

UNITED STATES COPYRIGHT OFFICE



## Long Comment Regarding a Proposed Exemption Under 17 U.S.C. § 1201

### ITEM A. COMMENTER INFORMATION

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## ITEM B. PROPOSED CLASS ADDRESSED

Proposed Class 7: Computer Programs – Repair

## ITEM C. OVERVIEW

Unlike some other petitioners as cited in the NPRM, these farmer, rancher and grower commenters (hereinafter, Farmers) have not sought to broaden the categories of device covered by the Sixth Triennial Proceeding to Determine Exemptions to the Prohibition on Circumvention (the “Sixth Round”) exemption for necessary circumvention for the repair and upgrade of motorized vehicles and associated implements (“equipment”). Rather, Farmers now focus on the pressing need to *make this exemption useful to their businesses and livelihoods*.<sup>1</sup> This can occur only by interpreting this exemption as including the assistance of *expert local mechanics when equipped with the necessary software tools*.

In some localities, Farmers see the price of older and otherwise obsolete farm equipment *rising* because obsolete, non-software-dependent vehicles are the only equipment that a Farmer can expect to have fixed without risking catastrophic delay or severe financial loss.

The following Overview is supported by the attached Declarations of:

- Kevin Kenney – Software Engineer for Agricultural Vehicles
  - Guy Mills, Jr. – Farmer
  - Jason Pratt – Farmer
  - Kyle Schwarting – Farmer
  - Paul Shamblin – Lead Mechanic at Talley Farms
  - “John Doe” – Large scale Farmer<sup>2</sup>
1. Functions that are entirely mechanical on older vehicles and agricultural implements are, on newer vehicles, controlled and restricted by embedded, proprietary software, passwords, and computer memory modifications.<sup>3</sup>
  2. Internal electronic control units (“ECUs”) or engine control modules (“ECMs”) increasingly govern the operation of agricultural equipment. Where maintenance, upgrade, or repair is

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<sup>1</sup> Farmers, with livelihoods at stake, are a core example of what the Register has identified as the “legitimate concern for exemption beneficiaries, many of whom may be increasingly frustrated by a lack of access to the tools or skills required to make use of exemptions, particularly when trying to engage in activities, such as automobile repair, that simply did not implicate copyright in the analog world.” U.S. Copyright Office, *Section 1201 of Title 17*, at 59 (2017) (“1201 Study”).

<sup>2</sup> Declaration provided on condition of anonymity by farmer known to American Farm Bureau Federation. See Declaration of Mary Pat Weyback, American Farm Bureau Federation.

<sup>3</sup> Mills Declaration (“Mills”) ¶ 2.b, Pratt ¶¶ 3,6, Shamblin ¶¶ 4, 5, Doe ¶ 3.

necessary, the ECU may control the ability to diagnosis, access, and repair, and whether the equipment, once repaired, will recognize the user and accept commands.<sup>4</sup>

3. Proprietary embedded software frustrates the ability of Farmers and local servicers to maintain equipment that is owned by the Farmer and which the Farmer would like to maintain himself, with assistance of a local servicer as may be necessary.<sup>5</sup>
  - a. Original Equipment Manufacturers (“OEMs”) commonly use Technical Protection Measures (“TPMs”) in order to limit access to and control over the ECU software and firmware. The TPMs are designed to limit access and control to only OEM-authorized dealers, to the exclusion of independent local dealers and servicers.<sup>6</sup>
  - b. Due to these TPMs, as well as manufacturer restrictions on distribution of necessary codes, information, and software, Farmers cannot maintain their equipment themselves, as was possible with older equipment that is less dependent on embedded software, or to which TPMs were not applied.<sup>7</sup>
  - c. Some major OEMs do not license necessary software to local, independent dealers and repair shops.<sup>8</sup>

#### Coding / handshake / connectors

4. Some ECUs are configured to refuse commands unless a “challenge-response” condition, such as a correct 16-32 bit response, is completed. This “virtual handshake” limits access to and control over the ECU.<sup>9</sup>
  - a. Farmers need local expert assistance and tools in order to accomplish a “virtual handshake” by either modifying a version of the OEM software, or developing compatible software that identifies the user so as to be accepted by the ECU of the Farmer’s own vehicle.<sup>10</sup>
  - b. OEMs also limit access to ECUs through restrictive connectors designed to enable only proprietary software to interface with the vehicle.<sup>11</sup>

#### Passwords / resets / code clearing

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<sup>4</sup> *Id.* and Kenney ¶¶ 2, 3.

<sup>5</sup> Kenney ¶¶ 1 – 5, Mills ¶ 4.b, Pratt ¶ 6, Schwarting ¶ 3, Shamblin ¶ 4, Doe ¶ 3.

<sup>6</sup> Kenney ¶¶ 1 – 5 and Mills ¶¶ 2.b, 3.a; Schwarting, ¶ 3.

<sup>7</sup> Mills ¶¶ 2.b, 3.a, Pratt ¶ 6, Shamblin, ¶ 4, Doe, ¶ 3.

<sup>8</sup> Kenney ¶¶ 6,7, Mills ¶¶ 2.b, 3.a.

<sup>9</sup> Kenney ¶¶ 2, 6; *see*, Electronic Frontier Foundation Class 21 Supp. at 3 (2015) (“EFF 2015 Comment”).

<sup>10</sup> Kenney ¶ 2, Mills ¶¶ 2.b, 3.a, Pratt ¶ 3, Doe, 3.

<sup>11</sup> Kenney ¶ 5, Doe ¶ 2.

5. Many common maintenance and repair tasks, such as diagnosis and tuning, now require passwords to embedded software.<sup>12</sup> Passwords may be necessary to access or program ECUs, or even to clear fault codes once a repair has been completed. After paying tens or hundreds of thousands of dollars for farm equipment, Farmers are not given access to these passwords, nor are these passwords provided to local independent dealers and servicers.<sup>13</sup>
6. If a code cannot be cleared the equipment might not function, or might function at lower capacity or efficiency, such as “limp mode” with limited power.<sup>14</sup>
7. Methods tried in the past – obtaining passwords from other farmers or mechanics with similar machines, shared in-person or through online forums, hacking the passwords by manually guessing, or using “brute force” methods which employ software scripts that would attempt tens of thousands of guesses until the correct password is discovered<sup>15</sup> – are less and less likely to succeed today.<sup>16</sup>
8. Unless a local mechanic or servicer has acquired tools from an authorized dealer or an unauthorized third party, the local mechanic cannot render expert assistance to the Farmer in operating, maintaining, or repairing agricultural equipment.<sup>17</sup>
9. Third parties outside of the United States have modified and developed versions of software to bypass password requirements, or at least to reveal fault codes, so some repairs can be undertaken if the user relies on expert local servicers to whom such tools have become available.<sup>18</sup>
10. Farmers are unaware of whether the engineering of such software or tools involved the making of a copy of OEM software and have no interest in making any copy other than may be necessary for operating their own equipment.<sup>19</sup>

#### Memory modifications

11. OEMs restrict access to the ECUs by modifying memory to disable data access ports, such as the industry standard Joint Test Action Group (“JTAG”) port. A particular code or “bit” is added to the ECU’s volatile memory, thus closing the rest of the computer memory off from access.<sup>20</sup> OEMs can put further protection on the ECUs by modifying it with a type of

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<sup>12</sup> Kenney ¶ 3, Pratt ¶ 3, Schwarting ¶ 3, *See* USC Intellectual Property & Technology Law Clinic 2015 Class 21 (“IPTC USC 2015”) at 7.

<sup>13</sup> Kenney ¶ 7, Pratt ¶3, Schwarting ¶ 3, Shamblin ¶ 2.

<sup>14</sup> Kenney ¶ 6, Schwarting ¶ 3.

<sup>15</sup> *See* IPTC USC 2015 Comment at 7.

<sup>16</sup> Kenney ¶¶ 5, 6, Mills ¶¶ 2, 3, Pratt ¶ 3, Schwarting ¶ 3,

<sup>17</sup> Pratt ¶ 3, Mills ¶ 1, Schwarting ¶6, Doe ¶ 2.

<sup>18</sup> Kenney ¶ 5, Schwarting ¶ 3.

<sup>19</sup> *E.g.* Kenney ¶¶ 2, 3.

<sup>20</sup> IPTC USC 2015 Comment at 7.

permanent memory called a “fuse” – for example a JTAG fuse, which will disable extraction of firmware.<sup>21</sup>

12. Farmers require expert assistance and tools to obtain access to an ECU protected by memory modification.
  - a. Attempts to circumvent volatile and permanent memory modifications can involve “fault injection.” An expert would disturb the ECU’s electrical signals so as to bypass the required “bit” checking step. This would enable access to the firmware to be re-programmed with a different set of instructions.<sup>22</sup>
  - b. To circumvent a volatile memory modification, a non-invasive fault injection method such as clock or power glitching is sufficient.
  - c. To circumvent the permanent memory fuse, an invasive fault injection method such as voltage or optical glitching is required.<sup>23</sup>
  - d. Neither of these techniques involves copying embedded software, or performing modifications to the proprietary software.
  - e. As is the case with codes and passwords, without expert assistance and necessary tools Farmers are not capable of performing necessary circumvention on the agricultural machines upon which they rely for their livelihoods, because they cannot control their operation or perform the simplest maintenance.
13. Local servicers are conveniently available to most Farmers, over relatively short distances. Local servicers can make on-site visits at relatively minimal expense and delay to the farmer.<sup>24</sup>
14. Manufacturer-authorized dealers are located much further from most farms than local repairmen or servicers, in some cases at great distance. This trend is increasing in some areas, as dealerships move or close.<sup>25</sup>
15. Increasingly, maintenance and repair of farm equipment can be performed only by manufacturer-authorized dealers and servicers because neither Farmers nor independent local repairmen or servicers are afforded access to necessary information and tools.<sup>26</sup>

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<sup>21</sup> EFF 2015 Comment at 6.

<sup>22</sup> *Id.*

<sup>23</sup> See IPTC USC 2015 Comment at 8; Jasper G.J. van Woudenberg, Marc F. Witteman, Federico Menarini, *Practical Optical Fault Injection*, pp. 91–92, available at <http://ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=6076471> (“Practical Optical Fault Injection”).

<sup>24</sup> Mills ¶ 2, Pratt ¶ 3, Schwarting ¶¶ 5,6, Shamblin ¶ 3, Doe ¶ 2.

<sup>25</sup> *Id.*

<sup>26</sup> Kenney ¶¶ 5, 6, Mills ¶ 1, Pratt ¶ 3, 5, Schwarting ¶ 7, Shamblin ¶ 3, Doe ¶ 2.

16. It is often severely burdensome for a Farmer to transport equipment to an authorized dealer or, alternatively, to pay for a dealer's authorized servicer to travel to the farm.
- a. During growing seasons there is often a substantial wait for an authorized servicer's availability.<sup>27</sup>
  - b. In some regions growing seasons are short.<sup>28</sup>
  - c. It is increasingly the case that vital equipment cannot be economically maintained, controlled, or repaired during a growing season. This has impacted the viability of both large and small farms and ranches, and has threatened the livelihoods of many Farmers.<sup>29</sup>
17. One indication of the challenge to farm viability posed by manufacturer control of essential maintenance and repair is that the price of used, relatively obsolete agricultural equipment has been rising,<sup>30</sup> because Farmers and their local servicers are better able to maintain older equipment that is less reliant on the embedded, proprietary software to which Farmers and local servicers have no or limited access.
18. To the extent Farmers and their local servicers can operate, maintain, or fix the Farmer's newer equipment, they often must rely on software tools obtained from third parties. These tools initially may have been distributed on an authorized basis in another jurisdiction, such as Canada, where they have not been as closely controlled by the manufacturer.<sup>31</sup>

#### Proposed New Exemption Language

Farmers have welcomed the Copyright Office focus, as set forth in the 1201 Study and this NPRM, on making exemptions truly useful to petitioners, rather than useful only in theory. With this objective in mind, and *with respect only to mechanized agricultural equipment*,<sup>32</sup> Farmers propose that the relevant exemption read as follows:

Computer programs that are contained in and control or assist the functioning of a mechanized agricultural vehicle or implement, where the owner or authorized user of the vehicle or implement, or one rendering expert assistance toward maintaining or improving its use, determines that circumvention lawful under the copyright law or an enabling tool for such circumvention is necessary for the diagnosis, repair, or lawful modification of the vehicle or implement's function, and such assistance or tool is to be applied to this lawful purpose.

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<sup>27</sup> Mills ¶ 1, Pratt ¶ 5, Schwarting ¶ 3, Shamblin ¶ 2.

<sup>28</sup> Mills ¶ 1, Schwarting ¶ 5, Pratt ¶ 5, Shamblin ¶ 3.

<sup>29</sup> Mills ¶¶ 1 – 7, Schwarting ¶ 5, Pratt ¶¶ 4 – 7, Shamblin ¶ 2.

<sup>30</sup> Mills ¶ 4.a, *see* Doe ¶ 2.

<sup>31</sup> Kenney ¶¶ 5, 6, Schwarting ¶ 3.

<sup>32</sup> Farmers take no position on whether or to what extent the new exemption should apply to other devices.

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

ECUs and ECMs increasingly govern the operation of agricultural vehicles and implements. When there is a malfunction, these control mechanisms may control diagnosis, access, repair, and, further, whether the vehicle or implement will recognize the user, and function, once repaired. Functions that are entirely mechanical on older vehicles are, on newer vehicles, controlled and restricted by proprietary software, passwords, and computer memory modifications.

### **Proprietary Software Restricts Access to the ECUs and Methods of Circumvention**

OEMs commonly restrict access to ECUs by ensuring that they respond only to proprietary firmware and software.<sup>33</sup> Some ECUs are configured to refuse commands unless “challenge-response” conditions such as correct 16-32 bit responses are met, which act as a virtual “handshake” allowing access and control of the ECUs.<sup>34</sup> OEMs also limit access to ECUs through restrictive connectors designed to enable only proprietary software to interface with the vehicle.<sup>35</sup>

Farmers need local expert assistance and tools in order to accomplish a “virtual handshake” by either modifying a version of the OEM software, or developing compatible software that identifies the user so as to be accepted by the ECU of the Farmer’s own vehicle. Third parties outside the United States have modified and developed versions of software to accomplish this, or at least to reveal fault codes, so repair can be undertaken by the user with expert assistance.<sup>36</sup> Farmers are unaware of whether the engineering of such software has involved making a copy of OEM software.<sup>37</sup>

### **Passwords Restrict Access to the ECUs and to Essential Re-sets**

Common maintenance and repair activities, such as diagnosis and tuning, now require passwords to embedded software.<sup>38</sup> Passwords are often required in accessing and reprogramming ECUs, and even to clear fault codes. Failure to clear a code means that if the vehicle works at all it may function at lower capacity or efficiency; it may be put into “limp mode” with limited power.<sup>39</sup> After buying this equipment at great expense, Farmers are not given access to the passwords vital to the efficient function of their equipment. Even where there is no interest in or capability of copying any software, Farmers often cannot perform once routine and simple maintenance or control vehicle operating modes after repair. Nor, unless they have acquired

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<sup>33</sup> Kenney ¶ 4

<sup>34</sup> See EFF 2015 Comment at 3 (2015).

<sup>35</sup> Kenney ¶ 5.

<sup>36</sup> Schwarting ¶ 3.

<sup>37</sup> Kenney ¶ 5.

<sup>38</sup> IPTC USC 2015 Comment at 7.

<sup>39</sup> Kenney ¶ 6.

tools from an authorized dealer or a third party, can the local independent mechanic or servicer who may be the Farmer's only economic alternative.

Methods tried in the past – obtaining passwords from other farmers or mechanics with similar equipment shared in-person or through online forums, hacking the passwords by manually guessing or using “brute force” methods which employ software scripts that would attempt tens of thousands of guesses until the correct password is discovered<sup>40</sup> – are less and less likely to succeed.<sup>41</sup>

### **Computer Memory Modifications Restrict Access to the ECUs**

OEMs also restrict access to the ECUs by modifying memory, to disable data access ports, such as the industry standard Joint Test Action Group (“JTAG”) port. A particular code or “bit” is added to the ECU's volatile memory, thus closing off the rest of the computer memory from access.<sup>42</sup> OEMs can put further protection on the ECUs by modifying it with a type of permanent memory called a “fuse” – for example a JTAG fuse, which will disable extraction of firmware.<sup>43</sup>

Attempts to circumvent such volatile and permanent memory modifications can involve “fault injection.” An expert would disturb the ECU's electrical signals so as to bypass the required “bit” checking step. This would enable access to the firmware to be re-programmed with a different set of instructions.<sup>44</sup> To circumvent the volatile memory modification, a non-invasive fault injection method such as clock or power glitching is sufficient, but to circumvent the permanent memory fuse an invasive fault injection method such as voltage or optical glitching is required.<sup>45</sup> *Without expert assistance*, Farmers are not capable of accomplishing this, even though it clearly does not involve copying software and is covered by the Sixth Round exemption.

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

Farming does not infringe copyright. Farmers and ranchers running equipment lawfully acquired at enormous expense and owned by the farmer or rancher does not infringe copyright. The only issue is whether maintaining, repairing, or upgrading such equipment *in aid of the purposes for which it was acquired* infringes copyright. Farmers' answers to the NPRM's specific questions show that (1) all of the activities for which an exemption is sought are lawful under the copyright law, and (2) an exemption for these activities, including expert assistance with necessary tools, would not entail any purported Copyright Office approval of “trafficking” –

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<sup>40</sup> IPTC USC 2015 Comment at 7.

<sup>41</sup> *Id.*

<sup>42</sup> *Id.*

<sup>43</sup> EFF 2015 Comment at 6.

<sup>44</sup> *Id.*

<sup>45</sup> N.23, *supra*.

an issue that, as the Register of Copyrights (the “Register”) has noted,<sup>46</sup> the Copyright Office lacks the authority to resolve one way or the other.

- *Whether the proposed class includes at least some works protected by copyright.*

Farmers assume that the software and firmware that control the operation of farm and ranch equipment is protected by copyright. The codes and passwords that inhibit access to software or firmware may or may not be protected by copyright.<sup>47</sup>

- *Whether the uses at issue are noninfringing under title 17.*

In the Sixth Round the Register found that a user’s repair of motor vehicles that involves the repair of functions that were previously controlled by mechanical or analog techniques is noninfringing under title 17.<sup>48</sup> By renewing the exemption in this NPRM, the Register has obviated the need to make this case again. The *only* issue now is whether necessary expert assistance from farm or ranch employees and contractors or local independent mechanics or repair shops, with such software or other tools as may be required to make necessary repairs, should be construed as included within this “user” exemption.

In the 1201 Study the Register recognized that lack of expert assistance could impair or destroy the utility of the user exemption. The Study suggested that Section 1201(a)’s text references “users” as opposed to “owners” of a work, may support a “less restrictive” definition of “eligible user.”<sup>49</sup> Thus the Register,

... where appropriate, will seek to avoid recommending unduly narrow definitions of exemption beneficiaries. This may provide greater opportunity for the courts to provide guidance on the proper construction of the anti-trafficking provisions.<sup>50</sup>

Farmers welcome this approach and have a compelling case for its application in this Seventh Triennial Section 1201 Proceeding (2018) (this “Round”).

With the renewal of the Sixth Round Class 21 exemption, the only issues to be decided in this Round pertaining to farm equipment repair are (1) whether local, specific, and necessary expert repair assistance falls within a circumstantial definition of “user,” and (2) whether, due to concern over “trafficking,” the Register must exempt from such assistance acquisition of the very

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<sup>46</sup> 1201 Study at 61 – 62 and n. 338.

<sup>47</sup> “Generally speaking, ‘lock-out’ codes fall on the functional-idea rather than the original-expression side of the copyright line.” *Lexmark International, Inc. v. Static Control Components, Inc.*, 387 F.3d 522, 536 (6<sup>th</sup> Cir. 2004).

<sup>48</sup> Farmers do not agree with the Register’s exception for telematics and media. Indeed, as discussed in the Overview, because farms are geographically dispersed and it is very expensive and time-consuming to transport equipment or to schedule dealer visits, remote telematic diagnosis and repair interoperability will be particularly valuable to Farmers. Farmers also have little interest in adding to memory storage for any infringing purpose.

<sup>49</sup> 1201 Study at 61 and n. 335.

<sup>50</sup> *Id.*, noting a May 20, 2016 Roundtable observation that a Librarian’s exemption cannot foreclose or impair court action against “trafficking.”

tools that would enable such assistance. The Declarations of large and small farmers and industry experts attached to these comments establish that (1) local and beneficial repair assistance, including use of necessary tools, should fall within the definition of noninfringing use, and (2) acquisition and application of tools necessary to make this exemption meaningful need not be excluded as “trafficking.”

- *Whether users are adversely affected....*

As the Register concluded in the Sixth Round, motor vehicle repair is adversely affected by an inability to make noninfringing uses of vehicle software and firmware, and this affects the users of the vehicles.<sup>51</sup> With respect to the factors listed in section 1201(a)(1)(C), the only remaining issue for this Round is whether circumvention of the technological measures applied to motor vehicle software would have an “effect ... on the market for or value of copyright works.”

The Declarations provided with these Comments establish that:

- (1) Local expert assistance for noninfringing farm equipment repair does not diminish the value of copyrighted works embedded in farm equipment.
- (2) Use of specific and necessary software tools in the repair of farm equipment does not diminish the value of copyrighted works embedded in farm equipment.
- (3) Acquisition and application of the necessary repair tools is not trafficking such as to diminish the value of works embedded in farm equipment.

#### Access to software tools and their expert use do not diminish their value

The experience of other industries shows that access to software tools by independent dealers does not diminish their worth, as intellectual property, to OEMs. In the auto industry, for example, while multi-brand software tools are not generally available on an authorized basis, OEM-proprietary software, including necessary circumvention tools, is widely available due to the 2014 Memorandum of Understanding (“MOU”) expansion of a 2002 agreement between automobile manufacturers and independent servicers.<sup>52</sup> The Reply Comments of the Auto Alliance made during the 2015 Sixth Round at 11 – 12 show that, although the MOU has resulted in widespread availability of software tools to independent dealers, there is no evidence that auto manufacturers have chosen to be less reliant on embedded functional software in designing vehicles and components, or that the value of their intellectual property has suffered. Rather, the 2002 agreement was expanded in 2014. No complaint was raised regarding expanded circumvention as a result of these tools being in the hands of independent repair persons. The availability of the tools was, in fact, cited only as evidence of reduced harm to independents.

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<sup>51</sup> “TPMs protecting computer programs on ECUs have a substantial adverse impact on the ability of vehicle owners to engage in lawful diagnosis, repair and modification of their vehicles.” 2015 Recommendation at 240.

<sup>52</sup> See Memorandum of Understanding, Jan. 25, 2014, [http://www.nastf.org/files/public/OtherReference/MOU\\_SIGNED\\_1\\_15\\_14.pdf](http://www.nastf.org/files/public/OtherReference/MOU_SIGNED_1_15_14.pdf).

**DOCUMENTARY EVIDENCE -- Sworn Declarations Attached.**

Declaration of Kevin Kenney  
Software Engineer for Agricultural Vehicles

1. My name is Kevin Kenney and I am a software engineer in Nebraska specializing in low-emission systems for agricultural and commercial vehicles.
2. I have developed and patented a clean diesel system (Patent # 8826888) that I would like to offer to owners of agricultural and commercial vehicles, however any attempts to install this system led to a shut-down of the vehicle due to TPMs, as the manufacturer software recognizes the modifications. Moreover, I am prevented from installing any replacement parts on a vehicle, as it requires configuring a calibration code before the ECU will recognize the new part and allow it to function.
3. The system for which I received a patent is designed to be in compliance with EPA regulations and has been praised, as an improvement over present technology, by experts knowledgeable in the field. However without a code to crack the manufacturer's code, this legal system is unusable. Vehicle owners seeking to lower their fuel emissions may be forced to take out the emissions systems from their vehicles, send it away to Canada for programmers to modify the code, and then reinstall the systems in their vehicles.
4. Software that would allow access to the ECUs of John Deere vehicles called "John Deere Service Adviser" is available only to authorized dealers, and my request for access to this software have been denied when I have contacted their local John Deere dealer per instruction on their website.
5. I have seen third-party repair technicians operate programs developed overseas that may have been developed from scratch or is a modified version of John Deere Service Adviser to get around the TPMs of agricultural vehicles. This circumvention software is however incompatible with any tractor that has a tier 4 emissions system, and typically will not work on tractors that are less than five years old. This software is installed in a laptop and is connected to the ECU through a USB cable. Some tractors require a J1339 port, but for the most part John Deere tractors have a USB port that interfaces with the laptop software.
6. The circumvention software is able to re-set error codes that alert the system when the sensors indicate some problems in the tractor. Even though the physical problems in the tractor may be fixed, unless the error code is re-set, the system puts the tractor in a "limp" mode where the functions of the machine are severely limited. Without this software that is able to talk to the ECU and re-set the code, farmers normally would have to call a John Deere dealer to send out a technician, which is expensive and could cost more than \$1000 an hour due to loss in crop.
7. The JD Service Adviser itself is very simple to use and the users do not need to have much technical knowledge to use it, but because of the lack of access to this software & ever-changing user id/password updates from the OEMs, there is an essential monopoly of these tractor companies on farm equipment repair.

This Sworn Declaration accurately reflects my belief & knowledge.

*/s/Kevin Kenney*  
Kevin Kenney  
Software Engineer

Declaration of Guy Mills, Jr.  
Farmer  
December 4, 2017

My name is Guy Mills, Jr. and I am a fifth generation Nebraska farmer. Some of the current 3810-acre operation has been in the family for four generations. I own 5 John Deere tractors (including a John Deere 8360R), a Case IH tractor, a John Deere combine, baler, planter, 4 semi-trucks with a mix of Caterpillar and Cumming motors, and other equipment. I became aware of the DMCA a few years ago when my son informed me of a *Wired Magazine* article in which John Deere claimed that farmers do not own their tractors.

This Declarative Statement, which includes personal accounts, summarizes some of the problems perpetuated by the DMCA:

**1. Being at Mercy of Dealers Increases Farming Costs while Hindering Economy**

- a. Time is of the essence for farmers for a couple of reasons. We are harvesters of sunlight and have a very short window to get our crops planted and harvested. Since other farmers are using their equipment during the same short windows, dealers are extremely busy with repair demands. This leaves farmers literally at the mercy of dealers who are in a position to charge exorbitant prices to accommodate their customers' urgent needs. This lack of competition, takes business away from local repair shops and hurts the local economy.
- b. Since the Case dealership in Broken Bow closed its doors last year because of stagnant sales and a poor farm economy, the nearest dealership is 35 away. But, sometimes there is a need to travel additional miles to other dealerships if parts are not in stock. There are many local, independent shops in my area, the closest being only eight miles away. Their labor rate is \$70/hour compared to the \$109/hour dealership rate plus. If there is a need to pay someone to come to the farm for repair work, having someone travel less than 20 miles round trip compared to someone traveling over 100 miles is substantial to the overall cost. The repair cost differential between local repair shops and dealerships is substantial.

**2. Lack of Competition Does not Incentivize Production of Competitive, Weather & Customer-Friendly Equipment**

- a. Three years ago, I replaced the software on my 2630 John Deere monitor with a competitor's brand SMS. The new software is superior to John Deere's APEX as it has less problems while allowing me to run regression analysis on variables collected in the harvest, planting and soil data. In this data-driven era, correlation of variables are used to reduce costs and increase yield while producing more with less inputs.

- b. Before agricultural vehicles ran on software, I used to be able to repair my machines myself. For example, if an alternator on one of my tractors malfunctioned, it cost approximately \$35 to replace the armature and 45 minutes of my time. Now, if the alternator malfunctions the dealer's solution is a \$1,200 dollar new alternator. Last fall, my John Deere combine would not shut down when I tried to turn it off. I had to call the nearest dealer who traveled 40 miles to the combine site at one of my farms to diagnose the problem. The technician said I needed to replace the ECU or "brain" (a small 8 x 6 x 1" box inside the machine). But, there was only one dealership in Nebraska who had that particular part in inventory. I drove five hours to the second dealer to buy the part. Upon returning to the site with the ECU, the technician returned and unlocked the code. The solution could have been greatly simplified had I been able to plug in the part myself, without having to have the dealer enter the code in order for the combine to run.
- c. In Nebraska, the wind blows quite often. Last week, one of my tractors wouldn't work because a fault code was triggered during a windstorm. I had to call a John Deere technician to clear the codes, even though nothing was actually wrong with the machine. I haven't received the bill yet from the dealer but I expect it will cost me around \$500. The technician warned me about cleaning the ECU after a windstorm as static electricity from an air hose or brush could cause even more damage.

### **3. Farmers Have No Recourse for Manufacturer & Dealer Error**

- a. Last winter I took my John Deere tractor into the dealership for an annual service program. The dealer ran diagnostics and their equipment indicated that a transmission O ring inside the tractor was out of place. I was reluctant to let the dealer replace this because everything was working fine on this tractor. However, the purpose of these service programs is to identify potential problems and fix them to reduce if not eliminate down time. They gave me an estimate of \$12,000 to fix the o ring in the transmission. The dealer implied that if he didn't fix it at the time, he may not be inclined to come out later to fix it on site during planting. I acquiesced and returned two days later to check on the progress of my tractor. The service manager was out but a young mechanic let me into the repair shop area. He told me they had opened up the tractor and found that the O ring was not bad. When asked if their diagnostic software was out of calibration, the service manager claimed that it was not, yet he had no other explanation for the misdiagnosis. Ultimately, I was charged \$12,995.14 the majority of which is attributable to the O ring.

- b. I also had an issue with my 24-row John Deere planter. The 2630 monitor on the planter showed that each row was planting, but in actuality there were intermittent blank spaces of 60-feet-wide by 20-to-30-feet-long .The monitor did not register this skip. I had to go out into the field with my foreman, check for blank spots, and re-plant the rows the machine missed once the corn emerged. I brought this issue up with the dealer, who conferred with John Deere's D TACH troubleshooting center in Iowa. Neither the dealer nor John Deere could come up with any answer as to why my planter was skipping. The ECU on the planter was replaced. All electrical connections were fine. The second year the service manager was very frustrated trying to solve this problem. He exhausted all remedies John Deere offered. He then decided to try blogs on the internet. A farmer from Texas responded saying it was not the planter at all but rather a hydraulic fitting under the armrest in an 8330 tractor. This fitting was replaced and the problem was solved. Allowing farmers to collaborate with others in the farm community to access and share information about their own machinery is necessary, especially when the manufacturers themselves are at a loss as to how to repair their own equipment. It took the help of another farmer and over two years to eventually solve this problem. The \$10,000 2630 monitor did not show these skips whereas a simpler monitor with blinking lights of a few years ago would have alerted me that the planter not planting. A monitor's primary function is to alert the operator of a planting malfunction.
- c. Recently, after baling 1,200 bales over a couple day period, the 569 baler stopped because a code triggered the knife used to cut the net wrap. It was a costly malfunction as the technician drove 80 miles round trip and took three hours to clear the code.

#### **4. Poor Manufacturing Decisions Puts Financial Burden on Farmers**

- a. The secondary market for used, pre-software equipment is expensive and such older equipment is in high demand because they do not need such repairs that can be done only by the manufacturer. Older tractors, like the John Deere 4030, can cost more than they were sold for when they were brand new.
- b. I use my semi-trucks for hauling corn and soybeans at harvest. A Caterpillar C 12 diesel engine was intermittently sputtering. I took it to the local dealer. The dealer kept misdiagnosing the problem. First the ECU was replaced at \$2,800. That did not work. Next the wires leading up to the ECU were replaced at a \$600 cost. That did not work. Next the Jake brake was worked on for at an \$800 cost. That did not work. Then the dealer said the cause of the diesel engine sputtering was the transmission. At this time I questioned his rationale as I have had many diesel

engines on pivots which run fine without a transmission. The dealer claimed the super-ten-speed transmission in the truck has an ECU between the 9 and 10th gear which goes bad. It was manufactured by Eaton in Kearney Nebraska but Eaton no longer manufactures them. The dealer's solution for a sputtering diesel engine was to replace the transmission at a cost of \$12,000 dollars. While the part was still being manufactured, it cost around \$100. The gears in the transmission are fine. This example shows the absolute lunacy seen in equipment manufacturing today. The dealer complained to me that a similar situation happened to them on one of their company trucks.

Recently, I gave input to the Kansas City Federal Reserve regarding the current risks to a healthy agricultural economy. I have requested that the KCFR and UNL economists collect data on the DMCA issue.

I believe the adverse impact caused by the DMCA extends well beyond the agriculture sector and makes our entire economy more vulnerable. Since I have been asked to address this situation, I have received thank you letters from various leaders—from hospital administrators to business CEOs; confirming that this is not just an agriculture problem. History has already taught us that monopolies thwart American ingenuity; resulting in the customer paying more for less reliable and inferior equipment.

Under penalty of perjury I affirm that this Declaration accurately reflects my knowledge.

*/s/Guy Mills, Jr.*

Guy Mills, Jr.

Farmer

Declaration of Charles "Jason" Pratt  
Farmer

1. My name is Jason Pratt, and I run a small farm in Virginia.
2. I have John Deere, McCormick, and Ferguson tractors.
3. In particular, I have had issues with repair of my McCormick tractor. I initially bought my tractor from a dealership an hour away from where I live. However, that dealership closed. Now, to get to a dealership that is able to service my McCormick, I have to travel five or fifteen hours to get to the two closest dealerships. Two mechanics live approximately ten minutes from me. The mechanics can do all the repairs up to having to reset some software or needing to use the diagnostic machine. As time has gone by, however, the mechanics are able to repair fewer and fewer problems with the tractors because of software advancements, and physical aspects of the tractors being entirely controlled by software.
4. In one instance, my McCormick tractor broke down in the field. I could either send it to the dealership or attempt to fix it myself. I did not send it to the dealership, because the dealership that was able to fix it was two states away. To get the tractor to that dealership, I would have had to pay someone to ship it there because my trucks wouldn't be legal to leave VA with the weight of that tractor. Instead, I worked with a local mechanic to bypass the wires to try to determine what the problem was. It took ten hours for us to determine that the problem was the voltage regulator.
5. I make sure I have a back-up tractor in the case of a breakdown because I cannot rely on dealerships providing me with a replacement right away, if at all.
6. On several occasions I, along with my local mechanics, have been unable to fix physical issues with the tractors, such as issues with voltage regulators, because we are unable to determine the issue without the diagnostic software.
7. Local mechanics cost approximately \$25/hr., whereas dealerships cost \$85/hr.

Under penalty of perjury I affirm that this Declaration accurately reflects my knowledge.

*/s/ Jason Pratt*  
Charles Jason Pratt  
Farmer

Declaration of Kyle Schwarting  
Farmer

1. My name is Kyle Schwarting and I am a farmer in Nebraska engaging in custom fertilization.
2. I own and utilize my own equipment, mainly CASE IH and John Deere tractors.
3. I mostly do my own repairs on my vehicles and own a primitive diagnostic software that may be an OEM version released in a foreign country. This software however can only read out the ECU's fault codes. The version that I use is unable to change the engine parameters, update the firmware, or modify the embedded ECU software in any way. My current software does not allow me to reset the ECU to its original state after any problems have been repaired.
4. If I am forced to go to a dealer, it could be up to two weeks before they can see to my vehicle because the dealers in his area prioritize the bigger farms that bring in more business for the dealers. Bigger farms have the resources to buy new, expensive equipment, but I go to the dealer only occasionally. This has only been getting worse in this area because many of the dealers are consolidating into larger entities.
5. The fertilization window in Nebraska is very short, thus I have one-month period in the fall before the ground freezes or snow begins to fall to cover as many acres as possible. Therefore, if my vehicle breaks down and the local John Deere dealer is unable to fix it in the next two weeks, I would have lost half of my business for that season. Additionally, this would mean that I would lose repeat business in other farms because they will not hire me in future seasons due to the risk of inconsistency.
6. Logistics of using a dealer in my area are often difficult and expensive. A dealer technician would sometimes come to where my vehicle has broken down, but in most cases the technician will only diagnose the vehicle at the dealership. The dealer will arrange to haul my vehicle to the dealership, take two weeks to repair it, and then haul it back—all of this is expense. I have on occasion arranged the haul myself, but hiring special haulers that can handle a 55,500-lb tractor and obtaining special permits to carry a heavy load over the roads have cost \$3000 in transportation alone.
7. I do not have particular preference between a local mechanic and a dealer technician as long as my equipment is fixed quickly at a reasonable price, but local mechanics are closer and more readily available in my area. The nearest Case IH dealer is 75 miles away.

Under penalty of perjury I affirm that this Declaration accurately reflects my knowledge.

*/s/Kyle Schwarting*  
Kyle Schwarting  
Farmer

Declaration of Paul Shamblin  
Lead Mechanic at Talley Farms

1. My name is Paul Shamblin, and I am an employee of Talley Farms in San Louis Obispo, CA. I am the lead mechanic there. Talley Farms owns 30-40 John Deere tractors, including a 7810 tractor. We also own several Caterpillar and Kabota tractors.
2. When one of the agricultural machines stops working, it slows things down on the farm. When a field needs preparation, a vehicle malfunction can set the farm back one or two weeks, which has downstream effects on production.
3. Sometimes it can take 3 weeks for the John Deere dealer to even get a malfunctioning vehicle onto their schedule, and then another 3-4 weeks for the repair to be done. For smaller, simpler fixes, I would consider going to an independent repair shop if I were confident they were competent and could get the job done faster.
4. I've been having trouble with the John Deere 7810 tractor: it has 16 speeds but has been skipping 5 speeds in the middle (it'll function at speeds 1 through 7 and then skip straight to speed 13). I called a John Deere technician and diagnosed the issue as a problem with the electronic solenoids on the transmission, but because of the wait time (7-8 weeks), I'm considering replacing the transmission with a rebuilt one. I think this will only require a mechanical fix—however if there are software implications with replacing the transmission, I will have to go to the dealer for that.
5. Talley Farms also owns Caterpillar and Kobota tractors. These are older models, with the Kobota ones from around 2000, 2005, and 2008. I'm mostly able to fix these tractors myself because they are older and use less software.

Under penalty of perjury I affirm that this Declaration accurately reflects my knowledge as Lead Mechanic at Talley Farms.

*/s/Paul Shamblin*

Paul Shamblin

Lead Mechanic at Talley Farms.

Declaration of John Doe  
Large-Scale Farmer

1. My name is John Doe (actual name is known to counsel) and I operate a larger-scale farm (one of the top three biggest in my county) in Kansas. I own approximately twelve tractors, which are a mix of John Deere and New Holland brand. I own a total of 20-25 pieces of agricultural equipment, including a Case IH combine. Most of my machinery is newer, bought within the last 6-7 years. I do not experience many issues with the right to repair because I live within twenty-five miles of a dealership.
2. If I have a physical problem that isn't controlled by software, a local mechanic can fix it. But when an error code appears, they can't help with those issues. More often than not, I have to take my equipment to the dealership. None of my local mechanics have attempted to use crack software, but one of them has a computer that is able to communicate with older equipment. This computer was not compatible with my 2011 tractor when we attempted to use it.
3. In one instance, my combine had an error code, and I was very close to the dealership, so I took it to the dealership. The dealership used its diagnostic software and determined the problem was a plugged filter. I bought the filter but couldn't find where the filter was in the machine to install it. The service manager couldn't find it either without looking at their program. Therefore, without that software technology, someone couldn't even find where the filter was supposed to be installed physically.

Under penalty of perjury I affirm that this Declaration accurately reflects my knowledge.

*/s/ "John Doe"*

Farmer

Declaration of Mary Pat Weyback  
Deputy General Counsel, American Farm Bureau Federation

I am Mary Pat Weyback, Deputy General Counsel, American Farm Bureau Federation (“AFBF”).

1. The Declarants above are known to AFBF and each Declaration is as reviewed and digitally signed by the Declarant. This includes the Declaration of “John Doe,” a farmer who wishes to be known in this proceeding only by that name.
  
2. On behalf of AFBF and with respect to this proceeding I have engaged in or reviewed additional interviews with farmers and other industry members that are all consistent with and supportive of the facts, observations, and assertions contained in these Comments, and in the above Declarations.

As counsel I affirm that this Declaration accurately reflects my knowledge.

*/s/ Mary Pat Weyback*

Deputy General Counsel  
American Farm Bureau Federation