error having occurred while the memory module is in the first mode;

wherein the module controller in the second mode is further configurable to provide information related to the one or more training sequences by ~~outputting a signal via~~ driving the open drain output and the error edge connection to a first state or to a second state, one of the first state and the second state being a low logic level and the other one of the first state and the second state being a high impedance state ~~while the memory module is in the second mode~~.

2. (Original) The memory module of claim 1, wherein the module controller comprises an integrated circuit.

3. (Currently Amended) The memory module of claim 1, wherein the module controller includes a notification circuit comprising a transistor ~~one or more transistors each~~ having an open drain coupled to the open drain output and a source coupled to ground.

4. (Currently Amended) The memory module of claim 3, wherein the module controller is configurable to drive a gate of the transistor high so as to drive the open drain output and the error edge connection to ground, or to drive the gate of the transistor low so as to drive the open drain output and the error edge connection to the high impedance state ~~output to the memory controller the signal related to the one or more training sequences by driving a gate of each of the one or more transistors from a first logic level to a second logic level~~.

5. (Currently Amended) The memory module of claim 4, wherein the module controller is configurable to output the ~~parity error~~ signal indicating a parity error having occurred by driving the gate of the transistor high ~~each of the one or more transistors to a logic high level~~ to provide a low impedance path between the open drain output and the ~~to~~ ground.

6. (Currently Amended) The memory module of claim 3 ~~5~~, wherein the notification circuit further includes a multiplexor or a logic circuit having an output coupled to a gate of the transistor and configurable to drive the gate of the transistor with either a first signal related to

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the parity error or a second signal related to the one or more training sequences ~~one or more logic elements selected from the group consisting of AND, OR, NOR, NAND, and XOR gates~~.

7. (Currently Amended) The memory module of claim ~~3~~ ~~1~~, wherein the module controller is configurable to provide the information ~~output the signal~~ related to the one or more training sequences by driving a gate of the transistor with the second signal so as to drive the open drain output from the high impedance state to ground or from ground to the high impedance state ~~a first logic state to a second logic state~~.

8. (Currently Amended) The memory module of claim 1, wherein the second edge connections include one or more ~~read/write~~ pins that are not active while the memory module is in the second mode.

9. (Previously Presented) The memory module of claim ~~1~~ ~~8~~, wherein the memory module in the second mode is configurable to perform the operations related to the one or more training sequences without communicating data signals via the first edge connections ~~second edge connections include one or more high-order address pins that are not active~~ while the memory module is in the second mode.

10. (Currently Amended) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and control ~~command~~ signals, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board ~~and configurable to communicate data signals with the memory controller via the first edge connections~~;

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller having an open drain output coupled to the error edge connection and configurable to drive the open drain output from a first state to a second state and from the second state to the first state, one of the first state and the second state being a

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Ex. 1096, p. 226

low logic level, and the other one of the first state and the second state being a high impedance state; and

wherein the memory module is operable in at least a first mode in which the memory module is configurable to perform one or more memory read or write operations by communicating data signals via the first edge connections in response to address and ~~command~~ control signals received via the second edge connections, and a second mode in which ~~at least the first edge connections are not active and~~ the memory module is not accessed by the memory controller for memory read or write operations, and wherein the memory module in the second mode is configurable to ~~undergo training with~~ perform operations related to one or more training sequences without communicating data signals via the first edge connections;

wherein the module controller in the first mode is configurable to receive via the second edge connections the address and ~~command~~ control signals associated with the one or more memory read or write operations ~~and to control~~, wherein the dynamic random access memory elements are configurable to communicate data signals with the memory controller via the first edge connections in accordance with the address and ~~command~~ control signals, and wherein the module controller in the first mode is further configurable to output via the open drain output and the error edge connection a signal indicating a parity error having occurred in the memory module while the memory module is in the first mode;

wherein the module controller in the second mode is further configurable to output to the memory controller ~~a signal~~ open-drain signals related to the one or more training sequences via the open drain output and the error edge connection while the memory module is in the second mode.

11. (Previously Presented) The memory module of claim 10, wherein the module controller comprises an integrated circuit.

12. (Currently Amended) The memory module of claim 10, wherein the module controller includes a notification circuit having a transistor with ~~one or more transistors each having~~ an open drain coupled to the open drain output and a source coupled to ground, wherein the module controller is configurable to output to the memory controller the ~~signal~~ open-drain signals related to the one or more training sequences by driving a gate of the transistor high so as to drive the open drain output and the error edge connection to ground, and by driving the gate of the

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transistor low so as to drive the open drain output and the error edge connection to the high impedance state ~~each of the one or more transistors from a first logic level to a second logic level~~, and wherein the notification circuit is configurable to output the ~~parity error~~ signal indicating a parity error having occurred by driving the gate of the transistor high ~~each of the one or more transistors to a logic high level~~ to provide a low impedance path between the open drain output ~~to~~ and ground.

13. (Currently Amended) The memory module of claim 12, wherein the notification circuit further includes a multiplexor or a logic circuit having an output coupled to the gate of the transistor and configurable to drive the transistor with either a first signal related to the parity error or a second signal related to the one or more training sequences ~~one or more logic elements selected from the group consisting of AND, OR, NOR, NAND, and XOR gates~~.

14. (Currently Amended) The memory module of claim 10, wherein the module controller is configurable to output the ~~signal~~ open-drain signals related to the one or more training sequences by driving the open drain output from the high impedance state to the low logic level or from the low logic level to the high impedance state ~~a first logic state to a second logic state~~.

15. (Currently Amended) The memory module of claim 10, wherein the second edge connections include one or more ~~read/write~~ pins that are not active while the memory module is in the second mode.

16. (Previously Presented) The memory module of claim 10, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is in the second mode.

17. (Currently Amended) A method, ~~of operating a memory module coupled with a memory controller of a host system, the memory module including a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and command signals, and an error edge connection in addition to the first edge connections and the second edge connections, the~~

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~~memory module further including dynamic random access memory elements on the printed circuit board and configurable to communicate data signals with the memory controller via the first edge connections, the method~~ comprising:

at a memory module coupled with a memory controller of a host system, the memory module including a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections via which the memory module receives or outputs data signals, second edge connections via which the memory module receives address and control signals, and an error edge connection in addition to the first edge connections and the second edge connections, the memory module further including dynamic random access memory elements on the printed circuit board:

receiving via the second edge connections address and control signals associated with one or more memory read or write operations;

controlling the dynamic random access memory elements to communicate data signals corresponding to the one or more memory read or write operations via the first edge connections in response to the address and ~~command~~ control signals ~~received by the memory module via the second edge connections~~;

outputting via an open drain output ~~and~~ coupled to the error edge connection a signal indicating a parity error having occurred in the memory module while the memory module is ~~performing the one or more~~ being accessed by the memory controller for a memory read or write operation;

~~training the memory module with~~ performing operations related to one or more training sequences~~, wherein at least the first edge connections are not active~~ while the memory module is not accessed by the memory controller for memory read or write operations ~~trained with the one or more training sequences~~; and

outputting to the memory controller via the open drain output and the error edge connection ~~a signal to provide information~~ open-drain signals related to the one or more training sequences ~~to the memory controller while the memory module is not accessed by the memory controller for~~ and unrelated to any memory read or write operation.

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18. (Currently Amended) The method of claim 17, wherein the second edge connections include one or more ~~read/write~~ pins that are not active while the memory module is trained with the one or more training sequences.

19. (Previously Presented) The method of claim 18, wherein the second edge connections include one or more high-order address pins that are not active while the memory module is trained with the one or more training sequences.

20. (Currently Amended) The method of claim 17, wherein the memory module includes a notification circuit having ~~one or more transistors each having~~ a transistor with an open drain coupled to the open drain output and a source coupled to ground, wherein outputting via an open drain output ~~and~~ coupled to the error edge connection a signal indicating a parity error having occurred in the memory module comprises driving a gate of the transistor high ~~each of the one or more transistors to a logic high level~~ to provide a low impedance path between the open drain output and ~~to~~ ground, and wherein outputting ~~a signal to provide information~~ the open-drain signals related to the one or more training sequences and unrelated to any memory read or write operation comprises driving the gate of the transistor to drive the open drain output from a high impedance state to ground and from ground to the high impedance state ~~a gate of each of the one or more transistors from a first logic level to a second logic level~~.

21. (New) A memory module operable with a memory controller of a host system, comprising:

a printed circuit board having edge connections that fit into a corresponding slot of the host system so as to be in electrical communication with the memory controller, the edge connections including first edge connections, second edge connections, and an error edge connection in addition to the first edge connections and the second edge connections;

dynamic random access memory elements on the printed circuit board; and

a module controller on the printed circuit board and coupled to the dynamic random access memory elements, the module controller including a transistor having a gate and an open drain output coupled to the error edge connection;

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wherein the module controller is configurable to drive the gate of the transistor so as to drive the open drain output to a first state or a second state, the first state being a low logic level and the second state being a high impedance state;

wherein the module controller is configurable to receive via the second edge connections memory commands associated with normal memory read or write operations and to output a set of address and control signals for each of the normal memory read or write operations;

wherein the dynamic random access memory elements are configurable to communicate one or more N-bit-wide data signals with the memory controller via the first edge connections in response to the set of address and control signals, where N is at least 32;

wherein the module controller is further configurable to output via the open drain output and the error edge connection a signal indicating a parity error having occurred during any of the memory read or write operations by driving the open drain output and the error edge connection to the first state;

wherein the memory module is configurable to perform operations related to one or more training sequences while the memory module is not accessed by the memory controller for memory read or write operations; and

wherein the module controller is configurable to provide information related to the one or more training sequences by driving the open drain output and the error edge connection from one of the first state and the second state to the other one of the first state and the second state.

22. (New) The memory module of claim 21, wherein the module controller further includes a multiplexor or a logic circuit having an output coupled to the gate of the transistor, and wherein the module controller is configurable to drive the gate of the transistor with either a first signal related to the parity error or a second signal related to the one or more training sequences.

23. (New) The memory module of claim 22, wherein the transistor has a source coupled to ground, wherein the module controller is configurable to output the signal indicating a parity error having occurred by driving the gate of the transistor high to provide a low impedance path between the open drain output and ground, and wherein the module controller is configurable to provide the information related to the one or more training sequences by driving the open drain output from a high impedance state to ground or from ground to the high impedance state.

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24. (New) The memory module of claim 21, wherein the memory module is configurable to perform the operations related to the one or more training sequences while the memory module is not communicating signals via the first edge connections.

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REMARKS

This amendment is in response to the Notice of Allowance dated March 29, 2019, and is filed with a Request for Continued Examination.

Claims 1, 3-8, 10, 12-15, 17-18, and 20 have been amended. New claim 21-24 are presented.

Support for the amendments can be found throughout the specification and drawings of the application as filed (e.g., paragraphs [0016], [0018], [0019], [0035]-[0037], and [0040]). No new matter has been added.

After entry of this amendment, the pending claims are: claims 1-24.

The Examiner is invited to call the undersigned attorney at (650) 843-4000, if a telephone call could help resolve any remaining items.

Respectfully submitted,

Date: July 1, 2019

/Jamie J. Zheng/ 51,167

Jamie J. Zheng (Reg. No.)

MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304
Phone: (650) 843-4000

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Electronic Patent Application Fee Transmittal

Application Number:	15857553
Filing Date:	28-Dec-2017
Title of Invention:	MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng/S. Olivier
Attorney Docket Number:	129980-5066-US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	1202	4	100	400
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
RCE- 2ND AND SUBSEQUENT REQUEST	1820	1	1900	1900
		Total in USD ($)		**2300**

Electronic Acknowledgement Receipt

EFS ID:	36470493
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/S. Olivier
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066-US
Receipt Date:	01-JUL-2019
Filing Date:	28-DEC-2017
Time Stamp:	20:26:45
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$2300
RAM confirmation Number	070219INTEFSW00007036500310
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		129980_5066US_RCE_AMEND.pdf	200047 6059be2674e1facb44e520db618b1e2c6d1b2e2b	yes	14

Multipart Description/PDF files in .zip description

Document Description	Start	End
Request for Continued Examination (RCE)	1	1
Response After Final Action	2	2
Specification	3	4
Claims	5	13
Applicant Arguments/Remarks Made in an Amendment	14	14

Warnings:

Information:

2	Fee Worksheet (SB06)	fee-info.pdf	32418 dea21b9534114c56911ebe8d7f92becd637e1db5	no	2

Warnings:

Information:

Total Files Size (in bytes):	232465

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If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE SPECIFICATION

Please replace the Title of the application with the following:

MEMORY MODULE HAVING AN OPEN-DRAIN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE

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Please replace the Abstract of the Disclosure with the following:

According to certain aspects, a memory module is coupled to a memory controller of a host computer system via an interface. The memory module is operable in at least a second mode and a first mode. The memory module in the second mode is configured to perform training related to ~~be trained with~~ one or more training sequences initiated by the memory controller while the memory module is not accessed by the memory controller for memory read or write operations. The memory module in the first mode is configured to perform one or more memory read or write operations not associated with the one or more training sequences by communicating data signals with the memory module. The memory module has an open-drain output pin via which the memory module output a signal indicating a parity error having occurred while the memory module is performing a normal memory read or write operation ~~in the first mode~~, and via which the memory module output a signal related to the one or more training sequences ~~in the second mode~~.

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PTO/SB/06 (09-11)
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PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/857,553	Filing Date 12/28/2017	☐ To be Mailed

ENTITY: ☑ LARGE ☐ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $80 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $420 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT	07/01/2019	CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 24	Minus	** 20	= 4		x $100 =	400
	Independent (37 CFR 1.16(h))	* 4	Minus	*** 3	= 1		x $460 =	460
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	860

		(Column 1)		(Column 2)	(Column 3)			
AMENDMENT		CLAIMS REMAINING AFTER AMENDMENT		HIGHEST NUMBER PREVIOUSLY PAID FOR	PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	/ELMIRA Y HALL/
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

This collection of information is required by 37 CFR 1.16. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Document code: WFEE

United States Patent and Trademark Office
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NOTICE OF ALLOWANCE AND FEE(S) DUE

79141 7590 08/09/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER
CHERY, MARDOCHEE

ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 08/09/2019

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066-US	5811

TITLE OF INVENTION: MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	11/12/2019

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

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PART B - FEE(S) TRANSMITTAL

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By mail, send to: Mail Stop ISSUE FEE
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Alexandria, Virginia 22313-1450

By fax, send to: (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

79141 7590 08/09/2019
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being transmitted to the USPTO via EFS-Web or by facsimile to (571) 273-2885, on the date below.

(Typed or printed name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066-US	5811

TITLE OF INVENTION: MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	$1000	$0.00	$0.00	$1000	11/12/2019

EXAMINER	ART UNIT	CLASS-SUBCLASS
CHERY, MARDOCHEE	2133	711-154000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-09 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.

1_____
2_____
3_____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document must have been previously recorded, or filed for recordation, as set forth in 37 CFR 3.11 and 37 CFR 3.81(a). Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. Fees submitted: ❑Issue Fee ❑Publication Fee (if required) ❑Advance Order - # of Copies _____

4b. Method of Payment: *(Please first reapply any previously paid fee shown above)*

❑ Electronic Payment via EFS-Web ❑ Enclosed check ❑ Non-electronic payment by credit card (Attach form PTO-2038)

❑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment to Deposit Account No. _____

5. **Change in Entity Status** (from status indicated above)

❑ Applicant certifying micro entity status. See 37 CFR 1.29

❑ Applicant asserting small entity status. See 37 CFR 1.27

❑ Applicant changing to regular undiscounted fee status.

NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066-US	5811

79141 7590 08/09/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

EXAMINER	
CHERY, MARDOCHEE	
ART UNIT	PAPER NUMBER
2133	

DATE MAILED: 08/09/2019

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

PTOL-85 (Rev. 02/11)

Samsung Electronics Co., Ltd.
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OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 30 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/857,553	Applicant(s) Lee, Hyun	
	Examiner MARDOCHEE CHERY	Art Unit 2133	AIA (FITF) Status No

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☑ This communication is responsive to the RCE filed 07/01/2019.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

3. ☑ The allowed claim(s) is/are 1-24 . As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see **http://www.uspto.gov/patents/init_events/pph/index.jsp** or send an inquiry to **PPHfeedback@uspto.gov.**

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☐ All b) ☐ Some *c) ☐ None of the:

   1. ☐ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____ .

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file areply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____ .

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____.
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material _____.
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date. _____.
5. ☐ Examiner's Amendment/Comment
6. ☐ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	08/05/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 247

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

CPC						
Symbol					**Type**	**Version**
G06F	/	13	/	1694	F	2013-01-01
G11C	/	5	/	04	I	2013-01-01
G11C	/	7	/	1063	I	2013-01-01
G06F	/	13	/	1668	I	2013-01-01
G06F	/	9	/	445	I	2013-01-01
G06F	/	13	/	24	I	2013-01-01
G06F	/	3	/	0619	I	2013-01-01
G06F	/	3	/	0632	I	2013-01-01
G06F	/	3	/	0659	I	2013-01-01
G06F	/	3	/	0673	I	2013-01-01
G06F	/	11	/	1068	I	2013-01-01
G11C	/	29	/	52	I	2013-01-01
G06F	/	12	/	0646	I	2013-01-01
G11C	/	2207	/	2254	A	2013-01-01
G11C	/	5	/	00	A	2013-01-01
G11C	/	7	/	1066	A	2013-01-01
G11C	/	16	/	26	A	2013-01-01
G11C	/	29	/	78	A	2013-01-01
G11C	/	2029	/	4402	A	2013-01-01

CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
	/		/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	24	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	05 August 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190805

Samsung Electronics Co., Ltd.
Ex. 1096, p. 248

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

INTERNATIONAL CLASSIFICATION					
CLAIMED					
	/		/		
NON-CLAIMED					
	/		/		

US ORIGINAL CLASSIFICATION	
CLASS	SUBCLASS
711	154

CROSS REFERENCES(S)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	24	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	05 August 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190805

Samsung Electronics Co., Ltd.
Ex. 1096, p. 249

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	**Art Unit**
	MARDOCHEE CHERY	2133

☑ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIMS

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		10		19										
	2		11		20										
	3		12		21										
	4		13		22										
	5		14		23										
	6		15		24										
	7		16												
	8		17												
	9		18												

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	24	
/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	05 August 2019	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	1

U.S. Patent and Trademark Office — Part of Paper No.: 20190805

Samsung Electronics Co., Ltd.
Ex. 1096, p. 250

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

CPC - Searched*		
Symbol	**Date**	**Examiner**
G11C5/00 G11C16/26 G11C2029/4402 G11C29/78 G11C7/1066	02/03/2019	MC
(G06F13/1694 or G06F12/0646 or G06F3/0619 or G11C29/52 or G06F11/1068 or G06F3/0673 or G06F3/0659 or G06F3/0632 or G06F13/24 or G06F9/445 or G06F13/1668 or G11C7/1063 or G11C5/04 or G11C2029/4402 or G11C5/00 or G11C7/1066 or G11C16/26 or G11C29/78 or G11C2207/2254).cpc.	08/05/2019	MC

CPC Combination Sets - Searched*		
Symbol	**Date**	**Examiner**
G11C5/00 G11C16/26 G11C2029/4402 G11C29/78 G11C7/1066	02/03/2019	MC
(G06F13/1694 or G06F12/0646 or G06F3/0619 or G11C29/52 or G06F11/1068 or G06F3/0673 or G06F3/0659 or G06F3/0632 or G06F13/24 or G06F9/445 or G06F13/1668 or G11C7/1063 or G11C5/04 or G11C2029/4402 or G11C5/00 or G11C7/1066 or G11C16/26 or G11C29/78 or G11C2207/2254).cpc.	08/05/2019	MC

US Classification - Searched*			
Class	**Subclass**	**Date**	**Examiner**
711	154	02/03/2019	MC

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

Search Notes		
Search Notes	**Date**	**Examiner**
EAST Search	08/22/2018	MC
EAST Updated	02/03/2019	MC
EAST Updated	03/15/2019	MC
EAST Updated; CPC; Inventor Assignee	08/05/2019	MC

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	02/04/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 251

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15/857,553	Lee, Hyun
	Examiner	Art Unit
	MARDOCHEE CHERY	2133

Interference Search			
US Class/CPC Symbol	US Subclass/CPC Group	Date	Examiner
	See attached	02/03/2019	MC

/MARDOCHEE CHERY/ Primary Examiner, Art Unit 2133	02/04/2019

Samsung Electronics Co., Ltd.
Ex. 1096, p. 252

EAST Search History

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	0	((controller circuit configured cause memory module enter$3 initialization mode in response command host computer system memory module execut$3 at least one initialization sequence during initialization mode) and (at least one output$3 defin$3 function operational mode according to industry standard but undefined industry standard initialization mode) and (notification circuit output$3 notification signal indicat$3 status initialization mode memory controller via least output$4)).clm.	USPAT	SAME	ON	2019/08/05 14:40
L2	0	((controller circuit configured cause memory module enter$3 initialization mode in response command host computer system memory module execut$3 at least one initialization sequence during initialization mode) and (at least one output$3 defin$3 function operational mode according to industry standard but undefined industry standard initialization mode) and (notification circuit output$3 notification signal indicat$3 status initialization mode memory controller via least output$4)).clm.	USPAT	SAME	ON	2019/08/05 14:40

8/ 5/ 2019 2:56:36 PM
C:\ Users\ mchery\ Documents\ EAST\ Workspaces\ 13942721.wsp

Samsung Electronics Co., Ltd.
Ex. 1096, p. 253

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L3	138210	(G06F13/1694 or G06F12/0646 or G06F3/0619 or G11C29/52 or G06F11/1068 or G06F3/0673 or G06F3/0659 or G06F3/0632 or G06F13/24 or G06F9/445 or G06F13/1668 or G11C7/1063 or G11C5/04 or G11C2029/4402 or G11C5/00 or G11C7/1066 or G11C16/26 or G11C29/78 or G11C2207/2254).cpc.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:42
L4	4275	3 and (controller microcontroller micro-controller) same (memory $3RAM) with (read write pre-charg$3 precharg$3 refresh$3) and (transistor $3FET drain$3) same (controller device microcontroller micro-controller) and drain$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:42
L5	30	4 and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:44
L6	15	5 and (open$3 near2 drain)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:45
L7	1	6 and (handshak$3 hand-shak$3) near3 memory near5 controller near5 host	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:45
L8	0	7 and @ad<"20090612"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:46
L9	1	6 and (handshak$3 hand-shak$3 (signal near3 (coordinat$3 arbitrat$3))) near7 memory near7 controller near7 host	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:46

Samsung Electronics Co., Ltd.
Ex. 1096, p. 254

L10	4	6 and (FET MOSFET transistor p-junction n-junction)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:47
L11	2	10 and @ad<"20090612"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:48
L12	2	11 and (error fault ECC) same (wire port connect$3 attach$5 bond$3 drain source gate pin)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:52
L13	48967	(LEE near2 HYUN).in.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:54
L14	18643	13 and @ad<"20090612"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:54
L15	8	14 and (controller microcontroller micro-controller) same (memory $3RAM) with (read write pre-charg$3 precharg$3 refresh$3) and (transistor $3FET drain$3) same (controller device microcontroller micro-controller) and drain$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:55
L16	0	15 and edg$3 near5 (wire port connect$3 attach$5 bond$3 drain source gate pin) same ($3RAM DIM DIMM SODIMM) same (controller microcontroller micro-controller)	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2019/08/05 14:56

8/5/2019 2:56:50 PM
C:\Users\mchery\Documents\EAST\Workspaces\13942721.wsp

Samsung Electronics Co., Ltd.
Ex. 1096, p. 255

PART B - FEE(S) TRANSMITTAL

Electronically filed August 16, 2019

Complete and send this form with applicable fee(s), to: Mail — Mail Stop ISSUE FEE, Commissioner of Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450

or Fax — (571) 273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advanced orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS

MORGAN, LEWIS & BOCKIUS LLP
1400 Page Mill Road
Palo Alto, CA 94304

Note: A certificate of mailing below can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing.

Certificate of Mailing

I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)

(Signature)

(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTY'S DOCKET NO.	CONFIRMATION NO.
15/857,553	12/28/2017	Hyun Lee	129980-5066-US	5811

TITLE OF INVENTION **MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE**

APPLN. TYPE	ENTITY STATUS	ISSUE FEE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	UNDISCOUNTED	1000	0	1000	11/12/2019

EXAMINER	ART UNIT	CLASS-SUB CLASS
CHERY, MARDOCHEE	2133	711-154000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).

☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.

☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list (1) the names of up to 3 registered patent attorneys or agents OR, alternatively, (2) the name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed

1. **Morgan, Lewis & Bockius LLP**
2.
3.

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: NETLIST, INC.

(B) RESIDENCE: (CITY and STATE OR COUNTRY) Irvine, CA

Please check the appropriate assignee category or categories (will not be printed on the patent) ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:

☒ Issue Fee

☐ Advanced Order - # of Copies ____

4b. Payment of Fee(s): (**Please first reapply any previously paid issue fee shown above.**)

☐ A check in the amount of the fee(s) enclosed

☐ Payment by credit card. Form PTO-2038 is attached.

☒ The Director is hereby authorized to charge the required fee(s), or credit any overpayment, to Deposit Account Number 50-0310 (order no. 129980-5066-US).

5. **Change in Small Entity Status** (from status indicated above)

☐ a. Applicant certifying micro entity status. See 37 CFR 1.29. — NOTE: Absent a valid certification of Micro Entity (see form PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.

☐ Applicant asserting small entity status. See 37 CFR 1.27. — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.

☐ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be sign in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature / Jamie J. Zheng / Date: August 16, 2019

Printed Name: Jamie J. Zheng Registration No. 51,167

Electronic Patent Application Fee Transmittal

Application Number:	15857553
Filing Date:	28-Dec-2017
Title of Invention:	MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng/S. Olivier
Attorney Docket Number:	129980-5066-US

Filed as Large Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	1501	1	1000	1000

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**1000**

Electronic Acknowledgement Receipt

EFS ID:	36904638
Application Number:	15857553
International Application Number:	
Confirmation Number:	5811
Title of Invention:	MEMORY MODULE HAVING AN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng/S. Olivier
Filer Authorized By:	Jamie Jie Zheng
Attorney Docket Number:	129980-5066-US
Receipt Date:	16-AUG-2019
Filing Date:	28-DEC-2017
Time Stamp:	20:04:05
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	CARD
Payment was successfully received in RAM	$1000
RAM confirmation Number	E20198FK04254376
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	129980-506US_Issue_Fee.pdf	115432 53d1977d76f6d222842b52abefe4c43ff7b2ad31	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30485 ecc24baeb0613aa788575bf19e2be941e2709451	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	145917		

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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/857,553	12/28/2017	2133	2740	129980-5066-US	7	1

CONFIRMATION NO. 5811

CORRECTED FILING RECEIPT

79141
Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

OC000000110554688

Date Mailed: 08/21/2019

Receipt is acknowledged of this non-provisional utility patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF FIRST INVENTOR, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection.

Please verify the accuracy of the data presented on this receipt. If an error is noted on this Filing Receipt, please submit a written request for a corrected Filing Receipt, including a properly marked-up ADS showing the changes with strike-through for deletions and underlining for additions. If you received a "Notice to File Missing Parts" or other Notice requiring a response for this application, please submit any request for correction to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections provided that the request is grantable.

Inventor(s)

Hyun Lee, Ladera Ranch, CA;

Applicant(s)

Netlist, Inc., Irvine, CA;

Power of Attorney: The patent practitioners associated with Customer Number 79141

Domestic Priority data as claimed by applicant

This application is a CON of 15/088,115 04/01/2016 PAT 9858218
which is a CON of 13/942,721 07/16/2013 PAT 9311116
which is a CON of 12/815,339 06/14/2010 PAT 8489837
which claims benefit of 61/186,799 06/12/2009

Foreign Applications for which priority is claimed (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.) - None.
Foreign application information must be provided in an Application Data Sheet in order to constitute a claim to foreign priority. See 37 CFR 1.55 and 1.76.

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: Yes

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Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 01/23/2018

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/857,553**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No

Title

MEMORY MODULE HAVING AN OPEN-DRAIN OUTPUT PIN FOR PARITY ERROR IN A FIRST MODE AND FOR TRAINING SEQUENCES IN A SECOND MODE

Preliminary Class

711

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific

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countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT Substitute for Form 1449-PTO				*Electronically filed March 21, 2019*	
				Application Number	***15/857,553***
				Filing Date	***December 28, 2017***
				First Named Inventor	***Hyun Lee***
				Art Unit	***2133***
				Examiner Name	***Chery, Mardochee***
Sheet	1	of	1	Attorney Docket Number	***129980-5066-US***

U.S. PATENT DOCUMENTS					
Examiner Initials	Cite No.[1]	Document Number Number - Kind Code[2]	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS						
Examiner Initials	Cite No.	Foreign Patent Document Country Code[3] – Number[4] - Kind Code[5] *(if known)*	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

NON PATENT LITERATURE DOCUMENTS		
Examiner Initials	Cite No.	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published
		Inter Partes Review of US Patent No.9535623, Case No. IPR2018-00303, Final Written Decision, filed March 21, 2019

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Examiner Signature	/MARDOCHEE CHERY/	Date Considered	09/15/2019

DB2/ 35663151.1

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/857,553	11/12/2019	10474595	129980-5066-US	5811

79141 7590 10/23/2019

Morgan, Lewis & Bockius LLP (PA)(J. Zheng)
1400 Page Mill Road
Palo Alto, CA 94304

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Hyun Lee, Ladera Ranch, CA;
Netlist, Inc., Irvine, CA;

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