

| ABOUT ME

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| AGENDA:

1. Introduction
2. What's the problem with farm repair, and how do we know it's a problem?
3. The role of software locks in farm equipment
4. Do repair tools make it easier to bypass safety or emissions controls?
5. Questions (20 mins)

| Introduction

In order to fix something, you need:

- The skills
- Manuals / informaion
- The tools
- The parts

For tech-weary Midwest farmers, 40-year-old tractors now a hot commodity

Tractors built in 1980 or earlier cause bidding wars at auctions.

By Adam Belz Star Tribune | JANUARY 5, 2020 — 8:27PM



... The other big draw of the older tractors is their lack of complex technology. Farmers prefer to fix what they can on the spot, or take it to their mechanic and not have to spend tens of thousands of dollars.

“The newer machines, any time something breaks, **you’ve got to have a computer to fix it,**” Stock said.

...

“The main reason we do this is to make money,” Folland said. “**Older equipment is a way to reduce your cost per bushel to become more profitable.**”

| Timeline for right to repair

2012

Massachusetts voters approved a ballot measure (86% - 14%) in 2012 which required independent mechanics be able to access service information and diagnostic software for cars.

Farm and repair advocates won an exemption from federal copyright law for bypassing software locks to repair farm equipment.

2014

The Massachusetts law became a national agreement between aftermarket auto industry and car manufacturers, extending access to all 50 states. Road-commercial vehicles added to the agreement.

2018

Manufacturers and dealers promised to sell the tools needed to repair equipment as part of R2R Solutions, with a deadline of Jan. 2021.




**Farm Bureau members ratchet up
“right-to-repair” pressure**

| The role of software locks in farm equipment repair



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| Installing “firmware” or payload files

- Works like a printer driver -- enables interoperability.
- Distributed as “compiled machine code” -- not user editable
- Even turn signals can require firmware installations, and therefore dealership support
- Other parts require a “calibration” sequence after installation to pair the part.



Machine running properly

Mechanical or software failure occurs

Emissions or safety control codes engaged

Software key authorizes repair and clears error codes

WHAT DOES IT TAKE TO REPAIR FARM EQUIPMENT?

Steps in red require software tools

only available to manufacturer-authorized technicians

or rely on a prior step that does.

Immobilizer activates, putting machine into "limp mode"

Necessary mechanical or software repairs made

Diagnostic tools help identify problem

Software key entered to access diagnostic tools

| Do repair tools make it easier to bypass safety or emissions controls?

| QUESTIONS