

John Deere Control of Repairs – a Brief Description

By Willie Cade, 1-March-2021, V 2.0

Executive Summary: Given the dramatic transformation of farm equipment from mechanically enabled to software defined machines manufactures now exclusively control the most essential repairs. This new paradigm and potential for abuse require legislative intervention to level the playing field.

Definitions:

- 1) **Payloads:** Mandatory software information (digits), unique to each machine, is created exclusively by John Deere and is required to operate the equipment. Certain repairs require John Deere, not the dealer, to create a new payload. Absent this work by John Deere the repair is non-functional. These software digits are based on a collection of electronic serial numbers as kept in a proprietary John Deere database, only accessible to current John Deere employees. Payloads have to be ordered electronically via DL-JDSA.
- 2) **Dealer Level - John Deere Service Advisor - current version 5.2 (DL-JDSA):** A software program written by John Deere and provided only to verified technicians currently employed by an authorized John Deere Dealer. The software is a Windows PC tool used on laptop devices that enables the technician to test equipment systems and diagnose issues, calibrate parts and request new payloads. The computer transfers the digits through the equipment via the CAN bus(s) to controller(s).
- 3) **Customer Level - John Deere Service Advisor - current version 5.2 (CL-JDSA):** A modified version of the DL-JDSA available to equipment owners that only allows for limited issue identification not calibration nor to request new payloads from John Deere. If a new payload is required, this software is not enabled to deliver the digits. Testing capabilities of this software is limited. Current price is \$2,500.
- 4) **Mechanical Enabled:** Products engineered with mechanical and electro-mechanical controls.
- 5) **Software Defined:** Products engineered that can be controlled by microprocessors and software.
- 6) **Calibration:** Tolerance levels for parts controlled by microprocessors and software.
- 7) **Controllers:** Microprocessors and software in combination that direct actions of the equipment.
- 8) **Electronic Serial Numbers:** Software digits that are used by microprocessors and software.
- 9) **CAN Bus:** Low voltage communication and control system within the equipment.
- 10) **Voltage Controlled:** Actions taken based on feedback voltages.

The Repair Process:

1. Diagnoses
 1. A John Deere Dealer Technician determines the source of the problem. This is done by using DL-JDSA testing procedures. Equipment owners who have CL-JDSA can also diagnose a limited set of issues.
2. Parts replacement
 1. Replacement parts not controlled by the equipment's microprocessors and software can be replaced using traditional methods. **Currently it is estimated to be 50% of all repairs.**
 2. Replacement parts that require calibration can only be incorporated into the equipment using DL-JDSA **Currently it is estimated at 50% of repairs.**
 3. Replacement parts that are controlled by the equipment's microprocessors and software can require a new payload obtained exclusively via DL-JDSA. **Currently it is estimated 15 to 20% of all repairs require this additional step.** These new parts often have electronic serial numbers or are voltage controlled. Additionally, a new payload may be needed if there are slight changes to a parts specifications.
3. Software Modification
 1. Non-controlled parts do not require DL-JDSA software for installation.
 2. Parts requiring calibration can have the unit's software updated by DL-JDSA, but **not** CL-JDSA.
 3. Payloads must be requested using specific replacement part serial numbers and unit serial number using exclusively DL-JDSA directly from John Deere and only from Deere.

Willie's Conclusions

- 1) Deere has gone miles past the legal probation of "tying."
- 2) Dealers and dealer technicians are not able to affect a repair in some cases without Deere's explicit authorization.
- 3) This system adds considerable complexity, time, and cost to the repair process.
- 4) I can see a significant value derived by Deere for quality control and planning purposes.
- 5) Robust electronic communication is required for this system to run smoothly and efficiently. (maybe that is why Deere is buying cell phone spectrum and why they want government support for connecting rural America)
- 6) A national agreement would be complicated to implement because of the need to include payload services in the agreement.
- 7) Federal Trade Commission (FTC) could be a useful tool to rebalance this equation.
- 8) Trucking industry makes their payloads publicly available.
- 9) Additional control and revenue can be generated via stealth software updates.
- 10) CL-JDSA 5.2 is not a solution for farmers to repair their own equipment.
- 11) Farmer data is a whole other issue that in aggregate could be used to the farmer's disadvantage. Deere is rapidly consolidating and controlling ag data.

- 12) Parts serialization and voltage control can be expanded to parts that are not controlled and therefore could be subject to the need for a payload modification.

- 13) Deere can stop producing new payloads requiring the purchase of new equipment by preventing repairs.

- 14) Unit complexity has greatly expanded in this new paradigm both physically and logically.

- 15) Because these units are completely dependent on software, these units are subject to an array of software security issues by nefarious individuals and adversarial nation states.

- 16) John Deere has the exclusive ability to capture, control and profit from any data generated in this new software defined paradigm without regards to the potential harm to the equipment owner..

- 17) It is likely that this paradigm shift was engineered to monitor and enhance both quality and safety, but it has also usurped the rights of the owner.

To Do list

- 1) Quantify repair receipts and parts purchases (source: discovery, volunteer, users, and others)