IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
WACO DIVISION

NETLIST, INC.,
 	
         Plaintiff,
 	
 v.
 	
 MICRON TECHNOLOGY, INC., MICRON SEMICONDUCTOR PRODUCTS, INC., and MICRON TECHNOLOGY TEXAS LLC,
 	
         Defendants.
	Civil Action No. 6:21-cv-430
	
	 JURY TRIAL DEMANDED

NETLIST, INC.'S
COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Netlist, Inc. ("Netlist") as and for its complaint for patent infringement against

Micron Technology, Inc. ("Micron Technology"), Micron Semiconductor Products, Inc.

("Micron Semiconductor"), and Micron Technology Texas LLC ("Micron Texas") (collectively,

"Defendants") alleges as follows:

PARTIES

1. Plaintiff Netlist is a corporation organized and existing under the laws of the State of

Delaware, having a principal place of business at 175 Technology Drive, Suite 150, Irvine,

California 92618.

2. Netlist is the owner by assignment of U.S. Patent No. 8,301,833 ("the '833 Patent")

("the Asserted Patent") (attached as Exhibit 1).

3. Micron Technology is a corporation organized and existing under the laws of

Delaware, having a principal place of business at 8000 South Federal Way, Boise, Idaho 83716.

Micron Technology also has a place of business at 101 West Louis Henna Boulevard, Suite 210,

Austin, Texas 78728. Micron Technology makes dynamic random-access memory (DRAM), NAND Flash, and NOR Flash memory, and other memory products. Micron makes its own products in semiconductor fabrication plants in the United States and other countries throughout the world. On information and belief, Micron sells its products to customers, including customers in this District, in the computer, networking and storage, consumer electronics, solid-state drives, and mobile telecommunications markets.

4.   Micron Semiconductor is a corporation organized and existing under the laws of Idaho, having a principal place of business at 8000 South Federal Way, Boise, Idaho 83716. Micron Semiconductor also has a place of business at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728. Micron Semiconductor is registered with the Texas Secretary of State to do business in Texas. Micron Semiconductor can be served through its registered agent, The Corporation Service Company, 211 E. 7th Street, Suite 620, Austin, TX 78701-3218.

5.   Micron Texas is a corporation organized and existing under the laws of Idaho, having a principal place of business at 8000 South Federal Way, Boise, Idaho 83716. Micron Texas also has a place of business at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas 78728. Micron Texas is registered with the Texas Secretary of State to do business in Texas. Micron Texas can be served through its registered agent, The Corporation Service Company, 211 E. 7th Street, Suite 620, Austin, TX 78701-3218.

6.   Micron Semiconductor and Micron Texas are wholly owned subsidiaries of Micron Technology. Micron Technology does not separately report revenue from Micron Semiconductor or Micron Texas in its filings to the Securities Exchange Commission, but rather reports combined revenue from its various products and subsidiaries.

7.   Defendants place, have placed, and contributed to placing infringing products like

their Non-Volatile Dual In-line Memory Module ("NVDIMM") products into the stream of

commerce via an established distribution channel knowing or understanding that such products

would be sold and used in the United States, including in the Western District of Texas. On

information and belief, Defendants have also derived substantial revenues from infringing acts in

this District including from the sale and use of infringing NVDIMM products.

JURISDICTION AND VENUE

8.   This is an action for patent infringement arising under the patent laws of the United

States, Title 35 of the United States Code § 1, et seq. Accordingly, this Court has subject matter

jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

9.   This Court has specific personal jurisdiction over Defendants at least in part because

Defendants conduct business in this Judicial District. Netlist's causes of action arise, at least in

part, from Defendants' contacts with and activities in the State of Texas and this District. On

information and belief, Defendants have committed acts of infringement within the State of

Texas and this District by, among other things, directly and/or indirectly using, selling, offering

to sell, or importing products that infringe one or more claims of the Asserted Patent.

10.   Defendants conduct business in this District and maintain regular and established

places of business within this District. For example, Defendants has maintained regular and

established places of business with offices and/or other facilities in this District, including at

least such offices and/or facilities at 101 West Louis Henna Boulevard, Suite 210, Austin, Texas

78728. On information and belief, personnel working at this facility in Austin engage in

activities directly related to the NVDIMM products at issue in this case.

11.   For example, personnel employed by Defendants working at this location are

semiconductor professionals, including design engineers, fabrication engineers, field applications

engineers, storage solutions engineers, software engineers, data analysts, customer quality

specialists, facilities designers, product line managers, quality assurance managers, program

managers, sales directors, marketing directors, and systems architects.

12.   Defendants have placed or contributed to placing infringing products including, but

not limited to, their NVDIMM products into the stream of commerce knowing or understanding

that such products would be sold and used in the United States, including in this District.

13.   Defendants have also derived substantial revenues from infringing acts in this

District, including from the sale and use of infringing products including, but not limited to,

Defendants' NVDIMM products.

14.   Defendants have committed acts within this District giving rise to this action, and

have established sufficient minimum contacts with the State of Texas such that the exercise of

jurisdiction would not offend traditional notions of fair play and substantial justice.

15.   Venue is proper in this District as to Defendants pursuant to 28 U.S.C. § 1391(b), (c),

and 1400(b) because Defendants (1) have committed and continue to commit acts of patent

infringement in this District by, among other things, directly and/or indirectly making, using,

selling, offering to sell, or importing products that infringe one or more claims of the Asserted

Patent, and (2) have done and continue to do business in this District by maintaining regular and

established places of business, including at least at 101 West Louis Henna Boulevard, Suite 210,

Austin, Texas 78728.

FACTUAL BACKGROUND

A.   NETLIST

16.   Since its founding in 2000, Netlist has been a leading innovator in high-performance

memory module technologies. Netlist designs and manufactures a wide variety of high-

performance products for the cloud computing, virtualization and high-performance computing

markets. Netlist's technology enables users to derive useful information from vast amounts of data in a shorter period of time. These capabilities will become increasingly valuable as the volume of data continues to dramatically increase.

17. Netlist has a long history of being the first to market with disruptive new products based on Netlist's distributed buffer architecture later adopted by the industry.

18. Netlist's innovative products built on Netlist's early pioneering work in areas such as embedding passives into printed circuit boards to free up board real estate, doubling densities via quad-rank double data rate (DDR) technology, and other off-chip technology advances that result in improved performance and lower costs compared to conventional memory modules.

19. The inventors of the Asserted Patent were critical in the development of these pioneering technologies. For example, inventor Jay Bhakta was one of the co-founders of Netlist prior to his passing, and inventor Scott Milton has been with Netlist for nearly twenty years and currently serves as Vice President of Engineering.

B.   NETLIST'S NVDIMM TECHNOLOGY

20. The technologies disclosed and claimed in the Asserted Patent relate generally to memory modules. Memory modules are typically printed circuit boards that contain, among other important components, DRAM (Dynamic Random-Access Memory) integrated circuits. Memory modules are often installed into memory slots on computer motherboards and serve as memory for computer systems.

21. NVDIMM or NVRDIMM refers as shorthand to a "non-volatile" DIMM.

22. While DRAM memory is extremely fast, it is volatile. DRAM requires electrical power to constantly refresh the data that is held in its cells. Flash memory, on the other hand, is "non-volatile"—it is capable of retaining data within it even without electrical power.

23.   NVDIMM combines the low cost and non-volatility of Flash memory with the high-speed and durability of DRAM. NVDIMM leverages this unique combination of semiconductor raw materials to provide fast access to critical data while protecting the data in the event system power is lost.

24.   Netlist changed the direction of the industry when it designed DRAM and NAND Flash to work together for the first time on a single memory module using a controller. After inventing the NVDIMM—years ahead of industry efforts—Netlist has supplied this custom memory module in high volume to computer storage customers for many years.

THE ASSERTED PATENT

25.   Netlist owns the '833 Patent by assignment from the listed inventors Chi-She Chen, Jeffery C. Solomon, Scott Milton, and Jay Bhakta. The '833 Patent was filed as Application No. 12/240,916 on September 29, 2008, issued as a patent on October 30, 2012, and claims priority to provisional application No. 60/941,586 filed on June 1, 2007.

26.   The '833 Patent is entitled "Non-Volatile Memory Module," and relates generally to a specific configuration of hybrid memory systems that address operating non-volatile memory during backup operation while running the volatile memory subsystem at a lower clock speed than during normal operation, and therefore, at lower power.

27.   The invention of the '833 Patent includes circuitry for providing a regular high-speed clock frequency (first clock frequency) during communications between the host and the volatile memory subsystem, and a slower clock frequency during communications between the volatile memory subsystem (using a third clock frequency) and the non-volatile memory subsystem (using a second clock frequency).

28.   Netlist contacted Defendants by letter dated April 28, 2021 and notified them of their

infringement of the '833 Patent and offered to license Defendants' NVDIMM Infringing

Products. By service of this Complaint, the Defendants have refused to take a license to the '833

Patent.

OVERVIEW OF DEFENDANTS' INFRINGING TECHNOLOGY

29.   Defendants are worldwide semiconductor solution providers that primarily

manufacture semiconductor memory products such as DRAM, NAND Flash and MCP (Multi-

Chip Package).

30.   Defendants' infringing NVDIMM memory modules are designed for use in servers,

such as those supporting cloud-based computing and other data-intensive applications.

31.   Defendants make, use, sell, offer to sell, and/or import within this District and

elsewhere in the United States, infringing DDR4 NVDIMMs (the "Infringing Products").

32.   The Infringing Products include, without limitation, the following exemplary DDR4

NVRDIMM modules—as well as comparable models that operate in the same or similar manner

as described in the Infringement Count:

- MTA18ASF2G72PF1Z

- MTA18ASF2G72XF1Z

- MTA36ASS4G72PF1Z

- MTA36ASS4G72XF1Z

COUNT 1

(Willful Infringement of U.S. Patent No. 8,301,833)

33.   Plaintiff re-alleges and incorporates by reference the allegations in the foregoing

paragraphs as if fully set forth herein.

34.   Plaintiff is informed and believes, and on that basis alleges, that Defendants have

infringed and are currently infringing one or more claims (e.g., claim 15) of the '833 Patent, in

violation of 35 U.S.C. § 271.

35.   Defendants have infringed and are currently infringing literally and/or under the

doctrine of equivalents, by, among other things, making, using, offering for sale, selling, and/or

importing within this judicial district and elsewhere in the United States, without license or

authority, infringing products, including but not limited to their DDR4 SDRAM NVRDIMM and

related products and/or processes falling within the scope of one or more claims of the '833

Patent, including claim 15:

> 15. A memory system operatively coupled to a host system, the memory system comprising:
>
> a volatile memory subsystem operable at a first clock frequency when the memory system is in a first mode of operation in which data is communicated between the volatile memory subsystem and the host system; and
>
> a non-volatile memory subsystem operable at a second clock frequency when the memory system is in a second mode of operation in which data is communicated between the volatile memory subsystem and the non-volatile memory subsystem,
>
> the volatile memory subsystem further being operable at a third clock frequency when the memory system is in the second mode of operation, the third clock frequency being less than the clock first frequency.

36.   Defendants' acts of making, using, offering for sale, selling, and/or importing

infringing products, including but not limited to their DDR4 SDRAM NVRDIMM and related

products and/or processes satisfy, literally or under the doctrine of equivalents, each and every

claim limitation, including but not limited to limitations of claim 15.[1]

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[1] Plaintiff expressly reserves the right to identify additional asserted claims in its infringement contentions in accordance with this Court's Order Governing Procedures ("OGP") and other Standing Orders. Claim 15 is provided for notice pleading only and is not presented as an "exemplary" claim of all other claims in the '833 Patent.

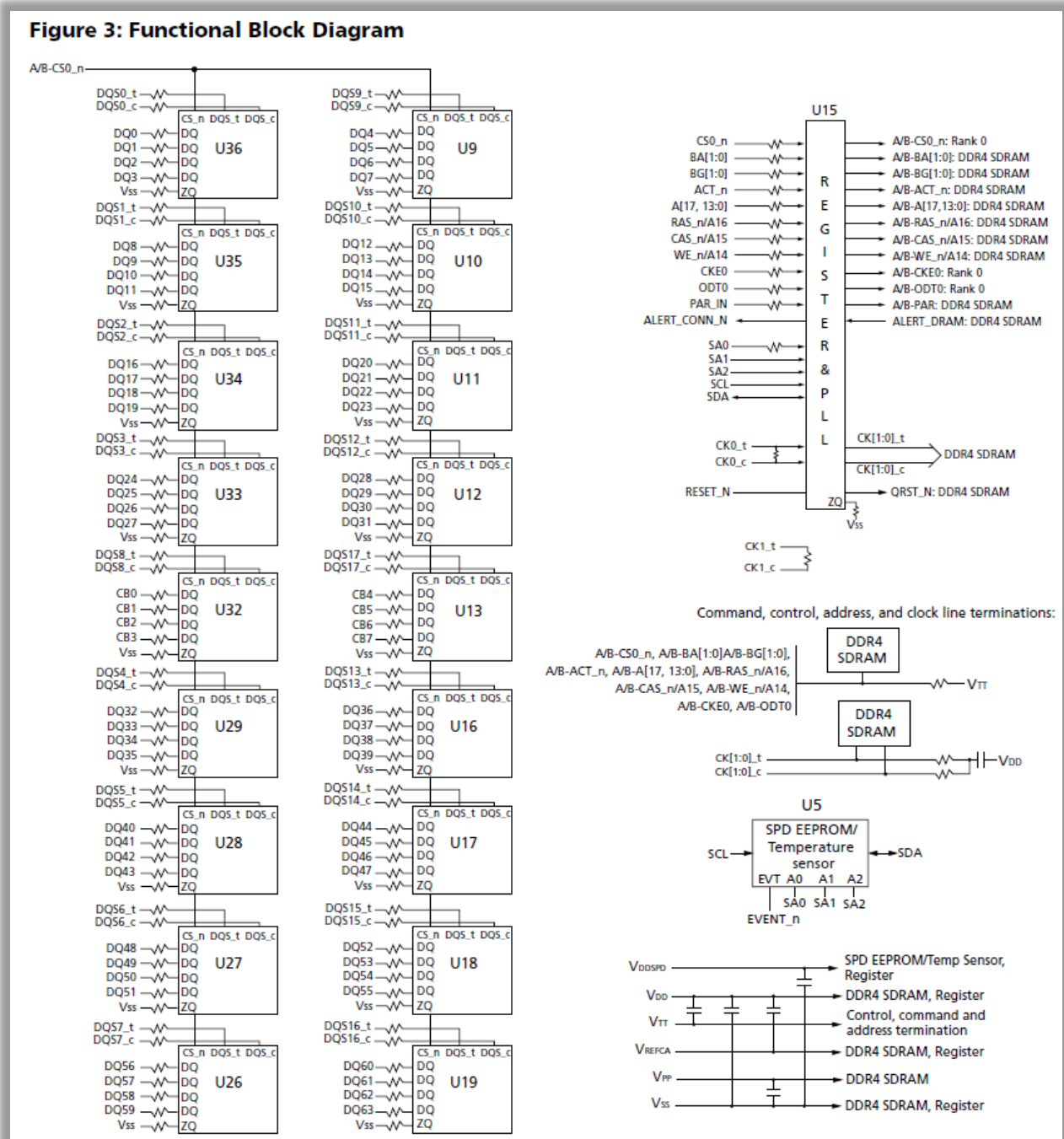COMPLAINT FOR PATENT INFRINGEMENT   8

37. For example, Defendants' 16GB DDR4 NVRDIMM MTA18ASF2G72PF1Z

("Micron 16GB NVRDIMM") meets each and every limitation of claim 15.

38. The infringing Micron 16GB NVRDIMM is a memory system that is operatively

coupled to a host system.

Figure 2: Micron DDR4 NVDIMM System Block Diagram
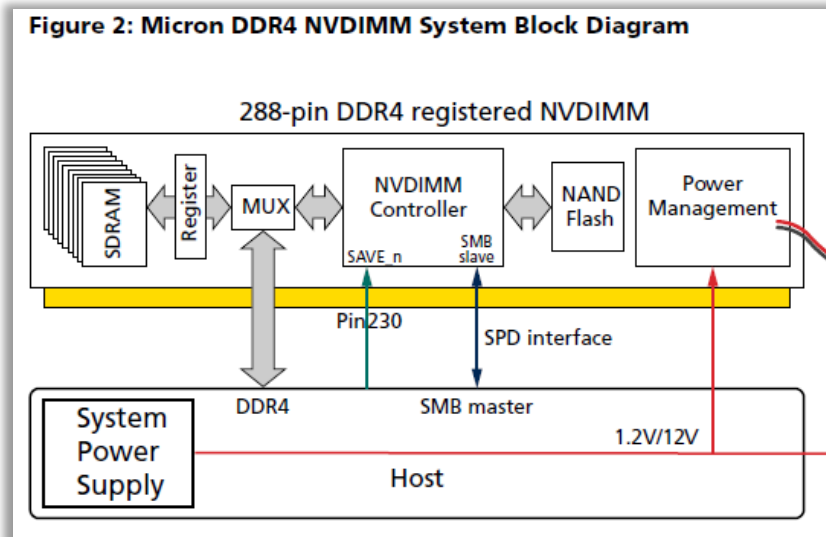
See Micron MTA18ASF2G72PF1Z – 16GB data sheet ("Micron 16GB NVRDIMM Data
Sheet"), Figure 2 (https://www.micron.com/products/dram-modules/nvdimm/part-
catalog/mta18asf2g72pf1z-2g9).

39.   The infringing Micron 16GB NVRDIMM includes a volatile memory subsystem.

Figure 3: Functional Block Diagram

See Micron 16GB NVRDIMM Data Sheet, Figures 2-3.

40.   The volatile memory subsystem of the infringing Micron 16GB NVRDIMM is operable at a first clock frequency. For example, Micron 16GB NVRDIMM is operable at a frequency of 1333MHz—a clock period of 0.75ns (Nano second), or a data rate of 2666 MT/s (Million Transfer per second).

**Table 3: Part Numbers and Timing Parameters – 16GB Modules**

Base device: MT40A2G4,[1] 8Gb DDR4 SDRAM

Part Number	Module Density	Configuration	Module Bandwidth	Memory Clock/ Data Rate	Clock Cycles (CL-^{t}RCD-^{t}RP)
MTA18ASF2G72PF1Z-2G6__	16GB	2 Gig x 72	21.3 GB/s	0.75ns/2666 MT/s	19-19-19

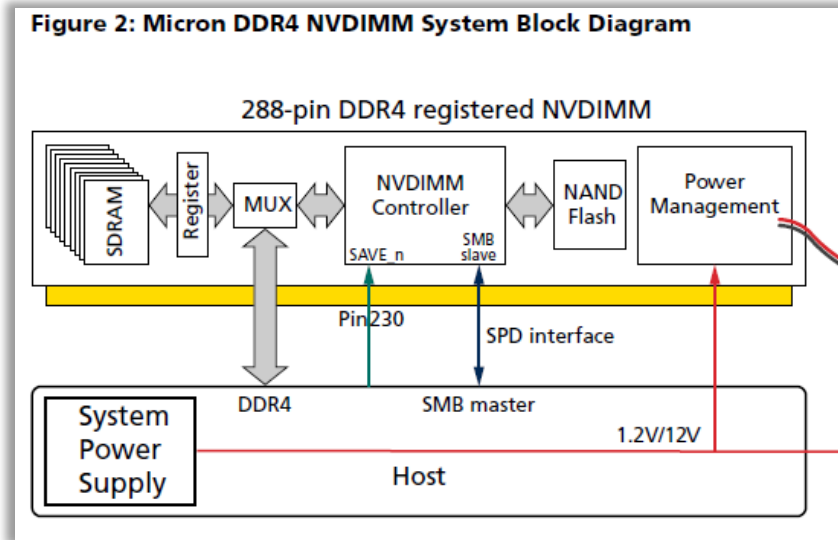*See* Micron 16GB NVRDIMM Data Sheet, Table 3.

41.   During normal operation, the infringing Micron 16GB NVRDIMM is in a first mode of operation ("bypass mode") in which data is communicated between the volatile memory subsystem and the host system.

During normal operation, bypass mode, the Micron DDR4 NVDIMM appears as a standard registered DDR4 DIMM to the host system, providing all the benefits and speed of a high-speed, high-density SDRAM. In the event of a power loss, the Micron NVD|IMM controller can be commanded to take control of the SDRAM, transferring its contents to flash memory using energy from its own battery-free power source or from a system-level persistent power source, thereby preserving all of the SDRAM data. After power is restored, the Micron NVDIMM controller can be commanded to transfer the contents from the flash back to the SDRAM and return control to the host system.

Figure 3: Functional Block Diagram
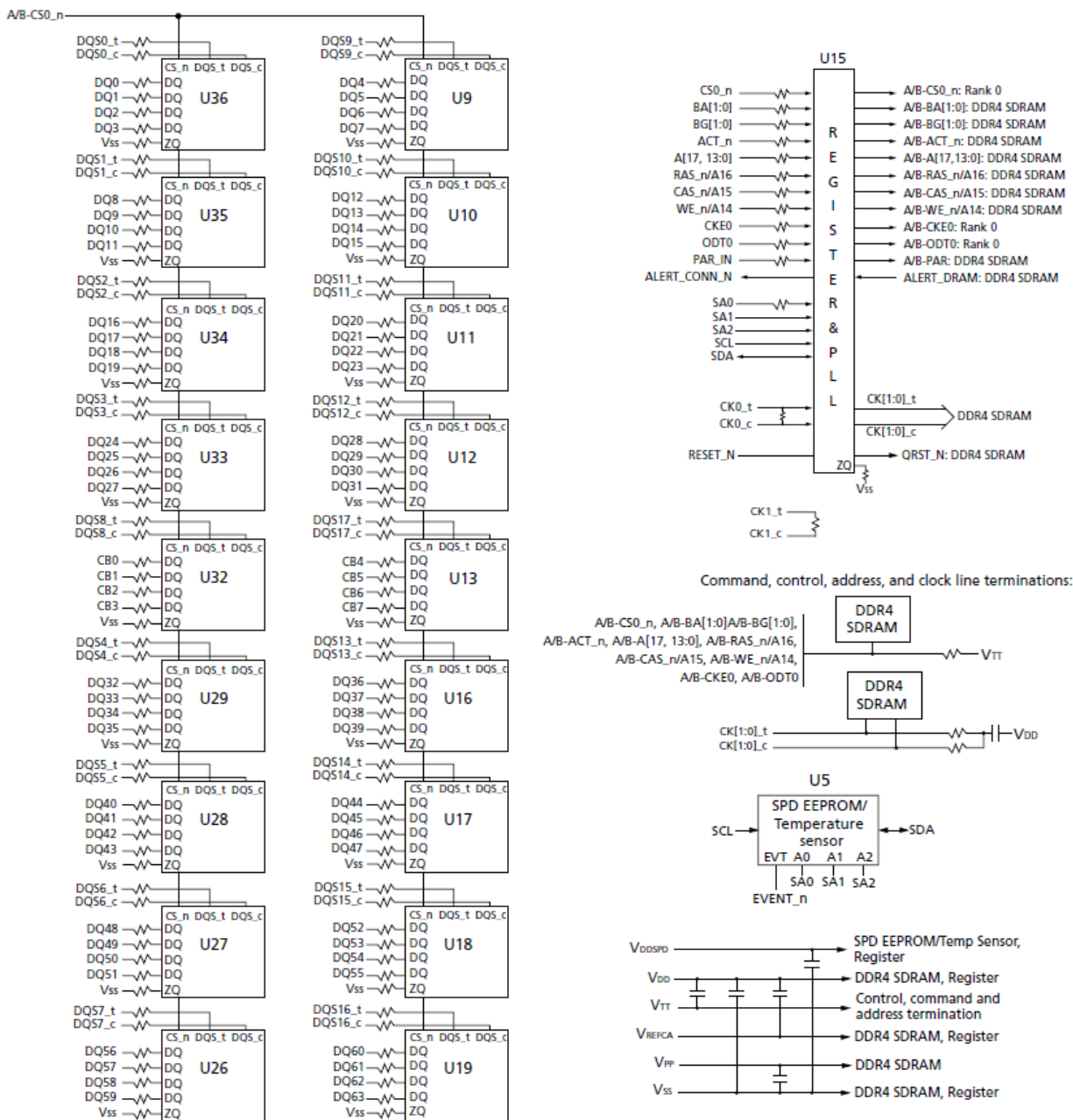
See Micron 16GB NVRDIMM Data Sheet, p. 13 and Figure 3.

42.　　The infringing Micron 16GB NVRDIMM comprises a nonvolatile memory subsystem. For example, the non-volatile memory subsystem in the infringing Micron 16GB NVRDIMM includes NVRDIMM Controller (FPGA) and NAND Flash (NF).

Figure 2: Micron DDR4 NVDIMM System Block Diagram

See Micron 16GB NVRDIMM Data Sheet, Figure 2.

43.   The non-volatile memory subsystem in the infringing Micron 16GB NVRDIMM is operable at a second clock frequency when the memory system is in a second mode of operation. For example, during Backup and Restore operations, the Micron NVRDIMM controller takes control of the SDRAM, transferring its content to the NAND Flash memory. The Micron NVRDIMM controller operations require at least a clock that operates at a given frequency appropriate for the non-volatile memory subsystem operation.

During normal operation, bypass mode, the Micron DDR4 NVDIMM appears as a standard registered DDR4 DIMM to the host system, providing all the benefits and speed of a high-speed, high-density SDRAM. In the event of a power loss, the Micron NVDIMM controller can be commanded to take control of the SDRAM, transferring its contents to flash memory using energy from its own battery-free power source or from a system-level persistent power source, thereby preserving all of the SDRAM data. After power is restored, the Micron NVDIMM controller can be commanded to transfer the contents from the flash back to the SDRAM and return control to the host system.

See Micron 16GB NVRDIMM Data Sheet, p. 13.

44.   Further, because the NVRDIMM Controller of the infringing Micron 16GB NVRDIMM is powered to communicate data between the SDRAM and the FLASH memories, it

further indicates that the non-volatile memory subsystem operates at a second clock frequency during backup or restore operation.

FPGA (NV Con-troller)	Powered during bypass mode and only fully utilized during a re-store or backup operation. DRAM bus is operated at a lower clock frequency during backup and restore operations.
PSOC (NV Con-troller)	Powered during bypass mode and only fully utilized during a re-store or backup operation. DRAM bus is operated at a lower clock frequency during backup and restore operations.

See Micron 16GB NVRDIMM Data Sheet, Table 10.

45.   During the second mode of operation in the infringing Micron 16GB NVRDIMM, data is communicated between the volatile memory subsystem and the non-volatile memory subsystem. For example, during Backup and Restore mode, the Micron 16GB NVRDIMM is operable to switch the internal MUXs (multiplexers) to enable data communication between the DDR4 SDRAM and the NAND Flash.

SAVE_n	Input (open drain)	**Force Save:** Active LOW, open-drain input pulled up to 2.5V through a 2K resistor. Commands the Micron NVDIMM to switch its internal MUXs and copy the data in the SDRAM to internal NAND Flash. The SDRAM must be placed in self refresh mode be-fore asserting this pin to ensure that no data is lost during this operation.

See Micron 16GB NVRDIMM Data Sheet, Table 5, p. 9.

46.   The infringing Micron 16GB NVRDIMM comprises a volatile memory subsystem which is further operable at a third clock frequency when the memory system is in the second mode of operation, where the third clock frequency is less than the clock first frequency. For example, during Backup and Restore mode, all data transfers from or to the DDR4 SDRAM (volatile memory subsystem) occur at a third clock frequency that is lower than the clock frequency that the DDR4 SDRAM operates at during Bypass mode.

Table 10: Thermal Characteristics

The NVDIMM consists of many devices with differing temperature specifications. It i
signer to ensure the temperature specifications are maintained for all devices.

Device	Parameter/Condition
DRAM	DRAM case temperature - Measured at the center top of die. The DRAM consumes power in all modes as per I_{DD} tables in Micron DDR4 component data sheets. The memory bus operates at a lower frequency during backup and restore operations therefore dissipating less power then when operating in bypass mode.
NAND Flash	NF is utilized during backup and restore operations. The NF is not utilized during bypass mode therefore making temperature specifications relatively simple to maintain.
FPGA (NV Controller)	Powered during bypass mode and only fully utilized during a restore or backup operation. DRAM bus is operated at a lower clock frequency during backup and restore operations.
PSOC (NV Controller)	Powered during bypass mode and only fully utilized during a restore or backup operation. DRAM bus is operated at a lower clock frequency during backup and restore operations.
NOR	Holds the code and fabric for the NV controller. Utilized during initialization.
RCD	Resides on Command/ Address bus and consumes power in all modes. DRAM bus is operated at a lower frequency during backup and restore operations, therefore consuming less power.

See Micron 16GB NVRDIMM Data Sheet, Table 10.

47.   By infringing claim 15 and other claims of the '833 Patent, Defendants' infringing

Products allow for systems configured with higher-performance memory than other types of

memory modules.

48.   Defendants have also infringed indirectly and continue to infringe indirectly the '833

Patent by active inducement under 35 U.S.C. § 271(b).

49.   Defendants have been aware of the '833 Patent and their infringement since no later

than April 28, 2021, when Netlist informed Defendants of their infringement and offered to

license the Infringing Products. By service of this Complaint, Defendants refused to pay for a

license.

50.   On information and belief, Defendants have intended, and continue to intend, to

induce patent infringement by others, including system designers, software providers,

distributors, customers, end-users, and/or other third parties incorporating their DDR4 SDRAM

NVRDIMM memory modules and have had knowledge that the inducing acts would cause

infringement or have been willfully blind to the possibility that the inducing acts would cause

infringement.

51.   For example, Defendants advertise and market their DDR4 SDRAM NVRDIMM as

"developed to meet the need for higher-density, higher-performance memory for enterprise-class

storage and server applications." *See* Micron 16GB NVRDIMM Data Sheet, p. 13.

52.   Defendants have also infringed indirectly and continue to infringe indirectly the '833

Patent by contributory infringement under 35 U.S.C. § 271(c).

53.   Defendants have and continue to intentionally commit contributory infringement by

selling, offering to sell, or importing the infringing products, which include configurations that

have no substantial non-infringing use, including but not limited to their DDR4 SDRAM

NVRDIMM memory modules, with the knowledge that they will be used by others, including

system designers, software providers, distributors, customers, end-users, and/or other third

parties to directly infringe claims of the '833 Patent.

54.   Defendants have had actual knowledge of the '833 Patent since at least April 28,

2021, when Netlist informed Defendants of their infringement of the '833 Patent. By service of

this Complaint, despite having actual knowledge of their infringement of the '833 Patent,

Defendants have continued to willfully, wantonly, and deliberately infringe the '833 Patent.

55.   To the extent applicable, the requirements of 35 U.S.C. § 287(a) have been met with

respect to the '833 Patent.

56.   As a result of Defendants' infringement of the '833 Patent, Plaintiff has been injured

by Defendants' unauthorized use of Plaintiff's intellectual property.

57.   Plaintiff seeks monetary damages in an amount adequate to compensate for

Defendants' infringement, but in no event less than a reasonable royalty for the use made of the

invention by Defendants, together with interest and costs as fixed by the Court, and Plaintiff will

continue to suffer damages in the future unless Defendants' infringing activities are enjoined by

this Court.

58.   Unless a permanent injunction is issued enjoining Defendants and their agents,

servants, employees, representatives, affiliates, and all others acting or in active concert

therewith from infringing the '833 Patent, Plaintiff will be greatly and irreparably harmed.

PRAYER FOR RELIEF

Plaintiff prays for the following relief:

A.   A judgment that Defendants have infringed one or more claims of the Asserted

Patent;

B.   A permanent injunction enjoining Defendants and their officers, directors, agents,

servants, affiliates, employees, divisions, branches, subsidiaries, parents, and all

others acting in active concert or participation with them, from infringing the

Asserted Patent;

C.   An award of damages resulting from Defendants' acts of infringement in accordance with 35 U.S.C. § 284;

D.   A judgment and order finding that Defendants' acts of infringement were egregious and willful and trebling damages under 35 U.S.C. § 284;

E.   A judgment and order finding that this is an exceptional case within the meaning of 35 U.S.C. § 285 and awarding to Plaintiff its reasonable attorneys' fees against Defendants.

F.   A judgment and order requiring Defendants to provide accountings and to pay supplemental damages to Plaintiff, including, without limitation, prejudgment and post-judgment interest; and

G.   Any and all other relief to which Plaintiff may show itself to be entitled.

JURY TRIAL DEMANDED

Plaintiff hereby demands a jury trial for all issues so triable.

Dated: April 28, 2021   /s/ *Paul J. Skiermont*

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COMPLAINT FOR PATENT INFRINGEMENT   19