

Repair, Modification, or Resale of Software-Enabled Consumer Electronic Devices: Copyright Law Issues

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Summary

Modern consumer electronic devices and products often contain software programs that facilitate their operations or provide automation, Wi-Fi and smartphone connectivity, remote control, and other sophisticated functions. Equipment manufacturers have integrated software in televisions, refrigerators, thermostats, coffee makers, garage door openers, automobiles, vacuums, printers, and medical devices. When consumers buy these "software-enabled" products from retailers, they acquire ownership of the physical hardware, but may only receive a limited license (a form of legal permission) to use the embedded software. However, the software license's terms and conditions may restrain certain consumer behavior after purchasing the product. Some consumer rights organizations and civil liberties groups have raised concerns that software licensing, in restricting the unauthorized resale of a product or prohibiting certain product modifications or repairs, unnecessarily limits how consumers can use software-enabled products.

In addition, some products may include "digital rights management" (DRM) technologies that prevent consumers from altering the installed software or control the types of accessories that may be used with them. For example, manufacturers have installed DRM in gourmet coffee makers and printers to prevent consumers from using generic, unlicensed coffee pods and toner cartridges, respectively, that are usually cheaper and easier to acquire than brand-name, manufacturer-authorized parts. Wireless carriers have also used DRM in smartphones to prevent the devices from connecting to, and operating on, unauthorized cellular networks. Thus, consumers with such "locked" cellphones cannot use them on a different service provider's network once their contract has expired with their original mobile carrier.

It may seem unusual that copyright law has any application or relevance to consumer electronic products. After all, such products do not, by themselves, fall within the traditional categories of copyrightable subject matter: literary, musical, dramatic, and pictorial works; motion pictures; and sound recordings. Yet the software embedded in many consumer electronic products may be subject to copyright protection; thus, these devices contain copyrighted content. As a result, copyright law may impact the rights of consumers to repair, modify, or sell their personal property that contains copyrighted software, to the extent that such activities involve making changes to the software or transferring ownership of the product with the original software still running on it. Consumers or businesses that engage in such actions with respect to software-enabled electronic products, without the authorization of the software developer or original equipment manufacturer, may be in violation of the federal Copyright Act.

This report provides a discussion and analysis of copyright law issues that may be implicated by the repair, modification, or resale of software-enabled consumer electronic devices. These issues include software licensing, fair use, the first sale doctrine, and the anti-circumvention provisions of the Digital Millennium Copyright Act (DMCA). It also examines state and federal legislation that has been offered related to this issue, including the You Own Devices Act (H.R. 862), Breaking Down Barriers to Innovation Act of 2015 (S. 990), and the Unlocking Technology Act of 2015 (H.R. 1587).

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Introduction

Moving beyond its traditional place in personal computers and corporate servers, software today may be integrated in everyday consumer goods[1] such as televisions, refrigerators, thermostats, coffee makers, garage door openers, automobiles, vacuums, and printers,[2] as well as personal medical devices (for example, glucose meters,[3] asthma inhalers,[4] and blood pressure monitors[5]). Software enables modern consumer products' operations or provides users with convenient features such as automation, Wi-Fi connectivity, and remote control via laptops, smartwatches, and smartphones.[6] Products that can communicate with the Internet are sometimes referred to as "smart" devices or "connected" appliances. The incorporation of software in everyday consumer products has benefited consumers because it provides "new qualities to ordinary products, making them safer, more efficient, and easier to use."[7]

When consumers purchase these "software-enabled" products from retailers, they become the owner of the hardware components of the device or machine. In contrast, however, they may only acquire a license (a form of legal permission) to use any embedded software during the time of their product ownership. Manufacturers of electronic devices may employ software licensing as a legal mechanism to restrict unauthorized resale of their products (via secondary marketplaces such as craigslist and eBay) or to prohibit product alterations or repairs that they do not officially sanction.[8]

Furthermore, some companies have incorporated into their products software or computer chips that provide "digital rights management" (DRM) measures that attempt to control their consumers' post-purchase behavior.[9] For example, manufacturers have installed DRM in gourmet

[1] U.S. DEP'T OF COMMERCE INTERNET POLICY TASK FORCE, WHITE PAPER ON REMIXES, FIRST SALE, AND STATUTORY DAMAGES 50 (2016) (hereinafter "Commerce Department White Paper").

[2] Emily Matchar, *The Fight for the "Right to Repair,"* SMITHSONIAN MAGAZINE (July 13, 2016), http://www.smithsonianmag.com/innovation/fight-right-repair-180959764/?no-ist.

[3] Loren Grush, *Smart Glucose Monitor Will Wirelessly Transmit Patients' Data to Doctors,* THE VERGE (Jan. 5, 2016, 1:30 PM), http://www.theverge.com/2016/1/5/10710264/att-yofimeter-connected-blood-glucose-monitor-announced-ces-2016.

[4] Rob Matheson, *A Smart Inhaler for People with Asthma,* MIT NEWS (Oct. 27, 2015), http://news.mit.edu/2015/gecko-health-smart-inhaler-asthma-1028.

[5] Jim Rossman, *Wireless Blood Pressure Monitor Transmits Reading to Smartphone,* DALLAS MORNING NEWS (May 31, 2014, 10:06 PM), http://www.dallasnews.com/business/technology/headlines/20140531-wireless-blood-pressure-monitor-transmits-reading-to-smartphone.ece.

[6] Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. 77,668 (Dec. 15, 2015), *available at* http://copyright.gov/fedreg/2015/80fr77668.pdf.

[7] For more information about such products, see CRS Report R44227, *The Internet of Things: Frequently Asked Questions*, by Eric A. Fischer.

[8] *See* Corynne McSherry, *Who Will Own the Internet of Things? (Hint: Not the Users),* ELECTRONIC FRONTIER FOUNDATION (Jan. 20, 2015), https://www.eff.org/deeplinks/2015/01/who-will-own-internet-things-hint-not-users ("You may own your *device*, but your use of *the software in it* is usually governed by the terms of an End-User License Agreement (or EULA). And that license agreement is likely to restrict your ability to tinker with your stuff. Typical clauses forbid reverse-engineering (e.g., figuring out how the software works so you can adapt it), transfer (e.g., giving it to a friend or selling it on the secondary market), and even using "unauthorized" repair services at all.") (emphasis in original).

[9] *See, e.g.,* Heather A. Sapp, *Garage Door Openers and Toner Cartridges: Why Congress Should Revisit the Anti-Circumvention Provisions of the DMCA,* 3 BUFF. INTELL. PROP. L.J. 135 (2006) and Marcus Howell, *The Misapplication of the DMCA to the Aftermarket,* 11 B.U. J. SCI. & TECH. L. 128 (2005).

coffee makers[10] and printers[11] to prevent the use of third-party, unlicensed coffee pods and toner cartridges that are often cheaper and possibly easier to acquire than brand-name, manufacturer-authorized accessories. DRM also may be used to prevent consumers from modifying the software in their cell phones in order to connect the devices to different wireless carriers.

The inclusion of licensed software and DRM in consumer products and devices has raised concerns about the ability of consumers to repair, modify, or resell their personal property[12] because engaging in such activities may potentially violate provisions of the Copyright Act (or the Act). Some consumers may be surprised to discover that copyright law has anything to do with relatively mundane consumer products, such as coffee makers and thermostats, that do not store, display, or play copyrighted material such as movies, television shows, music, pictures, or electronic books. Yet the software itself that is installed in these consumer products is subject to copyright protection. Thus, because many everyday consumer products contain copyrighted software,[13] copyright law may impact how these products are used, modified, or resold by consumers.

This report examines copyright law issues raised by software-enabled consumer goods. The report will begin with a review of general principles of copyright law and then explain how copyright law applies to software programs generally. The report will then analyze copyright law provisions, including fair use, the first sale doctrine, and DRM, that may limit or otherwise affect consumers' ability to repair, resell, or modify their software-enabled electronic devices. The report will first provide a general background of these issues, then discuss selected case law applicable to each doctrine, and finally analyze the interplay of these concepts with consumer rights and expectations regarding their software-enabled electronic devices. The report will conclude with a summary of federal agency studies and federal and state legislation that relate to this topic.

Fundamentals of Copyright Law

The Copyright Clause of the U.S. Constitution authorizes Congress to "promote the Progress of Science … by securing for limited Times to Authors … the exclusive Right to their respective Writings.... "[14] Copyright is a federal grant of legal protection available to the creator or owner of certain forms of creative expression (referred to as "works" in copyright parlance), including

[10] Juliana Kenny, *Keurig Under Fire for Use of DRM in New Coffee Makers,* INSIDE COUNSEL (Mar. 4, 2014), http://www.insidecounsel.com/2014/03/04/keurig-under-fire-for-use-of-drm-in-new-coffee-mak?slreturn=1468607106.

[11] Ed Felton, *Pro-Competition Ruling in Lexmark Case*, FREEDOM TO TINKER BLOG (Oct. 27, 2004), https://freedom-to-tinker.com/blog/felten/pro-competition-ruling-lexmark-case/.

[12] *See, e.g.,* Comments of Consumers Union to the U.S. Copyright Office, Software-Enabled Consumer Products Study, Docket No. 2015-6, at 1, http://consumersunion.org/wp-content/uploads/2016/03/CommentsReplySoftwareEnabledDevices3-18-16.pdf (last visited Aug. 10, 2016) ("[W]e are concerned that inconsistent and unsettled application of copyright law to software that enables and governs, and restricts, the functioning of everyday consumer products in which it is embedded, threatens to cause far-reaching harm to fundamental consumer rights.").

[13] Letter from Senators Grassley and Leahy to Maria A. Pallante, Register of Copyrights, Oct. 22, 2015, http://www.grassley.senate.gov/sites/default/files/judiciary/upload/2015-10-22%20GEG-Leahy%20to%20Copyright%20Office%20%28Software%20Copyright%20Study%20Request%29.pdf ("Copyrighted software is now essential to the operation of our refrigerators, our cars, our farm equipment, our wireless phones, and virtually any other device you can think of.").

[14] U.S. CONST. art. I, § 8, cl. 8.

books, movies, photography, art, and music.[15] Copyright protection does not extend to any underlying abstract idea, procedure, process, system, method of operation, concept, principle, or discovery, but rather it only protects the manner in which those ideas are expressed.[16] A copyright holder possesses several exclusive legal entitlements under the Copyright Act, which provide the holder with the right to determine whether and under what circumstances the protected work may be used by third parties. The grant of copyright permits the copyright holder to exercise several exclusive rights, including the right to reproduce the copyrighted work, distribute copies of the work, publicly perform the work, and publicly display the work.[17]

A copyright holder may also permit a third party to exercise one of these exclusive rights. Such permission is often granted in the form of a license, which is usually expressed in a written contract.[18] A license allows a third party to do something with a protected work that implicates a copyright holder's exclusive rights without concern of violating the copyright holder's rights. Each exclusive right of a copyright holder may be subject to licensing. For example, a third party wishing to duplicate a copyrighted work as well as publicly perform the work must negotiate separate licenses from the copyright holder to engage in the different activities. The terms of a licensing agreement may include certain limitations or conditions on using the copyrighted work and may require payment of a royalty fee.

Unauthorized use of a copyrighted work by a third party in a manner that implicates one of the copyright holder's exclusive rights generally constitutes infringement.[19] The copyright holder may file a lawsuit against an alleged infringer to enforce his or her intellectual property rights. The Copyright Act provides several civil remedies to the copyright holder who is harmed by infringement.[20]

However, certain unauthorized uses may not constitute infringement if the activities come within the scope of several statutory limitations on the copyright holder's exclusive rights, two of which (fair use and first sale) are discussed later in this report. In addition, copyrights are limited in the number of years a copyright holder may exercise his or her exclusive rights. In general, the creator of the work (referred to as an "author" in copyright parlance) may enjoy copyright protection for the work for a term lasting the entirety of his or her life plus 70 additional years.[21] At the expiration of a term, the copyrighted work becomes part of the public domain. A work in the public domain is available for anyone to use without the need to seek prior permission from the creator of the work.[22]

Mere ownership of a book, compact disc, or other material object that embodies a copyrighted work does not convey to the possessor of those objects any rights in the copyright. As the Copyright Act explains,

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[15] 17 U.S.C. § 102(a).

[16] Baker v. Selden, 101 U.S. 99, 103 (1879); 17 U.S.C. § 102(b).

[17] 17 U.S.C. § 106.

[18] *Id.* §§ 201(d), 204(a).

[19] *Id.* § 501.

[20] *Id.* §§ 502; 504, 505.

[21] *Id.* § 302. Other terms have been established for different works and different periods of time. For a concise chart explaining the different terms, see http://copyright.cornell.edu/resources/publicdomain.cfm (last visited Aug. 10, 2016).

[22] STANFORD UNIV. LIBRARIES, WELCOME TO THE PUBLIC DOMAIN, http://fairuse.stanford.edu/overview/public-domain/welcome/ (last visited Aug. 10, 2016) ("The term 'public domain' refers to creative materials that are not protected by intellectual property laws such as copyright, trademark, or patent laws. The public owns these works, not an individual author or artist. Anyone can use a public domain work without obtaining permission, but no one can ever own it.").

> Ownership of a copyright, or of any of the exclusive rights under a copyright, is distinct from ownership of any material object in which the work is embodied. Transfer of ownership of any material object, including the copy … in which the work is first fixed, does not of itself convey any rights in the copyrighted work embodied in the object…[23]

Thus, for example, a person who buys a copy of a book does not obtain the right to reproduce that book (beyond what may be permissible under fair use, discussed later in this report); similarly, someone who purchases a music compact disc (CD) is not entitled to duplicate that CD and distribute the copy to another person.

Copyrights and Software

As noted above, copyright protection is available for a variety of written materials (such as books, magazines, and newspapers), which the Copyright Act refers to as "literary works."[24] The Act's definition of this term appears to include software programs,[25] and courts and legislative history have supported the view that the category of "literary works" includes computer programs.[26] (The Act also defines a "computer program" as "a set of statements or instructions to be used directly or indirectly in a computer in order to bring about a certain result."[27]) Thus, software developers may claim copyright protection for their software programs.

The Copyright Act establishes a few limitations on the reproduction rights of software copyright holders. Section 117(a) of the Act allows the owner of a particular copy of a software program to create copies of the software that are necessary as an "essential step" in using the computer program and as "back-up" copies for the personal use of the individual software owner.[28] Furthermore, Section 117(c) provides that an owner of a machine may "make … a copy of a computer program if such copy is made solely by virtue of the activation of a machine that lawfully contains an authorized copy of the computer program, for purposes only of maintenance or repair of that machine…."[29] Section 117(d) defines "maintenance" of a machine to mean "the servicing of the machine in order to make it work in accordance with its original specifications and any changes to those specifications authorized for that machine," and "repair" of a machine to mean "the restoring of the machine to the state of working in accordance with its original specifications and any changes to those specifications authorized for that machine."[30]

[23] 17 U.S.C. § 202.

[24] *Id.* § 102(a)(1).

[25] *Id.* § 101 (defining "literary works" to mean "works … expressed in words, numbers, or other verbal or numerical symbols or indicia…").

[26] Oracle Am., Inc. v. Google Inc., 750 F.3d 1339, 1354 (Fed. Cir. 2014) ("It is undisputed that computer programs … can be subject to copyright protection as 'literary works.'"); H.Rept. 94-1476 at 54 (1976), *available at* http://www.copyright.gov/history/law/clrev_94-1476.pdf (House Judiciary Committee report explaining that the term "literary works" encompasses "computer data bases and computer programs to the extent that they incorporate authorship in the programmer's expression of original ideas, as distinguished from the ideas themselves.").

[27] 17 U.S.C. § 101 (definition of a "computer program").

[28] *Id.* § 117(a).

[29] *Id.* § 117(c).

[30] *Id.* § 117(d)(1), (2).

Licensing Versus Ownership of Software

A software company typically structures the original transaction between the company and its consumers as a license, rather than as an outright sale.[31] In other words, the software manufacturer provides the end user with a limited license to use the software (via an "end user license agreement," or EULA), the terms of which may restrict further distribution and other activities with respect to the copyrighted software. As one legal commentator has explained,

> [M]any of the rights that purchasers of goods have come to expect—for instance, the right to use the goods for their intended purpose, or to resell them—do not automatically apply to purchases of most software or digital content. Instead, the copyright holder must specifically grant such rights. If such rights are withheld or withdrawn, the buyer may find that he has in fact bought nothing at all.[32]

Most mass marketed software is subject to so-called "shrinkwrap" licenses, referring to a piece of paper containing EULA terms that has been wrapped in transparent plastic along with the computer floppy disks inside the product's packaging.[33] For software that is offered as a download through the Internet, the license is often referred to as a "click-through" license because, after a window or pop-up box appears on the computer screen prior to downloading or installing the software, users must click on an icon to accept the terms of the electronic agreement before proceeding.[34] By tearing the shrinkwrap plastic packaging surrounding physical software media or, when using accessing software online, by clicking on boxes labeled "accept," "yes," or "I agree," the consumer is indicating his or her consent to the terms of the EULA, which typically include restrictions on copying, usage, distribution, modifications, and legal remedies.[35]

In the leading opinion concerning the enforceability of shrinkwrap licenses, the U.S. Court of Appeals for the Seventh Circuit ruled in 1996 that "shrinkwrap licenses are enforceable unless their terms are objectionable on grounds applicable to contracts in general (for example, if they violate a rule of positive law, or if they are unconscionable)."[36] Federal district courts have also upheld the enforceability of click-through agreements.[37]

Advanced Copyright Law Concepts

Because software embedded in many modern consumer products may be subject to copyright protection, this section of the report will describe several advanced copyright topics, including fair use, first sale, and digital rights management, that may impact consumers' ability to repair,

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[31] Michael Seringhaus, *E-Book Transactions: Amazon "Kindles" the Copy Ownership Debate,* 12 YALE J. OF LAW & TECH. 147, 163 (2009).

[32] *Id.* at 164.

[33] Mark A. Lemley, *Intellectual Property and Shrinkwrap Licenses*, 68 S. CAL. L. REV. 1239, 1241 (1995).

[34] Nguyen v. Barnes & Noble Inc., 763 F.3d 1171, 1175-76 (9th Cir. 2014) (explaining that "[c]ontracts formed on the Internet come primarily in two flavors: 'clickwrap' (or 'click-through') agreements, in which website users are required to click on an 'I agree' box after being presented with a list of terms and conditions of use; and 'browsewrap' agreements, where a website's terms and conditions of use are generally posted on the website via a hyperlink at the bottom of the screen.").

[35] ProCD, Inc. v. Zeidenberg, 908 F. Supp. 640, 650 (W.D. Wis. 1996), rev'd, 86 F.3d 1447 (7th Cir. 1996).

[36] ProCD, Inc. v. Zeidenberg, 86 F.3d 1447, 1449 (7th Cir. 1996).

[37] *See* Berkson v. Gogo LLC, 97 F. Supp. 3d 359, 397 (E.D.N.Y. 2015) (observing that "Courts of Appeals, while accepting the general definition of what constitutes a clickwrap agreement, have yet to rule on their presumptive validity..... By contrast, almost every [lower] court to consider the issue has found clickwrap licenses, in which an online user clicks 'I agree' to standard form terms, enforceable.") (internal citations and quotation marks omitted).

modify, or sell their electronic devices. The next section will discuss selected case law examples applicable to each of these topics.

Fair Use Doctrine

The doctrine of "fair use," codified in Section 107 of the Copyright Act, recognizes the right of the public to make reasonable use of copyrighted material, under particular circumstances, without the copyright holder's consent. For example, a teacher may be able to use reasonable excerpts of copyrighted works in preparing a scholarly lecture or commentary, without obtaining permission to do so. The Copyright Act expressly mentions fair use "for purposes such as criticism, comment, news reporting, teaching, scholarship, or research."[38] However, the Copyright Act requires a federal court to consider and evaluate, on a "case-by-case"[39] basis, several statutory factors in determining whether any particular conduct constitutes a "fair use":

- the purpose and character of the use including whether such use is of a commercial nature or is for nonprofit educational purposes;
- the nature of the copyrighted work;
- the amount and substantiality of the portion used in relation to the copyrighted work as a whole; and
- the effect of the use upon the potential market for or value of the copyrighted work.[40]

The first decade of litigation involving software companies primarily addressed the extent to which copyright protection was available for computer programs and did not analyze the applicability of the fair use doctrine to software copyright infringement claims.[41] However, beginning in the early 1990s, courts have considered the affirmative fair use defense in several high profile software cases, as will be discussed in the next section.

First Sale Doctrine

Section 109(a) of the Copyright Act expresses the "first sale doctrine"[42] that limits the copyright owner's exclusive control over distribution of the material objects in which a work is expressed. The doctrine permits the owner of a particular copy of a copyrighted work to sell or dispose of that copy without the copyright owner's permission. The U.S. Supreme Court has previously explained that "[t]he whole point of the first sale doctrine is that once the copyright owner places a copyrighted item in the stream of commerce by selling it, he has exhausted his exclusive statutory right to control its distribution."[43] For example, someone who purchases a new book in a

[38] 17 U.S.C. § 107.

[39] Campbell v. Acuff-Rose Music, Inc., 510 U.S. 569, 577 (1994).

[40] 17 U.S.C. § 107.

[41] Pamela Samuelson, *Fair Use for Computer Programs and Other Copyrightable Works in Digital Form: The Implications of Sony, Galoob and Sega,* 1 J. INTELL. PROP. L. 49, 51-52 (1993).

[42] *Id.* § 109(a). The U.S. Supreme Court first articulated the first sale doctrine over a century ago in *Bobbs-Merrill Co. v. Straus*, 210 U.S. 339 (1908).

[43] Quality King Distribs., Inc. v. L'anza Research Int'l, Inc., 523 U.S. 135, 152 (1998). More recently, the Supreme Court held that the first sale doctrine applies to protect a buyer or other lawful owner of a copy of a copyrighted work that was lawfully made abroad. Kirtsaeng v. John Wiley & Sons, Inc., 133 S. Ct. 1351, 1355-56 (2013). Thus, "a buyer or other lawful owner of a copy (of a copyrighted work) lawfully manufactured abroad … . [may] bring that copy into the United States (and sell it or give it away) without obtaining permission to do so from the copyright owner." *Id.* at (continued...)

bookstore (thus constituting the "first sale" of that particular copy) may thereafter distribute the book (for example, share it with a friend, give it away to a public library, or sell it to a used book store) without obtaining prior consent of the book's copyright owner. Owners of lawful copies of a copyrighted work are thus immunized from copyright infringement liability when they transfer ownership of those copies to other individuals.[44] However, the first sale doctrine limits only the copyright owner's distribution rights; thus, owners of lawful copies who reproduce or publicly perform the work, without obtaining prior permission of the copyright owner, may be liable for infringement (unless they qualify for certain statutory exceptions[45] or can successfully invoke the fair use doctrine).

Notably, however, if the copyright owner merely licenses a copy of the work to a user (such that legal title in the copy does not pass to the possessor), the doctrine does *not* apply.[46] Thus, retailers often characterize transactions involving digital media content as a purchase of a limited license to access or use the material,[47] rather than as a sale, in order to avoid the effects of the first sale doctrine and retain control over downstream distribution (reselling or donating the media to others) and other post-purchase consumer actions (such as using the digital media on hardware devices that are not produced or authorized by the retailer).[48]

Compelling public policy reasons support the first sale doctrine. As the U.S. Supreme Court has explained, "The primary objective of copyright is not to reward the labor of authors, but 'to promote the Progress of Science and useful Arts.'"[49] In accordance with this constitutional mandate, the Copyright Act balances the rights of copyright holders in their intellectual property with the public's interest in having robust ownership rights in the tangible material in which copyrighted works are fixed. By terminating the distribution right of copyright holders after the initial sale of a particular copy, owners of those copies benefit from having unrestrained alienability of personal property.

There are several statutory exceptions to the first sale doctrine. The Record Rental Amendment Act of 1984[50] prevents owners of sound recordings from renting, leasing, or lending those

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[44] The first sale doctrine is triggered by the first authorized disposition by which title passes. MELVILLE B. NIMMER & DAVID NIMMER, 2 NIMMER ON COPYRIGHT § 8.12[B][1][a] (Matthew Bender 2010).

[45] The Copyright Act contains several statutory exceptions to the copyright holder's exclusive rights, such as those that are available to libraries or people with disabilities. See 17 U.S.C. § 108 ("[I]t is not an infringement of copyright for a library or archives, or any of its employees acting within the scope of their employment, to reproduce no more than one copy … of a work" if certain statutory conditions are satisfied.); and 17 U.S.C. § 121(a) ("[I]t is not an infringement of copyright for an authorized entity to reproduce or to distribute copies … of a previously published… literary work if such copies … are reproduced or distributed in specialized formats exclusively for use by blind or other persons with disabilities.").

[46] NIMMER & NIMMER, *supra* note 44.

[47] This business practice is commonly used for electronic books and MP3-format music downloads. *See, e.g.,* Geoffrey A. Fowler, *Buyer's E-Morse: "Owning" Digital Books – Purchasing Electronic Tomes Online Gives Readers Fewer Legal Rights to Share and Resell Than Hard-Copy Customers Enjoy,* WALL ST. JOURNAL, July 23, 2009, http://www.wsj.com/articles/SB124830307703373747; Ed Bott, *Who Owns Your Digital Downloads? (Hint: It's Not You),* ZDNET (Jan. 3, 2011, 1:00 AM), http://www.zdnet.com/article/who-owns-your-digital-downloads-hint-its-not-you/.

[48] H.Rept. 94-1476 at 79 (1976) (House Judiciary Committee report explaining that the first sale doctrine does not "apply to someone who merely possesses a copy … without having acquired ownership of it.").

[49] Feist Publ'ns, Inc. v. Rural Tel. Serv. Co., 499 U.S. 340, 349 (1991) (*quoting* U.S. CONST. art. I, § 8, cl. 8).

[50] P.L. 98-450 (1984).

material objects, for the purposes of direct or indirect commercial advantage, without the authorization of the copyright owners of those works.[51] (This statute does not apply to retailers selling previously owned compact discs or used vinyl records, as these are completed transfers of ownership as opposed to temporary rentals.) The Computer Software Rental Amendments Act of 1990[52] extended this first sale doctrine exception to software, thus preventing owners[53] of a particular copy of a computer program from renting, leasing, or lending it for the purposes of direct or indirect commercial advantage.[54] These two amendments to the first sale statute were apparently "prompted by concern that commercial lending could encourage unauthorized copying and displace sales, thereby diminishing the incentive for creation of new sound recordings" and software programs.[55] Notably, the Computer Software Rental Amendments Act contained an express exemption to its software rental prohibition, providing that it did not apply to "a computer program which is embodied in a machine or product and which cannot be copied during the ordinary operation or use of the machine or product."[56] This statutory language demonstrates that over a quarter century ago, Congress wanted to distinguish traditional software programs that run on computers from software embedded in products to enable their operation.[57]

Digital Rights Management

In 1998, Congress passed the Digital Millennium Copyright Act (DMCA), in part to help copyright owners protect their exclusive rights against infringement facilitated by digital technologies, including the Internet.[58] Section 1201(a)(1) of the DMCA prohibits any person from circumventing a technological measure that effectively controls access to a copyrighted work. Technology-based measures to thwart copyright infringement (usually unauthorized reproduction and distribution) include Internet video streaming protections, encrypted transmissions, and content scrambling systems (CSS) on DVD media. These measures are often referred to as digital rights management (DRM) because they permit copyright holders to control access to, and use of, digital content through certain technological restrictions.

The DMCA makes the act of gaining access to copyrighted material by circumventing DRM security measures, itself, a violation of the Copyright Act. Prohibited conduct includes descrambling a scrambled work; decrypting an encrypted work; or avoiding, bypassing,

[51] 17 U.S.C. § 109(b)(1)(A). This prohibition does not apply to the lending of sound recordings for nonprofit purposes by a nonprofit library or nonprofit educational institution. *Id.*

[52] P.L. 101-650 (1990).

[53] Note that, like digital media content such as e-books, movie downloads, and MP3 music files, software is usually licensed by users, rather than owned, and thus the first sale doctrine would not apply to software licensees even in the absence of the Computer Software Rental Amendments Act.

[54] 17 U.S.C. § 109(b)(1)(A). This prohibition does not apply to the lending of a computer program for nonprofit purposes by a nonprofit library, if certain statutory requirements are satisfied. *Id.* § 109(b)(2)(A).

[55] U.S. COPYRIGHT OFFICE, THE COMPUTER SOFTWARE RENTAL AMENDMENTS ACT OF 1990: THE NONPROFIT LIBRARY LENDING EXEMPTION TO THE "RENTAL RIGHT" iii (1994), *available at* http://www.copyright.gov/reports/computer-software-rental-report.pdf.

[56] 17 U.S.C. § 109(b)(1)(B)(i).

[57] Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. 77,668, 77,670 n.18 (Dec. 15, 2015), *available at* http://copyright.gov/fedreg/2015/80fr77668.pdf (quoting legislative history indicating that Members of Congress did not intend to apply the software rental prohibition to "computer programs which may be contained as a component of another machine, such as a program which drives a mechanized robot or runs a microwave or a household kitchen utensil.").

[58] The DMCA added a new chapter 12 to the Copyright Act, entitled "Copyright Protection and Management Systems." 17 U.S.C. §§ 1201-1205.

removing, deactivating, or impairing a technological measure, without the authority of the copyright owner.[59] In addition, the DMCA prohibits the selling of products or services that circumvent access-control measures, as well as trafficking in devices that circumvent "technological measures" protecting "a right" of the copyright owner.[60] Violations of the DMCA are subject to civil remedies and criminal penalties.[61]

In contrast to copyright infringement, which concerns the unauthorized or unexcused use of copyrighted material, the DMCA's anti-circumvention provisions prohibit the actual act of DRM circumvention, as well as the design, manufacture, import, offer to the public, or trafficking in technology used to circumvent those copyright protection measures, regardless of the actual existence or absence of copyright infringement activity. Thus, someone who disables or bypasses a DRM measure but takes no further action with respect to the underlying copyrighted material (e.g., copying, distributing, publicly performing or displaying the work), may have committed a DMCA offense but not copyright infringement. While the fair use doctrine may be raised as a defense to claims of copyright infringement, courts have held that fair use does not excuse a violation of the DMCA.[62]

The statutory prohibition on circumventing DRM is not absolute. The DMCA empowers the Librarian of Congress to issue regulations every three years that provide temporary exemptions to Section 1201(a)(1), thereby giving consumers the right to disable digital locks that control access to specific "classes" of copyrighted materials.[63] Proposals for such classes are submitted by members of the public during a lengthy rulemaking proceeding; the Register of Copyrights then offers recommendations of designated classes to the Librarian for approval. The Librarian-approved exemptions to the DMCA's "anti-circumvention" prohibition allow users to lawfully modify or disable the particular access controls during the three-year period for which the regulation applies.[64] (The Librarian is required by the DMCA to issue a ruling every three years in order to ensure that the classes remain technologically and commercially appropriate.)[65]

In addition, the DMCA includes provisions that allow circumvention in three situations involving "reverse engineering": (1) an individual may circumvent a DRM measure "for the sole purpose of identifying and analyzing those elements of the program that are necessary to achieve interoperability of an independently created computer program with other programs, and that have not previously been readily available to [that person]";[66] (2) an individual "may develop and employ technological means" that are "necessary" to enable interoperability;[67] and (3) these technological means may be made available to others "solely for the purpose of enabling interoperability of an independently created computer program with other programs."[68]

[59] *Id.* § 1201(a)(3).

[60] *Id.* §§ 1201(a)(2), (b).

[61] *Id.* §§ 1203, 1204.

[62] *See* Universal City Studios, Inc. v. Reimerdes, 111 F. Supp. 2d 294, 322 (S.D.N.Y. 2000) ("[T]he decision not to make fair use a defense to a claim under Section 1201(a) was quite deliberate" on Congress's part).

[63] 17 U.S.C. §§ 1201(a)(1)(B)-(C).

[64] For more information, see CRS Report RL33887, *The Digital Millennium Copyright Act: Exemptions to the Prohibition on Circumvention*, by Brian T. Yeh.

[65] H.Rept. 105-551, pt. 2, at 36 (1998).

[66] 17 U.S.C. § 1201(f)(1).

[67] *Id.* § 1201(f)(2).

[68] *Id.* § 1201(f)(3).

Selected Case Law Involving Copyrighted Software

This section provides examples of how the three copyright law concepts described in the previous section have been interpreted and applied by courts in cases involving software copyrights. As noted by the U.S. Copyright Office, courts that have considered copyright issues involving software to date "have not generally distinguished between software installed on general purpose computers and that embedded in everyday products."[69] Thus, it remains to be seen whether, in the future, courts will view copyright protection for software-enabled consumer products any differently than they have for "traditional" software that runs on computers, video game consoles, servers, and communication devices.

Fair Use of Copyrighted Software

Courts have accepted the fair use defense to infringement claims involving copyrighted software when the cases involve "reverse engineering" a computer program in order to gain access to its unprotected functional elements.[70] For example, in *Sega Enterprises Ltd. v. Accolade, Inc.,* the U.S. Court of Appeals for the Ninth Circuit (Ninth Circuit) held that Accolade's disassembly and reverse engineering of Sega's copyrighted computer program was a fair use.[71] Accolade reverse engineered the program in order to manufacture video games on cartridges that were compatible with Sega's gaming console, Genesis.[72] Accolade's copies of Sega's software enabled it to discover the functional requirements for compatibility with the Genesis console.[73] Even though Accolade's ultimate purpose was the development of Genesis-compatible games for sale, the appellate court found that Accolade's purpose in reverse engineering Sega's copyrighted software code was to study the functional requirements for Genesis compatibility and thus constitutes a fair use.[74]

In another case involving video games, Sony Computer Entertainment, the maker of the Sony PlayStation video game console, brought a copyright infringement action in 1999 against Connectix Corporation, which produced a software program called Virtual Game Station that allowed PlayStation games to be played on regular computers.[75] In order to develop the software program, Connectix needed to "reverse engineer" Sony's software that operates its PlayStation (called the basic input-output system or BIOS). Such reverse engineering, however, required Connectix to repeatedly copy Sony's copyrighted software. The district court ruled that the copying of the BIOS was not protected by the Copyright Act's fair use provision and issued an injunction that prevented Connectix from selling the Virtual Game Station.[76] The Ninth Circuit reversed the lower court and remanded with instruction to dissolve the injunction, holding that "[t]he intermediate copies made and used by Connectix during the course of its reverse

[69] Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. 77,668, 77,670 (Dec. 15, 2015), *available at* http://copyright.gov/fedreg/2015/80fr77668.pdf.

[70] Sega Enters. Ltd. v. Accolade, Inc., 977 F.2d 1510 (9th Cir. 1993); see also Sony Comput. Entm't. Connectix Corp., 203 F.3d 596 (9th Cir. 2000); Bateman v. Mnemonics, Inc., 79 F.3d 1532, 1539 (11th Cir. 1996); Atari Games Corp. v. Nintendo, 975 F.2d 832, 843 (Fed. Cir. 1992).

[71] *Sega Enters. Ltd.,* 977 F.2d at 1518.

[72] *Id.* at 1514.

[73] *Id.*

[74] *Id.* at 1520.

[75] *Sony Comput. Entm't, Inc.,* 203 F.3d at 598.

[76] *Id.* at 599.

engineering of the Sony BIOS were protected fair use, necessary to permit Connectix to make its non-infringing Virtual Game Station function with PlayStation games."[77] In reaching this decision, the appellate court relied on *Sega Enterprises* that had established the following rule regarding reverse engineering of software code in order to gain access to elements that are not protected by copyright: "Where disassembly is the only way to gain access to the ideas and functional elements embodied in a copyrighted computer program and where there is a legitimate reason for seeking such access, disassembly is a fair use of the copyrighted work, as a matter of law."[78]

In a lawsuit filed in 2010, the software company Oracle alleged that Google had copied parts of Oracle's software code related to its Java programming language and incorporated it into its Android mobile operating system, which is used in many tablets and smartphones.[79] Oracle argued that Google should have paid license fees to use the Java code and sought $8.8 billion in damages for the alleged copyright infringement, while Google asserted that it copied only a small portion of the code in order to transform it into a new mobile operating system that did not compete against any of Oracle's products.[80] In May 2016, a federal jury unanimously found that Google's use of the software code was protected by the fair use doctrine and thus was not liable for copyright infringement.[81] Oracle is expected to appeal the fair use decision to the U.S. Court of Appeals for the Federal Circuit.[82]

Software Licensees and First Sale Doctrine

In 2010, the U.S. Court of Appeals for the Ninth Circuit decided a significant case involving the rights of software licensees in *Vernor v. Autodesk, Inc.*[83] The appellate court held that the Copyright Act's first sale limitation on copyright holders' distribution rights (codified in Section 109) and the "essential step" limitation (in Section 117) on software copyright holders' reproduction rights do not apply to parties who are only licensed to use their copies of software; that is, they may not raise these statutory limitations as affirmative defenses to charges of copyright infringement. In this case, the software produced by Autodesk (called AutoCAD) was subject to a EULA that imposed several conditions and restrictions, including (1) Autodesk retains title to all copies of the software; (2) the customer is granted a nonexclusive and nontransferable license to use it; (3) the customer is prohibited from renting, leasing, or transferring the software without the company's prior consent; and (4) the customer is prohibited from engaging in certain activities such as modifying the software.[84] In addition, the appellate court noted that the software company has an elaborate system in place to enforce its license requirements:

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[77] *Id.*

[78] *Sega Enters. Ltd.,* 977 F.2d at 1527-28.

[79] Steve Lohr, *Software War Pits Oracle vs. Google,* N.Y. TIMES, Aug. 29, 2010.

[80] Jack Nicas, *Oracle and Google Head Back to Court,* WALL ST. JOURNAL, May 8, 2016.

[81] Joel Rosenblatt, *Google Beats Oracle on Copyright, Defeating $9 Billion Claim*, BLOOMBERG (May 26, 2016, 7:47 PM), http://www.bloomberg.com/news/articles/2016-05-26/google-beats-oracle-copyright-suit-wiping-away-9-billion-claim.

[82] Rachel King, *Google Prevails in Copyright Fight Against Oracle*, FORTUNE (May 26, 2016, 4:34 PM), http://fortune.com/2016/05/26/oracle-google-verdict/.

[83] 621 F.3d 1102 (9th Cir. 2010).

[84] *Id.* at 1104.

> It assigns a serial number to each copy of AutoCAD and tracks registered licensees. It requires customers to input "activation codes" within one month after installation to continue using the software. The customer obtains the code by providing the product's serial number to Autodesk. Autodesk issues the activation code after confirming that the serial number is authentic, the copy is not registered to a different customer, and the product has not been upgraded. Once a customer has an activation code, he or she may use it to activate the software on additional computers without notifying Autodesk.[85]

In 1999, Cardwell/Thomas & Associates, Inc. (CTA) purchased 10 licensed copies of the AutoCAD software program.[86] CTA later upgraded to a newer version of the software. Autodesk's software licensing agreement requires its customers to destroy copies of previous versions of the software.[87] However, instead of doing so, CTA sold the older software version to the defendant Vernor at an office sale. Vernor then listed several copies on eBay for sale.[88] In August 2007, Vernor brought a declaratory action against Autodesk, seeking a determination that his resales of the used software are protected by the first sale doctrine and do not infringe Autodesk's copyright.[89] The district court held that Vernor's sales were non-infringing under the first sale doctrine and the essential step defense.[90]

The Ninth Circuit vacated the district court's decision to grant summary judgment in favor of Vernor.[91] The appellate court explained that "a software user is a licensee rather than an owner of a copy where the copyright owner (1) specifies that the user is granted a license; (2) significantly restricts the user's ability to transfer the software; and (3) imposes notable use restrictions."[92] Applying this test, the court determined that CTA was a licensee, and not an owner, of a particular copy of copyrighted software, and thus not entitled under the first sale doctrine to resell the copies in its possession to Vernor.[93] Because CTA was a licensee, CTA could not, because of the restrictions in the license, convey title to the copies to Vernor, who could also not pass ownership to any prospective eBay purchasers.[94] The Ninth Circuit found that both CTA's original sale to Vernor and Vernor's sale on eBay infringed Autodesk's exclusive right to distribute copies of its copyrighted software.[95] Furthermore, the court explained that neither CTA, Vernor, nor Vernor's customers are entitled to invoke the essential step defense because they are all licensees and not owners of copies of the software.[96]

DRM Circumvention

In addition to copyright infringement claims, software copyright holders have sometimes added claims under Section 1201 of the DMCA if the defendant's actions involved circumvention of

[85] *Id.* at 1104-05 (internal citations omitted).

[86] *Id.* at 1105.

[87] *Id.*

[88] *Id.*

[89] *Id.* at 1106.

[90] Vernor v. Autodesk, Inc., 555 F. Supp. 2d 1164, 1170-71, 1175 (W.D. Wash. 2008), rev'd, 621 F.3d 1102 (9th Cir. 2010).

[91] *Vernor,* 621 F.3d at 1116.

[92] *Id.* at 1111.

[93] *Id.*

[94] *Id.* at 1112.

[95] *Id.*

[96] *Id.* at 1111-12.

technological security measures. For example, Apple filed a civil lawsuit in 2008 against Psystar Corporation, which made and sold unauthorized "clones" of Macintosh computers.[97] Apple had sold its Macintosh operating system on a DVD so that customers could upgrade their Mac computers to the latest version of the operating system; however, the terms of Apple's software license prohibited users from installing and running the software on any computers not manufactured by Apple.[98] To enforce this license restriction, Apple included a technological measure that prevented the operating system from working on non-Apple computers.[99] Apple alleged that Psystar used decryption measures to disable Apple's technological scheme and then installed the software onto its computers.[100] Apple sued Psystar for copyright infringement as well as for violations of the DMCA's anti-circumvention provision. The federal court agreed with Apple's copyright infringement claims, finding Psystar liable for violating Apple's exclusive rights of reproduction, distribution, and adaptation. The court also ruled in favor of Apple on its DMCA violation claim.

Analysis: Copyright Law and Software-Enabled Consumer Electronic Products

End user license agreements that apply to copyrighted software may prohibit the owner of an electronic device from reselling the product, or from modifying or repairing the installed software, unless such activities are performed by a service provider that has been authorized by the equipment manufacturer to do so. This section discusses how software licenses and the provisions of copyright law discussed herein may affect consumers' rights and expectations regarding the software-enabled devices and products that they purchase.

Resale of Devices

In many instances, the original equipment manufacturer may not develop the software programs embedded within consumer products; instead, the product manufacturer may enter into contracts with third-party software developers to produce customized software. Such contracts, however, are often license agreements that make the product manufacturer only a licensee of the software,[101] as opposed to owners of the software. Thus under the rationale of the *Vernor* case discussed above, the manufacturer cannot transfer title or ownership interest in the software to the consumer that purchases the product.[102] Instead, the consumer in this situation would acquire only

[97] Apple, Inc. v. Psystar Corp., 673 F. Supp. 2d 931 (N.D. Cal. 2009).

[98] *Id.* at 933.

[99] *Id.* at 934.

[100] *Id.* at 940-41.

[101] Comments of the Center for Democracy & Technology, Software-Enabled Consumer Products, Docket No. 2015-6, at 3, https://cdt.org/files/2016/03/Software-enableddevicesformatted.docx.pdf (last visited Aug. 10, 2016) ("[S]ome software developers grant only non-transferrable licenses [to product manufacturers] that allow installation solely on a specific device for a specific purpose.").

[102] *See* Darin Bartholomew, Senior Intellectual Property Counsel, Deere & Company, *Long Comment Regarding a Proposed Exemption Under 17 U.S.C. 1201,* at 5, *available at* http://copyright.gov/1201/2015/comments-032715/class%2021/John_Deere_Class21_1201_2014.pdf ("In some cases, the manufacturer of the vehicle may not have title or ownership interest in the software and can transfer no more rights than the manufacturer has.").

an "implied license" to use such embedded software that is an essential part of the product's functioning.[103]

Because the original purchaser of consumer electronic products merely holds a license to use the software embedded within them, the "first sale doctrine" is not applicable to this software, according to cases like *Vernor*. Instead, companies may offer customers the option of paying a "software license transfer" fee in exchange for the right to sell their software-enabled product to another consumer.[104] In the absence of obtaining such permission of the original equipment manufacturer, consumers who try to resell their software-enabled electronic devices may risk potential copyright infringement liability or liability for breach of the EULA contract. This possibility is often mentioned with respect to computers, servers, and telecommunications networking equipment,[105] but some believe that it could soon affect everyday consumer goods, as more of those products are sold with pre-installed software.[106] However, others have expressed doubts about this outcome, arguing, for example, that "[i]f a software company ever prevented owners of an everyday product from reselling their goods on the secondary market, it would not be long before the manufacturer of that product found a different software provider to partner with. Arguably, neither the software developer nor product provider would survive very long if it garnered a reputation for such anti-consumer behaviors."[107] In addition, the legal consequences of such resale activity have not yet been judicially established, as courts have not addressed whether, or to what extent, copyright infringement liability may apply in this situation.

Modification of Devices: the Example of "Locked" Cellphones

Copyright issues could also arise as a result of attempting to modify consumer software-enabled products. It is useful to consider the issue of product modifications through the lens of a recent example, involving "locked" cellphones. Cellphone carriers use software installed on wireless devices, such as iPhones and Android smartphones, to enable those devices to connect to their

[103] *Id.* at 6. An implied license "allow[s] reasonable use of the work by one party … by attributing to the work's creator/copyright owner implicit consent for such use." Orit Fischman Afori, Implied License: An Emerging New Standard in Copyright Law, 25 SANTA CLARA COMPUTER & HIGH TECH. L.J. 275, 277 (2009). In this context, an "implied license" gives the purchaser of a product that incorporates copyrighted software the right to use the product in a manner that was intended by the manufacturer. *Id.* at 282.

[104] Jennifer Abel, *The YODA Bill Would Let You Buy and Sell Used Electronics Without Copyright Problems,* CONSUMERAFFAIRS (Feb. 13, 2015), https://www.consumeraffairs.com/news/the-yoda-bill-would-let-you-buy-and-sell-used-electronics-without-copyright-problems-021315.html; *see also* Comments of the Center for Democracy & Technology, Software-Enabled Consumer Products, *supra* note 101, at 3 ("[Some] device makers use licensing agreements to require recertification fees or other steps in order for the subsequent purchaser to use the device.").

[105] Jon Healey, *New Bill Would Protect the Market for Used High-Tech Goods,* L.A. TIMES, Sept. 22, 2014, http://www.latimes.com/opinion/opinion-la/la-ol-farenthold-bill-first-sale-digital-devices-iphone-20140919-story.html ("Hewlett-Packard … requires that buyers of certain used HP servers pay $400 to license the software needed to operate them. Why? Because, the company explains, when it sells a server, it doesn't relinquish ownership of the copy of the software inside it. Instead, it merely grants the buyer the right to use it – a right that vanishes when the equipment is resold.").

[106] *See* Commerce Department White Paper, *supra* note 1, at 50 n.309.

[107] Comments of the Copyright Alliance, Software-Enabled Consumer Products, Docket No. 2015-6, at 12, https://www.copyrightalliance.org/sites/default/files/copyright_alliance_software_enabled_consumer_products_study.pdf (last visited Aug. 10, 2016); *see also* Initial Comments of the Software and Information Industry Association, Software-Enabled Consumer Products, Docket No. 2015-6, at 13, https://www.regulations.gov/document?D=COLC-2015-0011-0014 (last visited Aug. 10, 2016) ("In the event that 'everyday consumer products' were subject to license terms that restricted their transfer in secondary markets, courts would likely scrutinize those transactions using the indicia of sale and licensing developed in the common law and interpretative decisions of the copyright act, as appropriate.").

communication networks. Such software also ensures that the devices cannot operate on networks other than for which the device was originally used; the device is thus "locked" to a particular carrier such as AT&T or Verizon. The wireless carriers assert that they retain ownership of the phone's copyrighted software and only license it to consumers who purchase the phone.[108]

After their initial service contract expires, consumers may wish to modify their cellphones, or have them "unlocked," in order to use them on a different service provider's network. If the carrier or device retailer refuses to unlock the phone at the customer's request in order to fulfill this goal, the consumer (or an independent repair professional) could be in violation of the DMCA if he or she attempts to modify the phone's software in such a way that circumvents the digital lock (a DRM measure) that restricts the phone to the original carrier.

However, in rulemakings conducted in 2006 and 2010, the Librarian of Congress approved an exemption to the DMCA that allowed consumers to bypass or disable the software locks on their cell phones in order to move their phones over to other wireless networks, without incurring liability under the DMCA. The rulemaking provided that the DMCA's anti-circumvention provisions would not apply to "[c]omputer programs in the form of firmware that enable wireless telephone handsets to connect to a wireless telephone communication network, when circumvention is accomplished for the sole purpose of lawfully connecting to a wireless telephone communication network."[109]

In the fall of 2012, the Librarian curtailed the cell phone unlocking exemption, limiting it to phones that were originally acquired from a carrier before January 26, 2013.[110] Many consumer protection groups, digital rights activists, and newspaper editorials objected to the Librarian's decision to narrow the cellphone unlocking exemption.[111] The Obama Administration also called on Congress to provide a narrow "legislative fix" to ensure that consumers can switch carriers (and use their existing phones on alternative networks) once their service agreement has ended.[112] In response, Congress passed in 2014 the Unlocking Consumer Choice and Wireless Competition Act,[113] which temporarily restored the cellphone unlocking exemption from 2010. It also instructed the Librarian of Congress to consider (in its next rulemaking proceeding) whether to extend the unlocking exemption to include other types of mobile devices, such as tablet computers, in addition to cellphones.

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[108] *See, e.g.,* AT&T TERMS OF SERVICE, https://www.att.com/legal/terms.wirelessCustomerAgreement.html#howCanIUseTheSoftware (last visited Aug. 10, 2016) ("The software … provided for your Equipment … is licensed, not sold, to you by AT&T and/or its licensors/suppliers for use only on your Equipment. … You are not permitted to use the Software in any manner not authorized by this License. You may not (and you agree not to enable others to) copy, decompile, reverse engineer, disassemble, reproduce, attempt to derive the source code of, decrypt, modify, defeat protective mechanisms, combine with other software, or create derivative works of the Software or any portion thereof. You may not rent, lease, lend, sell, redistribute, transfer or sublicense the Software or any portion thereof. You agree the Software contains proprietary content and information owned by AT&T and/or its licensors/suppliers.").

[109] Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 70 Fed. Reg. 68,472, 68,476-77 (Nov. 27, 2006), *available at* http://www.copyright.gov/fedreg/2006/71fr68472.pdf.

[110] Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 77 Fed. Reg. 65,260, 65,278 (Oct. 26, 2012), *available at* http://www.copyright.gov/fedreg/2012/77fr65260.pdf.

[111] *See, e.g.,* Ajit V. Pai, *Don't Treat Consumers Like Criminals,* N.Y. TIMES, Jun. 5, 2013; Mitch Stoltz, *Is It Illegal To Unlock a Phone? The Situation is Better—and Worse—Than You Think*, ELEC. FRONTIER FOUND. (Jan. 28, 2013), https://www.eff.org/is-it-illegal-to-unlock-a-phone.

[112] R. David Edelman, *It's Time to Legalize Cell Phone Unlocking*, *at* https://petitions.whitehouse.gov/petition/make-unlocking-cell-phones-legal (last visited Aug. 10, 2016).

[113] P.L. 113-144.

In the most recent DMCA exemption rulemaking that was concluded in October 2015, the Librarian adopted a cellphone unlocking exemption similar to the 2010 exemption and also expanded the exemption to a variety of wireless devices such as tablets, mobile hotspots, and wearable wireless devices, such as smartwatches or fitness tracker devices.[114] In addition, the Librarian approved, for the first time, an exemption that permits circumvention of access controls to allow the diagnosis, repair, and "lawful modification" of "motorized land vehicles," such as personal cars, commercial vehicles, and agricultural equipment.[115]

The cellphone unlocking example demonstrates the possible copyright implications of modifying software-enabled devices. To the extent that such modifications require copying any embedded software in a device, the activity could be an infringement of the software copyright. And to the extent that such modification involves circumventing DRM measures (as it did in the cellphone unlocking scenario), the DMCA could also be involved. The Librarian's triennial rulemaking proceeding is a complicated, lengthy, and temporary way to address the issue. Furthermore, while the regulation directly applies to DMCA concerns, it would not affect copyright infringement claims.

Repair of Devices: the Proposed "Digital Right to Repair"

Consumers with broken electronic devices are faced with several options: (1) throw them away and purchase new, replacement models; (2) contact the original equipment manufacturer's repair division or a service provider that has been authorized by the manufacturer to perform repair work; (3) attempt to perform the repair themselves; or (4) seek out independently owned repair facilities that are willing to fix them.[116] Yet performing maintenance on software-enabled products "often will require copying of the software,"[117] and thus, anyone attempting to repair these products may risk violating the software copyright holder's right to control reproduction of the protected work. In addition, some manufacturers have threatened to take legal action against users for posting online copies of their copyrighted product service manuals (or other instructions for product repair), thus making it difficult for members of the public to locate such information.[118]

To address this situation, some consumer rights organizers and independent repair services have argued for a so-called "digital right to repair" to be enacted into federal or state laws that would either provide consumers with an affirmative right to repair their electronic property however they see fit or limit their liability for copyright infringement if they attempt such repairs. Advocates for a right to repair digital devices (such as iFixit[119] and the Repair Association[120]) believe that consumers should be given more options to fix their malfunctioning electronic

[114] Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 80 Fed. Reg. 65,944, 65,962-63 (Oct. 28, 2015), *available at* http://www.copyright.gov/fedreg/2015/80fr65944.pdf.

[115] Id. at 65,963; see also CRS Legal Sidebar WSLG1382, *Copyright Law Restrictions on a Consumer's Right to Repair Cars and Tractors*, by Brian T. Yeh.

[116] *See* Matchar, *supra* note 2 (observing that "[m]anufacturers have increasingly restricted repair information to authorized repair centers, leaving consumers and independent repair people unable to deal with even simple problems. It's just easier (and sometimes cheaper) to buy something new.").

[117] Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. 77,668, 77,670 (Dec. 15, 2015), *available at* http://copyright.gov/fedreg/2015/80fr77668.pdf.

[118] Kyle Wiens, *The Shady World of Repair Manuals: Copyrighting for Planned Obsolescence,* WIRED (Nov. 12, 2012, 6:00 PM), http://www.wired.com/2012/11/cease-and-desist-manuals-planned-obsolescence/.

[119] IFIXIT, http://ifixit.org/ (last visited Aug. 10, 2016).

[120] THE REPAIR ASSOCIATION, https://repair.org/ (last visited Aug. 10, 2016).

devices beyond the limited number of authorized dealers that may charge high repair prices, such as making publicly available do-it-yourself repair instructions or offering repair manuals, diagnostic equipment, and replacement parts to small, independent repair facilities.[121] In addition, advocates for a right to repair believe that repairing old or faulty devices contributes to the longevity of a product and reduces electronic waste by slowing down the pace of discarded electronics ending up in landfills.[122] Lastly, these groups believe that consumers would benefit from being able to purchase lower cost, "refurbished" electronics that are sold by resellers of used equipment.[123]

On the other hand, the consumer electronics industry has opposed legislative efforts to loosen restrictions on consumers' rights to repair or modify their electronic devices. Technology companies resist changing the status quo regarding electronics repair for a variety of reasons. First, they believe that "maintaining tight control over consumer repair options preserves the integrity of their products and provides a better customer experience."[124] In addition, electronic industry trade associations have raised concerns that manufacturers' confidential and propriety information may be at risk if they are required to divulge to anyone how their devices are made and can be repaired.[125] Also, according to the Consumer Technology Association (which represents a wide variety of electronics companies), manufacturers have created certification programs that provide tools and training to independent repair facilities that wish to apply to become authorized repairers of their electronic devices.[126] Finally, manufacturers have expressed concerns about the possible damage to their brand and reputation, as well as the safety of their customers, as a result of improper, faulty repair work done by unauthorized service providers.[127]

Federal Agency Studies Related to Software-Enabled Consumer Products

Two federal agencies that have responsibility for administering intellectual property laws have examined, or are in the process of reviewing, copyright issues relating to software-enabled consumer products or devices.

[121] Matchar, *supra* note 2.

[122] Karen Turner, *N.Y. Kills Right-to-Repair Bill That Could Make It Easier to Fix Your Phone,* WASH. POST (Jun. 22, 2016), https://www.washingtonpost.com/news/the-switch/wp/2016/06/22/n-y-kills-right-to-repair-bill-that-could-make-it-easier-to-fix-your-phone/.

[123] Neal St. Anthony, *Minnesota DFLer and Republican Work Together to Expand Local Electronic Repair Business,* MINN. STAR TRIBUNE (April 9, 2016, 3:46 PM), http://www.startribune.com/inside-track-minnesota-dfler-and-republican-work-together-to-expand-local-electronic-repair-business/374991531/.

[124] Turner, *supra* note 122.

[125] Damon Beres & Andy Campbell, *Apple Is Fighting a Secret War to Keep You From Repairing Your Phone,* HUFFINGTON POST (Jun. 9, 2016, 11:42 AM), http://www.huffingtonpost.com/entry/apple-right-to-repair_us_5755a6b4e4b0ed593f14fdea (quoting a Consumer Technology Association's statement in opposition to a Minnesota "right to repair" bill that "the [legislative] proposal could enable anyone posing as a repair shop to reverse engineer such a device to create counterfeit devices.").

[126] Letter from Consumer Technology Association to the Nebraska Legislature Re: Opposition to LB1072, Fair Repair Act (Feb. 23, 2016), at 2, http://sitefinity.dmz.ctia.org/docs/default-source/Legislative-Activity/coalition-letter-in-opposition-to-nebraska-lb-1072—-digital-right-to-repair.pdf?sfvrsn=2 (last visited Aug. 10, 2016).

[127] *Id.* at 4-5.

U.S. Department of Commerce Internet Policy Task Force "White Paper"

In January 2016, the Department of Commerce's Internet Policy Task Force published a White Paper that examined aspects of copyright law and policy in the digital age, including the applicability of the first sale doctrine to digital content and consumer devices that contain embedded software.[128] The Task Force concluded that copyright law's first sale doctrine did not require revision "at this time" because it found "insufficient evidence to show that there has been a change in circumstances in markets or technology" to justify it.[129] However, the White Paper noted that the situation may change in the future, explaining that:

> The Task Force did not hear evidence that licenses purporting to restrict a consumer's ability to resell [an electronic product] have been used with respect to embedded software that operates a functional product, other than a computer or related equipment. Thus, the record before us does not establish that … consumer products … are currently sold subject to such licenses. We do believe, however, that the alienability of everyday functional products is an important issue for consumers. If the market develops so that such devices are commonly sold with restrictions on subsequent purchasers' use of necessary software, further attention would be warranted.[130]

U.S. Copyright Office Forthcoming Report

On October 22, 2015, Senators Grassley and Leahy wrote a letter to the Register of Copyrights that requested the U.S. Copyright Office to "undertake a comprehensive review of the role of copyright" in "everyday products" that contain software.[131] The Senators asked the Office to seek public input in performing this review, "including from interested industry stakeholders, consumer advocacy groups, and relevant federal agencies."[132] The letter establishes a deadline of December 15, 2016, for completion of this report.

The Copyright Office published a notice of inquiry in the Federal Register on December 15, 2015, that invited public comments regarding the following issue: "whether the application of copyright law to software in everyday products enables or frustrates innovation and creativity in the design, distribution and legitimate uses of new products and innovative services."[133] The Office is also soliciting "information as to whether legitimate business interests or business models for copyright owners and users could be improved or undermined by changes to the copyright law in this area."[134] The notice specifically states that the study is not intended to address more general questions about copyright protection for software or issues involving the DMCA's prohibition on the circumvention of technological protection measures on copyrighted works.[135]

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[128] Commerce Department White Paper, *supra* note 1.

[129] *Id.* at 4.

[130] *Id.* at 64 (citations omitted).

[131] Letter from Senators Grassley and Leahy to Maria A. Pallante, Register of Copyrights, *supra* note 13, at 1.

[132] *Id.* at 2.

[133] Software-Enabled Consumer Products Study: Notice and Request for Public Comment, 80 Fed. Reg. 77,668 (Dec. 15, 2015), *available at* http://copyright.gov/fedreg/2015/80fr77668.pdf.

[134] *Id.*

[135] *Id.* at 77,668-69.

The Office has received a wide variety of public comments on this issue. For example, one group representing consumer interests argued that "consumer rights and expectations should be as equivalent as possible with respect to software-enabled consumer products as they have been for products containing no software."[136] Another commentator objected to the use of end user licensing agreements accompanying software-enabled devices, criticizing them as "contracts of adhesion, offered on a take-it-or-leave-it basis by service providers with far greater bargaining power, legal sophistication, and time to consider the terms than their users."[137] Finally, one public interest organization observed that:

> Users do not inherently distinguish between software-enabled devices and other devices they may own. When a user purchases a device, she likely assumes that she may use it for any purposes of which it is capable, repair it, alter it, sell it, or just give it away. Copyright's most significant influence on user engagement with software-enabled devices may be to limit which of these otherwise unremarkable activities are legitimate either under the terms of the [Copyright] Act or under the licenses that control access to and use of the software on that device.[138]

On the other hand, submissions from representatives of copyright holders oppose changes to current law to deal with software-enabled consumer products. An organization representing copyright holders argued that "[u]ntil we find ourselves confronted with significant examples of embedded software licensors actively preventing downstream consumers from reselling products that they own, it is prudent to consider this problem as no more than theoretical posturing."[139] A trade association of software and information industries stated that "[t]he licensing of software contributes to product integrity: the operation of the product in the manner in which the consumer expects, and the manufacturer intends. … The manufacturer and software provider should be permitted to decide whether or not the software in a consumer good has been licensed, sold, or is the subject of a service contract."[140] Finally, an organization representing many large and small businesses urged the Copyright Office to "resist any temptation to treat software in devices as deserving only second-class copyright protection. The software embedded in devices constitutes a copyrightable work and therefore deserves the full respect of the law."[141]

Legislation

Legislation has been proposed, but not passed into law, at both the federal and state levels, that would modify the rights of consumers with respect to software-embedded consumer electronic devices and products.

[136] Comments of Consumers Union to the U.S. Copyright Office, Software-Enabled Consumer Products Study, *supra* note 12, at 2.

[137] Comments of Electronic Frontier Foundation In the Matter of Software-Enabled Consumer Products Study, Docket No. 2015-06, at 4, *available at* https://www.regulations.gov/document?D=COLC-2015-0011-0009.

[138] Comments of the Center for Democracy & Technology, Software-Enabled Consumer Products Study, *supra* note 101, at 4.

[139] Comments of the Copyright Alliance, Software-Enabled Consumer Products, *supra* note 107, at 10.

[140] Initial Comments of the Software and Information Industry Association, Software-Enabled Consumer Products, *supra* note 107, at 10.

[141] Submission of Comments from the Global Intellectual Property Center, U.S. Chamber of Commerce, Docket No. 2015-6: Software-Enabled Consumer Product Study, at 6, https://www.regulations.gov/document?D=COLC-2015-0011-0016 (last visited Aug. 10, 2016).

Federal Legislation

Legislation has been introduced in the 114th Congress, the You Own Devices Act (YODA) (H.R. 862), that would amend the Copyright Act to provide that the first sale doctrine applies to any software program that is embedded in a machine or other product, thus permitting consumers to dispose of their unwanted electronic devices without needing to worry about copyright infringement. Specifically, YODA provides that "if a computer program enables any part of a machine or other product to operate, the owner of the machine or other product is entitled to transfer an authorized copy of the computer program, or the right to obtain such copy, when the owner sells, leases, or otherwise transfers the machine or other product to another person."[142] YODA also states that this transfer right may not be waived by any agreement. Thus, under YODA, if someone purchases a used electronic device, he or she would also acquire the right to use the software that makes the device function. In addition, YODA provides that the person to whom the machine or product is transferred is entitled to receive any security patches or other fixes to correct errors in the embedded software program.[143] The bill's amendments would take effect on the date of enactment and would apply to transfers of computer programs occurring on or after that date.[144]

Another bill, the Breaking Down Barriers to Innovation Act of 2015 (S. 990), would, among other things, require the Librarian of Congress, in making approval decisions regarding proposed temporary exemptions to Section 1201(a)(1) of the DMCA, to consider the impact that the DMCA's anti-circumvention prohibition has on "repair, recycling, research, or other fair uses, and on access to information not subject to copyright protection."[145]

The Unlocking Technology Act of 2015 (H.R. 1587) would directly amend the DMCA to allow circumvention of digital rights management and other technological protection measures if the purpose of such action "is to engage in a use that is not an infringement of copyright."[146] The legislation would thus create a permanent exemption to the DMCA so that consumers may unlock their electronic communication devices in order to switch cellular carriers. However, the amendment could also potentially apply to other types of consumer electronics.

State Legislation

State legislation to date has primarily focused on the "right to repair." Supporters of a right to repair electronic devices are attempting to duplicate the success of the automotive right to repair initiative. In 2012, an overwhelming majority of voters in Massachusetts answered yes[147] to an election ballot question asking them if they approve of state legislation "requiring motor vehicle manufacturers to allow vehicle owners and independent repair facilities in Massachusetts to have access to the same vehicle diagnostic and repair information made available to the manufacturers' Massachusetts dealers and authorized repair facilities."[148] After Massachusetts passed the

[142] H.R. 862, § 2(a), *adding new* 17 U.S.C. § 109(f)(1).

[143] *Id.*, § 2(a), *adding new* 17 U.S.C. § 109(f)(2).

[144] *Id.*, § 2(b).

[145] S. 990, § 3(a)(1)(B)(iii).

[146] H.R. 1587, § 2(a)(1)(B).

[147] The ballot measure passed with 86% of the vote. *See* Campaign 2012, Question 1: Approve Right to Repair Law, http://archive.boston.com/news/special/politics/2012/general/mass-ballot-question-1-election-results-2012.html (last visited Aug. 10, 2016).

[148] Secretary of the Commonwealth of Massachusetts, 2012 Information for Voters, *at* http://www.sec.state.ma.us/ele/ (continued...)

automotive right to repair law in 2013,[149] trade groups representing automobile manufacturers announced that they had reached an agreement with advocates of the automotive right to repair movement. First, the major automobile trade associations signed a "memorandum of understanding" with independent garages and auto parts retailers that essentially extends the provisions of Massachusetts' law nationwide.[150] In exchange, the advocates promised to stop lobbying other state legislatures regarding the enactment of right to repair legislation.[151] The agreement was intended to avoid a "patchwork of 50 differing state bills, each with its own interpretations and compliance parameters."[152] However, it is worth noting that the memorandum of understanding does not have the force of law and lacks penalties for noncompliance that are provided in the Massachusetts law.[153]

In the past few years, a small number of states (Minnesota,[154] Nebraska,[155] Massachusetts,[156] and New York[157]) have considered state legislation that would facilitate the repair of consumer electronic devices, though none have been enacted into law. These bills contain similar provisions, such as a requirement that original equipment manufacturers make diagnostic software and repair information and tools available for purchase by independent, third-party repair shops,[158] though the various proposals would not require manufacturers to divulge trade secrets in doing so.[159] In addition, while the legislation applies to digital electronic equipment, it expressly exempts motor vehicles.[160] Some critics of the legislation argue that the bills are too vaguely worded and would apply to too many electronic products (such as medical devices and farm equipment), thus encouraging a wide range of companies to combine their lobbying efforts in opposition to the measures.[161]

(...continued)

ele12/ballot_questions_12/quest_1.htm (last visited Aug. 10, 2016).

[149] Chapter 165 of the Acts of 2013, *at* https://malegislature.gov/Laws/SessionLaws/Acts/2013/Chapter165 (last visited Aug. 10, 2016).

[150] *Automakers and Aftermarket Move to Preserve Consumer Choice in Auto Repair,* AUTO ALLIANCE (Jan. 23, 2014), http://www.autoalliance.org/index.cfm?objectid=0879D470-8457-11E3-AB0B000C296BA163.

[151] Kyle Wiens, *You Gotta Fight For Your Right to Repair Your Car*, THE ATLANTIC (Feb. 13, 2014), http://www.theatlantic.com/technology/archive/2014/02/you-gotta-fight-for-your-right-to-repair-your-car/283791/.

[152] *Id.*

[153] *Id.*

[154] Minnesota Fair Repair Bill, SF3227, https://www.revisor.mn.gov/bills/text.php?number=SF3227&session=ls89&session_year=2016&session_number=0&version=latest&format=pdf (last visited Aug. 10, 2016).

[155] Nebraska Fair Repair Act, LB1072, http://nebraskalegislature.gov/FloorDocs/104/PDF/Intro/LB1072.pdf (last visited Aug. 10, 2016).

[156] Massachusetts Digital Right to Repair Bill, H.3383, https://malegislature.gov/Bills/189/House/H3383 (last visited Aug. 10, 2016).

[157] New York Fair Repair Act, S3998B, http://legislation.nysenate.gov/pdf/bills/2015/S3998B (last visited Aug. 10, 2016).

[158] Turner, *supra* note 122.

[159] *See, e.g.,* New York Fair Repair Act, S3998B, § 1(3). The Minnesota bill does not directly address trade secrets, however. Some observers have raised concerns that this exception may encourage electronics manufacturers to claim many of their documents and information as "trade secrets" in order to evade the legislation's disclosure requirements. Jennifer Abel, *Proposed "Right to Repair Electronics" Bill Moves Forward in New York State,* CONSUMERAFFAIRS (Mar. 30, 2015), https://www.consumeraffairs.com/news/proposed-right-to-repair-electronics-bill-moves-forward-in-new-york-state-033015.html.

[160] *See, e.g.,* New York Fair Repair Act, S3998B, § 1(6).

[161] Beres & Campbell, *supra* note 125.

Concluding Observations

Software installed on modern electronic devices and products help to shape the consumer's ownership experience by adding convenient features that enhance the product's operation (such as automation, connectivity to social media platforms, or operability with smartphone apps). However, such software may restrict (either by technological (DRM) or legal (licensing) means) the product's functions, accessories, or repair options to only those that have been authorized by the original equipment manufacturer. As described in this report, copyright protection of the software embedded in consumer devices affords certain benefits to the equipment manufacturer, while at the same time potentially creating uncertainty about the rights of users to resell, modify, or repair everyday products that they have purchased.[162]

The difficulty in analyzing software-enabled consumer electronic products from a copyright law perspective arises from the fact that software within the device is subject to copyright protection, and yet the physical hardware of the device is not copyrightable matter. In addition, the courts have not yet directly considered how fair use, the first sale doctrine, or the DMCA applies to consumers owning software-embedded products. The extent to which copyright law applies, or should apply, to such products thus remains open to debate. Some lawmakers and consumers may be satisfied with the status quo regarding the resale, modification, or repair of software-enabled products and, thus, may not see a need to make any changes to the law unless new circumstances warrant them. In addition, narrower, targeted legislation or market solutions could address the repair or modification of particular types of products, such as the examples of automobile repair and cellphone unlocking have demonstrated. Other interest groups, however, believe strongly in broadly protecting the ownership rights of consumers and object to efforts by device manufacturers to assert post-purchase control over electronic products through copyright law. If Congress decides that this issue merits legislative attention, it would likely need to weigh the appropriate balance between the rights of software copyright holders and manufacturers on the one hand and the rights and expectations of consumers on the other.

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[162] Letter from Senators Grassley and Leahy to Maria A. Pallante, Register of Copyrights, *supra* note 13, at 1 ("As software plays an ever-increasing role in defining consumer interactions with devices and products, many questions are being asked about how consumers can lawfully use products that rely on software to function. The public is rightly seeking clarity.").