Where to Draw the Line between Reverse Engineering and Infringement: Sony Computer Entertainment, Inc.

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Sony Computer Entertainment, Inc. ("Sony") produces and sells the Sony PlayStation ("PlayStation"),[1] a small video game console with hand controls. The PlayStation plays games on compact discs that are inserted into the console and displayed on a television screen.[2] Sony owns the copyright on the software programs that operate the PlayStation known as the basic input-output system or BIOS.[3] Connectix Corporation makes and sells a software program called Virtual Game Station.[4] The Virtual Game Station program is a PlayStation emulator.[5] It emulates the functioning of the PlayStation console on a regular computer.[6] This allows computer owners to buy the Virtual Game Station software and play PlayStation games using their computer rather than use the PlayStation console.[7] The Virtual Game Station program itself does not

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1. The PlayStation system consists of a console (essentially a mini-computer), controllers, and software that allows three-dimensional games to be played on a television set. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 599 (9th Cir. 2000). The PlayStation console itself contains hardware components and software that is known as firmware that is written on to a read-only memory chip. *See id.*

2. *See id.* at 598.

3. *See id.*

4. *See id.*

5. An emulator such as the Virtual Game Station allows a consumer to load the software onto a computer, insert a PlayStation game into the computer's CD-ROM drive, and play the PlayStation game using the computer monitor. The emulator emulates both hardware and firmware components of the Sony console. *See id.* at 599.

6. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 598 (9th Cir. 2000). The Virtual Game Station does not play PlayStation games as well as Sony's PlayStation does because there are sometimes compatibility issues with some games and some computer hardware. At the time of the lawsuit, Connectix had marketed its Virtual Game Station for Macintosh computer systems but had not completed a version of the Virtual Game Station software for Windows PC's. *See id.* at 599.

7. *See id.* at 598.

contain any of Sony's copyrighted material.[8]   However, in the process of producing the Virtual Game Station, Connectix repeatedly copied Sony's copyrighted BIOS during a reverse engineering process that Connectix undertook to determine how the Sony PlayStation functioned.[9]   Sony brought a copyright infringement action against Connectix based upon Connectix's copying of the BIOS software during the reverse engineering process.[10]

During arguments for a preliminary injunction, Connectix admitted that it copied the copyrighted BIOS software during the development of the Virtual Game Station, but contended that doing so was protected as a fair use under 17 U.S.C. § 107.[11] The District Court for the District of Northern California held that: (1) wholesale copying of Sony's BIOS code by Connectix, in order to develop emulation software, was not fair use and (2) Connectix would be enjoined from selling the Virtual Game Station, even though the finished emulator did not contain any copied code.[12]   The district court enjoined Connectix from selling the Virtual Game Station and from copying Sony's BIOS software during development of any other emulator products.[13] The district court impounded all copies of the Sony BIOS held by Connectix and all copies of works based upon or incorporating the Sony BIOS.[14]

Connectix appealed the district court's ruling. The Ninth Circuit Court of Appeals reversed and held: "The intermediate

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8.   *See id.*

9.   *See id.*   In order to reverse engineer the Sony BIOS Connectix engineers purchased a Sony PlayStation console and took the Sony BIOS from a chip inside the console. The engineers then copied the BIOS into the RAM of a computer and observed the functioning of the Sony BIOS in conjunction with the Virtual Game Station hardware emulation software as that hardware emulation software was being developed. *See id.* at 601.

10.   *See id.* at 598.

11.   *See id.* at 602.

12.   *See* Sony Computer Entm't, Inc. v. Connectix Corp., 48 F. Supp.2d 1212, 1224 (N.D.Cal. 1999). In making its determination, the district court held that Connectix's intermediate copying of Sony's code did not result in a transformative end product designed to be compatible with the plaintiff's code, but rather was used to create a complete substitute for the plaintiff's work. *See* Katherine C. Spelman, *Current Developments in Copyright Law 2000,* in UNDERSTANDING BASIC COPYRIGHT LAW 2000, at 25, 104-05 (Practicing Law Institute ed., 2000). The district court also determined that the intermediate copying was substantial. *See id.* at 105.

13.   *See Sony Computer Entm't Inc.*, 48 F. Supp.2d at 1224.

14.   *See* Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 602 (9th Cir. 2000).

copies made and used by Connectix during the course of its reverse engineering of the Sony BIOS were protected [by] fair use, necessary to permit Connectix to make its non-infringing Virtual Game Station function with PlayStation games."[15]

The issue raised by the Ninth Circuit's application of the fair use doctrine to *Sony Computer Entertainment, Inc. v. Connectix Corp.* is whether the intermediate copying of software during the reverse engineering process should be considered fair use under the Copyright Act when the final product contains no infringing code. The inappropriate extension of the fair use doctrine into an area in which it does not belong could leave software developers powerless to stop the use of their software by others to plunder profits that would otherwise belong to the software developer. Alternatively, without the extension of the fair use doctrine into the area of reverse engineering, software developers may be able to receive copyright-like protection of functional elements of their software due to the fact that the functional elements of the software are not directly observable. Therefore, a happy median must be found between these two extremes.

This Comment discusses the holding of the Ninth Circuit in *Sony Computer Entertainment, Inc. v. Connectix Corp.* and determines whether the holding was an appropriate application of the fair use doctrine to the creation of intermediate copies of software using the reverse engineering process. The background section provides the necessary foundation regarding the fair use doctrine, the application of copyright law to software in general, and the cases leading up to *Sony Computer Entertainment, Inc. v. Connectix Corp*. This comment proposes here that the Ninth Circuit correctly applied the fair use doctrine to the case at hand, but that allowing of reverse engineering of software under the fair use doctrine should not be extended further.

I. BACKGROUND

A. COPYRIGHT LAW AND FAIR USE

Article I, Section 8, of the United States Constitution provides that "Congress shall have Power . . . To promote the Progress of Science and useful Arts, by securing for limited

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15. *Id.* at 599.

Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."[16]   This Constitutional provision is set forth in the copyright and patent laws enacted by Congress.   Copyright law protects "original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device."[17]   However, the Copyright Act excludes from copyright protection "any idea, procedure, process, system, method of operation, concept, principle, or discovery, regardless of the form in which it is described, explained, illustrated, or embodied in such work."[18]   As a result, the "mere fact that a work is copyrighted does not mean that every element of the work may be protected."[19]   The protection of copyright law is limited to those aspects of the work—generally termed expression—that display the author's originality.[20]

The primary purpose of copyright law is to increase the distribution of knowledge to the public.[21]   Copyright law is "intended to motivate the creative activity of authors . . . by the provision of a special reward, and to allow the public access to The products of their genius after the limited period of exclusive control has expired."[22]   The ultimate aim of the Copyright Act is "to stimulate artistic creativity for the general public good."[23]   The exclusive rights conferred by the copyright law of the United States are designed to ensure that the contributors of knowledge receive a fair return for their

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16.   U.S. CONST. art. I, § 8, cl. 8.

17.   17 U.S.C. § 102 (1994).   The types of works of authorship that are covered by copyright law include: (1) literary works; (2) musical works, including any accompanying words; (3) dramatic works, including any accompanying music; (4) pantomimes and choreographic works; (5) pictorial, graphic, and sculptural works; (6) motion pictures and other audiovisual works; (7) sound recordings; and (8) architectural works. *See id.* § 102(a).

18.   *Id.* § 102(b).

19.   Atari Games Corp. v. Nintendo of Am., Inc., 975 F.2d 832, 838 (Fed. Cir. 1992) (citing Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 348 (1991)).

20.   *See* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 547 (1985).

21.   *See id.* at 545.

22.   Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 429 (1984).

23.   *Id.* at 432 (citing Fox Film Corp. v. Doyal, 286 U.S. 123, 127 (1932)).

labors.[24]   In other words, the temporary monopoly created by copyright law is designed to reward individual authors in order to benefit the public as a whole.[25]   However, the monopoly privileges that Congress authorizes under the Copyright Act are neither unlimited nor primarily designed to provide a special private benefit.[26]

Section 106 of the Copyright Act confers a collection of exclusive rights to the owner of a copyright.[27]   In general terms, these rights include the exclusive right to publish, copy, and distribute the author's work.[28]   A person that "violates any of the exclusive rights of the copyright owner as provided by sections 106 through 121 . . . is an infringer of the copyright."[29] To prove copyright infringement, the plaintiff must show two elements: (1) ownership of a valid copyright and (2) copying of expression protected by the copyright.[30]   If infringement is found to have occurred, the plaintiff may receive damages, the defendant may be enjoined from future infringing activities, or the infringing articles may be impounded or destroyed.[31]   The copyright owner's exclusive rights, however, are subject to certain statutory exceptions set forth in the Copyright Act.[32]

Among these limitations is Section 107, which codifies the privilege of authors to make "fair use" of an earlier writer's

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24. *See Harper & Row, Publishers*, 471 U.S. at 546 (citing Twentieth Century Music Corp. v. Aiken, 422 U.S. 151, 156 (1975)).

25. *See Sony Corp. of Am.*, 464 U.S. at 477 (Blackmun, J., dissenting)(citing *Twentieth Century Music Corp.*, 422 U.S. at 156).

26. *See id.* at 429.

27.   These rights include the right: (1) to reproduce the copyrighted work in copies or phonorecords; (2) to prepare derivative works based upon the copyrighted work; (3) to distribute copies or phonorecords of the copyrighted work to the public by sale or other transfer of ownership, or by rental lease, or lending; (4) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and motion pictures and other audiovisual works, to perform the copyrighted work publicly; (5) in the case of literary, musical, dramatic, and choreographic works, pantomimes, and pictorial, graphic, or sculptural works, including the individual images of a motion picture or other audiovisual work, to display the copyrighted work publicly; and (6) in the case of sound recordings, to perform the copyrighted work publicly by means of a digital audio transmission. *See* 17 U.S.C. § 106.

28. *See id.*

29. *Id.* § 501(a).

30. *See Sony Computer Entm't*, 48 F. Supp.2d at 1216 (citing Triad Sys. Corp. v. Southeastern Express Co., 64 F.3d 1330, 1335 (9th Cir. 1995)).

31. *See* 17 U.S.C. §§ 502-504.

32. *See* 17 U.S.C. §§ 107-118.

work.[33]   The fair use doctrine has historically been a judge-made exception to the exclusive rights of copyright law, but was codified in the 1976 Copyright Act.[34]   Fair use has traditionally been defined as "a privilege in others than the owner of the copyright to use the copyrighted material in a reasonable manner without his consent."[35]

A rationale for the fair use doctrine has been articulated as:

> [An] author's consent to a reasonable use of his copyrighted works [has] always been implied by the courts as a necessary incident of the constitutional policy of promoting the progress of science and the useful arts, since a prohibition of such use would inhibit subsequent writers from attempting to improve upon prior works and thus . . . frustrate the very ends sought to be attained.[36]

Fundamentally, the traditional concept of fair use permits reasonable unauthorized appropriations from a prior work of another author when the use to which the material is put advances the public benefit in some way.[37]   However, the appropriation must not substantially impair the current or potential value of the first work.[38] The rationale behind the fair use doctrine is that, "when the free flow of information is sufficiently vital, it should override the copyright holder's interest in the exclusive control of the work."[39]   The fair use defense "permits courts to avoid rigid application of the copyright statute when, on occasion, it would stifle the very creativity which that law is designed to foster."[40]

The preamble of Section 107 gives examples of uses that may be considered fair, including "criticism, comment, news reporting, teaching (including multiple copies for classroom

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33. *See* 17 U.S.C. § 107.

34. *See* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 576 (1994).

35. Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 549 (1985) (citing H. BALL, LAW OF COPYRIGHT AND LITERARY PROPERTY 260 (1944)). *See also* Triad Sys. Corp*.,* 64 F.3d at 1336 (citing Narell v. Freeman, 872 F.2d 907, 913 (9th Cir. 1989)).

36. *Harper & Row, Publishers*, 471 U.S. at 549 (citing H. BALL, LAW OF COPYRIGHT AND LITERARY PROPERTY 260 (1944)).

37. *See id.* at 549-51.

38. *See id.* at 550.

39. Advanced Computer Servs. of Mich., Inc. v. MAI Sys. Corp., 845 F. Supp. 356, 364 (E.D.Va. 1994) (citing Hustler Magazine, Inc. v. Moral Majority, Inc., 796 F.2d 1148, 1151-1152 (9th Cir. 1986)).

40. Dr. Seuss Enters. v. Penguin Books USA, Inc., 109 F.3d 1394, 1399 (9th Cir. 1997) (quoting Iowa State Univ. Research Found., Inc. v. Am. Broad. Cos., 621 F.2d 57, 60 (2d Cir. 1980)).

use), scholarship, [and] research."[41]   Fair use requires a balancing of multiple factors "in light of the purposes of copyright."[42] Section 107 states:

> In determining whether the use made of a work in any particular case is a fair use the factors to be considered shall include—(1) the purpose and character of the use, including whether such use is of a commercial nature or is for nonprofit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.[43]

The statutory factors set forth in Section 107 of the 1976 Copyright Act are not exclusive, nor is any one factor determinative in fair use analysis.[44] The statutory factors must be examined on a case-by-case basis[45] and must be considered in light of the purpose of the fair use doctrine, which is "to prevent strict enforcement of the copyright law when its enforcement would inhibit the very Progress of Science and useful Arts that copyright is intended to promote."[46]   Although the four statutory factors identified by Congress are not meant to be exclusive, they are especially relevant in determining whether use is fair.[47]   Other relevant factors may also be considered in a fair use analysis, if necessary, since fair use is an 'equitable rule of reason' to be applied in light of the overall purposes of the Copyright Act.[48]   The analysis under the fair use exception must not "be simplified with bright-line rules, for the statute, like the doctrine it recognizes, calls for case-by-case analysis."[49]   In order to determine whether a defendant's use of copyrighted material may be considered fair use, a court must consider each of the four statutory factors set forth in Section

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41.   17 U.S.C. § 107.

42.   Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 578 (1994).

43.   17 U.S.C. § 107.

44.   *See Campbell*, 510 U.S. at 578.   *See also* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 549 (1985); Rubin v. Brooks/Cole Pub. Co., 836 F. Supp. 909, 916 (D. Mass. 1993).

45.   *See Harper & Row, Publishers*, 471 U.S. at 549.

46.   *Rubin*, 836 F. Supp. at 916 (internal quotation marks omitted)(citing Penelope v. Brown, 792 F.Supp 132, 136 (D.Mass. 1992)).

47.   *See Harper & Row, Publishers*, 471 U.S. at 560.

48.   *See id.   See also Rubin*, 836 F. Supp. at 916.

49.   *Campbell*, 510 U.S. at 577 (citing *Harper & Row, Publishers*, 471 U.S. at 560).

107.[50]

1.   The Purpose and Character of the Allegedly Infringing Use

The first statutory factor that must be considered in a fair use analysis is the purpose and character of the use.[51] Under this factor, the court must consider whether the alleged infringer's work "merely supersedes the objects of the original creation, or instead adds something new, with a further purpose or different character, altering the first with new expression, meaning, or message; it asks, in other words, whether and to what extent the new work is transformative."[52] It is not required that a fair use be transformative, but "the more transformative the new work, the less will be the significance of other factors, like commercialism, that may weigh against a finding of fair use."[53] Although transformative use of a copyrighted work is not necessary for finding a fair use, "the goal of copyright, to promote science and the arts, is generally furthered by the creation of transformative works."[54] If

> the secondary use adds value to the original—if [copyrightable expression in the original work] is used as raw material, transformed in the creation of new information, new aesthetics, new insights and understandings—this is the very type of activity that the fair use doctrine intends to protect for the enrichment of society.[55]

When analyzing the purpose and character of the alleged infringer's use of a copyrighted work, a court often will begin by looking at the preamble of Section 107. The preamble lists as being potentially fair uses, use "for purposes such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research."[56] Although the

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50. *See Campbell*, 510 U.S. at 578.

51. *See* 17 U.S.C. § 107.

52. *Campbell*, 510 U.S. at 579 (internal quotation marks and citations omitted).

53. *Id.*

54. *Id.* (citing Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 455 n.40 (1984)).

55. Castle Rock Entm't, Inc. v. Carol Publ'g Group, Inc., 150 F.3d 132, 142 (2d Cir. 1998) (quoting Pierre N. Leval, *Toward a Fair Use Standard*, 103 HARV. L. REV. 1105, 1105 (1990)).

56. Infinity Broad. Corp. v. Kirkwood, 150 F.3d 104, 107 (2d Cir. 1998) (citing 17 U.S.C. § 107).

categories listed in the preamble "have an 'illustrative and not limitative' function, . . . the illustrative nature of the categories should not be ignored."[57] The uses listed in the preamble "provide only general guidance about the sorts of copying that courts and Congress most commonly had found to be fair uses."[58] As a result, the fact that the use in question falls or does not fall under the examples given in the preamble is not dispositive.

Courts usually consider three underlying factors in their examination of the purpose and character of the alleged infringer's use of a copyrighted work for purposes of the fair use defense: (1) whether the use was productive; (2) whether the use was commercial; and (3) whether the alleged infringer's conduct was proper.[59] However, none of the three factors are determinative.[60] Despite the fact that no one factor is determinative, some courts have argued that "the essence of character and purpose is the transformative value, that is, productive use, of the secondary work compared to the original."[61] A productive use of a copyrighted work is a use that "result[s] in some added benefit to the public beyond that produced by the first author's work."[62] The productive use of a copyrighted work, though not determinative, normally favors a finding of fair use.[63]

The crux of the commercial and non-commercial use distinction is "not whether the sole motive of the use is monetary gain but whether the user stands to profit from exploitation of the copyrighted material without paying the customary price."[64] A commercial use of copyrighted material does not make the use presumptively unfair; rather,

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57. *Id.* (citing Ringgold v. Black Entm't Television, Inc., 126 F.3d 70, 78 (2d Cir. 1997)).

58. *Castle Rock Entm't*, 150 F.3d at 141 (citing *Campbell*, 510 U.S. at 577-78).

59. *See* Rubin v. Brooks/Cole Pub. Co., 836 F. Supp. 909, 916 (D. Mass. 1993).

60. *See* Basic Books, Inc. v. Kinko's Graphics Corp., 758 F. Supp. 1522, 1530 (S.D.N.Y. 1991).

61. *Id.*

62. *Rubin*, 836 F. Supp. at 916 (citing Sony Corp. of Am. v. Universal City Studios, Inc., 464, 478 U.S. 417 (1984) (Blackmun, J., dissenting)).

63. *See Rubin*, 836 F. Supp. at 916 (citing Harper & Row, Publishers, Inc. v. Nation Enters., 471, 561 U.S. 539 (1985)).

64. *Harper & Row, Publishers*, 471 U.S. at 562 (citing Roy Exp. Co. Establishment v. Columbia Broad. Sys., Inc., 503 F. Supp. 1137, 1144 (S.D.N.Y. 1980)).

commercial use is but one of the factors that the court must weigh.[65] A commercial purpose of the use of a copyrighted work does not alone defeat a fair use defense to copyright infringement action.[66] Generally a commercial purpose of the use "tends to weigh against a finding of fair use."[67] However, where the use of the copyrighted work was an intermediate one only, any resulting commercial exploitation of the work was indirect or derivative and the commercial use weighs less heavily against a finding of fair use.[68] In their examination of commercial use, courts are free to consider any public benefit resulting from a particular use regardless of the fact that the alleged infringer made commercial use of the copyrighted material.[69] The benefit to the public need not be direct or tangible, but the challenged use of the copyrighted work must serve the public interest.[70]

2.   The Nature of the Copyright Work Used by the Alleged Infringer

The second statutory factor "calls for recognition that some works are closer to the core of intended copyright protection than others, with the consequence that fair use is more difficult to establish when the former works are copied."[71] The court's inquiry under this factor concerns whether the plaintiff's work is primarily creative as opposed to informational; the defense of fair use has been given greater reach when the work copied is informational in nature.[72] Beyond this, the court should not consider the contents of the copyrighted work, even if the court

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65. *See* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 585 (1994). The Supreme Court expressly rejected the irrebutability of the presumption against fair use in commercial contexts in *Campbell* when the Supreme Court flatly reversed the Sixth Circuit for making just such a presumption.

66. *See* Consumers Union of United States, Inc. v. General Signal Corp., 724 F.2d 1044, 1049 (2d Cir. 1983) (citing Triangle Publications, Inc. v. Knight-Ridder Newspapers, Inc. 626 F.2d 1171, 1175 (5th Cir. 1980)).

67. *Campbell*, 510 U.S. at 585.

68. *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1522 (9th Cir. 1992).

69. *See* Hustler Magazine, Inc. v. Moral Majority, Inc., 796 F.2d 1148, 1148, 1153 (9th Cir. 1986) (citing MCA, Inc. v. Wilson, 677 F.2d 180, 182 (2d Cir. 1981)).

70. *See id.*

71. *Campbell*, 510 U.S. at 586.

72. *See* Hustler Magazine, Inc. v. Moral Majority, Inc., 606 F. Supp. 1526, 1536 (C.D. Cal. 1985).

finds the material objectionable.[73]   Works such as works of fiction receive greater protection than factual works and works which have strong factual elements, such as historical or biographical works.[74]   Factual works, such as biographies, reviews, factual compilations, criticism, and commentary, are "believed to have a greater public value and, therefore, uses of them may be better tolerated by the copyright law."[75]   To the extent that the copyrighted work is "functional or factual, it may be copied, as may those expressive elements of the work that 'must necessarily be used as incident to' expression of the underlying ideas, functional concepts, or facts."[76]

3. The Amount and Substantiality of the Portion of the Work Used by the Alleged Infringer

The third statutory factor considers the amount of the copyrighted work copied by the alleged infringer and the substantiality of the portion copied.[77]   "There are no absolute rules as to how much of a copyrighted work may be copied and still be considered a fair use."[78]   Therefore, the third statutory factor considers "not only the percentage of the original used but also the 'substantiality' of that portion to the whole of the work; that is, courts must evaluate the qualitative aspects as well as the quantity of material copied."[79]   "The court must weigh the significance of the copying both in terms of the quantity and quality of the alleged infringement."[80]   In other words, the court must take into account how much of the copyrighted work was taken and whether that portion was an

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73. *See id.*

74. *See* Maxtone-Graham v. Burtchaell, 803 F.2d 1253, 1263 (2d Cir. 1986).

75. Basic Books, Inc. v. Kinko's Graphics Corp. 758 F. Supp. 1522, 1533 (S.D.N.Y. 1991) (citing Salinger v. Random House, Inc., 811 F.2d 90, 96 (2d Cir. 1987)).

76. Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1524 (9th Cir. 1992) (citing Baker v. Selden, 101 U.S. 99, 102-04 (1879) (internal quotations and citations omitted)).

77. *See* 17 U.S.C. § 107(3) (1994).

78. *Maxtone-Graham*, 803 F.2d at 1263.

79. *Basic Books*, 758 F. Supp. at 1533 (citing New Era Publ'ns v. Carol Publishing Group, 904 F.2d 152, 158 (2d Cir. 1990)).

80. Hustler Magazine, Inc. v. Moral Majority, Inc., 606 F. Supp. 1526, 1537 (C.D. Cal. 1985) (citing Marcus v. Rowley, 695 F.2d 1171, 1176 (9th Cir. 1983)).

essential element of the plaintiff's work.[81]   In general, the greater the amount of the copyrighted work used, the less likely it is that the fair use exception is applicable.[82]   However, even the copying of an entire work does not preclude fair use,[83] although it does weigh against a finding of fair use.[84]   As a result, questions of fair use often turn on qualitative assessments of the content copied.[85]   A small portion "which is 'the heart of' a work may not be fair use and a longer piece which is pedestrian in nature may be fair use."[86]   However, in a case of intermediate infringement where the final product does not contain infringing material, this factor is of "very little weight."[87]

4.   The Effect of the Alleged Infringer's Use upon the Potential Market for the Copyrighted Work

The final statutory factor is "the effect of the use upon the potential market for or value of the copyrighted work."[88]   This factor takes into account "not only the extent of market harm caused by the particular actions of the alleged infringer, but also whether unrestricted and widespread conduct of the sort engaged in by the defendant . . . would result in a substantially adverse impact on the potential market for the original."[89]   Fair use of a copyrighted work, when properly applied, is "limited to copying by others which does not materially impair the marketability of the work which is copied."[90]   This factor has

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81.   *See id.* (citing *Marcus*, 695 F.2d at 1176).

82.   *See* Ass'n of Am. Med. Coll. v. Mikaelian, 571 F. Supp. 144, 153 (E.D. Pa. 1983) (citing Walt Disney Productions v. Air Pirates, 581 F.2d 751, 756 (9th Cir. 1978)).

83.   *See Sony Corp. of Am.*, 464 U.S. 417, 449-50 (1984).

84.   *See Advanced Computer Servs. of Mich.*, 845 F. Supp. at 366. *See also* Sundeman v. Seajay Soc'y, Inc., 142 F.3d 194, 205 (4th Cir. 1998) (citing *Advanced Computer Servs. of Mich.*, 845 F. Supp. at 365-66).

85.   *See* Maxtone-Graham v. Burtchaell, 803 F.2d 1253, 1263 (2d Cir. 1986).

86.   *Basic Books*, 758 F. Supp. at 1533.

87.   *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1526-27 (9th Cir. 1992)

88.   *See* 17 U.S.C. § 107(4) (1994).

89.   *See* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 590 (1994) (quoting M. NIMMER & D. NIMMER, 3 NIMMER ON COPYRIGHT, § 13.05[A][4], at 13-102.61 (1993)).

90.   Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 566-67 (1985) (citing M. NIMMER & D. NIMMER, 1 NIMMER ON COPYRIGHT, §

been said to be "undoubtedly the single most important element of fair use."[91] Analysis of the effect on the market for a copyrighted work requires a balancing of the benefit that the public will derive if the use is permitted against personal gain that the copyright owner will receive if the use is denied.[92] A possibility of harm to the copyrighted work arises if the defendant's use would tend to diminish the sales of the plaintiff's work, interfere with its marketability, or fulfill the demand for the original.[93] In simple terms, the use of a protected work that destroys the value of the copyrighted work to the copyright holder cannot be considered fair.[94] "[A] work that merely supplants or supersedes another is likely to cause a substantially adverse impact on the potential market of the original, [but] a transformative work is less likely to do so."[95] Therefore, there is a presumption that market harm will occur when there is direct duplication for a commercial purpose, but there is no presumption or inference of market harm that is applicable to cases involving something other than mere duplication for commercial purposes.[96]

The inquiry into the final statutory factor "must take account not only of harm to the original but also of harm to the market for derivative works."[97] A derivative work is defined as "a work based upon one or more preexisting works, such as a translation, musical arrangement, dramatization, fictionalization, motion picture version, sound recording, art reproduction, abridgment, condensation, or any other form in which a work may be recast, transformed, or adapted."[98] Even though "derivative works that are subject to the author's copyright transform an original work into a new mode of

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1.10[D], at 1-87 (1984)).

91. *Id.* at 566 (citing M. NIMMER & D. NIMMER, 3 NIMMER ON COPYRIGHT, § 13.05[A], at 13-76 (1984)).

92. *See* MCA, Inc. v. Wilson, 677 F.2d 180, 183 (2d Cir. 1981).

93. *See* Hustler Magazine, Inc. v. Moral Majority, Inc., 606 F. Supp. 1526, 1539 (C.D. Cal. 1985) (citing Encyclopaedia Britannica Educ. Corp. v. Crooks, 542 F. Supp. 1156, 1169 (W.D.N.Y. 1982)).

94. *Ass'n of Am. Med. Coll.*, 571 F. Supp. 144, 153 (E.D. Pa. 1983) (citing Meeropol v. Nizer, 560 F.2d 1061, 1069-71 (2d Cir. 1977)).

95. *Sony Computer Entm't,* 203 F.3d at 607 (Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 591 (1994)).

96. *See Campbell*, 510 U.S. at 591.

97. Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 568 (1985) (citing Iowa State Univ. Research Found., Inc. v. Am. Broad. Cos., 621 F.2d 57, 60 (2d Cir. 1980)).

98. 17 U.S.C. § 101 (1994).

presentation, such works—unlike works of fair use—take expression for purposes that are not 'transformative'."[99] Markets for derivative works are those markets "that creators of original works would in general develop or license others to develop."[100]

Even if the copying in question results in an adverse impact on the potential market for the original work, fair use is not precluded if the use "simply enables the copier to enter the market for works of the same type as the copied work."[101] This is because an "attempt to monopolize the market by making it impossible for others to compete runs counter to the statutory purpose of promoting creative expression and cannot constitute a strong equitable basis for resisting the invocation of the fair use doctrine."[102]

B. COPYRIGHT PROTECTION OF SOFTWARE PROGRAMS

The issue of the scope and strength of copyright protection of computer programs has been extremely important in recent years, primarily due to the increase in the size and importance of the software industry. Courts have found it increasingly difficult to address the copyright issues surrounding the protection of software because of the idea/expression duality inherent to software programs.

The issues surrounding the protection of computer programs under copyright law are particularly difficult to deal with because "computer programs are, in essence, utilitarian articles—articles that accomplish tasks."[103] As a result, "they contain many logical, structural, and visual display elements that are dictated by the function to be performed, by considerations of efficiency, or by external factors such as compatibility requirements and industry demands."[104] Although "there are certainly creative aspects within any particular program, there are also those functional aspects

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99. Castle Rock Entm't v. Carol Publ'g Group, 150 F.3d 132, 143 (2d Cir. 1998).

100. *Campbell*, 510 U.S. at 592.

101. Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1523 (9th Cir. 1992).

102. *See id.* at 1523-24.

103. *Id.* at 1524.

104. *Id*. (citing Computer Assoc. Int'l, Inc. v. Altai, 982 F.2d 693, 705-08 (2d Cir. 1992)).

necessary to perform the given task which will not enjoy copyright protection."[105]   Courts generally have come to the conclusion that "the literal elements of computer programs, i.e., their source and object codes, are the subject of copyright protection."[106]   Therefore the object code[107] of a program may be copyrighted as expression,[108] but the ideas and functional elements contained in the object code are not entitled to copyright protection.[109]   As a result, when there has been literal copying of a copyrighted program, there is no question that copyright infringement has occurred.   The defendant is then liable for that infringement unless the copying falls within the fair use doctrine.   On the other hand, when there has been no literal infringement of the computer program the question of whether or not infringement actually occurred is more complicated.   As a result, courts must look to certain tests to determine whether the copyright of a program was infringed upon.

One test used by courts to determine whether infringement has occurred in a software copyright infringement case is the "abstraction-filtration-comparison" test.[110]   In this approach, the court first looks at the "abstraction" of the computer program, which is a breakdown of "the allegedly infringed program into its constituent structural parts."[111]   Next, the court examines "each of these parts for such things as incorporated ideas, expression that is necessarily incidental to those ideas, and elements that are taken from the public domain"[112] and would eliminate all non-protectable material from consideration of infringement.   Finally, the court would compare the allegedly infringed program with the allegedly infringing program and determine if infringement in fact had occurred.[113]

The Ninth Circuit, in *Dr. Seuss Enterprises, L.P. v.*

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105. DSC Communications Corp. v. DGI Tech., Inc., 898 F. Supp. 1183, 1190 (N.D. Tex. 1995) (citing Lotus Dev. Corp. v. Borland Int'l, 49 F.3d 807, 815-19 (1st Cir. 1995)).

106. Computer Assoc. Int'l, Inc. v. Altai, 982 F.2d 693, 702 (2d Cir. 1992).

107. Object code is the binary code of the computer program that the computer "runs" when it executes the program. Object code cannot be read by humans. *See Sony Computer Entm't*, 203 F.3d at 602.

108*. See* 17 U.S.C. § 102(a) (1994).

109*. See id.* § 102(b).

110*. See Computer Assoc. Int'l*, 982 F.2d at 706-12.

111*. Id*. at 706-07.

112*. Id*.

113. *See id.* at 710.

Penguin Books USA, Inc., developed a similar test referred to as the "extrinsic-intrinsic" test.[114] The court first used "analytic dissection to determine the scope of copyright protection before [the] works are considered 'as a whole.'"[115] Analytic dissection looks at each element of each work in isolation from all of the other elements, combinations of elements, and expression of elements within the program.[116] The court then determined whether there was a similarity of ideas between the two programs in question, the extrinsic portion of the test.[117] The second part of the test, the intrinsic portion, asked "if an 'ordinary reasonable person' would perceive a substantial taking of protected expression."[118] Using these two parts of the test, the court then determined whether the copying of the portions of the computer program in question constituted infringement.

In some cases, even the direct, literal copying of a computer program may be allowed under the fair use doctrine. Since the object code cannot be read by humans, the "unprotected ideas and functions of the code . . . are frequently undiscoverable in the absence of investigation and translation that may require copying the copyrighted material."[119] Even if a software developer's final product does not contain copied computer code, oftentimes the developer must use reverse engineering to determine how a particular computer program functions. In such a case, intermediate copies of the computer program must be made in computer memory or in some other form, such as a printout of disassembled code. Such intermediate copying may constitute copyright infringement even when the end product did not itself contain copyrighted material,[120] but the intermediate copying could also be protected as a fair use if it was necessary to gain access to the

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114. *See* Dr. Seuss Enters. v. Penguin Books USA, Inc., 109 F.3d 1394, 1398 (9th Cir. 1997). *See also* Sid & Marty Krofft Television Prods., Inc. v. McDonald's Corp., 562 F.2d 1157, 1164 (9th Cir. 1977).

115. *See Dr. Seuss Enters.*, 109 F.3d at 1398 (quoting Apple Computer Inc. v. Microsoft Corp., 35 F.3d 1435, 1442-43 (9th Cir. 1994)).

116. *See Dr. Seuss Enters.*, 109 F.3d at 1398 n.3.

117. *See id.* at 1398. *See also Sid & Marty Krofft Television Prods.*, 562 F.2d at 1164.

118. *Dr. Seuss Enters.*, 109 F.3d at 1398. *See also Sid & Marty Krofft Television Prods.*, 562 F.2d at 1164.

119. *Sony Computer Entm't*, 203 F.3d at 602.

120. *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1519 (9th Cir. 1992).

functional elements of the software itself.[121]   Where there is a legitimate reason for a developer to study or examine the unprotected functional aspects of a copyrighted program and there are no other means to do so, the disassembly of the program involved is considered a fair use under the fair use doctrine.[122]

C.   REVERSE ENGINEERING

"Reverse engineering is the process of starting with a finished product and working backwards to analyze how the product operates or how it was made."[123]   Software developers designing a program that "must be compatible with a copyrighted product frequently must 'reverse engineer' the copyrighted product to gain access to the functional elements of the copyrighted product."[124]   During the manufacture of a computer program, a program written in source code by a programmer is translated into object code using a computer program called an assembler or compiler, and then copied onto some type of storage medium, such as a silicon chip, a compact disk, or a floppy disk.[125]   Devices or programs called disassemblers or decompilers can reverse this process by interpreting the electronic signals that are produced while the program is being run, "storing the resulting object code in computer memory, and translating the object code into source code."[126]   The devices that assemble and disassemble programs are widely available and are commonly used within the software industry.[127]   There are four typical ways to reverse engineer a piece of software: (1) read about the program in available literature; (2) observe the program in operation by using it on the computer and observing the output on the computer screen; (3) perform a static examination of the instructions contained within the program; or (4) perform a

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121.   *See id.* at 1524-26.
122.   *See id.* at 1527-28.
123.   Secure Servs. Tech., Inc. v. Time & Space Processing, 722 F. Supp. 1354, 1361 n.16 (E.D. Va. 1989).
124.   *Sony Computer Entm't*, 203 F.3d at 599 (citing Andrew Johnson-Laird, *Software Reverse Engineering in the Real World*, 19 U. DAYTON L. REV. 843, 845-46 (1994)).
125.   *See Sega Enters.*, 977 F.2d at 1514 n.2.
126.   *Id*.
127.   *See id.*

dynamic examination of instructions as the program is being run on a computer.[128]

In the first method of reverse engineering, the developer gathers and reads all available literature regarding the computer program, such as the documentation included with the program and any other documentation available from the software's manufacturer. This method of reverse engineering is the least effective, because "[d]ocumentation, by its very nature and the manner of its production, is always incomplete, inaccurate, and out-of-date when compared to the actual software itself."[129]

The second, third, and fourth methods require the developer seeking access to the program code to load the target program onto a computer, an activity "that necessarily involves copying the copyrighted program into the computer's random access memory or RAM."[130] The second method of reverse engineering, observation of the program while being run, may take several forms.[131] The "ideas and functional concepts underlying many types of computer programs, including word processing programs, spreadsheets, and video game displays, are readily discernible without the need for disassembly, because the operation of such programs is visible on the computer screen."[132] In such cases it is relatively easy for a person to observe the external expression of the object code and determine how the object code operates.[133] The functional elements of other programs that run in the background, such as basic input-output system programs and operating systems, cannot be readily be seen during the operation of the program because they create little or no helpful display on the computer screen. One of the other methods used to observe the operation of these programs is to run the program in an emulated environment and observe the operation of the program through the use of another program known as a "debugger."[134] However,

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128. *See* Andrew Johnson-Laird, *Software Reverse Engineering in the Real World*, 19 U. DAYTON L. REV. 843, 846 (1994).

129. *Id*. This can clearly be seen by the fact that most software programs include a "Readme" file, or a similar file, that contains all of the errors in and changes made to the documentation of the program after the manual was made.

130. *Sony Computer Entm't*, 203 F.3d at 600.

131. *See id.*

132. *Sega Enters.,* 977 F.2d at 1520.

133. *See Sony Computer Entm't*, 203 F.3d at 600.

134. *See id.*

regardless of the method of observation used, "[t]he software program is copied each time the engineer boots up the computer, and the computer copies the program into RAM."[135] Therefore, a direct copy is made of the computer program, but all the copying may be intermediate; that is, the final product may not contain any of the copyrighted material.[136]

The third and fourth methods of reverse engineering constitute true disassembly of the object code into source code.[137] The "need to disassemble object code arises only in connection with operations systems, system interface procedures, and other programs that are not visible to the user when operating—and then only when no alternative means of gaining an understanding of those ideas and functional concepts exists."[138] When using either of these methods, developers use a disassembler "to translate the ones and zeros of binary machine-readable object code into the words and mathematical symbols of source code."[139] This translated source code is similar to, but not exactly the same as, the original source code since it does not contain the annotations added by the program that explain the functioning of the source code.[140] In the third method of reverse engineering, the static examination of computer instructions, a developer disassembles the object code for all or part of the program without running the program itself.[141] During this process, the program usually has to be copied one or more times to facilitate disassembly.[142]

In the fourth method of reverse engineering, dynamic examination of computer instructions, a developer uses a disassembler to disassemble a part of the program, one set of instructions at a time, while the program is in operation.[143] Like the third method, this method requires that several intermediate copies of the program be made. The particular number of copies that are made during this process depends upon how the disassembly is completed. As a result, during the

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135. *Id.*

136. *See id.*

137. *See id.*

138. Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1520 (9th Cir. 1992).

139. *See Sony Computer Entm't*, 203 F.3d at 600.

140. *See id.* Software is generally written by programmers in source code format and then compiled into object code.

141. *See id.*

142. *See id.*

143. *See id.*

reverse engineering of a program using the third or fourth methods, a direct copy is made of the computer program, but all the copying is intermediate.[144]

II. CASE DESCRIPTION

In reaching its decision in *Sony Computer Entertainment, Inc. v. Connectix Corp.*, the Ninth Circuit looked at the four factors listed in Section 107: (1) the purpose and character of the use; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used; and (4) the effect of the use upon the potential market.[145] The court first determined that Sony owned a valid copyright for its BIOS code[146] and, based upon Connectix's admission, that copying had occurred.[147] The Ninth Circuit then went on to analyze each factor in Section 107 in turn.

The Ninth Circuit determined that the repeated intermediate copying of Sony's BIOS, in order to observe its operation, was necessary to access unprotected elements of the program for purposes of fair use analysis. The court also concluded that the large numbers of copies made by Connectix did not weigh heavily against fair use, even though Connectix could have made fewer copies by disassembling the entire BIOS.[148] The court first determined that the trial court erred in holding that Connectix's commercial purpose in copying the Sony BIOS resulted in a "presumption of unfairness that . . . can be rebutted by the characteristics of a particular commercial use."[149] Instead, the court stated that the correct legal standard was that a commercial purpose is only a "separate factor that tends to weigh against a finding of fair use."[150] The court found that Connectix's commercial use of the copyrighted material from Sony's BIOS was an intermediate one, and "thus was only indirect or derivative."[151] The court

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144. *See Sony Computer Entm't*, 203 F.3d at 600.

145. *See* 17 U.S.C. § 107.

146. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 599 (9th Cir. 2000).

147. *See id.* at 602.

148. *See id.* at 603-05.

149. *Id*. at 606.

150. *Campbell v. Acuff-Rose Music, Inc.*, 510 U.S. 569, 585 (1994).

151. *Sony Computer Entm't,* 203 F.3d at 607 (citing Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1522 (9th Cir. 1992)).

determined that "Connectix reverse-engineered the Sony BIOS to produce a product that would be compatible with games designed for the Sony PlayStation,"[152] a purpose that has been recognized "as a legitimate one under the first factor of the fair use analysis."[153]   The court went on to find that Connectix's Virtual Game Station was "modestly transformative,"[154] in contrast to the district court's holding that Connectix's intermediate copying of Sony's BIOS code did not result in a transformative end product designed to be compatible with the plaintiff's code, but instead was assigned to create a substitute for the Sony's work.[155] The court determined that:

> [t]he product creates a new platform, the personal computer, on which consumers can play games designed for the Sony PlayStation. This innovation affords opportunities for game play in new environments, specifically anywhere a Sony PlayStation console and television are not available, but a computer with a CD-ROM drive is. More important[ly], the Virtual Game Station itself is a wholly new product, notwithstanding the similarity of uses and functions between the Sony PlayStation and the Virtual Game Station. The expressive element of software lies as much in the organization and structure of the object code that runs the computer as it does in the visual expression of that code that appears on a computer screen.[156]

The Virtual Game Station itself contained no code that infringed on Sony's copyright.[157] Therefore, the court was "at a loss to see how Connectix's drafting of entirely new object code for its [Virtual Game Station] program could not be transformative, despite the similarities in function and screen output."[158] Based on these findings, the Ninth Circuit held that this factor favored Connectix.[159]

The Ninth Circuit then looked at the nature of Sony's BIOS in the realm of copyright. The court determined that Sony's BIOS fell at a distance from the core of copyright protection

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152. *Id.*
153. *Id.* (citing Sega Enters., 977 F.2d at 1522).
154. *Sony Computer Entm't*, 203 F.3d at 606.
155. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 48 F. Supp. 2d 1212, 1219-20 (N.D.Cal. 1999)
156. Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 606 (9th Cir. 2000)
157. *See id.*
158. *Id.* at 606-07.
159. *See id.* at 607.

because it contained unprotected aspects that could not be examined without copying.[160]   Therefore, the court accorded Sony's BIOS a "lower degree of protection than more traditional literary works."[161]

Although Sony's BIOS contained unprotected functional elements, Connectix could not gain access to the unprotected elements without copying the Sony BIOS.[162]   There was little publicly available technical information about the functionality of the Sony BIOS and, since Sony's BIOS was an internal operating system, the functioning of the program did not produce a screen display that could be observed.[163]   In order to gain access to the functional elements of the BIOS, Connectix was required to access the elements "through a form of reverse engineering that required copying the Sony BIOS onto a computer."[164]   Connectix employed several methods of reverse engineering, namely observation and observation with partial disassembly, "each of which required Connectix to make intermediate copies of copyrighted material."[165]   However, the court determined that "[n]either of these methods renders fair use protection inapplicable."[166]   In addition, the court determined that the specific method of reverse engineering was irrelevant because "intermediate copying is the gravamen of the intermediate infringement claim, and [because] both methods of reverse engineering require it, [the court found] no reason inherent in these methods to prefer one to another as a matter of copyright law."[167]

The court dismissed Sony's argument that Connectix's creation of more intermediate copies than would have been required by different methods of reverse engineering should cause this factor to weigh against fair use because the necessity that was "addressed in *Sega* was the necessity of the method, i.e. disassembly, not the necessity of the number of times that method was applied."[168]   The court determined that the district

160. *See id.* at 603 (citing Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1526 (9th Cir. 1992)).

161. *Sony Computer Entm't*, 203 F.3d at 603 (quoting *Sega Enters.*, 977 F.2d at 1526).

162. *See id.*

163. *See id.*

164. *Id.*

165. *Id.*

166. *Sony Computer Entm't*, 203 F.3d at 603.

167. *Id.* at 604.

168. *Id.* at 605 (citing Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510,

court erred in finding that this factor favored Sony because "[w]ithin the limited context of a claim of intermediate infringement, [the court found] the semantic distinction between 'studying' and 'use' to be artificial, and decline[d] to adopt it for purposes of determining fair use."[169] Based on these findings, the Ninth Circuit found that this factor favored Connectix since the "intermediate copying in this manner was 'necessary'."[170]

In its analysis of the amount and substantiality of Connectix's use, the Ninth Circuit found that Connectix had disassembled portions of the Sony BIOS and copied the entire program multiple times.[171] Therefore, the court determined that this factor favored Sony and weighed against a finding of fair use.[172] However, the court also held that "in a case of intermediate infringement when the final product itself does not itself contain infringing material, this factor is of 'very little weight'."[173]

The final factor that the Ninth Circuit looked to in its fair use analysis of Connectix's copying of Sony's BIOS was the effect on the market for the Sony PlayStation. The Ninth Circuit determined that the Virtual Game Station did not merely supplant Sony's game consoles, despite the similarities between the operation of the program and the hardware console, but instead created a whole new platform for PlayStation games.[174] The court concluded that it was possible that Sony will lose console sales and profits due to the sale of the Virtual Game Station.[175] However, since the Virtual Game Station was transformative, and "does not merely supplant the PlayStation console, the Virtual Game Station is a legitimate competitor in the market for platforms on which Sony and Sony-licensed games can be played."[176] Therefore, "some economic loss by Sony as a result of this competition does not compel a finding of no fair use."[177] The Ninth Circuit

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1524-26 (9th Cir. 1992)).

169. *Id.* at 604.
170. *Id.*
171. *See Sony Computer Entm't*, 203 F.3d at 606.
172. *See id.*
173. *Id.*
174. *See id.* at 606-607.
175. *See Sony Computer Entm't*, 203 F.3d at 607.
176. *Id.*
177. *Id.*

determined that, although Sony was likely to lose sales as a result of the introduction of the Virtual Game Station on the market, this factor favored a finding of fair use because the Virtual Game Station was a legitimate competitor in the market for platforms on which PlayStation games could be played.[178]

The Ninth Circuit found that three of the statutory fair use factors favored Connectix, while one favored Sony and that factor was "of little weight" because the final product contained no infringing code.[179]   The Ninth Circuit determined that "Connectix's intermediate copying of the Sony BIOS during the course of its reverse engineering of the product was a fair use under 17 U.S.C. § 107, as a matter of law."[180]   In addition, the court concluded "there is a legitimate public interest in the publication of Connectix's software."[181]   The Ninth Circuit concluded that the intermediate copying of Sony's BIOS was necessary to access unprotected functional elements of the BIOS and was a fair use.

As a result of the Ninth Circuit's ruling, a process that is widely used within the software industry, and whose legality had yet to be determined, was found to be a fair use of copyrighted material.   The court's holding reiterated and clarified the court's prior decision in *Sega Enterprises Ltd. v. Accolade, Inc.*,[182] which held that "[w]here there is good reason for studying or examining the unprotected aspects of a copyrighted computer program, disassembly for purposes of such study or examination constitutes a fair use."[183]   The Ninth Circuit's holding in *Sega* left open the possibility that the use of disassembly or an equivalent form of reverse engineering to study or examine a computer program for the purpose of making a compatible product might not be a fair use.[184]   The court's subsequent holding in *Sony Computer Entertainment, Inc. v. Connectix Corp.* eliminated the confusion surrounding the legality of the commercial use of information gathered

178.   *See id.* at 607-08.

179.   *See Sony Computer Entm't*, 203 F.3d at 608.

180.   *Id.*

181.   *Id.* at 608 n.11.

182.   977 F.2d 1510 (9th Cir. 1992).

183.   *Sega Enters.*, 977 F.2d at 1520.

184.   The confusion regarding the exact limits of the Ninth Circuit's holding in *Sega* is evident in the district court's decision in this case.   *See* Sony Computer Entm't, Inc. v. Connectix Corp., 48 F. Supp.2d 1212, 1220 (N.D. Cal. 1999).

during reverse engineering of a computer program. As a consequence, the protection of the non-functional, creative elements of computer programs has been left intact but the software industry may continue to use reverse engineering to aid in its development of compatible products without the worry of facing liability for copyright infringement.

III. ANALYSIS

In order to analyze the Ninth Circuit's decision in *Sony Computer Entertainment, Inc. v. Connectix Corp.*, one must apply copyright law and the fair use doctrine to the facts of the case.

The first step is to determine whether the Sony BIOS falls under the protection of the copyright law. The object code[185] of the Sony BIOS undoubtedly is protected by copyright as expression,[186] because the Copyright Act does not "require that a work be directly accessible to humans in order to be eligible for copyright protection."[187] The functional elements of the BIOS, likewise, undoubtedly fall outside the scope of copyright protection.[188] Under the Copyright Act, "society is free to exploit facts, ideas, processes, or methods of operation in a copyrighted work."[189] In order "[t]o protect processes or methods of operation, a creator must look to patent laws," rather than copyright laws.[190] Since the object code, wherein the functional aspects of the program lie, cannot be read by humans, the "unprotected ideas and functions of the code . . . are frequently undiscoverable in the absence of investigation and translation that may require copying the copyrighted material."[191] In the process of reverse engineering to examine the unprotected portions of a software program, an intermediate copy of the computer program must normally be

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185. Object code is the binary code of the computer program that the computer "runs" when it executes the program. Object code cannot be read by humans. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 602 (9th Cir. 2000).

186. *See* 17 U.S.C. § 102(a).

187. *Sega Enters.*, 977 F.2d at 1519.

188. *See* 17 U.S.C. § 102(b).

189. Atari Games Corp. v. Nintendo of Am., Inc., 975 F.2d 832, 842 (Fed. Cir. 1992).

190. *See id.* (citing Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 159-64 (1989)).

191. *See Sony Computer Entm't*, 203 F.3d at 602.

made in computer memory. The Copyright Act seems to encompass and proscribe such intermediate copying,[192] and such intermediate copying may constitute copyright infringement even when the end product did not itself contain copyrighted material.[193] However, the question of whether the intermediate copying of a computer program is infringement is not completely clear based solely on the text of the Copyright Act, and as a result the question has been answered on a case-by-case basis.

Intermediate copying may be protected as a fair use if it was necessary to gain access to the functional elements of the software itself.[194] This is due to the fact that "the Copyright Act permits an individual in rightful possession of a copy of a work to undertake necessary efforts to understand the work's ideas, processes, and methods of operation."[195] Therefore, where there is a legitimate reason for a developer to study or examine the unprotected functional aspects of a copyrighted program and there are no other means to do so, the disassembly of the program and the making of the intermediate copies must be analyzed under the fair use doctrine.[196] In order to determine whether the use of a copyrighted work was fair, one must consider the four statutory factors set forth in Section 107:

> (1) the purpose and character of the use, including whether such use is of a commercial nature or is for non-profit educational purposes; (2) the nature of the copyrighted work; (3) the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and (4) the effect of the use upon the potential market for or value of the copyrighted work.[197]

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192. *See Sega Enters.*, 977 F.2d at 1518.
193. *See id.* at 1519.
194. *See id.* at 1527.
195. *Atari Games*, 975 F.2d at 842.
196. *See Sega Enters.*, 977 F.2d at 1527-28.
197. *See* 17 U.S.C. § 107 (2000).

A. THE PURPOSE AND CHARACTER OF THE USE OF COPYRIGHTED
    SOFTWARE IN A PROCESS OF REVERSE ENGINEERING DURING
    THE DEVELOPMENT OF COMPATIBLE PROGRAMS SUPPORTS A
    FINDING OF FAIR USE.

The first statutory factor that must be considered in a fair use analysis is the purpose and character of the use.[198]   The question under this factor is whether Connectix's Virtual Game Station "merely 'supersedes the objects' of the original creation, or instead adds something new, with a further purpose or different character, altering the first with new expression, meaning, or message; it asks, in other words, whether and to what extent the new work is 'transformative'."[199]

In its analysis of this factor in *Sony Computer Entertainment, Inc. v. Connectix Corp.*, the Ninth Circuit neglected to consider the preamble to Section 107, but the omission was not a major fault in its analysis. The preamble lists uses "such as criticism, comment, news reporting, teaching (including multiple copies for classroom use), scholarship, or research" as being potential fair uses.[200]   It is possible that Connectix's intermediate copies of Sony's BIOS could be considered copies made for research purposes since the copies were made to determine how the program functioned. However, the categories listed in the preamble of Section 107 seem to be based on activities in which the user of the work expects little commercial return on the user's use of the material. In contrast, Connectix's use of Sony's BIOS was to develop a commercial product that was compatible with the Sony BIOS.   Therefore, Connectix expected to receive an indirect commercial return from its use of Sony's BIOS during the development of the Virtual Game Station. This seems to mitigate against a determination that Connectix's use falls under the categories espoused in the preamble to Section 107. However, the categories listed in the preamble "have an 'illustrative and not limitative' function"[201] and the uses listed in the preamble "provide only general guidance about the sorts of copying that courts and Congress most commonly had found

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198. *See id.* § 107(1) (2000).
199. Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 579 (1994) (internal quotation marks and citations omitted).
200. *See* Infinity Broad. Corp. v. Kirkwood, 150 F.3d 104, 107 n.1 (2d Cir. 1998).
201. *Id.*

to be fair uses."[202] Therefore, whether or not Connectix's use is a fair use is not determined by the consideration of the categories listed in the preamble, despite the fact the categories seem to slightly weigh against a finding of fair use.

The next step in the analysis of the purpose and character of Connectix's use of Sony's BIOS for purposes of the fair use defense is to consider: (1) whether the use was productive; (2) whether the use was commercial; and (3) whether Connectix's conduct was proper.[203] The Ninth Circuit also neglected to directly undertake this portion of the purpose and character analysis. However, the Court did, in effect, consider the first two sub-factors because it considered whether the Virtual Game Station was transformative and considered Connectix's commercial use of Sony's BIOS.[204] The Court did not consider whether Connectix's conduct was proper.

A productive use of a copyrighted work is a use that "result[s] in some added benefit to the public beyond that produced by the first author's work."[205] In Connectix's case, the Ninth Circuit correctly found that the Virtual Game Station was a transformative, and therefore productive, work.[206] Although both programs have similar uses and functions, the Virtual Game Station is an entirely new product that does not include any code contained in Sony's BIOS. The Virtual Game Station allows players of PlayStation games to play games on an entirely new platform, the personal computer, which would be unavailable without the Virtual Game Station. Therefore, the Virtual Game Station is not a direct substitute for the PlayStation, although it certainly is a competitor, as it would be had Connectix's engineers directly copied Sony's BIOS and made a PlayStation console clone. In addition, the development of the Virtual Game Station involved a great deal of creativity on the part of Connectix's engineers to write a program that allowed PlayStation games to be played on a computer with components that vary widely from computer to computer as opposed to a PlayStation console that contains a

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202. Castle Rock Entm't v. Carol Publ'g Group, 150 F.3d 132, 141 (2d Cir. 1998).

203. *See* Rubin v. Brooks/Cole Pub. Co., 836 F. Supp. 909, 916 (D.Mass. 1993).

204*. See Sony Computer Entm't*, 203 F.3d at 606-607.

205. *Rubin*, 836 F.Supp. at 916 (quoting Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 478 (1984) (Blackmun, J., dissenting)).

206*. See Sony Computer Entm't*, 203 F.3d at 606.

set type of hardware that does not vary from console to console. Overall, Connectix's productive use of Sony's BIOS, though not determinative, strongly favors a finding of fair use.[207]

Connectix admitted that its engineers disassembled Sony's code not just to study the concepts, but to actually use the code in the development of the Virtual Game Station.[208]   In Connectix's case it was clear that the use was intended to be commercial—the development of the Virtual Game Station was a commercial endeavor. However, a commercial purpose of the use of a copyrighted work does not alone defeat a fair use defense to copyright infringement action[209] and does not make the use presumptively unfair as the district court held.[210] The Supreme Court directly rejected this type of presumption in *Campbell* and therefore the application of such a presumption to fair use analysis in any case is inappropriate.[211]   In other words, the commercial nature of Connectix's use of Sony's BIOS cannot be given dispositive weight in the fair use analysis.[212] A commercial purpose of the use does tend "to weigh against a finding of fair use" and therefore Connectix's commercial purpose in its use of Sony's BIOS tends to favor Sony.[213] Where the use of the copyrighted work was an intermediate one only, "any commercial 'exploitation' was indirect or derivative" and the commercial use weighs less heavily against a finding of fair use.[214]

The crux of the commercial and non-commercial use distinction is "not whether the sole motive of the use is monetary gain but whether the user stands to profit from exploitation of the copyrighted material without paying the customary price."[215]   Connectix, however, did not directly

207.   *See Rubin*, 836 F.Supp. at 916 (citing Harper & Row, Publishers, Inc. v. Nation Enters., 471, 561 U.S. 539 (1985)).

208.   *See* Sony Computer Entm't, Inc. v. Connectix Corp., 48 F. Supp.2d 1212, 1220 (N.D. Cal. 1999).

209.   *See* Consumers Union of United States, Inc. v. General Signal Corp., 724 F.2d 1044, 1049 (2d Cir. 1983) (citing Triangle Publications, Inc. v. Knight-Ridder Newspapers, Inc. 626 F.2d 1171, 1175 (5th Cir. 1980)).

210.   *See* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 590-91 (1994).

211.   *See Sony Computer Entm't*, 203 F.3d at 606 (citing *Campbell*, 510 U.S. at 585).

212.   *See* DSC Communications Corp. v. DGI Tech., Inc., 898 F. Supp. 1183, 1189 (N.D. Tex. 1995) (citing *Campbell*, 510 U.S. at 585).

213.   *See Campbell*, 510 U.S. at 585.

214.   *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1522 (9th Cir. 1992).

215.   *See* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539,

exploit Sony's BIOS. Connectix merely used Sony's BIOS to examine the way that the program functioned so that it could develop a compatible product on its own. Without the ability to study Sony's BIOS for the purpose of determining how its functional elements work, Connectix would be unable to develop a compatible product and would have given Sony a de facto monopoly over the functional elements of its BIOS for as long as its copyright lasted. A monopoly over functional elements such as this is directly opposed to the ultimate aim of copyright law "to stimulate artistic creativity for the general public good."[216] In order to receive such protection of the functional elements of its BIOS, Sony must seek protection under the more stringent requirements of patent law rather than copyright law. As a result, Connectix's commercial purpose in its use of Sony's BIOS tends to weigh against a finding of fair use, but only marginally so due to the offsetting effect of the public policy ramifications that would result from such a finding.

The final sub-factor of the purpose and character of use analysis is whether Connectix's conduct was proper. This sub-factor turns largely upon whether Connectix acted in bad faith when it copied Sony's BIOS.[217] Connectix copied Sony's BIOS in a good faith effort to develop its own product. Connectix did not literally copy Sony's code into its own product, but rather only observed the operation of Sony's BIOS to discover how it functioned. Connectix approached Sony during its development of the Virtual Games Station in order to request technical assistance, and thereby avoid making intermediate copies of Sony's BIOS, but Sony declined the request.[218] Sony also does not make the information regarding the BIOS of the PlayStation available to the public.[219] As a result, Connectix had no other way to access unprotected functional elements of Sony's BIOS that did not involve intermediate copying. Despite the fact that Sony denied Connectix permission to make intermediate copies of its BIOS and Connectix made intermediate copies on its own, this does not favor a finding

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562 (1985) (citing Roy Exp. Co. Establishment v. Columbia Broad. Sys., Inc., 503 F. Supp. 1137, 1144 (S.D.N.Y. 1980)).

216. *See* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 432 (1984).

217. *See* Rubin v. Brooks/Cole Pub. Co., 836 F. Supp. 909, 918-19 (D. Mass. 1993).

218. *See Sony Computer Entm't*, 203 F.3d at 601.

219. *See id.* at 600.

that Connectix acted improperly, nor does it preclude a finding of fair use.[220] Therefore, this sub-factor favors Connectix.

Overall, there is one sub-factor that strongly favors Connectix, one sub-factor that merely favors Connectix, and one sub-factor that weakly favors Sony. These sub-factors, together with the preamble, which slightly favors Sony, weigh toward a finding that the purpose and character factor of the fair use analysis favors Connectix. Therefore, the Ninth Circuit correctly determined that the purpose and character of Connectix's use favored a finding of fair use.

B.   DUE TO THE NATURE OF COPYRIGHTED SOFTWARE, THE PROCESS OF REVERSE ENGINEERING DURING THE DEVELOPMENT OF COMPATIBLE PROGRAMS IS FAIR USE, PARTICULARLY WHEN UNPROTECTED FUNCTIONAL ELEMENTS CANNOT BE ACCESSED WITHOUT COPYING.

The second statutory factor concerns whether Sony's BIOS is primarily creative as opposed to informational or functional.[221] The defense of fair use has been given a greater reach when the work copied is informational in nature.[222] Factual works, such as biographies, reviews, factual compilations, criticism, and commentary, are "believed to have a greater public value and, therefore, uses of them may be better tolerated by the copyright law."[223] Since Sony's BIOS is primarily a functional work, albeit with some expressive elements such as its overall structure and specific object and source code, the BIOS would seem to fall toward the 'factual' end of the copyright spectrum and would be protected by a 'thin' copyright. When the nature of the work requires intermediate copying to understand ideas and processes in the copyrighted work, that nature supports intermediate copying as a fair use; thus, "reverse engineering of object code to discern unprotected ideas in a computer program is a fair use."[224] To

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220.   *See* Fisher v. Dees, 794 F.2d 432, 437 (9th Cir. 1986).

221.   *See* Hustler Magazine, Inc. v. Moral Majority, Inc., 606 F. Supp. 1526, 1536 (C.D. Cal. 1985).

222.   *See id.*

223.   *See* Basic Books, Inc. v. Kinko's Graphics Corp., 758 F. Supp. 1522, 1532-33 (S.D.N.Y. 1991) (citing Salinger v. Random House, Inc., 811 F.2d 90, 96 (2d Cir. 1987)).

224.   *See* Atari Games Corp. v. Nintendo of Am., Inc., 975 F.2d 832, 843 (Fed. Cir. 1992).

the extent that the copyrighted work is "functional or factual, it may be copied, as may those expressive elements of the work that 'must necessarily be used as incident to' expression of the underlying ideas, functional concepts, or facts."[225]   Connectix could not gain access to the unprotected elements of Sony's BIOS without copying it.[226]   There was little publicly available technical information about the functionality of the Sony BIOS. Sony's BIOS was also an operating system which did not produce a screen display as a result of its functioning, precluding the opportunity to determine how it functioned based on screen displays.[227]   Therefore, in order to gain access to the functional elements of the BIOS it was necessary for Connectix to access the elements through some form of reverse engineering that required intermediate copies of the BIOS to be made.[228]   The nature of Sony's BIOS and the resulting difficulty in accessing unprotected elements of the software program cause this factor to favor Connectix.

C.   ALTHOUGH THE REVERSE ENGINEERING OF SOFTWARE MAY REQUIRE THE COPYING OF AN ENTIRE PROGRAM, THE USE OF THE COPYRIGHTED MATERIAL IS FAIR IF THE COPYING WAS NECESSARY TO UNDERSTAND THE UNPROTECTED ELEMENTS OF THE PROGRAM AND THE FINAL PRODUCT DOES NOT CONTAIN COPIED CODE.

The third statutory factor considers the amount of Sony's BIOS copied by Connectix and the substantiality of the portion copied.[229]   The amount of Sony's BIOS copied by Connectix is clear; the entire BIOS was copied during the process of reverse engineering and was copied multiple times.[230]   However, "translation of a program from object code into source code cannot be accomplished without making copies of the code."[231]

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225.   *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1524 (9th Cir. 1992) (citing citing Baker v. Selden, 101 U.S. 99, 102-04 (1879) (internal quotations and citations omitted)).

226.   *See Sony Computer Entm't*, 203 F.3d at 603.

227.   *See id.*

228.   *See id.*

229.   *See* 17 U.S.C. § 107(3) (2000).

230.   *See Sony Computer Entm't*, 203 F.3d at 606.

231.   *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1526 (9th Cir. 1992).

Even the copying of an entire work does not preclude fair use,[232] although it does weigh against finding of fair use.[233]   The substantiality of the portion of Sony's BIOS is also clear; since the entire program was copied, and when an entire computer software program is copied, there is no doubt that protected elements of the software were copied.[234]   Therefore, this factor favors Sony. However, in a case of intermediate infringement where the final product does not contain infringing material, this factor is of "very little weight."[235]

In the Ninth Circuit's analysis of the amount and substantiality of Sony's BIOS copied by Connectix, the Court neglected to address several important issues that, although not important in the instant case, may be important in future applications of the Court's decision. The fair use reproductions of a computer program made during activities such as reverse engineering "must not exceed what is necessary to understand the unprotected elements of the work."[236]   In Connectix's case, the reverse engineering of Sony's BIOS required the copying of the entire program to complete the process.   Therefore, Connectix copied no more than was required to understand the unprotected elements of the work.   The second issue not addressed by the court is that "[a]ny reproduction of protectable expression must be strictly necessary to ascertain the bounds of protected information within the work."[237]   Again, since the copying of the entire BIOS was necessary during the process of reverse engineering, the reproduction of the protected elements of the program was necessary to determine the protected and functional portions of the program. Because the court chose not to address these issues, the court's holding may be interpreted by some to be far broader than it should be.   Some may interpret the court's holding as supporting the proposition that any copying during the process of reverse engineering, whether necessary to access the unprotected elements of the program or not, is a fair use. Based upon this proposition, some developers

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232.   *See* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 449-50 (1984).

233.   *See* Advanced Computer Servs. of Mich., Inc. v. MAI Sys. Corp., 845 F. Supp. 356, 365 (E.D.Va. 1994).

234.   *See* Triad Sys. Corp. v. Southeastern Express Co., 64 F.3d 1330, 1335 (9th Cir. 1995).

235.   *See Sega Enters.*, 977 F.2d at 1526-27.

236.   *See* Atari Games Corp. v. Nintendo of Am., Inc., 975 F.2d 832, 843 (Fed. Cir. 1992).

237.   *See id.*

may resort to the copying of a program during the process of reverse engineering, even when the copying is not necessary to access unprotected elements of the program, and infringe upon the copyright of the program. If this occurs, there would be yet another round of litigation to determine the bounds of the Ninth Circuit's holding that could have just as easily be established in the instant case. Although neither of these issues would have changed the outcome of the instant case, the Ninth Circuit missed an opportunity to clarify the limits of its holding of fair use and, as a result, issues such as these may come before the court at a later date.

D.   THE USE OF COPYRIGHTED SOFTWARE TO DEVELOP A COMPATIBLE PRODUCT THROUGH REVERSE ENGINEERING DOES NOT HAVE AN ADVERSE EFFECT UPON THE POTENTIAL MARKET FOR OR VALUE OF THE COPYRIGHTED WORK, ASIDE FROM THE EFFECTS THAT RESULT FROM ANY KIND OF COMPETITION IN THE MARKETPLACE.

The final statutory factor is the effect of the use upon the potential market for, or value of, the copyrighted work.[238] The final statutory factor takes into account not only the extent of market harm caused by the particular actions of the alleged infringer, but also "whether unrestricted and widespread conduct of the sort engaged in by the defendant . . . would result in a substantially adverse impact on the potential market" for the original.[239] This factor is "the single most important element of fair use."[240] The potential for harm to Sony's BIOS arises if Connectix's use would tend to diminish the sales of Sony's work, interfere with its marketability, or fulfill the demand for the original.[241] If the production of PlayStation emulators became widespread, the market for the Sony PlayStation may become less lucrative. However, the fact

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238. *See* 17 U.S.C. § 107(4).

239. *See* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 590 (1994) (quoting M. NIMMER & D. NIMMER, 3 NIMMER ON COPYRIGHT, § 13.05[A][4], at 13-102.61 (1993)).

240. *See* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 566 (1985) (citing M. NIMMER & D. NIMMER, 1 NIMMER ON COPYRIGHT, § 13.05[A], at 13-76 (1984)).

241. *See* Hustler Magazine, Inc. v. Moral Majority, Inc., 606 F. Supp. 1526, 1539 (C.D. Cal. 1985) (citing Encyclopaedia Britannica Educ. Corp. v. Crooks, 542 F. Supp. 1156, 1169 (W.D.N.Y. 1982)).

that the emulators are not, contrary to the finding of the district court,[242] direct substitutes for the PlayStation console, since they run PlayStation games on a completely new platform, would mean that it is unlikely that the widespread production of emulators would have a "substantially adverse impact on the potential market."[243]   The adverse impact suffered by the market for Sony PlayStation consoles would be no different than the effect of the introduction of competition into any other market and in fact would probably be less since the PlayStation console and emulators are not direct competitors.[244]   In other words, Connectix's Virtual Game Station does not merely supplant the Sony PlayStation console, but instead is transformative and competes with the PlayStation console in the market for platforms upon which PlayStation games may be played. There is a presumption that market harm will occur when there is direct duplication for a commercial purpose, but that is not the case with Connectix's use of Sony's BIOS; thus, there is no presumption or inference of market harm that is applicable to the instant case.[245] Therefore, the first part of the market effect factor favors Connectix.

Analysis of the effect on the market for a copyrighted work also requires a balancing of the benefit that the public will derive if use is permitted against the personal gain that the copyright owner will receive if the use is denied.[246] In this case, the public benefit if the use is permitted is great—a whole new class of platforms for PlayStation games will open up and be available for use by fans of PlayStation games. On the other hand, the personal gain that Sony will receive if use is denied is a gain of an unprecedented level of protection for its software products. "If disassembly of copyrighted object code is per se an unfair use, the owner of the copyright gains a de facto monopoly over the functional aspects of his work—aspects that

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242. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 48 F. Supp. 2d 1212, 1220 (N.D. Cal. 1999).

243. *See id.* at 1221.

244. The two products are not direct competitors since the PlayStation console and emulators are merely similar products made for similar uses rather than versions of basically the same product made for the same use, such that the purchase of one naturally excludes purchase of the other. This is not the case with the PlayStation and emulators since consumers may buy one or the other or both of the products.

245. *See* Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 591 (1994).

246. *See* MCA, Inc. v. Wilson, 677 F.2d 180, 183 (2d Cir. 1981).

were expressly denied copyright protection by Congress."[247] The functional elements of Sony's software would effectively be protected by copyright law, if a finding of fair use was denied. This is due to the fact that the functional aspects of Sony's BIOS can only be accessed through the reverse engineering and study of the software, which due to the type of software, necessarily entails copying that would be prevented by copyright law. In order for Sony "to enjoy a lawful monopoly over the idea or functional principle underlying a work, [Sony] must satisfy the more stringent standards imposed by the patent laws."[248] Therefore, the balancing of the benefit that the public will derive if the use is permitted against the personal gain that the copyright owner will receive if the use is denied tends to favor Connectix.

Based on the two methods of analysis under the final statutory factor, the effect of the use upon the potential market for, or value of, the copyrighted work, this factor favors Connectix.

E. THE PUBLIC BENEFIT THAT RESULTS FROM THE FRUITS OF
    REVERSE ENGINEERING AND THE ULTIMATE PURPOSE OF
    COPYRIGHT LAW MAKE THE USE OF COPYRIGHTED SOFTWARE
    DURING THE PROCESS OF REVERSE ENGINEERING A FAIR USE.

The public policy ramifications of a finding of or denial of fair use must be a consideration in fair use analysis because the ultimate purpose of copyright law is to benefit the public, through the distribution of knowledge, rather than the author.[249]   The ultimate aim of the Copyright Act is "to stimulate artistic creativity for the general public good."[250] The temporary monopoly created by copyright law is designed to benefit the public as a whole, rather than to reward individual authors.[251] Therefore, the effect on the public benefit of a denial of fair use must be considered. In this case, the benefit the

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247. *See* Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510, 1526 (9th Cir. 1992) (citing 17 U.S.C. 102(b)).

248*. See id.* (citing Bonito Boats, Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 159-64 (1989)).

249*. See* Harper & Row, Publishers, Inc. v. Nation Enters., 471 U.S. 539, 546 (1985).

250*. See* Sony Corp. of Am. v. Universal City Studios, Inc., 464 U.S. 417, 432 (1984).

251. *See id.* at 477 (Blackmun, J., dissenting).

public will receive if the use of a copyrighted program in the development of compatible products is permitted is great—the inability to develop compatible products would seriously disrupt the computer industry and greatly increase the development costs of computer products. In a time where there are a great multitude of hardware and software manufacturers, the compatibility of software with other software and across the many computer platforms that are available is integral to the effective and efficient use of computers. In addition, a finding that a use such as Connectix's is not fair would do a great disservice to the public because Sony, and any other developer producing software with strong functional elements, would receive an unprecedented level of protection for its software products. Under such a finding, both the expressive and functional elements of Sony's software would effectively be protected by copyright law. This is due to the fact that the functional aspects of Sony's BIOS can only be accessed through the reverse engineering and study of the software, which necessarily entails copying that would be prevented by such a finding. Without the ability to study copyrighted software to determine how its functional elements work, other developers would be unable to develop compatible products. Therefore, a finding that the use of copyrighted software in the process of reverse engineering is unlawful would give the software owner a de facto monopoly over the functional elements of its program for as long as its copyright lasted. A monopoly over functional elements such as this is directly opposed to the ultimate aim of copyright law "to stimulate artistic creativity for the general public good."[252] In order for an author of a software program "to enjoy a lawful monopoly over the idea or functional principle underlying a work, [the author] must satisfy the more stringent standards imposed by the patent laws."[253] Due to the ramifications of the granting of a de facto monopoly over functional elements of computer programs to copyright owners, in direct opposition to the purposes of copyright law, public policy strongly supports a finding of fair use in situations in which copying of a program during reverse engineering is necessary to access unprotected functional elements of the program.

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252. *See id.* at 432.
253. *See Sega Enters.*, 977 F.2d at 1526.

IV. CONCLUSION

The Ninth Circuit correctly found that three of the statutory fair use factors favored Connectix, while one favored Sony and that factor was "of little weight" because the final product contained no infringing code.[254] The court correctly held that the "intermediate copies made and used by Connectix during the course of its reverse engineering of the Sony BIOS were protected [by] fair use, necessary to permit Connectix to make its non-infringing Virtual Game Station function with PlayStation games."[255] This holding reiterated and clarified the Ninth Circuit's previous decision in *Sega Enterprises Ltd. v. Accolade, Inc.*[256] which held that "[w]here there is good reason for studying or examining the unprotected aspects of a copyrighted computer program, disassembly for purposes of such study or examination constitutes a fair use."[257] The holding in *Sega* arguably did not cover cases in which the user utilized disassembly or an equivalent form of reverse engineering to study or examine a computer program for the purpose of using the gathered information to make their own compatible product.[258] The Ninth Circuit's holding in the instant case eliminated some of the confusion surrounding the legality of the commercial use of information gathered during reverse engineering of a computer program caused by the court's decision in *Sega*. This holding correctly extends fair use protection far enough to protect the use of reverse engineering to produce compatible products and to prevent software developers from gaining de facto monopoly over the functional aspects of their work. However, the holding misses an opportunity to correctly limit the application of the decision only to cases in which the making of intermediate copies of a software program during reverse engineering is necessary to access unprotected elements and there is no other way to do so. This omission is likely to result in a future round of litigation designed to determine the applicability and the bounds of the necessity requirement in the use of reverse engineering of other

254. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 203 F.3d 596, 608 (9th Cir. 2000).

255. *See id.* at 599.

256.   977 F.2d 1510 (9th Cir. 1992).

257. *See Sega Enters.*, 977 F.2d at 1520.

258. *See* Sony Computer Entm't, Inc. v. Connectix Corp., 48 F. Supp. 2d 1212, 1220 (N.D. Cal. 1999).

types of software.

The Ninth Circuit's holding in *Sony Computer Entertainment, Inc. v. Connectix Corp.* is an appropriate application of the fair use doctrine to the reverse engineering of computer software. As a result of the court's ruling, a process that was already widely used within the software industry was decided to be a fair use of copyrighted material. The protection of the non-functional, creative elements of computer programs has been left intact by the Ninth Circuit's holding, but the software industry may continue to use reverse engineering to aid in its development of compatible products without worry of facing liability for copyright infringement.   Therefore, the holding of the court in *Sony Computer Entertainment, Inc. v. Connectix Corp.* correctly balances these competing interests of software developers and the public.