Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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.)

Applicant Information:

Applicant 1 Remove

Applicant Authority ◉ Inventor ◯ Legal Representative under 35 U.S.C. 117 ◯ Party of Interest under 35 U.S.C. 118

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 i	US

Citizenship under 37 CFR 1.41(b) i: US

Mailing Address of Applicant:

Address 1	21 Thalia St.
Address 2	

City	Ladera Ranch	State/Province	CA
Postal Code	92694	Country i	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	jz@jzpatent.com	Add Email Remove Email

Application Information:

Title of the Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION		
Attorney Docket Number	NETL.071C1	Small Entity Status Claimed	☒
Application Type	Nonprovisional		
Subject Matter	Utility		
Suggested Class (if any)		Sub Class (if any)	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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).
Enter either 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	79141		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(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)(2) or CFR 1.78(a)(4), and need not otherwise be made part of the specification.

Prior Application Status	Pending		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation of	13288850	2011-11-03
Prior Application Status	Expired		Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
13288850	non provisional of	61409893	2010-11-03

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 benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. 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(a).

Remove

Application Number	Country [i]	Parent Filing Date (YYYY-MM-DD)	Priority Claimed
			◉ Yes ◯ No

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

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

Assignee Information:

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.

Assignee 1			Remove
If the Assignee is an Organization check here. ☒			
Organization Name	Netlist, Inc.		
Mailing Address Information:			
Address 1	175 Technology, Suite 150		
Address 2			
City	Irvine	**State/Province**	CA
Country i	US	Postal Code	92618
Phone Number		Fax Number	
Email Address			
Additional Assignee Data may be generated within this form by selecting the **Add** button.			Add

Signature:

A signature of the applicant or representative is required in accordance with 37 CFR 1.33 and 10.18. Please see 37 CFR 1.4(d) for the form of the signature.

Signature	/Jamie J. Zheng/			Date (YYYY-MM-DD)	2014-07-21
First Name	Jamie	Last Name	Zheng	Registration Number	51167

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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 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 inspections 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.

MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

RELATED APPLICATION

[0001] This application is a continuation application of U.S. Pat. App. No. 13/288,850, filed on November 3, 2011, which claims the benefit of priority under 35 U.S.C. § 119(e) of U.S. Provisional Patent Application No. 61/409,893, filed on November 03, 2010, and entitled "ARCHITECTURE FOR MEMORY MODULE WITH PACKAGES OF THREE-DIMENSIONAL STACKED (3DS) MEMORY CHIPS." The disclosure of each of the above applications is hereby incorporated by reference in its entirety.

BACKGROUND

Technical Field

[0002] The present disclosure relates to memory devices and memory modules. More specifically, the present disclosure relates to systems and methods for reducing the load of drivers of memory packages included on the memory modules.

Description of the Related Art

[0003] Memory modules may include a number of memory packages. Each memory package may itself include a number of array dies that are packaged together. Each array die may include an individual semiconductor chip that includes a number of memory cells. The memory cell may serve as the basic building block of computer storage representing a single bit of data.

[0004] FIGS. 1A and 1B schematically illustrate examples of existing memory package designs currently used or proposed to be used to provide the dynamic random-access memory of memory modules. FIG. 1A schematically illustrates a memory package 100 with three array dies 110 and a control die 130. The control die 130 is configured to respond to signals received by the memory package 100 by sending appropriate control signals to the array dies 110 and includes a driver 134 for driving data signals to each of

the array dies 110 via a corresponding die interconnect 120. Further, the control die 130 includes a driver 140 for driving command and/or address signals to each of the array dies 110 via another corresponding die interconnect 142. For simplicity, FIG. 1A shows only a single driver 134, die interconnect 120, driver 140, and die interconnect 142. However, additional drivers and die interconnects may be included for each bit the memory package 100 is designed to support. Thus, a 16-bit memory may include 16 pairs of drivers and die interconnects for the data signals and other similar drivers and die interconnects for the command and/or address signals. Each array die 110 also includes a chip select port 144, with the chip select ports 144 of the array dies 110 configured to receive corresponding chip select signals to enable or select the array dies for data transfer. The array dies 110 are configured to transfer data (e.g. read or write) to or from the selected memory cells identified by the command, address, and chip select signals via the die interconnects.

[0005] In some cases, the control die 130 may include memory cells and therefore, also serve as an array die. Thus, as can be seen from FIG. 1A, the control die 130 may also include a chip select port 144. Alternatively, the control die 130 and the array dies 110 may be distinct elements and the control die 130 may not include any memory cells.

[0006] FIG. 1B schematically illustrates an example of a memory package 150 that includes four array dies 160 and a control die 170 that does not include memory cells. As can be seen in FIG. 1B, each array die 160 includes a chip select port 174. However, because the control die 170 does not also serve as an array die, the control die 170 does not include a chip select port. As with memory package 100, memory package 150 includes a driver 184 that drives data signals to each of the array dies 160 along a corresponding die interconnect 182. Further, the memory package 150 includes a driver 186 for driving command and/or address signals to each of the array dies 160 via another die interconnect 188.

[0007] Generally, a load exists on each of the drivers 134, 140, 184, and 186 by virtue of the drivers being in electrical communication with the corresponding die interconnects and the corresponding circuitry of the array dies. Thus, to drive a signal along a die

interconnect, a driver typically must be large enough to overcome the load on the driver. However, generally a larger driver not only consumes more space on the control die, but also consumes more power.

SUMMARY

[0008] In certain embodiments, an apparatus is provided that comprises a plurality of array dies having data ports. The apparatus further comprises at least a first die interconnect and a second die interconnect. The first die interconnect is in electrical communication with at least one data port of a first array die of the plurality of array dies and at least one data port of a second array die of the plurality of array dies and not in electrical communication with the data ports of at least a third array die of the plurality of array dies. The second die interconnect is in electrical communication with at least one data port of the third array die and not in electrical communication with the data ports of the first array die and the data ports of the second array die. In addition, the apparatus comprises a control die. The control die comprises at least a first data conduit configured to transmit a data signal to the first die interconnect and to not transmit the data signal to the second die interconnect, and at least a second data conduit configured to transmit the data signal to the second die interconnect and to not transmit the data signal to the first die interconnect.

[0009] In certain embodiments, an apparatus is provided that comprises a plurality of array dies having ports. The apparatus further comprises at least a first die interconnect and a second die interconnect. The first die interconnect is in electrical communication with at least one port of a first array die of the plurality of array dies and at least one port of a second array die of the plurality of array dies and not in electrical communication with the ports of at least a third array die of the plurality of array dies. The second die interconnect is in electrical communication with at least one port of the third array die and not in electrical communication with the ports of the first array die and the ports of the second array die. In addition, the apparatus comprises a control die. The control die comprises at least a first conduit configured to transmit a signal to the first die interconnect and to not transmit the signal to the second die interconnect, and at least a

second conduit configured to transmit the signal to the second die interconnect and to not transmit the signal to the first die interconnect. Moreover, a first load on the first conduit comprises a load of the first die interconnect, a load of the first array die, and a load of the second array die. In addition, a second load on the second conduit comprises a load of the second die interconnect and a load of the third array die.

[0010] In certain embodiments, a method is provided for optimizing load in a memory package. The memory package comprises a plurality of array dies, at least a first die interconnect and a second die interconnect, and a control die. The control die comprises at least a first driver and a second driver, the first driver configured to drive a signal along the first die interconnect, and the second driver configured to drive the signal along the second die interconnect. The method comprises selecting a first subset of array dies of the plurality of array dies and a second subset of array dies of the plurality of array dies. The first subset of array dies and the second subset of array dies are exclusive of one another and are selected to balance a load on the first driver and on the second driver based at least in part on array die loads of array dies of the plurality of array dies and at least in part on die interconnect segment loads of segments of at least the first die interconnect and the second die interconnect. The method further comprises forming electrical connections between the first die interconnect and the first subset of array dies. In addition, the method comprises forming electrical connections between the second die interconnect and the second subset of array dies.

[0011] In certain embodiments, an apparatus is provided that comprises a register device configured to receive command/address signals from a memory control hub and to generate data path control signals. The apparatus further comprises a plurality of DRAM packages. Each of the DRAM packages comprises a control die. The control die comprises a plurality of command/address buffers and a data path control circuit configured to control command/address time slots and data bus time slots. The control die is configured to receive data signals from the memory control hub, the data path control signals from the register device, and command/address signals from the register device. Further, each of the DRAM packages comprises a plurality of DDR DRAM dies operatively coupled to the control die to receive the data signals from the control die.

Moreover, the memory module is selectively configurable into at least two operational modes. The two operational modes comprise a first operational mode and a second operational mode. In the first operational mode the register device generates the data path control signals, and the control die uses the data path control signals to operate the data path control circuit. In the second operational mode, the control die operates the data path control circuit to provide the command/address signals to the plurality of DDR DRAM dies without decoding the command/address signals.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] Throughout the drawings, reference numbers are re-used to indicate correspondence between referenced elements. The drawings are provided to illustrate certain example embodiments of the inventive subject matter described herein and not to limit the scope thereof.

[0013] FIGS. 1A and 1B schematically illustrate examples of existing memory package designs.

[0014] FIG. 2 schematically illustrates an example embodiment of a memory package in accordance with the present disclosure.

[0015] FIG. 3 schematically illustrates another example embodiment of a memory package in accordance with the present disclosure.

[0016] FIG. 4 schematically illustrates an example embodiment of a driver structure of a control die in accordance with the present disclosure.

[0017] FIG. 5 presents a flowchart for an example embodiment of a load optimization process.

[0018] FIGS. 6A and 6B schematically illustrate an example of a Load Reduction Dual In-line Memory Module (LRDIMM) and a HyperCloud™ Dual In-line Memory Module (HCDIMM) architecture respectively.

[0019] FIG. 7 schematically illustrates an example of a Three-Dimensional Structure

Dual In-line Memory Module (3DS-DIMM) architecture.

[0020] FIG. 8 schematically illustrates an example embodiment of a memory module architecture in accordance with the present disclosure.

DETAILED DESCRIPTION OF SPECIFIC EMBODIMENTS

[0021] In addition to the below, the following U.S. patents are incorporated in their entirety by reference herein: U.S. Patent Nos. 7,289,386, 7,286,436, 7,442,050, 7,375,970, 7,254,036, 7,532,537, 7,636,274, 7,630,202, 7,619,893, 7,619,912, 7,811,097. Further, the following U.S. patent applications are incorporated in their entirety by reference herein: U.S. Patent Application Nos. 12/422,912, 12/422,853, 12/577,682, 12/629,827, 12/606,136, 12/874,900, 12/422,925, 12/504,131, 12/761,179, and 12/815,339.

[0022] Certain embodiments of the present disclosure reduce the size of drivers that are configured to drive a signal, such as a data signal, along a die interconnect to one or more array dies. Further, certain embodiments of the present disclosure reduce the power consumption of the drivers.

[0023] In certain embodiments, reducing one or both of driver size and driver power consumption may be accomplished by increasing the number of die interconnects and reducing the number of array dies that are in electrical communication with each die interconnect. For example, instead of one die interconnect in electrical communication with four array dies, there may be two die interconnects, each in electrical communication with a different pair of the four array dies.

[0024] In certain embodiments, determining the number of die interconnects and the number of array dies in electrical communication with each die interconnect is based, at least in part, on a load of each array die and a load of the die interconnect that is in electrical communication with one or more of the array dies.

[0025] In some embodiments, the load contribution from a die interconnect may be negligible compared to the load contribution from the array dies. In such embodiments,

determining the number of die interconnects and the number of array dies in electrical communication with each die interconnect may be based, at least in part, on a load of each array die without considering the load of the die interconnect. However, as the physical size of a memory package shrinks, the load of a die interconnect becomes a non-negligible value relative to the load of the array dies. Thus, as memory packages become physically smaller, it becomes more important to consider the load of the die interconnect in determining the number of die interconnects and the number of array dies in electrical communication with each die interconnect. Advantageously, certain embodiments of the present disclosure account for both the loads of the array dies and the loads of the die interconnects on a conduit (e.g., driver) in determining the number of die interconnects to be used and the number of array dies in electrical communication with each die interconnect.

[0026] FIG. 2 schematically illustrates an example embodiment of a memory package 200 in accordance with the present disclosure. One example of a memory package that includes array dies and a control die is the Hybrid Memory Cube (HMC). Examples of an HMC compatible with certain embodiments described herein are described by the IDF2011 Intel Developer Forum website, http://www.intel.com/idf/index.htm, which includes presentations and papers from the IDF2011 Intel Developer Forum including the keynote address given by Justin Rattner on September 15, 2011. Additional examples of an HMC compatible with certain embodiments described herein are described by the Hybrid Memory Cube Consortium website, http://www.hybridmemorycube.org. The memory package 200 can include any type of memory package. For example, the memory package 200 may be a DRAM package, a SDRAM package, a flash memory package, or a DDR SDRAM package (e.g., DDR3, DDR4), to name a few. A memory module (not shown) may include one or more memory packages in accordance with the memory package 200. Further, the memory package 200 may include input/output terminals (not shown) that are configured to be placed in electrical communication with circuitry of the memory module to transmit signals between the memory package 200 and a Memory Control Hub (MCH) (not shown).

[0027] The memory package 200 may include a plurality of array dies 210 (e.g., array

dies 210a-210d). The plurality of array dies 210 may be sealed within the memory package 200. Further, circuitry of the array dies 210 may be in electrical communication with the input/output terminals of the memory package 200. Although generally referred to as array dies herein, the array dies 210 may also be called slave dies or slave chips. Each of the array dies 210a-210d may include circuitry (e.g., memory cells) (not shown) for storing data. Examples of array dies compatible with certain embodiments described herein are described by the existing literature regarding the Hybrid Memory Cube (e.g., as cited above). As illustrated in FIG. 2, the plurality of array dies 210 may be arranged in a stack configuration known as a three-dimensional structure (30S). Examples of 30S compatible with certain embodiments described herein are described by the existing literature regarding the Hybrid Memory Cube (e.g., as cited above). However, the structure or layout of the plurality of array dies 210 is not limited as such, and other structures are possible in accordance with the present disclosure. For example, the plurality of array dies 210 may be arranged in a planar structure, or in a structure that combines 30S with a planar structure. Moreover, while the memory package 200 is illustrated as including four array dies, the memory package 200 is not limited as such and may include any number of array dies. For example, as illustrated in FIG. 3, the memory package 200 may include eight array dies. As further examples, the memory package 200 may include three or sixteen array dies.

[0028] Each of the array dies 210 may include one or more data ports (not shown). The data ports enable electrical communication and data transfer between the corresponding memory circuitry of the array dies 210 and a communication pathway (e.g., a die interconnect).

[0029] In the example schematically illustrated in FIG. 2, the memory package 200 includes a plurality of die interconnects 220 (e.g., die interconnects 220a, 220b). For example, certain versions of HMC have been reported to have 512 data ports per die, with the corresponding bits of each die all connected to a single die interconnect (e.g., TSV). Examples of die interconnects include, but are not limited to, through-silicon vias (TSV), conducting rods, wire bonds, and pins. (See e.g., U.S. Patent Nos. 7,633,165 and 7,683,459.) Each of these die interconnects 220 may be coupled to, or in electrical

communication with at least one data port of at least one of the array dies 210. In certain embodiments, at least one of the die interconnects 220 is in electrical communication with at least one data port from each of at least two array dies 210 without being in electrical communication with a data port from at least one array die 210, which may be in electrical communication with a different die interconnect 220.

[0030] For example, die interconnect 220a may be in electrical communication with a data port from array die 210a and a data port from array die 210b (as illustrated by the darkened circles in FIG. 2) and not in electrical communication with any data ports from array die 210c or any data ports from array die 210d. The data ports of array dies 210a and 210b in electrical communication with the die interconnect 220a can be corresponding to the same data bit (e.g., 00). Other die interconnects (not shown) can be in electrical communication with other data ports corresponding to other data bits (e.g., 01, 02, ...) of array dies 210a and 210b. These other die interconnects can be electrically isolated from the corresponding data ports of array dies 210c and 210d.

[0031] However, continuing this example, the die interconnect 220b may be in electrical communication with a data port from array die 210c and a data port from array die 210d (as illustrated by the darkened circles in FIG. 2) (e.g., corresponding to the same data bit, e.g., 00) without being in electrical communication with any data ports from array die 210a and array die 210b. Other die interconnects (not shown) can be in electrical communication with other data ports corresponding to other data bits (e.g., 01, 02, ...) of array dies 210c and 210d. Despite not being in electrical communication with any data ports from array die 210a and 210b, in some implementations, the die interconnect 220b may pass through the array dies 210a and 210b (as illustrated by the unfilled circles) e.g., through through-holes or vias of array dies 210a and 210b. For some implementations, each of the array dies 210 may be in electrical communication with corresponding die interconnects 220, without any of the die interconnects 220 being in electrical communication with all of the array dies 210. Where existing systems may utilize a single die interconnect to be in electrical communication with the corresponding data ports of each array die (e.g., the data ports corresponding to the same bit), certain embodiments described herein utilize multiple die interconnects to provide electrical

communication to the corresponding data ports of the array dies (e.g., the data ports corresponding to the same data bit) with none of the multiple die interconnects in electrical communication with data ports of all the array dies.

[0032] In addition to the plurality of array dies 210, the memory package 200 includes a control die 230, which may also be called a master die. Examples of master dies compatible with certain embodiments described herein are described by the existing literature regarding the Hybrid Memory Cube (e.g., as cited above). In some embodiments, the control die 230 may be one of the array dies 210. Alternatively, the control die 230 may be a modified version of one of the array dies 210. Thus, in some implementations, memory package 200 may include four dies or chips instead of the five illustrated in FIG. 2. Further, in some embodiments, the control die 230 may comprise a logic layer (e.g., the logic layer of an HMC).

[0033] The control die 230 may include a number of data conduits 232, which includes data conduits 232a and 232b. Each of these data conduits 232 may be configured to transmit a data signal to a single die interconnect 220. For example, the data conduit 232a may be configured to transmit a data signal to the die interconnect 220a without transmitting the data signal to the die interconnect 220b. Conversely, the data conduit 232b may be configured to transmit the data signal to the die interconnect 220b without transmitting the data signal to the die interconnect 220a (e.g., data conduit 232b is electrically isolated from die interconnect 220a and data conduit 232a is electrically isolated from die interconnect 220b).

[0034] In some embodiments, the data conduits 232 may also include one or more drivers 234 as schematically illustrated by FIG. 2. The drivers 234 may be configured to drive the data signals along the corresponding die interconnects 220. In some embodiments, a single data conduit 232 or driver 234 may be in electrical communication with multiple die interconnects 220, each of which may be in electrical communication with different array dies 210.

[0035] Each of the data conduits 232 may be configured to receive the data signal from a common source. For instance, the data conduit 232a and the data conduit 232b may each

receive a substantially similar, if not identical, data signal from the same signal source (e.g. the data signal corresponding to the same data bit). The source of the data signal may include a data path, a driver, a latch, a pin, or any other construct that may provide a data signal to a data conduit.

[0036] The data conduits 232 may each be subject to a load. Although not limited as such, this load may be measured as a capacitive load, such as a parasitic capacitance. The load on each of the data conduits 232 may include at least a load of the die interconnect 220 to which the data conduit 232 is coupled or connected as well as a load of each array die 210 with which the die interconnect 220 is in electrical communication via a data port of the die interconnect 220. Thus, for example, the load of the data conduit 232a may include loads of the die interconnect 220a, the array die 210a, and the array die 210b. Similarly, the load of the data conduit 232b may include loads of the die interconnect 220b, the array die 210c, and the array die 210d.

[0037] Generally, a load that would be on a data conduit that was in electrical communication with a die interconnect that was in electrical communication with at least one data port of each of the array dies 210 can be considered the maximum load for a data conduit. This maximum load is the load of a data conduit of a memory package that does not implement the teachings of this disclosure, but is in accordance with conventional configurations.

[0038] In some implementations, the difference between the load of the data conduit 232a and the load of the data conduit 232b is less than the maximum load for a data conduit as described above. Thus, in some cases, there may exist a degree of balance or equalization between the loads of the data conduits 232a, 232b. In some implementations, the difference between the load of the data conduit 232a and the load of the data conduit 232b is zero or substantially zero. In some embodiments, the length of each die interconnect 220, and the number of array dies 210 in electrical communication with each die interconnect 220 may be selected to maintain the difference between the load of the data conduit 232a and the load of the data conduit 232b to be at or below a threshold load difference. For example, suppose that the load of each array die 210 is 1, the load of each

segment of the die interconnects 220 is 0.25, and that the threshold load difference is 0.5. Using the configuration schematically illustrated in FIG. 2, the load on the data conduit 232a in this example is 2.5 and the load on the data conduit 232b in this example is 3. Thus, in this example, the difference between the load of the data conduit 232a and the load of the data conduit 232b is at the threshold load difference value of 0.5. However, an alternative configuration that places the die interconnect 220a in electrical communication with only the array die 210a, and the die interconnect 220b in electrical communication with the array dies 210b-210d would not satisfy the threshold load difference value of 0.5 of the above example. In the alternative configuration, the load on the data conduit 232a would be 1.25 and the load on the data conduit 232b would be 4. Thus, in the alternative configuration, the difference between the load of the data conduit 232a and the load of the data conduit 232b is 2.75, which is above the threshold load difference value of 0.5.

[0039] For certain embodiments, the load of each data conduit is less than the maximum load as described above. Thus, in some cases, the load of the data conduit 232a is less than the maximum load and the load of the data conduit 232b is less than the maximum load. Further, in many implementations, the combined load of the data conduit 232a and the data conduit 232b is less than the maximum load of a single data conduit. In other words, it is possible to design the data conduit 232a and the data conduit 232b to reduce the overall load compared to a single data conduit that is in electrical communication with a die interconnect that is in electrical communication with at least one data port of each of the array dies 210. By reducing the overall load compared to the single data conduit, it is possible in many cases to reduce power consumption. Further, it is possible in many cases to maintain signal quality (e.g. maintain signal amplitude, maintain low signal distortion, etc.) while reducing power consumption. Advantageously, in a number of embodiments, by using multiple data conduits instead of a single data conduit, the speed of the memory package 200 can be increased. In some cases, this speed increase can include a reduced latency in accessing array dies 210 and/or operating the memory package 200 at a higher clock frequency.

[0040] Each of the die interconnects 220 may include any type of conducting material.

For example, the die interconnects 220 may include copper, gold, or a conductive alloy, such as a copper/silver alloy. Further, the die interconnects 220 may include any type of structure for enabling electrical communication between the data conduits 232 and the data ports of the array dies 210. For example, the die interconnects 220 may include a wire, a conducting rod, or a conducting trace, to name a few. Moreover, the die interconnects 220 may use vias, or through-silicon vias (TSVs) to couple with or to electrically communicate with an array die. For instance, die interconnect 220a may be connected with data ports of the array dies 210a and 210b using vias (illustrated by the filled or darkened circles). Examples of TSVs which may be used with the present disclosure are described further in U.S. Patent Nos. 7,633,165 and 7,683,459.

[0041] In addition, the die interconnects 220 may use via holes to pass through an array die that is not configured to be in electrical communication with the die interconnect. For instance, die interconnect 220b may pass through array dies 210a and 210b using TSVs that do not enable electrical communication between the die interconnect 220b and data ports of the array dies 210a and 210b (illustrated by the unfilled circles). In this way, the array dies 210a, 210b are not responsive to the data signal beings transmitted by the die interconnect 220b. However, the die interconnect 220b may be connected with at least one data port of each of the array dies 210c and 210d using a via (illustrated by the filled or darkened circles). In cases where the die interconnect passes through an array die that is not configured to be in electrical communication with the die interconnect, the TSV may include an insulator or an air gap between the die interconnect and the array die circuitry that is large enough to prevent electrical communication between the die interconnect and the array die circuitry. In certain embodiments, the TSV for array dies that are configured to be in electrical communication with the die interconnect and for array dies that are not configured to be in electrical communication with the die interconnect may be configured the same. However, in such cases, electrical connections leading from the TSV of the array dies that are not configured to be in electrical communication with the die interconnect may not exist or may be stubs. These stubs are not configured to provide electrical communication with the memory cells of the array die.

[0042] Although FIG. 2 illustrates a single pair of data conduits 232 corresponding to a single pair of die interconnects 220, this is only to simplify the drawing figure. The memory package 200 may generally include as many additional data conduits and corresponding die interconnects as the number of bits the memory package 200 is designed or configured to support per memory address. Thus, if, for example, the memory package 200 is configured to be a 16-bit memory, the memory package 200 may include 16 pairs of data conduits 232 and 16 pairs of corresponding die interconnects 220. Similarly, if the memory package 200 is configured as a 32-or 64-bit memory, the memory package 200 may include 32 or 64 pairs of data conduits 232 and 32 or 64 pairs of corresponding die interconnects 220. Generally, the data conduits and die interconnects for each bit are configured identically. Thus, for the memory package 200, each data conduit is configured to be in electrical communication with a die interconnect that is configured to be in electrical communication with a pair of the array dies 210. However, it is possible that, in some embodiments, the data conduits and die interconnects of different bits may be configured differently.

[0043] In certain embodiments, the same die interconnects and the same corresponding data conduits may be used to transfer data both to and from the array dies 210. In such embodiments, the die interconnects may be bi-directional. In alternative embodiments, separate die interconnects and corresponding data conduits may be used to transfer data to the array dies 210 and data from the array dies 210 to the control die 230. Thus, such embodiments may include double the number of die interconnects and data conduits as embodiments that use the same die interconnect to transfer data to and from an array die.

[0044] In some embodiments, the control die 230 may include additional command/address conduits 240 and die interconnects 242, which may be in electrical communication with at least one port of each of the array dies 210. For simplicity, FIG. 2 shows only a single such conduit 240 and die interconnect 242. The command/address conduits 240 are configured to provide corresponding signals to the die interconnects 242. These signals may be command signals, address signals, or may serve as both command and address signals (e.g., may include a memory cell address and a write command or a read command) either simultaneously or based on a determining criterion,

such as the edge of a clock signal. The command die 230 may include a command/address conduit 240 and corresponding die interconnect 242 for each bit of the command/address signals that the memory package 200 is configured to support. The number of bits of the command/address signals may be the same or may be different from the number of data bits of the memory package 200.

[0045] In addition, in certain embodiments, the control die 230 may include a plurality of chip select conduits 250 (e.g., chip select conduits 250a-250d as shown in FIG. 2). Further, the control die 230 may include corresponding die interconnects 252 (e.g., die interconnects 252a-252d) with one die interconnect 252 in electrical communication with one chip select conduit 250 and one array die 210. Each of the die interconnects 252 may be in electrical communication with a different array die 210. For example, the die interconnect 252a may be in electrical communication with the array die 210a and the die interconnect 252b may be in electrical communication with the array die 210b. Each of the chip select conduits 250 may be configured to provide a chip select signal to a corresponding array die 210 via a corresponding die interconnect 252.

[0046] In some embodiments, the control die 230 may include additional drivers that are configured to drive the chip select signals along the die interconnects 252. Alternatively, the chip select signals may be driven by drivers that are external to the control die 230. For example, a register (not shown) that is part of a memory module that includes the memory package 200 may determine the chip select signals and drive the chip select signals to the array dies 210. As a second example, the chip select signals may be provided by an MCH. In some embodiments, the control die 230 may determine the array die 210 to select based on, for example, an address signal. In such embodiments, the control die may generate the chip select signals.

[0047] FIG. 3 schematically illustrates another example embodiment of a memory package 300 in accordance with the present disclosure. In certain embodiments, some or all of the embodiments described above with respect to the memory package 200 may be applicable to the memory package 300. However, for ease of illustration and to simplify discussion, certain elements are omitted in FIG. 3, such as the chip select conduits.

Nevertheless, it should be understood that the memory package 300 can include the same or similar elements as described above with respect to the memory package 200, including, for example, the chip select conduits.

[0048] The memory package 300 may include a plurality of array dies 310 (e.g., array dies 310a-310h). In the implementation illustrated in FIG. 3, the memory package includes eight array dies. However, as stated earlier, the memory package 300 may include more or fewer array dies. Each of the array dies 310 may include one or more ports (not shown) that enable electrical communication between the circuitry of the array dies 310 and one or more die interconnects 320. Each of these die interconnects 320 may be coupled to, or in electrical communication with at least one port of at least one of the array dies 310. As with the memory package 200, in certain embodiments, at least one of the die interconnects 320 is in electrical communication with at least one port from each of at least two array dies 310 without being in electrical communication with a port from at least one array die 310, which may be in electrical communication with a different die interconnect 320.

[0049] In addition to the plurality of array dies 310, the memory package 300 includes a control die 330. In some embodiments, the control die 330 may include a number of conduits 332 (e.g., conduits 332a-332f). Each of these conduits 332 may be configured to transmit a signal to a single die interconnect 320.

[0050] Further, implementations of the conduits 332 may include one or more drivers 334 (e.g., drivers 334a-334f). Each of the drivers 334 may be configured to drive a signal along a corresponding die interconnect 320. For instance, the driver 334a of the conduit 332a may be configured to drive a signal along the die interconnect 320a to one or more of the array dies 310a and 310b. As a second example, the driver 334b of the conduit 332b may be configured to drive a signal along the die interconnect 320b to one or more of the array dies 310c and 310d. Although the die interconnect 320b may pass through the array dies 310a and 310b, because the die interconnect 320b, in the example illustrated in FIG. 3, is not configured to be in electrical communication with the array dies 310a and 310b, the driver 334b does not drive the signal to the array dies 310a and

310b.

[0051] In some embodiments, the signal can be a data signal, a command or address signal, a chip select signal, a supply voltage signal, or a ground voltage signal, to name a few. Further, as the signal is not limited to a data signal, in some embodiments, the conduits 332 may include conduits configured to provide signals other than data signals to the die interconnects 320. For example, the conduits may include conduits configured to provide a command or address signal, a chip select signal, a supply voltage signal, or a ground voltage signal to one or more die interconnects. Consequently, in some embodiments, the drivers 334 may be configured to drive signals other than data signals.

[0052] Generally, the signal that each of the drivers 334 drive to the corresponding die interconnects 320 is from a common source. Thus, each of the drivers 334, in certain embodiments, is driving the same signal to each corresponding die interconnect 320.

[0053] The size of the drivers 334 is generally related to the load on the driver 334. In certain embodiments, the load on each driver 334 corresponds to the load of the respective conduit 332. Although not limited as such, the load may be measured as a capacitive load, such as a parasitic capacitance.

[0054] The load on each of the conduits 332 may include at least the loads of the die interconnect 320 with which the conduit 332 is coupled or connected as well as the loads of each array die 310 with which the die interconnect 320 is in electrical communication via a port of the die interconnect 320. Thus, for example, the loads of the conduit 332a may include the loads of the die interconnect 320a, the array die 310a, and the array die 310b. Similarly, the loads of the conduit 332b may include the loads of the die interconnect 320b, the array die 310c, and the array die 310d. The loads of both conduits 332a and 332b include a load of two array dies 310 because the corresponding die interconnects 320 are each configured to be in electrical communication with two array dies 310. On the other hand, the load of the conduit 332c, which may include the loads of the die interconnect 320c and the array die 310e, includes a load of one array die 310e because the corresponding die interconnect 320c is configured to be in electrical communication with only one array die 310.

[0055] As previously described with respect to FIG. 2, a load that would be on a conduit that was in electrical communication with a die interconnect that was in electrical communication with at least one port of each of the array dies 310 can be considered the maximum load for a conduit. This maximum load is the load of a conduit of a memory package that does not implement the teachings of this disclosure, but is used in accordance with conventional configurations.

[0056] In some implementations, the difference between the loads of any pair of the conduits 332 is less than the maximum load for a conduit as described above. For instance, the difference between the load of the conduit 332a and the load of the conduit 332b is less than the maximum load. As a second example, the difference between the load of the conduit 334f and anyone of the conduits 334a334e is less than the maximum load. Thus, in some cases, the load on each of the conduits 332 may be, at least partially balanced or equalized to reduce or minimize the difference between the load of any pair of the conduits 332. In some implementations, the difference between the load of a pair of the conduits 332 is zero or substantially zero. In some embodiments, the length of each die interconnect 320, and the number of array dies 310 in electrical communication with each die interconnect 320 may be selected to maintain the difference between the load of any pair of the conduits 332 to be at or below a threshold load difference.

[0057] For certain embodiments, the load of each conduit is less than the maximum load as described above. Thus, for example, the load of the conduit 332a, the load of the conduit 332b, and the load of the conduit 332c are each less than the maximum load defined above.

[0058] In certain embodiments, the load associated with each of the array dies 310 may be substantially equivalent. For example, the load of the array die 310a may be substantially equal to the load of the array die 310h. Thus, the load contribution from the array dies 310 for a specific conduit 332 may be measured as a multiple of the array dies that are in electrical communication with a die interconnect 320 corresponding to a specific conduit 332. For example, assuming that the load of each of the array dies 310 is 'L', then the contribution of the load from the array dies 310 to the conduit 332a would be

2L because the die interconnect 320a corresponding to the conduit 332a is in electrical communication with two array dies 310, array dies 310a and 310b. In alternative embodiments, the load of each of the array dies 310a may differ. For example, the load of array die 310a may be L and the load of the array die 310b may be 1.25L.

[0059] Similar to the array dies 310, in some embodiments, a die interconnect 320 can be considered to comprise a plurality of segments, with each segment of a die interconnect 320 contributing a substantially equivalent load to the load of the die interconnect 320. In this case, the segment of the die interconnect 320 may refer to the portion of the die interconnect between two successive or adjacent dies (array die-to-array die, master die-to-array die, or both) along the die interconnect 320. Further, the segment may be defined as a portion of the die interconnect 320 between the dies exclusive of a portion of the dies. For example, one segment of the die interconnect 320a may extend from the top of the array die 310a to the bottom of the array die 310b. Alternatively, the segment may be defined to include at least a portion of at least one of the array dies 310. For example, one segment of the die interconnect 320a may extend from the center of array die 310a to the center of array die 310b. As a second example, one segment of the die interconnect 320a may extend from the top of the control die 330 to the top of the array die 310a, and therefore may include a portion of the die interconnect 320a extending from the bottom of the array die 310a to the top of the array die 310a. In some implementations, the segments are substantially equal in length to each other. Moreover, the load contribution of each segment may be substantially equal to each other. Alternatively, the segments may be unequal in length and/or may each contribute a different load to the total load of a die interconnect 320. Further, in some cases, the load contribution of a segment of the die interconnect 320 that is in electrical communication with a port of an array die 310 may differ from the load contribution of a segment of the die interconnect 320 that is not in electrical communication with a port of an array die 310.

[0060] In some cases, the load contribution of each segment of the die interconnect 320 may be measured as a fraction of the load contribution from an array die 310. For example, the load of one segment of the die interconnect 320a may be equivalent to one quarter of the load of an array die 310. Thus, for example, the load of the conduit 332a

may be 2.5L assuming a load contribution of L per array die 310 (two in this case) in electrical communication with the die interconnect 320a and a load contribution of 0.25L per segment (two in this case) of the die interconnect 320a. As a second example, the load of the conduit 332f may be 3L assuming the same load values as the previous example and a load contribution from one array die 310h and eight die interconnect 320f segments. Table 1 specifies the capacitive load values for each conduit 332 assuming, as with the previous two examples, that the load of each of the array dies 310 is L, and that the load of each segment of the die interconnects 320 is 0.25L. Table 1 also specifies the deviation in load from the conduits having the highest load value, which in this example are conduits 332b and 332f.

TABLE 1

Conduit	Number of Array Dies	Number of Die Interconnect Segments	Capacitive Load	Deviation from Maximum Load
332a	2	2	2.5L	0.5
332b	2	4	3L	0
332c	1	5	2.25L	0.75
332d	1	6	2.5L	0.5
332e	1	7	2.75L	0.25
332f	1	8	3L	0

[0061] As can be seen from Table 1, the maximum load of any conduit 332, using the example values previously described, is 3L, or rather three times the load of a single array die 310. Assuming the same example values, the load of a conduit in electrical communication with a die interconnect that itself is in electrical communication with each array die 310 would be 10L. Thus, certain embodiments of the present disclosure enable a reduction in the load of the conduits 332. Consequently, in some embodiments, the drivers 334 may each be smaller than a single driver that is configured to drive a signal from a conduit along a single die interconnect that is in electrical communication with a port from each of the array dies 310. Moreover, the drivers 334 may include smaller transistor sizes than a single driver that is configured to drive a signal to each of the array dies 110.

[0062] As can be seen from Table 1, conduits 332b and 332f have the largest capacitive load of the group of conduits, which is 3L. Conduit 332 has the smallest capacitive load

of the group of conduits, which is 2.25L and which is a deviation of only 0.75 from the maximum load. Thus, in some embodiments, each of the drivers 334 may be substantially similar in size. In certain implementations, the drivers 334 may vary in size based on the total capacitive load on each conduit 332. Thus, the driver 334f may be larger than the driver 334e. Alternatively, each driver 334 may be substantially equal and may be configured based on the drivers 334 with the largest load, which are drivers 334b and 334f in the example illustrated in FIG. 3 and Table 1.

[0063] In some embodiments, the capacitive load of each conduit 332 or driver 334 can be calculated using formula (1).

$$CL = AD + {}^{S}/_{M}$$

[0064] In formula (1), CL represents the capacitive load of a conduit 332 or driver 334, AD represents the number of array dies 310 in electrical communication with a die interconnect 320 that is in electrical communication with the conduit 332 and/or driver 334, 8 represents the number of die interconnect segments of the die interconnect 320, and M represents the ratio of the load of an array die 310 to the load of a segment of a die interconnect 320. Thus, using formula (1) and the example values described above, the load of the driver 332a, for example, can be calculated with the following values: AD=2, for two array dies 310; 8=2, for the two segments of the die interconnect 320a; and M=4, for the ratio of the load of an array die 310, **L,** to the load of a segment of the die interconnect 320a, 0.25L. Therefore, as can be seen from Table 1, the capacitive load of the driver 332a is 2.5L where L is the load of a single array die.

[0065] In some cases, the load on each conduit 332 and/or driver 334 may be evenly balanced. In other words, the load on each conduit 332 and/or driver 334 may be substantially the same. To achieve a balanced load, each of the conduits 332 may be in electrical communication with a combination of array dies 310 and die interconnect 320 segments that results in a load that is substantially equivalent to the loads of the other conduits 332. In certain embodiments, the load of the conduits 332 is balanced despite each conduit 332 being in electrical communication with a different subset of the array dies 310. However, in alternative embodiments, the load of each conduit 332 and/or

driver 334 may differ. This difference in the load of the conduits 332 and/or drivers 334 may be a design decision (e.g. to maintain a specific number of drivers). Alternatively, or in addition, the load difference between conduits 332 and/or drivers 334 may occur because the loads of the array dies 310 and the die interconnect segments 320 do not allow for perfect or substantially even load balancing.

[0066] As previously stated, in some embodiments the loads of the conduits 332 and/or drivers 334 may be balanced to minimize the difference between any pair of conduits 332 and/or drivers 334. For example, as illustrated in FIG. 3, a driver in electrical communication with a longer die interconnect, which may consequently include more die interconnect segments, is likely to obtain a larger load contribution from the die interconnect than a driver in electrical communication with a shorter die interconnect (e.g., compare driver 334f to 334a). Thus, the driver in electrical communication with the longer die interconnect may be in electrical communication with fewer array dies than the driver in electrical communication with the shorter die interconnect (e.g. compare driver 334f to 334a). The selection of die interconnect length and the selection of array dies to place in electrical communication with the die interconnects may therefore be dependent on the load of each segment of the die interconnects 320 and the loads of the array dies 310.

[0067] Alternatively, or in addition, the loads of the conduits 332 and/or drivers 334 may be balanced to reduce the maximum load of each conduit 332 and/or driver 334. Further, in some embodiments, the maximum load of each conduit 332 and/or driver 334 may be reduced to maintain the load of each conduit 332 and/or driver 334 to be at or below a threshold load difference.

[0068] Although not illustrated in FIG. 3, each of the conduits 332 may include one or more additional drivers configured to drive a signal received from an array die via a corresponding die interconnect 320. The additional drivers may drive the signal to a processor, a register, a latch, or any other component or device that mayor may not be part of a memory module that includes the memory package 300. In some implementations, one or more of the die interconnects 320 are configured to be bi-

directional, thereby enabling a signal to be driven to the array dies 310 via the die interconnect 320, and to enable a signal received from the array dies 310 along the same die interconnect 320 to be transmitted to a corresponding conduit 332 of the control die 330. Alternatively, the memory package 300 comprises one or more die interconnects 320 that are configured to enable a signal to be driven to the array dies 310 without enabling a signal to be received from the array dies 310 (e.g., the die interconnects 320 may not be bidirectional). In certain embodiments where one or more of the die interconnects 320 are not bi-directional, the memory package 300 may include additional die interconnects (not shown) that are in electrical communication with the one or more additional conduits or drivers and that are configured to enable a signal from the array dies 310 to be transmitted to the one or more additional conduits or drivers.

[0069] In addition to the drivers 334 of the control die 330, the memory package 300 may include one or more pre-drivers 340. A pre-driver 340, shown schematically in FIG. 3, may be large enough to drive a signal (e.g., a data signal) to any of the drivers 332 and subsequently, to any of the array dies 310. Thus, using the same example values as described above in relation to Table 1, a load of the pre-driver 340 may be at least 10l, which is the load of a conduit in electrical communication with a die interconnect that is in electrical communication with a port from each of the array dies 310. In some embodiments, the memory package 300 may include any number of additional drivers and/or latches for buffering and/or driving the signal to any of the array dies 310.

[0070] Just as the memory package 300 may include a pre-driver 340 for providing a signal to the conduits 332, the memory package 300 may include a post-driver (not shown) for driving an output signal from the control die 330. This post-driver may drive the output signal to additional latches and/or drivers. In some embodiments, the post-driver may drive the signal from the memory package 300 to a bus or other electrical path that is in electrical communication with the memory package 300.

[0071] FIG. 4 illustrates an example embodiment of a driver structure 400 of a control die (e.g. control die 230) in accordance with the present disclosure. The driver structure 400 is configured for a single data bit. Thus, a control die for a 32-bit memory package will

generally include at least 32 instances of the driver structure 400, one per bit. In some embodiments, the control die 230 may include the driver structure 400 in place of the combination of drivers 232a and 232b. Similarly, in certain embodiments, the control die 330 may include a structure similar to the driver structure 400 in place of the drivers 334. In such embodiments, the driver structure 400 would be modified to enable a signal (e.g., data signal) to be driven to the six conduits 332.

[0072] The driver structure 400 can include an input/output port 402 configured to receive or send a signal, such as a data signal. Signals received at the input/output port 402 can be provided to the drivers 404a and 404b. In turn, these drivers 404a and 404b can drive the signal to conduits 406a and 406b respectively, which are in electrical communication with corresponding die interconnects. Each of the die interconnects may be in electrical communication with different array dies in accordance with certain embodiments described herein.

[0073] In some embodiments, the driver structure 400 is bi-directional. In such embodiments, operation of the drivers 404a and 404b, and 408a and 408b may be controlled or enabled by a control signal (e.g., a directional control signal). This control signal, in some cases, may correspond to one or more of a command/address signal (e.g., read/write) and a chip select signal. In some implementations, the drivers 404a and 404b may drive a signal to the array die corresponding to the chip select signal, and not to array dies that do not correspond to a chip select signal. For example, suppose the conduit 406a is in electrical communication with array dies one and two (not shown), and that the conduit 406b is in electrical communication with array dies three and four (not shown). If a chip select signal is received corresponding to array die two, then in some implementations, driver 404a may be configured to drive a signal along a die interconnect in electrical communication with the conduit 406a to array die one and two. In this example, the driver 404b would not drive the signal because the chip select signal does not correspond to either array die three or array die four.

[0074] In some embodiments, the drivers 404a and 404b may drive a signal to all of the array dies. For example, assume the memory package that includes the driver structure

400 also includes four array dies. If the die interconnect in electrical communication with the conduit 406a is in electrical communication with two of the array dies, and if the die interconnect in electrical communication with the conduit 406b is in electrical communication with the other two array dies, then the drivers 404a and 404b may drive a signal to all four of the array dies of this example.

[0075] Similar to the input/output port 402, the conduits 406a and 406b can be configured to receive a signal from the die interconnects that are in electrical communication with the conduits 406a and 406b. In turn, the signal received at one of the conduits 406a and 406b can be provided to drivers 408a and 408b respectively. The drivers 408a and 408b can each be configured to drive a signal received from a respective data conduit 406a and 406b to the input/output port 402 and to another component that may be in electrical communication with the input/output port 402, such as a MCH.

[0076] In some embodiments, one or more chip selects, as illustrated in FIG. 2, may be used to select, determine, or enable the array die that communicates the signal to or from one or more of the conduits 406a and 406b and the drivers 408a and 408b. Similarly, in some embodiments, the chip select may select, determine, or enable the array die to receive and/or respond to the signal driven by the drivers 404a and 404b to the array dies.

[0077] It should be noted that the driver structure 400 is a non-limiting example for arranging drivers in a control die. Other driver structures are possible. For example, instead of the drivers 404a and 408a being in electrical communication with the same conduit 406a, each of the drivers 404a and 408a can be in electrical communication with a separate conduit and consequently a separate die interconnect. In such an example, the drivers 404a and 408a may still be in electrical communication with the same input/output port 402, or each driver may be in electrical communication with a separate port, the driver 404a in electrical communication with an input port, and the driver 408a in communication with an output port.

[0078] FIG. 5 presents a flowchart for an example embodiment of a load optimization process 500. In certain embodiments, the load optimization process 500 may be performed, at least in part, by one or more computing systems. Further, the process 500,

in some embodiments, may be used to optimize one or more loads in a memory package (e.g. memory package 200 or memory package 300). Optimizing the loads in the memory package can include optimizing the load on one or more conduits and/or drivers. As previously described with respect to FIGS. 2 and 3, the memory package can include a plurality of array dies, a plurality of die interconnects, and a control die. Furthermore, the control die can include a plurality of drivers, each of which may be configured to drive a signal along a die interconnect.

[0079] In some implementations, the process 500 can comprise selecting a first subset of array dies and a second subset of array dies from a plurality of array dies (e.g., array dies 310), as shown in operational block 502. Generally, the first subset of array dies and the second subset of array dies may be exclusive of one another. Thus, the first subset of array dies does not include any array dies from the second subset of array dies and vice versa. However, in some cases there may be some overlap between the first subset of array dies and the second subset of array dies. Further, in some cases, at least one of the subsets of array dies includes more than one array die. For instance, the first subset of array dies may include two array dies, and the second subset of array dies may include one array die, which, depending on the embodiment, mayor may not be included in the first subset of array dies.

[0080] Further, the first subset of array dies and the second subset of array dies may be selected to balance a load on a first driver and a load on a second driver based, at least in part, on the loads of the array dies 310 and on the loads of the die interconnect segments from a first and a second die interconnect. The first die interconnect may be in electrical communication with the first driver and the second die interconnect may be in electrical communication with the second driver. In some embodiments, the first subset of array dies and the second subset of array dies are selected to balance a load on a first conduit and a load on a second conduit. The load on each driver and/or conduit may be calculated using formula (1) as previously described above. In some embodiments, the first subset of array dies and the second subset of array dies may be selected to balance a load on a first driver and a load on a second driver based, at least in part, on the loads of the array dies 310 without considering the loads of the die interconnect segments from the first die

interconnect and the second die interconnect.

[0081] The process 500 further comprises forming electrical connections between the first die interconnect and the first subset of array dies in an operational block 504. The process 500 further comprises forming electrical connections between the second die interconnect and the second subset of array dies in an operational block 506. Forming the electrical connections places the die interconnects in electrical communication with the respective subsets of array dies. In some embodiments, forming the electrical connections can comprise forming electrical connections between the die interconnects and at least one port from each array die of the respective subsets of array dies.

[0082] The process 500 further comprises selecting a driver size for a first driver at block 508 and selecting a driver size for a second driver at block 510. Selecting the driver size can be based, at least in part, on the calculated load on the driver. Generally, the greater the load on the driver, the larger the driver is selected to drive a signal along, for example, a die interconnect. The size of the driver may be adjusted by the selection of the transistor size and/or number of transistors included in the driver. A larger driver often consumes more power than a smaller driver. Thus, in certain embodiments, balancing the loads on the drivers to reduce the load on each driver can reduce the power consumption of a memory package.

[0083] In some embodiments, the size of the first driver and the size of the second driver are both less than the size sufficient for a driver to drive a signal along a die interconnect to each of the array dies 310 (e.g., with less than a predetermined or threshold signal degradation). The threshold signal degradation can be based on anyone or more characteristics of a signal. For example, the threshold signal degradation can be based on the amplitude of the signal, the frequency of the signal, the noise distortion included in or introduced into the signal, or the shape of the signal, to name a few.

[0084] The process 500 further comprises forming electrical connections between the first die interconnect and the first driver in an operational block 512. Similarly, the process 500 further comprises forming electrical connections between the second die interconnect and the second driver in an operational block 514. Forming the electrical

connections places the die interconnects in electrical communication with the respective drivers. In some embodiments, forming the electrical connections can comprise forming electrical connections between the die interconnects and a data conduit that includes the respective driver.

[0085] Advantageously, certain embodiments of the present disclosure reduce the load on each conduit and on each corresponding driver. In certain embodiments, reducing the load on a driver may increase the speed of data transfer between the array dies and other components in a computer system (e.g. a MCH or a processor). Further, reducing the load on a driver may result in reduced power consumption by the driver and consequently, by the memory package. In addition, certain embodiments of the present disclosure may minimize current switching noise.

Operational Modes

[0086] A proposed three-dimensional stacking (3DS) standard for dual in-line memory modules (DIMMs) being considered by the Joint Electron Devices Engineering Council (JEDEC) addresses three major shortcomings in the current JEDEC registered DIMM (RDIMM) and JEDEC load reduced DIMM (LRDIMM) standards (an example LRDIMM structure 600 is schematically illustrated in FIG. 6A). These shortcomings include: a) The DIMM density limitation due to the fixed number of chip-select signals received by the DIMM from the system memory controller. b) The performance loss due to the increased load on the data bus as the DIMM density (e.g., the number of DRAM devices and number of ranks) increases. c) The upper bound of the DIMM density due to the physical DIMM form factor.

[0087] Further, the LRDIMM structure 600 may have timing issues due to signals passing through a single memory buffer 601. In addition, the increased size of the data path of the LRDIMM architecture 600, compared to the HCDIMM architecture 602, an example of which is schematically illustrated in FIG. 68, may result in more latency and signal integrity issues.

[0088] FIG. 7 schematically illustrates an example memory module 700 that has

previously been proposed for the 3DS-DIMM standard. The proposed 3DS Dual In-line Memory Module (3DS-DIMM) schematically illustrated in FIG. 7 attempts to address the above shortcomings using two components, a 3DS register 712 and a controller die 722. In some implementations, the 3DS-DIMM 700 includes the 3DS register 712 (also known as an enhanced DDR3 register). The 3DS register 712 may include a DDR3 JEDEC standard register with a "rank multiplication" circuit, which increases the number of the output chip-select signals for selecting an array die 710 by decoding one or more higher-order row or column address bits with the incoming chip-select signals from the system controller. The 3DS Register 712 can also include a command/address buffer, a register operational code buffer (RC word buffer), and rank multiplication logic (e.g., supporting rank multiplication of 1-to-2, 1-to-4, and/or 1-to-8). The 3DS register addresses shortcoming (a) of the JEDEC RDIMM and LRDIMM listed above.

[0089] Another component of the proposed 3DS-DIMM is a 3DS dynamic random-access memory (DRAM) package 720. The 3DS DRAM package 720 includes a plurality of stacked DDR DRAM chips 724 or array dies. The 3DS DRAM package 720 has a data I/O load that is equivalent to the data I/O load of a single-die DRAM package, regardless of the actual number of DRAM dies in the 3DS DRAM package 720. The 3DS DRAM package 720 may comprise a plurality of array dies (e.g., 2, 4 or 8 DDR DRAM dies) and a controller die 722. The controller die 722 may include data buffers, a data path timing controller, a secondary command/address buffer, a programmable secondary 1-to-2 rank decoder, and a data path signal (e.g., DDT, DDT, RTT) controller. Examples of such memory packages include HMC. The 3DS DRAM package 720 addresses the shortcomings (b) and (c) of the JEDEC RDIMM and LRDIMM listed above. However, there are deficiencies in the proposed 3DS-DIMM standard as described below.

[0090] The JEDEC DDR3 RDIMM standard contains two major components: a DDR3 register and a plurality of DRAM packages each comprising one or more DRAM chips or dies. The DDR3 register serves as a command/address signal buffer and as a command/control decoder. This DDR3 register holds a set of register control (RC) words, which a computer system configures to ensure the proper operation of the RDIMM. The DDR3 register contains a phase-lock-loop (PLL), which functions as a clock

synchronizer for each RDIMM. The DDR3 register outputs a set of buffered command/address signals to all the DRAM packages on the RDIMM, but the data signals are directly fed to the DRAM packages from the system memory controller.

[0091] In contrast to the JEDEC DDR3 RDIMM standard, the 3DS-DIMM proposal requires the DRAM package 720 to include the controller die 722 that controls all data paths timing and operations. This arrangement of the DRAM package reduces the load on the data bus, however, it presents three significant shortcomings: 1) The command/address buffer in the 3DS DRAM package introduces clock cycle latency since it needs to provide clock synchronous operation to the DRAM dies in the package. 2) The data path control circuit (e.g., DDT, read/write data direction) in the control die becomes very complicated to support semi-synchronous (flyby) data path control among all 3DS DRAM packages that are on a DIMM. 3) The variations in the DRAM die timing characteristics within each 3DS DRAM package would be likely to require resynchronization of the data signals during the read/write operations, which increases the read/write latency and the read-to-write and write-to-read turn around time.

[0092] The 3DS-DIMM proposal can also be compared to the HyperCloud™ (HC) DIMM architecture of Netlist, Inc. An example of the HCDIMM architecture 602 is illustrated in FIG. 68. Further details and embodiments of the HCDIMM architecture is disclosed in U.S. Pat. Nos. 7,289,386, 7,532,537, 7,619,912, and 7,636,274, each of which is incorporated in its entirety by reference herein. One of the main topological differences between the 3DS-DIMM and HCDIMM architectures is that while the 3DS-DIMM architecture uses a control die 722 to buffer the data signals and to decode command/address signals from the 3DS register, certain configurations of the HCDIMM architecture include a plurality of isolation devices (ID), each of which includes data buffers, but no decoding capability. Unlike the HCDIMM architecture, since the command/address signal needs to pass through the control die 722 in the 3DS DRAM package 720, the 3DSDIMM proposal presents the same shortcoming (b) of the controller die described above. The data path control signals are generated by the register device (RD) 612 in the HCDIMM architecture 602, while the data path control signals are generated by the control die 722 in the 3DS DRAM. This aspect of the 3DS-DIMM

architecture creates timing critical control paths in 3DS-DIMM architecture.

[0093] In certain embodiments described herein, a memory module architecture is proposed that includes a set of device components that support JEDEC 3DS operation with the benefit of RDIMM and HCDIMM architectures (see, e.g., FIG. 8). This set of device components may comprise two components: a register device 812 (RD), which in some embodiments may be the same or similar RD component as used in HCDIMM architectures, and a plurality of array dies 824, such as a DDR DRAM Stack Package (DDSP). The DDSP may comprise a DRAM control die that can include command/address buffers and a data path control circuit. Certain embodiments of the architecture described herein differs from the 3DS-DIMM architecture in that instead of the controller die of the 3DS-DIMM (which provides a secondary address buffer, and a second rank multiplication decoder), certain embodiments described herein use an "ID+" die as a control die 822, which can provide both selective isolation and address pass-through. Selective isolation refers generally to a driver corresponding to an array die driving a signal to the array die in response to a corresponding chip select signal while additional drivers corresponding to additional array dies maintain a previous state (e.g. do not drive the signal). For example, assuming that the memory package 300 implements selective isolation, if a chip select signal is received that corresponds to a selection of array die 310b, then the driver 334a will drive a signal along the die interconnect 320a to the array die 310b, and the remaining drivers (e.g., drivers 334b-334f) will maintain their state (e.g., not drive the signal). Address pass-through is described in further detail below.

[0094] The data path control circuit of certain embodiments may have at least two operational modes: mode-C (HCDIMM/RDIMM Compatible mode) and mode-3DS (3DS DIMM compatible mode). In mode-C, the array dies 824 (e.g. a DDSP) receive the data path control signals from the register device 812, which can be configured to control a command/address time slot and a data bus time slot. In mode-3DS, the control die 822 internally generates the data path control signals to ensure the proper operation of the data path.

[0095] The control die 822 of certain embodiments enables the memory module 800 to

work as either a 3DS-DIMM, a RDIMM, or a HCDIMM. However, the memory module 800 may comprise a set of optional control input pins (in addition to the package pins that are included in 3DS-DRAM packages) which in mode-C receive the data path control signals from the register device 812.

[0096] As previously mentioned, FIG. 8 schematically illustrates an example embodiment of a memory module architecture 800 in accordance with the present disclosure. Advantageously, certain embodiments of the memory module architecture 800 address the shortcomings described above without adding complexity or latency, and without causing performance loss. The memory module architecture 800 includes a memory control hub 802 (also known as a memory controller hub, a memory control handler, or a northbridge) and a memory module 810. As schematically illustrated in FIG. 8, the memory control hub 802 may communicate directly with one or more components of the memory module 810. Alternatively, the memory control hub 802 may communicate with one or more intermediary system components (not shown), which in turn communicate with one or more components of the memory module 810. In some embodiments, the memory control hub 802 may be integrated with another component of the computer system, such as a Central Processing Unit (CPU).

[0097] Further, in some embodiments, the memory control hub 802 may communicate with one or more memory modules. Each of the memory modules may be similar or substantially similar to the memory module 810. Alternatively, some of the memory modules may differ from memory module 810 in configuration, type, or both. For example, some of the memory modules may be capable of operating at different frequencies, may include a different amount of storage capability, or may be configured for different purposes (e.g. graphics versus nongraphics memory). Although in some cases a system may include memory modules capable of operating at different frequencies, each memory module may be configured to operate at the same frequency when used in a specific device. In certain implementations, the memory control hub 802 may set the operating frequency for the one or more memory modules.

[0098] The memory module 810 may include a register device 812, which is configured

to receive command, address, or command and address signals from the memory control hub 802. For the purpose of simplifying discussion, and not to limit these signals, the signals will be referred to herein as command/address signals.

[0099] In some embodiments, the register device 812 receives the command/address signals via a command/address bus 814. The command/address bus 814, although illustrated as a single line, may include as many lines or signal conduits as the number of bits of the command/address signal.

[0100] Further, the register device 812 may generate data path control signals, which can be provided to a control die 822, or isolation device, of a memory package 820 via one or more data path control lines 816. In certain embodiments, the control dies 822 can include some or all of the embodiments described above with respect to the control dies 230 and 330. Moreover, in certain embodiments, the memory packages 820 can include some or all of the embodiments described above with respect to the memory package 200 and 300. In general, the memory module 812 may include one or more memory packages 820.

[0101] In certain embodiments, each control die 822, or isolation device, may be capable of address pass-through. Address pass-through, in some cases, enables the control die 822 to provide an address signal to one or more array dies 824 without decoding the address signal. This is possible, in some implementations, because the address signal received by the control die 822 is not encoded.

[0102] Some implementations of the control dies 822 include a plurality of command/address buffers (not shown). These buffers may comprise latches. In certain embodiments, the buffers are configured to hold command/address signals to control the timing of command/address signals. In some cases, controlling the timing of the command/address signals may reduce or slow signal degradation. In some implementations, the control dies 822 include a plurality of data buffers, which may control the timing of data signals to reduce or slow signal degradation. Further, the control dies 822 may include a data path control circuit (not shown) that is configured to control command/address time slots and data bus time slots. Controlling the

command/address time slots and the data bus time slots enables the control dies 822 to reduce or prevent signal collisions caused by multiple memory packages 820 sharing the data path control lines 816 and the data bus 818. In some implementations, the data path control circuit may be separate from the control die 822.

[0103] Each of the control dies 822 may be configured to receive data signals from the memory control hub 802 via the data bus 818. Further, the control dies 822 may provide data signals to the memory control hub 802 via the data bus 818. The control dies 822 may also receive data path control signals and/or command/address signals from the register device 812 via the data path control lines 816.

[0104] As illustrated in FIG. 8, each memory package 820 may include one or more array dies 824 operatively coupled to the control die 822. The array dies 824 may be configured to receive data signals from the control die 822. As with the array dies 210 and 310, the array dies 824 may include any type of Random Access Memory (RAM) die. For example, the array dies 824 may include DDR DRAM, SDRAM, flash memory, or SRAM, to name a few. Further, if the memory module 810 is utilized for graphics, the array dies 824 may include GDDR SDRAM or any other type of graphics memory. In addition, the array dies 824 may be configured in a stack arrangement as illustrated in FIG. 8. Alternatively, the array dies 824 may be arranged in a planar configuration or a hybrid configuration utilizing both a planar and a stack arrangement.

[0105] In some embodiments, the memory module 810 is selectively configurable into two operational modes. In the first operational mode, the register device 812 generates data path control signals provided to the control dies 822 via the data path control lines 816. The control dies 822 may decode command/address signals included with the data path control signals generated by the register device 812. In some implementations, the control dies 822 use the data path control signals to operate the data path control circuits of the control dies 822.

[0106] In the second operational mode, the control dies 822 may operate the data path control circuits to provide command/address signals to the array dies 824 without decoding the command/address signals. In this mode, the control dies 822 may use

address pass-through to provide received address signals to the array dies 824.

[0107] Other operational modes may also be possible. In some embodiments, the data path control signals generated by the register device 812 may include decoded command/address signals that are decoded from command/address signals received from the memory control hub 802 via the command/address bus 814.

[0108] In some embodiments, the register device 812 may be configured to perform rank multiplication. In addition, or alternatively, the control dies 822 may be configured to perform rank multiplication. Embodiments of rank multiplication are described in greater detail in U.S. Patent Nos. 7,289,386 and 7,532,537, each of which are incorporated in their entirety by reference herein. In such embodiments, the register device 812 can generate additional chip select signals that are provided to the array dies 824. For instance, if the memory control hub 802 is configured to recognize a single array die 824 per memory package 820, but there exists four array dies 824 per memory package 820, the memory control hub 802 may not provide the correct number of chip select signals to access a specific memory location of the plurality of array dies 824 is memory package 820. Thus, to access the specific memory location, the register device 812 can determine the array die that includes the specific memory location to be accessed based on the command/address signals received from the memory control hub 802 and can generate the correct chip select signal to access the array die that includes the specific memory location. In certain embodiments, when the memory module 810 is operating in the second operation module as described above, the memory module 810 does not perform rank multiplication.

Terminology

[0109] Unless the context clearly requires otherwise, throughout the description and the claims, the words "comprise," "comprising," and the like are to be construed in an inclusive sense, as opposed to an exclusive or exhaustive sense; that is to say, in the sense of "including, but not limited to." The term "coupled" is used to refer to the connection between two elements, the term refers to two or more elements that may be either directly connected, or connected by way of one or more intermediate elements. Additionally, the

words "herein," "above," "below," and words of similar import, when used in this application, shall refer to this application as a whole and not to any particular portions of this application. Where the context permits, words in the above Detailed Description using the singular or plural number may also include the plural or singular number respectively. The word "or" in reference to a list of two or more items covers all of the following interpretations of the word: any of the items in the list, all of the items in the list, and any combination of the items in the list.

[0110] The above detailed description of embodiments of the invention is not intended to be exhaustive or to limit the invention to the precise form disclosed above. While specific embodiments of, and examples for, the invention are described above for illustrative purposes, various equivalent modifications are possible within the scope of the invention, as those skilled in the relevant art will recognize. For example, while processes or blocks are presented in a given order, alternative embodiments may perform routines having steps, or employ systems having blocks, in a different order, and some processes or blocks may be deleted, moved, added, subdivided, combined, and/or modified. Each of these processes or blocks may be implemented in a variety of different ways. Also, while processes or blocks are at times shown as being performed in series, these processes or blocks may instead be performed in parallel, or may be performed at different times.

[0111] The teachings of the invention provided herein can be applied to other systems, not necessarily the system described above. The elements and acts of the various embodiments described above can be combined to provide further embodiments.

[0112] Conditional language used herein, such as, among others, "can," "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.

[0113] While certain embodiments of the inventions have been described, these embodiments have been presented by way of example only, and are not intended to limit the scope of the disclosure. Indeed, the novel methods and systems described herein may be embodied in a variety of other forms; furthermore, various omissions, substitutions and changes in the form of the methods and systems described herein may be made without departing from the spirit of the disclosure. The accompanying claims and their equivalents are intended to cover such forms or modifications as would fall within the scope and spirit of the disclosure.

WHAT IS CLAIMED IS:

1. A memory package, comprising:

a plurality of input/output terminals via which the memory package communicate data and control/address signals with one or more external devices;

a plurality of stacked array dies including a first group of array dies and a second group of at least one array die, each array die having data ports;

at least a first die interconnect and a second die interconnect, the first die interconnect in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnect in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

a control die comprising at least a first data conduit between the first die interconnect and a first terminal of the plurality of input/output terminals, and at least a second data conduit between the second die interconnect and the first terminal, the first terminal being a data terminal, the first data conduit including a first driver having a first driver size and configured to drive a data signal from the first terminal to the first group of array dies, the second data conduit including a second driver configured to drive a signal from the second terminal to the second group of at least one array die, the second driver having a second driver size different from the first driver size.

2. The memory package of claim 1, wherein the second die interconnect is longer than the first die interconnect, and wherein the second driver size is larger than the first driver size.

3. The memory package of clam 1, wherein the second die interconnect is longer than the first die interconnect, and wherein a number of array dies in the second group of at least one array die is less than a number of array dies in the first group of array dies.

4. The memory package of claim 1, wherein first driver size and the second driver size are related to a load on the first driver and a load on the second driver.

5. The memory package of claim 1, wherein the control die further comprising a control circuit to control respective states of the first data conduit and the second data conduit in response to control signals received via one or more second terminals of the plurality of terminals.

6. A memory package, comprising:

a plurality of input/output terminals via which the memory package communicate data and control/address signals with one or more external devices;

a plurality of stacked array dies including a first group of array dies and a second group of at least one array die, each array die having data ports;

at least a first die interconnect and a second die interconnect, the first die interconnect in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnect in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

wherein the second die interconnect is longer than the first die interconnect, and wherein a number of array dies in the second group of at least one array die is less than a number of array dies in the first group of array dies.

7. The memory package of claim 6, further comprising:

a control die comprising at least a first data conduit between the first die interconnect and a first terminal of the plurality of input/output terminals, and at least a second data conduit between the second die interconnect and the first terminal, the first terminal being a data terminal, the first data conduit including a first driver having a first driver size and configured to drive a data signal from the first terminal to the first group of array dies, the second data conduit including a second driver configured to drive a signal from the second terminal to the second group of at least one array die, the second driver having a second driver size different from the first driver size.

8. The memory package of claim 7, wherein the second driver size is larger than the first driver size.

9. The memory package of claim 7, wherein the control die further comprising a control circuit to control respective states of the first data conduit and the second data conduit in response to control signals received via one or more second terminals of the plurality of terminals.

MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

ABSTRACT OF THE DISCLOSURE

An apparatus is provided that includes a plurality of array dies and at least two die interconnects. The first die interconnect is in electrical communication with a data port of a first array die and a data port of a second array die and not in electrical communication with data ports of a third array die. The second die interconnect is in electrical communication with a data port of the third array die and not in electrical communication with data ports of the first array die and the second array die. The apparatus includes a control die that includes a first data conduit configured to transmit a data signal to the first die interconnect and not to the second die interconnect, and at least a second data conduit configured to transmit the data signal to the second die interconnect and not to the first die interconnect.

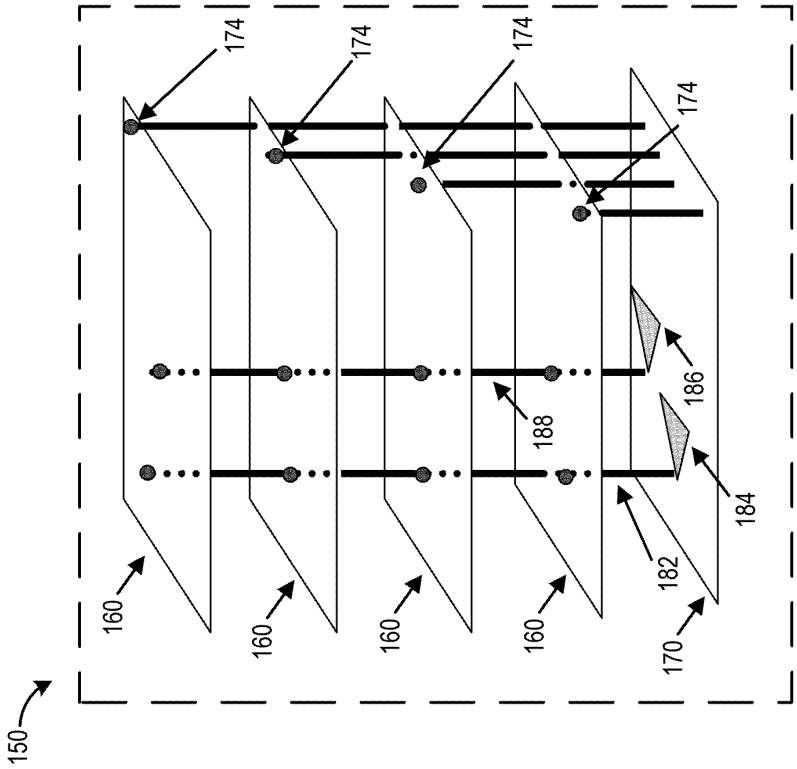
150
160
160
160
160
174
174
174
174
188
186
184
182
170

FIG. 1B

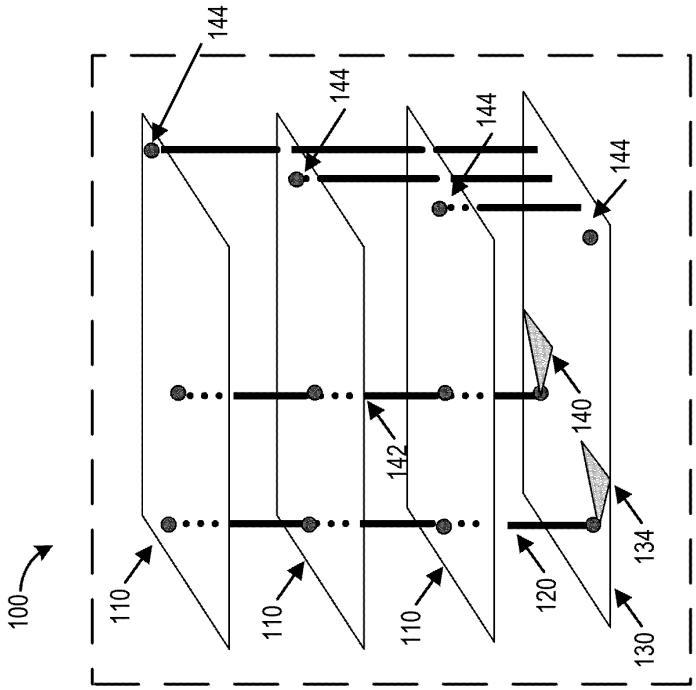
100
110
110
110
120
130
134
140
142
144
144
144
144

FIG. 1A

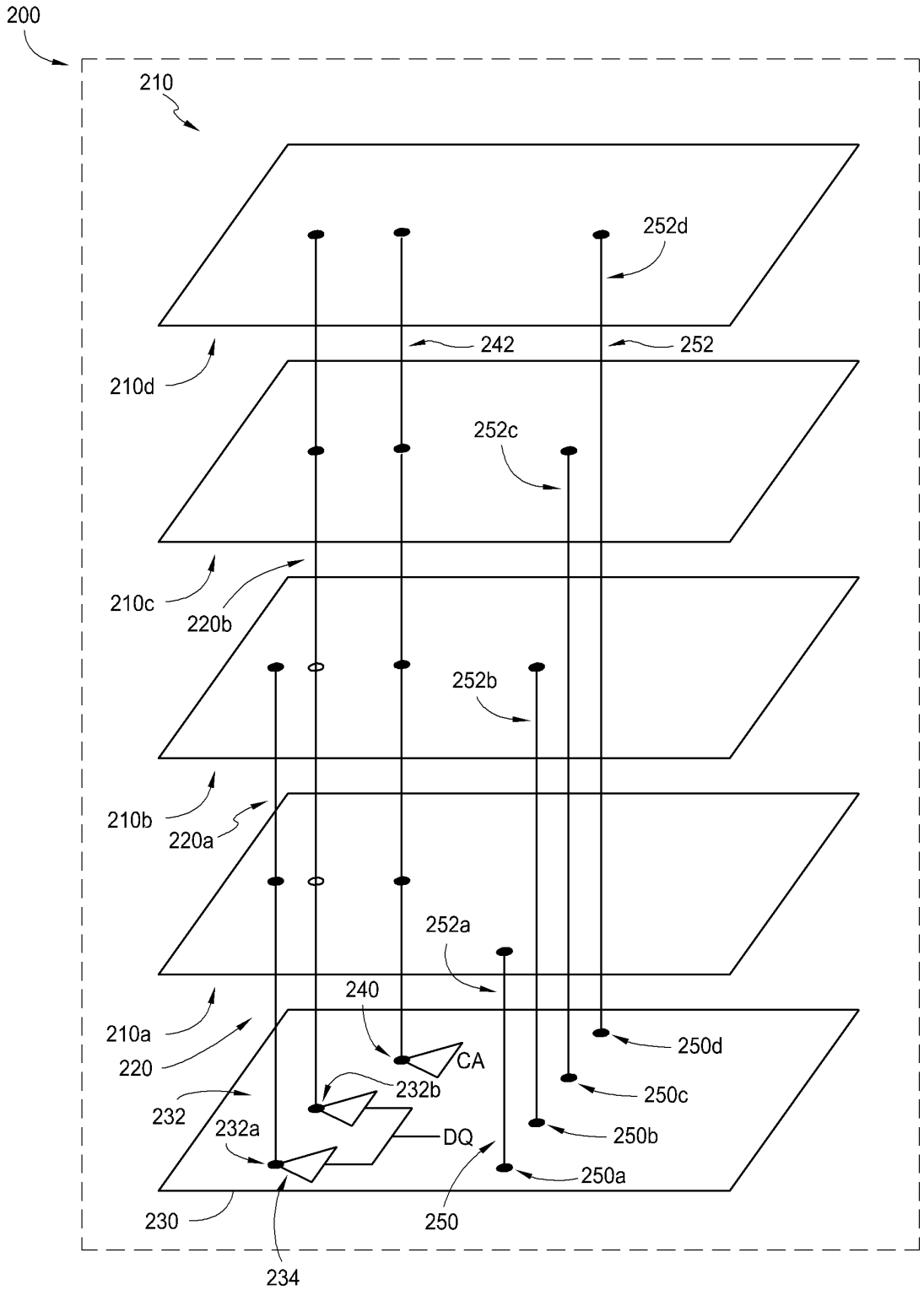
200
210
252d
242
252
210d
252c
210c
220b
252b
210b
220a
252a
240
210a
220
CA
250d
232b
250c
232
232a
DQ
250b
250a
230
250
234

FIG. 2

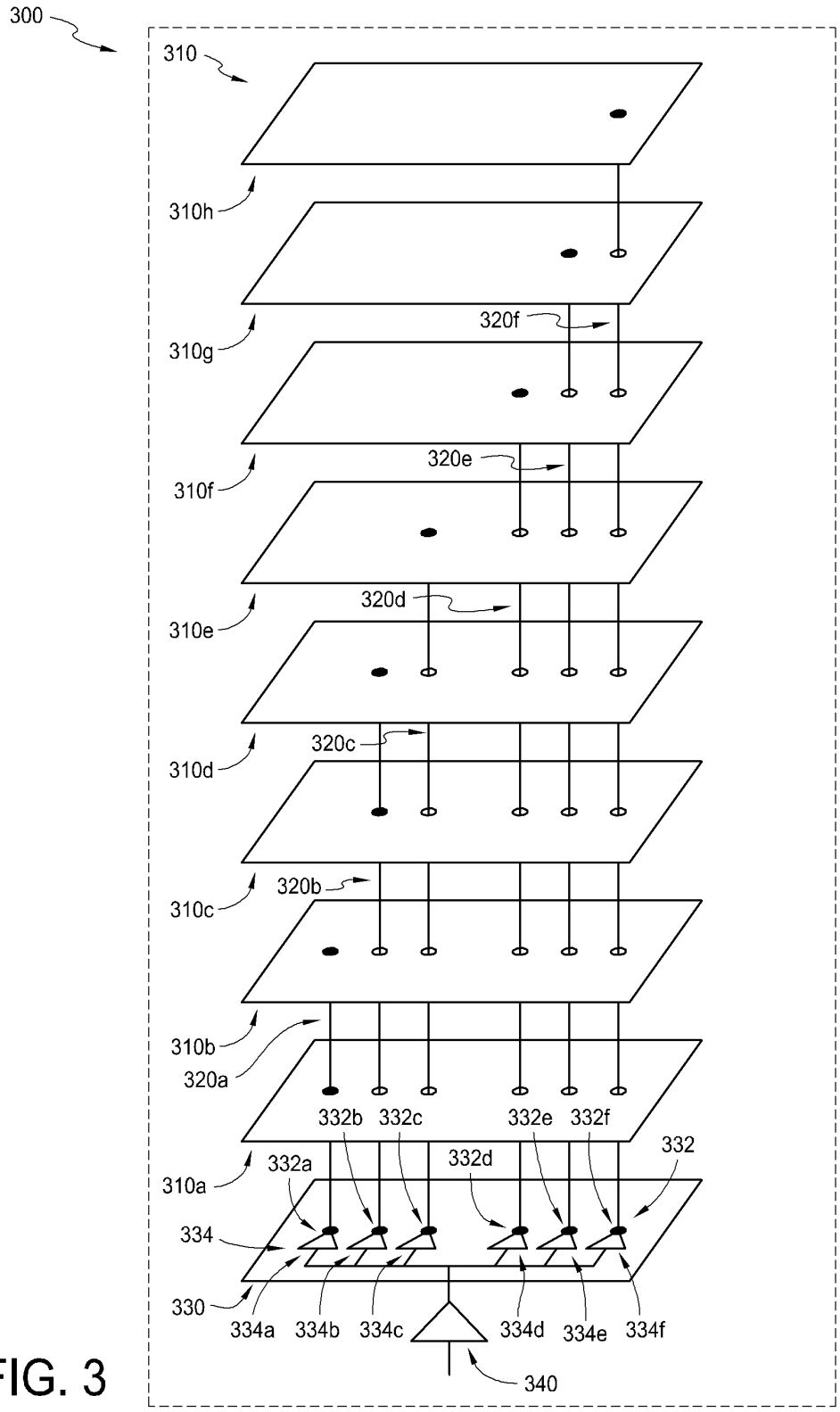
300
310
310h
310g
320f
310f
320e
310e
320d
310d
320c
310c
320b
310b
320a
332b
332c
332e
332f
332
332a
332d
310a
334
330
334a
334b
334c
334d
334e
334f
340

FIG. 3

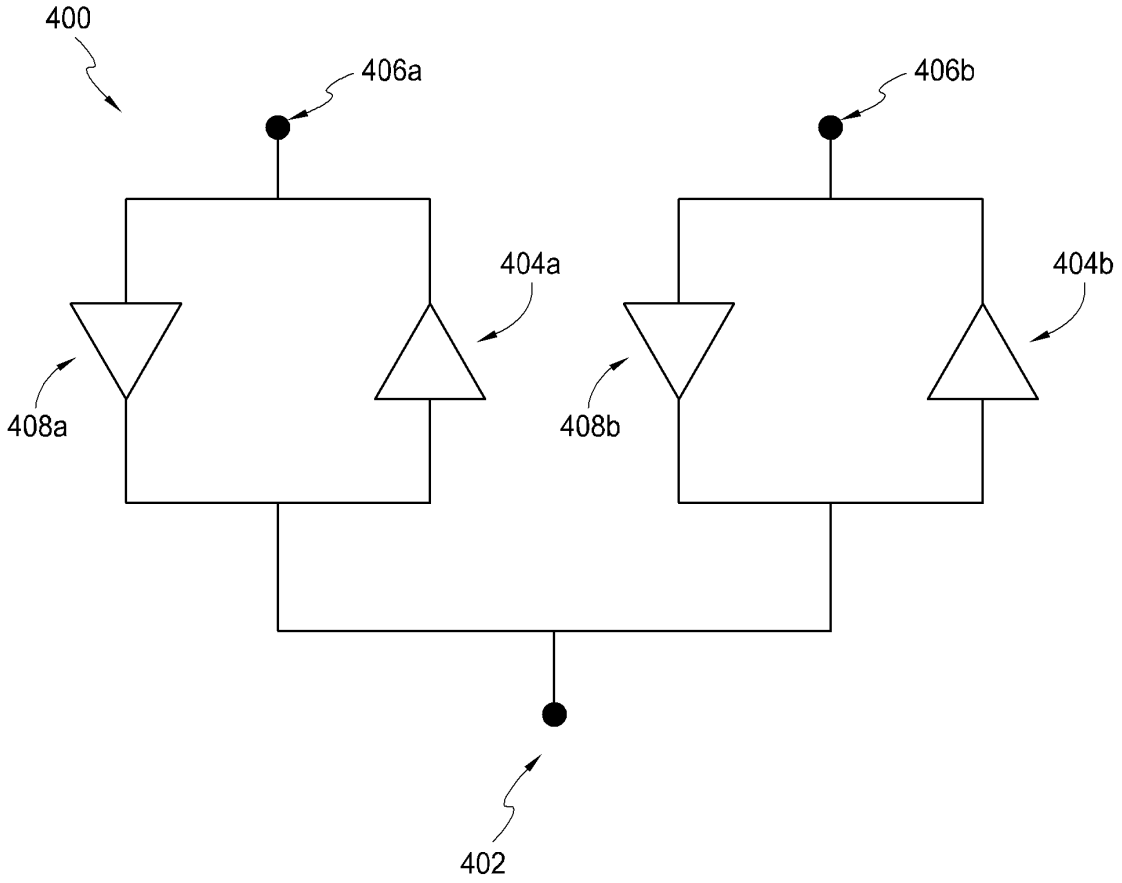

FIG. 4

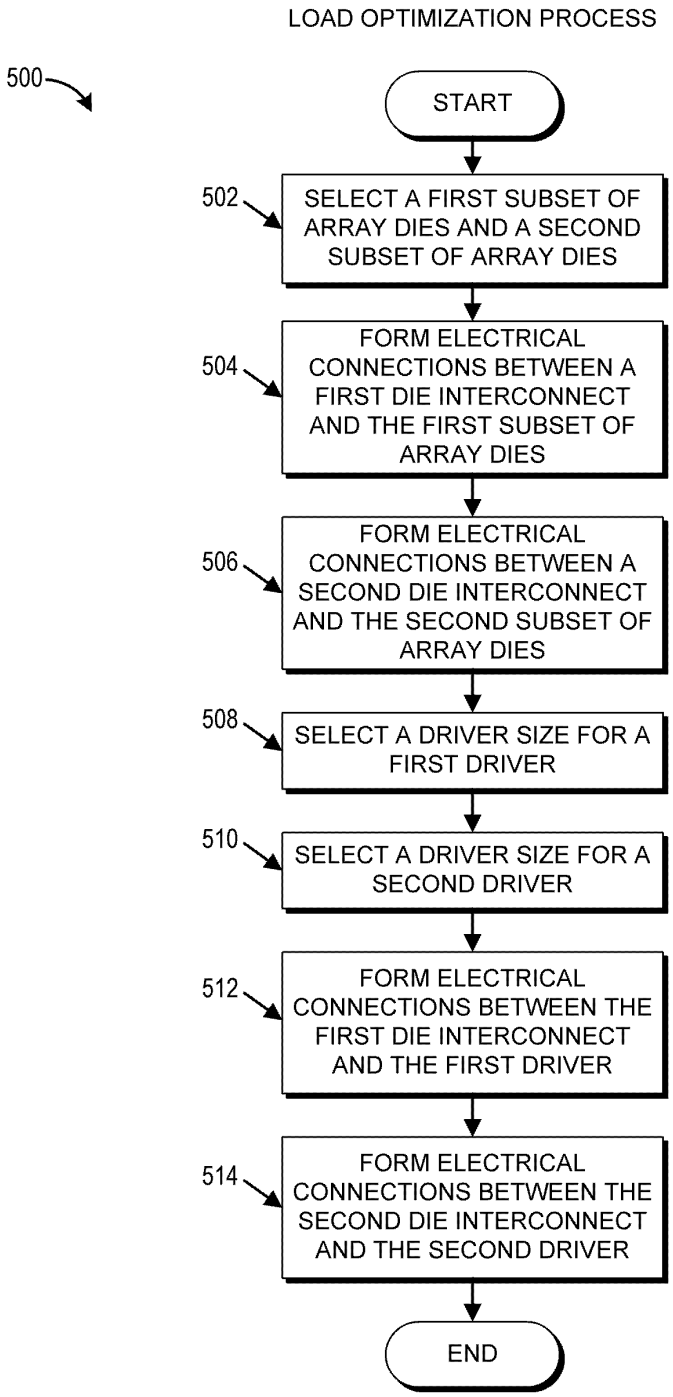
LOAD OPTIMIZATION PROCESS
500
START
502
SELECT A FIRST SUBSET OF ARRAY DIES AND A SECOND SUBSET OF ARRAY DIES
504
FORM ELECTRICAL CONNECTIONS BETWEEN A FIRST DIE INTERCONNECT AND THE FIRST SUBSET OF ARRAY DIES
506
FORM ELECTRICAL CONNECTIONS BETWEEN A SECOND DIE INTERCONNECT AND THE SECOND SUBSET OF ARRAY DIES
508
SELECT A DRIVER SIZE FOR A FIRST DRIVER
510
SELECT A DRIVER SIZE FOR A SECOND DRIVER
512
FORM ELECTRICAL CONNECTIONS BETWEEN THE FIRST DIE INTERCONNECT AND THE FIRST DRIVER
514
FORM ELECTRICAL CONNECTIONS BETWEEN THE SECOND DIE INTERCONNECT AND THE SECOND DRIVER
END

FIG. 5

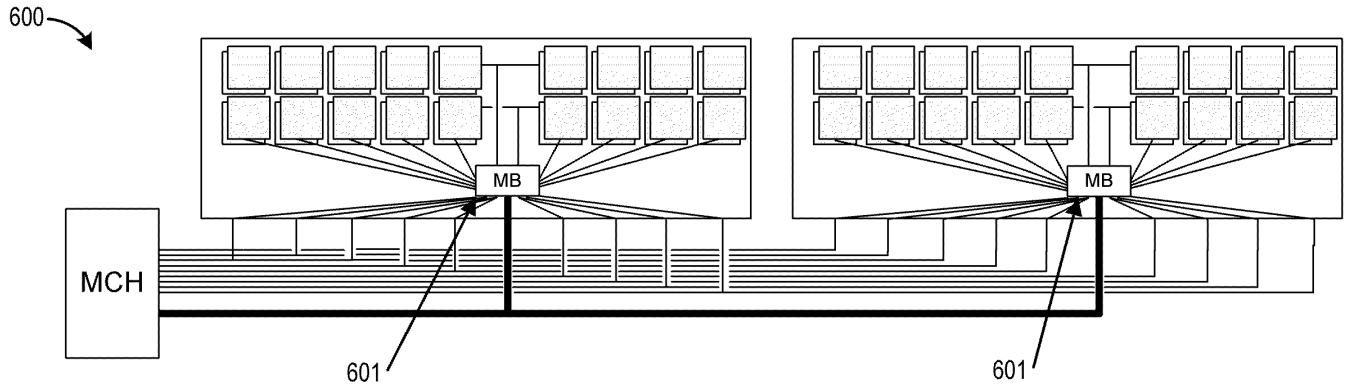

FIG. 6A

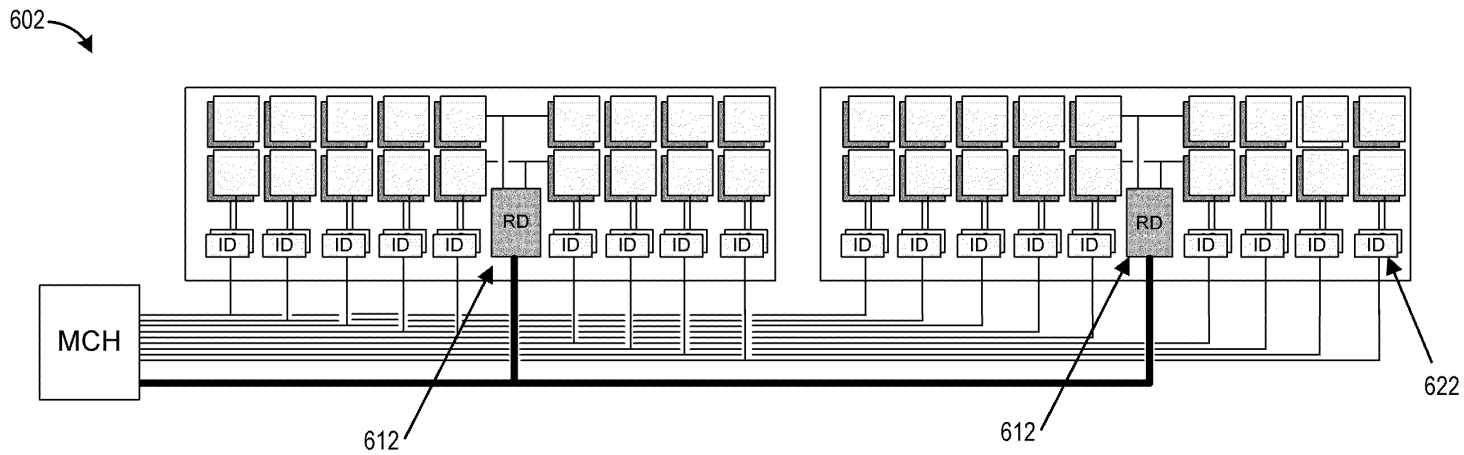

FIG. 6B

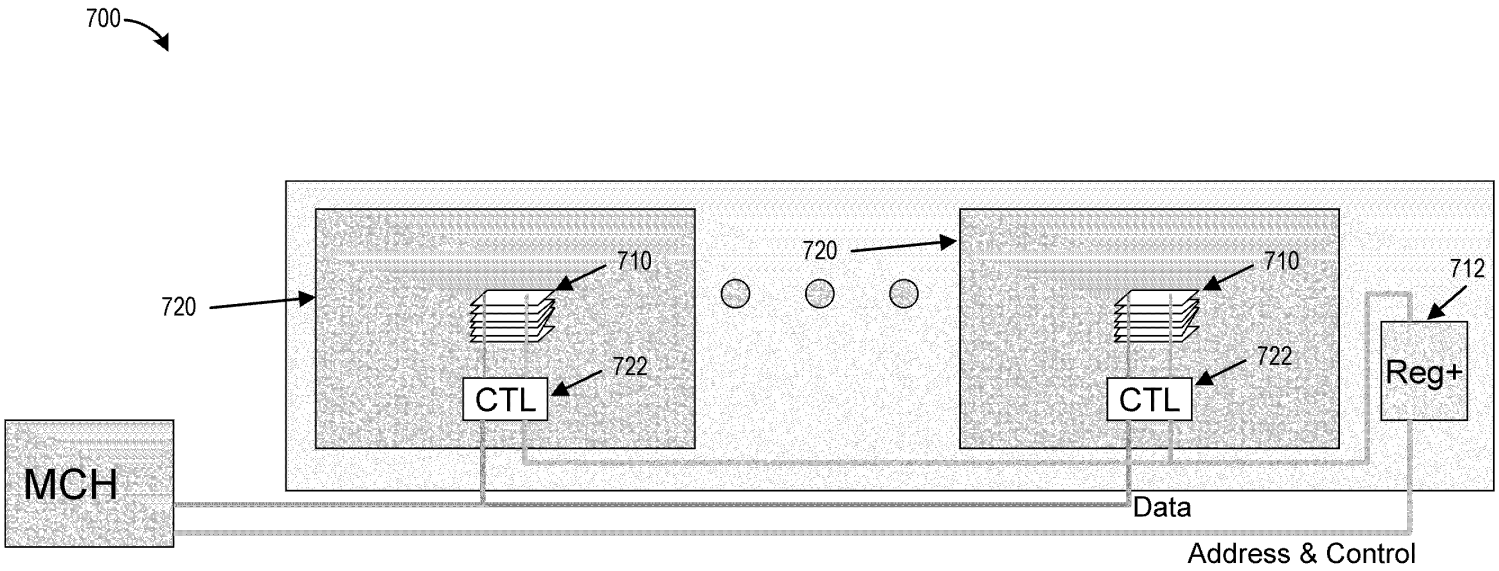
700
720
710
722
CTL
720
710
722
CTL
712
Reg+
MCH
Data
Address & Control

FIG. 7

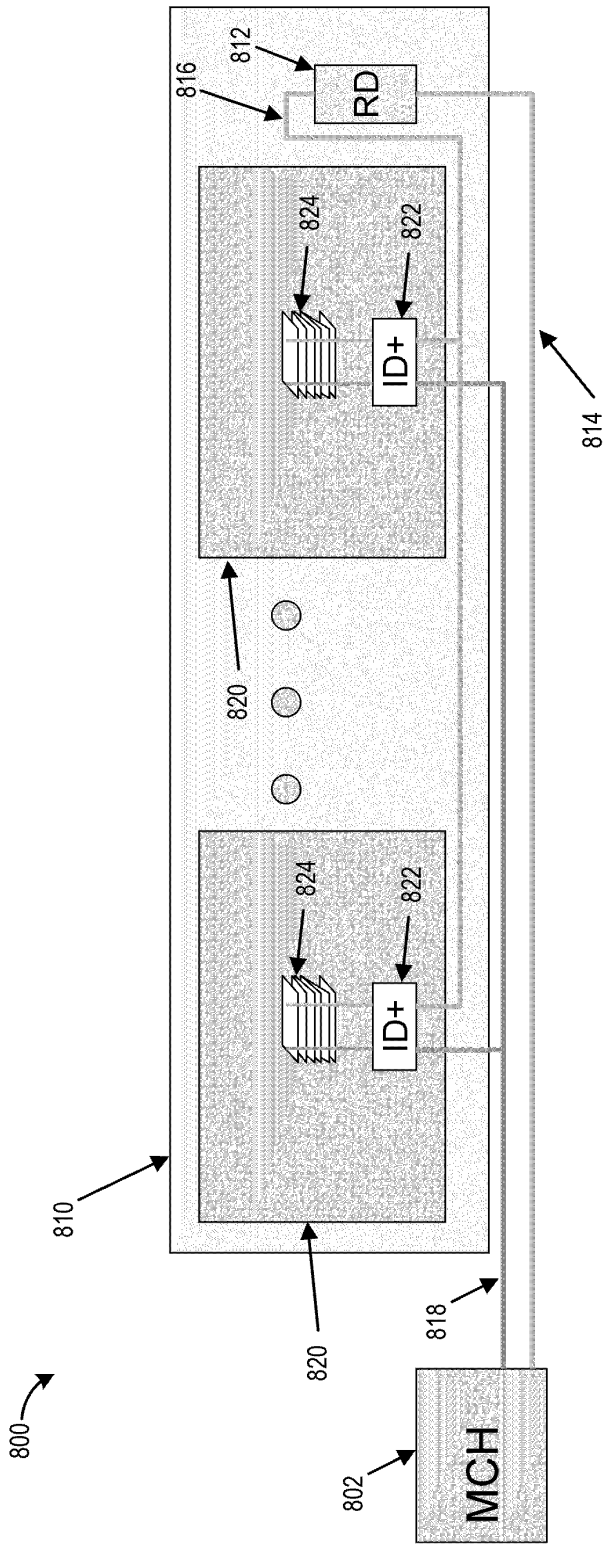

FIG. 8

Electronic Patent Application Fee Transmittal

Application Number:	
Filing Date:	
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng
Attorney Docket Number:	NETL.071C1

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**730**

Electronic Acknowledgement Receipt

EFS ID:	19640637
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	21-JUL-2014
Filing Date:	
Time Stamp:	22:35:51
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	2014-07-21_Datasheet_NETL071C1.pdf	1425359 398381ae346980768cde7c56c07f2467d37fbd5c	no	4

Warnings:

Information:

2	Specification	2014-07-21_Specification_NETL71C1.pdf	341189 d3180e02d95e6e415c646b24d6611f1bedc0b29b	no	41
Warnings:					
Information:					
3	Drawings-only black and white line drawings	2014-07-21_Drawings_NETL071C1.pdf	674388 5eee57b769385996a12c45083a8e8e6e284936cd	no	8
Warnings:					
Information:					
4	Fee Worksheet (SB06)	fee-info.pdf	32957 29746c0db47da09a46920dc7f20829d032b1b5cf	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	2473893	

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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
14/337,168	07/21/2014	2811	0.00	NETL.071C1	9	2

CONFIRMATION NO. 8733

FILING RECEIPT

79141
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000069919932

Date Mailed: 08/04/2014

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;

Assignment For Published Patent Application
NETLIST, INC., Irvine, CA

Power of Attorney: None

Domestic Priority data as claimed by applicant
This application is a CON of 13/288,850 11/03/2011 PAT 8787060
which claims benefit of 61/409,893 11/03/2010

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.

If Required, Foreign Filing License Granted: 07/30/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/337,168**

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

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

Title

MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

Preliminary Class

257

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).

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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
14/337,168

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	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	9 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 210 =	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	730		TOTAL	

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 =	
AMENDMENT A	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT A	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT A	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($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
AMENDMENT B	Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
AMENDMENT B	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT B	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT B	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
14/337,168	07/21/2014	Hyun Lee	NETL.071C1

CONFIRMATION NO. 8733

FORMALITIES LETTER

79141
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000069919933

Date Mailed: 08/04/2014

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. Small entity discount is in effect. 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.)

- $ **70** basic filing fee.
- $ **70** surcharge.
- $ **300** search fee.
- $ **360** examination fee.
- $(**0**) previous unapplied payment amount.
- $ **800** TOTAL FEE BALANCE DUE.

Items Required To Avoid Processing Delays:

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's

oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  Hyun Lee

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.

/tnguyen/

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

Electronic Patent Application Fee Transmittal

Application Number:	14337168
Filing Date:	21-Jul-2014
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng
Attorney Docket Number:	NETL.071C1

Filed as Small Entity

Utility under 35 USC 111(a) Filing Fees

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Utility filing Fee (Electronic filing)	4011	1	70	70
Utility Search Fee	2111	1	300	300
Utility Examination Fee	2311	1	360	360
Pages:				
Claims:				
Miscellaneous-Filing:				
Late Filing Fee for Oath or Declaration	2051	1	70	70
Petition:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**800**

Electronic Acknowledgement Receipt

EFS ID:	20330248
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	04-OCT-2014
Filing Date:	21-JUL-2014
Time Stamp:	00:17:40
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$800
RAM confirmation Number	6119
Deposit Account	
Authorized User	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)

1	Fee Worksheet (SB06)	fee-info.pdf	36990 88152888bed52dead58ea268fda77685167b289e	no	2

Warnings:	
Information:	
Total Files Size (in bytes):	36990

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.

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number
14/337,168

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	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	9 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	2 minus 3 =	*	x 210 =	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	730		TOTAL	

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 =	
AMENDMENT A	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT A	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT A	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 =	
AMENDMENT B	Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
AMENDMENT B	Application Size Fee (37 CFR 1.16(s))									
AMENDMENT B	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	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
14/337,168	07/21/2014	2811	800	NETL.071C1	9	2

CONFIRMATION NO. 8733

UPDATED FILING RECEIPT

79141
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000072203464

Date Mailed: 12/05/2014

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;

Assignment For Published Patent Application
NETLIST, INC., Irvine, CA

Power of Attorney: None

Domestic Priority data as claimed by applicant
This application is a CON of 13/288,850 11/03/2011 PAT 8787060
which claims benefit of 61/409,893 11/03/2010

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.

If Required, Foreign Filing License Granted: 07/30/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/337,168**

Projected Publication Date: 03/12/2015

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****

Title

MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

Preliminary Class

257

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).

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

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
14/337,168	07/21/2014	Hyun Lee	NETL.071C1

CONFIRMATION NO. 8733

NOTICE

79141
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000072203465

Date Mailed: 12/05/2014

INFORMATIONAL NOTICE TO APPLICANT

Applicant is notified that the above-identified application contains the deficiencies noted below. No period for reply is set forth in this notice for correction of these deficiencies. However, if a deficiency relates to the inventor's oath or declaration, the applicant must file an oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each actual inventor no later than the expiration of the time period set in the "Notice of Allowability" to avoid abandonment. See 37 CFR 1.53(f).

The item(s) indicated below are also required and should be submitted with any reply to this notice to avoid further processing delays.

- A properly executed inventor's oath or declaration has not been received for the following inventor(s):
  Hyun Lee

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.
14/337,168	07/21/2014	Hyun Lee	NETL.071C1	8733

79141 7590 01/22/2015
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

EXAMINER
HOANG, HUAN

ART UNIT	PAPER NUMBER
2827	

NOTIFICATION DATE	DELIVERY MODE
01/22/2015	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):

jz@jzpatent.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 14/337,168	Applicant(s) LEE, HYUN	
	Examiner HUAN HOANG	Art Unit 2827	AIA (First Inventor to File) 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 _____.

☐ 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) 1-9 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) 1-9 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 07/21/14 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: _____.

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

DETAILED ACTION

Double Patenting

1. 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 claims at issue 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); and *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 a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of

activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form 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 http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

2. Claims 1-9 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 8,787,060. Although the claims at issue are not identical, they are not patentably distinct from each other because it would have been obvious to one of ordinary skill in the art to recognize that all the limitations of claim 1 are recited in claim 15 of the patent. The only differences between claims 2-9 and claims 1-19 of the patent are the different sizes of the first and second drivers and the different lengths of the first die and second die interconnects. However, the memory package of claims 1-9 and the memory package of claims 1-19 are identical in structure and the differences would have been obvious to one of ordinary skill in the art.

3. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUAN HOANG whose telephone number is (571)272-1779. The examiner can normally be reached on Tues-Fri 8:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. 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.

/HUAN HOANG/
Primary Examiner, Art Unit 2827

Notice of References Cited	Application/Control No. 14/337,168	Applicant(s)/Patent Under Reexamination LEE, HYUN	
	Examiner HUAN HOANG	Art Unit 2827	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
*	A	US-8,787,060	07-2014	Lee, Hyun	365/63
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

CPC- SEARCHED

Symbol	Date	Examiner

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner
365	63, 51, 52	1/12/15	HH

SEARCH NOTES

Search Notes	Date	Examiner
EAST (text search)	1/12/15	HH

INTERFERENCE SEARCH

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

	/HUAN HOANG/ Primary Examiner.Art Unit 2827

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

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

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

CLAIM		DATE								
Final	Original	01/12/2015								
	1	✓								
	2	✓								
	3	✓								
	4	✓								
	5	✓								
	6	✓								
	7	✓								
	8	✓								
	9	✓								

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	3	"8787060"	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 12:38
L3	14111	(memory stor$3) and ("input/output" "i/o") and stack$3 with (dies die ic chip)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:45
L5	6380	3 and interconnect	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:46
L6	2481	5 and interconnect with (group portion number part)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:47
L7	1439	6 and control$4 with (die dice chip ic)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:49
L8	0	7 and driv$3 near3 (size capability) with interconnect with different	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:50
L9	8	7 and driv$3 near3 (size capability) with interconnect	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:50
L10	107	7 and interconnect with (longer shorter) and number with (die dice)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:52
L11	21	7 and interconnect with (longer shorter) and number with (die dice) near3 array	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/01/12 14:53

EAST Search History (Interference)

<This search history is empty>

1/ 12/ 2015 3:00:05 PM
C:\ Users\ hhoang1\ Documents\ EAST\ Workspaces\ default.wsp

UNITED STATES PATENT AND TRADEMARK OFFICE
COMMISSIONER FOR PATENTS
P.O.BOX 1450
ALEXANDRIA VA 22313-1451

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
POSTEDIGITAL
NNNNN

The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

Courtesy Reminder for
Application Serial No: 14/337,168

Attorney Docket No: NETL.071C1
Customer Number: 79141
Date of Electronic Notification: 01/22/2015

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
jz@jzpatent.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://sportal.uspto.gov/secure/myportal/privatepair.** If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

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
14/337,168	07/21/2014	Hyun Lee	NETL.071C1

CONFIRMATION NO. 8733

PUBLICATION NOTICE

79141
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000073920306

Title:MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

Publication No.US-2015-0070959-A1
Publication Date:03/12/2015

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 Office of Public Records. The Office of Public Records can be reached by telephone at (703) 308-9726 or (800) 972-6382, by facsimile at (703) 305-8759, by mail addressed to the United States Patent and Trademark Office, Office of Public Records, 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 http://pair.uspto.gov/. 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

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Hyun Lee
App. No.	:	14/337,168
Filed	:	July 21, 2014
For	:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
Examiner	:	HOANG, HUAM
Art Unit	:	2827
Conf. No.	:	8733
Docket No.	:	NETL.071C1

CERTIFICATE OF EFS WEB TRANSMISSION

I hereby certify that this correspondence and any other attachment noted on the Automated Acknowledgement Receipt, is being transmitted from within the Pacific Time zone to the Commissioner for Patents via the EFS Web Server on:

July 22, 2015

(Date)

/Jamie J. Zheng/

Jamie J. Zheng, Reg. No. 51167

AMENDMENT

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

Sir:

The enclosed Amendment is in response to the Non-Final Office Action dated January 22, 2015 for the above-identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Deposit Account No. 50-5963.

AMENDMENTS to the CLAIMS begin on Page 2 of this paper.

REMARKS begin on Page 7 of this paper.

HAT IS CLAIMED IS:

1. – 9. **(Cancelled)**

10. **(New)** A memory package, comprising:

data terminals and control terminals;

stacked array dies including a first group of array dies and a second group of at least one array die;

first die interconnects and second die interconnects, the first die interconnects in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnects in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

a control die comprising first data conduits between the first die interconnects and the data terminals, and second data conduits between the second die interconnects and the data terminals, the first data conduit including first drivers each having a first driver size and configured to drive a data signal from a corresponding data terminal to the first group of array dies, the second data conduit including second drivers each having a second driver size and configured to drive a data signal from a corresponding data terminal to the second group of at least one array die, the second driver size being different from the first driver size.

11. **(New)** The memory package of claim 10, wherein the second die interconnects are longer than the first die interconnects, and wherein the second driver size is larger than the first driver size.

12. **(New)** The memory package of clam 10, wherein the second die interconnects are longer than the first die interconnects, and wherein a number of array dies in the second group of at least one array die is less than a number of array dies in the first group of array dies.

13. **(New)** The memory package of claim 10, wherein the first driver size and the second driver size are related to a load on the first driver and a load on the second driver.

14. (**New**) The memory package of claim 10, wherein the control die further comprises a control circuit to control respective states of the first data conduits and the second data conduits in response to control signals received via the control terminals.

15. (**New**) A memory package, comprising:

data terminals and control terminals;

stacked array dies including a first group of array dies and a second group of at least one array die;

first die interconnects and a second die interconnects, the first die interconnects in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnects in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

wherein the second die interconnects are longer than the first die interconnect, and wherein a number of array dies in the second group of at least one array die is less than a number of array dies in the first group of array dies.

16. (**New**) The memory package of claim 15, further comprising:

a control die comprising first data conduits between the first die interconnects and the data terminals, and second data conduits between the second die interconnects and the data terminals, the first data conduits including first drivers each having a first driver size and configured to drive a data signal from a corresponding data terminal to the first group of array dies, the second data conduit including second drivers each having a second driver size and configured to drive a data signal from a corresponding data terminal to the second group of at least one array die, the second driver size being different from the first driver size.

17. (**New**) The memory package of claim 16, wherein the second driver size is larger than the first driver size.

18. (**New**) The memory package of claim 16, wherein the control die further comprises a control circuit to control respective states of the first data conduits and the

second data conduits in response to control signals received via one or more second terminals of the plurality of terminals.

19. (**New**) A memory module operable in a computer system with a system memory controller, comprising:

a register device configured to receive input command/address signals from the system memory controller and to output control signals; and

a plurality of DRAM packages, each DRAM package comprising:

data terminals via which the DRAM package communicate data signals with the system memory controller, and control terminals via which the DRAM package receive the control signals from the register device;

stacked array dies including a first group of array dies and a second group of at least one array die;

die interconnects including first die interconnects and second die interconnects, the first die interconnects in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnects in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

a control die including first data conduits between the first die interconnects and data terminals, and second data conduits between the second die interconnects and the data terminals, the first data conduits including first drivers each having a first driver size, the second data conduits including second drivers each having a second driver size different from the first driver size, the first drivers to drive first write data signals received from the system memory controller to one of the first group of array dies, the second drivers to drive second write data signals received from the system memory controller to one of the second group of at least one array die.

20. (**New**) The memory module of claim 19, wherein the control die receives the control signals and further includes a control circuit to control respective states of the first data conduits and the second data conduits in response to the control signals.

21. (**New**) The memory module of claim 20, wherein the control signals include data path control signals generated by the register device, the data path control signals being used to control the respective states of the first data conduits and the second data conduits.

22. (**New**) The memory module of claim 20, wherein the control die is configured to generate data path control signals from at least some of the control signals, the data path control signals being used to control the respective states of the first data conduits and the second data conduits.

23. (**New**) The memory module of claim 19, wherein the control signals include address signals and the control die provides the address signals to the plurality of array dies.

24. (**New**) The memory module of claim 19, wherein the input command/address signals include first chip select signals, wherein the register device is configured to perform rank multiplication by generating second chip select signals from at least some of the input command/address signals, the second chip select signals having a number of chip select signals greater than the first chip select signals and equal to a number of array dies in the plurality of array dies, and wherein the DRAM package further comprises chip select die interconnects for conducting the second chip select signals to respective ones of the plurality of array dies.

25. (**New**) The memory module of claim 19, wherein the control signals include output command/address signals derived from the input command/address signals, the output command/address signals including first chip select signals, wherein the control die is further configured to perform rank multiplication by generating second chip select signals from at least some of the output command/address signals, the second chip select signals having a number of chip select signals greater than the first chip select signals and equal to a number of array dies in the plurality of array dies, and wherein the DRAM package further comprises chip select die interconnects for conducting the second chip select signals to respective ones of the plurality of array dies.

26. (**New**) The memory module of claim 19, wherein the first driver size and the second driver size are related to a first load on the first driver and a second load on the second driver.

27. (**New**) The memory module of claim 19, wherein the control signals include command/address signals, and the control die includes buffers to control the timing of the command/address signals.

28. (**New**) The memory module of claim 19, wherein the control die includes data buffers to control the timing of the data signals.

29. (**New**) The memory module of claim 19, wherein the first group of array dies include a greater number of array dies than the second group of at least one array die.

REMARKS

This amendment responds to the Non-Final Office Action dated January 22, 2015. In the Office Action, the Examiner:

- rejected claims 1-9 on the ground of nonstatutory double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 8,787,060.

I. CLAIM AMENDMENT

Claims 1-9 are rewritten as new claims 10-18 for clarity and to correct minor issues. Claims 1-9 are thus cancelled. Additional new claims 19-29 are presented. No new matter is added.

I. REJECTION OF CLAIMS 1-9 ON THE GROUND OF NONSTATUTORY DOUBLE PATENTING

Applicant files herewith a terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) to overcome any nonstatutory double patenting rejection the Examiner may raise with regard to the new claims 10-29.

Applicant submits that claims 10-29 are in condition for allowance, and Applicant respectfully requests such action. The Examiner is invited to call the undersigned at (650) 273-6008 if such phone call would help resolve any remaining issues.

Respectfully submitted,

Date: July 22, 2015

/Jamie J. Zheng/ 51167

Jamie J. Zheng (Reg. No.)
Customer No. 79141

Electronic Patent Application Fee Transmittal

Application Number:	14337168
Filing Date:	21-Jul-2014
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng
Attorney Docket Number:	NETL.071C1

Filed as Small 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($)
Extension - 3 months with $0 paid	2253	1	700	700
Miscellaneous:				
Statutory or Terminal Disclaimer	1814	1	160	160
		Total in USD ($)		**860**

Electronic Acknowledgement Receipt

EFS ID:	22996626
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	22-JUL-2015
Filing Date:	21-JUL-2014
Time Stamp:	19:42:17
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$860
RAM confirmation Number	5700
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	Terminal Disclaimer Filed	2015-07-22_Terminal_Disclaimer_NETL071C1.pdf	159919 4413e49ed1e313ba474e0be56dc491c9e9d64ad7	no	2
Warnings:					
Information:					
2		2015-07-22_Amendment_NETL071C1.pdf	132501 c099342d211bf00cba53c6a2b85fe949ea634388	yes	7

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	7

Warnings:					
Information:					
3	Fee Worksheet (SB06)	fee-info.pdf	32654 33f8af30000ac623d7aafcb0b27a4611862099ac	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	325074	

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/AIA/26 (04-14)
Approved for use through 07/31/2016. OMB 0651-0031
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.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT

Docket Number (Optional)
NETL.018P2C7

In re Application of: Netlist, Inc.

Application No.: 14/337,168

Filed: July 21, 2014

For: MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

The applicant, Netlist, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8,767,060 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **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 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 51167

/Jamie J. Zheng/ — Signature
July 22, 2015 — Date

Jamie J. Zheng — Typed or printed name

Title
650-273-6008 — Telephone Number

☑ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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.

This collection of information is required by 37 CFR 1.321. 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 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.

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.

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 14/337,168	Filing Date 07/21/2014	☐ 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 $ =	
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	07/22/2015	(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 $40 =	0
	Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	X $210 =	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
/PAULA BRITTON/

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.

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	1	of	7

US PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	Document Number Number-Kind Code [2] (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
	1.	5345412	09-06-1994	Shiratsuchi	
	2.	5537584	07-16-1996	Miyai et al.	
	3.	5617559	04-01-1997	Le et al.	
	4.	5649159	07-15-1997	Le et al.	
	5.	5655113	08-05-1997	Leung	
	6.	5717851	02-10-1998	Yishay et al.	
	7.	5724604	03-03-1998	Moyer	
	8.	5729716	05-17-1998	Lee et al.	
	9.	5784705	07-21-1998	Leung, Wingyu	
	10.	5802541	09-01-1998	Reed	
	11.	5973392	10-26-1999	Senba et al.	
	12.	6011710	01-04-2000	Wiggers	
	13.	6173357	01-09-2011	Ju	
	14.	6260127	07-10-2001	Olarig et al.	
	15.	6446158	09-03-2002	Karabatsos	
	16.	6553449	04-22-2003	Dodd et al.	
	17.	6618791	09-09-2003	Dodd et al.	
	18.	6717855	04-06-2004	Underwood	
	19.	6747887	06-08-2004	Halbert et al.	
	20.	6788592	09-07-2004	Nakata et al.	
	21.	6832303	12-14-2004	Tanaka	
	22.	6948084	09-20-2005	Manapat et al	
	23.	7093066	08-15-2006	Klein	
	24.	7130308	10-31-2006	Haddock et al.	
	25.	7133960	11-07-2006	Thompson et al.	
	26.	7379361	05-27-2008	Co et al.	
	27.	7464225	12-09-2008	Tsern	
	28.	7865674	01-04-2011	Gower et al.	
	29.	8089795	01-03-2012	Rajan	
	30.	8189328	05-29-2012	Kanapathippillai	
	31.	8233303	07-31-2012	Best	
	32.	8516185	08-20-2013	Lee et al.	
	33.	8782350	07-15-2014	Lee et al.	
	34.	8689064	04-01-2014	Lee et al.	
	35.	2001/0008006	07-12-2001	Klein	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	2	of	7

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

US PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	Document Number Number-Kind Code [2] (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
	36.	2002/0048195	04-25-2002	Klein, Dean A.	
	37.	2002/0038405	03-28-2002	Leddige, M. et al.	
	38.	2003/0070052	04-10-2003	Lai, Jiin	
	39.	2004/0098528	05-20-2004	Janzen, Jefferey W.	
	40.	2005/0010737	01-01-2005	Ware et al.	
	41.	2005/0257109	11-17-2005	Averbuj	
	42.	2006/0262586	11-23-2006	Solomon, et al	
	43.	2007/0070669	03-29-2007	Tsern	
	44.	2007/0293094	12-01-2007	Aekins, Robert A.	
	45.	2008/0104352	05-01-2008	Talbot	
	46.	20080162790	07-03-2008	Im, Jeon-Taek	
	47.	2009/0103387	04-23-2009	Shau, Jeng-Jye	
	48.	2009/0296503	12-03-2009	Chu, M. et al.	
	49.	2011/0085408	04-14-2011	Solomon, J. et al.	
	50.	2011/0125966	05-26-2011	Amidi, H. et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	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]
	51.	EP1816570 A2	08-08-2007	Rambus, Inc.		
	52.	JP10092169	10/04/1998	IBM		
	53.	JP2000311485	10/13/00	Fujitsu Ltd.		
	54.	JP2000285674	10-13-2000	Fujitsu Ltd.	Translation of Abstract Only	
	55.	JP2002184176	06-28-2002	NEC Tohoku Ltd.		
	56.	JP2003007963	01-10-2003	Hitachi Ltd.et al.	Machine Translation	
	57.	JP2008046989	02-28-2008	Fujitsu Ltd	Translation of Abstract Only	
	58.	JP09237492	09-09-1997	Toshiba Corp.	Machine Translation	
	59.	JP2010320270	12-04-1998	Matsushita Electric Inc. Co.	Translation	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	3	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	60.	International Search Report and Written Opinion, International Application No. PCT/US14/48517, filed July 28, 2014, dated October 27, 2014	
	61.	Inter Partes Review Case No. IPR2014-01029, Petitioner's Request for Rehearing pursuant to 37 C.F.R. § 42.71, filed on January 15, 2015.	
	62.	Inter Partes Review Case No. IPR2014-01029, Decision Denying Request for Rehearing, Issued on March 3, 2015.	
	63.	Petition for Inter Partes Review filed on 6/24/2014 for U.S. Patent No. 8,516,185, IPR Case Number IPR2014-01029, and all associated documents including cited references and expert declarations, available at https://ptabtrials.uspto.gov	
	64.	Altera, ACEX iK, Programmable Logic Device Family, Data Sheet, May 2003, Ver 3.4	
	65.	Horowitz, "The Art of Electronics," Cambridge Univ. Press, 1989, selected pages	
	66.	Huang et al, "An Efficient Parallel Transparent BIST Method for Multiple Embedded Memory Buffers," VLSI Design 2001, p. 379	
	67.	Jacob, Bruce L.; "Synchronous DRAM Architectures, Organizations, and Alternative Technologies". University of Maryland, Dec. 10, 2002.	
	68.	JEDEC Standard No. 21-C Section 4.5.7, 168 Pin Registered SDRAM DIMM Family, Release 7	
	69.	JEDEC 21-C, Section 4..6.1, 278 Pin Buffered SDRAM DIMM Family	
	70.	JEDEC Standard No. 21-C Section 4.1.2.5, Appendix E, "Specific PD's for Synchronous DRAM (SDRAM)," pp. 1-25,	
	71.	JEDEC Standard, "Fully Buffered DIMM (FBDIMM): DFx Design for Validation and Test," JESD82-28, February 2008	
	72.	Reese, "Introduction to Logic Synthesis using Verilog HDL," Morgan&Claypool Publishers, 2006, pp. 1-28	
	73.	Inter Partes Review Case No. IPR2014-01369, Decision Denying Institution of Inter Partes Review 37 C.F.R. § 42.108, issued March 9, 2014.	
	74.	Inter Partes Review Case No. IPR2014-01029, Petition for Inter Partes Review of U.S. Patent No. 8,516,185, filed on June 24, 2014.	
	75.	Inter Partes Review Case No. IPR2014-01029, Exhibit 1008 to Petition for Inter Partes Review, "Declaration of Charles J. Neuhauser, Ph.D. under 37 C.F.R. § 1.68," filed on June 24, 2014.	
	76.	Inter Partes Review Case No. IPR2014-01029, Supplemental Petition for Inter Partes Review of U.S. Patent No. 8,516,185, filed on July 23, 2014.	
	77.	Inter Partes Review Case No. IPR2014-01029, Patent Owner's Preliminary Response pursuant to 37 C.F.R. § 42.107, filed on October 17, 2014.	
	78.	Inter Partes Review Case No. IPR2014-01029, Decision Denying Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014.	
	79.	Inter Partes Review Case No. IPR2014-01369, Corrected Petition for Inter Partes Review of Claims 1-19 of U.S. Patent No. 8,516,185, filed on September 22, 2014.	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	4	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	80.	Inter Partes Review Case No. IPR2014-01369, Exhibit 1008 to Corrected Petition for Inter Partes Review, "Declaration of Dr. Nader Bagherzadeh under 37 C.F.R. § 1.68," filed on September 22, 2014.	
	81.	Inter Partes Review Case No. IPR2014-01369, Exhibit 1013 to Corrected Petition for Inter Partes Review, "Webster's II New College Dictionary," filed on September 22, 2014.	
	82.	Inter Partes Review Case No. IPR2014-01369, Exhibit 1014 to Corrected Petition for Inter Partes Review, "Standard Dictionary of Electrical and Electronics Terms," IEEE 1988, filed on September 22, 2014.	
	83.	Inter Partes Review Case No. IPR2014-00882, Corrected Petition for Inter Partes Review of U.S. Patent No. 7,881,150, filed on July 8, 2014.	
	84.	Inter Partes Review Case No. IPR2014-00882, Exhibit 1007 to Petition for Inter Partes Review, "Declaration of Dr. Srinivasan Jagannathan," filed on June 22, 2014.	
	85.	Inter Partes Review Case No. IPR2014-00883, Corrected Petition for Inter Partes Review of U.S. Patent No. 8,081,536, filed on July 8, 2014.	
	86.	Inter Partes Review Case No. IPR2014-00883, Exhibit 1011 to Petition for Inter Partes Review, "Declaration of Dr. Srinivasan Jagannathan," filed on June 21, 2014.	
	87.	Inter Partes Review Case No. IPR2014-01011, Corrected Petition for Inter Partes Review of U.S. Patent No. 7,881,150, filed on July 8, 2014.	
	88.	Inter Partes Review Case No. IPR2014-01011, Exhibit 1007 to Petition for Inter Partes Review, "Declaration of Dr. Srinivasan Jagannathan." filed on June 22, 2014.	
	89.	McCluskey, Edward J., *Logic Design Principles with Emphasis on Testable Semicustom Circuits*, Prentice Hall, 1986, pp. 104-107 and 119-120.	
	90.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-00882, Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107, filed October 7, 2014	
	91.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-00882, Decision – Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014	
	92.	Inter Partes Review of U.S. Patent No. 8,081,536, IPR Case No. IPR2014-00883, Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107, filed October 7, 2014	
	93.	Inter Partes Review of U.S. Patent No. 8,081,536, IPR Case No. IPR2014-00883, Decision – Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014	
	94.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107, filed October 7, 2014	
	95.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Decision – Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014	
	96.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3001 to Decision – Institution of Inter Partes Review, Excerpts from IEEE Dictionary, issued December 16, 2014	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	5	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	97.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3002 to Decision – Institution of Inter Partes Review, Excerpts from IEEE Dictionary, issued December 16, 2014	
	98.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3003 to Decision – Institution of Inter Partes Review, Excerpts from Oxford English Dictionary, issued December 16, 2014	
	99.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3004 to Decision – Institution of Inter Partes Review, Excerpts from Oxford English Dictionary, issued December 16, 2014	
	100.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Smart Storage Systems, Inc.'s Invalidity Contentions, dated June 6, 2014	
	101.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits E.1-E.7 to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	102.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits F.1-F.5 to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	103.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits G.1-G.6 to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	104.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibit H to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	105.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Diablo Technologies, Inc.'s Invalidity Contentions, dated June 6, 2014.	
	106.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits D-1 to D6 to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	107.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits F-1 to F-5 to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	108.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits G-1 to G-6 to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	6	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	109.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibit H to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	110.	Anonymous. (December 1996). "Applications Note: Understanding DRAM Operation," IBM, 10 pages.	
	111.	Behrens, S. "HP Printer Memory Explained", The ZonkPage, Last Updated 01-21-2004. Accessed 02-10-2013, Retrieved from the Internet: URL <http://warshaft.com/hpmem.htm>. 7pp.	
	112.	Non-Final Office Action, U.S. Pat. App. 13/412,243, January 2, 2014, 20 pages	
	113.	Non-final office action, U.S. Patent Application No. 13/288,850, October 11, 2013, 24 pages	
	114.	Non-final office action, U.S. Patent Application No. 13/411,344, December 31, 2013, 28 pages	
	115.	Non-final office action, U.S. Patent Application No. 13/473,413, November 17, 2011, 46 pages	
	116.	Response to non-final office action dated October 14, 2013 for U.S. Patent Application No. 13/288,850, filed January 13, 2014, 15 pages	
	117.	Response to non-final office action dated 12/31/2013 for U.S. Patent Application No. 13/411,344, filed March 31, 2014, 12 pages	
	118.	Patent Owner's Response to Office Action mailed November 13, 2012 for Reexamination Control Nos.95/000,578; 95/000,579, and 95/001,339, filed January 14, 2013, 96 pages.	
	119.	Patent Owner's Response to Office Action mailed December 19, 2012 for Reexamination Control No. 95/001,758, filed March 19, 2013, 61 pages	
	120.	Patent Owner's Response to Office Action mailed September 26, 2013 for Reexamination Control No. 95/001,758, filed November 26, 2013, 85 pages	
	121.	Third Party Requester's Comments after Non-Final Action mailed September 26, 2013 for Reexamination Control No. 95/001,758, filed December 26, 2013,	
	122.	Patent Owner's Appeal Brief for Reexamination Control Nos. 95/000,546 and 95/000,577, filed October 2, 2013, 46 pages	
	123.	Patent Trial and Appeal Board Decision on Appeal for Reexamination Control No.95/001/337, mailed January 16, 2014, 30 pages	
	124.	Patent Trial and Appeal Board Decision on Appeal for Reexamination Control No.95/001/381, mailed January 16, 2014, 24 pages	
	125.	Action Closing Prosecution mailed March 27, 2014 for Reexamination Control No. 95/001,758, filed September 14, 2011, 40 pages	
	126.	Action Closing Prosecution mailed March 27, 2014 for Reexamination Control No. 95/001,339, filed June 8, 2010, 106 pages	
	127.	Notice of Allowance, U.S. Pat. App. 12/504,131, February 12, 2013, 52 pages	
	128.	Non-Final Office Action, dated January 2, 2014, for U.S. Pat. App. No. 13/287,042, filed November 1, 2011, 42 pages	
	129.	Response to Non-Final Office Action dated January 2, 2014, filed April 2, 2004, for U.S. Pat. App. No. 13/287,042, filed November 1, 2011, 12 pages	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	7	of	7

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	130.	Office Action mailed April 2, 2014, for Japanese Patent Application No. 2012-520662 and English translation thereof, 7 pages	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

Electronic Patent Application Fee Transmittal

Application Number:	14337168
Filing Date:	21-Jul-2014
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng
Attorney Docket Number:	NETL.071C1

Filed as Small 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($)
Miscellaneous:				
Submission- Information Disclosure Stmt	2806	1	90	90
		Total in USD ($)		**90**

Electronic Acknowledgement Receipt

EFS ID:	22997562
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	23-JUL-2015
Filing Date:	21-JUL-2014
Time Stamp:	01:42:38
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$90
RAM confirmation Number	9590
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	Transmittal Letter	2015-07-22_IDS_Cover_NETL071C1.pdf	61326 03596d185e871132bf7e3c669fcb823928b7c4a1	no	2
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	2015-07-22_IDS_NETL071C1.pdf	243229 e9bee371fff6cdbfe8a60362aa85c16df747292e	no	7
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Fee Worksheet (SB06)	fee-info.pdf	30706 40294191f98eb06a7a691c8e726a3e1380e8be2b	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	335261	

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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.

INFORMATION DISCLOSURE STATEMENT

Applicant	:	Netlist, Inc.
App. No.	:	14/337,168
Filed	:	July 21, 2014
For	:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
Examiner	:	HOANG, HUAM
Art Unit	:	2827
Conf. No.	:	8733

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

Dear Sir:

Enclosed for filing in the above-identified application is a Form PTO/SB/08a/b Equivalent listing 130 references. Copies of foreign documents and/or their translation and non-patent literature have been submitted together with corresponding Information Disclosure Statements filed on March 18, 2015, January 19, 2015, December 23, 2014, August 6, 2014, April 23, 2014, and April 22, 2014, in the commonly-owned co-pending U.S. Pat. App. No. 13/970,606, filed August 20, 2013, which are available on PAIR.

The applicants would appreciate the Examiner initialing and returning the Form PTO/SB/08a/b Equivalent indicating that the information has been considered and made of record herein.

The information contained in this Information Disclosure Statement is not to be construed as a representation that: (i) a complete search has been made; (ii) additional information material to this application does not exist; (iii) the information, protocols,

results and the like reported by third parties are accurate or enabling; or (iv) the above information constitutes prior art to the subject invention.

The Commissioner is authorized to charge the fee set forth in 37 C.F.R. § 1.17(p) to Deposit Account No. 50-5963.

Respectfully submitted,

Dated: July 22, 2015

/Jamie J. Zheng/ 51167

Jamie J. Zheng (Reg. No.)
Customer No. 79141
(650) 273-6008

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	14/337,168	LEE, HYUN	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☐ APPROVED	☒ DISAPPROVED
Date Filed : 7/22/15	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

The terminal disclaimer identifies a party who is not the applicant (only for applications filed on or after September 16, 2012; See FP 14.26.10):

Below is what needs to be done to correct the defects:

For cases filed on/after 9/16/12, 37 CFR 1.321 specifies that the applicant can disclaim, and the terminal disclaimer must specify the extent of the applicant's ownership.

A request under 37 CFR 1.46(c) to change the applicant needs to be filed, which is (1) a request, signed by a 1.33(b) party, (2) a corrected ADS (37 CFR 1.76(c)) that identifies the "new" applicant in the applicant information, and is underlined since it is new, and (3) a 3.73(c) statement showing chain of title to the new applicant. Along with the § 1.46(c) request we need a POA that gives power to the attorney who is signing the TD, along with another copy of the TD, unless they file a TD that is signed by the applicant.

The TD must be re-filed; no new fees are due.

Jean Proctor

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.
14/337,168	07/21/2014	Hyun Lee	NETL.071C1	8733

79141 7590 10/22/2015
The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

EXAMINER
HOANG, HUAN

ART UNIT	PAPER NUMBER
2827	

NOTIFICATION DATE	DELIVERY MODE
10/22/2015	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):

jz@jzpatent.com
eofficeaction@appcoll.com

PTOL-90A (Rev. 04/07)

Office Action Summary	Application No. 14/337,168	Applicant(s) LEE, HYUN	
	Examiner HUAN HOANG	Art Unit 2827	AIA (First Inventor to File) 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 *07/22/15*.

☐ 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) *10-29* 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) *10-29* 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 *07/23/15*.

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

4) ☐ Other: _____.

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

DETAILED ACTION

The Amendment filed on 07/22/2015 has been received and entered.

Terminal Disclaimer

1. The terminal disclaimer filed on 07/22/2015 disclaiming the terminal portion of any patent granted on this application which would extend beyond the expiration date of US Patent No. 8,767,060 has been reviewed and is NOT accepted.

2. This application was filed on or after September 16, 2012. The party identified in the terminal disclaimer is not the applicant of record. A request to change the applicant under 37 CFR 1.46(c) must be filed and must include an application data sheet specifying the applicant in the applicant information section and comply with 37 CFR 3.71 and 3.73. To be reconsidered, the terminal disclaimer must be filed with the request under 37 CFR 1.46(c).

The terminal disclaimer identifies a party who is not the applicant.

For cases filed on/after 9/16/12, 37 CFR 1.321 specifies that the applicant can disclaim, and the terminal disclaimer must specify the extent of the applicant's ownership. A request under 37 CFR 1.46(c) to change the applicant needs to be filed, which is (1) a request, signed by a 1.33(b) party, (2) a corrected ADS (37 CFR 1.76(c)) that identifies the "new" applicant in the applicant information, and is underlined since it

is new, and (3) a 3.73(c) statement showing chain of title to the new applicant. Along with the § 1.46(c) request we need a POA that gives power to the attorney who is signing the TD, along with another copy of the TD, unless they file a TD that is signed by the applicant.

It should be noted that applicant is not required to pay another disclaimer fee as set forth in 37 CFR 1.20(d) when submitting a replacement or supplemental terminal disclaimer.

Double Patenting

3. 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 claims at issue 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); and 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 a nonstatutory double patenting ground provided the reference application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement. A terminal disclaimer must be signed in compliance with 37 CFR 1.321(b).

The USPTO internet Web site contains terminal disclaimer forms which may be used. Please visit http://www.uspto.gov/forms/. The filing date of the application will determine what form 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 http://www.uspto.gov/patents/process/file/efs/guidance/eTD-info-I.jsp.

4. Claims 10-29 are rejected on the ground of nonstatutory double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 8,787,060. Although the claims at issue are not identical, they are not patentably distinct from each other because it would have been obvious to one of ordinary skill in the art to recognize that the memory package and a memory module of claims 10-29 and the memory package of claims 1-19 are identical in structure.

Response to Arguments

5. Applicant's arguments filed 07/22/2015 have been fully considered but they are not persuasive.

Applicant argued:

"Applicant files herewith a terminal disclaimer in compliance with 37 CFR 1.321 (c) or 1.321 (d) to overcome any nonstatutory double patenting rejection the Examiner may raise with regard to the new claims 10-29."

Since the Terminal Disclaimer filed on 07/22/2015 is not accepted, the nonstatutory double patenting rejections of claims 10-29 are maintained.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUAN HOANG whose telephone number is (571)272-1779. The examiner can normally be reached on Tues-Fri 8:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. 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.

/HUAN HOANG/
Primary Examiner, Art Unit 2827

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	7

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

US PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	Document Number Number-Kind Code [2] (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
	1.	5345412	09-06-1994	Shiratsuchi	
	2.	5537584	07-16-1996	Miyai et al.	
	3.	5617559	04-01-1997	Le et al.	
	4.	5649159	07-15-1997	Le et al.	
	5.	5655113	08-05-1997	Leung	
	6.	5717851	02-10-1998	Yishay et al.	
	7.	5724604	03-03-1998	Moyer	
	8.	5729716	05-17-1998	Lee et al.	
	9.	5784705	07-21-1998	Leung, Wingyu	
	10.	5802541	09-01-1998	Reed	
	11.	5973392	10-26-1999	Senba et al.	
	12.	6011710	01-04-2000	Wiggers	
	13.	6173357	01-09-2011	Ju	
	14.	6260127	07-10-2001	Olarig et al.	
	15.	6446158	09-03-2002	Karabatsos	
	16.	6553449	04-22-2003	Dodd et al.	
	17.	6618791	09-09-2003	Dodd et al.	
	18.	6717855	04-06-2004	Underwood	
	19.	6747887	06-08-2004	Halbert et al.	
	20.	6788592	09-07-2004	Nakata et al.	
	21.	6832303	12-14-2004	Tanaka	
	22.	6948084	09-20-2005	Manapat et al	
	23.	7093066	08-15-2006	Klein	
	24.	7130308	10-31-2006	Haddock et al.	
	25.	7133960	11-07-2006	Thompson et al.	
	26.	7379361	05-27-2008	Co et al.	
	27.	7464225	12-09-2008	Tsern	
	28.	7865674	01-04-2011	Gower et al.	
	29.	8089795	01-03-2012	Rajan	
	30.	8189328	05-29-2012	Kanapathippillai	
	31.	8233303	07-31-2012	Best	
	32.	8516185	08-20-2013	Lee et al.	
	33.	8782350	07-15-2014	Lee et al.	
	34.	8689064	04-01-2014	Lee et al.	
	35.	2001/0008006	07-12-2001	Klein	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	2	of	7

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

US PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	Document Number / Number-Kind Code [2] (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
	36.	2002/0048195	04-25-2002	Klein, Dean A.	
	37.	2002/0038405	03-28-2002	Leddige, M. et al.	
	38.	2003/0070052	04-10-2003	Lai, Jiin	
	39.	2004/0098528	05-20-2004	Janzen, Jefferey W.	
	40.	2005/0010737	01-01-2005	Ware et al.	
	41.	2005/0257109	11-17-2005	Averbuj	
	42.	2006/0262586	11-23-2006	Solomon, et al	
	43.	2007/0070669	03-29-2007	Tsern	
	44.	2007/0293094	12-01-2007	Aekins, Robert A.	
	45.	2008/0104352	05-01-2008	Talbot	
	46.	20080162790	07-03-2008	Im, Jeon-Taek	
	47.	2009/0103387	04-23-2009	Shau, Jeng-Jye	
	48.	2009/0296503	12-03-2009	Chu, M. et al.	
	49.	2011/0085408	04-14-2011	Solomon, J. et al.	
	50.	2011/0125966	05-26-2011	Amidi, H. et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	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]
	51.	EP1816570 A2	08-08-2007	Rambus, Inc.		
	52.	JP10092169	10/04/1998	IBM		
	53.	JP2000311485	10/13/00	Fujitsu Ltd.		
	54.	JP2000285674	10-13-2000	Fujitsu Ltd.	Translation of Abstract Only	
	55.	JP2002184176	06-28-2002	NEC Tohoku Ltd.		
	56.	JP2003007963	01-10-2003	Hitachi Ltd.et al.	Machine Translation	
	57.	JP2008046989	02-28-2008	Fujitsu Ltd	Translation of Abstract Only	
	58.	JP09237492	09-09-1997	Toshiba Corp.	Machine Translation	
	59.	JP2010320270	12-04-1998	Matsushita Electric Inc. Co.	Translation	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	3	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	60.	International Search Report and Written Opinion, International Application No. PCT/US14/48517, filed July 28, 2014, dated October 27, 2014	
	61.	Inter Partes Review Case No. IPR2014-01029, Petitioner's Request for Rehearing pursuant to 37 C.F.R. § 42.71, filed on January 15, 2015.	
	62.	Inter Partes Review Case No. IPR2014-01029, Decision Denying Request for Rehearing, Issued on March 3, 2015.	
	63.	Petition for Inter Partes Review filed on 6/24/2014 for U.S. Patent No. 8,516,185, IPR Case Number IPR2014-01029, and all associated documents including cited references and expert declarations, available at https://ptabtrials.uspto.gov	
	64.	Altera, ACEX iK, Programmable Logic Device Family, Data Sheet, May 2003, Ver 3.4	
	65.	Horowitz, "The Art of Electronics," Cambridge Univ. Press, 1989, selected pages	
	66.	Huang et al, "An Efficient Parallel Transparent BIST Method for Multiple Embedded Memory Buffers," VLSI Design 2001, p. 379	
	67.	Jacob, Bruce L.; "Synchronous DRAM Architectures, Organizations, and Alternative Technologies". University of Maryland, Dec. 10, 2002.	
	68.	JEDEC Standard No. 21-C Section 4.5.7, 168 Pin Registered SDRAM DIMM Family, Release 7	
	69.	JEDEC 21-C, Section 4..6.1, 278 Pin Buffered SDRAM DIMM Family	
	70.	JEDEC Standard No. 21-C Section 4.1.2.5, Appendix E, "Specific PD's for Synchronous DRAM (SDRAM)," pp. 1-25,	
	71.	JEDEC Standard, "Fully Buffered DIMM (FBDIMM): DFx Design for Validation and Test," JESD82-28, February 2008	
	72.	Reese, "Introduction to Logic Synthesis using Verilog HDL," Morgan&Claypool Publishers, 2006, pp. 1-28	
	73.	Inter Partes Review Case No. IPR2014-01369, Decision Denying Institution of Inter Partes Review 37 C.F.R. § 42.108, issued March 9, 2014.	
	74.	Inter Partes Review Case No. IPR2014-01029, Petition for Inter Partes Review of U.S. Patent No. 8,516,185, filed on June 24, 2014.	
	75.	Inter Partes Review Case No. IPR2014-01029, Exhibit 1008 to Petition for Inter Partes Review, "Declaration of Charles J. Neuhauser, Ph.D. under 37 C.F.R. § 1.68," filed on June 24, 2014.	
	76.	Inter Partes Review Case No. IPR2014-01029, Supplemental Petition for Inter Partes Review of U.S. Patent No. 8,516,185, filed on July 23, 2014.	
	77.	Inter Partes Review Case No. IPR2014-01029, Patent Owner's Preliminary Response pursuant to 37 C.F.R. § 42.107, filed on October 17, 2014.	
	78.	Inter Partes Review Case No. IPR2014-01029, Decision Denying Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014.	
	79.	Inter Partes Review Case No. IPR2014-01369, Corrected Petition for Inter Partes Review of Claims 1-19 of U.S. Patent No. 8,516,185, filed on September 22, 2014.	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT
(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	4	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	80.	Inter Partes Review Case No. IPR2014-01369, Exhibit 1008 to Corrected Petition for Inter Partes Review, "Declaration of Dr. Nader Bagherzadeh under 37 C.F.R. § 1.68," filed on September 22, 2014.	
	81.	Inter Partes Review Case No. IPR2014-01369, Exhibit 1013 to Corrected Petition for Inter Partes Review, "Webster's II New College Dictionary," filed on September 22, 2014.	
	82.	Inter Partes Review Case No. IPR2014-01369, Exhibit 1014 to Corrected Petition for Inter Partes Review, "Standard Dictionary of Electrical and Electronics Terms," IEEE 1988, filed on September 22, 2014.	
	83.	Inter Partes Review Case No. IPR2014-00882, Corrected Petition for Inter Partes Review of U.S. Patent No. 7,881,150, filed on July 8, 2014.	
	84.	Inter Partes Review Case No. IPR2014-00882, Exhibit 1007 to Petition for Inter Partes Review, "Declaration of Dr. Srinivasan Jagannathan," filed on June 22, 2014.	
	85.	Inter Partes Review Case No. IPR2014-00883, Corrected Petition for Inter Partes Review of U.S. Patent No. 8,081,536, filed on July 8, 2014.	
	86.	Inter Partes Review Case No. IPR2014-00883, Exhibit 1011 to Petition for Inter Partes Review, "Declaration of Dr. Srinivasan Jagannathan," filed on June 21, 2014.	
	87.	Inter Partes Review Case No. IPR2014-01011, Corrected Petition for Inter Partes Review of U.S. Patent No. 7,881,150, filed on July 8, 2014.	
	88.	Inter Partes Review Case No. IPR2014-01011, Exhibit 1007 to Petition for Inter Partes Review, "Declaration of Dr. Srinivasan Jagannathan." filed on June 22, 2014.	
	89.	McCluskey, Edward J., *Logic Design Principles with Emphasis on Testable Semicustom Circuits*, Prentice Hall, 1986, pp. 104-107 and 119-120.	
	90.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-00882, Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107, filed October 7, 2014	
	91.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-00882, Decision – Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014	
	92.	Inter Partes Review of U.S. Patent No. 8,081,536, IPR Case No. IPR2014-00883, Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107, filed October 7, 2014	
	93.	Inter Partes Review of U.S. Patent No. 8,081,536, IPR Case No. IPR2014-00883, Decision – Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014	
	94.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Patent Owner's Preliminary Response Pursuant to 37 C.F.R. § 42.107, filed October 7, 2014	
	95.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Decision – Institution of Inter Partes Review 37 C.F.R. § 42.108, issued December 16, 2014	
	96.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3001 to Decision – Institution of Inter Partes Review, Excerpts from IEEE Dictionary, issued December 16, 2014	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	5	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	97.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3002 to Decision – Institution of Inter Partes Review, Excerpts from IEEE Dictionary, issued December 16, 2014	
	98.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3003 to Decision – Institution of Inter Partes Review, Excerpts from Oxford English Dictionary, issued December 16, 2014	
	99.	Inter Partes Review of U.S. Patent No. 7,881,150, IPR Case No. IPR2014-01011, Exhibit 3004 to Decision – Institution of Inter Partes Review, Excerpts from Oxford English Dictionary, issued December 16, 2014	
	100.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Smart Storage Systems, Inc.'s Invalidity Contentions, dated June 6, 2014	
	101.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits E.1-E.7 to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	102.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits F.1-F.5 to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	103.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits G.1-G.6 to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	104.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibit H to "Smart Storage Systems, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	105.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Diablo Technologies, Inc.'s Invalidity Contentions, dated June 6, 2014.	
	106.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits D-1 to D6 to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	107.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits F-1 to F-5 to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	108.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibits G-1 to G-6 to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet 6 of 7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	109.	U.S. District Court Northern District of California, Case No. 4:13-CV-05889-YGR, Netlist, Inc. v. Smart Storage Systems, Inc., and Diablo Technologies, Inc., Exhibit H to "Diablo Technologies, Inc.'s Invalidity Contentions," dated June 6, 2014.	
	110.	Anonymous. (December 1996). "Applications Note: Understanding DRAM Operation," IBM, 10 pages.	
	111.	Behrens, S. "HP Printer Memory Explained", The ZonkPage, Last Updated 01-21-2004. Accessed 02-10-2013, Retrieved from the Internet: URL <http://warshaft.com/hpmem.htm>. 7pp.	
	112.	Non-Final Office Action, U.S. Pat. App. 13/412,243, January 2, 2014, 20 pages	
	113.	Non-final office action, U.S. Patent Application No. 13/288,850, October 11, 2013, 24 pages	
	114.	Non-final office action, U.S. Patent Application No. 13/411,344, December 31, 2013, 28 pages	
	115.	Non-final office action, U.S. Patent Application No. 13/473,413, November 17, 2011, 46 pages	
	116.	Response to non-final office action dated October 14, 2013 for U.S. Patent Application No. 13/288,850, filed January 13, 2014, 15 pages	
	117.	Response to non-final office action dated 12/31/2013 for U.S. Patent Application No. 13/411,344, filed March 31, 2014, 12 pages	
	118.	Patent Owner's Response to Office Action mailed November 13, 2012 for Reexamination Control Nos.95/000,578; 95/000,579, and 95/001,339, filed January 14, 2013, 96 pages.	
	119.	Patent Owner's Response to Office Action mailed December 19, 2012 for Reexamination Control No. 95/001,758, filed March 19, 2013, 61 pages	
	120.	Patent Owner's Response to Office Action mailed September 26, 2013 for Reexamination Control No. 95/001,758, filed November 26, 2013, 85 pages	
	121.	Third Party Requester's Comments after Non-Final Action mailed September 26, 2013 for Reexamination Control No. 95/001,758, filed December 26, 2013,	
	122.	Patent Owner's Appeal Brief for Reexamination Control Nos. 95/000,546 and 95/000,577, filed October 2, 2013, 46 pages	
	123.	Patent Trial and Appeal Board Decision on Appeal for Reexamination Control No.95/001/337, mailed January 16, 2014, 30 pages	
	124.	Patent Trial and Appeal Board Decision on Appeal for Reexamination Control No.95/001/381, mailed January 16, 2014, 24 pages	
	125.	Action Closing Prosecution mailed March 27, 2014 for Reexamination Control No. 95/001,758, filed September 14, 2011, 40 pages	
	126.	Action Closing Prosecution mailed March 27, 2014 for Reexamination Control No. 95/001,339, filed June 8, 2010, 106 pages	
	127.	Notice of Allowance, U.S. Pat. App. 12/504,131, February 12, 2013, 52 pages	
	128.	Non-Final Office Action, dated January 2, 2014, for U.S. Pat. App. No. 13/287,042, filed November 1, 2011, 42 pages	
	129.	Response to Non-Final Office Action dated January 2, 2014, filed April 2, 2004, for U.S. Pat. App. No. 13/287,042, filed November 1, 2011, 12 pages	

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

Sheet	7	of	7

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]
	130.	Office Action mailed April 2, 2014, for Japanese Patent Application No. 2012-520662 and English translation thereof, 7 pages	

EXAMINER /HUAN HOANG/ **DATE CONSIDERED** 10/08/2015

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.[1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

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

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

CLAIM		DATE								
Final	Original	01/12/2015	10/08/2015							
	1	✓	-							
	2	✓	-							
	3	✓	-							
	4	✓	-							
	5	✓	-							
	6	✓	-							
	7	✓	-							
	8	✓	-							
	9	✓	-							
	10		✓							
	11		✓							
	12		✓							
	13		✓							
	14		✓							
	15		✓							
	16		✓							
	17		✓							
	18		✓							
	19		✓							
	20		✓							
	21		✓							
	22		✓							
	23		✓							
	24		✓							
	25		✓							
	26		✓							
	27		✓							
	28		✓							
	29		✓							

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

CPC- SEARCHED

Symbol	Date	Examiner
G11C 5/063, G11C 7/18, G11C 5/025, G11C 5/04	10/08/15	HH

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner
365	63, 51, 52	1/12/15	HH
Above	Updated	10/08/15	HH

SEARCH NOTES

Search Notes	Date	Examiner
EAST (text search)	1/12/15	HH
EAST (text search)	10/08/15	HH

INTERFERENCE SEARCH

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

	/HUAN HOANG/ Primary Examiner.Art Unit 2827

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	4106	(memory stor$3) and (die dice ic integrated adj circuit chip) with stack$3 with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:02
L2	1148	1 and (connection interconnect$3) with (die dice ic integrated adj circuit chip) with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:04
L3	1	2 and control$4 near3 (die chip dice integrated adj circuit ic) with driv$3 near3 size	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:07
L4	5	2 and control$4 near3 (die chip dice integrated adj circuit ic) with driv$3 with (different larger smaller)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:08
L5	8	1 and (connection interconnect$3) with (die dice ic integrated adj circuit chip) with (group set subset) with (longer shorter)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:11
L6	1	5 and number with (array bank block subarray)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:12
L7	15916	(g11c5/063 g11c7/18 g11c5/04 g11c5/025).cpc. (365/63 365/51 365/52).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:16
L8	482	7 and (connection interconnect$3) with (die dice ic integrated adj circuit chip) with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:16
L9	1	8 and control$4 near3 (die chip dice integrated adj circuit ic) with driv$3 near3 size	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:17
L10	10	7 and (connection interconnect$3) with (die dice ic integrated adj circuit chip) with (group set subset) with (longer shorter)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:17
L11	1	10 and number with (array bank block subarray)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:18
L12	1	8 and control$4 with (die chip dice integrated adj circuit ic) with driv$3 near3 size	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:18

L13	7	8 and (die chip dice integrated adj circuit ic) with driv$3 near3 size	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2015/10/08 17:19

EAST Search History (Interference)

< This search history is empty>

10/ 8/ 2015 5:20:47 PM

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Hyun Lee
App. No.	:	14/337,168
Filed	:	July 21, 2014
For	:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
Examiner	:	HOANG, HUAM
Art Unit	:	2827
Conf. No.	:	8733
Docket No.	:	NETL.071C1

CERTIFICATE OF EFS WEB TRANSMISSION

I hereby certify that this correspondence and any other attachment noted on the Automated Acknowledgement Receipt, is being transmitted from within the Pacific Time zone to the Commissioner for Patents via the EFS Web Server on:

January 6, 2016

(Date)

/Jamie J. Zheng/

Jamie J. Zheng, Reg. No. 51167

RESPONSE TO FINAL OFFICE ACTION DATED OCTOBER 22, 2015

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

Sir:

The enclosed Amendment is in response to the Final Office Action dated October 22, 2015 for the above-identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Deposit Account No. 50-5963.

AMENDMENTS to the CLAIMS begin on Page 2 of this paper.

REMARKS begin on Page 7 of this paper.

HAT IS CLAIMED IS:

1. – 9. **(Cancelled)**

10. **(Previously Presented)** A memory package, comprising:

data terminals and control terminals;

stacked array dies including a first group of array dies and a second group of at least one array die;

first die interconnects and second die interconnects, the first die interconnects in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnects in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

a control die comprising first data conduits between the first die interconnects and the data terminals, and second data conduits between the second die interconnects and the data terminals, the first data conduit including first drivers each having a first driver size and configured to drive a data signal from a corresponding data terminal to the first group of array dies, the second data conduit including second drivers each having a second driver size and configured to drive a data signal from a corresponding data terminal to the second group of at least one array die, the second driver size being different from the first driver size.

11. **(Previously Presented)** The memory package of claim 10, wherein the second die interconnects are longer than the first die interconnects, and wherein the second driver size is larger than the first driver size.

12. **(Previously Presented)** The memory package of clam 10, wherein the second die interconnects are longer than the first die interconnects, and wherein a number of array dies in the second group of at least one array die is less than a number of array dies in the first group of array dies.

13. (**Previously Presented**) The memory package of claim 10, wherein the first driver size and the second driver size are related to a load on the first driver and a load on the second driver.

14. (**Previously Presented**) The memory package of claim 10, wherein the control die further comprises a control circuit to control respective states of the first data conduits and the second data conduits in response to control signals received via the control terminals.

15. (**Previously Presented**) A memory package, comprising:

data terminals and control terminals;

stacked array dies including a first group of array dies and a second group of at least one array die;

first die interconnects and a second die interconnects, the first die interconnects in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnects in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

wherein the second die interconnects are longer than the first die interconnect, and wherein a number of array dies in the second group of at least one array die is less than a number of array dies in the first group of array dies.

16. (**Previously Presented**) The memory package of claim 15, further comprising:

a control die comprising first data conduits between the first die interconnects and the data terminals, and second data conduits between the second die interconnects and the data terminals, the first data conduits including first drivers each having a first driver size and configured to drive a data signal from a corresponding data terminal to the first group of array dies, the second data conduit including second drivers each having a second driver size and configured to drive a data signal from a corresponding data terminal to the second group of at least one array die, the second driver size being different from the first driver size.

17. (**Previously Presented**) The memory package of claim 16, wherein the second driver size is larger than the first driver size.

18. (**Previously Presented**) The memory package of claim 16, wherein the control die further comprises a control circuit to control respective states of the first data conduits and the second data conduits in response to control signals received via one or more second terminals of the plurality of terminals.

19. (**Previously Presented**) A memory module operable in a computer system with a system memory controller, comprising:

a register device configured to receive input command/address signals from the system memory controller and to output control signals; and

a plurality of DRAM packages, each DRAM package comprising:

data terminals via which the DRAM package communicate data signals with the system memory controller, and control terminals via which the DRAM package receive the control signals from the register device;

stacked array dies including a first group of array dies and a second group of at least one array die;

die interconnects including first die interconnects and second die interconnects, the first die interconnects in electrical communication with the first group of array dies and not in electrical communication with the second group of at least one array die, the second die interconnects in electrical communication with the second group of at least one array die and not in electrical communication with the first group of array dies; and

a control die including first data conduits between the first die interconnects and data terminals, and second data conduits between the second die interconnects and the data terminals, the first data conduits including first drivers each having a first driver size, the second data conduits including second drivers each having a second driver size different from the first driver size, the first drivers to drive first write data signals received from the system memory controller to one of the first group of array dies, the second drivers to drive second write data signals received from the system memory controller to one of the second group of at least one array die.

20. (**Previously Presented**) The memory module of claim 19, wherein the control die receives the control signals and further includes a control circuit to control respective states of the first data conduits and the second data conduits in response to the control signals.

21. (**Previously Presented**) The memory module of claim 20, wherein the control signals include data path control signals generated by the register device, the data path control signals being used to control the respective states of the first data conduits and the second data conduits.

22. (**Previously Presented**) The memory module of claim 20, wherein the control die is configured to generate data path control signals from at least some of the control signals, the data path control signals being used to control the respective states of the first data conduits and the second data conduits.

23. (**Previously Presented**) The memory module of claim 19, wherein the control signals include address signals and the control die provides the address signals to the plurality of array dies.

24. (**Previously Presented**) The memory module of claim 19, wherein the input command/address signals include first chip select signals, wherein the register device is configured to perform rank multiplication by generating second chip select signals from at least some of the input command/address signals, the second chip select signals having a number of chip select signals greater than the first chip select signals and equal to a number of array dies in the plurality of array dies, and wherein the DRAM package further comprises chip select die interconnects for conducting the second chip select signals to respective ones of the plurality of array dies.

25. (**Previously Presented**) The memory module of claim 19, wherein the control signals include output command/address signals derived from the input command/address signals, the output command/address signals including first chip select signals, wherein the control die is further configured to perform rank multiplication by generating second chip select signals from at least some of the output command/address signals, the second

chip select signals having a number of chip select signals greater than the first chip select signals and equal to a number of array dies in the plurality of array dies, and wherein the DRAM package further comprises chip select die interconnects for conducting the second chip select signals to respective ones of the plurality of array dies.

26. (**Previously Presented**) The memory module of claim 19, wherein the first driver size and the second driver size are related to a first load on the first driver and a second load on the second driver.

27. (**Previously Presented**) The memory module of claim 19, wherein the control signals include command/address signals, and the control die includes buffers to control the timing of the command/address signals.

28. (**Previously Presented**) The memory module of claim 19, wherein the control die includes data buffers to control the timing of the data signals.

29. (**Previously Presented**) The memory module of claim 19, wherein the first group of array dies include a greater number of array dies than the second group of at least one array die.

REMARKS

This amendment responds to the Final Office Action dated October 22, 2015. In the Office Action, the Examiner:

- rejected claims 10-29 on the ground of nonstatutory double patenting as being unpatentable over claims 1-19 of U.S. Patent No. 8,787,060.

To overcome the nonstatutory double patenting rejection with regard to claims 10-29, Applicant files herewith a terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d), together with:

- a request under 37 CFR 1.46(c) to change the applicant to the assignee Netlist Inc.;
- a corrected ADS in compliance with 37 CFR 1.76(c) that identifies the applicant in the applicant information (a marked up version where the applicant information is underlined since it is new is included for easy reference); and
- a 3.73(c) statement showing chain of title to the new applicant.

Applicant hereby request under 37 CFR 1.46(c) to change the applicant to the assignee Netlist Inc.;

Filed herewith is also a power of attorney that gives power to the attorney who is signing the terminal disclaimer.

Applicant submits that claims 10-29 are in condition for allowance, and Applicant respectfully requests such action. The Examiner is invited to call the undersigned at (650) 273-6008 if such phone call would help resolve any remaining issues.

Respectfully submitted,

Date: January 6, 2016

/Jamie J. Zheng/ 51167

Jamie J. Zheng (Reg. No.)
Customer No. 79141

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
- [x] 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.

Electronic Acknowledgement Receipt

EFS ID:	24550859
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	07-JAN-2016
Filing Date:	21-JUL-2014
Time Stamp:	02:24:32
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	Response After Final Action	2016-01-06_Rsps_FOA_NETL071C1.pdf	128423 92ceaa9a31a4e8b71dd9a854fe40ad4becaaff03	no	8

Warnings:

Information:

2	Terminal Disclaimer Filed	2016-01-06_Terminal_Disclaimer_NETL071C1.pdf	159939 d4f497ae98a2976bd211f58a4c03707f6340fbb6	no	2
Warnings:					
Information:					
3	Application Data Sheet	2016-01-06_Appl_Data_Sheet_R_NETL071C1.pdf	1819004 fee50f9557c7a62e1bdc1d6425b5f5f87b98e198	no	7
Warnings:					
Information:					
4	Application Data Sheet	2016-01-06_Appl_Data_Sheet_Markup_NETL071C1.pdf	869802 4922c51972c53dc6a8c28aac969298fa691ef4ac	no	7
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
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					
5	Assignee showing of ownership per 37 CFR 3.73	2016-01-06_373cStatement_NETL071C1.pdf	665273 b8bd2e94d195e637c908419f63039573d57d1fb6	no	3
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:					
6	Power of Attorney	2016-01-05_AIA82A_transmittal_POA_NETL071C1.pdf	195897 dce2f4583ee8f35ad498052dbfabac608e017cdd	no	3
Warnings:					
Information:					
7	Power of Attorney	AIA_General_POA_Netlist.pdf	133545 f8258889ee9edc63b1cc17705b3158faaed49e9e	no	1
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:					
		Total Files Size (in bytes):	3971883		

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/AIA/26 (04-14)
Approved for use through 07/31/2016. OMB 0651-0031
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.

TERMINAL DISCLAIMER TO OBVIATE A DOUBLE PATENTING REJECTION OVER A "PRIOR" PATENT

Docket Number (Optional)
NETL.071C1

In re Application of: Netlist, Inc.

Application No.: 14/337,168

Filed: July 21, 2014

For: MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

The applicant, Netlist, Inc., owner of 100 percent interest in the instant application hereby disclaims, except as provided below, the terminal part of the statutory term of any patent granted on the instant application which would extend beyond the expiration date of the full statutory term of **prior patent** No. 8,767,060 as the term of said **prior patent** is presently shortened by any terminal disclaimer. The applicant hereby agrees that any patent so granted on the instant application shall be enforceable only for and during such period that it and the **prior patent** are commonly owned. This agreement runs with any patent granted on the instant application and is binding upon the grantee, its successors or assigns.

In making the above disclaimer, the applicant does not disclaim the terminal part of the term of any patent granted on the instant application that would extend to the expiration date of the full statutory term of the **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 CFR 1.321;
has all claims canceled by a reexamination certificate;
is reissued; or
is in any manner terminated prior to the expiration of its full statutory term as presently shortened by any terminal disclaimer.

Check either box 1 or 2 below, if appropriate.

1. ☐ The undersigned is the applicant. If the applicant is an assignee, the undersigned is authorized to act on behalf of the assignee.

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.

2. ☑ The undersigned is an attorney or agent of record. Reg. No. 51167

/Jamie J. Zheng/ — Signature
January 6, 2016 — Date

Jamie J. Zheng — Typed or printed name

Title
650-273-6008 — Telephone Number

☐ Terminal disclaimer fee under 37 CFR 1.20(d) included.

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.

This collection of information is required by 37 CFR 1.321. 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 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.

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.

PTO/AIA/14 (07-14)
Approved for use through 04/30/2017. 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 contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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 i	US

Mailing Address of Inventor:

Address 1	21 Thalia		
Address 2			
City	Ladera Ranch	State/Province	CA
Postal Code	92694	Country i	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	jz@jzpatent.com	Add Email	Remove Email

Application Information:

Title of the Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION		
Attorney Docket Number	NETL.071C1	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Filing By Reference :

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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	79141		

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 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.
When referring to the current application, please leave the application number blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14337168	Continuation of	13288850	2011-11-03
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
13288850	Claims benefit of provisional	61409893	2010-11-03

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

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

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. ☒

Organization Name	Netlist, Inc.		
Mailing Address Information For Applicant:			
Address 1	175 Technology, #150		
Address 2			
City	Irvine	**State/Province**	CA
Country	US	Postal Code	92618
Phone Number		Fax Number	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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 subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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

Remove

Signature:

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

Signature	/Jamie J. Zheng/			Date (YYYY-MM-DD)	2016-01-06
First Name	Jamie	Last Name	Zheng	Registration Number	51167

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

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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 C o o p eration 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 inspections 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.

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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 i	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	jz@jzpatent.com	Add Email	Remove Email

Application Information:

Title of the Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION		
Attorney Docket Number	NETL.071C1	Small Entity Status Claimed	☐
Application Type	Nonprovisional		
Subject Matter	Utility		
Total Number of Drawing Sheets (if any)	8	Suggested Figure for Publication (if any)	

Filing By Reference :

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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	79141		

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 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.
When referring to the current application, please leave the application number blank.

Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
14337168	Continuation of	13288850	2011-11-03
Prior Application Status			Remove
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
13288850	Claims benefit of provisional	61409893	2010-11-03

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

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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[j] (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.

Authorization to Permit Access:

☐ Authorization to Permit Access to the Instant Application by the Participating Offices

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

If 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 World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date o f filing this Authorization.

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. ☒

Organization Name	Netlist, Inc.		
Mailing Address Information For Applicant:			
Address 1	175 Technology, #150		
Address 2			
City	Irvine	**State/Province**	CA
Country	US	Postal Code	92618
Phone Number		Fax Number	

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

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 subsitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

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

Signature	/Jamie J. Zheng/			Date (YYYY-MM-DD)	2016-01-06
First Name	Jamie	Last Name	Zheng	Registration Number	51167

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

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	NETL.071C1
	Application Number	
Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION	

This collection of information is required by 37 CFR 1.76. 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 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet 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.**

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 C o o p eration 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 inspections 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.

PTO/AIA/96 (08-12)
Approved for use through 01/31/2013. OMB 0651-0031
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.

STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Netlist, Inc.

Application No./Patent No.: 14/337,168 Filed/Issue Date: July 21, 2014

Titled: MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

Netlist, Inc., a Corporation

(Name of Assignee) (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.

2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):

☐ The extent (by percentage) of its ownership interest is _____%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.

☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.

4. ☐ The recipient, via a court proceeding or the like (*e.g.*, bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☑ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel 27520, Frame 280, or for which a copy thereof is attached.

B. ☐ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

2. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). 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 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.

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.

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____

The document was recorded in the United States Patent and Trademark Office at

Reel _____, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☑ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

Signature	Date: Jan. 6, 2016
Noel Whitley	VP, Intellectual Property
Printed or Typed Name	Title or Registration 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.

PTO/AIA/82A (07-12)
Approved for use through 11/30/2014. OMB 0651-0035
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.

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 or equivalent) to identify the application to which the Power of Attorney is directed, in accordance with 37 CFR 1.5. If the Power of Attorney by Applicant form is not accompanied by this transmittal form or an equivalent, the Power of Attorney will not be recognized in the application.

Application Number	14/337,168
Filing Date	07/21/2014
First Named Inventor	HYUN LEE
Title	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
Art Unit	2827
Examiner Name	HOANG, HUAN
Attorney Docket Number	NETL.071C1

SIGNATURE of Applicant or Patent Practitioner

Signature	/Jamie J. Zheng/	Date	January 6, 2016
Name	Jamie J. Zheng	Telephone	650-521-4828
Registration Number	51,167		

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

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 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.

PTO/AIA/82B(07-12)
Approved for use through 11/30/2014. OMB 0651-0035
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.

POWER OF ATTORNEY BY APPLICANT

I hereby revoke all previous powers of attorney given in the application identified in the attached transmittal letter.

☐ I hereby appoint Practitioner(s) associated with the following Customer Number as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

OR

☐ I hereby appoint Practitioner(s) named below as my/our attorney(s) or agent(s), and to transact all business in the United States Patent and Trademark Office connected therewith for the application referenced in the attached transmittal letter (form PTO/AIA/82A or equivalent):

Name	Registration Number	Name	Registration Number

Please recognize or change the correspondence address for the application identified in the attached transmittal letter to:

☐ The address associated with the above-mentioned Customer Number.

OR

☐ The address associated with Customer Number:

OR

☐ Firm or Individual Name					
Address					
City		State		Zip	
Country					
Telephone		Email			

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 concurrently being filed with this document)

SIGNATURE of Applicant for Patent

Signature		Date	
Name		Telephone	
Title and Company			

NOTE: Signature - This form must be signed by the applicant in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications. Submit multiple forms for more than one signature, see below *.

☐ *Total of _____ forms are submitted.

This collection of information is required by 37 CFR 1.31, 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.

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.

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	Filing Date	
14/337,168	07/21/2014	☐ 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 $ =	
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 01/07/2016

	(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 $40 =	0
Independent (37 CFR 1.16(h))	* 3	Minus	***3	= 0	x $210 =	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
/CASSANDRA B. DOWNS/

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.

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
14/337,168	07/21/2014	Hyun Lee	NETL.071C1

CONFIRMATION NO. 8733

POA ACCEPTANCE LETTER

79141
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000079908538

Date Mailed: 01/14/2016

NOTICE OF ACCEPTANCE OF POWER OF ATTORNEY

This is in response to the Power of Attorney filed 01/07/2016.

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**.

/vnguyen/

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
14/337,168	07/21/2014	2827	800	NETL.071C1	9	2

CONFIRMATION NO. 8733

REPLACEMENT FILING RECEIPT

79141
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

OC000000079908622

Date Mailed: 01/14/2016

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 13/288,850 11/03/2011 PAT 8787060
which claims benefit of 61/409,893 11/03/2010

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: No

Permission to Access Search Results: No

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: 07/30/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 14/337,168**

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

Preliminary Class

365

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).

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.

Application Number	Application/Control No.	Applicant(s)/Patent under Reexamination	
	14/337,168	LEE, HYUN	

Document Code - DISQ	Internal Document – DO NOT MAIL

TERMINAL DISCLAIMER	☒ APPROVED	☐ DISAPPROVED
Date Filed : 1/7/16	This patent is subject to a Terminal Disclaimer	

Approved/Disapproved by:

Lawana Hixon

U.S. Patent and Trademark Office

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 02/10/2016
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

EXAMINER
HOANG, HUAN

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 02/10/2016

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/337,168	07/21/2014	Hyun Lee	NETL.071C1	8733

TITLE OF INVENTION: MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0	$0	$480	05/10/2016

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: Utility patents issuing on applications filed on or after Dec. 12, 1980 may require payment of maintenance fees. It is patentee's responsibility to ensure timely payment of maintenance fees when due.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for 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, 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 02/10/2016
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

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 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	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/337,168	07/21/2014	Hyun Lee	NETL.071C1	8733

TITLE OF INVENTION: MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$480	$0	$0	$480	05/10/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS
HOANG, HUAN	2827	365-063000

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 03-02 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 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 (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. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — 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.
- ❑ 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 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. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

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.
14/337,168	07/21/2014	Hyun Lee	NETL.071C1	8733

79141 7590 02/10/2016
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

EXAMINER
HOANG, HUAN

ART UNIT	PAPER NUMBER
2827	

DATE MAILED: 02/10/2016

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.

Notice Requiring Inventor's Oath or Declaration	Application No. 14/337,168	Applicant(s) Hyun Lee	
	Examiner HOANG, HUAN	Art Unit 2827	

This notice is an attachment to the Notice of Allowability (PTOL-37), or the Notice of Allowability For A Design Application (PTOL-37D).

An inventor's oath or declaration in compliance with 37 CFR 1.63 or 1.64 executed by or with respect to each inventor has not yet been submitted.

An oath or declaration in compliance with 37 CFR 1.63, or a substitute statement in compliance with 37 CFR 1.64, executed by or with respect to each inventor (for any inventor for which a compliant oath, declaration, or substitute statement has not yet been submitted) MUST be filed no later than the date on which the issue fee is paid. See 35 U.S.C. 115(f). Failure to timely comply will result in ABANDONMENT of this application.

A properly executed inventor's oath to declaration has not been received for the following inventor(s):

If applicant previously filed one or more oaths, declarations, or substitute statements, applicant may have received an informational notice regarding deficiencies therein.

The following deficiencies are noted:

INFORMAL ACTION PROBLEMS

- A properly executed inventor's oath or declaration has not been received for the following inventor(s): **Hyun Lee**.
  Applicant may submit the inventor's oath or declaration at any time before the Notice of Allowance and Fee(s) Due, PTOL-85, is mailed.

Questions relating to this Notice should be directed to the Application Assistance Unit at 571-272-4200.

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 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, 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. 14/337,168	Applicant(s) LEE, HYUN	
	Examiner HUAN HOANG	Art Unit 2827	AIA (First Inventor to File) 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 Amendment filed on 01/07/16*.
   ☐ 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 *10-29*. 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 a reply 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 _____.

/HUAN HOANG/
Primary Examiner, Art Unit 2827

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

EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

The application has been amended as follows:

In the claims:

Claim 15, line 5, delete "a" before "second die interconnects"; and

line 10, replace "the first die interconnect" with "the first die interconnects".

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to HUAN HOANG whose telephone number is (571)272-1779. The examiner can normally be reached on Tues-Fri 8:30AM-7:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. 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.

/HUAN HOANG/
Primary Examiner, Art Unit 2827

Receipt date: 01/07/2016

OK TO ENTER: /H.H./
01/22/2016

PATENT

Customer No. 79141

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	Hyun Lee
App. No.	:	14/337,168
Filed	:	July 21, 2014
For	:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
Examiner	:	HOANG, HUAM
Art Unit	:	2827
Conf. No.	:	8733
Docket No.	:	NETL.071C1

CERTIFICATE OF EFS WEB TRANSMISSION

I hereby certify that this correspondence and any other attachment noted on the Automated Acknowledgement Receipt, is being transmitted from within the Pacific Time zone to the Commissioner for Patents via the EFS Web Server on:

January 6, 2016

(Date)

/Jamie J. Zheng/

Jamie J. Zheng, Reg. No. 51167

RESPONSE TO FINAL OFFICE ACTION DATED OCTOBER 22, 2015

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

Sir:

The enclosed Amendment is in response to the Final Office Action dated October 22, 2015 for the above-identified patent application.

The Commissioner is hereby authorized to charge any required fee(s) to Deposit Account No. 50-5963.

AMENDMENTS to the CLAIMS begin on Page 2 of this paper.

REMARKS begin on Page 7 of this paper.

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

CPC- SEARCHED

Symbol	Date	Examiner
G11C 5/063, G11C 7/18, G11C 5/025, G11C 5/04	10/08/15	HH
Above Updated	1/22/16	HH

CPC COMBINATION SETS - SEARCHED

Symbol	Date	Examiner

US CLASSIFICATION SEARCHED

Class	Subclass	Date	Examiner
365	63, 51, 52	1/12/15	HH
Above	Updated	10/08/15	HH
Above	Updated	1/22/16	HH

SEARCH NOTES

Search Notes	Date	Examiner
EAST (text search)	1/12/15	HH
EAST (text search)	10/08/15	HH
EAST (text search)	1/22/16	HH
Inventor search	1/22/16	HH

INTERFERENCE SEARCH

US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner
	EAST (US-PGPUB)	1/22/16	HH

	/HUAN HOANG/ Primary Examiner.Art Unit 2827

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L1	2428	(memory stor$3) and stack$3 with (die dice ic integrated adj circuit) with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 08:34
L2	833	1 and interconnect$3 with (die dice ic integrated adj ciruit)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 08:35
L3	54	1 and interconnect$3 with (die dice ic integrated adj ciruit) with first adj2 (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 08:36
L4	5	3 and control$4 near3 (die ic integrated adj circuit) with interconnect$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 08:37
L5	86	2 and array near4 (die dice ic integrated adj ciruit) with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 08:42
L6	46	2 and array near4 (die dice ic integrated adj ciruit) with (group set subset) with stack$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 08:42
L7	14	3 and ("not" "no" "without") with electrical$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 09:50
L8	16417	(g11c5/063 g11c7/18 g11c5/04 g11c5/025).cpc. (365/63,51,52).ccls.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 09:59
L9	164	8 and stack$3 with (die dice ic integrated adj circuit) with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 09:59
L10	8	9 and control$4 near3 (die ic integrated adj circuit) with interconnect$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 09:59
L11	10	8 and interconnect$3 with (die dice ic integrated adj ciruit) with first adj2 (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:00
L12	4	11 and ("not" "no" "without") with electrical$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:01

L17	893552	lee.in.	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:08
L18	175	17 and stack$3 with (die dice ic integrated adj circuit) with (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:08
L19	50	18 and interconnect$3 with (die dice ic integrated adj ciruit)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:08
L20	9	19 and control$4 near3 (die ic integrated adj circuit) with interconnect$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:08
L21	21	17 and interconnect$3 with (die dice ic integrated adj ciruit) with first adj2 (group set subset)	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:11
L23	7	21 and ("not" "no" "without") with electrical$3	US-PGPUB; USPAT; EPO; JPO; DERWENT	OR	ON	2016/01/22 10:12

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
L13	2	(data and control and stacked and dies and interconnects and electrical and communication and conduit and size and driver).clm.	US-PGPUB; USPAT	OR	ON	2016/01/22 10:03
L14	2	(data and control and stacked and array and dies and interconnects and electrical and communication and longer).clm.	US-PGPUB; USPAT	OR	ON	2016/01/22 10:03
L15	2	(data and control and register and dram and dies and interconnects and electrical and communication and conduit).clm.	US-PGPUB; USPAT	OR	ON	2016/01/22 10:04
L16	290233	lee.in.	US-PGPUB; USPAT	OR	ON	2016/01/22 10:07

1/22/2016 10:13:13 AM
C:\Users\hhoang1\Documents\EAST\Workspaces\default.wsp

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

CPC

Symbol					Type	Version
G11C		5	/	066	F	2013-01-01
G11C		5	/	06	I	2013-01-01
G11C		7	/	1057	I	2013-01-01
G11C		7	/	1084	I	2013-01-01
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			
			/			

CPC Combination Sets

Symbol					Type	Set	Ranking	Version
			/					
			/					

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/HUAN HOANG/ Primary Examiner.Art Unit 2827 (Primary Examiner)	01/22/2016 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION	
CLASS	SUBCLASS	CLAIMED	NON-CLAIMED
365	63	G 1 1 C 5 / 06 (2006.01.01)	

CROSS REFERENCE(S)					
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)				
365	51				

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/HUAN HOANG/ Primary Examiner.Art Unit 2827 (Primary Examiner)	01/22/2016 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

U.S. Patent and Trademark Office

Part of Paper No. 20160122

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	14337168	LEE, HYUN
	Examiner	**Art Unit**
	HUAN HOANG	2827

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

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
	1		17												
	2		18												
	3		19												
	4		20												
	5		21												
	6		22												
	7		23												
	8		24												
	9		25												
	10		26												
	11		27												
	12		28												
	13		29												
	14														
	15														
	16														

NONE (Assistant Examiner)	(Date)	**Total Claims Allowed:** 20	
/HUAN HOANG/ Primary Examiner.Art Unit 2827 (Primary Examiner)	01/22/2016 (Date)	O.G. Print Claim(s) 1	O.G. Print Figure 2

U.S. Patent and Trademark Office

Part of Paper No. 20160122

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

BIB DATA SHEET

CONFIRMATION NO. 8733

SERIAL NUMBER	FILING or 371(c) DATE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
14/337,168	07/21/2014 RULE	365	2827	NETL.071C1

APPLICANTS
Netlist, Inc., Irvine, CA;

INVENTORS
Hyun Lee, Ladera Ranch, CA;

**** CONTINUING DATA ***************************
This application is a CON of 13/288,850 11/03/2011 PAT 8787060
which claims benefit of 61/409,893 11/03/2010

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

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
07/30/2014

Foreign Priority claimed	☐ Yes ☑ No	☐ Met after Allowance	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
35 USC 119(a-d) conditions met	☐ Yes ☑ No		CA	8	9	2
Verified and Acknowledged	/HUAN HOANG/ Examiner's Signature	Initials				

ADDRESS
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306
UNITED STATES

TITLE
MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

FILING FEE RECEIVED		
800	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

BIB (Rev. 05/07).

UNITED STATES PATENT AND TRADEMARK OFFICE
COMMISSIONER FOR PATENTS
P.O.BOX 1450
ALEXANDRIA VA 22313-1451

PRESORTED
FIRST-CLASS MAIL
U.S. POSTAGE PAID
POSTEDIGITAL
NNNNN

Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

Courtesy Reminder for
Application Serial No: 14/337,168

Attorney Docket No: NETL.071C1
Customer Number: 79141
Date of Electronic Notification: 02/10/2016

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

An email notification regarding the correspondence was sent to the following email address(es) associated with your customer number:
jz@jzpatent.com

To view your correspondence online or update your email addresses, please visit us anytime at **https://sportal.uspto.gov/secure/myportal/privatepair.** If you have any questions, please email the Electronic Business Center (EBC) at EBC@uspto.gov or call 1-866-217-9197.

Customer No. 79141
Attorney Docket No.: NETL.071C1

COMBINED DECLARATION AND ASSIGNMENT FOR UTILITY OR DESIGN APPLICATION

Title of Invention	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION

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 14/337,168 filed on July 21, 2014.

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.

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

Note to Inventor: 37 C.F.R. § 1.63(c) states: "A person may not execute an oath or declaration for an application unless that person has reviewed and understands the contents of the application, including the claims, and is aware of the duty to disclose to the Office all information known to the person to be material to patentability as defined in § 1.56."

First Inventor (Legal Name): Hyun Lee

Signature: _____ Date: 3/2/2016

Electronic Acknowledgement Receipt

EFS ID:	25085509
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	02-MAR-2016
Filing Date:	21-JUL-2014
Time Stamp:	22:17:15
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	Oath or Declaration filed	2016-03-02_Declaration_NETL071C1.pdf	89632 21d2c22e0beba85fe1d21bca1384eeb525fbdeb5	no	1

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:

Total Files Size (in bytes):	89632

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.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for 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, 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)

Customer No. 79141

The Law Office of Jamie Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

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 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	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/337,168	07/21/2014	Hyun Lee	NETL.071C1	8733

TITLE OF INVENTION:

APPLN. TYPE	SMALL ENTITY	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	undiscounted	$960	$0	$0	$960	05/10/2016

EXAMINER	ART UNIT	CLASS-SUBCLASS

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 03-02 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 JAMIE J. ZHENG, Ph.D, Esq.
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
☐ Publication Fee (No small entity discount permitted)
☐ Advance Order - # of Copies _____

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

☐ A check is enclosed.
☑ Payment by credit card. Form PTO-2038 is attached.
☑ The Director is hereby authorized to charge the required fee(s), any deficiency, or credit any overpayment, to Deposit Account Number 50-5963 (enclose an extra copy of this form).

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

☐ a. Applicant claims SMALL ENTITY status. See 37 CFR 1.27.

☑ b. Applicant is no longer claiming SMALL ENTITY status. See 37 CFR 1.27(g)(2).

NOTE: The Issue Fee and Publication Fee (if required) will not be accepted from anyone other than the applicant; a registered attorney or agent; or the assignee or other party in interest as shown by the records of the United States Patent and Trademark Office.

Authorized Signature /Jamie J. Zheng/ Date March 10, 2016

Typed or printed name Jamie J. Zheng Registration No. 51,167

This collection of information 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 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, 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.

Electronic Patent Application Fee Transmittal

Application Number:	14337168
Filing Date:	21-Jul-2014
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Filer:	Jamie Jie Zheng
Attorney Docket Number:	NETL.071C1

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	960	960

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
		Total in USD ($)		**960**

Electronic Acknowledgement Receipt

EFS ID:	25159878
Application Number:	14337168
International Application Number:	
Confirmation Number:	8733
Title of Invention:	MEMORY PACKAGE WITH OPTIMIZED DRIVER LOAD AND METHOD OF OPERATION
First Named Inventor/Applicant Name:	Hyun Lee
Customer Number:	79141
Filer:	Jamie Jie Zheng
Filer Authorized By:	
Attorney Docket Number:	NETL.071C1
Receipt Date:	10-MAR-2016
Filing Date:	21-JUL-2014
Time Stamp:	14:16:20
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	Credit Card
Payment was successfully received in RAM	$960
RAM confirmation Number	504
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)	2016-03-01_Issue_Fee_Transmittal_NETL071C1.pdf	74753 b86685c3e2da56fedc64c562c84a4cfb8e186d54	no	2
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	30662 e5e9b095b7d9f34cc94edc5d2ea44efb219ccf33	no	2
Warnings:					
Information:					
			Total Files Size (in bytes):	105415	

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.

<u>New Applications Under 35 U.S.C. 111</u>
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.

<u>National Stage of an International Application under 35 U.S.C. 371</u>
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.

<u>New International Application Filed with the USPTO as a Receiving Office</u>
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/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	2	of	7

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

US PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	Document Number / Number-Kind Code [2] (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
	36.	2002/0048195	04-25-2002	Klein, Dean A.	
	37.	2002/0038405	03-28-2002	Leddige, M. et al.	
	38.	2003/0070052	04-10-2003	Lai, Jiin	
	39.	2004/0098528	05-20-2004	Janzen, Jefferey W.	
	40.	2005/0010737	01-01-2005	Ware et al.	
	41.	2005/0257109	11-17-2005	Averbuj	
	42.	2006/0262586	11-23-2006	Solomon, et al	
	43.	2007/0070669	03-29-2007	Tsern	
	44.	2007/0293094	12-01-2007	Aekins, Robert A.	
	45.	2008/0104352	05-01-2008	Talbot	
	46.	20080162790	07-03-2008	Im, Jeon-Taek	
	47.	2009/0103387	04-23-2009	Shau, Jeng-Jye	
	48.	2009/0296503	12-03-2009	Chu, M. et al.	
	49.	~~2011/0085408~~	04-14-2011	Solomon, J. et al.	
	50.	2011/0125966	05-26-2011	Amidi, H. et al.	

Change(s) applied to document, /R.F./ 2/17/2016

20110085406

FOREIGN PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	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]
	51.	EP1816570 A2	08-08-2007	Rambus, Inc.		
	52.	JP10092169	10/04/1998	IBM		
	53.	JP2000311485	10/13/00	Fujitsu Ltd.		
	54.	JP2000285674	10-13-2000	Fujitsu Ltd.	Translation of Abstract Only	
	55.	JP2002184176	06-28-2002	NEC Tohoku Ltd.		
	56.	JP2003007963	01-10-2003	Hitachi Ltd.et al.	Machine Translation	
	57.	JP2008046989	02-28-2008	Fujitsu Ltd	Translation of Abstract Only	
	58.	JP09237492	09-09-1997	Toshiba Corp.	Machine Translation	
	59.	JP2010320270	12-04-1998	Matsushita Electric Inc. Co.	Translation	

NON PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No.[1]	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.	T[2]

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

PTO/SB/08a/b(07-09)
Approved for use through 7/31/2012. OMB 0651-0031
US Patent & 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 contains a valid OMB control number.

Substitute for form 1449/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(Use as many sheets as necessary)

Sheet	1	of	7

Complete if Known	
Application Number	14/337,168
Filing Date	July 21, 2014
First Named Inventor	Hyun Lee
Art Unit	2827
Examiner Name	Unknown
Attorney Docket Number	NETL.071C1

US PATENT DOCUMENTS

Examiner Initials *	Cite No. [1]	Document Number Number-Kind Code [2] (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
	1.	5345412	09-06-1994	Shiratsuchi	
	2.	5537584	07-16-1996	Miyai et al.	
	3.	5617559	04-01-1997	Le et al.	
	4.	5649159	07-15-1997	Le et al.	
	5.	5655113	08-05-1997	Leung	
	6.	5717851	02-10-1998	Yishay et al.	
	7.	5724604	03-03-1998	Moyer	
	8.	5729716	~~05-17-1998~~ 03-1998	Lee et al.	
	9.	5784705	07-21-1998	Leung, Wingyu	
	10.	5802541	09-01-1998	Reed	
	11.	5973392	10-26-1999	Senba et al.	
	12.	6011710	01-04-2000	Wiggers	
	13.	6173357	01-09-2011	Ju	
	14.	6260127	07-10-2001	Olarig et al.	
	15.	6446158	09-03-2002	Karabatsos	
	16.	6553449	04-22-2003	Dodd et al.	
	17.	6618791	09-09-2003	Dodd et al.	
	18.	6717855	04-06-2004	Underwood	
	19.	6747887	06-08-2004	Halbert et al.	
	20.	6788592	09-07-2004	Nakata et al.	
	21.	6832303	12-14-2004	Tanaka	
	22.	6948084	09-20-2005	Manapat et al	
	23.	7093066	08-15-2006	Klein	
	24.	7130308	10-31-2006	Haddock et al.	
	25.	7133960	11-07-2006	Thompson et al.	
	26.	7379361	05-27-2008	Co et al.	
	27.	7464225	12-09-2008	Tsern	
	28.	7865674	01-04-2011	Gower et al.	
	29.	8089795	01-03-2012	Rajan	
	30.	8189328	05-29-2012	Kanapathippillai	
	31.	8233303	07-31-2012	Best	
	32.	8516185	08-20-2013	Lee et al.	
	33.	8782350	07-15-2014	Lee et al.	
	34.	8689064	04-01-2014	Lee et al.	
	35.	2001/0008006	07-12-2001	Klein	

Change(s) applied to document, /R.F./ 2/17/2016

EXAMINER **DATE CONSIDERED**

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant. [1] Applicant's unique citation designation number (optional). [2] See Kinds Codes of USPTO Patents Documents at www.uspto.gov or MPEP 901.04. [3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST. 3). [4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. [5] Kind of document by the appropriate symbols as indicated on the document and WIPO Standard ST. 16 if possible. [6] Applicant is to place a check mark here if English language Translation is attached.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGH. /H.H./

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.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/337,168	04/19/2016	9318160	NETL.071C1	8733

79141 7590 03/30/2016
Jamie J. Zheng, Ph.D Esq.
P.O. Box 60573
Palo Alto, CA 94306

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;

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 USA offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to encourage and facilitate business investment. To learn more about why the USA is the best country in the world to develop technology, manufacture products, and grow your business, visit SelectUSA.gov.

IR103 (Rev. 10/09)

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	REQUEST ID
14/337,168	07/21/2014	Netlist, Inc.	129980-5068US	67124

Acknowledgement of Loss of Entitlement to Entity Status Discount

The entity status change request below filed through Private PAIR on 07/06/2018 has been accepted.

CERTIFICATIONS:

Change of Entity Status:

☒ Applicant changing to regular undiscounted fee status.
NOTE: Checking this box will be taken to be notification of loss of entitlement to small or micro entity status, as applicable.

This portion must be completed by the signatory or signatories making the entity status change in accordance with 37 CFR 1.4(d)(4).

Signature:	/Jamie J. Zheng/
Name:	Jamie J. Zheng
Registration Number:	51167