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

VIASAT, INC., **Plaintiff,** **vs.** **KIOXIA CORPORATION and KIOXIA AMERICA, INC.,** **Defendants.**	**Case No. 6:21-cv-1231** **JURY TRIAL DEMANDED**

COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Viasat, Inc. ("Viasat") demands a trial by jury on all issues so triable and in its complaint against Defendants Kioxia Corporation and Kioxia America, Inc. (collectively "Kioxia" or "Defendants"), alleges as follows:

INTRODUCTION

1. Flash memory has revolutionized computing, personal technology, gaming, enterprise data storage, and e-commerce. Through its widespread adoption, computer memory has shifted from a physical rotating platter storing magnetic ones and zeros to solid-state flash memory holding electric charges with no moving parts and few of the limitations that plagued prior memory technology. Electrical charges held in increasingly small transistors now store and power most of our digital lives.

2. But flash memory has limitations. One is that NAND flash – the most common form of flash memory – is notoriously error prone. As data is written and erased from its transistors, flash memory degrades in quality, *i.e.*, the likelihood increases that a controller or microprocessor will read a stored electric charge representing a one as a zero (or vice versa).

Moreover, as the transistors in flash memory become denser, as they have over time, the likelihood of errors also increases. These errors undermine flash's usefulness. Bad data can slow down devices and weaken flash's advantages over prior memory technology.

3. Given these limitations, there is substantial value in figuring out how to eliminate or fix flash errors quickly while utilizing as little power as possible. The most important tool for eliminating flash errors is having robust error-correction protocols that allow controllers or microprocessors to identify and fix errors on the fly. But these protocols can also slow devices down, and there was a need to develop an architecture that could fix errors quickly or even ensure that the errors do not happen in the first place.

4. Viasat is a global communications company, with significant expertise in engineering satellite, optical, and terrestrial wireless, and optical communications solutions. The named inventors, employees at Viasat at the time the patent at issue was filed, used the knowledge they had gained designing error-correction systems for satellites and fiber optics to design an improved architecture for error correction in flash. As information passes from transistors to a controller and on to an electronic device, flash memory functions as a communication channel – just like a satellite beaming signals down to a rooftop antenna. Viasat's engineers designed an improved way to structure flash error correction, including a novel architecture and the ability to adapt to degradation in flash memory's reliability.

5. Their work resulted in U.S. Patent Number 8,615,700 (the '700 patent), asserted here.

NATURE OF THE ACTION

6. This is a civil action for patent infringement under the patent laws of the United States of America, 35 U.S.C. § 1 *et seq*.

7. Viasat is the owner of all rights, title, and interest in the '700 patent.

8. Kioxia has infringed and is still infringing the '700 patent, directly or indirectly, by making, using, offering for sale or selling in the United States, including in this District, certain products that implement the patents' error-correction architecture, specifically, Kioxia's NAND-flash-memory-containing products. Examples of potentially infringing products include Kioxia's Enterprise SSDs, Data Center SSDs, and Client SSDs.[1]

9. This list of Accused Products is non-limiting and based on information currently available to Viasat. Kioxia has several additional flash products that may contain infringing error-correction architectures, including certain SLC NAND products like BENAND (or Built-in ECC NAND) and SLC NAND;[2] and Managed Flash (such as UFS and e-MMC).[3] Viasat reserves the right to modify the list of Accused Products as discovery progresses, including as new products and iterations of older products are released during the pendency of this case.

10. Viasat seeks monetary damages.

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[1] *Solid State Drive*, available online at https://business.kioxia.com/en-us/ssd.html.

[2] *SLC NAND Flash Memory*, available online at https://business.kioxia.com/en-jp/memory/slc-nand.html.

[3] *Managed Flash: UFS/e-MMC*, available online at https://business.kioxia.com/en-jp/memory/mlc-nand.html.

THE PARTIES

11. Plaintiff Viasat is a global communications company based in San Diego, California, and organized under the laws of Delaware. Viasat's headquarters are at 6155 El Camino Real, Carlsbad, CA 92009-1699.

12. Viasat maintains an established place of business in this District at 111 Sandra Muraida Way, STE. 100, Austin, TX 78703. Viasat employs approximately 30 individuals in its Austin office in several different technical areas.

13. On information and belief, Defendant Kioxia Corporation (formerly Toshiba Memory Corporation) is a corporation organized under the laws of Japan with its principal place of business at 3-1-21, Shibaura, Minato-ku, Tokyo 108-0023, Japan.

14. On information and belief, Defendant Kioxia America, Inc. (formerly Toshiba Memory America, Inc.) is a subsidiary of Defendant Kioxia Corporation, organized under the laws of California, with its principal place of business at 2610 Orchard Parkway, San Jose, CA 95134 and with an established place of business at 801 East Old Settlers Blvd., Suite 110, Round Rock, TX 78664.

15. Kioxia America, Inc. is registered with the Texas Secretary of State to do business in Texas. Kioxia America, Inc. has a registered agent for the service of process in Texas with CT Corporation System, 1999 Bryan St., Suite 900, Dallas, TX 75201-3136.

JURISDICTION AND VENUE

16. This is a civil action for patent infringement arising under the Patent Laws of the United States, Title 35 of the United States Code.

17. This Court has subject matter jurisdiction over this action pursuant to 28 U.S.C. §§ 1331 and 1338(a) and 35 U.S.C. § 271 *et seq*.

18. The Court's exercise of personal jurisdiction over the Defendants complies with both the Texas long-arm statute and the Due Process Clause of the Fourteenth Amendment. The Defendants do continuous and systematic business in this District, including by providing infringing products and services to residents of this District and by soliciting business from residents in this District. The Defendants also make infringing sales in this District.

19. The Defendants have purposely directed their activities toward Texas and have purposefully availed themselves of the privileges of conducting activities in the state. Kioxia has maintained a physical presence in this District for years. Kioxia America, Inc. maintains an office at 801 East Old Settlers Blvd., Suite 110, Round Rock, TX 78664. Last year, it was disclosed that Kioxia America, Inc. would be investing over $1.1 million dollars to occupy 8,665 square feet of space in this Round Rock facility.[4] On information and belief, Defendant Kioxia Corporation also owns property in this District at 5300 Bee Caves Rd., 1-200 Austin, TX 78746.

20. Kioxia also employs individuals in this District who, on information and belief, contribute to the Defendants' design and sales of infringing products. For example, and without limitation, Kioxia employs in Round Rock, Texas a Senior Manager responsible for product development who was formerly responsible for providing account engineering support for all Kioxia enterprise SSD products (Greg Blanchette). Kioxia also employs in Round Rock, Texas a Director of Customer Technical Support who provides support for Kioxia's SSD drives used by large companies in central Texas (Vinh Do); the Sales Director for flash sales to Dell Technologies (Blake Wellings); a Senior Customer Support Engineer (Mark Lindholm); a Staff Engineer who works on SSDs (Patrick Day); a Supply and Demand Global Account Manager

[4] *Kioxia America, Inc. To Spend $1,116,917.00 To Occupy 8,665 Square Feet Of Space In Round Rock Texas*, available online at https://www.intelligence360.news/kioxia-america-inc-to-spend-1116917-00-to-occupy-8665-square-feet-of-space-in-round-rock-texas/.

(Bory Marsh); and a Principal Engineer for SSD industry standards (Paul Suhler). Kioxia also maintains one of its Global Sales offices at its Round Rock facility.[5]

21. Kioxia has also sought to recruit individuals for employment within the District through its website, LinkedIn, and other websites. This includes recent postings seeking to fill full-time positions for Sales Coordinator, Inside Sales Account Representative, and System Test Engineer.[6]

FACTUAL BACKGROUND

22. Viasat is a global communications company founded in 1986 in Carlsbad, California.[7]

23. Viasat's businesses range from providing resilient communications services to the U.S. Department of Defense and other allied militaries to offering broadband connectivity to residential and commercial aviation customers around the globe.[8] Viasat currently provides high-speed internet service to nearly 1,500 commercial airliners, has over 500,000 residential broadband subscribers in the U.S., and employs over 5,800 employees in over 60 offices around the world. In fiscal year 2021, Viasat generated $2.3 billion in revenues and spent over $115

[5] *Global Sales Offices*, available online at https://business.kioxia.com/en-us/buy/global-sales.html.

[6] *Careers@Kioxia*, available online at https://about.kioxia.com/en-us/careers.html (filter by location for Round Rock, Texas).

[7] *See Viasat History, Innovation & Industry Firsts*, available online at https://www.viasat.com/about/history/ (last visited Sept. 15, 2021).

[8] *See Viasat Space and Networking Technology*, available online at https://www.viasat.com/business-and-commercial/space-and-networking-technology/ (last visited Sept. 15, 2021).

million on independent research and development, including in support of a forthcoming global satellite network expected to provide over 3 terabytes per second of data capacity from space.

24. At its core, Viasat innovates how to successfully and efficiently move large quantities of data. Viasat's engineers work to solve technical challenges relating to communications channels, with an emphasis on satellites. Satellites are essential to the world's modern communications systems. Whether downloading an app or responding to emails in-flight, Viasat satellites route information via electromagnetic signals sent between the satellites twenty-two thousand miles overhead and users on earth. Over these long distances, data must pass through the harsh conditions of outer space, not to mention clouds, storms, trees, and other obstructions, each potentially degrading the signal and causing data loss through the creation of noise and errors. Noise and errors in data transmitted across a communication system or stored and then retrieved can render the data unusable. And unusable information can frequently be the same as no information.

25. Transmitting data across a satellite channel or data storage system thus requires ways to ensure the integrity of the data that is being sent and received. One potential method for doing so would be to require retransmission of data from a given host to correct errors. But retransmission has its limitations. It requires an entire data message to be re-sent even if only a part is corrupted, in turn clogging the channel. Even then, some errors are to be expected due to noise in any transmission or retrieval of data, leaving the same problem that retransmission seeks to fix.

26. Channel coding is the science of adding controlled redundancy to make a data message robust to noise, or errors caused by noise. In the context of satellite communication, Viasat developed novel systems for channel coding known as "forward error correction" (or

FEC), which gives the *recipient* of a signal the ability to correct certain errors in the data without requiring retransmission.

27. For years, Viasat has worked to implement industry-leading FEC in its satellite systems. In 1996, Bill Thesling and Mark Vanderaar founded Efficient Channel Coding after the two met performing communications research for NASA. Efficient Channel Coding designed satellite communications components and systems for both the public and private sectors. The company – including the named inventors of the '700 patent – designed the software and hardware necessary to ensure effective satellite communications. FEC was one of the many areas where the inventors focused their energies.

28. After its purchase by Viasat in 2005, the division housing what used to be Efficient Channel Coding broadened its focus to new and different markets in which to apply the innovations they had created for satellite communications. One of those markets was flash memory.

29. At its most fundamental, flash memory consists of electrical charges stored in transistors. These charges represent binary digits or bits. In single-level cells, an electrical charge represents a 1 and a lower charge represents a 0. Bits are the smallest unit of information in computer technology. When strung together, these bits form more complex data structures from bytes (8 bits) to gigabytes (approximately 1,000,000,000 bytes). In turn, these strings of bits collectively represent apps, programs, documents, and countless other forms of digital information.

30. Flash memory is usually associated with a controller. A controller is a microprocessor that regulates how data is stored in flash memory and how it is retrieved. For example, when saving a photograph to a flash drive, the controller will send all the 1s and 0s

representing that photograph to the flash memory and dictate where that data should be stored or "written" as electrical charges in the flash memory. And when a user wants to open and view the photograph, the controller determines what electrical charges should be "read" from which portions of the flash memory and will then route that data so that the image can be displayed on a screen. Unlike some other forms of memory, the charge held in a flash-memory transistor – representing a 1 or a 0 – is stored even when unpowered.

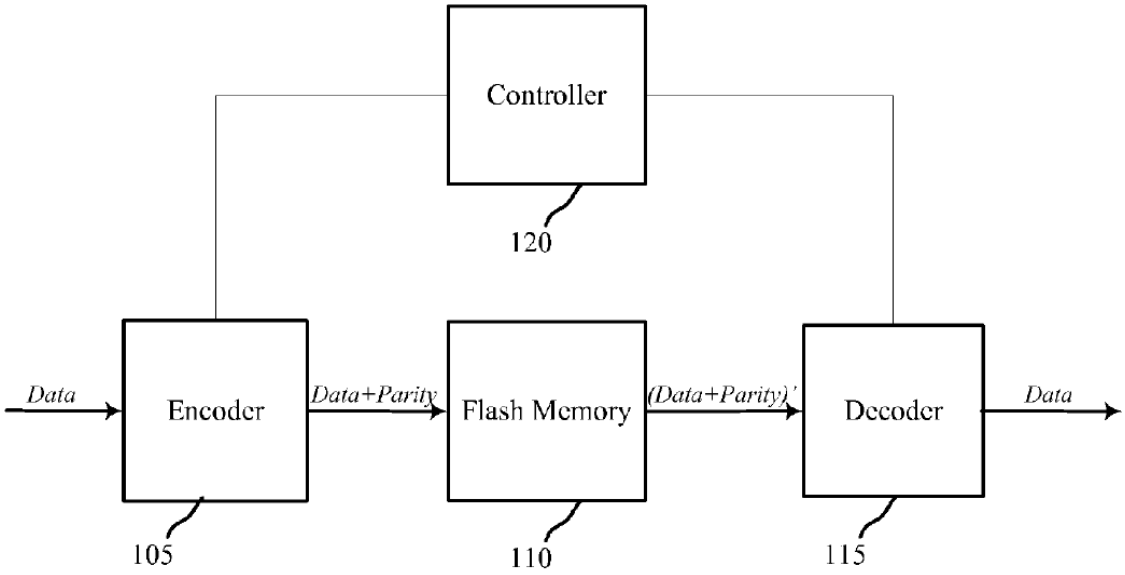
31. Reading and writing to flash memory inherently results in errors, especially as data is written or rewritten multiple times. When the '700 patent's inventors turned their attention to flash memory, it was increasingly being used in computers, enterprise storage, and consumer technology. As processing speed increased, so too did the need for greater storage capabilities. These converging trends began to pose problems with the integrity of the data being stored in and retrieved from flash memory. For example, flash memory began incorporating more and smaller transistors. As these transistors got more compact, they held less charge. This increased the probability of memory errors because of the more exact measurement needed to figure out if the charge represented a 1 or a 0. Plus, rather than store a single bit in each transistor, flash memory began holding multiple bits. This too resulted in each bit being represented by a smaller charge, compounding the difficulties in measuring the stored charge.

32. The '700 patent's inventors recognized that the increasingly common errors then arising with flash memory were similar to the types of problems they had encountered when designing satellite systems. Just as it was foreseeable that a rainstorm would degrade some portion of the signal sent from a satellite, bit errors were going to occur in reading data from increasingly small electrical charges in flash memory. And because flash memory was becoming

more widespread in broader applications, controllers would be processing more data even while users were expecting higher levels of both data fidelity and speed.

33. To the inventors, these were problems that demanded innovation in error correction. Although error correction systems existed for flash already, the inventors focused on how to improve those systems in light of the challenges posed by flash's increasing use and data flow and their experience designing error-correction systems in other contexts.

34. As depicted below, FEC in flash memory is implemented in the flash controller. Data flows into an encoder that takes the information and adds redundancy that creates an error correction coding (ECC) signature for that data. This data and the ECC signature are then transmitted into a memory cell (the flash memory) and stored together there. When the controller accesses the stored data at a later point in time, it reads both the original underlying data and the associated ECC signature and a new ECC signature is formed for the retrieved data. The original and the new ECC signatures are compared. If the ECC signatures match, there is no error and the data is sent on. If they do not match, however, an error has occurred and the controller then corrects the error before sending it on.



35. Some algorithms for a controller to implement error detection and correction were generally known in 2010. Nevertheless, the '700 patent inventors determined that error detection and correction in flash memory could be improved. The patent at issue, entitled "Forward error correction with parallel error detection for flash memories," is the result of that work.

36. The '700 patent lists as inventors Sameep Dave, Russell Fuerst, Mark Kohoot, Jim Keszenheimer, and William H. Thesling.

37. The '700 patent issued on December 24, 2013.

38. The '700 patent is assigned to Viasat, Inc.

39. Unlike previous systems, the '700 patent claims an error-correction architecture that, among other things, parallelized error detection and physically separated error correction from error detection.

40. These improvements to otherwise known error-correction architectures and algorithms are not abstract ideas. The '700 patent addresses, among other things, a specific improvement to the way that electronic devices are structured to detect and correct errors in flash

memory, including specific claimed materials, structures, and configurations of an error-correction system that provides enhanced error correction for flash devices.

41. There are several benefits associated with the error-correction architecture claimed in the ’700 patent. The claimed architecture provides for high data throughput, low power consumption, and higher data integrity. The architecture also contributes to the overall reliability and longevity of flash memory devices. And the claimed error-correction system makes it possible for the controller to dynamically manage the flash’s operation over the life of the device.

KIOXIA’S INFRINGING PRODUCTS

42. Kioxia manufactures and sells data-storage devices containing flash memory with ECC systems that infringe the ’700 patent’s claims, including flash-based solid-state drives (SSDs) for a wide array of uses, such as enterprise storage and data centers.

43. Kioxia makes, uses, sells, offers to sell, imports, or otherwise distributes and supports the Accused Products in the United States.

44. On information and belief, Kioxia conducts research and development and testing of the Accused Products in the United States. Kioxia also manufactures Accused Products outside of the United States and sells them to third parties with the knowledge that the Accused Products will be imported for use in the United States. All these activities contribute to Kioxia’s revenues in the United States.

45. Kioxia maintains a website through which it advertises and sells the Accused Products, including touting the infringing error-correction architecture in its SSDs.[9]

46. Kioxia sells NAND flash-memory products containing error-correction functionality. Kioxia markets several different brands of SSDs, which use a form of proprietary error correction hardware known as Quadruple Swing-By Code or QSBC. Kioxia touts this error-correction technology as "a highly efficient error correction code (ECC), which helps protect customer data from corruption, improves reliability, and extends the life of Toshiba SSDs."[10] Kioxia incorporates QSBC into every SSD.[11] Specifically, Kioxia sells SSD products for use in traditional servers and storage for enterprises, large-scale cloud data centers, and PCs. Without limitation as to what is accused in this case, Kioxia markets these products under the following names: FL6 Series; CM6 Series; CM5 Series; PM6 Series; CD Series; XD Series; XG Series; and the BG Series.[12]

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[9] *See Technology of Enterprise Solid State Drive* at 2, available online at https://business.kioxia.com/content/dam/kioxia/shared/business/ssd/doc/WhitePaper_eSSD_e_201404.pdf.

[10] *See Toshiba Unveils Three NVMe Solid State Drive Families*, Aug. 10, 2015, available online at https://www.businesswire.com/news/home/20150810006427/en/Toshiba-Unveils-Three-NVMe-Solid-State-Drive-Families.

[11] *See Technology of Enterprise Solid State Drive* at 2, available online at https://business.kioxia.com/content/dam/kioxia/shared/business/ssd/doc/WhitePaper_eSSD_e_201404.pdf.

[12] *Solid State Drive*, available online at https://business.kioxia.com/en-us/ssd.html; *see also Product Archive*, available online at https://business.kioxia.com/en-jp/ssd/support/product-archive.html.

47. Viasat's patented FEC architecture improves the overall reliability and lifespan of the Accused Products' flash devices, both of which are, on information and belief, key drivers of sales of the Accused Products. According to Kioxia:

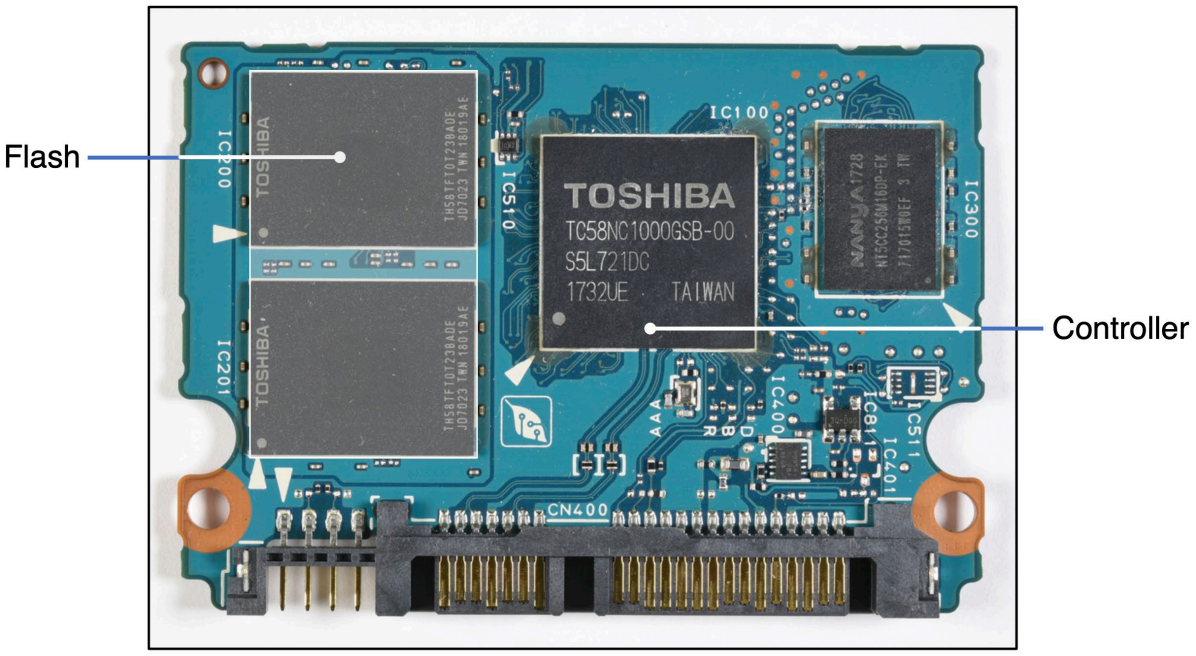
> [An] SSD controller should support error detection / correction function to improve data reliability. As generation of NAND flash memory is moving forward to narrower process rule definition, data detection and error correction code (ECC) technology has become more important for SSD.[13]

48. One example of an infringing SSD is Kioxia's KSG60ZSE256G SSD depicted below.

49. Kioxia's KSG60ZSE256G SSD contains multiple flash-memory packages (Toshiba TH58TFT0T23BADE NAND flash) and at least a Toshiba TC58NC1000GSB-00 controller. On information and belief, all versions of Kioxia's KSG60ZSE256G SSD utilize a

[13] *See Technology of Enterprise Solid State Drive* at 2, available online at https://business.kioxia.com/content/dam/kioxia/shared/business/ssd/doc/WhitePaper_eSSD_e_201404.pdf.

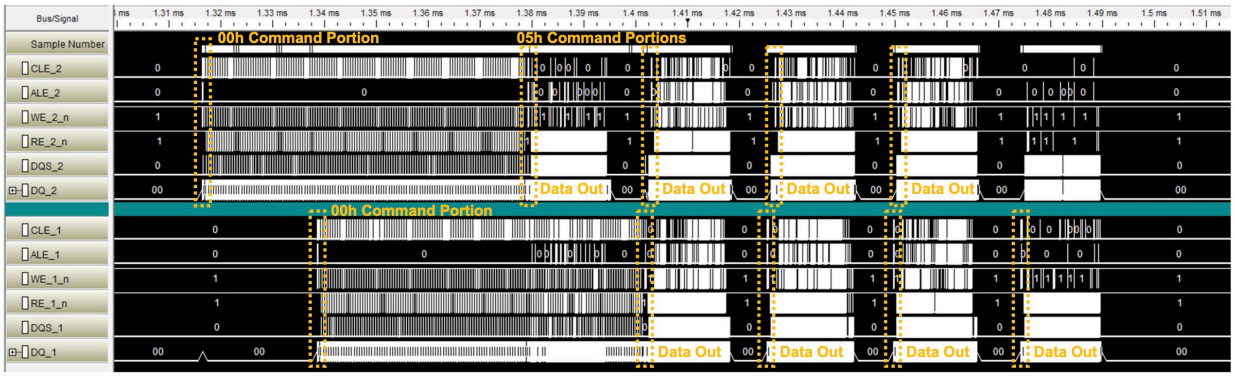
QSBC error correction system and the operation of this SSD is materially the same as those products in the XG6 series and the other SSDs identified above.[14]



50. On information and belief, the controller in Kioxia's KSG60ZSE256G SSD includes a flash memory decoder and a decoding module configured to receive data with an ECC signature.

51. On information and belief, the decoder in Kioxia's KSG60ZSE256G SSD generates a plurality of partially decoded data streams from the encoded data it receives from the flash memory. Notably, when a stream containing multiple packages of data is sent through the decoder, the decoder splits the data into discrete packages, as demonstrated by the simultaneous real time "overlapping" data output of the signals below.

[14] *See Client SSDs*, available online at https://business.kioxia.com/content/dam/kioxia/shared/business/ssd/doc/cSSD-Data-Sheet-E-Oct-2019.pdf; *Toshiba Memory Corporation Unveils SATA Client SSD Utilizing 64-Layer, 3D Flash Memory*, available online at https://business.kioxia.com/en-jp/news/2017/20170808-2.html.



52. On information and belief, the flash memory controller in the Kioxia's KSG60ZSE256G SSD further contains an error detection module that is communicatively coupled with the decoder and comprises a number of sub-modules operating in parallel. Each error detection sub-module can receive a partially decoded data stream, detect whether a portion of the respective stream contains an error, and forward on the portion of the stream that contains an error to an error correction module.

CLAIM I: INFRINGEMENT OF U.S. PATENT NO. 8,615,700

53. Viasat incorporates by reference and re-alleges the foregoing paragraphs of this Complaint.

54. Kioxia has infringed and continues to infringe at least claim 1 of the '700 patent by making, using, selling, offering for sale, and importing the Accused Products without authority or license in violation of 35 U.S.C. § 271(a).

55. The Accused Products meet the limitations of at least claim 1 of the '700 patent. Representative claim 1 recites the following error-correction system:

1. A flash memory decoder comprising:

a decoding module configured to:

receive encoded data from the flash memory; and

decode the received encoded data to generate a plurality of partially decoded data streams;

an error detection module communicatively coupled with the decoding module, and comprising a plurality of error detection sub-modules operating in parallel, each error detection sub-module configured to:

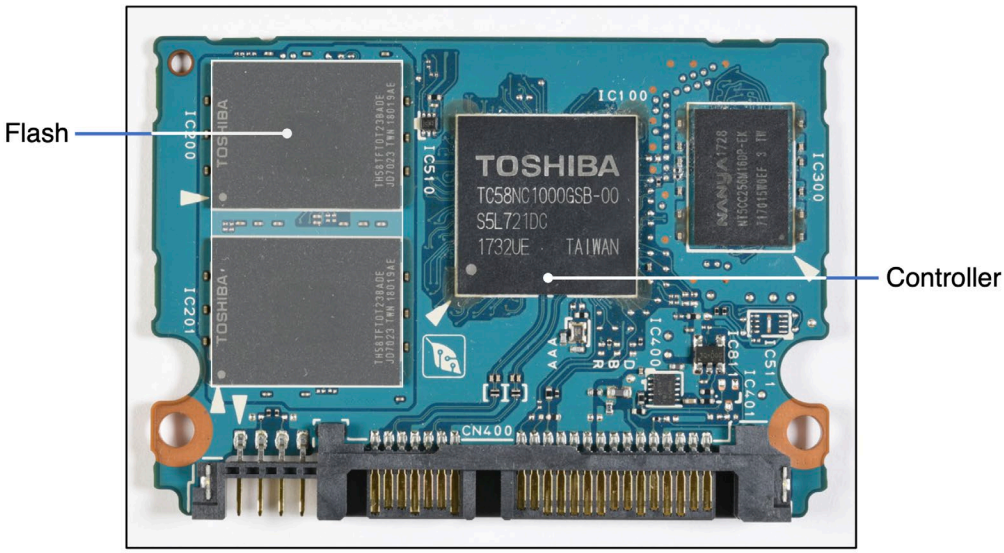
receive a different one of the plurality of partially decoded data streams;

detect whether a portion of the respective received stream contains an error; and

forward the portion of the respective received stream containing an error to an error correction module; and

the error correction module, communicatively coupled with and physically separate from the error detection module, and configured to correct the received portions of the respective received streams containing an error.

56. The Accused Products all contain flash memory and a controller (including a flash memory decoder). By way of non-limiting example, on information and belief, Kioxia's KSG60ZSE256G SSD meets each and every limitation of claim 1 of the '700 patent. Kioxia's KSG60ZSE256G SSD contains multiple flash-memory packages and a Kioxia controller.



57. The Accused Products all contain a flash memory decoder comprising a decoding module configured to receive encoded data from flash memory. For example, on information and

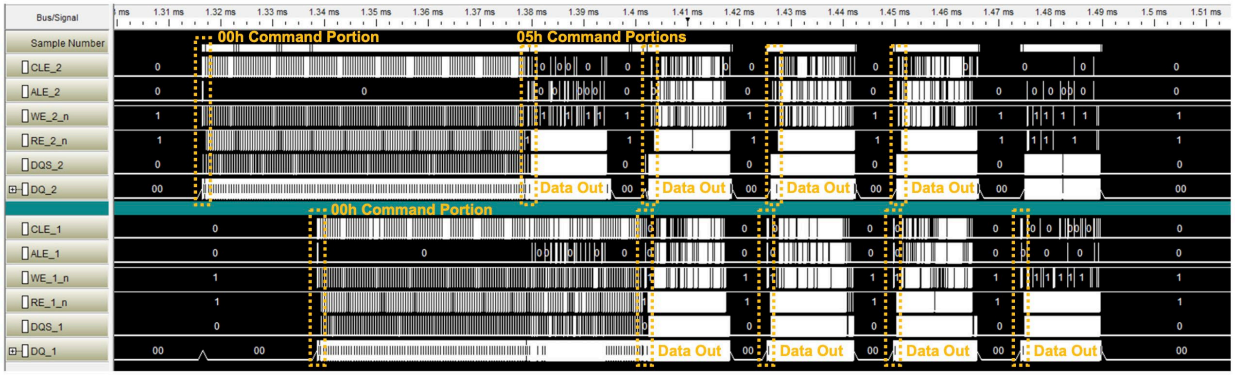
belief, the controller in the KSG60ZSE256G SSD includes a flash memory decoder comprising a decoding module configured to receive data with ECC encoding. As Kioxia has stated in a White Paper concerning its enterprise SSDs, all SSDs contain the QSBC.[15] In addition, on information and belief, data readout segments are used in the KSG60ZSE256G SSD, which reflects ECC codeword segmentation for a NAND flash.

58. On information and belief, as part of the read-out of data from the flash memory, the encoded data (in the form of the stored data and ECC signature) is received by the decoding module. For example, data readout segments are used in the KSG60ZSE256G SSD, consistent with ECC codeword segmentation for a NAND flash. The controller and the flash memory in the KSG60ZSE256G SSD communicate using the NVDDR2 flash interface method of the Open NAND Flash Interface (ONFI) specification and the Toggle- mode DDR2 method of the JEDEC JESD230 standards. On information and belief, the segments that are read from the flash to the controller in the KSG60ZSE256G SSD are consistent with the typical data page segmentation to have multiple codewords per page. Applying the ONFI specifications on page size and spare bits for ECC bits to the KSG60ZSE256G SSD, this would translate to four codeword chunks that are read out from a data page, where each chunk has its own ECC bits.

59. The Accused Products' decoding modules are also configured to decode the received encoded data to generate a plurality of partially decoded data streams. For example, on information and belief, the controller in the KSG60ZSE256G SSD includes a flash memory decoder comprising a decoding module configured to receive encoded data from flash memory

[15] *Technology of Enterprise Solid State Drive* at 2, available online at https://business.kioxia.com/content/dam/kioxia/shared/business/ssd/doc/WhitePaper_eSSD_e_201404.pdf.

and then decodes the received encoded data to generate a plurality of partially decoded data streams. Communication between the flash and the controller occurs over channels of control and data signals. Each channel goes to a separate NAND flash die. The BGA-272 NAND flash memory package found in Kioxia's KSG60ZSE256G SSD is a quad channel package that has two channels of data and control signals. On information and belief, the controller in the KSG60ZSE256G SSD uses the NVDDR2 ONFI flash interface method to communicate with the flash memory and the toggle- mode DDR2 method of the JEDEC JESD230 standard. Under the ONFI ECC standard, the data transferred from the flash memory occurs in discrete units with data, metadata, and ECC check bytes that are subsequently decoded, as shown below.[16]



60. The Accused Products' flash memory decoder also comprises an error detection module communicatively coupled with the decoding module. For example, the controller in the KSG60ZSE256G SSD includes an error detection module communicatively coupled with the decoding module that receives the partially decoded data streams from the decoding module. On information and belief, data is sent from flash memory through to the controller, which contains an error detection module that receives partially decoded data streams. Kioxia has described its

[16] *Open NAND Flash Interface Specification*, Rev. 4.2, Feb. 12, 2020, available at https://media-www.micron.com/-/media/client/onfi/specs/onfi_4_2-gold.pdf?la=en&rev=1fb1f47489584c0eb2f31f22a30b94f8.

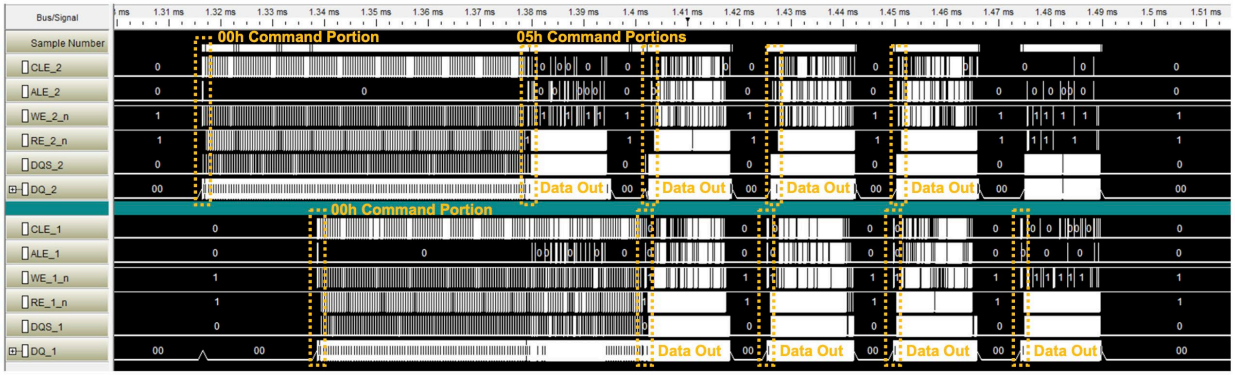
QSBC error correction as including "multiple error correction circuits that can select the most efficient error correction operation for different level errors," which on information and belief involves the detection of errors by an error detection module communicatively coupled to a decoding module.[17] On information and belief, Kioxia's ECC implementations, including QSBC contained in all its SSDs, contains an error detection module communicatively coupled with the decoding module that receives the partially decoded data streams from the decoding module.[18]

61. On information and belief, the Accused Products' error detection modules also comprise a plurality of error detection sub-modules operating in parallel, each error detection sub-module configured to receive a different one of the plurality of partially decoded data streams, detect whether a portion of the respective received stream contains an error, and forward the portion of the respective received stream containing an error to an error correction module. For example, on information and belief, the controller in the KSG60ZSE256G SSD contains an error detection module comprising a plurality of error detection sub-modules operating in parallel, each error detection sub-module configured to: receive a different one of the plurality of partially decoded data streams, detect whether a portion of the respective received stream contains an error, and forward the portion of the respective received stream containing an error to an error correction module. On information and belief, the stream of data with partially decoded ECC encoding is decoded in chunks as parallel streams come into the error detection module. For the KSG60ZSE256G SSD, on information and belief, the data being sent to the controller

[17] *Toshiba Begins Sample Shipment of Mission Critical 1.6TB Large Capacity Enterprise SSDs*, available online at https://business.kioxia.com/en-jp/news/2013/20130603-1.html.

[18] *Open NAND Flash Interface Specification*, Rev. 4.2, Feb. 12, 2020, available online at https://media-www.micron.com/-/media/client/onfi/specs/onfi_4_2-gold.pdf?la=en&rev=1fb1f47489584c0eb2f31f22a30b94f8.

from the flash generates a plurality of partially decoded data streams. As depicted below, multiple data streams can be seen being processed in parallel with each stream, on information and belief, consisting of partially decoded data streams that each enter error-detection sub-modules. Kioxia has described its QSBC error correction as including "multiple error correction circuits that can select the most efficient error correction operation for different level errors," which on information and belief involves receiving and correcting only those portions of the data stream containing errors.[19]



62. On information and belief, the Accused Products' flash memory decoders also comprise an error correction module, communicatively coupled with and physically separate from the error detection module, and configured to correct the received portions of the respective received streams containing an error. For example, on information and belief, the controller in the KSG60ZSE256G SSD has an error correction module, communicatively coupled with and physically separate from the error detection module and configured to correct the received portions of the respective received streams containing an error. On information and belief, the Accused Products implement modules in a hardware implementation physically separate from

[19] *Toshiba Begins Sample Shipment of Mission Critical 1.6TB Large Capacity Enterprise SSDs*, available online at https://business.kioxia.com/en-jp/news/2013/20130603-1.html.

the error detection modules to evaluate error location and correct errors. For example, Toshiba has described its QSBC error-detection system as using "multiple error correction circuits that can select the most efficient error correction operation for different level errors."[20]

DEMAND FOR A JURY TRIAL

63. Viasat requests a trial by jury of all issues so triable under Fed. R. Civ. P. 38.

PRAYER FOR RELIEF

WHEREFORE, Viasat respectfully requests that the Court:

A. Enter judgment in favor of Viasat that Kioxia has infringed one or more claims of the '700 patent, directly and indirectly, literally or under the doctrine of equivalents;

B. Award damages sufficient to compensate Viasat for Kioxia's infringement under 35 U.S.C. § 284;

C. Find this case exceptional under 35 U.S.C. § 285 and award Viasat its reasonable attorneys' fees;

D. Award Viasat costs and expenses associated with maintaining this action;

E. Award pre-judgment and post-judgment interest; and

F. Provide any other relief that the Court deems appropriate.

[20] *Id.*

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Respectfully submitted,

/s/ Melissa R. Smith

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