

Manufacturers Beware of Right to Repair: An analysis of the Resurgence of Right to Repair & the Legal Consequences of Third-party Access to Embedded Software in the 'Internet of Things' Era

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MANUFACTURERS BEWARE OF RIGHT TO REPAIR: AN ANALYSIS OF THE RESURGENCE OF RIGHT TO REPAIR & THE LEGAL CONSEQUENCES OF THIRD-PARTY ACCESS TO EMBEDDED SOFTWARE IN THE 'INTERNET OF THINGS' ERA

By Lindsey Barrington*

I. INTRODUCTION

On March 18, 2019 California became the twentieth state to introduce Right to Repair legislation in one year.¹ The policy objectives for Right to Repair are straightforward: advocate for federal and state laws that make it easier for owners of consumer goods to fix a device when it breaks rather than relying on the Apple store.² However, since 2014, small farmers have joined the Right to Repair movement because major manufacturers, such as John Deere, have consolidated dealer networks in response to the consolidation of farming in the past decade.³

While proponents for Right to Repair legislation argue that consumers should be able to repair the electronics that they own, the introduction of farming equipment has complicated the landscape by comparing apples to oranges.⁴ Right to Repair bills have classified consumer goods and equipment broadly as digital electronic equipment containing "embedded software."⁵ Accordingly, heavy and complex machinery that contain microprocessors, such as off-highway engines, marine vessels, construction, and farm equipment, are subject to Right to Repair legislation rooted in concerns about access to service information for mass-produced consumer electronics.⁶

The 'slippery slope' of grouping mass-produced consumer electronics with agricultural and construction equipment began in the Copyright Office.⁷ In October 2015, the Register of Copyrights was confronted for the first time during its Sixth Triennial Proceeding with the challenging task of simplifying the diversified universe of embedded software into one category or definition.⁸

During the 2015 Section 1201 rulemaking session, the Librarian of Congress evaluated Right to Repair proposals for Section 1201 of the Digital Millennium Copyright Act ("DMCA") exemptions to anticircumvention for modern automobiles, agricultural equipment, and machinery grouped as the 'vehicle software' class.⁹ Ultimately, exemptions were granted to third-party users, such as independent repair shops and owners.¹⁰ These exemptions were granted based on legal defenses in the Copyright Act, which limit exclusivity rights for copyrighted works under 'fair use' justifications for copying or modifying 'functional' software.¹¹

Proponents of Right to Repair have made significant strides in gaining access to software from manufacturing companies by utilizing the exemptions provided in Section 1201 of the

DMCA.¹² Through this process, the exemptions on technological protection measures ("TPMs") for motorized land vehicles set a precedent for circumvention of proprietary software at the federal level, while also undermining emissions regulatory protections promulgated by the Environmental Protection Agency ("EPA") under the Clean Air Act.¹³

This article argues that the circumvention precedent for proprietary software, set forth during the 2015 Section 1201 rulemaking session, affirmed the legal justification for third-party users to effectuate broad Right to Repair legislation at the state level. Part II provides background on the origins of Right to Repair legislation. It discusses both Congress' reasoning for the creation of the DMCA anticircumvention statute and the litigation in response to the Clean Air Act during the 1990s. It then compares common law development of the tampering provision within the Clean Air Act and evaluates how the Clean Air Act factored into the Section 1201 rulemaking sessions, which led to current Right to Repair initiatives. Part III analyzes the extensive legal conflicts and consequences of providing third-party access to embedded software for diagnostic repairs and modifications per the Right to Repair provisions. Part IV recommends that Right to Repair legislation exempt equipment manufacturers from being classified as manufacturers that produce 'digital electronic equipment.' It recommends that the evolving digital era requires for the Copyright Office to sever ties with the Library of Congress in its rulemaking process. Part V concludes by highlighting the legal consequences of Right to Repair bills that would result if enacted in state.

II. THE CLEAN AIR ACT & ORIGINS OF RIGHT TO REPAIR LEGISLATION

President Nixon enacted the Clean Air Act on December 2, 1970 in order to decrease air pollution caused by a dramatic increase of cars on the road from urbanization and to quell the

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growing manufacturer concern of inconsistent state standards that would require manufacturers to develop vehicles differently for sale in different states.¹⁴ After a series of Congressional proposals in the 1980s, the 1990 Clean Air Act Amendment was established to reduce toxic air emissions and to improve the enforcement program for compliance purposes.¹⁵

In order to better monitor emissions in cars, the 1990 Amendments required auto manufacturers to develop new technologies and computer systems.¹⁶ Although the statute included provisions that protected independent repair shops from potential threats of monopolization by manufacturers and their authorized dealerships, the third-party repair community became weary of their ability to effectively repair vehicles after the Clean Air Act mandated that vehicles made after 1996 must include on-board diagnostic systems (“OBD”).

A. TAMPERING PROHIBITION & THE “KNOWINGLY” FACTOR

While Right to Repair efforts gained advocates in the automotive industry, the EPA navigated litigation away from liability enforcement under the 1990 Clean Air Act Amendment’s tampering provision.¹⁷ Although the Clean Air Act includes statutory language defining the act of tampering, the Sixth Circuit court in *United States vs. Haney Chevrolet, Inc.*¹⁸ developed the “knowingly” element when a manufacturer or dealer, either by removing or replacing a car part, renders a vehicle noncompliant with emissions standards and releases that vehicle from his or her custody.¹⁹

Shortly after the 1990 Clean Air Act became law, the court in *United States v. Economy Muffler & Tire Center, Inc.*²⁰ reaffirmed the Sixth Circuit’s definition of “knowingly” in the tampering statute.²¹ The defendant in *Economy Muffler* replaced a three-way converter with a two-way converter in violation of the Clean Air Act’s regulations.²² The court reasoned that, similar to the employee who removed a “device” or “element of design” in *Haney Chevrolet*, the Economy Muffler employee “knowingly” replaced a three-way converter with a two-way converter because Economy Muffler regularly received EPA-issued compliance notices for converter installations that were subject to Clean Air Act emissions standards.²³

Economy Muffler argued that the employee was ignorant of the compliance notice and made an honest mistake in replacing the compliant converter with a noncompliant one.²⁴ However, the court rejected this argument and expounded on *Haney’s* “knowingly” definition, which does not create an exception to liability based on ignorance of the environmental statute when proper notice of the prohibited replacement was provided to the employer in advance.²⁵

As software became more prevalent in equipment operating systems during the late 1990s, the Department of Justice (“DOJ”), on behalf of the EPA, exercised its enforcement power through a relatively new and controversial rulemaking process termed “regulation by litigation.”²⁶ Original equipment manufacturers were held accountable for violations of the tampering statute and paid millions of dollars in settlement.²⁷ These lawsuits garnered public attention because the EPA’s claims alleged that Fortune

100 manufacturing companies deceitfully installed defeat devices before selling noncompliant vehicles to unassuming customers.²⁸ As a result, the EPA issued more stringent emissions standards and compliance with these standards became part of a manufacturing company’s reputational strength in the market, while the “greening effect” took deeper roots in American socio-economic values.²⁹

Conversely, lawsuits brought by plaintiffs alleging product liability or fraudulent advertising claims related to emissions control defects in vehicles are generally preempted by the Clean Air Act.³⁰ However, in 2017, the United States District Court for the Eastern District of Michigan denied a motion to dismiss per the Clean Air Act’s statutory preemption section in favor of the “knowingly” concept established in Michigan’s duty to disclose doctrine.³¹

In *Counts v. General Motors, LLC*,³² General Motors (“GM”), argued that the plaintiffs’ claims of a defeat device in a vehicle that it manufactured and sold should be dismissed because the claims related to emissions control regulations and were preempted by Section 209 of the Clean Air Act.³³ However, the plaintiffs argued that fraud and consumer protection claims are not preempted because they are not attempts to enforce emissions standards.³⁴

B. SETTING THE STAGE: SECTION 1201 RULEMAKING

While the EPA continued to mandate a highly regulated emissions environment, the courts grappled with the advent of embedded software in everyday consumer products.³⁵ In 1998, Congress added Section 1201 to Title 17, which protects copyright owners from infringement in the new digital landscape.³⁶ By adopting this provision, Congress made a decision to provide a remedy for the copyright owner that is distinct from the traditional rights of the copyright owner under Section 106 of the Copyright Act.³⁷

The statute supported copyright owners’ use of TPMs as many copyrighted works, such as video games and other software, were beginning to be offered to the public in digital form.³⁸ However, Congress recognized that, in certain scenarios, circumvention could have a lawful purpose and spur innovation.³⁹

The original drafters of Section 1201 did not provide an option to adopt additional exemptions; however, the House Commerce Committee became concerned that not having the option to waive the prohibition would undermine the concept of fair use for consumers and innovators.⁴⁰ Originally, the Commerce Committee, in consultation with the Assistant Secretary of Commerce for Communications and Information, issued DMCA rulemaking with the consultation of the Commissioner of Patents and Trademarks and the Register of Copyrights.⁴¹ After a Senate and House conference, Congress modified these provisions by shifting the responsibility to the Librarian of Congress based upon a recommendation from the Register of Copyrights.⁴²

C. COMMON LAW COPYRIGHT TEST: IDEA V. EXPRESSION

In 1879, the Supreme Court decided *Baker v. Selden*⁴³ and established the scope of copyright protections afforded to original works.⁴⁴ The Court found that Selden's book illustrated only his unique system of book-keeping and reasoned that Baker read about Selden's unique system and decided to carry it out in a different way.⁴⁵ Therefore, the copyright protection extended only to the expression of an idea and not to the underlying idea itself.⁴⁶

This dichotomy is codified in Section 102(b) of the Copyright Act that protects the original work of authorship, but draws a line on non-expressive intellectual concepts, such as procedures and processes.⁴⁷ Courts still rely on the *Baker* doctrine that copyright protections extend only to expression and not to ideas, systems, or processes.⁴⁸ The advent of embedded software in mass-produced consumer products and other forms of machinery posed significant challenges for the Librarian's interpretations of Section 102(b) when applied to complex software code during the Sixth Triennial Proceeding.⁴⁹

The proposals from Right to Repair advocates seeking exemption from circumvention outlined arguments for the application of traditional copyright limitations, such as merger and fair use, that stem from the underlying concept of what is functional software versus what is expressive software.⁵⁰ However, the circuit court holdings were split on the idea versus expression dichotomy.⁵¹ More importantly, the tests that circuit courts endorsed to delineate between what is functional and what is expressive software caused more confusion amongst lawmakers and the Copyright Office, instead of offering a clear solution.⁵²

During both the 2015 and 2018 rulemaking sessions, manufacturers and trade associations warned the Librarian of the potential consequences that the new nature of software posed in granting exemptions to circumvention for repair purposes.⁵³ In *Oracle America, Inc. v. Google, Inc.*,⁵⁴ Oracle filed suit against Google alleging that Android's operating system infringed Oracle's copyright protections.⁵⁵ The jury ultimately found that Google infringed on Oracle's copyrights in thirty-seven Java software packages, but the jury returned a noninfringement verdict for eight decompiled security files.⁵⁶

Although the circuit courts remain split on determining what is expressive versus functional software, the most recent Ninth Circuit opinion adopted the Second Circuit's "abstraction-filtration-comparison" test.⁵⁷ In doing so, the Ninth Circuit rejected the bright line approach that an expressive software component, which is part of a larger, functional component, is uncopyrightable because it is predominately functional in controlling processes or systems.⁵⁸

During the Sixth Triennial Proceeding, the Librarian granted an exemption to permit circumvention of TPMs that protected electronic control units ("ECUs") from circumvention for the diagnosis, repair, or modification of vehicle software.⁵⁹ However, the Librarian disagreed with the Register's recommendation to include language that permitted circumvention of TPMs

"on behalf of" vehicle and agricultural equipment owners.⁶⁰ This decision was in response to letters from the EPA, the California Air Resources Board ("CARB"), and the Department of Transportation ("DOT") urging the Librarian to prevent exemptions on the circumvention of TPMs.⁶¹ In addition, the Librarian refused to enact the exemptions until twelve months after the conclusion of the rulemaking session in order for regulatory bodies to prepare for the lifting of the DMCA prohibition.⁶²

The renewal of circumvention measures for vehicle and equipment software granted in the Seventh Triennial Proceeding added a new element of potential circumvention "on behalf of" third-parties.⁶³ By permitting this language, the Librarian significantly increased the likelihood of third-party tampering and modifications, while reducing the likelihood of traceability to the original actor.⁶⁴

D. THE SCOPE OF RIGHT TO REPAIR PROVISIONS

State legislative efforts were the next step in enabling third-party access to software for Right to Repair advocates.⁶⁵ In 2019, Right to Repair have revamped calls for action across the United States and have garnered national attention from the left-wing of the Democratic party, such as Elizabeth Warren.⁶⁶ This national momentum continues as states are proposing new legislation into 2020 and supporters are seeking a favorable ruling from the Federal Trade Commission's first Right to Repair hearing on the federal level.⁶⁷ However, if one state were to enact a Right to Repair bill, the legal conflicts arising from federally mandated Clean Air Act regulations and copyright law are innumerable.⁶⁸

Right to Repair defines digital electronic equipment as equipment that is run, in part or in whole, by software embedded within the equipment.⁶⁹ This language groups mass-produced consumer products, such as iPhones and tablets, with large and complex machinery, inclusive of marine vessels, off-highway engines, construction and farm equipment, and stationary generators.⁷⁰ If a state enacts a Right to Repair bill, original equipment manufacturers who sell or manufacture in that state would face liability for third-party emissions violations. The provisions force manufacturing companies to hand over proprietary software to third-party users, but the regulatory environment remains intact.⁷¹ Moreover, the state would be responsible for regulating emissions based on EPA standards that differ by machine type.⁷²

Although firmware is normally encrypted and not proprietary, the definition of firmware pursuant to Right to Repair legislation includes several types of code that courts have protected from circumvention under Section 102(b).⁷³ Moreover, most bills require that manufacturers make available to independent repair shops or equipment owners the same diagnostic, and repair information that they make available to authorized repair dealers and at no cost to the third-party.⁷⁴

Notably, some states, such as Minnesota, Illinois, and Massachusetts, require that manufacturers of digital electronic devices sold or used in the state must make all diagnostic repair tools available to third-party users that are provided to a

manufacturer's engineering staff.⁷⁵ In addition, most Right to Repair bills include a provision that would force manufacturers of digital electronic equipment for sale or use in-state to allow third-parties the ability to unlock security-related software modules for repair purposes.⁷⁶

III. BLURRED LINES: AN ANALYSIS OF THE LEGAL IMPLICATIONS OF ACTIVE STATE RIGHT TO REPAIR LEGISLATION

Right to Repair advocacy groups, such as iFixit and Repair.org, set the legal precedent for classifying mass-produced digital electronic devices with agricultural equipment in the Section 1201 rulemaking sessions.⁷⁷ However, lawmakers in several states have drafted Right to Repair bills with extremely broad provisions that would effectuate burdensome liability and litigation costs on manufacturing companies if enacted in one state.⁷⁸

A. IMPACT #1: ENFORCING EMISSIONS STANDARDS

Courts apply the *Haney* “knowingly” element of the tampering statute to establish liability when the manufacturer or dealer knew or should have known that by removing, bypassing, or modifying an emissions control device, he or she would violate the Clean Air Act.⁷⁹ However, if a state enacted Right to Repair legislation, the manufacturer or dealer could be held liable for third-party violations because the “knowingly” provision assumes a heightened standard for the manufacturer or authorized dealer in relation to the customer or owner.⁸⁰

While Right to Repair legislation is silent on third-party liability, the provisions requiring access to proprietary code and firmware effectuates an equal relationship between the authorized dealer and third-party user in terms of the ability to modify software and render equipment noncompliant with the Clean Air Act.⁸¹ In some states, the extent of this unauthorized access is the same as highly trained engineers responsible for writing complex source code for the repair of operating systems within agricultural and industrial equipment.⁸²

Right to Repair legislation creates a liability structure that requires the manufacturer to remain compliant with federal regulations throughout the manufacture and sale of equipment in a state that lawfully provides repair shops and owners the right to access software, which could modify or bypass emissions control devices.⁸³

The regulatory world that equipment manufacturers live in requires significant compliance costs in order to develop equipment parts and software pursuant to Clean Air Act regulations.⁸⁴ In addition, these regulations differ for marine vessels, nonroad construction, farm equipment, and off-highway engines.⁸⁵ Under Right to Repair legislation, the third-party responsibility to remain compliant with stringent emissions standards for complex machinery categorized as digital electronic equipment is extremely ambiguous.⁸⁶ If a third-party intentionally or unintentionally modified an emissions device, the third-party, in certain states, could sue the manufacturer for failure to provide appropriate diagnostic tools.⁸⁷

As equipment technology continues to develop, repairs require modifications to sophisticated software embedded in the machine's operating systems that are rarely tangible and increasingly more difficult to trace, if modified, for reporting purposes.⁸⁸ Accordingly, in a Right to Repair state, a court's ability to objectively apply the “knowingly” standard in Section 203(a)(3) of the Clean Air Act becomes almost impossible for two primary reasons.⁸⁹ First, unlike the court in *Economy Muffler*, courts in jurisdictions with Right to Repair legislation would evaluate complex code or modifications to software instead of tangible parts that modified emissions in the vehicle or engine.⁹⁰ Second, the court would apply the “knowingly” indicator on a standard of review that would no longer exist due to third-party access to code and firmware.⁹¹ The DOJ would bring claims against the state or manufacturer for unlawful modifications that would not be easily traced back to the original modifier.⁹² Moreover, the “knowingly” standard would take on a different meaning because third-parties are provided access to software in the same manner as dealers and, in some cases, engineers, but without the reasonable training required to make sophisticated diagnostic repairs.⁹³

Although courts have held major manufacturing companies, such as Volkswagen, liable under the tampering statute for “knowingly” developing software algorithms or defeat devices that bypass emissions standards in vehicles, the application of the “knowingly” standard was unambiguous. Federal reporting and testing requirements sufficiently proved knowledge prior to distribution and sale.⁹⁴ The primary legal issue that Right to Repair legislation would pose to both federal and state courts is the ability to apply the “knowingly” standard on a third-party populace, which is relatively unregulated and not properly trained, but legally allowed access to highly sophisticated code and firmware.⁹⁵

Section 203(a) of the Clean Air Act requires that any modifications on engines or equipment must be reported to the original manufacturer and recertified.⁹⁶ If a Right to Repair bill were enacted in state, the court's holding in *Economy Muffler* indicates that the EPA could succeed in a defeat device claim against an independent shop owner for an employee violation if someone reported the violation.⁹⁷ However, the individual equipment owner's access to firmware and proprietary codes would create significant hurdles to both EPA compliance efforts for reporting and testing emissions regulations.⁹⁸

Moreover, Right to Repair legislation affords third-party equipment owners access to software that controls emissions regulation, but without requiring the supervision of an employer or trained engineer.⁹⁹ The problems with enforcement of the Clean Air Act stem from the lack of compliance with the federal regulatory structure that Right to Repair legislation endorses through untrained third-party access to complex equipment software.¹⁰⁰

Although Right to Repair provisions would, in practice, require companies to change how they operate prior to the sale of new engines and vehicles in order to avoid noncompliance, it is not clear how different jurisdictions would interpret the extent

of third-party access to software that could modify emissions.¹⁰¹ Further, if a state enacted Right to Repair legislation, the EPA would have to expend resources on monitoring violations of emissions regulations in order for the DOJ to justify bringing a preemption claim in federal court.¹⁰²

The EPA's regulation by litigation enforcement tactic would require constant surveillance of reporting and testing in states with Right to Repair legislation.¹⁰³ In essence, this state-by-state repair requirement unduly burdens manufacturers and dealers by forcing significant resource allocation towards outfitting equipment differently for sale in each state.¹⁰⁴ Although Section 209(a) of the Clean Air Act bars states from adopting or attempting to enforce emissions standards, the Right to Repair legislation has the ability to unravel the Clean Air Act's purpose without legally falling in scope of preemption.¹⁰⁵

B. IMPACT #2: A PATCHWORK OF STATES

Even if Right to Repair legislation could be preempted by Section 209(a), the court in *General Motors*, applied the consumer law duty to disclose doctrine in analyzing claims that GM "knowingly" sold a vehicle with a defeat device that created the appearance of low emissions.¹⁰⁶ Similar to the tampering provision, the duty to disclose doctrine placed GM in a distinguished class of superior industry knowledge, which required greater adherence to consumer protections in distributing the sale of complex machinery into the stream of commerce.¹⁰⁷

If the court applied the duty to disclose doctrine in a Right to Repair state, the plaintiff would strategically benefit from alleging a consumer protection claim that would fail to apply to Section 209 of the Clean Air Act.¹⁰⁸ Under the state court standard of review, the plaintiff could bring claims that put him or her in an implied inferior position of being in a position to know of the defeat device prior to purchasing or selling the vehicle or engine.¹⁰⁹

Accordingly, states with a consumer protection duty to disclose requirement that enact Right to Repair legislation would expose manufacturing companies to a damaging liability structure both pre-and-post sale.¹¹⁰ For example, if manufacturers are required to provide third-party owners and repair shops the same access to proprietary software as its engineering staff, then the manufacturing company loses its 'exclusive' or 'superior' knowledge status in relation to the consumer.¹¹¹ However, the manufacturer is not afforded any protection against third-party modifications while being forced to provide the proprietary software in active Right to Repair legislation.¹¹² Plaintiffs could bring consumer protection suits similar to those in the *General Motors* case that would not be preempted by the Clean Air Act; however, courts would be completely devoid of clear traceability to the exclusive knowledge of the deceitful modification prior to the sale or purchase that would fix liability.¹¹³

Under the duty to disclose doctrine, the threshold to constitute "active concealment of material fact" is met when the defendant installs a defeat device prior to distribution.¹¹⁴ Therefore, the manufacturer's ability to monitor third-party

modifications in each state becomes nearly impossible and unduly burdensome.¹¹⁵ This concrete example is one of several that could dismantle Congress' literal purpose in enacting the Clean Air Act, which prevents claims that have no effect on the applicable emissions standards and, if accepted, would lead to a chaotic patchwork of state standards.¹¹⁶

C. PREEMPTION POTENTIAL

During both the 2015 and 2018 public hearings for the Section 1201 rulemaking sessions, manufacturers and industry experts expressed concerns about granting exemptions to anticircumvention because of the sophistication of software in electronic equipment.¹¹⁷ The idea-expression dichotomy became less discernible and manufacturers feared that allowing unauthorized third-party access to diagnostic software would lead to violations against tampering prohibitions, intellectual property protections, and liability protections.¹¹⁸

The Right to Repair provisions requiring manufacturing companies to provide firmware, security-locks, and other diagnostic services that are provided to authorized dealers and, in some cases, engineers, could face potential federal preemption by Section 106 of the Copyright Act and/or could fail the licensee versus ownership test.¹¹⁹ However, unlike the environment in 2015, the rapid development of embedded software in nearly all products and machinery suggest that copyright law is in need of significant alteration to afford the protections necessary for the rapid advancements in technology.¹²⁰

Congress stated in Section 301(a) of the Copyright Act that no person may claim entitlement to a grant of rights under the common law or any State which are equivalent to the exclusive rights within Section 106 or within subject matter of Sections 102 and 103.¹²¹ As explained earlier, the Right to Repair provisional language that would most likely be preempted by the Copyright Act under Section 106 is the requirement for a manufacturer to provide software including, but not limited to, proprietary software, such as microcode or root code.¹²²

The broad scope of this language would likely interfere with the exclusive right and protection of source code that the Copyright Act affords its owners.¹²³ The idea-expressive dichotomy in Section 102(b) makes clear that originality of software makes the software eligible for copyright protection but does not necessarily mean that every aspect is protected if there are predominately functional components.¹²⁴

Understanding what is and what is not protected from preemption under the Copyright Act took on a new and ambiguous meaning with electronic equipment.¹²⁵ Moreover, the different idea-expressive tests employed by the Second and Tenth circuit courts concerning software infringement adds to this developing "swiss cheese" impact in analyzing how Right to Repair state law could be preempted by the Copyright Act.¹²⁶ For example, the exclusive right protection in Section 106 would traditionally preempt Right to Repair state legislation and prevent third-party access to the manufacturer's exclusive right to proprietary software.¹²⁷

However, the Section 1201 anticircumvention exemption process that “unlocked” proprietary software for third-party repair purposes has already conflicted with the manufacturers’ exclusive right protections in Section 106.¹²⁸ Now that exemptions have been granted to circumvent proprietary software for repairs on electronic equipment and circuit courts are split on copyright infringement tests for software in general, who is to stop the states from demanding access to source code?¹²⁹

The current circuit split on interpretations of Section 102(b) could allow for circumvention of source and/or access code to third-party repair shops and owners under Right to Repair legislation.¹³⁰ Copyright protection extends to computer programs as “literary works” pursuant to 17 U.S.C. § 102(a) (1).¹³¹ However, the functionality of a software program has been interpreted by the courts to serve as a defense against the copyright protections afforded to expressive works.¹³²

Under the *Oracle* abstraction-filtration-comparison test, the courts would have to interpret software in complex machinery that functions on many operating systems instead of one computer software program.¹³³ The court would then have to extract the uncopyrightable code including expressive source code that is incidental to the predominately functional code under review.¹³⁴ The problematic aspect of this common law test is that it has only been applied to basic software programs versus sophisticated operating systems in heavy equipment.¹³⁵

Moreover, other circuit courts have interpreted Section 102(b) of the Copyright Act to deny copyright protection to software systems that contain expressive components, but are used in a functional manner or definition.¹³⁶ This bright line approach would be the most damaging if applied to Right to Repair legislation for manufacturers of heavy and complex equipment because most all operating systems include firmware or software embedded within the machinery that has a functional purpose.¹³⁷

Courts utilize a four factor test in deciding whether a work affords copyright protections.¹³⁸ In applying *Oracle’s* opinion to Right to Repair legislation, the fair use affirmative defense to copyright protection could be very detrimental to manufacturing companies.¹³⁹ Although the other three factors could be framed against protections for proprietary software in the context of Right to Repair bills, the first factor requires that the court must inquire into the commercial nature of the use.¹⁴⁰ If the court finds that the use of the copyrighted work is commercial, then the fair use defense is generally dismissed.¹⁴¹ In the context of self-repair, the fair use analysis would generally be supported by a non-commercial use standard of repair and, thus, proprietary software would be subject to a ruling that would allow for circumvention under Section 1201.¹⁴²

Moreover, there are exceptions to preemption by the Copyright Act that would allow states to grant additional rights that are different from those in a copyright.¹⁴³ One such exception is if the violation of a right is not equivalent to any of the exclusive rights under copyright law, then the state common law or statute will be protected from preemption.¹⁴⁴ For example,

if Right to Repair legislation required distribution of firmware that was not technically proprietary because it did not contain unencrypted source code to third-party repair shops and owners, the distribution of this material to unauthorized repair shops and owners could be outside of the copyright law entirely.¹⁴⁵ However, the practice of putting this type of information into the hands of untrained personnel becomes magnified due to the complexities of the machinery.¹⁴⁶

IV. WITH GREAT POWER COMES GREAT RESPONSIBILITY: PROACTIVE SOLUTIONS FOR LAWMAKERS IN THE ‘INTERNET OF THINGS’ ERA

The 2019 Right to Repair bills include provisions for overly broad classifications that would force manufacturing companies and authorized dealers to provide third-party repair shops and owners with proprietary software.¹⁴⁷ This access would expose manufacturers to unnecessary risk in compliance with the Clean Air Act.¹⁴⁸

The ideal proposal for a solution to this legal conflict would be to alter the provisional language in the Right to Repair bills that enact overly broad manufacturer classifications.¹⁴⁹ This would exempt complex and heavy machinery from being subject to the same standards as mass-produced consumer products.¹⁵⁰

There are several reasons for eliminating broad classifications on software-enabled equipment. The first is related to compliance with regulations under the Clean Air Act.¹⁵¹ The second is the liability schema that Right to Repair legislation would impose on the manufacturer.¹⁵² Heavy equipment manufacturers are subject to regulatory mandates provided in EPA and DOT regulations.¹⁵³ Without sufficient language exempting manufacturers from liability after the sale of vehicles or engines, the manufacturing company would be subject to immense compliance costs for servicing products in state, which would take away from research and development.¹⁵⁴

Third and finally, Right to Repair legislation hurts the third-party repair campaign’s continuance by grouping electronic devices with equipment that is federally regulated.¹⁵⁵ The unfortunate fact for Do-It-Yourself proponents is that ‘The Internet of Things’ era will continue to transform consumers of everyday products into computer users and new industries will be brought into the scope of regulatory requirements for cybersecurity and product liability protections.¹⁵⁶ With that in mind, right to repair organizations should exclude industry sectors subject to regulations that currently exist.¹⁵⁷

In rapid time, the ubiquity of software has fundamentally changed how major companies, hospitals, and agencies operate in order to prevent cyber-hacking into control systems that threaten autonomous mining trucks to basic coffee machines.¹⁵⁸ Some states have realized this new reality and revised their Right to Repair bills to include a particular class of vehicles or products.¹⁵⁹ This significantly reduces the potential for burdensome liability on equipment manufacturers while affording protections for productive consumer innovations

and enabling a streamlined process for future section 1201 rulemaking sessions.

A proposed solution for concerns surrounding the Register's Section 1201 rulemaking process should include a re-evaluation of the role of the Librarian of Congress in granting exemptions to anticircumvention.¹⁶⁰ Given the fast-paced technological environment, the Librarian of Congress is likely not equipped for prospective determinations on copyright infringement for software embedded devices.¹⁶¹

The Sixth and Seventh Triennial reviews indicate that technology continues to outpace copyright law.¹⁶² Although the statutory law itself may serve the purpose that Congress intended, the content has changed significantly since codification.¹⁶³ In order to account for the introduction of autonomous vehicles and other 'smart' devices, copyright law and its rulemaking process should fall under the supervision of a federal agency that utilizes the resources and expertise required to address rulemaking with a practical understanding of how circumvention exemptions would impact cybersecurity, regulatory compliance, and intellectual property law.¹⁶⁴

This change would likely not negatively affect the dynamic between the public and the federal agency officials in the rulemaking process for public hearings. However, it would likely result in a less taxing process on resources spent towards identifying future legal inconsistencies in granting exemptions within the ever-changing software embedded universe of which copyright law has recently become involved.¹⁶⁵

Finally, as the world becomes increasingly digital and connected in the 'Internet of Things' era, federal agencies that are affected by software-enabled devices, machinery, and

other smart technologies should continue to weigh protections for companies and users prospectively.¹⁶⁶ The most damaging factors for circumvention of software in every day consumer products, automobiles, agricultural equipment, and construction equipment include the potential for cyber-hacking by bad agents in foreign countries and other intellectual property concerns that software embedded devices will continue to create in this globally interactive setting.¹⁶⁷

Therefore, lawmakers should assume a more proactive role in federal agency regulatory rulemaking processes.¹⁶⁸ In doing so, Congress and the judiciary will better mitigate conflicts caused by introductions of advanced technologies that both circumvent and conflate the relationship between the law and the protections it bestows on the marketplace of goods, producers, and consumers in the digital age.¹⁶⁹

V. CONCLUSION

The concept of Right to Repair is rooted in American culture. However, the advent of the 'Internet of Things' has required a different approach to circumventing diagnostic software and access codes that were considered tangible hardware only a decade ago. Maintaining the appropriate balance in federal and state law for software-enabled device protections and consumer ownership rights is not an easy task, but one that is exceedingly necessary to regulate highly intelligent and intangible technologies. The current Right to Repair legislation seeks to put an imbalanced, faulty scale in place by subjecting the manufacturing company and its dealer network, the third-party user, and the safety and health of society as a whole to unnecessary risk.



ENDNOTES

¹ Elise Barsch, *California Becomes 20th State to Introduce Right to Repair this Year*, iFixIT (Mar. 18, 2019), <https://www.ifixit.com/News/california-right-to-repair-in-2019>.

² Ben Gotschall, *Support Fair Repair in Nebraska*, BOLD NEB. (Feb. 24, 2016), <http://boldnebraska.org/support-fair-repair-in-nebraska/>.

³ See Kyle Wiens, *New High-Tech Farm Equipment is a Nightmare for Farmers*, WIRED (Feb. 5, 2015 7:00 AM), (<https://www.wired.com/2015/02/new-high-tech-farm-equipment-nightmare-farmers/>) (explaining that "[r]egulations are stricter, agribusiness is more consolidated, resources are more scarce, and equipment is infinitely more complicated and proprietary").

⁴ *Learn About "Right to Repair,"* R2R SOLUTIONS, <https://r2rsolutions.org/right-to-repair-legislation/> (last visited Apr. 9, 2020).

⁵ See S. 107, 191st Leg., Reg. Sess. (Mass. 2019).

⁶ *Learn About "Right to Repair,"* R2R SOLUTIONS, <https://r2rsolutions.org/right-to-repair-legislation/> (last visited Apr. 9, 2020).

⁷ See Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 80 Fed. Reg. 65,944, 65,954 (Oct. 28, 2015) (to be codified at 37 C.F.R. pt. 201) (exempting "computer programs that are contained in and control the functioning of motorized land vehicle").

⁸ See Karyn Temple Claggett, U.S. Copyright Office, *Software-Enabled Consumer Products*, at i-ii (2016) (noting that public comments and roundtable testimony suggest that drawing distinctions between types of software-enabled devices is complicated by the evolving nature of technology).

⁹ See Maria A. Pallante, U.S. Copyright Office, *Recommendation to Determine Exemptions to the Prohibition on Circumvention*, at 218 (2015)

(stating that modern vehicles require access to and alternation of computer programs in order to operate and repair malfunctions).

¹⁰ See Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 80 Fed. Reg. at 65,953 (permitting the circumvention of electronic control units for the purposes of diagnosis, repair, and modification of modern automobiles and agricultural machinery).

¹¹ See *id.* at 65,954 (concluding that reproduction of ECUs for diagnosis, repair, and modification is non-infringing activity as a matter of fair use).

¹² See Exemption to Prohibition on Circumvention of Copyright Protection Systems for Access Control Technologies, 83 Fed. Reg. 54,010, 54,022 (Oct. 26, 2018) (to be codified at 37 C.F.R. pt. 201) (proposing the removal of the requirement that circumvention be "undertaken by the authorized owner").

¹³ See Geoff Cooper, U.S. EPA, *Comment Letter on Proposed Exemption for Vehicle Software* (July 17, 2015), <https://www.copyright.gov/1201/2015/USCO-letters/> (stating "Under Section 203(a), the Agency has taken enforcement action against third-party vendors who sell or install equipment that can 'bypass, defeat, or render inoperative' software designed to enable vehicles to comply with CAA regulations").

¹⁴ Env'tl. Prot. Agency, *CLEAN AIR ACT REQUIREMENTS AND HISTORY* (last updated Jan. 10, 2017), <https://www.epa.gov/clean-air-act-overview/clean-air-act-requirements-and-history>.

¹⁵ Env'tl. Prot. Agency, *1990 CLEAN AIR ACT AMENDMENT SUMMARY*, <https://www.epa.gov/clean-air-act-overview/1990-clean-air-act-amendment-summary>.

¹⁶ Customer Choice in Automotive Repair Shops: Hearing Before the S. Comm. on Consumer Aff., Foreign Com., and Tourism., 107th Cong. 16-17

continued on page 37