

**IN THE UNITED STATES DISTRICT COURT
FOR THE WESTERN DISTRICT OF TEXAS
AUSTIN DIVISION**

GREENTHREAD, LLC

Plaintiff,

vs.

CIRRUS LOGIC, INC.

Defendant.

Civil Action No. 1:23-cv-369

JURY TRIAL DEMANDED

FIRST AMENDED COMPLAINT FOR PATENT INFRINGEMENT

Plaintiff Greenthread, LLC (“Greenthread” or “Plaintiff”) files this First Amended Complaint against Cirrus Logic, Inc. (“Cirrus Logic” or “Defendant”) hereby alleges as follows:

THE NATURE OF THE ACTION

1. Greenthread owns a family of patents related to transistors and other components of integrated semiconductor devices. Greenthread’s patented inventions describe semiconductor devices that employ graded dopants and well regions for creating electric fields for aiding and/or limiting the movement of carriers to (or from) the semiconductor surface to (or from) the semiconductor substrate. These inventions improve semiconductor devices by (1) creating faster, more efficient, and more reliable processors, logic devices, DRAM and NAND flash, and image sensors and (2) allowing manufacturers to scale down the feature size of their semiconductor products.

2. Defendant has infringed and continues to infringe six Greenthread patents: U.S. Patent Nos. 8,421,195 (the “195 Patent”), 9,190,502 (the “502 Patent”), 10,510,842 (the “842 Patent”), 10,734,481 (the “481 Patent”), 11,121,222 (the “222 Patent”), and 11,316,014 (the

“’014 Patent”), (collectively “the Greenthread Patents”), copies of which are attached hereto as Exhibits 1-6, respectively. Defendant has infringed and continues to infringe the Greenthread Patents by:

- a. making, using, selling, offering for sale, and/or importing into the United States, semiconductor devices with infringing graded dopant regions and/or electronic products containing the same;
- b. incorporating or using the above-described semiconductor devices into electronic products such as laptop computers, desktop computers, and mobile workstations.

THE PARTIES

3. Plaintiff Greenthread, LLC (“Greenthread”) is a limited liability company organized and existing under the laws of Texas, having its principal place of business at 7424 Mason Dells Drive, Dallas, Texas 75230-3244.

4. Defendant Cirrus Logic, Inc. (“Cirrus Logic”) is a corporation organized and existing under the laws of Delaware with its headquarters and principal place of business at 800 West 6th Street, Austin, Texas 78701.

SUBJECT MATTER JURISDICTION

5. This court has subject matter jurisdiction over the patent infringement claims asserted in this case under 28 U.S.C. §§ 1331 and 1338(a).

PERSONAL JURISDICTION, VENUE, AND JOINDER

6. This Court has personal jurisdiction over Defendant Cirrus Logic pursuant to due process and Texas’ long-arm statute, Tex. Civ. Prac. & Rem. Code Ann. §§ 17.041-17.045, which extends jurisdiction as far as the federal constitutional requirements of due process will permit.

7. Cirrus Logic has a regular and established place of business in this District, having its principal place of business in Austin, Texas. On information and belief, Cirrus Logic has

regularly conducted and continues to conduct business in the United States, in the State of Texas, and in this judicial district. On information and belief, Cirrus Logic has committed acts of infringement in Texas and in this judicial district by making, using, offering for sale, and/or selling in the United States and/or importing into the United States, products and systems that infringe upon the Greenthread Patents, or by placing such infringing products and systems into the stream of commerce with the awareness, knowledge, and intent that they would be used, offered for sale, or sold by others in this judicial district and/or purchased by consumers in this district.

8. Venue is proper as to Cirrus Logic pursuant to 28 U.S.C. §§ 1391(b) and 1400(b) because Cirrus Logic has committed, and continue to commit, acts of infringement in this District. Further, Cirrus Logic is domiciled in the State of Texas and this District as an entity with its principal place of business in Austin, Texas.

9. “Cirrus Logic Accused Products” are products accused of meeting the claim limitations of a Greenthread Patent in this suit. Cirrus Logic designs and sells semiconductor devices containing transistors and other structures that infringe the Greenthread Patents in the United States. The infringing structures within semiconductor devices have application in many types of devices designed and sold by Cirrus Logic, including amplifiers¹, decoder and encoder integrated circuits (ICs)², digital-to-analog converters³, analog-to-digital converters⁴, haptic drivers⁵, voice processor ICs⁶, and other ICs.

10. Exhibit 8 demonstrates how exemplary Cirrus Logic Accused Products meet the

¹ https://www.cirrus.com/products/#psearch_T200

² https://www.cirrus.com/products/#psearch_T100

³ https://www.cirrus.com/products/#psearch_T400

⁴ https://www.cirrus.com/products/#psearch_T300

⁵ https://www.cirrus.com/products/#psearch_T800

⁶ https://www.cirrus.com/products/#psearch_T3000

claim limitations of Greenthread Patents and is herein incorporated by reference.

11. On information and belief, the decision to test the infringing designs and incorporate the infringing designs into Cirrus Logic's products were made by employees in this district. Cirrus Logic's Austin headquarters is the nerve center not only of Cirrus Logic's sales team, but also its research, development, and testing of the Cirrus Logic Accused Products.⁷

ITEM 2. Properties

As of March 26, 2022, our principal facilities are located in Austin, Texas and Edinburgh, Scotland, United Kingdom. The Austin facilities, which we own, consist of approximately 155,000 square feet of office space and are primarily occupied by research and development personnel and testing equipment. In addition, our failure analysis and reliability facility occupies approximately 27,000 square feet.

12. For example, Cirrus Logic's U.S. Patent Nos. 10,586,865, 9,919,913, and 9,853,103, pertain to the doping of semiconductor devices and name Austin-based Cirrus Logic employees as inventors. Cirrus Logic is also advertising a "Sr. Analog Design Engineer" position in this district that includes as part of its job responsibilities "transistor-level design."⁸ Cirrus Logic is also advertising a "Senior Analog IC Design Engineer – Power" position in this district that includes "Expertise in ... transistor-level design" among the "Required Skills and Qualifications" for the position.⁹

13. Cirrus Logic sells Cirrus Logic Accused Products directly and indirectly within the United States.¹⁰

⁷ Cirrus Logic, Inc., Form 10-K (May 20, 2022), at 23.

⁸ <https://www.cirrus.com/careers/job-detail/?p=job/ovj6lfwZ>

⁹ <https://www.cirrus.com/careers/job-detail/?p=job/obcfkfwG>

¹⁰ Cirrus Logic, Inc., Form 10-K (May 20, 2022), at 4.

Customers, Marketing, and Sales

We offer products worldwide through both direct and indirect sales channels. Our major customers are among the world's leading electronics manufacturers. We target both large existing and emerging customers that obtain value from our expertise in advanced analog and mixed-signal design processing, systems-level integrated circuit engineering and embedded software development. We derive our revenues from both domestic and international sales. Our domestic sales force includes direct sales offices located primarily in California and Texas. International sales offices and staff are located in Japan, People's Republic of China, Singapore, South Korea, Taiwan, and the United Kingdom. We supplement our direct sales force with external sales representatives and distributors. We have technical support centers in China, South Korea, Taiwan and the United States. Our worldwide sales force

14. For example, Cirrus Logic attributes 80% of its sales to California-based technology company Apple, Inc. and maintains a sales office that is, upon information and belief, only one mile Apple's headquarters in Cupertino, California.¹¹

15. For direct sales of the Cirrus Logic Accused Products, Cirrus Logic also maintains a primary sales office located in Austin, Texas.¹²

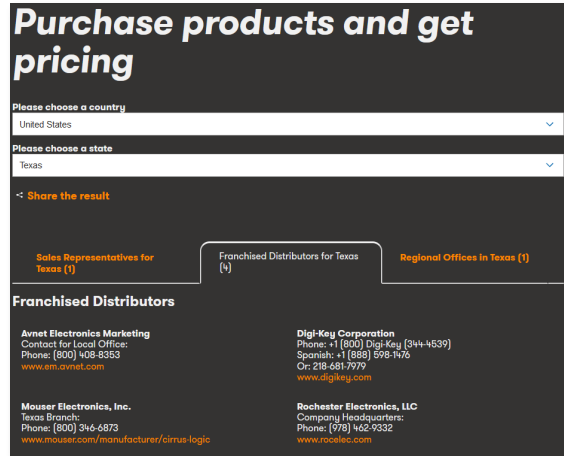
We were incorporated in California in 1984, became a public company in 1989 and were reincorporated in the State of Delaware in February 1999. Our primary facility housing engineering, sales and marketing, and administrative functions is located in Austin, Texas. We also have offices in various other locations in the United States, United Kingdom, the People's Republic of China, South Korea, Japan, Singapore, and Taiwan. Our common stock, which has been publicly traded since 1989, is listed on the NASDAQ's Global Select Market under the symbol CRUS.

16. For indirect sales, Cirrus Logic uses franchised distributors who sell online throughout the United States.

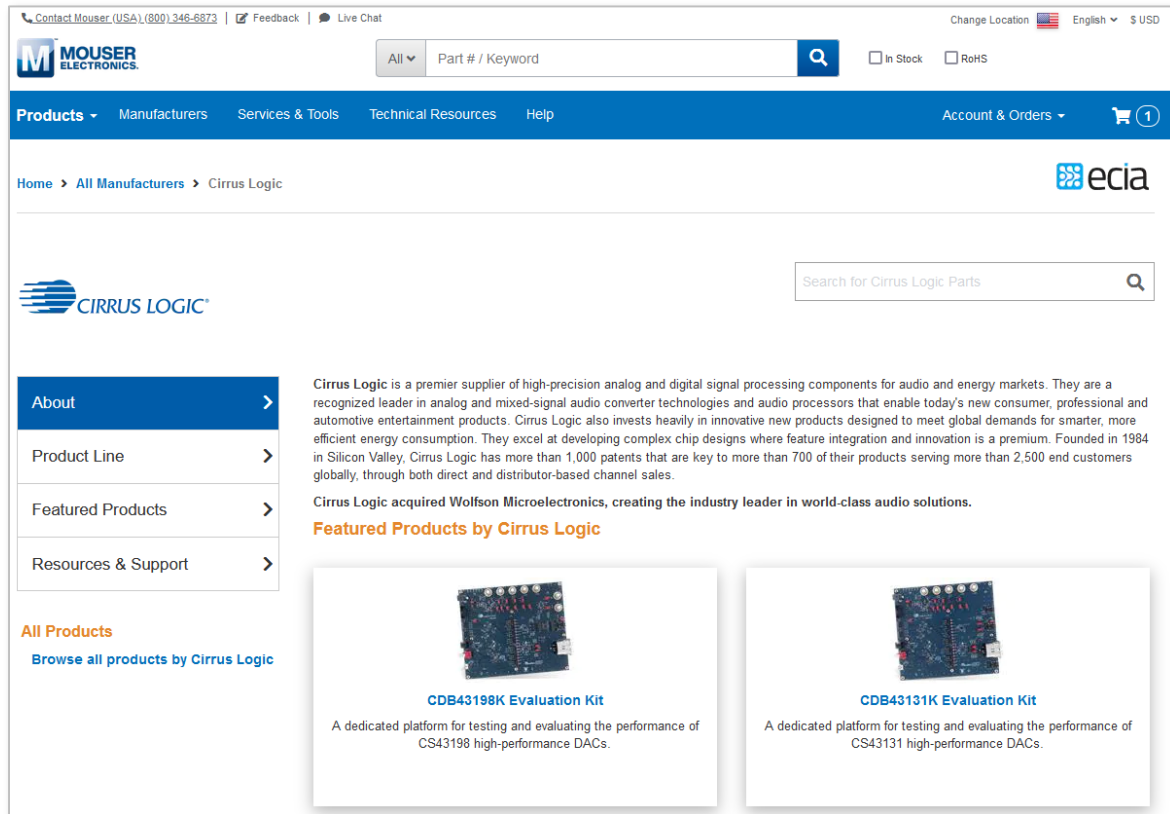
17. For example, one of Cirrus Logic's franchisees is the Texas-based Mouser Electronics. Mouser Electronics's website prominently features Cirrus Logic products, which upon information and belief include the Cirrus Logic Accused Products.

¹¹ Cirrus Logic, Inc., Form 10-K (May 20, 2022), at 4.

¹² Cirrus Logic, Inc., Form 10-K (May 20, 2022), at 3, 4.



Cirrus Logic “Franchised Distributors”
<https://www.cirrus.com/company/contacts/>



Mouser Electronics’ Cirrus Logic Product Page
<https://www.mouser.com/manufacturer/cirrus-logic/>

18. Cirrus Logic has also admitted in other judicial proceedings that it provides

products in the state of Texas and in this District.¹³

8. Cirrus Logic admits that it provides products such as processors and systems-on-chips (“SoCs”) in the state of Texas and in this District. Cirrus Logic denies any and all other allegations of this paragraph.

THE GREENTHREAD PATENTS

19. On April 16, 2013, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 8,421,195 (“the ’195 Patent”), entitled “Semiconductor Devices with Graded Dopant Regions,” listing Dr. Mohan Rao as the inventor, from a patent application filed January 12, 2007. The ’195 Patent claims priority from U.S. Patent Application No. 10/934,915,¹⁴ filed on September 3, 2004. A true and correct copy of the ’195 Patent is attached hereto as Exhibit 1 and incorporated herein by reference.

20. On November 17, 2015, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 9,190,502 (“the ’502 Patent”), entitled “Semiconductor Devices with Graded Dopant Regions,” listing Dr. Mohan Rao as the inventor, from a patent application filed October 16, 2014. The ’502 Patent claims priority from U.S. Patent Application No. 10/934,915,¹⁵ filed on September 3, 2004. A true and correct copy of the ’502 Patent is attached hereto as Exhibit 2 and incorporated herein by reference.

21. On December 17, 2019, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 10,510,842 (“the ’842 Patent”), entitled “Semiconductor Devices with Graded Dopant Regions,” listing Dr. Mohan Rao as the inventor, from a patent application filed

¹³ Defendant Cirrus Logic Inc.’s Answer, *Vantage Micro LLC v. Cirrus Logic Inc.*, 6:19-cv-578-RP [Dkt. 12] (W.D. Tex. Feb. 14, 2020)

¹⁴ Pub. No. US 2006/0049464.

¹⁵ Pub. No. US 2006/0049464.

on May 9, 2017. The '842 Patent claims priority from U.S. Patent Application No. 10/934,915,¹⁶ filed on September 3, 2004. A true and correct copy of the '842 Patent is attached hereto as Exhibit 3 and incorporated herein by reference.

22. On August 4, 2020, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 10,734,481 (“the '481 Patent”), entitled “Semiconductor Devices with Graded Dopant Regions,” listing Dr. Mohan Rao as the inventor, from a patent application filed on December 17, 2019. The '481 Patent claims priority from U.S. Patent Application No. 10/934,915,¹⁷ filed on September 3, 2004. A true and correct copy of the '481 Patent is attached hereto as Exhibit 4 and incorporated herein by reference.

23. On September 14, 2021, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 11,121,222 (“the '222 Patent”), entitled “Semiconductor Devices with Graded Dopant Regions,” listing Dr. Mohan Rao as the inventor, from a patent application filed on July 27, 2020. The '222 Patent claims priority from U.S. Patent Application No. 10/934,915,¹⁸ filed on September 3, 2004. A true and correct copy of the '222 Patent is attached hereto as Exhibit 5 and incorporated herein by reference.

24. On April 26, 2022, the U.S. Patent and Trademark Office duly and legally issued U.S. Patent No. 11,316,014 (“the '014 Patent”), entitled “Semiconductor Devices with Graded Dopant Regions,” listing Dr. Mohan Rao as the inventor, from a patent application filed on July 9, 2021. The '014 Patent claims priority from U.S. Patent Application No. 10/934,915,¹⁹ filed on September 3, 2004. A true and correct copy of the '014 Patent is attached hereto as Exhibit 6 and

¹⁶ Pub. No. US 2006/0049464.

¹⁷ Pub. No. US 2006/0049464.

¹⁸ Pub. No. US 2006/0049464.

¹⁹ Pub. No. US 2006/0049464.

incorporated herein by reference.

25. The '195, '502, '842, '481, '222, and '014 Patents are collectively referred to as the "Greenthread Patents."

26. Greenthread exclusively owns all rights, title, and interest in the Greenthread Patents necessary to bring this action, including the right to recover past and future damages. Certain of the Greenthread Patents were previously owned by Dr. G.R. Mohan Rao ("Dr. Rao"). On April 27, 2015, Dr. Rao assigned to Greenthread the then-issued Greenthread Patents and all related "continuations, continuations-in-part and extensions of said Applications and Patents and any pending applications or issued patents that directly claim or are amended to claim priority to any of the Applications or Patents." Dr. Rao's assignment was recorded with the U.S. Patent and Trademark Office on May 13, 2015, and again on July 22, 2021, and is attached hereto as Exhibit 7. Greenthread has therefore owned all rights to the Greenthread Patents necessary to bring this action throughout the period of Cirrus Logic's infringement and still owns those rights to the Greenthread Patents.

27. Cirrus Logic is not currently licensed to practice the Greenthread Patents.

28. The Greenthread Patents are valid and enforceable.

FACTUAL BACKGROUND

29. Dr. G.R. Mohan Rao ("Dr. Rao"), the sole inventor of the Greenthread Patents, has been an innovator in the semiconductor industry since the 1960s. He is a named inventor on more than 100 Patents worldwide and authored numerous technical publications over the last 50 years.

30. In September 1968, Dr. Rao received a Ph.D. in physics with a specialization in electronics from Andhra University in Waltair, India. He then traveled to the United States to attend a graduate program in physics at the University of Cincinnati.

31. After learning of an opportunity to work with Professor William Carr of Southern

Methodist University (“SMU”), Dr. Rao transferred to SMU where he earned a Ph.D in Electrical Engineering. While there, he worked in the SMU laboratory with Jack Kilby of Texas Instruments (a pioneering electrical engineer who would later receive a Nobel Prize for his work), on metal-oxide-silicon transistors (“MOS devices”), which are used for switching and amplifying electronic signals in electronic devices. MOS devices form the basis of modern electronics and are the most widely used semiconductor devices in the world. The U.S. Patent and Trademark Office has called this device a “groundbreaking invention that transformed life and culture around the world.”²⁰ Dr. Rao built these devices from scratch while a graduate student at SMU.

32. Through his mentor, Jack Kilby, Dr. Rao interviewed with—and was ultimately hired by—Texas Instruments to continue his work on MOS devices in 1972. Dr. Rao worked at Texas Instruments for the next twenty-two years, rising from an engineer to a Senior Fellow. At that time, Texas Instruments had only 12 Senior Fellows out of approximately 20,000 engineers. Eventually, Dr. Rao moved into a management position at Texas Instruments, ultimately becoming a Senior Vice President in 1985.

33. At Texas Instruments, Dr. Rao received his first patent while working in a process and product engineering capacity to solve a production problem with Texas Instruments’ 4-kilobit RAM product. That patent was merely the beginning of Dr. Rao’s long inventive career. Indeed, from the late 1970s through the mid-1980s, Dr. Rao worked on or managed projects relating to Texas Instruments’ 64kb RAM, 256Kb RAM, 1Mb RAM, 4 Mb RAM, EEPROM, SRAM, and microcontrollers. For that work, Dr. Rao received numerous additional U.S. Patents.

34. The USPTO was not the only organization to recognize Dr. Rao’s achievements.

²⁰ <https://www.uspto.gov/about-us/news-updates/remarks-director-iancu-2019-international-lectual-property-conference>

Some of Dr. Rao's work at Texas Instruments was so remarkable that it has been credited in multiple exhibits in the National Museum of American History at the Smithsonian Institution.²¹ For example, the Smithsonian has displayed Texas Instruments' experimental 1-megabit CMOS DRAM, produced in April 1985 under Dr. Rao's leadership, and credited Dr. Rao for the achievement.²²



35. In 1994, Dr. Rao left Texas Instruments for Cirrus Logic. During his two-year tenure at Cirrus Logic, he received more U.S. Patents relating to his work on integrated graphics controllers and memory.

36. In 1996, Dr. Rao started a company called Silicon Aquarius. Through a relationship between Silicon Aquarius and Matsushita, Dr. Rao led a design team in working on a 256Mb

²¹ <http://smithsonianchips.si.edu/texas/wafer.htm>

²² http://smithsonianchips.si.edu/texas/t_360.htm

DRAM chip. After Silicon Aquarius ceased operations, Dr. Rao did consulting work for a number of different consulting companies and devoted much of his free time to thinking about various challenges and problems with which the semiconductor industry had struggled for years.

37. In 2003, Dr. Rao and Philip John founded Greenthread to continue Dr. Rao's pioneering work. A focal point of Dr. Rao's research was poor refresh time and the related problem of how to deal with and control the movement of both wanted and unwanted carriers in semiconductor devices, including memory and logic devices. Dr. Rao realized that graded dopants could be used to create a "drift layer" and other structures to facilitate the movement—in an upward or downward direction, as appropriate—of carriers from the semiconductor surfaces down into the substrate and vice versa. It was Dr. Rao's work on this problem that culminated in the Greenthread Patents.

CIRRUS LOGIC'S INFRINGEMENT

38. Cirrus Logic has directly infringed, and continues to infringe, one or more claims of each of the Greenthread Patents through making, using, offering to sell, selling within the United States, and/or importing into the United States semiconductor products that practice the claimed inventions (*i.e.*, Cirrus Logic Accused Products) including amplifiers, decoder and encoder ICs, digital-to-analog converters, analog-to-digital converters, digital clocks, haptic drivers, rate converters, receivers, transceivers, signal processor ICs, and other ICs.

39. Further, in concert with among others, Apple and Cirrus Logic authorized distributors, Cirrus Logic caused or induced infringing accused products to be made, used, offered to be sold, sold within the United States, and/or imported into the United States. Cirrus Logic has knowledge of the Greenthread patents at least through the service of the Complaint.

40. Specifically, Cirrus Logic has designed and/or incorporated into other products

semiconductor devices for use in mixed-signal and analog processing. The Cirrus Logic Accused Products include semiconductor devices for boosted audio amplifiers, audio codecs, digital-to-analog audio converters, analog-to-digital audio converters, audio digital signal processors, camera controllers, and context-aware haptics and sensing technology, and are further identified in Exhibit 8.

41. As shown in Exhibit 8, transistors in the exemplary Cirrus Logic CLI1793B1 power management integrated circuit (“PIMIC”) meets each and every element of at least one claim of the Greenthread Patents.

42. Upon information and belief, Cirrus Logic designed and sold semiconductor devices using similar designs according to a limited number of processes, many or all of which utilize substantially similar process steps, including process steps for creating regions with graded dopant concentrations. The claimed invention would have application in numerous types of Cirrus Logic products, including amplifiers, decoder and encoder ICs, digital-to-analog converters, analog-to-digital converters, digital clocks, haptic drivers, rate converters, receivers, transceivers, signal processor ICs, and other ICs, because such products would benefit from, among other things, improved switching time. Upon information and belief, the Cirrus Logic Accused Products are in relevant part substantially similar to the exemplary Cirrus Logic CLI1793B1 PIMIC shown in Exhibit 8, particularly with regard to the manner in which the exemplary Cirrus Logic CLI1793B1 PIMIC includes and utilizes regions with graded dopant concentrations. Exhibit 8 is thus illustrative of the manner in which the Cirrus Logic Accused Products meet the claim limitations of the Greenthread Patents.²³

²³ Multiple courts have upheld Greenthread’s construction of the Greenthread Patents in related matters. In *Greenthread, LLC v. Samsung Electronics Co., Ltd. et al.*, Case No. 2:19-cv-00147-JRG (E.D. Tex.), the Eastern District of Texas Court adopted Greenthread’s claim construction.

COUNT I: INFRINGEMENT OF U.S. PATENT NO. 8,421,195

43. Greenthread incorporates by reference and re-alleges all of the foregoing paragraphs of this Amended Complaint and exhibits attached hereto as if fully set forth herein.

44. The following allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Cirrus Logic Accused Products. Greenthread reserves the right to modify this description, including, for example, on the basis of information about the Cirrus Logic Accused Products that it obtains during discovery.

45. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

46. As alleged above and in Exhibit 8, the products analyzed in Exhibit 8 meet each and every one of the claim limitations of at least one claim of the '195 patent.

47. As alleged above, the products analyzed in Exhibit 8 are exemplary of the Cirrus Logic Accused Products.

48. As alleged above, Cirrus Logic has and continues to infringe at least one claim of the '195 patent by making, using, offering to sell, selling within the United States, and/or importing

See Dkt. 67. In *Greenthread, LLC v. Intel Corp., et al.*, Case No. 6:22-cv-00105-ADA (W.D. Tex), the Western District of Texas similarly issued a preliminary claim construction order adopting Greenthread's construction. *See* Dkt. 36-21 in *Greenthread, LLC v. Intel Corp.*, Case No. 3:22-cv-02001-JR (attaching as an exhibit the Western District of Texas's preliminary claim construction order in a status update before the District of Oregon). The claims in this matter against Intel were ultimately severed and transferred to Oregon, and the District of Oregon adopted the Western District of Texas' preliminary claim construction. *See* Dkt. 44 ("The Court also finds that the WDTX's preliminary constructions and summary judgment rulings are neither legally incorrect nor factually distinguishable. As a result, the Court adopts the WDTX's preliminary constructions and summary judgment rulings as its own. . ."). The Western District of Texas also denied Defendants' motions to dismiss and for summary judgment on similar grounds. *See* Dkt. 36-22 in *Greenthread, LLC v. Intel Corp.*, Case no. 3:22-cv-02001-JR (attaching as an exhibit the Western District of Texas' denial of Defendants' motion for summary judgment); Dkt. 110 in *Greenthread LLC v. Intel Corp.*, Case No. 6:22-cv-00105-ADA (W.D. Tex). The District of Oregon similarly adopted these rulings. *See* Dkt. 44 in *Greenthread, LLC v. Intel Corp.*, Case no. 3:22-cv-02001-JR.

into the United States Cirrus Logic Accused Products.

49. As alleged above, Cirrus Logic induced infringement of at least one claim of the '195 Patent by designing and marketing infringing products for sale, use, and importation into the United States.

50. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

COUNT II: INFRINGEMENT OF U.S. PATENT NO. 9,190,502

51. Greenthread incorporates by reference and re-alleges all of the foregoing paragraphs of this Amended Complaint and exhibits attached hereto as if fully set forth herein.

52. The following allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Cirrus Logic Accused Products. Greenthread reserves the right to modify this description, including, for example, on the basis of information about the Cirrus Logic Accused Products that it obtains during discovery.

53. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

54. As alleged above and in Exhibit 8, the products analyzed in Exhibit 8 meet each and every one of the claim limitations of at least one claim of the '502 patent.

55. As alleged above, the products analyzed in Exhibit 8 are exemplary of the Cirrus Logic Accused Products.

56. As alleged above, Cirrus Logic has and continues to infringe at least one claim of the '502 patent by making, using, offering to sell, selling within the United States, and/or importing into the United States Cirrus Logic Accused Products.

57. As alleged above, Cirrus Logic induced infringement of at least one claim of the

'502 Patent by designing and marketing infringing products for sale, use, and importation into the United States.

58. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

COUNT III: INFRINGEMENT OF U.S. PATENT NO. 10,510,842

59. Greenthread incorporates by reference and re-alleges all of the foregoing paragraphs of this Amended Complaint and exhibits attached hereto as if fully set forth herein.

60. The following allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Cirrus Logic Accused Products. Greenthread reserves the right to modify this description, including, for example, on the basis of information about the Cirrus Logic Accused Products that it obtains during discovery.

61. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

62. As alleged above and in Exhibits 8, the products analyzed in Exhibit 8 meet each and every one of the claim limitations of at least one claim of the '842 patent.

63. As alleged above, the products analyzed in Exhibit 8 are exemplary of the Cirrus Logic Accused Products.

64. As alleged above, Cirrus Logic has and continues to infringe at least one claim of the '842 patent by making, using, offering to sell, selling within the United States, and/or importing into the United States Cirrus Logic Accused Products.

65. As alleged above, Cirrus Logic induced infringement of at least one claim of the '842 Patent by designing and marketing infringing products for sale, use, and importation into the United States.

66. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

COUNT IV: INFRINGEMENT OF U.S. PATENT NO. 10,734,481

67. Greenthread incorporates by reference and re-alleges all of the foregoing paragraphs of this Amended Complaint and exhibits attached hereto as if fully set forth herein.

68. The following allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Cirrus Logic Accused Products. Greenthread reserves the right to modify this description, including, for example, on the basis of information about the Cirrus Logic Accused Products that it obtains during discovery.

69. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

70. As alleged above and in Exhibits 8, the products analyzed in Exhibit 8 meet each and every one of the claim limitations of at least one claim of the '841 patent.

71. As alleged above, the products analyzed in Exhibit 8 are exemplary of the Cirrus Logic Accused Products.

72. As alleged above, Cirrus Logic has and continues to infringe at least one claim of the '841 patent by making, using, offering to sell, selling within the United States, and/or importing into the United States Cirrus Logic Accused Products.

73. As alleged above, Cirrus Logic induced infringement of at least one claim of the '481 Patent by designing and marketing infringing products for sale, use, and importation into the United States.

74. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

COUNT V: INFRINGEMENT OF U.S. PATENT NO. 11,121,222

75. Greenthread incorporates by reference and re-alleges all of the foregoing paragraphs of this Amended Complaint and exhibits attached hereto as if fully set forth herein.

76. The following allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Cirrus Logic Accused Products. Greenthread reserves the right to modify this description, including, for example, on the basis of information about the Cirrus Logic Accused Products that it obtains during discovery.

77. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

78. As alleged above and in Exhibit 8, the products analyzed in Exhibit 8 meet each and every one of the claim limitations of at least one claim of the '222 patent.

79. As alleged above, the products analyzed in Exhibit 8 are exemplary of the Cirrus Logic Accused Products.

80. As alleged above, Cirrus Logic has and continues to infringe at least one claim of the '222 patent by making, using, offering to sell, selling within the United States, and/or importing into the United States Cirrus Logic Accused Products.

81. As alleged above, Cirrus Logic induced infringement of at least one claim of the '222 Patent by designing and marketing infringing products for sale, use, and importation into the United States.

82. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

COUNT VI: INFRINGEMENT OF U.S. PATENT NO. 11,316,014

83. Greenthread incorporates by reference and re-alleges all of the foregoing

paragraphs of this Amended Complaint and exhibits attached hereto as if fully set forth herein.

84. The following allegations are based on publicly available information and a reasonable investigation of the structure and operation of the Cirrus Logic Accused Products. Greenthread reserves the right to modify this description, including, for example, on the basis of information about the Cirrus Logic Accused Products that it obtains during discovery.

85. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

86. As alleged above and in Exhibits 8, the products analyzed in Exhibit 8 meet each and every one of the claim limitations of at least one claim of the '014 patent.

87. As alleged above, the products analyzed in Exhibit 8 are exemplary of the Cirrus Logic Accused Products.

88. As alleged above, Cirrus Logic has and continues to infringe at least one claim of the '014 patent by making, using, offering to sell, selling within the United States, and/or importing into the United States Cirrus Logic Accused Products.

89. As alleged above, Cirrus Logic induced infringement of at least one claim of the '014 Patent by designing and marketing infringing products for sale, use, and importation into the United States.

90. Cirrus Logic's infringement has damaged and continues to damage Greenthread in an amount yet to be determined, of at least a reasonable royalty.

DAMAGES

91. As a result of Cirrus Logic's acts of infringement, Greenthread has suffered and continues to suffer actual and consequential damages. However, Greenthread does not yet know the full extent of the infringement and the amount of damages cannot be ascertained except through

discovery and special accounting. To the fullest extent permitted by law, Greenthread seeks recovery of damages at least for reasonable royalties, unjust enrichment, and benefits received by Cirrus Logic as a result of using the patented technology. Greenthread further seeks any other damages to which Greenthread is entitled under law or in equity.

DEMAND FOR JURY TRIAL

92. Greenthread hereby demands a jury trial for all issues so triable.

PRAYER FOR RELIEF

WHEREFORE, Greenthread respectfully requests that this Court enter judgment in its favor as follows:

- A. That Judgment be entered that Defendant has infringed one or more claims of the Greenthread Patents, literally and under the doctrine of equivalents;
- B. That, in accordance with 35 U.S.C. § 283, Defendant and all its affiliates, employees, agents, officers, directors, attorneys, successors, and assigns and all those acting on behalf of or in active concert or participation with any of them, be preliminarily and permanently enjoined from (1) infringing the Greenthread Patents and (2) making, using, selling, and offering for sale, or importing into the United States, the Cirrus Logic Accused Products;
- C. An award of damages sufficient to compensate Greenthread for Defendant's infringement under 35 U.S.C. § 284;
- D. That the case be found exceptional under 35 U.S.C. § 285 and that Greenthread be awarded its reasonable attorneys' fees;
- E. Costs and expenses in this action;
- F. Damages for pre-issuance infringement under 154(d);
- G. An award of prejudgment and post-judgment interest; and

Such other and further relief as the Court may deem just and proper.

Dated: June 16, 2023.

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***ATTORNEYS FOR PLAINTIFF
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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the above and foregoing document has been served on all counsel of record via the Court's ECF system on June 16, 2023.

/s/ Alan L. Whitehurst

Alan L. Whitehurst