ITEM A. COMMENTER INFORMATION

The Electronic Frontier Foundation (EFF) is a member-supported, nonprofit public interest organization devoted to maintaining the traditional balance that copyright law strikes between the interests of rightsholders and the interests of the public. Founded in 1990, EFF represents tens of thousands of dues-paying members, including consumers, hobbyists, artists, writers, computer programmers, entrepreneurs, students, teachers, and researchers, who are united in their reliance on a balanced copyright system that ensures adequate incentives for creative work while promoting innovation, discouraging censorship, and enabling broad and equal access to information in the digital age.

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ITEM B. PROPOSED CLASS ADDRESSED

Proposed Class 12: Computer Programs—Repair

ITEM C. OVERVIEW

Software-enabled devices are both ubiquitous and vital to modern life, which is why owners’ ability to repair, diagnose, and modify their devices is equally vital. Currently, users of these devices are stifled in making innovative, useful, and expressive uses of those devices as a harmful side effect of Section 1201(a)(1)’s ban on circumvention. Copyright law has destructively inserted itself into Americans’ ability to understand the technology around them, keep it in good repair, and make sure that it lives up to its potential to improve people’s lives.

The adverse effects of the ban on circumvention are not limited to any narrow category of devices, but impact a wide range of people seeking to make noninfringing uses of works within the proposed class. The evidence presented by proponents of Class 12 represents a wide range of software-enabled devices and demonstrates that an exemption taking a scattershot approach with
narrow conceptions of what devices are covered will miss the forest for the trees and will fail to adequately alleviate the adverse effects on users of the works in the proposed class.

**ITEM D. TECHNOLOGICAL PROTECTION MEASURE(S) AND METHOD(S) OF CIRCUMVENTION**

As described in the initial comments, the TPMs that interfere with repair, diagnosis, and modification of software-enabled devices consist of hardware and software that restrict access to data about the state of a device or that restrict modification of software or settings on a device. These TPMs include encryption, password protection, and read protection hardware.

Encryption is circumvented through decryption\(^1\) once one has discovered or otherwise obtained the decryption key.\(^2\) Password protection can be overcome through acquisition of a password from a third party\(^3\) or brute-forcing different input combinations to discover the password.\(^4\) Read protection hardware can be circumvented by altering the relevant protection bits using electronic means or through radiation with UV light.\(^5\)

**ITEM E. ASSERTED ADVERSE EFFECTS ON NONINFRINGEMENT USES**

1. **Standard of Decision**

Congress mandated that “[t]he Librarian shall publish any class of copyrighted works for which the Librarian has determined, pursuant to the rulemaking conducted under subparagraph (C), that noninfringing uses by persons who are users of a copyrighted work are, or are likely to be, adversely affected, and the prohibition contained in subparagraph (A) shall not apply to such users with respect to such class of works for the ensuing 3-year period.”\(^6\) Similarly, subparagraph (C) provides that the inquiry is “whether persons who are users of a copyrighted work are, or are likely to be in the succeeding 3-year period, adversely affected by the prohibition under subparagraph (A) in their ability to make noninfringing uses under this title of a particular class of copyrighted works.”

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1 17 U.S.C § 1201(a)(3)(A) (emphasis added).
2 scanlime, *Feiyu Gimbal Serial Hack*, YOUTUBE [https://www.youtube.com/watch?v=zLiJbQcjiNl&list=PLhbmdpDp9xEeO6E-ihfqqt8nycOP4S8r&index=3&ab_channel=scanlime](https://www.youtube.com/watch?v=zLiJbQcjiNl&list=PLhbmdpDp9xEeO6E-ihfqqt8nycOP4S8r&index=3&ab_channel=scanlime) (The relevant section of the video starts at 21:00); Taylor Killian, *Retrieving ST-Link/V2 Firmware from Update Utility*, (Jan. 6, 2013), [http://www.taylorkillian.com/2013/01/retrieving-st-linkv2-firmware-from.html](http://www.taylorkillian.com/2013/01/retrieving-st-linkv2-firmware-from.html).
5 Andrew “bunnie” Huang, *Hacking the PIC 18F1320*, BUNNIE:STUDIOS, [https://www.bunniestudios.com/blog/?page_id=40](https://www.bunniestudios.com/blog/?page_id=40).
The rulemaking exemptions have long been understood to grant freedom to operate for all persons who satisfy their requirements. Opponents propose a new requirement that only persons named in the rulemaking can benefit from it.\footnote{Class 12 Opposition Comment of DVD CCA and AACS LA at 4–5.} This proposal contradicts the statutory language stating that “such” users (not, for instance, “those” users) are exempt under the rulemaking exemptions. The most straightforward reading is that “such users” are “users of a copyrighted work.” Opponents’ novel restriction would also create repetitive and unnecessary work for the Copyright Office as every would-be beneficiary relitigates the issues, and would exacerbate the harm caused by an overbroad ban on circumvention by forcing every user to anticipate three years in advance and to hire their own attorneys. The process already depends upon the goodwill and free labor of dozens of public interest lawyers at nonprofits and law clinics to vindicate the rights of users; the Register should decline the invitation to adopt a new theory that serves no purpose except to impose new costs and traps for the unwary for those seeking to exercise their rights.

The Register should also not unduly narrow its authority to grant classes where the statutory standard has been met. In the past, the Register has considered whether a proposed class presents issues of sufficient “commonality” as to conclude that the evidence supports an exemption for that class, or if instead it will subdivide the class.\footnote{2018 Recommendation at 191.} As amply demonstrated by petitioners’ comments, there is substantial commonality of issues: the same types of TPMs, similar fair use analyses, and similar harms to users’ ability to engage in noninfringing activities.

2. The Covered Modifications Are Fair Uses That Advance Innovation

EFF’s initial comment demonstrated that modification of device firmware for the purpose of modifying how the device functions will in most cases be a fair use, regardless of the nature of the device or the modification. For eight examples—each involving different types of devices and different types of modifications—the application of the fair use factors was virtually identical and weighed heavily in favor of fair use.\footnote{See Class 12 Initial Comment of EFF at 18–20 (digital cameras); 23–26 (self-cleaning litterbox); 28-31 (printers); 33–36 (programmer/debugger); 38–41 (camera gimbal); 44–47 (e-reader); 49–53 (robotic companion); 55–58 (two-way radio).} By contrast, opponents have not presented their own fair use analyses, either for the examples offered and analyzed by EFF or for any other example of an allegedly infringing modification that would be covered by the proposed exemption.

Opponents attempt to distinguish \textit{Sony v. Connectix} and \textit{Sega v. Accolade} on the basis that those cases did not involve modification of the reverse-engineered source code. This distinction relies\footnote{MPA et al. incorrectly assert that all of these examples were included in EFF’s 2018 rulemaking comments. (Opposition Comment of MPA, ARM, and ESA at 7 & n. 21.) Not so. While EFF has provided expanded legal analysis and further factual details for certain of the use cases addressed in the last rulemaking, EFF has identified additional examples of adversely affected noninfringing uses in this cycle.}
on irrelevant differences of fact and is unsupported by case law. The derivative works right, just like the reproduction right, is limited by fair use. And contrary to opponents’ arguments, software modification is an eligible form of fair use.

In one recent example, a court held that a modification of Apple’s iOS was fair use, relying on Connectix and Sega. Corellium developed a product that “virtualizes” the Apple iOS, which means it enables the iOS software to run “on hardware it is not ordinarily meant to run on.” In order to do this, the Corellium product has to modify iOS, producing new software that “derives from a combination of Corellium’s code and Apple’s iOS code.” The court found this use transformative, rejecting Apple’s argument that Corellium “merely modifies iOS and ‘offers the software in a different medium.’” The court explained that Corellium’s modification of the code to add new features and benefits was a transformative use, not a mere repackaging Apple’s software. Like the software modification in Corellium, the modifications that would be covered by the proposed exemption would expand the utility of software-enabled devices, serving the goals of copyright.

Likewise, in Evolution, Inc. v. SunTrust Bank, it was fair use for defendant to incorporate copyrighted code into a derivative work to enable the derivative work to function with existing data structures. Since the functionality of embedded software is constrained by the existing hardware design and needs to interoperate, it is to be expected that derivative works will make fair use of existing code elements.

Finally, Section 117 specifically protects adaptation when the “adaptation is created as an essential step in the utilization of the computer program in conjunction with a machine and that it is used in no other manner.” This provision both protects the activities in the proposed class and demonstrates that they serve the purposes of copyright law such that they and similar uses ought to be considered fair use (whether or not they fall into the bright-line Section 117 safe harbor).

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12 Id. at *4.
13 Id. at *6.
14 Id. at *10.
15 Id.; see also id. at *11 (citing Sony Comput. Entm’t, Inc. v. Connectix Corp., 203 F.3d 596, 599, 606 (9th Cir. 2000)).
16 See id. at *10; see also 2018 Recommendation at 169 (recognizing that functionality-enhancing nature of jailbreaking favors a fair use finding).
3. The Proposed Exemption Will Not Harm the Market for Embedded Software

Opponents deny but do not rebut the argument that there is no likely effect on the market for embedded software, which composes the class of works subject to the exemption. Software-enabled devices are not sold as bare metal waiting for a separate purchase of operating firmware; they are sold with a copy of the firmware, and the copyright owner receives their compensation. This is true of all the devices described in petitioner’s initial comments and opponents provide no counter-examples.

Even if someone decided to infringe embedded software and distribute it, a person would need to own the hardware device for it to work. The economics of firmware markets and infringement simply do not have the properties of digital-only copying; they do not pose a substantial risk of substitution-based harms.

To be sure, a firm that holds the keys to what competitive software may be used on a device can use that leverage to extract monopoly rents, but that anticompetitive interest is contrary to the goals of copyright law. Interoperability is favored under the law even if a would-be monopolist may make less money thanks to the competition.20

4. The Proposed Exemption Will Not Encourage Infringement of Other Works

Some opponents claim that granting the proposed exemption would encourage infringement of other works and destroy markets for entertainment content. These arguments are specific to two narrow device categories: (1) DVD and Blu-ray players and (2) video game consoles.21 For the vast majority of devices that would be covered by the proposed exemption, no opposition at all has been submitted. Even as to the specific device categories addressed by opposition comments, the claims that an exemption would foster widespread infringement do not rise above a speculative level.

In past rulemakings, the Office has looked to the effect of previously granted exemptions in evaluating arguments that a new exemption would cause a meaningful increase in piracy. In 2018, the Office dismissed arguments that an exemption for jailbreaking voice assistant devices would result in piracy of streaming media.22 There, the Office noted that there was no evidence that other jailbreaking exemptions had led to increased piracy, and that opponents of the exemption had not demonstrated that a jailbreaking exemption for voice assistant devices was likely to be any different in this respect.

20 See, e.g., Sony, Inc. v. Connectix Corp., 203 F.3d 596 (9th Cir. 2000).

21 Class 12 Opposition Comment of DVD CCA and AACS LA at 2–4, 12–16; Class 12 Opposition Comment of MPA, ARM, and ESA at 6. DVD CCA and AACS LA also mention e-readers as an example of a device used to access other copyrighted work. Notably, no e-reader manufacturers or e-book publishers have submitted comments in opposition to Class 12.

The same reasoning applies here. Opponents of Class 12 have produced no evidence of increased infringement from any of the multiple existing jailbreaking exemptions, the first of which was granted over a decade ago; from the expansion of the vehicle repair and modification exemption to programs controlling telematics and entertainment systems; or from exemption for the diagnosis, maintenance, and repair of smartphones, home appliances, and home systems. Nor have they demonstrated that the ability to repair or modify any device within Class 12 poses a greater threat of infringement than the ability to repair or modify (which includes jailbreaking) the devices covered by existing exemptions. Likewise, markets for copyrighted entertainment media continue to thrive. Rightsholders for music, videos, e-books, and games continue to make their works available by the millions on smartphones and tablets, both of which have long been subject to jailbreaking exemptions and were also covered by the 2018 device repair exemption.

Opposition to a proposed class must be based on substantive evidence, not speculation about potential harms. Opponents simply have no non-speculative basis to assert that permitting users to repair and modify any kind of device firmware will spur increased piracy of entertainment media or deter creation of new entertainment content.

This lack of evidence is unsurprising. The proposed exemption would expressly apply only to software that controls the operation of the device—not to any other copyrighted works. Access to and copying of DRM-protected media are restricted by separate TPMs than those that restrict access to device firmware. The proposed exemption would not permit circumvention of those separate TPMs.

For example, DVD CCA and AACS LA state that the “TPMs of concern to [them] are the Content Scramble System (‘CSS’) used to protect copyright motion picture content on DVDs and the Advanced Access Content System (‘AACS’) used to protect copyrighted motion picture content on Blu-ray Discs.” The proposed exemption would not permit circumvention of those TPMs. As DVD CCA and AACS LA later admit, the code used by playback device manufacturers that they are worried about “is not part of the CSS or AACS technologies themselves” but rather “protect DVD and Blu-ray players from attacks that would expose the cryptographic keys necessary for the player to successfully play back copies of motion pictures distributed on CSS or AACS–protected discs.” Even assuming this code is a TPM controlling access to playback device firmware, which is not clear from the comment, circumventing it would not directly expose media content to infringement but rather would enable someone to access information that could in turn be used to circumvent the TPM protecting the disc content. In other words, accessing the media content would require another circumvention that would plainly not be covered by an exemption. DVD CCA and AACS LA present no evidence that someone who is willing to violate Section 1201 by circumventing the disc TPM will nonetheless be deterred by the potential consequences of circumventing the device TPM in the absence of an exemption—a proposition that defies common sense.

24 Class 12 Opposition Comment of DVD CCA and AACS LA at iii.
25 Class 12 Opposition Comment of DVD CCA and AACS LA at 12.
Relatedly, DVD CCA and AACS LA also argue that certain firmware modifications could be seen as “gaining access to (i.e., making use of)” other copyrighted works. To the extent that modifying firmware in a way that affects how it interacts with other copyrighted works qualifies as accessing those works, EFF in a sense agrees with opponents that the exclusion of circumventions “done for the purpose of gaining access to other copyrighted works” is not a helpful limitation here. Modifications that allow device owners to use copyrighted works in new ways should be covered by the exemption. There are many such uses that would be noninfringing, including opponents’ example of modification of e-readers to read more e-book formats. That is exactly the type of interoperability recognized as a favored purpose in cases like Sony v. Connectix and Sega v. Accolade. Moreover, as discussed above, the exemption still would not permit circumvention of any separate TPMs controlling access to other copyrighted works, such as the DRM schemes used to protect e-books. If the Office believes it necessary, it can make that limitation explicit by stating that the exemption does not extend to circumventions done for the purpose of circumventing further TPMs controlling access to other copyrighted works. But making the possibility of accessing other copyrighted works the dividing line between permitted and prohibited circumventions would make it all too easy for device manufacturers to gut the exemption.

5. Considerations Unrelated to Copyright Are Not an Appropriate Basis to Deny an Exemption

In its 2017 Section 1201 Report, the Office recognized the need to keep its analysis focused on copyright interests, and it assured Congress that it would “generally decline to consider health, safety, and environmental concerns.” The Office further correctly stated that “other agencies should not rely on section 1201 to help enforce or cover gaps in their own health, safety, environmental, or other regulations.” In the 2018 rulemaking, the Office applied these guiding principles and rejected arguments based in “concerns regarding vehicle safety, environmental impact, unauthorized access to private data, and compliance with regulations promulgated by other federal agencies.” Several opponents of Class 12 nonetheless argue that the Office should reject or limit the proposed exemption for the very same types of non-copyright-related reasons. The Office should decline to consider those arguments.

The position taken by the Office in the Section 1201 Report is consistent with the purpose, text, and structure of the statute. Section 1201 was enacted for the benefit of copyright owners, to

26 Class 12 Opposition Comment of DVD CCA and AACS LA at 3.
27 Id. at 4.
28 Section 1201 Report at 125–126.
29 Section 1201 Report at 126.
30 2018 Recommendation at 215.
31 See, e.g., Class 12 Opposition Comment of ACT at 6; Class 12 Opposition Comment of Philips at 9, 17–19; Class 12 Opposition Comment of Equipment Dealers Association and Associated Equipment Distributors at 8, 14–16; Class 12 Opposition Comment of AdvaMed at 11–14.
protect their copyright interests. The statute provides that the ban on circumvention “shall not apply” to noninfringing uses of copyrighted works when the Librarian determines that such uses are adversely impacted. And the statute requires that the Librarian “shall publish” each class of works for which adverse impact is shown. The enumerated “adverse impact” factors all tie directly to interests traditionally considered by copyright law, particularly under Section 107 and Section 108. While the statute also permits the Librarian to consider other factors as appropriate, that discretion is not unlimited and must be informed by the other, specified factors. Affording some degree of flexibility to consider other factors mirrors the flexibility of the fair use analysis. Like Section 1201(a)(1)(C), Section 107 identifies four factors that must always be considered while making clear that the list is non-exhaustive. But that does not mean a court evaluating fair use may consider whatever else it wants—that discretion is limited to factors that reasonably bear on the ultimate question of the proper scope of the copyright owner’s exclusive rights. In this same way, the Librarian’s discretion is cabined by the statutory standard: whether noninfringing uses are adversely affected, such that they should be excluded from the scope of the copyright owner’s right to control access to copyrighted works.

6. Adequate Alternatives to Circumvention Do Not Exist

Some opponents of Class 12 argue that device repair and modification are not adversely affected by Section 1201 because of non-circumventing alternatives available to users. The supposed “alternatives” these commenters identify do not pass muster.

DVD CCA and AACS LA posit that repair of DVD and Blu-Ray players is not adversely affected because the user may be able to purchase a replacement for less than it would cost to have a professional repair it. “Throw it in the trash and get a new one” is hardly a substitute for self-repair. Even assuming that buying a new player would be cheaper, cost-saving is not the only benefit to self-repair. For users who want to reduce e-waste or use device repair as an educational tool, for instance, buying a new player is not an adequate alternative. DVD CCA and AACS LA also fail to reliably support their assertions about economic efficiency. Their only citation for this point is to a forum comment posted by someone who appears to own an AV system installation company—neither a conclusive nor unbiased source. Even that person estimates that the cost of a DIY Blu-ray player repair may be as low as $10 and acknowledges that the additional effort of a repair may be “worth it” to someone who is “into repairing

35 See Castle Rock Entm't, Inc. v. Carol Publ'g Grp., Inc., 150 F.3d 132, 141 (2d Cir. 1998) (“The ultimate test of fair use, therefore, is whether the copyright law's goal of “promot[ing] the Progress of Science and useful Arts . . . would be better served by allowing the use than by preventing it.” (citation omitted)).
36 Class 12 Opposition Comment of DVD CCA and AACS LA at 18–19.
37 Class 12 Opposition Comment of DVD CCA and AACS LA at 18 n. 32.
electronics.”  Moreover, both the opposition comment and the forum post assume that a bottom-shelf player will be an adequate substitute for the broken device. By contrast, another response to the same forum question states: “If you’re talking about a higher end Blu-ray player like an Oppo, Denon or other audio/videophile brands, it probably would be worth it, as these frequently command prices of $500 and up.”

ACT also claims that device users have adequate alternatives to circumvention, pointing to “the availability of open-source software to build custom devices, damage warranties, and certified repair options.” ACT does not elaborate on how the availability of unspecified open-source software obviates the need for an exemption. Asserted alternatives to circumvention “should be realistic and not merely theoretical.” In any event, the Office has rejected nearly identical arguments from ACT in the past. In the 2018 rulemaking, ACT opposed an exemption for jailbreaking voice assistant devices and argued that consumers could use open-source software to build their own solutions. The Acting Register dismissed that option as neither “realistic” nor “sufficient,” explaining that the cost and burden of building a custom device went far beyond “mere inconveniences.” In that same rulemaking, the Acting Register also rejected arguments that the existence of manufacturer-authorized repair channels provided an adequate alternative to circumvention, for reasons including their availability, their cost, and their failure to address self-repair. Moreover, as the Office recognized in the Section 1201 Report, “virtually all agree that section 1201 was not intended to facilitate manufacturers’ use of TPMs . . . to achieve a lock-in effect under which consumers are effectively limited to repair services offered by the manufacturer.”

7. The Exemption Must Not Preclude Third-Party Assistance

The Copyright Office can and must grant exemptions to 1201(a)(1) for noninfringing activities, even when done on behalf of another.

38 Class 12 Opposition Comment of DVD CCA and AACS LA at 18 n. 32.
40 Class 12 Opposition Comment of ACT at 2.
41 Section 1201 Report at 122.
42 2018 Recommendation at 175.
44 Section 1201 Report at 1201 n. 92.
In the 2018 rulemaking, the Acting Register recommended that the exemption for vehicle repair, diagnosis, and modification omit the requirement that circumvention be “undertaken by the authorized owner.” The recommended exemption for diagnosis, repair, and maintenance of smartphones, home appliances, and home systems likewise did not include any such language. Instead, the Acting Register recommended that these exemptions remain agnostic as to third-party assistance. The recommendation noted that this approach was in keeping with the Section 1201 Report, in which the Office stated it would “seek to avoid recommending unduly narrow definitions of exemption beneficiaries” in future rulemakings. The Register should continue that approach here, for two reasons.

First, nothing in the statute or its legislative history, nor any court decision, limits “users of a copyrighted work,” as that term is used in Section 1201(a)(1), to owners of copies, nor to owners of devices. A repair technician who runs the software on a device in the course of a repair is also a user of that software.

Second, the scope of prohibited trafficking under Sections 1201(a)(2) and (b) has not been clearly defined by the courts. It remains possible to craft an exemption that would authorize using tools to carry out a circumvention on behalf of a third party without authorizing activities prohibited by Section 1201’s anti-trafficking provisions. Including repair technicians and other service providers within a 1201(a)(1) exemption will protect and encourage repair and modification that does not constitute trafficking. That Sections 1201(a)(2) and (b) may prohibit some activities relating to third-party repair and modification must not prevent the Register from granting a 1201(a)(1) exemption to permit those that do not.

The approach taken in the 2018 rulemaking will allow courts to decide cases about the contours of 1201(a)(2) and (b) rather than resolving those cases on broader 1201(a)(1) grounds. If the Office excludes third-party assistance from exemptions on the ground that some services may cross a line that has yet to be clearly marked by the courts, then the courts will never draw that line, and legitimate third-party activity will remain suppressed. This result would be contrary to the Librarian’s mandate to address adverse effects on noninfringing uses.

While Auto Innovators and Equipment Dealers Association et al. assert that third-party assistance with repair, diagnosis, or modification that requires circumvention is always a “circumvention service” prohibited by Sections 1201(a)(2) and (b), they provide no support for that assertion. This is unsurprising, as no court has so held. Defining all third-party assistance as prohibited trafficking would render the express limitations of Sections 1201(a)(2) and (b) largely or entirely superfluous. For the reasons identified in the Section 1201 Report, the 2018

45 2018 Recommendation at 224.
46 2018 Recommendation at 230.
49 Class 12 Opposition Comment of Auto Innovators at 5–6; Class 12 Opposition Comment of Equipment Dealers Association and Associated Equipment Distributors at 6–7.
rulemaking, and this proceeding, an exemption should not categorically preclude third-party assistance.

Based on the foregoing, the Register should recommend an exemption for repair, diagnosis, and modification of software-enabled devices.

**DOCUMENTARY EVIDENCE**

This reply comment does not include documentary evidence.