ADAM GARSON (Bar No. 240440)
GAZDZINSKI & ASSOCIATES, PC
750 B Street, Suite 1600
San Diego, CA 92101
Telephone: (858) 675-1670
Email: adam.garson@gazpat.com

Attorneys for Plaintiff
SPECTRA LICENSING GROUP, LLC

UNITED STATES DISTRICT COURT

NORTHERN DISTRICT OF CALIFORNIA

SPECTRA LICENSING GROUP, LLC a California corporation,

Plaintiff,

v.

MARVELL SEMICONDUCTOR, INC., a California corporation,

Defendant.

CASE NO.: 16-cv-06093-RS

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

JURY TRIAL DEMANDED

This is an action for patent infringement in which Plaintiff SPECTRA LICENSING GROUP, LLC ("SPECTRA" or "Plaintiff") makes the following allegations against Defendant MARVELL SEMICONDUCTOR, INC. ("MSI", "MARVELL", or "Defendant") as follows:

THE PARTIES

1. Plaintiff SPECTRA is a limited liability company organized under the laws of the State of California with a principal place of business at 2907 Shelter Island Drive, Suite 105-279, San Diego, California 92106.

2. Upon information and belief, Defendant MSI is a corporation organized under the laws of California, with its principal place of business at 5488 Marvell Lane, Santa Clara, California 95054 ("Marvell Headquarters"). MARVELL specializes in the design, development, sale, and marketing of high performance, mixed signal and digital integrated circuits aimed at the high speed computer, storage, communications, and multimedia markets.

3. Upon information and belief, MSI is a wholly-owned subsidiary of Marvell Technology Group, Ltd. ("MTGL"), a Bermuda corporation.

4. Although not a party to this case, MTGL's officers and directors are located in the United States at Marvell Headquarters. MTGL's officers perform their duties at Marvell Headquarters and have done so on a regular and ongoing basis for more than a decade, and continue doing so today.

5. Upon information and belief, MSI designs and develops products for a number of MTGL's other subsidiaries, specifically including, Marvell International, Ltd. and Marvell Asia Pte. Ltd.

JURISDICTION AND VENUE

6. This is an action for patent infringement arising under the patent laws of the United States, 35 U.S.C. § 1, *et seq.*, including 35 U.S.C. § 271. This Court has subject matter jurisdiction pursuant to 28 U.S.C. §§ 1331 and 1338(a).

7. This Court has personal jurisdiction over MSI at least because MSI is a California corporation present within or has ongoing and systematic contacts with the United States, the State of California, and the Northern District of California. MSI has purposefully and regularly availed itself of the privileges of conducting business in the State of California and in the Northern District of California and expected or reasonably should have expected its acts to have consequence in the State of California and within this judicial District. Plaintiff's causes of action arise directly from Defendant's business contacts and other activities in the State of California and in the Northern District of California. Defendant has committed acts of patent infringement in this District, and has harmed and continues to harm SPECTRA in this District, by, among other things, using, selling, offering for sale, and/or importing infringing products and/or services into this District.

8. Venue is proper in this District pursuant to 28 U.S.C. §§ 1391 and 1400(b) as Defendant is doing substantial business in this judicial District and therefore may be found in this District, and/or a substantial part of the events giving rise to the claim alleged herein occurred within this District.

PATENT-IN-SUIT

9. SPECTRA owns, by assignment, all right, title, and interest in U.S. Patent No. 6,108,388 ("the '388 patent" or the "Patent-in-Suit").

10. The '388 patent, entitled "Iterative-Structure Digital Signal Reception Device, and Module and Method Therefor" was duly and legally issued by the United States Patent and Trademark office on August 22, 2000 naming Catherine Douillard, *et al.* as inventors after a full and fair examination. The '388 patent has a priority date of at least February 7, 1995. The '388 patent was originally assigned to "France Telecom; Telediffusion de France, both of Paris, France".[1] A true and correct copy of the '388 patent (including the Certificate of Correction) is attached hereto as

[1] France Telecom is now known as "Orange S.A."

Exhibit A.

11. The Patent-in-Suit is/was valid and enforceable until at least February 6, 2016.

12. SPECTRA is in compliance with the marking requirements under 35 U.S.C. § 287 in that it has no duty to mark or to give notice in lieu thereof because it has no products to mark.

13. SPECTRA is informed and therefore believes that the previous owners of the '388 patent (including France Telecom and Telediffusion de France) were also in compliance with the marking requirements under 35 U.S.C. § 287 in that said previous owners did not sell products in the United States which practiced the invention(s) claimed in the '388 patent or otherwise did not have a duty to mark. Furthermore, SPECTRA is informed and therefore believes that, if the previous owners of the '388 patent did import products into the United States which practiced the invention(s) claimed in the '388 patent, said products were adequately marked under 35 U.S.C. § 287.

BACKGROUND

The Invention of Turbo Equalization and Iterative Detection.

14. During the early 1990s, France Telecom researchers (including the named inventor(s) of the '388 patent) made ground breaking advances in the area of iterative signal processing. These advances included the development of iteratively decodable codes such as "Turbo Codes" as well as the development of a signal processing technique called "turbo equalization." Turbo equalization may also be referred to as "iterative detection," "iterative coding," or "iterative reception."

15. The technological advance provided by turbo equalization, which was made possible by France Telecom in collaboration with ENST de Bretagne (an elite French information technology and telecommunications research school), led to huge performance gains in systems that experience substantial inter-symbol interference

(ISI) such as the hard disk drive storage market.

16. At its most basic, "turbo equalization" is an advanced signal processing technique for "cleaning-up" errors introduced by ISI during transmission or storage. In the context of high capacity hard disk drives ("HDDs"), ISI occurs because the data bits (symbols) are packed so closely together that they interfere with one another. This may cause cross-talk between the data symbols stored on the disk making it difficult to recover the original information.

17. Turbo equalization was first described in a paper from the inventors C. Douillard, *et al.*, entitled "Iterative Correction of Intersymbol Interference: Turbo-Equalization," Eur. Trans. Communications, vol. 6, pp. 507-11, Oct. 1995 (the "Douillard Paper"). (Attached hereto as Exhibit B.)

18. The Douillard Paper has been widely acknowledged as the first paper to propose turbo equalization. For example, the Douillard Paper was acknowledged as the first proposal of turbo equalization in a paper by Hagenauer, entitled "The Turbo Principle: Tutorial Introduction and State of the Art," 1997. (Exhibit C, p. 7, Col. 2, lines 12-13; the "Hagenauer Paper".)

19. The Hagenauer Paper is cited in a book authored by Dr. Zining Wu (The "Wu Book") entitled "Coding and Iterative Detection for Magnetic Recording Channels." (Portions attached hereto as Exhibit D.) The Wu Book is based on the PhD thesis of Mr. Wu.

20. Since 1999, Dr. Zining Wu has held various positions at MSI and MTGL including working as an engineer and in various managerial roles in the Storage Group at MSI. Dr. Wu served as Vice President, Data Storage Technologies at MSI since August 2008 and was promoted to CTO of MGTL in January of 2014. In August of 2016 Dr. Wu resigned his CTO position at MGTL and agreed to assist the company in a consulting capacity.

21. The Douillard Paper was also acknowledged as the first description of

turbo equalization in the paper by Michael Tuchler, Ralf Koetter, and Andrew Singer entitled "Turbo Equalization: Principles and New Results," 2002 (Exhibit E, Bates no. E-2, last two lines; the "Tuchler Paper.")

22. The Tuchler Paper is cited in "Equation Based LDPC Decoder for Intersymbol Interference Channels," which is a white paper authored by Dr. Zining Wu and MARVELL engineer Gregory Burd. (Exhibit F ("the Wu-Burd paper"), Bates no. F-2, first two lines of 2nd paragraph.).

23. The Wu-Burd paper also states in the first paragraph of the introduction section that:

> Combining iterative codes to ISI channels was **first introduced** in [a paper authored by '388 inventor Glavieux] under the name "turbo equalization". The key observation in turbo equalization is that ISI channel can be treated at rate-1 convolution code, therefore it can be easily decoded by soft-input soft-output (SISO) algorithms and iterated with an outer convolution of LDPC decoder. (Emphasis Added)

24. By stating that the technology was "first introduced" under the name turbo equalization, the Wu-Burd paper demonstrates that MSI personnel had knowledge of the origins of the invention of turbo equalization, which is the basis of the '388 patent.

25. On or around December 13, 2012, Dr. Zining Wu explained under oath that he came upon iterative coding as an area he wanted to study because "people from France first proposed this code called cable [sic] code as a way to iterative coding [sic]." (Excerpt filed herewith as Exhibit G, Bates No. G-2, lines 3-4.)

MARVELL Knew That Iterative Detection was First Disclosed in the Douillard Paper and was Associated with France Telecom's Research.

26. Upon information and belief, MSI, including Dr. Zining Wu, are aware and have been aware of France Telecom's work in the arena of iterative coding and iterative detection since at least 1999, and have knowledge that directly connects the discovery of turbo equalization to France Telecom's research activities. This is

demonstrated by, among other things, the two separate citations by Dr. Zining Wu of papers that acknowledge the origin of turbo equalization as the Douillard Paper.

Aspects of Iterative Detection are Claimed in the '388 Patent.

27. The ENST research activity reflected in the Douillard Paper also led to the issuance of the '388 patent, the first of many more related to turbo equalization and iterative detection. The '388 patent was assigned to France Telecom, and then later to Plaintiff.

28. Various aspects of the practice of turbo equalization and/or iterative detection as described in the Douillard Paper, especially as implemented by MARVELL in the context of devices for use in hard disk drives, infringe the '388 patent.

29. Via the use of MARVELL's iterative read channel devices, including the design, development, demonstration, sampling, evaluation, configuration, testing, optimization, and qualification thereof, Defendant MSI infringed the '388 patent under 35 U.S.C § 271.

30. Upon information and belief, and as will be borne out in discovery, MSI had knowledge of the '388 patent since 1999.

The MARVELL 88i9422 as an Exemplary Accused Product.

31. In a document entitled "SpinPoint M8 Hard Disk Drive Product Manual Rev 2.7" dated September 4, 2013, published by Samsung Electronics, a description and diagram of a MARVELL 88i9422 device and the associated MARVELL 88C9410 read/write channel core is provided. (The "SpinPoint Manual", attached hereto as Exhibit H). Samsung Electronics is a brand of U.S.-based Seagate Technology PLC since 2011 when Samsung divested itself of its commercial hard disk drive operations.

32. Based on information and belief, figure 5-3 of the SpinPoint Manual (Exhibit H, Bates no. H-37) is an accurate depiction of the MARVELL 88C9410 read/write channel core and the 88i9422 device in which that core is used.

33. Figure 5-3 of Exhibit H depicts the "Iterative Decoder" used in the MARVELL 88i9422 device and the MARVELL 88C9410 core. This Iterative Decoder appears in the block surrounded by a dotted line near the upper-right portion of the figure and contains a "SOVA" (soft output Viterbi Algorithm) and "Code Decoder." (Exhibit H, Bates No. H-37)

34. The "Iterative Decoder" used in the MARVELL 88i9422 device is comprised of a "SOVA" detector and a "Code Decoder" connected to one another via a bi-directional arrow. *Id.*

35. Section 5.4.1 of the SpinPoint Manual states that the ENDEC of the 88C9410 "decodes the LDPC[.]" *Id.* at Bates No. H-38.

36. An LDPC code is a low-density parity check code composed of many interconnected single parity check (SPC) codes.

Infringement Analysis of 88i9422/88c9410 as an Exemplary Accused Product.

37. Claim 9 of the '388 patent, with miniscule reference letters added to designate different part of the claim, reads as follows (in light of the Certificate of Correction):

> *9. Method for the reception of signals formed by a series of digital symbols corresponding to the convolutive encoding of items of source digital data comprising the following steps:*
>
> *[a] supplying with received symbols Ri; and*
>
> *[b] performing for each received symbol Ri at least two iterations of the following steps:*
>
> > *[c] correcting inter-symbol interference affecting received symbols Ri, by means of an item of correction information Zi, said correction information Zi except Z_1 (first iteration), being computed by a computing step of the previous iteration, and the*

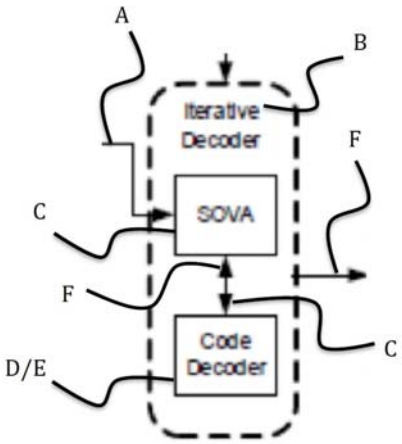
delivery of corresponding estimated symbols $A_{i,1}$ with weighted value;

[d] decoding said estimated symbols $A_{i,1}$ with weighted value entailing operations symmetrical to said convolutive encoding, and the delivery of decoded symbols $A_{i,2}$ with weighted value;

[e] computing said correction information Z_i from at least one of said estimated symbols $A_{i,1}$ and at least one of said decoded symbols $A_{i,2}$; and

[f] delivering said correction information Z_i to the step of correcting inter-symbol interference of the following iteration.

38. Attached hereto as Exhibit I (and included immediately below) is the "Iterative Decoder" portion of the MARVELL 88i9442/9410 core depicted in figure 5-3 of the SpinPoint Manual (Exhibit H, at H-37) shown with majuscule reference letters added.



39. Upon information and belief, the input arrow (A) to the Iterative Decoder is indicative of the step of (a) "supplying with received symbols."

40. Upon information and belief, the use of the term "Iterative" (B) in label "Iterative Decoder" is indicative of the step (b) of "performing for each received symbol R_i at least two iterations" where the operations are performed by the interconnected sub-blocks within the "Iterative Decoder."

41. Upon information and belief, the SOVA detector (C) is indicative of performing the step (c) of "correcting for inter-symbol interference." Additionally,

the downward pointing arrow (C) is indicative of the "delivery of decoded symbols with weighted value."

42. Upon information and belief, Code Decoder (D/E) is indicative of performing the step of (d) "decoding said estimated symbols" and "delivering estimated symbols with weighted value."

43. Upon information and belief, Code Decoder (D/E) further performs the step (e) of computing correction information from at least one of said estimated symbols and at least one of said decoded symbols.

44. Upon information and belief, Arrow (F) is indicative of the step (f) of supplying said correction information to the correcting step (performed by the SOVA detector).

45. Upon information and belief, the decoding performed by Code Decoder (D/E) entails operations symmetrical to said convolutional encoding due to the decoding of the single parity check codes that make up an LDPC code.

Application of Exemplary Infringement Analysis to MARVELL's Entire Read Channel Product Line.

46. Based on information and belief, SpinPoint Product Manuals or other documents similar to that provided in Exhibit H exist for other Accused Products, and these similar SpinPoint Product Manuals show other MARVELL read channel devices and cores using an "Iterative Decoder" configured in the same or similar configuration as shown for the 88i9442 device. These other MARVELL devices include, without limitation, the 88i9322 device (88c9300 series) and the 88i1064 device (88c1000/10 series).

47. Upon information and belief, the first two digits after the "88i" in the MARVELL part number are indicative of the read channel core on which the device is based. Therefore, if two part numbers share these initial two digits they will perform the same, or substantially similar, read channel processing. Thus, based on

the demonstration of infringement of Claim 9 of the '388 patent performed with respect to the 88i9442 device (and 88C9410 core) described in the SpinPoint Manual, other devices in the 88i94xx family will also infringe the '388 patent.

48. Other SpinPoint Product Manuals exist that depict iterative detection in the Marvell 88i9442 and the 88i1064 devices. The existence of these other SpinPoint Product Manuals depicting iterative detection in the 88i9442 and the 88i1064 devices is indicative of the use of iterative detection in all 88i94xx and 88i10xx series MARVELL read channel devices.

49. On December 12, 2012 Dr. Zining Wu stated under oath that the first three revisions of the 9xxx series MARVELL read channel device families used iterative codes. In particular, Dr. Wu stated under oath that "this [sic] three chips, 9000, 9100, 9200 all the SNR gains come from iterative code." (Docket No. 707 of CMU Case, excerpt attached hereto as Exhibit J, Bates no. J-3, lines 3-4.)

50. Additionally, in 2012, Dr. Zining Wu stated under oath that iterative coding is "implemented in every one of Marvell chips today." (*Id.* at Bates no. J-3, lines 5-9.)

51. Thus, based on information and belief, any read channel devices based on, or using, the following MARVELL read channel cores perform iterative detection and infringe the '388 patent: 88c9000, 88c9010, 88c9100, 88c9110, 88c9199, 88c9200, 88c9210, 88c9300, 88c9310, 88c9311, 88c9399, 88c9400, 88c9410, 88c9411, 88c10010, 88c11010, 88src9000, 88src9210, 88src10000, 88src10030, and 88src10050.

52. Additionally, based on information and belief, at least the following MARVELL products perform iterative detection and infringe the '388 patent (and in combination with cores listed in the paragraph immediately above, constitute the "Accused Products"):

- MARVELL 9000-series read channel device family, including without limitation model numbers 88i9010, 88i9012, 88i9015, 88i9017, 88i9018, 88i9020, 88i9022, 88i9025, 88i9031, 88i9035, 88i9045, 88i9046, and 88i9060;
- MARVELL 9100-series read channel device family, including without limitation model numbers 88i9103, 88i9104, 88i9105, 88i9108, 88i9112, 88i9115, 88i9117, 88i9118, 88i9119, 88i9122, 88i9125, 88i9126, 88i9137, 88i9138, 88i9145, 88i9146, and 88i9160;
- MARVELL 9200-series read channel device family, including without limitation model numbers 88i9205, 88i9212, 88i9217, 88i9222, 88i9225, 88i9226, 88i9245, and 88i9246;
- MARVELL 9300-series read channel device family, including without limitation model numbers 88i9305, 88i9311, 88i9312, 88i9317, 88i9318, 88i9319, 88i9321, 88i9322, 88i9335, 88i9346, 88i9347, and 88i9348;
- MARVELL 9400-series read channel device family, including without limitation model numbers 88i9405, 88i9411, 88i9412, 88i9421, 88i9422, 88i9435, 88i9441, 88i9446, and 88i9447;
- MARVELL C10010-series read channel device family, including without limitation model numbers 88i1005, 88i1012, 88i1017, 88i1038, 88i1046, 88i1047, 88i1048, 88i1049, 88i1061, 88i1062, 88i1064, 88i1065, 88i1067, 88i1068, and 88i1069;
- MARVELL C11000/C11010-series read channel device family, including without limitation model numbers 88i1146, 88i1148, 88i1149, 88i1160, 88i1161 and 88i1068;
- MARVELL C12000 -series read channel device family, including without limitation model number 88i1248; and

- MARVELL hard disk drive "hybrid" products that combine the use of hard disk drive and solid state storage (SSD) to provide SSD performance at an HDD price.

53. Infringement of the '388 patent may be found in other, or additional, operations performed in the Accused Products, MARVELL read channel devices, and other activities engaged in, or induced by, MARVELL, or it may be found through other basis of infringement including the doctrine of equivalents.

54. Upon information and belief, documents similar to the SpinPoint Product Manual are provided to all customers of the Accused Products along with data sheets and instructions. These documents provide instructions to the purchasers of the Accused Products as to how to use the Accused Products in an infringing manner and evidence MARVELL's active and knowing aiding and abetting the direct infringement of the purchasers of the Accused Products including, without limitation, manufacturers of magnetic hard disk drives.

55. Products containing the Accused Products are sold to consumers in California.

Iterative Detection was a Critical Feature Supporting MARVELL's Read Channel Success.

56. Around 2007-2008, MARVELL announced it was sampling production read channel devices incorporating iterative detection.

57. MARVELL's read channel devices for hard disk drives incorporating iterative detection (a.k.a. turbo equalization) employ signal processing techniques first proposed in the Douillard Paper and described in the '388 patent.

58. MARVELL would soon successfully develop, market, and sell read channel devices with iterative detection to several hard disk drive manufacturers to incorporate into consumer and enterprise hard disk drives.

59. The on-going development and sales in the area of iterative detection

read channel technology propelled MARVELL to market leadership in the area of read channel application-specific integrated circuits (ASICs) – especially in the area of hard disk drive technology.

60. On or around the time of the first delivery of production samples of iterative read channel devices, (former) MTGL CEO Sehat Sutardja made certain statements about the tremendous commercial benefits provided by iterative read channel technology. In an earnings conference call for fiscal Q1 2008, (the "Earnings Call" transcript, attached hereto as Exhibit K) Mr. Sutardja referred to the iterative read channel as "a revolutionary technology breakthrough" and as the "holy grail" of read channel development:

> Once again, we are very excited to announce that we have dramatically increased our SNR advantage with revolutionary technological breakthrough. After over six years of internal development, we have now achieved the holy grail of read channel development. We have the industry['s] first iterative read channel SOC.
>
> Our patented implementation of these extremely complicated and advanced iterative algorithms, will even further our customers to improve SNR and performance, which will allow even greater capacity points and manufacturing yields. We have incorporated this breakthrough technology into our new SOC's, which will go into production next year. Our customers are very excited about the tremendous improvement in performance we will be offering which will greatly enhance the competitiveness of their products in the market. [Exhibit K, Bates no. K-2 to K-3 (emphasis added.)]

61. Iterative coding would subsequently go on to be one of the most successful features MARVELL would add to its read channel products. MARVELL made, used, and sold these infringing read channel products as part of its normal business activities.

62. Mr. Sutardja also stated in the Earnings Call that MARVELL provided samples of read channel devices incorporating iterative read channel technology to

prospective customers (including hard disk drive manufacturers) as part of the sales cycle, and that MARVELL expected sales to increase as a result:

> <Q – Louis Gerhardy>: ... would you expect any change in your market share there and then also with regards to the new SNR performance and the products that will ramp in 2008 – calendar 2008, would you expect you share of the market to increase then?
>
> <A – Sehat Sutardja>: Yeah, Louis, so we don't expect any changes in the enterprise market share ... With regards to the new technology, the iterative technology there we have just finally been able to show samples to our customers. Of course, this is a very exciting technology because this is one of those technology [sic] that comes you know every ten years or so and this technology is yet another piece of the key critical technology that we provide to our customer in the storage business to make them more competitive. So, with such an important technology we do expect ... that we'll gain more market shares for next year. (Exhibit K, Bates no. K-4 (emphasis added).)

63. The success of MARVELL's iterative read channel technology and the associated products is further evidenced by testimony given under oath by Dr. Zining Wu on December 12, 2012 (Exhibit J):

> Q: Would you say iterative coding is a successful feature in Marvell's chips?
> A[Wu]: It's very successful feature [sic]. (Exhibit J, Bates no. J-3, line 24 to Bates no. J-4, line 1.)
> [...]
> A[Wu]: We have 3 dB in SNR gain from iterative coding.ing [sic] that give us larger SNR gain than any other feature in Marvell, so that it is a consideration to be very successful." (*Id.* at lines 5-8 (emphasis added).)

MARVELL's Product Sales Cycle Involves Extensive Use in the U.S.

64. In a 2003 prospectus disclosure prepared by MARVELL for the Security and Exchange Commission (attached hereto as Exhibit L), MARVELL made the following statement regarding the sales cycle of the storage product market:

> We have a lengthy and expensive storage product sales cycle that does not assure product sales, and that if unsuccessful, may harm our

> operating results.
>
> The sales cycle for our storage products is long and requires us to invest significant resources with each potential customer without any assurance of sales to that customer. Our sales cycle typically begins with a three to six month evaluation and test period, also known as qualification, during which our products undergo rigorous reliability testing by our customers.
>
> Qualification is typically followed by a twelve to eighteen month development period by our customers and an additional three to six month period before a customer commences volume production of equipment incorporating our products. This lengthy sales cycle creates the risk that our customers will decide to cancel or change product plans for products incorporating our integrated circuits. During our sales cycle, our engineers assist customers in implementing our products into the customers' products. We incur significant research and development and selling, general and administrative expenses as part of this process, and this process may never generate related revenues. We derive revenue from this process only if our design is selected. Once a customer selects a particular integrated circuit for use in a storage product, the customer generally uses solely that integrated circuit for a full generation of its product. Therefore, if we do not achieve a design win for a product, we will be unable to sell our integrated circuit to a customer until that customer develops a new product or a new generation of its product. Even if we achieve a design win with a customer, the customer may not ultimately ship products incorporating our products or may cancel orders after we have achieved a sale. In addition, we will have to begin the qualification process again when a customer develops a new generation of a product for which we were the successful supplier. [(Exhibit L, Bates no. L-21 to L-22 (emphasis added).)]

65. Based on information and belief, MARVELL made similar statements regarding the sales cycle in more recent SEC filings including the MARVELL 10-K filed for year 2015. *See* MARVELL 2015 Form 10-K for fiscal year ended January 31, 2015 at p. 19 and MARVELL's 2016 10-K for fiscal year ended January 30, 2016 at p. 21 (available at http://investor.marvell.com/phoenix.zhtml?c=120802&p=irol-reportsannual and incorporated herein by reference).

66. Based on information and belief, the management and strategic decision making of MARVELL as well as most of its business activities are conducted at Marvell Headquarters in Santa Clara, California.

67. Based on information and belief, almost all of MARVELL's sales and marketing decision making for read channel products is conducted at Marvell Headquarters in Santa Clara, California.

68. Based on information and belief, the sale and development of iterative detection read channel devices involved substantial use of those devices at MARVELL's U.S. locations and the U.S. locations of MARVELL's customers.

69. The Accused Products were researched, designed, and developed in MARVELL's headquarters in Santa Clara, California.

70. Based on information and belief, MSI used one or more of the Accused Products, and one or more of the Accused Products underwent an extensive development and sales cycle that involved substantial U.S.-based use of the Accused Products both at Marvell Headquarters and at the U.S.-based facilities of its customer(s) – generally over a period of twelve (12) to eighteen (18) months ("Sales Cycle"). During the Sales Cycle, MARVELL first provides evaluation chips for customers (hard disk drive manufacturers) to put through a rigorous process of performance and functionality validation. This is followed by a customization process whereby MSI further uses the Accused Products to perform customization based on the customer's requirements. Subsequently, the customer would go through another round of validation with input and help from MSI including even further use of one or more of the Accused Products prior to integrating the chips into its products (hard disk drives).

71. The infringing uses of the Accused Products by MSI during the Sales Cycle led to numerous MSI design wins. Many design wins resulted in orders of millions, tens of millions, or hundreds of millions of units, and associated revenue

and profit, and therefore those design wins were highly valuable sales.

72. But for this infringing activity (including the infringing use) by MSI, such design wins would not have been achieved and MSI would not have obtained or maintained market leadership in the hard-disk drive market and would not have reaped the huge profits which accompany such a position.

73. MSI performed infringing activity extensively in the U.S. during the Sales Cycle of its highly-valuable read/write channel products.

74. MSI performed infringing activity via the use of hard disk drives by its thousands of U.S.-based employees as part of conducting normal business activities in the United States. These hard disk drives incorporated and used infringing read channel devices including, but not limited to, Accused Devices.

75. Multiple lines of the Accused Products (product lines) each went through a Sales Cycle while being developed and sold by MSI.

76. Section 5.4.1 of the SpinPoint Manual (Exhibit H) refers to the 88i9422 as a "(Rev3.1) DSP." Therefore, upon information and belief, the 88i9422 went through several iterations and rounds of domestic testing and qualification.

77. Upon information and belief, many other Accused Products underwent several iterations and rounds of domestic testing, qualification, and customization.

78. A separate Sales Cycle was conducted during the development stage for each Accused Product family or product line.

79. The infringing activity associated with the use of MSI iterative read channel devices was performed extensively in the United States during, and as a part of, the sales and development cycle of multiple MSI device families (product lines) incorporating iterative detection – including the Accused Products.

80. The infringing activity was performed extensively, continuously, and repeatedly at MSI's U.S. location(s) from at least the time period of 2008 to the present date.

81. Western Digital Corp ("WESTERN DIGITAL") is a Delaware corporation with offices in Irvine, California. WESTERN DIGITAL is a buyer and user of MSI's read channel devices incorporating iterative detection including one or more of the Accused Products.

82. MSI used a 88i9446 read channel device, or prototype thereof, one or more times at a WESTERN DIGITAL U.S.-based facility as part of the Sales Cycle for that device.

83. MSI used a 88i9346 read channel device, or prototype thereof, one or more times at a WESTERN DIGITAL U.S.-based facility as part of the Sales Cycle for that device.

84. MSI used a 88i9146 read channel device, or prototype thereof, one or more times at a WESTERN DIGITAL U.S.-based facility as part of the Sales Cycle for that device.

85. MSI used a 88i9145 read channel device, or prototype thereof, one or more times at a WESTERN DIGITAL U.S.-based facility as part of the Sales Cycle for that device.

86. MSI used a 88i9045 read channel device, or prototype thereof, one or more times at a WESTERN DIGITAL U.S. based facility as part of the Sales Cycle for that device.

87. But for this extensive infringing activity conducted as part of the Sales Cycle MSI would not have achieved its numerous "design wins" for its highly profitable read/channel products, including its 9000, 9100, 9200, 9300, 9400, C10010, and C11000/C11010 production series read/write products (the Accused Products).

88. But for MSI substantial and repeated domestic use of one or more of the Accused Products, MSI would not have made volume sales of one or more of the Accused Products.

89. SPECTRA has been damaged by the foregoing acts of infringement of its patent by the Defendant and will continue to be damaged by such infringement.

COUNT I

DIRECT INFRINGEMENT OF THE '388 PATENT

90. SPECTRA incorporates paragraphs 1 through 89 by reference as if fully stated herein.

91. Defendant MSI directly infringed literally and/or under the doctrine of equivalents, at least claim 9 of the '388 Patent at least during the period prior to the expiration of the patent by making, using, selling and/or offering for sale Accused Products in the US.

92. Defendant MSI directly infringed, either literally and/or under the doctrine of equivalents, in violation of 35 U.S.C. § 271(a), by making, using, selling, offering for sale, and/or importing in or into the United States, without authority, products that infringe at least claim 9 of the '388 patent, including but not limited to the Accused Products at least during the period prior to the expiration of the patent.

93. As a direct and proximate result of the acts of patent infringement by Defendant, SPECTRA has been damaged and continues to be damaged in an amount not presently known.

PRAYER FOR RELIEF

SPECTRA respectfully requests that judgment be entered in its favor and against Defendant, and that the Court award the following relief to SPECTRA:

A. A judgment in favor of SPECTRA that Defendant has directly infringed the Patent-in-Suit;

B. A judgment and order that Defendant account for and pay all damages necessary to adequately compensate SPECTRA for infringement of the Patent-in-Suit, but in no event less than a reasonable royalty;

C. A judgment and order finding that this is an exceptional case within the

meaning of 35 U.S.C. § 285 and awarding SPECTRA its reasonable attorneys' fees against Defendant;

D. A judgment and order requiring Defendant to provide an accounting and to pay supplemental damages to SPECTRA, including without limitation, pre-judgment and post-judgment interest; and

E. Any and all other relief to which SPECTRA may be entitled.

JURY DEMAND

SPECTRA hereby respectfully demands trial by jury of all issues so triable.

Respectfully submitted,

Dated: December 6, 2016

GAZDZINSKI & ASSOCIATES, PC
/s/ Adam S. Garson
By: Adam Garson
Attorneys for Plaintiff
Email: adam.garson@gazpat.com