June 29, 2012

David O. Carson
General Counsel
U.S. Copyright Office
P.O. Box 70400
Washington, DC 20024

Re: Docket No. RM 2011-7
        Exemptions to Prohibition on Circumvention of Technological
        Measures that Control Access to Copyrighted Works

Dear Mr. Carson:

Thank you for the opportunity to participate in the recent hearings in the Copyright
Office's 1201 rulemaking proceeding, and for your follow-up questions on proposed
Class 3. We appreciate the opportunity to supplement the factual record.

1. **The proposed class of works for video game consoles appears to be broad
    enough to encompass all past, present, and future video game systems. Is
    there any evidence that scientists and homebrewers need an exemption to
    circumvent technological protection measures on the original Playstation, the
    Playstation 2, XBOX, all iterations of Nintendo's video game consoles prior
    to the Wii, and any other legacy videogame console?**

Yes.

Various legacy consoles have strong communities dedicated to homebrew game
development, among other non-infringing uses.[1] For example, users have modified the
unique synthesizers in the Nintendo Entertainment System and the Game Boy handheld
to transform these devices into musical "chiptune" instruments.[2] Artists have also created
real-time audio-visual displays on older consoles.[3]

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[1] For a summary of homebrew activity related to a wide variety of legacy consoles, see Homebrew (video games), http://en.wikipedia.org/w/index.php?title=Homebrew_(video_games)&oldid=497847311/ (last visited June 29, 2012); *see also, e.g.,* Retrozone, http://www.retrousb.com/index.php?cPath=30&osCsid=f1b806b793d7c4dc57832f0bd1a8d40c (last visited June 29, 2012) (examples of Nintendo Entertainment System homebrew games).

[2] Vijth Assar, *The Art of Music with Chips: Behind the Scenes with 8-bit Band Anamanaguchi*, CREATE DIGITAL MUSIC, Aug. 18, 2009, http://createdigitalmusic.com/2009/08/the-art-of-music-with-chips-behind-the-scenes-with-8-bit-band-anamanaguchi/; Mike Szczys, *Chiptune instrument from NES*, HACK A DAY, Oct. 3, 2010, http://hackaday.com/2010/10/03/chiptune-instrument-from-nes/; David Wolinsky, *8-bit punks Anamanaguchi beyond the side-scrollers*, THE A.V. CLUB, Aug. 12, 2009,

These innovative uses of legacy consoles may involve direct manipulation of the console's hardware or running independently designed software.[4] However, some of them contain lock-out systems to prevent consoles from booting cartridges or disks unapproved by the manufacturer. For example, the Nintendo Entertainment System used the 10NES chip to authenticate cartridges.[5] The original Sony PlayStation required game CDs to have a deliberately incorrect error code in a particular location, which could not be reproduced by a standard CD burner.[6] Sega placed a "protection ring" around the edge of game CDs to prevent unauthorized disks from playing on the Sega Saturn console.[7]

Furthermore, several legacy consoles contain firmware protected by encryption or other technological protection measures. For example, the firmware of the original Xbox employed a secure boot mechanism that allowed the console to run only code digitally signed by Microsoft. Users must circumvent this mechanism to install or run any other software on the console. Sony's PlayStation 2 and Nintendo's GameCube also featured various forms of technological protection measures.[8]

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http://www.avclub.com/chicago/articles/8bit-punks-anamanaguchi-beyond-the-sidescrollers,31388/ (interviewing a well-known band that uses the Nintendo Entertainment System to play chiptune music).

[3] Brian Benchoff, *Adding visuals to chiptune performances*, HACK A DAY, Jan. 30, 2012, http://hackaday.com/2012/01/30/adding-visuals-to-chiptune-performances/ (Sega Genesis modified to make visual art during chiptune performances); *see also* Joshua Kopstein, *Demoscene: The Original Hacker Art Underground*, MOTHER BOARD, May 18, 2010, http://motherboard.vice.com/2010/5/18/demoscene-the-original-hacker-art-underground.

[4] *See*, *e.g*., Joshua Kopstein, *Magical Game Boys: Demystifying the Live Chiptune Performance*, MOTHER BOARD, May 20, 2011, http://motherboard.vice.com/2011/5/20/magical-game-boys-demystifying-the-live-chiptune-performance ("Practitioners of chip music have traditionally used trackers to compose music for the vintage computer systems they perform with. This type of software, which was typically home-brewed and distributed on the Web—or initially, diskette— . . . provid[ed] a stripped-down but nevertheless adequate method for composing music on early computers.").

[5] *Atari Games Corp. v. Nintendo of Am. Inc.*, 975 F.2d 832, 836 (Fed. Cir. 1992); 10NES, http://en.wikipedia.org/w/index.php?title=10NES&oldid=499261627 (last visited June 29, 2012); CIC (Nintendo), http://en.wikipedia.org/w/index.php?title=CIC_(Nintendo)&oldid=499260767 (last visited June 29, 2012).

[6] PlayStation (console), http://en.wikipedia.org/w/index.php?title=PlayStation_(console)&oldid=499574468 (last visited June 29, 2012).

[7] Vital Frag, *Cracking Sega Copy Protection*, MYCE, March 13, 2006, http://club.myce.com/f80/cracking-sega-saturn-copy-protection-170852/#.T-0FWytYvdx.

[8] *See, e.g.,* PSOload, GAMECUBE LINUX WIKI, http://www.gc-linux.org/wiki/PSOload/ (last visited June 29, 2012) (explaining how to install Linux on a Nintendo GameCube using an exploit in an online video game).

Therefore, an exemption from Section 1201 is necessary to facilitate homebrew projects on these legacy consoles.

Our research has not identified examples of individuals using legacy consoles to perform scientific research. It may be that legacy consoles do not have computing capabilities powerful enough for that purpose. However, archivists may require an exemption to circumvent access controls on older consoles for preservation or repair purposes. *See* Jerome McDonough & Robert Olendorf, et. al., *Preserving Virtual Worlds Final Report*, ILLINOIS DIGITAL ENVIRONMENT FOR ACCESS TO LEARNING AND SCHOLARSHIP (Aug. 31, 2010), http://www.ideals.illinois.edu/handle/2142/17097.

> **2. The proposed class of works may be read to encompass handheld gaming platforms such as the Playstation Vita and all iterations of Nintendo's Game Boy and DS systems. Is there any evidence that scientists and homebrewers have a need to circumvent technological protection measures on such devices?**

Yes.

Portable gaming devices like the Nintendo Game Boy, Game Boy Advance, Game Boy Color, DS, and DSi can be used as musical synthesizers.[9] There are also homebrew communities developing independent programs for handheld gaming platforms.[10]

Modern handheld systems such as the PlayStation Vita and Nintendo 3DS contain numerous technological protection measures that restrict homebrew or other custom applications.[11] The original PlayStation Portable must also be jailbroken to play any

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[9] *See*, *e.g*., LITTLE SOUND DJ, http://littlesounddj.com/lsd/ (last visited June 29, 2012) ("The basic idea is to transform a plain Game Boy/Game Boy Color into a full-fledged music workstation."); Nanoloop, http://www.nanoloop.de/ (last visited June 29, 2012) (an electronic music program for handheld devices, including the Game Boy and Game Boy Advance); Rhythmcorealpha, *Rhythm Core Alpha: Sequencer/Synthesizer on Nintendo DSi: Unrehearsed Jam at Kulak's*, Sept. 30, 2010, https://www.youtube.com/watch?v=TseeClZX0oU.

[10] *See*, *e.g*., GBADEV.ORG, http://www.gbadev.org/ (last visited June 29, 2012) (Game Boy Advance homebrew community with more than 11,000 members); PSP Hacks, http://psp.dashhacks.com/ (last visited June 29, 2012) (PlayStation Portable homebrew site); Darthgord, *WGTV—Gameboy Advance Homebrew*, May 30, 2008, https://www.youtube.com/watch?v=vneATRrNVbU.

[11] *Can Sony's PS Vita be Jailbroken to play free pirated games? Not if the PSVita card can help it*, INFORMAL GADGET, Feb. 22, 2012, http://www.informalgadget.com/files/sony_ps_vita_stop_piracy_with_playstation_flash_card.html; Nikole Zivalich, *Nintendo Warns Against Playing Pirated Games On The 3DS; Threatens To Brick Consoles*, G4*, Mar. 7, 2011, http://www.g4tv.com/thefeed/blog/post/710875/nintendo-warns-against-playing-pirated-games-on-the-3ds-threatens-to-brick-consoles/.

homebrew software.[12] Although the hacking community has not yet discovered how to jailbreak the PlayStation Vita, it is extremely likely that (1) that discovery will happen and (2) installing homebrew software on the device will require full administrative access, which in turn will require circumvention. Therefore, an exemption from Section 1201 is necessary to facilitate homebrew projects on these handhelds.

Our research shows the vast majority of hacking projects involving the Nintendo DS, DS Lite, DSi, and DSi XL can be accomplished without altering the firmware on the handheld device.[13] However, the process of developing the software that allows independent programs to run on these devices may well expose the developers to Section 1201 risk: it appears they must circumvent cryptographic controls on these platforms to perform reverse engineering in the first place. Thus, while these activities may well be authorized by Section 1201(f), the legal situation is murky and an exemption is highly likely to benefit such developers.

Our research has not identified examples of individuals using handheld gaming systems to perform scientific research. It may be that their computing capabilities are not powerful enough for that purpose. However, archivists may require an exemption to circumvent access controls on handheld consoles for preservation or repair purposes. *See Preserving Virtual Worlds Final Report*.

3. **Please state for the record whether, and under what circumstances, videogame console repair requires an act of circumvention.**

   Yes. Please see the accompanying statement of hardware expert Andrew "bunnie" Huang. Mr. Huang offers several examples of video game console repair that may require acts of circumvention.

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[12] Micky, *[TUTORIAL] How to jailbreak your PSP*, OTAKU STUDIOS, Apr. 24, 2010, http://www.otaku-studios.com/f98/tutorial-how-jailbreak-your-psp-121778/.

[13] *See, e.g., DSLinuxFAQ,* DSLINUX WIKI*,* http://www.dslinux.org/wiki/moin.cgi/DSLinuxFAQ (last visited June 29, 2012) (the DSLinux project, which allows Linux to run on DS handhelds, "makes no changes to your DS" and "respects the DMCA."); *R4 DS Revolution Card For Nintendo DS, DS Lite*, R4, http://www.r4ds.com/r4ds.html#a4 (last visited June 29, 2012) ("No firmware hacks or any nasty tricks are required to use the R4."); Jason Fitzpatrick, *How to Hack Your Nintendo DS for Easy Backups and Single-Cartridge Playback*, LIFEHACKER, Jul. 16, 2010, http://lifehacker.com/5588151/hack-your-nintendo-ds-for-easy-backups-and-single+cartridge+playback ("None of [these] steps will require you to alter your actual DS unit—all tweaks and hacks occur entirely on the flash cartridge we will be setting up.").

Please do not hesitate to let us know if you have further questions or concerns.

Thank you.

Sincerely,

Marcia Hofmann
Senior Staff Attorney

cc:
Steven J. Metalitz, Esq.
Christian Genetski, Esq.

Encs.