

Petition for Proposed Exemption Under 17 U.S.C. § 1201

Item 1. Submitter and Contact Information

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Item 2. Brief Overview of Proposed Exemption

Original Equipment Manufacturers (“OEMs”) often prevent farmers from **repairing** their own agricultural machinery (e.g., tractors, transplanter, etc.) by employing technological protection measures (“TPMs”) that restrict access to embedded software in the machinery. OEMs restrict access to embedded software (also known as “firmware”) using: (1) computer memory modifications; (2) passwords; and (3) other cryptographic functions and keys.

The proposed exemption allows farmers to circumvent these TPMs for the purpose of diagnosing and/or repairing their own agricultural machinery.

Item 3. Copyrighted Works Sought to be Accessed

Farmers seek to access the copyrighted software that controls their agricultural machinery. The Copyright Act arguably protects such embedded software as a literary work. *See* 17 U.S.C. § 102.

More specifically, farmers seek to access the embedded software that resides in the memory of small computers in farm machinery known as electronic control units (“ECUs”), which usually consist of a single integrated circuit. Farmers typically require access to these ECUs to obtain vital diagnostic information about the increasingly sophisticated electrical systems in their agricultural machinery.

Item 4. Technological Protection Measures

The proposed exemption applies to three categories of TPMs.

Item 4.1 Computer Memory Modifications

OEMs often restrict access to the embedded software on ECUs by modifying computer memory on the ECU itself. OEMs can do this in at least one of two ways.

First, OEMs can modify the ECU's "volatile" (rewritable) memory to prevent a farmer from utilizing an industry standard computer port known as Joint Test Action Group ("JTAG"). Specifically, OEMs modify the ECU's memory to enable a particular "bit" that disables JTAG each time a farmer powers on the affected machinery. OEMs do this to restrict a farmer's ability to access the embedded software.

Second, OEMs can modify the ECU's "non-volatile" (read only) memory to restrict access. When OEMs modify non-volatile memory, however, they restrict access until a farmer disables the bit manually, since non-volatile memory persists even after an ECU loses power.

Item 4.2 Passwords that Lock the Embedded Software

OEMs often prevent farmers from accessing an ECU's embedded software using passwords, including "factory passwords," and "consumer passwords."

OEMs often use "factory passwords" to prevent farmers from (1) accessing locked functionality (often diagnostic tools and engine performance settings); (2) programming a new ECU (e.g., necessary to replace a malfunctioning ECU); (3) recovering "consumer passwords" necessary to change important parameters; and (4) clearing diagnostic codes.

OEMs lock other important settings in embedded software with unique "customer passwords" given to farmers purchasing new farm machinery. If the OEM does not give this password to the farmers at the point of first sale, they can prevent farmers from changing important parameters because it may be difficult or impossible for farmers to obtain this password later. When OEMs fail to provide this password, they also restrict subsequent purchasers from changing important parameters.

Item 4.3 Other Cryptographic Keys and Functions That Restrict Access to Diagnostic Codes

OEMs equip most modern agricultural machinery with multiple ECUs, each controlling a different electrical system, that coordinate their behavior over an intra-engine network. OEMs use this network to send messages to ECUs requesting diagnostic information. Typically, OEMs equip these ECUs with proprietary cryptographic functions and keys, which differ from simple passwords because they generate a unique password for every diagnostic request. Since only OEMs possess the cryptographic keys needed to access certain information, they alone can communicate over the network. OEMs do not provide cryptographic functions and keys to farmers, so farmers cannot access relevant diagnostic information.

Item 5. Noninfringing Uses

The proposed exemption allows farmers to access the embedded software on their own agricultural machinery and obtain information necessary to perform diagnostics and/or repairs. The exemption does not involve any of the exclusive rights enumerated in 17 U.S.C. § 106 in most instances because most diagnostic and repair activity will not require copying or modification of the embedded software. For example, when a farmer circumvents a password to access the portion of an ECU's embedded software that operates diagnostic tools, the farmer merely seeks to *use* the software's diagnostic tools—not to copy, modify, or adapt the software. Such uses qualify as non-infringing under 17 U.S.C. §§ 117 and 107.

17 U.S.C. § 117

Even if accessing the embedded software *did* require a farmer to copy it in some particular instance, the Copyright Act permits such incidental copying for purposes of “machine maintenance or repair.” 17 U.S.C. § 117(c); *see also, e.g., Storage Tech. Corp. v. Custom Hardware Eng'g & Consulting, Inc.*, 421 F.3d 1307, 1311–15 (Fed. Cir. 2005). The Copyright Act also permits a farmer to copy or adapt the embedded software as an essential step in utilizing it in conjunction with the machinery. *See* 17 U.S.C. § 117(a)(1).

17 U.S.C. § 107

Similarly, “fair use” permits farmers to copy the embedded software on the ECUs of their agricultural machinery for purposes of diagnosis and/or repair. As just one example,¹ fair use allows farmers to copy embedded software for purposes of disassembling, analyzing functional elements, and “debugging” the software. *See Sega Enterprises Ltd. v. Accolade, Inc.*, 977 F.2d 1510, 1527–28 (9th Cir. 1992), *as amended* (Jan. 6, 1993) (“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.”); *DSC Commc'ns Corp. v. DGI Technologies, Inc.*, 898 F. Supp. 1183, 1191 (N.D. Tex. 1995) *aff'd*, 81 F.3d 597 (5th Cir. 1996) (copying competitor's firmware to analyze unprotected, functional elements was fair use).

Item 6. Adverse Effects

The foregoing TPMs harm farmers in at least three ways.

Item 6.1 Without an Exemption, Farmers Cannot Effectively Repair Their Own Agricultural Machinery

¹ Different types of diagnoses and repairs necessarily involve different uses. We intend to submit a more complete discussion of fair use covering a wider variety of uses at the appropriate time.

Farmers need an exemption so that they can effectively repair their own agricultural machinery. Without an exemption, farmers must wait for a technician to travel to their farm to perform diagnostics and repairs—even for minor problems, such as malfunctioning sensor equipment. (Farmers often have to pay for that travel time.) Farmers living in rural areas and/or with time-sensitive harvest situations needlessly suffer because of this delay. In addition, small, family farms, in particular, often cannot afford more than one tractor and, if it breaks, harvesting must stop until a technician travels to the farm and fixes it.

Item 6.2 Without an Exemption, OEMs Will Continue to Have an Anti-Competitive Monopoly on Repair Services

Various OEMs have attempted to monopolize tractor repair services in the United States since at least 1920.² OEMs have now found a new method for monopolizing tractor repair services in computer technology and, more specifically, the TPMs described above.

Farmers need an exemption so that they have meaningful access to independent repair shops. When OEMs prevent farmers from accessing information necessary for diagnostics and repair, they prevent independent repair shops from providing the best service to their customers for the best price. For example, independent repair shops may be unable to perform fixes as simple as turning off an indicator light without access to the proper diagnostic information. Further, OEMs grant authorized dealers an effective monopoly on repairs when they prevent farmers from accessing diagnostic information; this in turn disincentivizes efficiency and customer service. Finally, OEMs force farmers to end long-standing relationships with the independent repair shops they trust when those shops cannot afford to purchase software required to fix the farmers' machinery.

Item 6.3 Without an Exemption, Prices of Agricultural Machinery in Secondary Markets Will Continue to Increase

Farmers need an exemption so that they do not have to resort to purchasing older machinery (and at higher-than-normal prices). As discussed above, “[t]here’s an increasing number of farmers placing greater value on acquiring older and simpler machines that don’t require a computer to fix.”³ “[T]his trend is only intensifying.”⁴ As competition for older agricultural machinery increases, prices rise as a result.⁵ Giving farmers a right to repair their newer agricultural machinery mitigates the demand for older, less-sophisticated machinery, which in turn will lead to lower used-machinery prices.

² See, e.g., T.F. Cullen, *Real Merchandising Methods Sell 275 Tractors in Year and a Half*, CHILTON TRACTOR AND IMPLEMENT JOURNAL, Vol. 4, May 1, 1920 (describing “virtual monopoly” on tractor service in Lake Charles Louisiana).

³ Greg Peterson, *Two Answers for Everything*, FARM JOURNAL, September 2014 at 66.

⁴ *Id.*

⁵ *Id.* at 65–66.