



Service Obstructor

JOHN DEERE'S REPAIR SOFTWARE PREVENTS FARMERS FROM INDEPENDENTLY FIXING THEIR OWN TRACTORS.

U.S. PIRG
Education Fund

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Written by:

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Acknowledgments

The author thanks Nathan Proctor, Right to Repair Senior Campaign Director, U.S. PIRG Education Fund and Willie Cade, Right to Repair Advocate.

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With public debate around important issues often dominated by special interests pursuing their own narrow agendas, U.S. PIRG Education Fund offers an independent voice that works on behalf of the public interest. U.S. PIRG Education Fund, a 501(c)(3) organization, works to protect consumers and promote good government. We investigate problems, craft solutions, educate the public, and offer meaningful opportunities for civic participation.

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Executive Summary

FACING RESTRICTED access to the software tools needed to fix their tractors,¹ farmers across the country have joined the years-long campaign for Right to Repair.² Such reforms would guarantee farmers and independent mechanics comprehensive access to all of the materials needed to fix modern agricultural equipment – including parts, documentation and physical and software tools – at a fair and reasonable price.³ In doing so, Right to Repair would restore repair choice for U.S. food producers, saving them an estimated \$4.2 billion per year in avoided downtime and repair costs.⁴

As public pressure mounted and Right to Repair legislation was considered in Congress and waves of states, the American Farm Bureau Federation and tractor-makers such as John Deere issued Memoranda of Understanding⁵ (MOUs) that purported to address the issue.⁶

These agreements, however, fail to fully fix the problem of agricultural repair restrictions.⁷ These agreements do not provide farmers who face repair restrictions with opportunity for legal recourse and allow manufacturers to walk away from the agreements with as little as 15 days' notice.⁸

Most notably, the repair materials promised in the MOUs are not comprehensive. U.S. PIRG Education Fund's comparison of the software tools⁹ provided to farmers to those provided to Deere-affiliated dealerships found that the publicly-available tool withholds, redacts or obfuscates functions and information required to independently complete many repairs. As such, industry agreements do not provide farmers with full fixing freedom.

One month after Deere's MOU went into effect, U.S. PIRG Education Fund and other repair advocates compared Customer Service ADVISOR (SA) with the version provided to dealer-affiliated technicians. To the extent that we were able to review features of the two versions, we found that the customer tool lacks key functionalities related to:

1. **Diagnosis.** Basic information needed to identify problems with equipment that is readily provided by the dealer tool is either withheld or difficult to find for independent fixers.
2. **Troubleshooting.** Dealer-level SA provides links to step-by-step troubleshooting guides and information on the primary Diagnostics screen that are not present in the Customer SA tool. Additionally, databases such as Dealer Technician Assistance Center (DTAC) that contain troubleshooting and repair information on manufacturing defects are not included in the materials promised by the MOUs.¹⁰
3. **Repair Authorization.** Many parts must be electronically paired to modern tractors, much in the way that the installation of a driver is necessary to allow a computer to

communicate with a printer. Deere calls these drivers “payload files” and they can only be installed or “reprogrammed” through dealer-level SA.

Any “solution” that fails to allow a farmer or independent mechanic to fully diagnose, troubleshoot and electronically authorize mechanical repairs falls short of a true Right to Repair fix. For this reason, along with the other problems of the MOUs listed above, lawmakers and other stakeholders who are being told that existing voluntary agreements are sufficient should examine our findings to improve their understanding of why the MOUs have not altered farmers' desire for enforceable legislation.

Dealer tools provide more diagnostic information and capabilities than farmer tools

U.S. PIRG EDUCATION FUND and other repair advocates compared the capabilities of Customer Service Advisor (SA) with dealer-level SA in February. John Deere's repair Memorandum of Understanding (MOU) went into effect the month prior, meaning that any updates to Customer SA to provide farmers the full right to repair their tractors should have been put in place.

Our analysis found clear differences in functionality between the capabilities of Customer and dealer-level SA.¹¹ These differences mean farmers do not have a full right to independently repair their equipment.

Basic diagnostic information is redacted from Customer Service ADVISOR

THE FIRST WAY in which the tool available to farmers and independent mechanics was inferior to dealer-level SA was that diagnostic information was redacted from Customer SA.

One such example was for problems related to the Engine Control Unit (ECU). The below screens show the list of error codes that the tractor previously triggered. Of note is the ECU-related code, which was related to an issue with the Diesel Emissions Fluid (DEF) system. Dealer-level SA includes a basic explanation of the ECU-related code: that the DEF tank fluid level signal is slightly low.

https://serviceadvisorlocal.deere.com:3075/WebSA/diagnostics/codes

JOHN DEERE 6155m

Diagnostics

Code +	Name	Controller	Status	Count
BLC 002396.05	BLC_002396.05	BLC	Stored	57
BLC 002398.05	BLC_002398.05	BLC	Stored	112
▼ ECU 001761.17	DEF Tank Fluid Level Signal Slightly Low	ECU - Engine Control Unit (Level 33)	Stored	2
RPT 524252.17	Rear PTO Solenoid Valve, Open Circuit	RPT	Stored	1

DEALER-LEVEL SERVICE ADVISOR

Diagnostics: Connected

10:30 AM 2/2/2023

When accessing the same screen through Customer SA, that basic description is redacted.

JOHN DEERE 6155m

Diagnostics

Code +	Name	Controller	Status	Count
BLC 002396.05	BLC_002396.05	BLC	Stored	57
BLC 002398.05	BLC_002398.05	BLC	Stored	112
▼ ECU 001761.17	[REDACTED]	ECU - Engine Control Unit (Level 33)	Stored	2
RPT 524252.17	Rear PTO Solenoid Valve, Open Circuit	RPT	Stored	1

CUSTOMER SERVICE ADVISOR

Are you working on a job? Click here to associate a Work Order and Job ID to track your diagnostics work.

Diagnostics: Connected

12:24 PM 2/2/2023

The fact that the DEF tank fluid level signal is low is information that the owner of the equipment would like to know. If the DEF tank runs too low, the tractor can be put into limp mode, certain cases of which can require a farmer to wait for a dealer technician to address

before the tractor can be put back into use. That can cause a delay of hours to weeks, which can cost a farmer their crop.¹²

Maryland farmer Kevin Anderson ran into this exact problem in 2021. “I had a nephew operating one of my tractors, and he ran it out of the diesel exhaust fluid,” he explained during a Maryland PIRG webinar.¹³ “The tractor stopped in the field, like it was supposed to, and derated the horsepower and alerted him that he had run out of fluid.” Anderson says his nephew filled it back up with fluid, but he needed access to the dealer software to ‘clear the code’ before the tractor would start again.¹⁴

Anderson had to haul his tractor on a trailer to his dealership so a mechanic could use their software tool to reset the tractor. Hauling alone cost him \$500, and the whole process left him without use of his tractor for two to three days.¹⁵

If Anderson’s nephew was given the same information as the dealer, he could have refilled the tank before the tractor derated and avoided the delay and additional costs. Downtime from repair restrictions could be avoided with a true right to repair, saving U.S. farmers an estimated \$3 billion per year in the process.¹⁶

Farmers have to dig for deeper diagnostic information.

Dealer’s don’t.

IN ADDITION TO REDACTING basic information from the main diagnostic screen, dealer-level SA includes links to the appropriate section of the electronic manual, which includes further diagnostic and troubleshooting information.

https://serviceadvisorlocal.deere.com:3075/WebSA/diagnostics/codes

JOHN DEERE 6155m

Diagnostics

Code	Name	Controller	Status	Count
BLC 002396.05	BLC_002396.05	BLC	Stored	57
BLC 002398.05	BLC_002398.05	BLC	Stored	112
ECU 001761.17	DEF Tank Fluid Level Signal Slightly Low	ECU - Engine Control Unit (Level 33)	Stored	2
RPT 524252.17	Rear PTO Solenoid Valve, Open Circuit	RPT	Stored	1

DEALER-LEVEL SERVICE ADVISOR

Diagnostics: Connected

10:30 AM 2/2/2023

As you can see above, the error codes are clickable links that direct you to the appropriate section of the electronic manual.

https://serviceadvisorlocal.deere.com:3075/WebSA/diagnostics/codes

JOHN DEERE 6155m

Diagnostics

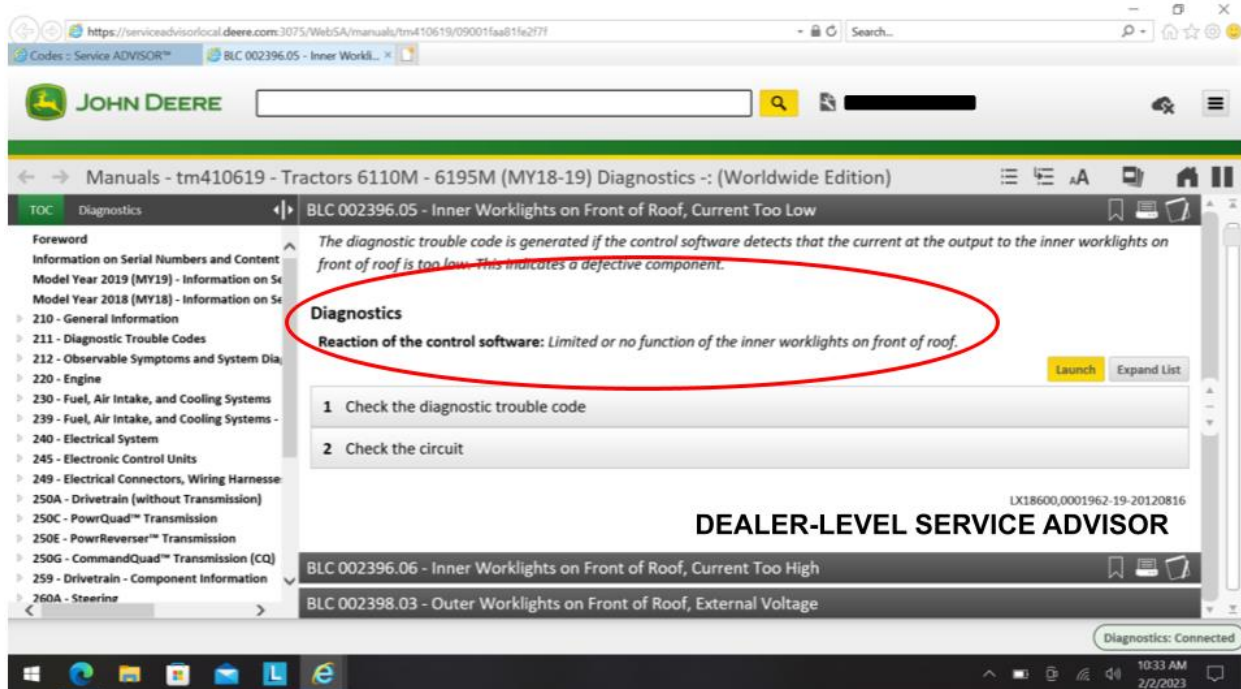
Code	Name	Controller	Status	Count
BLC 002396.05	BLC_002396.05	BLC	Stored	57
BLC 002398.05	BLC_002398.05	BLC	Stored	112
ECU 001761.17	DEF Tank Fluid Level Signal Slightly Low	ECU - Engine Control Unit (Level 33)	Stored	2
RPT 524252.17	Rear PTO Solenoid Valve, Open Circuit	RPT	Stored	1

CLICK HERE

DEALER-LEVEL SERVICE ADVISOR

Diagnostics: Connected

10:30 AM 2/2/2023



Where the main diagnostic screen did not provide any information on what the error code represented—the “Name” column simply repeats the error code—this screen explains that the problem is that the inner worklights on the front of the roof are not functioning properly. This screen also includes troubleshooting steps, which we will dive further into later.

The main diagnostic screen of Customer SA does not include links to the related section of the electronic manual.

The screenshot shows the John Deere Diagnostics interface. At the top, the John Deere logo and a search bar containing '6155m' are visible. Below the logo is a navigation bar with tabs for Codes, Readings, Controllers, Observed Symptoms, Tests, Calibrations, Procedures, Tools, and Reference Data. The 'Codes' tab is active, displaying a table of error codes. The table has five columns: Code, Name, Controller, Status, and Count. The code ECU 001761.17 is circled in blue. Below the table is a banner for 'CUSTOMER SERVICE ADVISOR' featuring a green tractor in a field. At the bottom of the interface, there is a search bar and a 'Diagnostics: Connected' status indicator.

Code	Name	Controller	Status	Count
BLC 002396.05	BLC_002396.05	BLC	Stored	57
BLC 002398.05	BLC_002398.05	BLC	Stored	112
ECU 001761.17		ECU - Engine Control Unit (Level 33)	Stored	2
RPT 524252.17	Rear PTO Solenoid Valve, Open Circuit	RPT	Stored	1

As a result, farmers are forced to leave this screen and search through the electronic manual to find the related error code.

Finding this information in Customer SA requires searching. There are a number of hang ups that could happen in the process; different models of equipment sometimes use the same error code to describe slightly different mechanical problems, and provide different troubleshooting steps accordingly. That could lead a farmer to mistakenly access the wrong manual, potentially incorrectly troubleshoot the problem and/or increasing the amount of time required to make a repair.

A look at the ECU stored code shows why this could be important. A search for the code in question (ECU 001761.17) gives you three different options, all with the same code number and description.

1 Model - 6155M
1761 results

ECU 001761.17 - DEF Tank FluidLevel Moderately Low
tm410619

ECU 001761.17 - DEF Tank FluidLevel Moderately Low DEF tank fluid level below 10 percent

001761.17 - DEF Tank FluidLevel Signal Slightly Low
ctm120019

001761.17 - DEF Tank FluidLevel Signal Slightly Low The DEF tank measurable fluid level is lower ... than 10 percent. Diagnostic Procedure Troubleshooting Sequence: 001761.03 001761.04 **001761.17** When DTC ... fluid level sensor signal is sending a valid level signal to the **ECU** and the level is less than 10

001761.17 - DEF Tank FluidLevel Signal Slightly Low
ctm120019

001761.17 - DEF Tank FluidLevel Signal Slightly Low The DEF tank measurable fluid level is lower ... This DTC is displayed when the DEF tank fluid level sensor signal is sending a valid level signal to the **ECU** and the level

ECU 523653.14 - ECU Shutdown Error
tm410619

ECU 523653.14 - ECU ShutdownError The **ECU** lost power before it was able to complete the shutdown ... before the **ECU** shutdown. IMPORTANT: On tractors with DEF, it is necessary to wait at least 5 minutes ... by disconnecting the battery. Diagnostics Reaction of the control software: The engine control unit (**ECU**) maintains

ECU 000629.12 - ECU EEPROMError (Tier 2)
tm410619

ECU 000629.12 - ECU EEPROMError (Tier 2) The **ECU** detects an internal problem. Diagnostics Reaction

ECU 000629.13 - ECU Boot SectorError (Tier 2)
tm410619

ECU 000629.13 - ECU Boot SectorError (Tier 2) The **ECU** detects an internal memory problem

Engine Control Unit (**ECU**) — Reprogramming Current **ECU**
ctm120019

Engine Control Unit (**ECU**) — Reprogramming Current **ECU** NOTE: An Internet connection is needed ... the **ECU** needs to be reprogrammed with the correct settings for that component. This is done by downloading ... Select "Reprogramming Current **ECU**" (Service Programming). Verify **ECU** part number and **ECU** serial number

ECU 000158.17 - ECU Error:No Voltage (Tier 2)
tm410619

ECU 000158.17 - ECU Error:No Voltage (Tier 2) The **ECU** is unable to complete proper power down ... procedures after detecting that ignition is OFF. This diagnostic trouble code is generated if the **ECU**

CUSTOMER SERVICE ADVISOR

The third link is the page that has the same information that is linked from the dealer-SA diagnostic screen. It is not unreasonable to imagine that the additional searching for the appropriate information could lead to more than an hour of wasted time—and considerable confusion—in the course of diagnosis.

JOHN DEERE | ecu 001761.17 | No Matches | 6155M - Tractors - 6M L0 (6068U FT4/Stage V) (...)

Manuals - tm410619 - 6110M - 6195M Tractors (MY18 -19) Diagnostics -: (Worldwide Edition)

TOC Diagnostics | ECU 001761.17 - DEF Tank Fluid Level Moderately Low

Foreword
 Information on Serial Numbers and Content
 Model Year 2019 (MY19) - Information on Se
 Model Year 2018 (MY18) - Information on Se
 210 - General Information
 211 - Diagnostic Trouble Codes
 212 - Observable Symptoms and System Diag
 220 - Engine
 230 - Fuel, Air Intake, and Cooling System
 239 - Fuel, Air Intake, and Cooling Systems - f
 240 - Electrical System
 245 - Electronic Control Units
 249 - Electrical Connectors, Wiring Harnesses
 250A - Drive Train (without Transmission)
 250C - PowrQuad™ Transmission
 250E - PowrReverse™ - Transmission
 250G - CommandQuad™ Transmission (CQ)
 259 - Drivetrain - Component Information
 260A - Steering
 260B - Brakes
 269 - Steering and Brakes - Component Infor
 270 - Hydraulic System
 279 - Hydraulic System - Component Informa

DEF tank fluid level below 10 percent.

For diagnostic procedure, see the relevant CTM for diesel engines:

- 0001761.17

NOTE:
 Component lead numbers and connector layout in this manual are different from the information given in the CTM.
 For diagnostics, use the component and circuit information provided under tractor-related information.

Tractor-related information:

- For details of location and information on components, see B5506 - DEF Module, Component Information in Section 249.
- For a summary of the circuit (layout of leads), see:
 - 50FA - Aftertreatment System, Diagnostic Schematic, Section 240.
- For a summary of wiring harnesses, see Summary of Wiring Harnesses, Summary of References, Section 249.

CUSTOMER SERVICE ADVISOR

ECU 001761.18 - DEF Tank Fluid Level Low

ECU 002003.09 - Incorrect CAN Bus Message, Information from PTA Control Software

This device is scheduled to update weekly but was last updated 23 days ago. Please connect to the Internet and allow the update to complete.

Service ADVISOR™ software update is available. To proceed, click here to go to Offline Device Management. 15 days remaining!

Clicking the first link brings you to a separate page that provides minimal information.

JOHN DEERE | ecu 001761.17 | No Matches | 6155M - Tractors - 6M L0 (6068U FT4/Stage V) (...)

Manuals - ctm120019 - 6068 Diesel Engine — Level 33 ECU -: (Worldwide Edition)

TOC Diagnostics | Connector and Wire Splice Location Diagrams

Foreword
 Identification Views—John Deere 6.8 LOEM Dic
 Related Manuals
 Training Information
 Definition of Terms
 Trademarks
 01 - General Information
 02 - Repair and Adjustments
 03 - Theory of Operation
 04 - Diagnostics
 05 - Tools and Other Materials
 06 - Specifications

NOTE:
 The harness diagrams provided are for a typical John Deere supplied OEM harness. Connector and wire splice locations may not apply to all applications.

RG24418-UN: Engine Harness Option Code 84DV- Engine Mounted ECU, Single Turbocharger

RG24419-UN: Engine Harness Option Code 84EK- Remote Mounted ECU, Single Turbocharger

RG23503A-UN: Engine Harness Option Code 84DT- Engine Mounted ECU, Series Turbochargers

CUSTOMER SERVICE ADVISOR

This device is scheduled to update weekly but was last updated 23 days ago. Please connect to the Internet and allow the update to complete.

Service ADVISOR™ software update is available. To proceed, click here to go to Offline Device Management. 15 days remaining!

The second link brings a list of wire splice location diagrams, which would provide little help without knowledge of what the problem is.

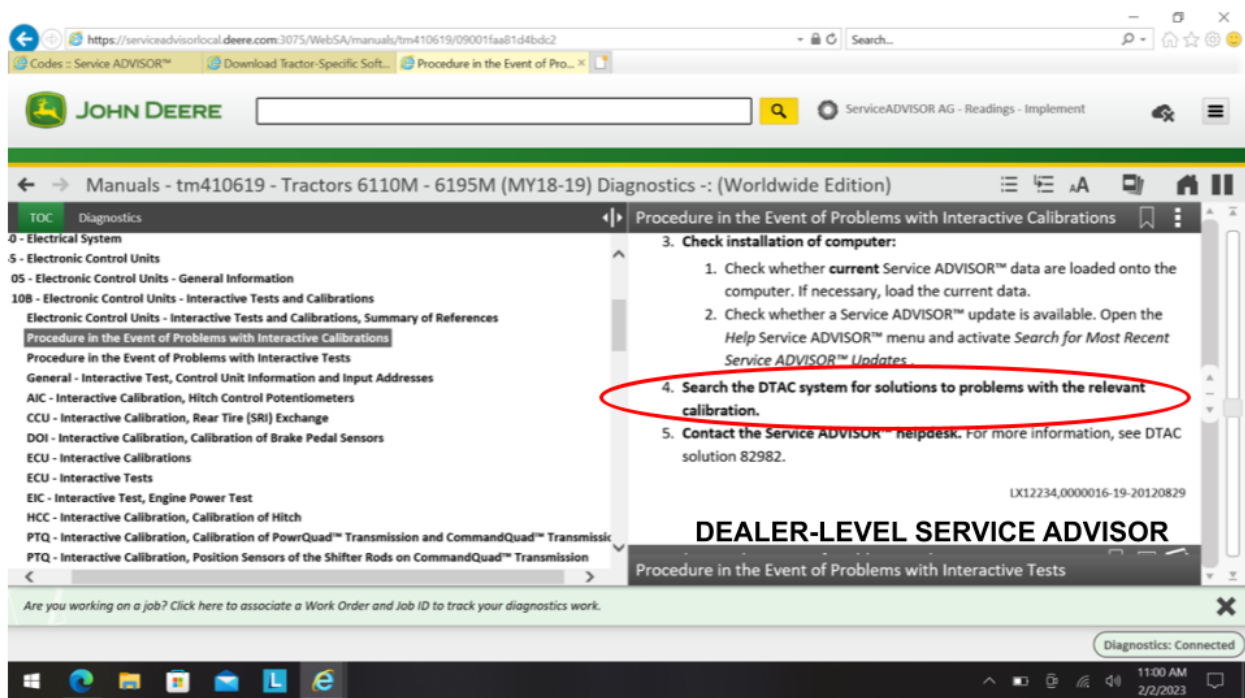
The third link finally takes you to the page with the full troubleshooting sequence and the appropriate wiring diagram. Dealers can access this page with one click, while farmers have to search through numerous other pages, without assurance that the page that they reached is the right one.

Having the right tool for the job can save a lot of time. If you have to unscrew something, you might be able to do so using a coin—but having the appropriate screwdriver makes the job a whole lot easier.

In cases where Customer SA lacks direct links to the appropriate information, farmers are left using the equivalent of the coin to remove the metaphorical screw. In cases where information is redacted, not even a dime will do. Whatever the logic behind these differences, it is clear that dealer-level SA is the best tool for the job, and the publicly-available version promised by Deere’s MOU is not.

Farmers using Customer Service ADVISOR cannot access necessary diagnostic information

After Deere puts a new product line on the market, unforeseen problems emerge. Dealers that encounter such a problem will submit them to Deere’s Dealer Technical Assistance Center, or DTAC, which is a central group of engineers that develop “solutions” to the problem. These DTAC solutions are maintained in the DTAC system, which is a database that John Deere does not make available to farmers.¹⁷

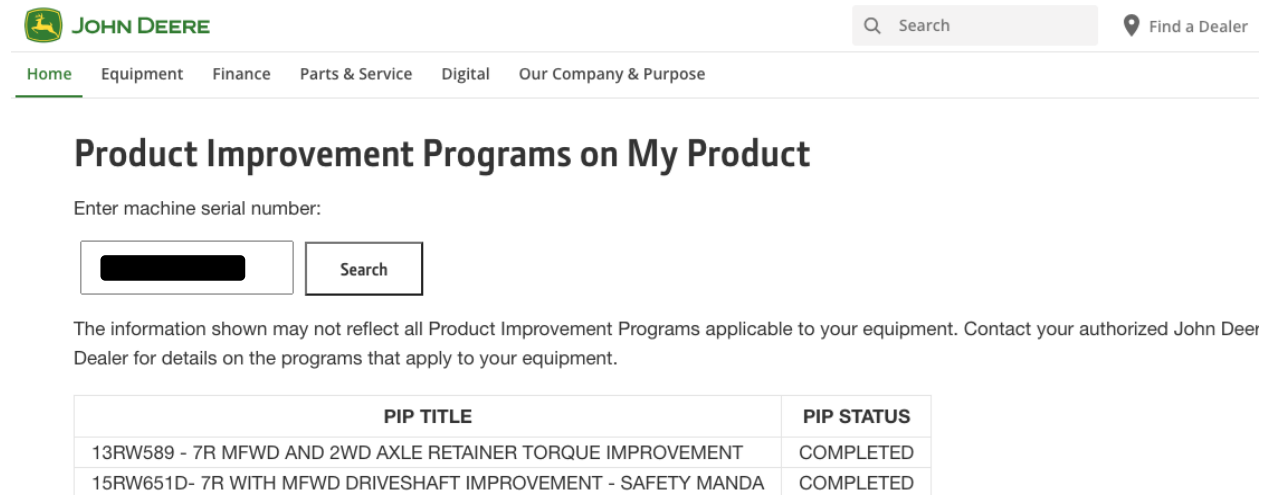


Repair procedures often instruct a farmer to search the DTAC system for solutions. Farmers and independent mechanics do not have access to this system, meaning that they cannot complete such repairs without dealer intervention.

Some problems are so pervasive that the DTAC team issues a notice known as a Product Improvement Program (PIP), for which a replacement part might be needed to fix the problem.¹⁸

Farmers can search for PIPs related to their product on John Deere’s site.¹⁹ But the information provided to them is typically not enough to make a repair—in many cases, it only includes a

few words on the problem and whether or not it has been fixed, without any further information on how to fix it, what replacement parts are needed and the like.



JOHN DEERE Search Find a Dealer

Home Equipment Finance Parts & Service Digital Our Company & Purpose

Product Improvement Programs on My Product

Enter machine serial number:

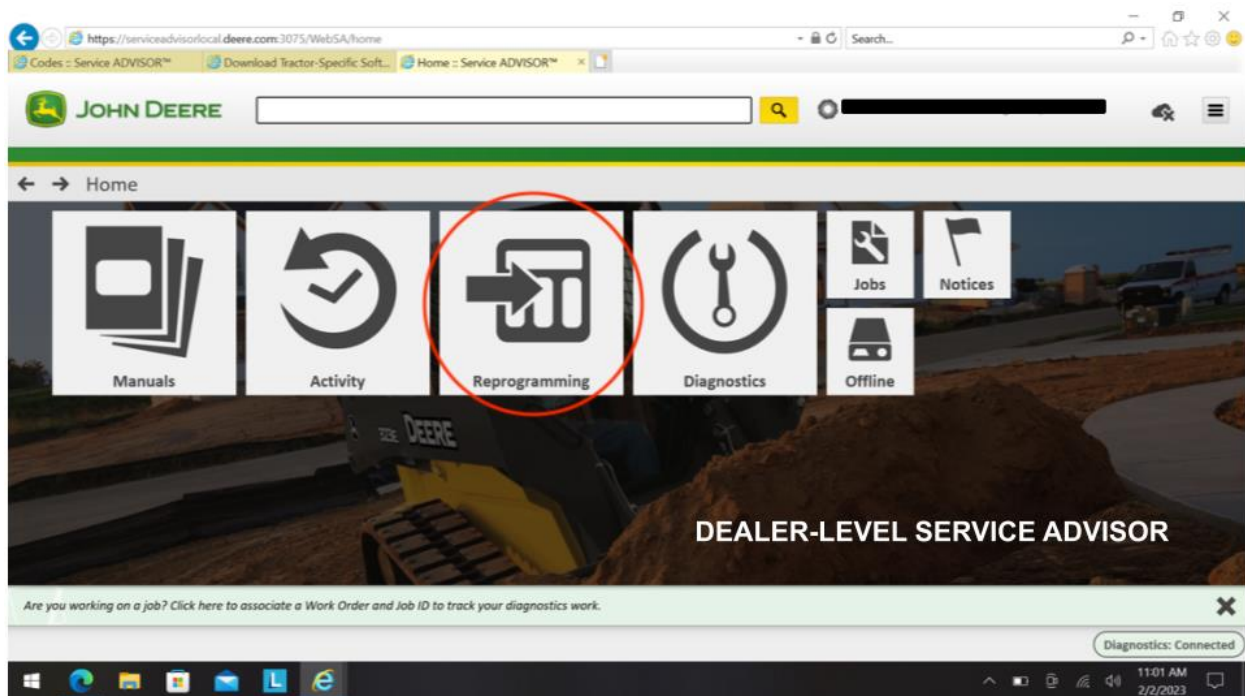
The information shown may not reflect all Product Improvement Programs applicable to your equipment. Contact your authorized John Deere Dealer for details on the programs that apply to your equipment.

PIP TITLE	PIP STATUS
13RW589 - 7R MFWD AND 2WD AXLE RETAINER TORQUE IMPROVEMENT	COMPLETED
15RW651D- 7R WITH MFWD DRIVESHAFT IMPROVEMENT - SAFETY MANDA	COMPLETED

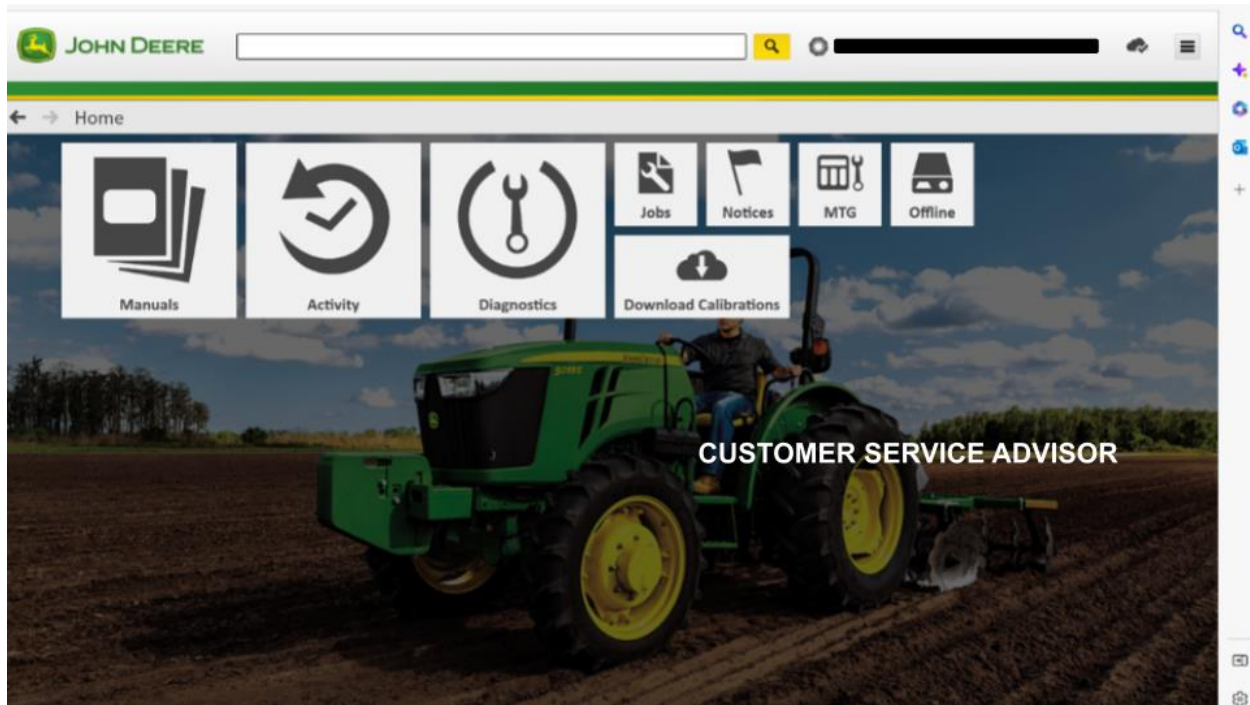
John Deere’s MOU does not explicitly guarantee access to DTAC or detailed PIP information.²⁰ Again, dealers have access to necessary repair information that farmers and independent mechanics cannot acquire.

Customer Service ADVISOR prevents farmers from digitally finalizing repairs

Reprogramming is a key repair function that farmers and independent mechanics cannot perform through Customer SA. This function is where farmers program embedded code, or “payload files” in John Deere terminology, onto new software-connected parts. Reprogramming is only possible through dealer-level SA.

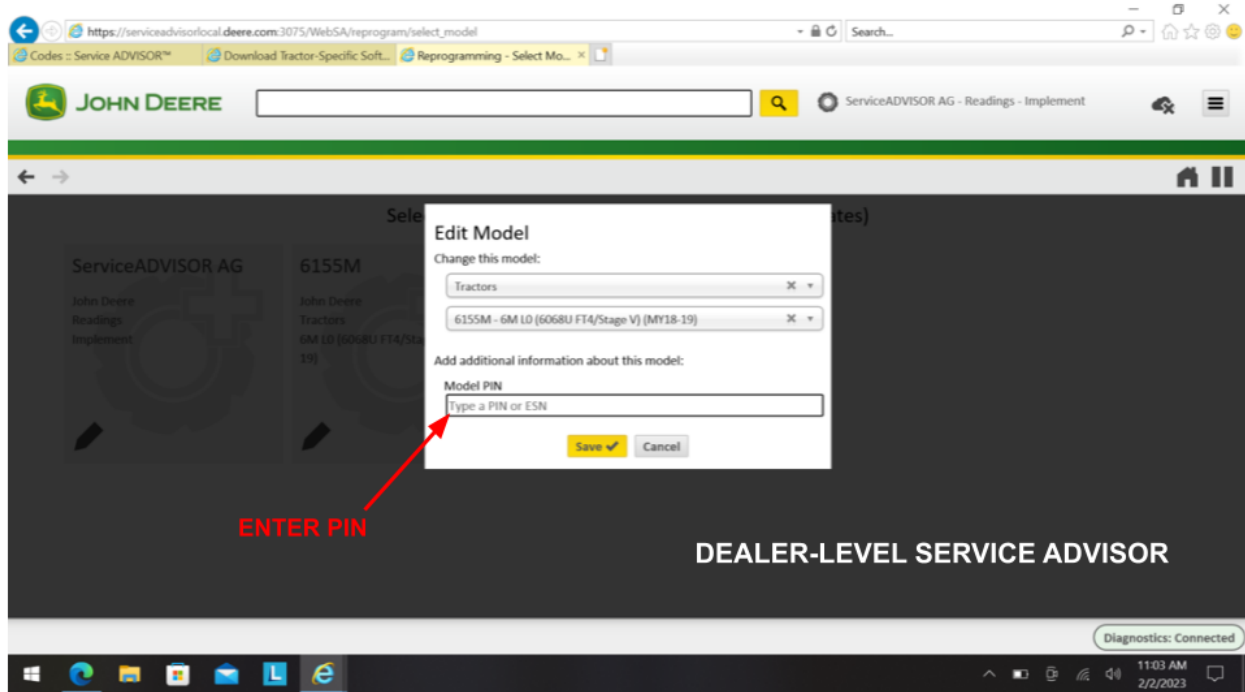


The reprogramming tile, which is necessary to digitally pair a part to a particular machine and finalize a repair, is only available through dealer-level SA.



Customer SA does not allow farmers or independent mechanics to reprogram parts.

Reprogramming is a form of 'parts pairing' in which a particular part must be digitally 'paired' to a particular piece of equipment. This is done by requiring a dealer mechanic to enter the serial number of the farmer's piece of equipment, known as a "Model PIN." Parts pairing is one way in which manufacturers of equipment ranging from smartphones to tractors can control elements of the repair process.²¹



In order to reprogram a part, the farmer must first enter their Model PIN, or serial number. This is a form of parts pairing, which manufacturers of a wide variety of products use to control the repair process.

It is important to note that farmers cannot modify source code or customize software at this point of the process.²² Access to this function simply allows them to install the latest firmware made available by Deere onto the part so that the part and piece of equipment can communicate with each other. Parts that require reprogramming will not properly function before this step is completed.²³

In addition to finalizing the repair process, reprogramming parts can be a crucial troubleshooting step. By updating parts' firmware, a mechanic or farmer could make sure that a given problem is not being caused by a software bug rather than a true mechanical problem. This option is not available to farmers or independent mechanics through the version of Customer SA that we reviewed.

The screenshot displays the John Deere ServiceAdvisor AG web interface. The browser address bar shows the URL: <https://serviceadvisorlocal.deere.com:3075/WebSA/manuals/tm410619/09001faa83c1766e>. The page title is "Manuals - tm410619 - Tractors 6110M - 6195M (MY18-19) Diagnostics - (Worldwide Edition)". The main content area is titled "50ZZ - Engine Control Unit, Test" and contains a list of diagnostic steps:

- 1 Preliminary check
- 2 Control unit, test of power supply circuit and ground circuit
- 3 Inspect all non-factory installed equipment
- 4 Non-factory equipment diagnosis
- 5 Additional checks and assessment of intermittent faults
- 6 Ascertain and verify the status of the software
- 7 Reprogramming of control unit

The text "DEALER-LEVEL SERVICE ADVISOR" is displayed to the right of the list. Below the list, the text "50ZZ - Engine Control Unit (Tier 2), Test" is visible. A red circle highlights step 7. At the bottom of the page, there is a status bar that says "Diagnostics: Connected" and a system tray showing the time as 11:08 AM on 2/2/2023.

Reprogramming a control unit can be an important troubleshooting step to determine whether a software bug is causing the problem.

Conclusion

Customer Service ADVISOR—the repair software promised in Deere’s Memorandum of Understanding with Farm Bureau—falls short of guaranteeing farmers and independent mechanics access to all of the information and materials that they need to fix modern agricultural equipment.²⁴

Farmers cannot reprogram parts, a critical step necessary to either digitally finalize many repairs or identify if a problem is being caused by a software bug. They cannot access the library of repair information housed in the DTAC system, nor do they have access to detailed explanations of PIP solutions. In some cases Customer Service ADVISOR—a program that Deere charges farmers \$3,100 per year to use—needlessly redacts repair information that dealers have at their fingertips.

As a result, farmers will still have no choice but to turn to the dealer for many repairs. In this way, the Deere’s MOU does not give farmers a true Right to Repair.

Right to Repair reforms similar to those passed in Colorado²⁵ and considered in the 117th Congress,²⁶ however, ensure that farmers have access to all of the repair parts, documentation and tools—including software—that they need to independently fix their equipment. Legislators should help farmers eliminate unnecessary equipment downtime and repair costs by enacting further Right to Repair laws until all American producers are given repair relief.

Methodology

Along with other repair advocates, U.S. PIRG Education Fund met in February 2023 with an expert that had access to dealer-level Service ADVISOR (SA). We first spoke with the expert to better understand the capabilities of the exclusive tool. Based on that conversation, other conversations we have had with farmers and previous research, we developed a list of questions that we had about potential differences between customer and dealer-level SA.

To answer these questions, we brought the expert's laptop, which was loaded with dealer-level SA, and an independently-acquired laptop with Customer SA access to a visit with a local farmer. We plugged both laptops into one of the farmer's John Deere tractors and to investigate and document the key differences between the two versions of SA.

In July 2023, U.S. PIRG Education Fund reviewed the same Customer SA-loaded to confirm the findings and search for alternate ways to access information that was more easily available from dealer-level SA. During that review, the login screen of Customer SA stated the version of the software we accessed was last updated in November 2022, implying that there were no changes to our tool in the months following the original comparison with dealer-level SA.

Endnotes

1. Kevin O'Reilly, "[Deere in the Headlights](#)," U.S. PIRG Education Fund, February 2021.
2. Kevin O'Reilly, "[Why Farmers Need Right to Repair](#)," U.S. PIRG Education Fund, January 2022.
3. Template legislation available at <https://docs.google.com/document/d/1RpxXIzHd4MxxqnZ6lnmr2StXp3HLOAdL/edit?rtpof=true&sd=true>
4. Kevin O'Reilly, "[Out to Pasture](#)," U.S. PIRG Education Fund, April 2023.
5. MOU between AFBF and John Deere available at https://www.fb.org/files/AFBF_John_Deere_MOU.pdf
6. Patience Haggin, "[Deere to Allow Farmers to Repair Their Own Equipment](#)," *Wall Street Journal*, January 2023.
7. Kevin O'Reilly, "[Another tractor repair MOU changes nothing](#)," PIRG, March 2023.
8. MOU between AFBF and John Deere available at https://www.fb.org/files/AFBF_John_Deere_MOU.pdf
9. In its repair MOU, John Deere makes multiple commitments to provide repair software, which it defines as: "Software means Customer Service ADVISOR." This is one reason that we chose to investigate this particular tool. See page 6: https://www.fb.org/files/AFBF_John_Deere_MOU.pdf
10. MOU between AFBF and John Deere available at https://www.fb.org/files/AFBF_John_Deere_MOU.pdf
11. Based on input from an expert who regularly uses dealer-level SA, we focused on examples that would be most illustrative of what a farmer or independent mechanic would have difficulty accessing during an attempted repair. See the methodology for more information. Further research could compare all aspects of the features of the two programs beyond the set of features we reviewed.
12. Kevin O'Reilly, "[Out to Pasture](#)," U.S. PIRG Education Fund, April 2023.
13. See 9:38: <https://www.facebook.com/MarylandPIRG/videos/deere-in-headlights-right-to-repair/259620692296129>
14. Ibid.
15. Ibid.
16. Kevin O'Reilly, "[Out to Pasture](#)," U.S. PIRG Education Fund, April 2023.
17. "In the summer of 2022, John Deere announced that it had expanded access to self-repair resources. The Customer Service ADVISOR™ tool is a subscription based digital database of Operator, Diagnostic, and Technical manuals for John Deere products. It's very similar to Service ADVISOR™ used by John Deere dealers and technicians with the **exception of software updates, remote capabilities, and access to DTAC solutions.**" See: <https://www.deere.com/en/publications/the-furrow/2022/november-2022/tech-at-work/>
18. "The team is traveling around and replacing a part that is supposed to prevent debris from settling on the engine." See: <https://allboardharvest.com/2013/06/03/jada-a-visit-from-the-john-deere-pip-team/>
19. See: <https://www.deere.com/en/parts-and-service/recall-information/>
20. MOU between AFBF and John Deere available at https://www.fb.org/files/AFBF_John_Deere_MOU.pdf
21. Lauren Greenlee, "[How Parts Pairing Kills Independent Repair](#)," *iFixit News*, January 2023.

22. Based on conversation with expert.
23. Kevin O'Reilly, "[Deere in the Headlights](#)," *U.S. PIRG Education Fund*, February 2021.
24. Kevin O'Reilly, "[Another tractor repair MOU changes nothing](#)," *PIRG*, March 2023.
26. See: <https://www.leg.colorado.gov/bills/hb23-1011>
25. L. Matsakis and O. Solon, "[Senate introduces bill to allow farmers to fix their own equipment](#)," *NBC News*, February 2022.