

**IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE**

ELM 3DS INNOVATIONS, LLC, a
Delaware limited liability company,

Plaintiff,

v.

MICRON TECHNOLOGY, INC., a
Delaware corporation, MICRON
SEMICONDUCTOR
PRODUCTS, INC., an Idaho corporation, and
MICRON CONSUMER PRODUCTS
GROUP, INC., a Delaware corporation,

Defendants.

C.A. No. 14-cv-1431-LPS

Jury Trial Demanded

SECOND AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Elm 3DS Innovations, LLC (“Plaintiff” or “Elm 3DS”), by its attorneys, for its complaint against Defendants Micron Technology, Inc., and its subsidiaries and related entities Micron Semiconductor Products, Inc., and Micron Consumer Products Group, Inc. (individually or collectively “Defendants” or “Micron”) hereby alleges as follows:

INTRODUCTION

1. This is an action for patent infringement under the Patent Laws of the United States, 35 U.S.C. § 1 et seq., for infringing the following Elm 3DS patents:

- (a) U.S. Patent No. 7,193,239 (“Leedy ’239 patent”), entitled “*Three Dimensional Structure Integrated Circuit*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 1);
- (b) U.S. Patent No. 7,474,004 (“Leedy ’004 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 2);
- (c) U.S. Patent No. 7,504,732 (“Leedy ’732 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 3);

- (d) U.S. Patent No. 8,410,617 (“Leedy ’617 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 4);
- (e) U.S. Patent No. 8,629,542 (“Leedy ’542 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 5);
- (f) U.S. Patent No. 8,653,672 (“Leedy ’672 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 6);
- (g) U.S. Patent No. 8,791,581 (“Leedy ’581 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 7);
- (h) U.S. Patent No. 8,796,862 (“Leedy ’862 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 8);
- (i) U.S. Patent No. 8,841,778 (“Leedy ’778 patent”), entitled “*Three Dimensional Memory Structure*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 9);
- (j) U.S. Patent No. 8,907,499 (“Leedy ’499 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 10);
- (k) U.S. Patent No. 8,928,119 (“Leedy ’119 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 11);
- (l) U.S. Patent No. 8,933,570 (“Leedy ’570 patent”), entitled “*Three Dimensional Structure Memory*,” owned by Elm 3DS Innovations, LLC (attached as Ex. 12).

2. The Elm 3DS Patents cover foundational semiconductor technologies in the design and manufacture of three-dimensional integrated circuits such as memory, processors, and image sensors. These fundamental technologies reduce manufacturing costs while improving speed and efficiency. Among other things, the Elm 3DS Patents disclose technologies that enable semiconductor manufacturers to stack multiple integrated circuits (“die”) on top of one another within one integrated circuit package, and to form interconnect circuitry for communication among

the stacked die, including interconnect circuitry passing through silicon substrates in stacked integrated circuits.

3. Micron has infringed and continues to infringe the Elm 3DS Patents, directly and indirectly, by making, using, selling, offering for sale, and/or importing into the United States, semiconductor products with multiple stacked die and/or electronics products containing the same; and by encouraging third parties to use, sell, offer for sale, and/or import into the United States, Micron semiconductor products with multiple stacked die and/or electronics products containing the same, with knowledge of the Elm 3DS Patents and in the infringement resulting therefrom.

THE PARTIES

4. Elm 3DS Innovations, LLC is a Delaware limited liability company with its principal address at 26147 Carmelo Street, Carmel, California 93923. Elm 3DS owns patents, originally issued to its President, inventor Glenn J. Leedy, covering Mr. Leedy's groundbreaking technology for thinning, vertically stacking and interconnecting integrated circuits.

5. Micron Technology, Inc. ("MTI") is a Delaware corporation with its principal place of business at 8000 S. Federal Way, Boise, Idaho. On information and belief, MTI is a global leader in advanced memory and semiconductor technologies. On information and belief, MTI designs, manufactures, has manufactured, uses, offers for sale, sells and/or imports into the United States—including into Delaware—billions of dollars of memory and semiconductor technologies each year

6. Micron Semiconductor Products, Inc. ("MSP") is an Idaho corporation with its principal place of business in Boise, Idaho. On information and belief, MSP is a wholly-owned subsidiary of MTI. On information and belief, MSP manufactures, has manufactured, uses, offers for sale, sells and/or imports into the United States—including into Delaware—various semiconductor devices, including DRAM, DRAM modules, NAND flash, NOR flash, and phase change memory.

7. Micron Consumer Products Groups, Inc. (“MCPG”) is a Delaware corporation with its principal place of business at 47300 Bayside Parkway, Fremont, California 94538. On information and belief, MCPG is a wholly-owned subsidiary of MTL. On information and belief, MCPG manufactures, has manufactured, uses, offers for sale, sells and/or imports into the United States—including into Delaware—various memory products for digital devices, including memory cards, SD cards, microSD cards, CompactFlash cards, CFast cards, XQD cards, and Memory Stick PRO Duo cards, as well as Image Rescue software to recover photo and video files from memory cards; card readers; USB flash drives and multipacks; and OEM products.

JURISDICTION

8. This is an action for patent infringement, over which this Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

9. This Court has personal jurisdiction over each of the Defendants consistent with the requirements of the Due Process Clause of the United States Constitution and/or the Delaware Long Arm Statute. On information and belief, each Defendant transacts substantial business in Delaware, and/or has committed and continues to commit acts of patent infringement in Delaware as alleged in this Complaint. In addition, Micron Technology, Inc. and Micron Consumer Products Group, Inc. are incorporated under the laws of Delaware. Further, on information and belief, the Defendants have admitted or not contested proper personal jurisdiction in this District in other patent infringement actions.

VENUE

10. Venue is proper in this District pursuant to 28 U.S.C. §§ 1391 (b)-(d) and 1400(b) because Defendants are subject to personal jurisdiction in this District, each has committed acts of patent infringement in this District, each has purposefully availed itself of the rights and benefits of Delaware law and regularly does and solicits business in Delaware, and each derives substantial

revenue from things used or consumed in this District. Further, on information and belief, the Defendants have admitted or not contested proper venue in this District in other patent infringement actions.

FACTUAL BACKGROUND

I. The Elm 3DS Patents

11. Plaintiff solely owns all rights, titles, and interests in and to the following United States patents (collectively, the “Elm 3DS Patents”), including the exclusive rights to bring suit with respect to any past, present, and future infringement thereof:

- (a) U.S. Patent No. 7,193,239 (“Leedy ’239 patent”), entitled “*Three Dimensional Structure Integrated Circuit*,” which was duly and legally issued on March 20, 2007, from a patent application filed July 3, 2003, with Glenn J. Leedy as the named inventor. The Leedy ’239 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (b) U.S. Patent No. 7,474,004 (“Leedy ’004 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on January 6, 2009, from a patent application filed December 18, 2003, with Glenn J. Leedy as the named inventor. The Leedy ’004 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (c) U.S. Patent No. 7,504,732 (“Leedy ’732 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on March 17, 2009, from a patent application filed August 19, 2002, with Glenn J. Leedy as the named inventor. The Leedy ’732 patent claims priority from U.S. Patent No. 5,915,167, which was duly and

legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;

- (d) U.S. Patent No. 8,410,617 (“Leedy ’617 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on April 2, 2013, from a patent application filed July 4, 2009, with Glenn J. Leedy as the named inventor. The Leedy ’617 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (e) U.S. Patent No. 8,629,542 (“Leedy ’542 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on January 14, 2014, from a patent application filed March 17, 2009, with Glenn J. Leedy as the named inventor. The Leedy ’542 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (f) U.S. Patent No. 8,653,672 (“Leedy ’672 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on February 18, 2014, from a patent application filed May 27, 2010, with Glenn J. Leedy as the named inventor. The Leedy ’672 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (g) U.S. Patent No. 8,791,581 (“Leedy ’581 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on July 29, 2014, from a patent application filed October 23, 2013, with Glenn J. Leedy as the named inventor. The Leedy ’581 patent claims priority from U.S. Patent No. 5,915,167, which was duly and

legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;

- (h) U.S. Patent No. 8,796,862 (“Leedy ’862 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on August 5, 2014, from a patent application filed August 9, 2013, with Glenn J. Leedy as the named inventor. The Leedy ’862 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (i) U.S. Patent No. 8,841,778 (“Leedy ’778 patent”), entitled “*Three Dimensional Memory Structure*,” which was duly and legally issued on September 23, 2014, from a patent application filed August 9, 2013, with Glenn J. Leedy as the named inventor. The Leedy ’778 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (j) U.S. Patent No. 8,907,499 (“Leedy ’499 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on December 9, 2014, from a patent application filed January 4, 2013, with Glenn J. Leedy as the named inventor. The Leedy ’499 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;
- (k) U.S. Patent No. 8,928,119 (“Leedy ’119 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on January 6, 2015, from a patent application filed March 17, 2009, with Glenn J. Leedy as the named inventor. The Leedy ’119 patent claims priority from U.S. Patent No. 5,915,167, which was duly and

legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;

- (l) U.S. Patent No. 8,933,570 (“Leedy ’570 patent”), entitled “*Three Dimensional Structure Memory*,” which was duly and legally issued on January 13, 2015, from a patent application filed March 17, 2009, with Glenn J. Leedy as the named inventor. The Leedy ’570 patent claims priority from U.S. Patent No. 5,915,167, which was duly and legally issued on June 22, 1999, from a patent application filed on April 4, 1997, with Glenn J. Leedy as the named inventor;

Each of the Elm 3DS Patents is valid and enforceable.

12. The Elm 3DS Patents disclose three-dimensional integrated circuit structures and methods for manufacturing the same. In one exemplary embodiment, the patents disclose a three-dimensional structure with thinned and polished integrated-circuit substrates that are stacked on top of one another and electrically connected. The disclosed technology enhances memory speed and efficiency because the signal paths are shorter. The disclosed technology also improves memory density because multiple storage arrays can be stacked within a single package that meets industry form-factor requirements. Industry implementations are referred to as “stacked” memories that are electrically connected with either wire bonds or through-silicon vias (“TSV”).

II. The Inventor

13. Glenn J. Leedy is the sole named inventor on the Elm 3DS Patents. Mr. Leedy had been involved in the information technology industry since the 1960s. Working first for established IT companies such as IBM and Fairchild Semiconductor, and eventually as an independent inventor, Mr. Leedy had consistently developed essential technologies that have significantly advanced the state of the art. Today, Mr. Leedy’s foundational inventions are used in literally billions of semiconductor products around the world.

14. Mr. Leedy graduated from the University of Michigan with a degree in Mathematics, in 1968.

15. After working at IBM, the University of Michigan, Sycor and ComShare, Mr. Leedy joined Digital Equipment Corporation (“DEC”) in 1976. While there, Mr. Leedy assisted in the design of DEC’s first 32-bit minicomputer, and in the development of the first 16-bit microprocessor. Mr. Leedy also invented a solution for providing high-speed backup and restore for large databases, an advance in the technology that saved DEC and its customers millions of dollars.

16. Mr. Leedy joined Fairchild Semiconductor in 1978. While there, Mr. Leedy assisted in the development of gate-array programmable logic products. Mr. Leedy’s time at Fairchild also provided him with the opportunity to become familiar with the semiconductor fabrication processes used to manufacture the integrated circuits he helped design.

17. In 1981, Mr. Leedy joined National Semiconductor. While there, Mr. Leedy assisted in the development of the computer industry’s first 32-bit microprocessor.

18. In 1983, Mr. Leedy left National Semiconductor to start his own business: American Information Systems (“AIS”). Mr. Leedy formed his own business to continue inventing but with independent creative control and ownership of his inventions.

19. Under Mr. Leedy’s direction, AIS developed and sold a 32-bit minicomputer. The minicomputer used the 32-bit National Semiconductor microprocessor Mr. Leedy had helped develop, and the minicomputer was instantly popular because it cost a fraction of the 32-bit DEC minicomputer Mr. Leedy worked on for his prior employer. AIS was short-lived, however, as National Semiconductor decided to cease manufacture and development of its 32-bit microprocessor. Without an affordable alternative 32-bit processor on the market, AIS’ cost-performance advantage disappeared and it was forced to shut down.

20. After AIS, Mr. Leedy worked for General Research for several years before again going into business for himself in 1989. Mr. Leedy then devoted himself to finding solutions to the various technological challenges he had encountered during his two decades in the IT industry. Over the next few years, Mr. Leedy developed the technologies underlying two patent portfolios that disclose and claim foundational inventions found in modern semiconductors the world over.

21. In the early 1990s, Mr. Leedy applied for and received a portfolio of patents built around his Membrane Dielectric Isolation (“MDI”) technology. The MDI technology uses a thin, flexible membrane of dielectric material to electrically isolate semiconductor devices such as transistors, which can then be used to form test circuitry.

22. Mr. Leedy developed the MDI technology in an effort to develop a semiconductor-grade dielectric that could serve as a membrane for testing bare integrated circuits. Mr. Leedy first worked on integrated circuit fabrication equipment in the basement of a friend, and later with an integrated circuit equipment manufacturer. One key aspect of the MDI technology was Mr. Leedy’s development of a tensile low-stress dielectric that could be fabricated into a flexible, free-standing membrane. The ductile characteristics of the novel membrane permitted “at speed” testing of integrated circuits while in wafer form.

23. Mr. Leedy’s MDI technology enabled testing methods and devices that ultimately became essential components in the semiconductor manufacturing process, a fact validated by Mr. Leedy’s sale of the MDI patent portfolio in 2008 to Taiwan Semiconductor Manufacturing Co., the world’s largest semiconductor foundry.

24. Following the successful development of his MDI technology, Mr. Leedy next applied for and received a portfolio of patents built around his Three-Dimensional Stacked “3DS” integrated circuit technology. The 3DS technology uses thinned, polished, flexible substrates to form

vertical stacks of integrated circuits that are connected to one another using either wire-bonds, or vertical interconnects that pass through the stacked substrates.

25. Mr. Leedy developed the 3DS technology in an effort to solve the processor-memory bottleneck—a longstanding barrier in computer-system design. The bottleneck arises when a computer’s processor is able to request and process data faster than the memory is able to provide it. Mr. Leedy believed that building the memory vertically, by stacking memory circuits on top of each other, rather than laying the memory circuits out horizontally, would shorten the electrical paths used to read and write data, thereby improving memory read/write speeds. Mr. Leedy was the first to understand that, in order to obtain an acceptable yield when stacking and connecting multiple thinned and polished integrated circuits, one needed to use a tensile low-stress dielectric layer to retain the structural integrity of the thinned and polished substrates. This prevented the substrates from cracking or warping, which can cause “bad” die.

26. Mr. Leedy maintained control over the 3DS portfolio until his passing in July 2017, as Elm 3DS’s President, and was extremely active in its development. In preparing the 3DS technology for patenting, Mr. Leedy drafted a rich specification that provides— among other things—a detailed account of the technical aspects of his inventions, the benefits associated with the inventions, and various embodiments of the inventions. The disclosures in the specification have provided enormous benefit to the semiconductor industry, and also permitted Mr. Leedy to claim the technical aspects of his inventions across the portfolio in many different ways that the semiconductor industry can understand. He continued to prosecute a number of patent applications that arose from his groundbreaking inventions until July 2017.

27. Mr. Leedy’s 3DS technology has allowed semiconductor manufacturers to improve performance and to lower the “cost-per-bit” of memory storage. Using thin integrated circuits allows manufacturers to stack multiple integrated circuits in a single industry-standard package with

a thickness of 1.2 mm, a feature demanded by form- factor sensitive industries such as servers and smartphones. Further, using vertical interconnects improves memory speed, reduces power consumption, and shrinks the integrated-circuit footprint.

28. Presently, all three leading memory manufacturers—Samsung, SK Hynix and Micron—use Mr. Leedy’s 3DS technology in various stacked semiconductor products. And in the future the industry’s adoption of Mr. Leedy’s 3DS technology will become more widespread, as the cost of propagating Moore’s Law and fitting more and more transistors on a single silicon die becomes increasingly cost-prohibitive.

29. In 2006, the transistor design node used to fabricate leading microprocessors was 65 nm. In 2015, the transistor design node used to fabricate leading microprocessors is 22 nm. Today, the transistor design node used to fabricate leading microprocessors is 5 nm. According to one industry report, constructing a semiconductor fabrication facility at the 65nm transistor design node cost under \$3 billion, and designing a chip for fabrication on the 65nm node cost under \$50 million. http://www.eetimes.com/author.asp?section_id=36&doc_id=1323755 (last accessed Nov. 20, 2014) (attached as Ex. 13). According to the same report, constructing a semiconductor fabrication facility at the 22 nm node cost nearly \$9 billion, and designing a chip for fabrication on the 22 nm node cost nearly \$150 million.

30. Mr. Leedy’s 3DS technology provides the solution to the compounding cost of semiconductor fabrication at smaller transistor nodes, by providing semiconductor manufacturers with the technologies needed to continue delivering faster, denser, and more efficient memories—it allows the manufacturers to expand memory up rather than out. The manufacturers’ adoption of this technology can be seen in their development of technologies such as stacked NAND Flash, the Hybrid Memory Cube (“HMC”), and TSV.

III. The Meeting With Defendants

31. Mr. Leedy communicated with Micron's CEO, Steve Appleton, and CTO shortly after issuance of the first Elm 3DS Patent, the '167 patent, the first in the 3DS family of patents, in 1999. Mr. Appleton referred Mr. Leedy to Mr. Durcan, Micron's VP of technology. During this communication, Mr. Leedy provided Micron with a slide presentation and a copy of the '167 patent, and explained the benefits of the patented technology. Mr. Leedy also explained that the technology was available to a limited number of licensees. Terms were not discussed, and a license agreement was never reached.

IV. The Defendants' Direct Infringement

32. Despite not having a license to Mr. Leedy's 3DS technology, Defendants have widely used it in their stacked memory products. Evidence of Defendants' infringement can be found on their website, at www.micron.com, where Defendants describe their stacked semiconductor products.

33. According to Micron's website, Micron uses stacked memory in at least some multi-chip packages: "Stacking memory either in the same package as the applications processor or in a package that mounts on top of the processor package has been proven to improve signal quality and reduce the overall footprint for the system."

http://www.micron.com/~media/Documents/Products/Technical%20Note/MCP/TN_10%2008.pdf (last accessed Nov. 20, 2014) (attached as Ex. 14).

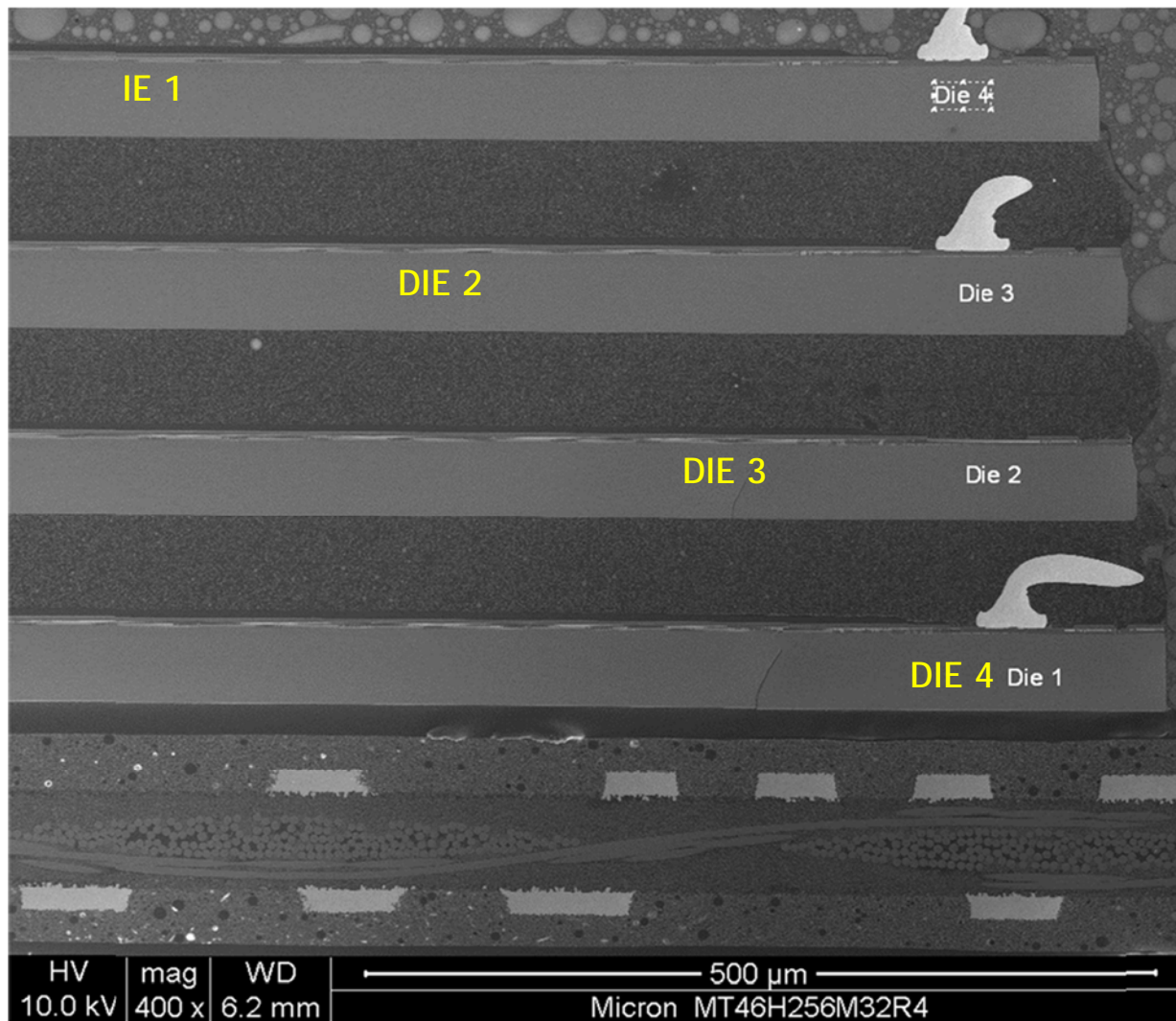
34. Micron's website represents that the "ClearNAND devices are like regular NAND – the interface and package types are the same—but they integrate a controller into that package, along with up to eight NAND devices. The internal controller offloads ECC from the host controller, freeing designers from having to adjust their design every time the NAND changes."

<http://www.micron.com/%20products/managed-nand/cleannand> (last accessed Nov. 20, 2014)
(attached as Ex. 15).

35. Micron's website also discusses stacked memories in the context of its e-MMC products. According to Micron, "e-MMC memory, on the other hand, combines a NAND controller and high-capacity NAND Flash in a single BGA package."

http://www.micron.com/~media/Documents/Products/White%20Paper/scaling_nonvolatile_mem_in_embedded_systems.pdf (last accessed Nov. 20, 2014) (attached as Ex. 16).

36. An example of Micron's die-stacking technology in LPDDR SRAM technology is shown below:

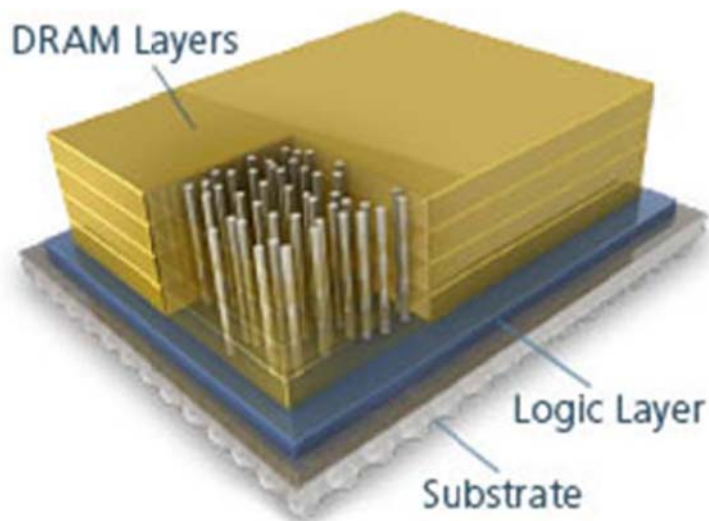


37. Micron has represented that it is using stacked memory and TSV technology in its Hybrid Memory Cube. According to Micron’s website, the “Hybrid Memor Cube (HMC) represents an entirely new leap forward in memory technology. It combines high-speed logic and DRAM layers into one optimized 3D package that leverages through-silicon via (TSV) technology.”

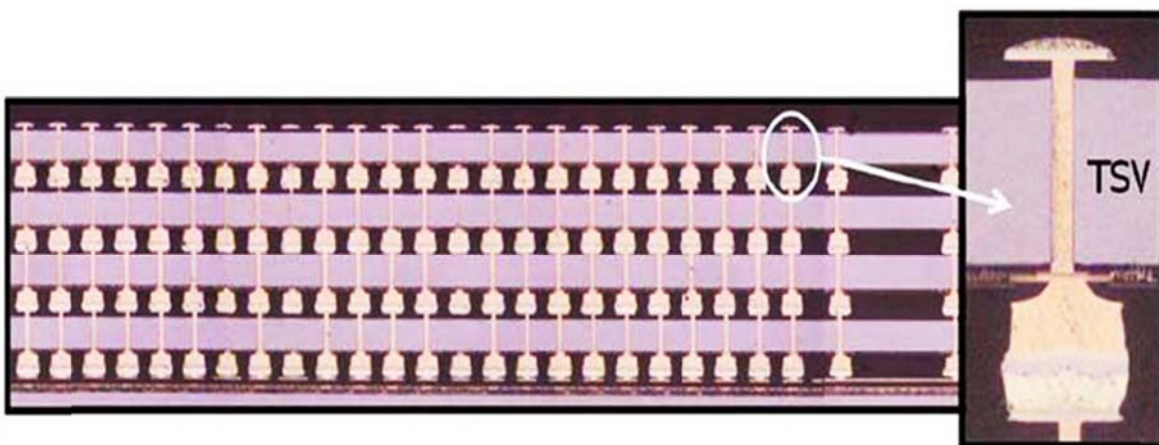
<http://www.micron.com/products/hybrid-memory-cube> (last accessed Nov. 20, 2014) (attached as Ex. 17). Further, “[a]t the core of the HMC is a small, high-speed logic layer that sits below vertical stacks of DRAM die that are connected using through-silicon-via (TSV) interconnects.”

<http://www.micron.com/products/hybrid-memory-cube/all-about-hmc> (last accessed Nov. 20,

2014) (attached as Ex. 18). Micron's website provides the following picture of the Hybrid Memory Cube:



A Micron presentation provides the following image of Micron's TSV technology in its Hybrid Memory Cube:



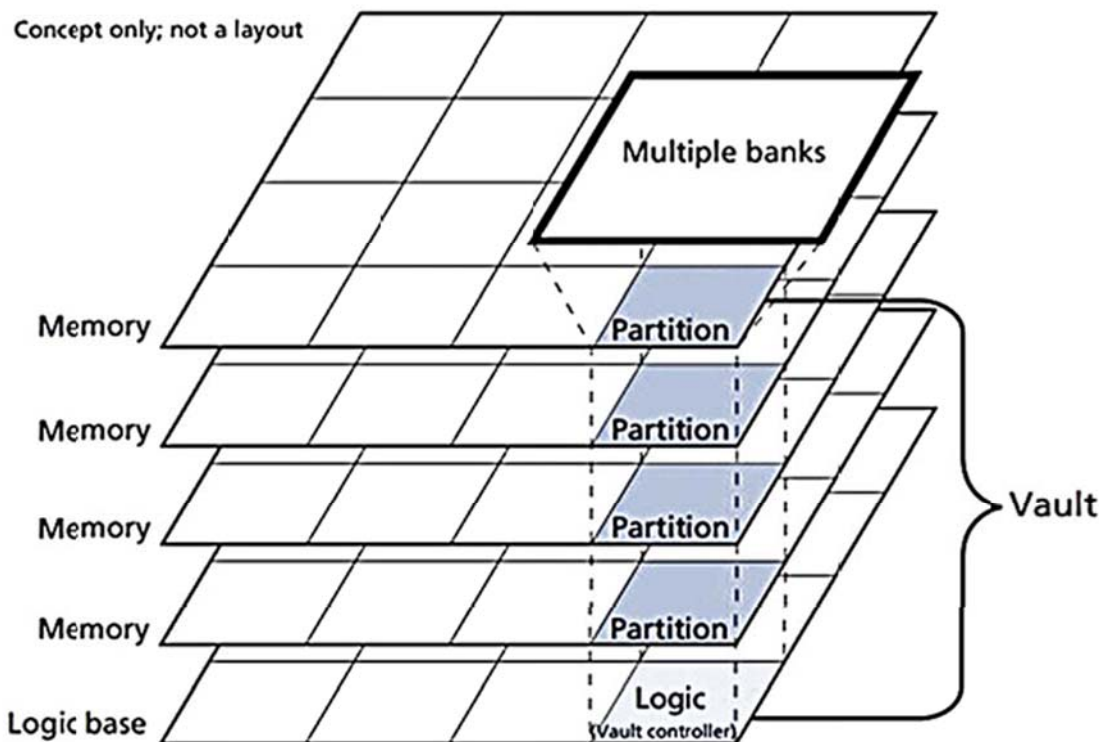
Cross Sectional Photo of HMC Die Stack Including TSV Detail (Inset)

<http://storageconference.us/2013/Presentations/Jeddeloh.pdf> (last accessed Mar. 24, 2015)

(attached as Ex. 19).

38. Micron has also represented that it is using circuit block stacks or vaults in its Hybrid Memory Cube: “Within an HMC, memory is organized into vaults. Each vault is functionally and operationally independent.”

http://www.hybridmemorycube.org/files/SiteDownloads/HMC_Specification%201_0.pdf (last accessed Mar. 24, 2015) (attached as Ex. 20). The Hybrid Memory Cube specification provides the following picture Micron’s vault technology in its Hybrid Memor Cube:



39. Micron’s use, sale, offer for sale and/or manufacture of stacked NAND, stacked DRAM, HMC and other stacked semiconductor products in the United States, and/or importation

of said products into the United States, constitutes infringement of at least one of the Leedy '239, '004, '732, '617, '542, '672, '581, '862, '778, '499, '119, and '570 patents.

40. Micron had actual notice of the Leedy '239, '732, '617, '542, '672, '581, '862, and '778 patents and the infringement alleged herein at least upon filing the original Complaint [D.I. 1] (if not earlier), pursuant to 35 U.S.C. § 287(a). Micron has had actual notice of the Leedy '004, '499, '119, and '570 patents and the infringement alleged herein at least upon filing the First Amended Complaint [D.I. 17] (if not earlier), pursuant to 35 U.S.C. § 287(a).

41. Each of the Defendants has directly infringed, and continues to infringe, literally or under the doctrine of equivalents, one or more claims of the Elm 3DS Patents by acting without authority to make, have made, use, offer to sell, sell within the United States, and/or import into the United States semiconductor products that practice the patented inventions, and/or electronics products that incorporate said semiconductor products, including *inter alia* solid state drives (“SSD”) and Flash drives.

42. The above-described acts of infringement committed by Defendants have caused injury and damage to Plaintiff, and will cause additional severe and irreparable injury and damages in the future.

V. The Defendants’ Indirect Infringement

GENERAL ALLEGATIONS

43. Micron indirectly infringes the Elm 3DS Patents by inducing infringement by others, such as OEMs, manufacturers, importers, resellers, customers and end users under 35 U.S.C. § 271(b) in this District and elsewhere in the United States. On information and belief, Micron has intended and continues to intend to induce patent infringement by these third parties and has had actual knowledge that the inducing acts would cause infringement or has been willfully blind to the possibility that its inducing acts would cause infringement. For example, Micron is aware of the Elm

3DS Patents, that the structural aspects of thinned, stacked, and electrically interconnected semiconductors are always present in infringing stacked semiconductor packages and cannot be modified by a purchaser of such stacked semiconductor packages and, therefore, that Micron's customers will infringe one or more claims of the Elm 3DS Patents by incorporating such stacked semiconductor packages in other products, and that subsequent sales of such products in the United States would be a direct infringement of one or more claims of the Elm 3DS Patents.

44. On information and belief, Micron indirectly infringes one or more claims of the Elm 3DS Patents by inducing numerous third-party OEMs, manufacturers, importers, resellers, customers, and end users to make, have made, use, sell, offer to sell in, and/or import into the United States, products that incorporate stacked semiconductor products and/or multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, which are manufactured by Micron and infringe one or more claims of the Elm 3DS Patents.

45. On information and belief, Micron has designed, marketed, and sold infringing products to third parties with knowledge and the specific intent to cause the third parties to in turn make, have made, use, sell, offer to sell in, and/or import into the United States, products incorporating Micron's stacked semiconductor products and/or multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package.

46. On information and belief, Micron has designed its infringing products such that, as incorporated into the products of third parties, the third-party product infringes one or more claims of the Elm 3DS Patents if made, used, sold, offered for sale in, or imported into the United States.

47. On information and belief, Micron is aware that by making, having made, using, selling, offering to sell in, or importing into the United States products that incorporate Micron's infringing products, these third parties directly infringe one or more claims of the Elm 3DS Patents.

48. On information and belief, Micron is aware that these third parties include, among many others, Motorola, Google, Intel, Samsung, HTC and Kingston; and that products they make, have made, use, sell, offer to sell, or import into the United States, include, among many others, SSD, server hardware, cameras, flash, and mobile devices.

MICRON'S PRE-SUIT INDIRECT INFRINGEMENT

49. Although Micron has asserted that it is implausible to infer that Micron had notice of the patents-in-suit, the facts tell a different story. Micron had pre-suit notice of the '239 Patent and the Elm 3DS Patents in general through its prosecution of patent applications that successfully issued as patents.

50. In 2000 or 2001, Mr. Leedy provided Micron with a slide presentation on the Elm 3DS technology and a copy of the 5,915,167 patent. The '167 patent is the parent patent in the Elm 3DS Patent portfolio.

51. Since the issuance of the '167 patent, Micron has routinely cited to the Elm 3DS patents, including certain of the patents-in-suit. For example:

- (a) U.S. Patent No. 6,090,636 assigned to Micron and issued on July 18, 2000, cites to Mr. Leedy's U.S. Patent No. 5,915,167. In all, more than 30 Micron patents cite to the '167 patent.
- (b) U.S. Patent No. 6,951,791 assigned to Micron and issued on October 4, 2005, cites to Mr. Leedy's U.S. Patent No. 6,551,857. In all, 4 Micron patents cite to the '857 patent.
- (c) U.S. Patent No. 7,314,822 assigned to Micron and issued on January 1, 2008, cites to Mr. Leedy's U.S. Patent No. 6,133,640. In all, 6 Micron patents cite to the '640 patent.

(d) U.S. Patent No. 7,602,630 assigned to Micron and issued on October 13, 2009, cites to Mr. Leedy's U.S. Patent No. 6,208,545. In all, 7 Micron patents cite to the '545 patent.

In total, more than 40 Micron patents, spanning 2000 to 2014, cite to at least one U.S. patent issued to Mr. Leedy, and owned by Elm 3DS.

52. Micron had actual notice of the '239 patent at least as of October 7, 2008, when Micron included the '239 patent on an Information Disclosure Statement during the prosecution of what became U.S. Patent No. 7,835,207 to Keeth, et al.

Substitute for form 1449A/PPTO INFORMATION DISCLOSURE STATEMENT BY APPLICANT (Use as many sheets as necessary)		<i>Complete if Known</i>			
		Application Number	Unknown		
		Filing Date	Herewith		
		First Named Inventor	Brent Keeth		
		Group Art Unit	Unknown		
		Examiner Name	Unknown		
Sheet 1 of 1		Attorney Docket No: 303.A52US1			
US PATENT DOCUMENTS					
Examiner Initial *	USP Document Number	Publication Date	Name of Patentee or Applicant of cited Document	Filing Date If Appropriate	
	US-6,466,053	10/15/2002	Duesman, Kevin	02/01/2002	
	US-7,193,239	03/20/2007	Leedy, Glenn J	07/03/2003	

53. Micron also had actual notice of the '239 patent as of January 3, 2013, when Micron included the patent on an Information Disclosure Statement devoted entirely to disclosing the U.S. patents issued to, and U.S. patent applications filed by Mr. Leedy, submitted during the prosecution of what became U.S. Patent No. 8,455,853 to Liu, et al.

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	13/442047
<i>(Use as many sheets as necessary)</i>				Filing Date	04-09-12
Sheet 1 of 2				First Named Inventor	Jun Liu
				Art Unit	2822
				Examiner Name	Mary A. Wilczewski
				Attorney Docket Number	MI22-5091

U.S. PATENT DOCUMENTS					
Examiner Initial *	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code ² (if known)			
	1	US-2001/0033030	10-25-2001	Leedy	
	2	US-2002/0132465	09-19-2002	Leedy	
	3	US-2002/0135075	09-26-2002	Leedy	
	4	US-2003/0057564	03-27-2003	Leedy	
	5	US-2003/0173608	09-18-2003	Leedy	
	6	US-2004/0070063	04-15-2004	Leedy	
	7	US-2004/0097006	05-20-2004	Leedy	
	8	US-2004/0152231	07-08-2004	Leedy	
	9	US-2004/0151043	08-05-2004	Leedy	
	10	US-2009/0057210	03-12-2009	Leedy	
	11	US-2009/0174082	07-09-2009	Leedy	
	12	US-2009/0175104	07-09-2009	Leedy	
	13	US-2009/0218700	09-03-2009	Leedy	
	14	US-2009/0219742	09-03-2009	Leedy	
	15	US-2009/0219743	09-03-2009	Leedy	
	16	US-2009/0219772	09-03-2009	Leedy	
	17	US-2009/0230501	09-17-2009	Leedy	
	18	US-2010/0171224	07-08-2010	Leedy	
	19	US-2010/0171225	07-08-2010	Leedy	

Substitute for form 1449A/PTO				Complete if Known	
INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application Number	13/442047
<i>(Use as many sheets as necessary)</i>				Filing Date	04-09-12
Sheet 2 of 2				First Named Inventor	Jun Liu
				Art Unit	2822
				Examiner Name	Mary A. Wilczewski
				Attorney Docket Number	MI22-5091

U.S. PATENT DOCUMENTS					
Examiner Initial *	Cite No.	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code ² (if known)			
	22	US-2010/012197	07-08-2010	Leedy	
	23	US-2010/0173453	07-08-2010	Leedy	
	24	US-2011/0188672	08-18-2011	Leedy	
	25	US-6208545	03-27-2001	Leedy	
	26	US-6551857	04-22-2003	Leedy	
	27	US-6563224	05-13-2003	Leedy	
	28	US-6632706	10-14-2003	Leedy	
	29	US-7138295	11-21-2006	Leedy	
	30	US-7193239	03-20-2007	Leedy	
	31	US-7474004	01-06-2009	Leedy	
	32	US-7504732	03-17-2009	Leedy	
	33	US-7705466	04-27-2010	Leedy	
	34	US-8035233	10-11-2011	Leedy	
	35	US-8288206	10-16-2012	Leedy	
	36	US-8316538	11-27-2012	Leedy	

54. The January 3, 2013 IDS also includes the applications that became the Leedy '542 patent (US 2009/0174082) and Leedy '672 patent (US 2010/0172197).

55. The January 3, 2013 IDS was preceded by an IDS, filed on April 28, 2012, that cited the '167 patent, which Mr. Leedy had provided to Micron in either 2000 or 2001, and the second patent in Mr. Leedy's 3DS portfolio, U.S. Patent No. 6,133,640, among numerous other prior art references.

56. The submission of a supplemental IDS devoted entirely to disclosing the additional patents and patent applications belonging to Mr. Leedy, more than thirty in all, indicates that sometime in 2012, Micron undertook a search to identify all intellectual property owned by Mr. Leedy in this technological space.

57. Micron's '207 patent was filed on October 7, 2008 and issued on November 16, 2010, listing MTI as the assignee. The lead inventor, Brent Keeth, is a Senior Fellow in the Advanced DRAM Architecture Group at Micron, where he has worked since July 1992. Mr. Keeth is responsible for leading the design of Micron's HMC product.

<http://www.micron.com/about/our-company/leadership/brent-keeth> (last accessed Mar. 26, 2015) (attached as Ex. 21).

58. Micron's '853 patent was filed on April 9, 2012 and issued on June 4, 2013, listing MTI as the assignee. The co-inventor, Gurtej S. Sandhu, is a Senior Fellow and Director of Advanced Technology Development at Micron, where he has worked since July 1992.

<http://www.micron.com/about/our-company/leadership/gurtej-sandhu> (last accessed Mar. 26, 2015) (attached as Ex. 22).

59. Both Mr. Keeth and Mr. Sandhu are listed as members of Micron's current leadership, where they comprise two of only three "Senior Fellows" in the leadership team.

<http://www.micron.com/about/our-company/leadership> (last accessed Mar. 26, 2015).

60. Thus, Micron had actual notice of the Leedy '239 patent, the Leedy '542 patent, and the Leedy '672 patent at least as of the dates it submitted IDS statements to the U.S. Patent and Trademark office disclosing those patents, as set forth in the paragraphs above.

Micron's Pre-suit Knowledge that Its Customers Directly Infringed the '239 Patent

61. On information and belief, Micron understood that its customers, companies in the computing, consumer, networking, telecommunications, and imaging markets, directly infringed the '239 patent when they imported or sold finished electronics products containing infringing Micron semiconductor chips in the United States. Examples of infringing electronics products include, but are not limited to, mobile phones, desktop PCs, servers, notebooks and workstations.

62. On information and belief, Mr. Keeth, the co-inventors of the Micron's '207 patent, and potentially others at Micron reviewed the specification and claims of the Leedy '239 patent prior to disclosing the '239 patent to the U.S. Patent and Trademark office as part of the '207 patent prosecution.

63. On information and belief, Mr. Sandhu, the co-inventor of the Micron's '853 patent, and potentially others at Micron reviewed the specification and claims of the Leedy '239 patent as part of the undertaking that led to the preparation of an IDS devoted entirely to disclosing the '239 patent, and other patent and patent applications belonging to Mr. Leedy, as part of the '853 patent prosecution.

64. Claim 1 to the '239 patent reads as follows:

a plurality of monolithic substrates having integrated circuits formed thereon and stacked in layers such that each layer comprises only one of the substrates, wherein at least one of the plurality of substrates is a substantially flexible substrate, and wherein a major portion of the monolithic substrate is removed; and between adjacent substrates, a bonding layer bonding together the adjacent substrates, the bonding layer being formed by bonding first and second

substantially planar surfaces having a bond-forming material throughout a majority of the surface area thereof.

65. On information and belief, based on the review of the '239 patent specification and claims, by two current members of its leadership team, and likely others within the organization, Micron understood in October 2008 ('207 patent IDS) or January 2013 ('853 patent IDS) that the '239 patent claims covered thinned, stacked semiconductor die that are bonded together in a single package.

66. Micron is a global manufacturer and marketer of semiconductor devices, principally DRAM and NAND Flash memory, with deep expertise in manufacturing such memory products. Mr. Keeth has a Masters degree in Electrical Engineering and received a patent directed to an integrated circuit package with multiple semiconductor die that are arranged in a stack. Mr. Sandhu has a Ph.D. in physics, is a Fellow in IEEE, and received a patent directed to fabrication methods for forming memory cells in an integrated circuit. Thus, Micron collectively, and Mr. Keeth and Mr. Sandhu individually, possessed the technical expertise required to understand the content and scope of the Leedy '239 patent.

67. On information and belief, based on its knowledge of its own products, Micron understood in October 2008, or least by January 2013, that certain of its products comprised thinned, stacked semiconductor die that were bonded together in a single package.

68. Micron's 10-k for the Fiscal Year ended September 2009 states that Micron possessed certain intellectual property related to the manufacture of stack DRAM products. The 10-k further states that, "In 2008, the Company established a partnering arrangement with Nanya Technology Corporation ("Nanya") pursuant to which the Company and Nanya jointly develop process technology and designs to manufacture stack DRAM products." Micron forecasted that "in

2010 its DRAM production will increase as a result of increases in stack and trench DRAM production purchased from Inotera.”

69. On information and belief, based on its knowledge of its own products and its review of the '239 patent specification and claims, Micron understood in October 2008 or January 2013 that certain of its products that comprised thinned, stacked semiconductor die that were bonded together in a single package infringed the '239 patent.

70. On information and belief, Micron further understood in October 2008 or January 2013 that its OEM customers were directly infringing the '239 patent when they imported into or sold in the United States, a finished product that contained thinned, stacked semiconductor die that were bonded together in a single package.

71. Micron's 10-k for the Fiscal Year ended September 2009 also states that Micron sold memory products to customers such as Intel and Hewlett-Packard. According to the 10-k, “Sales to Intel, primarily for NAND Flash from the IM Flash joint ventures, were 20% of the Company's net sales in 2009 and 19% of the Company's net sales in 2008.” Further, “Sales to Hewlett-Packard Company were 10% of the Company's net sales in 2007.”

72. Micron's 10-k for the Fiscal Year ended September 2009 also states that Micron's “Memory segment's primary products are DRAM and NAND Flash, which are key memory components used in a broad array of electronic applications, including personal computers, workstations, network servers, mobile phones, Flash memory cards, USB storage devices, MP3/4 players and other consumer electronics products.” The 10-k further states, “The Company sells primarily to original equipment manufacturers, distributors and retailers located around the world.”

73. On information and belief, Micron understood that its customers, including global OEMs like Apple, Intel and Hewlett-Packard sold finished products such as mobile phones, desktop

PCs, workstations, laptops and servers in the United States, and imported such products into the United States.

74. On information and belief, based on its knowledge of its customers' business activities, Micron understood that its customers would incorporate its products, including stack DRAM products, into finished electronics products sold around the world, including the United States. In addition, based on its knowledge of its own products and its review of the '239 patent specification and claims, Micron understood that when its customers sold finished electronics products containing Micron stack DRAM in the United States, or imported such electronics products into the United States, those acts constituted direct infringement of the '239 patent.

75. Micron is aware that its products cannot be used or sold in a manner that does not infringe. Micron is aware that the infringing stacked memory products are integral components of the computer and mobile products incorporating them, that the infringing stacked memory products are built into the computer and mobile products, and cannot be removed or disabled by a purchaser of the consumer products containing the infringing circuits. Therefore, Micron is aware that its customers would infringe one or more claims of the '239 patent by using the products as-sold and as-marketed by Micron, and that subsequent sales of such products in the United States would be direct infringement of the '239 patent.

Micron's Specific Intent to Induce Pre-Suit Direct Infringement of the '239 Patent

76. On information and belief, Micron actively induced its customers to directly infringe the '239 patent by encouraging its customers to use at least Micron stack DRAM products comprising thinned, stacked semiconductor die that were bonded together in a single package, in their finished products, while understanding that some of those finished products would be sold in or imported into the United States and thereby directly infringe the '239 patent.

77. Micron's 10-k for the Fiscal Year ended September 2009 indicates that Micron actively promoted the purchase and adoption of its products, including at least stack DRAM products comprising thinned, stacked semiconductor die that were bonded together in a single package, to numerous customers, including global OEMs like Apple, Intel and Hewlett-Packard. Micron's 10-k states, "The Company markets its semiconductor products primarily through its own direct sales force and maintains sales offices in its primary markets around the world. The Company maintains inventory at locations in close proximity to certain key customers to facilitate rapid delivery of products."

78. Micron's 10-k for the Fiscal Year ended September 2009 indicates that Micron understood that its success depended on the purchase and adoption of its products, including at least stack DRAM products comprising thinned, stacked semiconductor die that were bonded together in a single package, by global OEMs. Micron's 10-k states, "The Company markets its products through its internal sales force, independent sales representatives and distributors primarily to original equipment manufacturers and retailers located around the world. The Company's success is largely dependent on the market acceptance of a diversified portfolio of semiconductor products, efficient utilization of the Company's manufacturing infrastructure, successful ongoing development of advanced process technologies and generation of sufficient return on research and development investments."

79. On information and belief, based on its knowledge of its customers' business activities, its own products, and its review of the '239 patent specification and claims, Micron understood that when it encouraged its customers to purchase and adopt at least stack DRAM products comprising thinned, stacked semiconductor die that were bonded together in a single package, it was encouraging those customers to directly infringe the '239 patent by selling finished

electronics products containing Micron stack DRAM in the United States, or importing such electronics products into the United States.

80. Micron's supply agreements, partnerships, and sales volumes all evidence its intent to induce companies to infringe one or more claims of the '239 patent. Given (1) its review of the '239 patent specification and claims, (2) its understanding that the '239 patent claims covered thinned, stacked semiconductor die that are bonded together in a single package, (3) its knowledge that it manufactured and sold at least stacked DRAM products comprising thinned, stacked semiconductor die that are bonded together in a single package, (4) its knowledge that its OEM customers directly infringed by importing or selling into the United States, a finished product that contained thinned, stacked semiconductor die that are bonded together in a single package, and (5) its sales and supply agreements encouraging third parties to include Micron's stacked semiconductors in their products, Micron had the specific intent to induce infringement of the '239 patent, or has been willfully blind to the direct infringement it is inducing.

MICRON'S POST-SUIT INDIRECT INFRINGEMENT

81. At the very latest, Micron received actual notice of the Leedy '239, '732, '617, '542, '672, '581, '862, and '778 patents and of its infringement as of the date of the original Complaint [D.I. 1]. At the very latest, Micron has had actual notice of the Leedy '004, '499, '119, and '570 patents and of its infringement as of the date of the First Amended Complaint [D.I. 17].

Micron's Post-suit Knowledge that Customers Directly Infringe the Elm 3DS Patents

82. Micron is aware of how its stacked semiconductor products infringe the Elm 3DS patents as set forth in paragraphs 32-39 of the original Complaint, and at paragraphs of 32-39 of this First Amended Complaint.

83. On information and belief, products sold or manufactured in the United States that incorporate Micron's infringing stacked memory products include, but by no means are limited to,

the Motorola Moto360, the Google Chromecast Device, the Intel Ultrabook, the Kingston V300 SSD, the Samsung I8530 Galaxy Beam, and the HTC One M8. These and other products incorporating Micron's infringing products are currently offered for sale in the United States.

84. Micron is aware that the products cannot be used or sold in a manner that does not infringe. Micron is aware that the infringing stacked memory products are integral components of the computer and mobile products incorporating them, and that the infringing stacked memory products are built into the computer and mobile products and cannot be removed or disabled by a purchaser of the consumer products containing the infringing circuits. Therefore, Micron is aware that its customers will infringe one or more claims of the Elm 3DS Patents by using the products as-sold and as-marketed by Micron, and that subsequent sales of such products would be direct infringement of the Elm 3DS Patents.

Micron's Specific Intent to Induce Post-Suit Direct Infringement of the Elm 3DS Patents

85. Micron has undertaken affirmative action to encourage others to infringe and it has done so with the knowledge that its action would result in infringing conduct. Through its marketing of the infringing stacked semiconductor products, Micron specifically intends for its customers, such as OEMs, manufacturers, importers, resellers, customers, and end users, to purchase Micron's stacked semiconductor products and to incorporate them into end products that will infringe one or more claims of the Elm 3DS Patents. Micron routinely markets its infringing stacked semiconductor products to third parties for inclusion in products that are sold to customers in the United States. Micron has publicly stated that its DDR3 DRAM products—many of which are stacked memory products—are primarily targeted for computers, servers, networking devices, and communication equipment and that LPDRAM products—many of which are stacked memory products—are primarily used in mobile phones, tablets, embedded applications, ultra-thin laptop computers, and other mobile consumer devices. Further, Micron has stated that its embedded NAND Flash-based

storage devices—many of which are stacked memory products— are utilized in mobile phones, SSDs, tablets, computers, industrial and automotive applications, networking and other personal and consumer applications.

86. Micron lists eight distributors in the United States. <http://www.micron.com/how-to-buy/distributors> (last accessed Nov. 20, 2014) (attached as Ex. 23). Micron's marketing efforts show that it has specifically intended to and has induced, direct infringement in the United States.

87. Micron advertises on its website that its Hybrid Memory Cube technology is found in Knights Landing, Intel's next-generation Xero Phi CPU architecture. <http://www.micron.com/products/hybrid-memory-cube/high-performance-on-package-memory> (last accessed Nov. 20, 2014) (attached as Ex. 24).

88. Additionally, Xilinx and Open-Silicon, Inc. announced in April 2014 its Hybrid Memory Cube controller IP for Xilinx Virtex-7 FPGAs, enabling system developers to take advantage of the ultra-high memory bandwidth of the HMC. <http://hybridmemorycube.org/Xilinx%20and%20Open-Silicon%20Announce%20HMCC.pdf> (last accessed Nov. 20, 2014) (attached as Ex. 25). Micron advertises its partnership with Xilinx and specifically for the Virtex-7 FPGA. <http://www.micron.com/products/partner-ecosystem/xilinx> (last accessed Nov. 20, 2014) (attached as Ex. 26).

89. On information and belief, Micron revealed at the Denver Supercomputing show that other target applications of the HMC include data packet processing, data packet buffering or storage, and processor acceleration.

90. Micron's partnership and active advertising of its Hybrid Memory Cubes through Intel and Xilinx shows that it has specifically intended to and has induced these third parties' direct infringement.

91. Micron's marketing efforts, press releases, sales volume, and partnerships are all evidence of its intent to induce companies to infringe the patents-in-suit. Because Micron has marketed to customers products which it knows infringe the Elm 3DS Patents, it had the manifest specific intent to cause direct infringement and is therefore liable for indirect infringement.

92. Micron also provides OEMs, manufacturers, importers, resellers, customers, and end users instructions, user guides, and technical specifications on how to incorporate its infringing stacked semiconductor products into electronics products that are made used, sold, offered for sale in and/or imported into the United States. When OEMs, manufacturers, importers, resellers, customers, and end users follow such instructions, user guides, and technical specifications and embed the stacked semiconductor products in end products and make, use, offer to sell, sell, or import into the United States, they directly infringe one or more claims of the Elm 3DS Patents. Micron knows that when it provides such instructions, user guides, and technical specifications, OEMs, manufacturers, importers, resellers, customers, and end users follow these instructions, user guides, and other technical specifications, and therefore directly infringe one or more claims of the Elm 3DS Patents. Micron thus knows that its actions actively induce infringement.

93. On information and belief, Micron prides itself on being a company that is headquartered in the United States and specifically targets the United States market for their products listed above and actively induces OEMs, manufacturers, importers, resellers, customers, and end users to directly infringe one or more claims of the Elm 3DS Patents in the United States.

94. For example, on information and belief, at the 2014 Flash Memory Summit in Santa Clara, California, Micron showcased its latest memory technologies in an effort to encourage various OEMs, manufacturers, importers, resellers, customers, and end users to include its infringing technology in their computers, server hardware, and mobile devices. This event was attended by the direct infringers mentioned above and generally by companies that make, use, offer to sell, sell, or

import into the United States products that use memory components such as those made by Micron. At the Flash Memory Summit, Micron made presentations touting the virtues of its memory products, including products that infringe.

95. On information and belief, examples of third-party electronics products that incorporate Micron's stacked semiconductor products include, but are not limited to, the Motorola Moto360, Google Chromecast Device, Intel Ultrabook, Kingston V300 SSD, Samsung I8530 Galaxy Beam, and HTC One M8. These and other products incorporating Micron's stacked semiconductor products are currently offered for sale in the United States. Micron is aware of the manner in which its stacked semiconductor products infringe the Elm 3DS patents as set forth in paragraphs 32-39 of the original Complaint, and at paragraphs of 32-39 of this First Amended Complaint.

96. Further, on information and belief, products made, used, offered for sale, sold, or imported into the United States that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects (Hybrid Memory Cubes) within a single chip package manufactured by Micron include, but are not limited to Intel's Knights Landing Xeon Phi CPU and Xilinx Virtex-7 FPGAs. On information and belief, Intel's Knights Landing Xeon Phi CPU are scheduled to ship in mid-2015. On information and belief, Xilinx Virtex-7 FPGA is currently offered for sale in the United States. Further, Micron has stated publicly that in 2014, it began selling Hybrid Memory Cube ("HMC") products, which are semiconductor memory devices where vertical stacks of DRAM die that are connected using through-silicon-via interconnects are placed above a small, high-speed logic layer. Micron is aware of how its stacked semiconductor products infringe the Elm 3DS patents as set forth in paragraphs 32-39 of the original Complaint, and at paragraphs of 32-39 of this First Amended Complaint.

97. The specific products listed here are merely examples of the myriad products in which Micron's infringing circuits are incorporated. Micron indirectly infringes the patents-in-suit by pursuing third-party customers for its stacked semiconductor products, who then directly infringe the Elm 3DS Patents by making, having made, using, offering to sell, selling, or importing into the United States products that contain Micron's stacked semiconductor products.

98. Micron derives significant revenue by selling its stacked memory products to third parties who directly infringe the patents-in-suit in the United States. For instance, on information and belief, Micron has net sales in the United States of at least \$2.5 billion for its DRAM and Flash products in 2014.

99. Further, Micron has stated publicly that it is specifically partnering with Intel for design, development, and manufacture of NAND Flash and sells its NAND Flash products to Intel through its partnership with Intel. Micron knows that by selling its NAND Flash to Intel and other such third parties, Intel will incorporate the NAND Flash in its products and directly infringe one or more claims of the Elm 3DS Patents. Micron thus knows that its actions actively induce infringement.

100. Additionally, Micron has publicly stated that it is partnering with Seagate to supply NAND Flash to Seagate. http://files.shareholder.com/downloads/ABEA-45YXOQ/4018394610x0x809241/75720749-0480-418A-B10F-2839F16A856E/Micron_Seagate_Joint_Announce_02_12_2015_FINAL.pdf (last accessed Mar. 16, 2015) (attached as Ex. 27). On information and belief, Micron knows Seagate will incorporate stacked NAND Flash from Micron into its data storage products and directly infringe the Elm 3DS Patents by selling said data storage products in the United States or importing said data storage products into the United States.

101. Micron's marketing efforts, press releases, sales volume, and partnerships all evidence its intent to induce companies to infringe one or more claims of the Elm 3DS Patents. Because Micron has marketed its products to customers that it knows infringe one or more claims of the Elm 3DS Patents, it had the manifest specific intent to cause direct infringement and is therefore liable for indirect infringement. Given (1) Micron's knowledge that its stacked semiconductor products infringe one or more claims of the Elm 3DS Patents, (2) the volume of Micron's stacked semiconductor sales, (3) Micron's ubiquitous sales and marketing efforts directed to inducing third parties to include Micron's stacked semiconductors in their products, and (4) the fact that many third parties directly infringe one or more claims of the Elm 3DS Patents by making, having made, using, offering to sell, selling, or importing into the United States products that incorporate Micron's stacked semiconductor products, Micron has had specific intent to induce infringement or has been willfully blind to the direct infringement it is inducing.

102. The above-described acts of infringement committed by Defendants have caused injury and damage to Plaintiff, and will cause additional severe and irreparable injury and damages in the future.

FIRST CLAIM FOR RELIEF

Infringement of U.S. Patent No. 7,193,239

103. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

104. Defendants have directly infringed one or more claims of the Leedy '239 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one

another within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

105. Defendants have indirectly infringed one or more claims of the Leedy '239 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package. The infringement remains ongoing.

106. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

SECOND CLAIM FOR RELIEF

Infringement of U.S. Patent No. 7,474,004

107. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

108. Defendants have directly infringed one or more claims of the Leedy '004 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

109. Defendants have indirectly infringed one or more claims of the Leedy '004 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor

products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package. The infringement remains ongoing.

110. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

THIRD CLAIM FOR RELIEF

Infringement of U.S. Patent No. 7,504,732

111. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

112. Defendants have directly infringed one or more claims of the Leedy '732 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

113. Defendants have indirectly infringed one or more claims of the Leedy '732 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package. The infringement remains ongoing.

114. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

FOURTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,410,617

115. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

116. Defendants have directly infringed one or more claims of the Leedy '617 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

117. Defendants have indirectly infringed one or more claims of the Leedy '617 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package. The infringement remains ongoing.

118. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

FIFTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,629,542

119. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

120. Defendants have directly infringed one or more claims of the Leedy '542 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

121. Defendants have indirectly infringed one or more claims of the Leedy '542 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package. The infringement remains ongoing.

122. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

SIXTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,653,672

123. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

124. Defendants have directly infringed one or more claims of the Leedy '672 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

125. Defendants have indirectly infringed one or more claims of the Leedy '672 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package. The infringement remains ongoing.

126. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

SEVENTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,791,581

127. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

128. Defendants have directly infringed one or more claims of the Leedy '581 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnected circuit block stacks or vaults within a single chip package,

and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

129. Defendants have indirectly infringed one or more claims of the Leedy '581 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnected circuit block stacks or vaults within a single chip package. The infringement remains ongoing.

130. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

EIGHTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,796,862

131. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

132. Defendants have directly infringed one or more claims of the Leedy '862 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

133. Defendants have indirectly infringed one or more claims of the Leedy '862 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor

products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package. The infringement remains ongoing.

134. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

NINTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,841,778

135. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

136. Defendants have directly infringed one or more claims of the Leedy '778 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Micron electronics products that incorporate such chip packages. The infringement remains ongoing.

137. Defendants have indirectly infringed one or more claims of the Leedy '778 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include third-party electronics products that incorporate certain of Micron semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package. The infringement remains ongoing.

138. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

TENTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,907,499

139. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

140. Defendants have directly infringed one or more claims of the Leedy '499 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Hynix semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package and through vertical interconnected circuit block stacks or vaults, and Hynix electronics products that incorporate such chip packages. The infringement remains ongoing.

141. Defendants have indirectly infringed one or more claims of the Leedy '499 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include, but are not limited to, certain of Hynix semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another within a single chip package and through vertical interconnected circuit block stacks or vaults, and Hynix electronics products that incorporate such chip packages. The infringement remains ongoing.

142. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

ELEVENTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,928,119

143. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

144. Defendants have directly infringed one or more claims of the Leedy '119 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Hynix semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Hynix electronics products that incorporate such chip packages. The infringement remains ongoing.

145. Defendants have indirectly infringed one or more claims of the Leedy '119 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include, but are not limited to, certain of Hynix semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Hynix electronics products that incorporate such chip packages. The infringement remains ongoing.

146. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

TWELFTH CLAIM FOR RELIEF

Infringement of U.S. Patent No. 8,933,570

147. Plaintiff incorporates by reference the allegations set forth in paragraphs 1 through 102 above as if specifically set forth herein.

148. Defendants have directly infringed one or more claims of the Leedy '570 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271. The infringing products include, but are not limited to, certain of Hynix semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Hynix electronics products that incorporate such chip packages. The infringement remains ongoing.

149. Defendants have indirectly infringed one or more claims of the Leedy '570 patent, literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(b). The infringing products include, but are not limited to, certain of Hynix semiconductor products that incorporate multiple semiconductor die that are thinned, stacked on top of and electrically connected to one another through vertical interconnects within a single chip package, and Hynix electronics products that incorporate such chip packages. The infringement remains ongoing.

150. As a consequence of Defendants' infringement, Plaintiff is entitled to recover damages adequate to compensate it for the injuries complained of herein, but in no event less than a reasonable royalty.

JURY TRIAL DEMANDED

Elm 3DS Innovations, LLC, hereby demands a trial by jury on all claims and issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Plaintiff respectfully requests that this Court:

A. enter judgment that each of the Defendants has infringed one or more claims of one or more of the Elm 3DS Patents;

B. enter an order, pursuant to 35 U.S.C. § 284, awarding to Plaintiff damages adequate to compensate for Defendants' infringement of the Elm 3DS Patents (and, if necessary, related accountings), in an amount to be determined at trial, but not less than a reasonable royalty;

C. enter an order, pursuant to 35 U.S.C. § 285, deeming this to be an "exceptional case" and thereby awarding to Plaintiff its reasonable attorneys' fees, costs, and expenses;

D. enter an order that Defendants account for and pay to Plaintiff the damages to which Plaintiff is entitled as a consequence of the infringement;

E. enter an order awarding to Plaintiff pre- and post-judgment interest at the maximum rates allowable under the law; and

F. enter an order awarding to Plaintiff such other and further relief, whether at law or in equity, that this Court deems just and proper.

Dated: June 22, 2020

Respectfully submitted,

FARNAN LLP

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