Right to Repair

IFIXIT

Right to Repair
repair.org
Fix, or Toss? The ‘Right to Repair’ Movement Gains Ground

Both Republicans and Democrats are pursuing laws to make it easier for people to fix cellphones, cars, even hospital ventilators. In Europe, the movement is further along.
Right to Repair is a Growing Movement

88% of Voters in Massachusetts overrode the car companies and passed the automobile owners’ Right to Repair law in November, 2012.

114,322 Americans signed a petition to legalize cell phone unlocking. The White House supports cell phone unlocking—but your voice is still needed to convince Congress.
Monopoly Strategies
Copyright on Service Manuals

Dear Mr Hicks,

Toshiba copyright Repair Manuals.

We understand that you are the owner and editor of a website that is found at http://tim.id.au and that your ABN is [redacted].

On your website we are able to read and see that you are distributing, by download, copyright repair manuals (the Manuals) that are proprietary to Toshiba (Australia) Pty Limited and its parent company, Toshiba Corporation of Japan (Toshiba).

The Manuals are only available to Toshiba authorised service providers under strict confidentiality agreements. You are not a Toshiba authorised service provider and therefore you have no rights to have any of the Manuals that are listed and linked under the heading “Toshiba” that appears on your website.
Localytics

2019

Source: Localytics December 2019
Android Fragmentation
Right to Repair Legislation

Parts + Tools + Know-how
2020 – State Legislative Activity “Heat Map” (forecast)
THEN...

NOW...

REPAIR SHOP

CLOSED
It’s Time for a Repair Jobs Revolution

Repair jobs may be an answer to the global unemployment problem, help bridge the digital divide, and cut down the amount of unnecessary waste.
Repair is a cornerstone of our environmental and economic future.
Those stickers warning that repairs will void your warranty are nonsense, FTC says
Nixing the Fix: A Workshop on Repair Restrictions

JUL 16, 2019  12:30PM

CONSTITUTION CENTER
400 7th St SW, Washington, DC 20024 | Directions & Nearby
Nixing the Fix
A workshop on repair restrictions
July 16, 2019 - Washington DC

ARGUMENTS FOR & AGAINST REPAIR RESTRICTIONS

HOW DO REPAIR RESTRICTIONS AFFECT CONSUMERS & SMALL BUSINESSES?

- Product defects can only be fixed with purchase of a contract
- Design constraints make repair difficult
- Batteries are glued to devices
- Crowdsourced resources are pretty good
- Exponential age devices become more complex

WHAT'S THE FIX?

- Repairer's rights: make repairs easier
- Extend the life of electronics
- Select safer batteries can be replaced
- Repair is 50% or more of cost of device
- Unauthorized repairs removes accountability
- Right to repair

DO NO HARM

- Who should repair what and when?
- By who?
- Smartphones disposed of everyday
- 416,000 smartphones repaired

Do not hallucinate.
Repairable Products Make Good Sense

Repair is good for manufacturers, good for the economy, and good for the rest of us.

We rate the latest products to make it easy to buy repairable hardware.

Smartphones
<table>
<thead>
<tr>
<th>Model</th>
<th>Notes</th>
</tr>
</thead>
</table>
| iPhone 12 Pro       | + Display and battery replacements remain a priority in the new iPhones' design.  
                      + Most other important components are modular and easy to access or replace.  
                      - Glass on front and back doubles the likelihood of drop damage—and if the back glass breaks, you'll be removing every component and replacing the entire chassis. |
| Microsoft Surface Duo | - Batteries are glued and require extensive disassembly to service.  
                      - The USB-C port is soldered directly to the main board.  
                      - Uncommon tri-point screws secure key components. |
| Samsung Galaxy Note 20 Ultra | - Battery replacement remains far too difficult for a consumable component.  
                      - Screen repairs are tedious, poorly prioritized, and unnecessarily expensive.  
                      + You'll only need one screwdriver, a standard Phillips. |
| iPhone SE 2020      | + The two most commonly replaced components, display and battery, remain straightforward to access with the proper knowledge and tools.  
                      + Most components are modular and independently replaceable, including many that are cross-compatible with iPhone 8.  
                      - The fragile glass back is impractical to replace. |
ようこそ!! ジャンクの世界へ
Surface Pro3

液晶割れ
iFixitが10段階中1と評価した
修理・分解超難易度品
抜く猛者はいかが？

無保証品
税込
¥131,133

PCNETジャンク通り店 地下フロア
Microsoft
Surface Laptop

TEARDOWN
Final Thoughts

- This laptop is not meant to be opened or repaired; you can’t get inside without inflicting a lot of damage.
- The CPU, RAM, and onboard storage are soldered to the motherboard, making upgrades a no-go.
- The headphone jack, while modular, can only be accessed by removing the heat sink, fan, display, and motherboard.
- The battery is difficult and dangerous to replace, giving the device a limited lifespan.

Repairability Score
Repairability 0 out of 10
(10 is easiest to repair)
Microsoft Surface Laptop 3
15”
Final Thoughts

The opening procedure is straightforward, with a clever design that represents a dramatic improvement over its predecessors.

The M.2 SSD is fully modular and easy to access.

Torx Plus screws call for relatively rare drivers, but our standard Torx drivers worked in a pinch.

Display access is well-prioritized, but must be replaced as an (expensive) complete unit—subcomponents aren’t modular.

While many components are modular, intricate layered construction makes them difficult to service.

The firmly glued-down battery will be very difficult to service when it inevitably goes kaput.

Repairability Score

Repairability 5 out of 10
(10 is easiest to repair)
Electric goods 'should have repairability rating'

By Justin Parkinson
Political reporter, BBC News

The government must look at forcing manufacturers to put "repairability" scores on electric devices, opposition parties have said.
INDICE DE RÉPARABILITÉ

9,5
/10
Right to Repair Legislation

Parts + Tools + Know-how
Massachusetts "Right to Repair" Initiative, Question 1 (2012)

The Massachusetts "Right to Repair" Initiative, also known as Question 1, was on the November 6, 2012 general election ballot in the state of Massachusetts as an initiated state statute, where it was approved. The measure, originally filed four times with the Massachusetts Attorney General, was filed by Arthur W. Kinsman, and was assigned initiative numbers 11-17. The proposal required automobile manufacturers to provide non-proprietary diagnostic directly to consumers and also the safety information needed to repair their cars.[1][2]

According to reports, on the last day of session, a legislative compromise was confirmed. Although the compromise was enacted, Question 1 remained on the ballot. The measure became a law as well when voters approved it.[3]

Election results

See also: 2012 ballot measure election results

The following are official election results:

<table>
<thead>
<tr>
<th>Result</th>
<th>Votes</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>2,353,603</td>
<td>87.7%</td>
</tr>
<tr>
<td>No</td>
<td>392,562</td>
<td>12.3%</td>
</tr>
</tbody>
</table>

Results via the Massachusetts Secretary of State.
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Arguments for & Against Repair Restrictions

How do repair restrictions affect consumers & small businesses?

- Product defects can only be fixed with purchase of a contract
- High replacement costs
- Devices are completely sealed
- Batteries are glued to devices
- Consumer want thinner devices
- Access to reliable parts is a hurdle

Do no harm

Who should repair what & when?

Exponential age devices becoming more complex

Time is an issue with warranty repairs

1% consumers disposing of everyday smartphones disposed of everyday

Different products have different histories

Extended producer responsibility

Phones go to reuse market

Want access to good parts

右側のテキスト

- Repair restrictions are 50% or more of the cost of the device
- Unauthorized repairs removes accountability
- NIST follows new standards to help cybersecurity

Right to Repair

- What’s the Fix?
- Federal Issue
- Create = repairability score
- Competition makes it better
- Repair is more than an option (current)

Independent repair industry keeps market competitive

Phones go to reuse market

Demand for repair instructions by consumers

Value repair

Make manuals available

#NixTheFix
17 U.S. Code § 1201 - Circumvention of copyright protection systems

(a) Violations Regarding Circumvention of Technological Measures.—

(1)

(A) No person shall circumvent a technological measure that effectively controls access to a work protected under this title. The prohibition contained in the preceding sentence shall take effect at the end of the 2-year period beginning on the date of the enactment of this chapter.
Hacking Tractors for Repair
Using MITM Brute Force
Motivation

● Companies are locking diagnostics and commands behind proprietary code.
  ○ https://www.wired.com/story/john-deere-farmers-right-to-repair/
  ○ https://ifixit.org/blog/7192/john-deere-mess/
  ○ https://www.wired.com/2015/04/dmca-ownership-john-deere/

● Without access to information, repair becomes difficult.

● Tractor commands aren’t encrypted. We can view and copy them.
  ○ With a library of possible commands we can create our own tools.
Progress

- The CAN “language” has an open source handbook to help figure out commands
  - http://opengarages.org/handbook/

- Previous students have captured data packets and parsed some of them
  - https://tractorhacking.github.io/documentation/ has their results and instructions for how to pickup where they left off.

- The last group improved data collection with PolyCAN
General Goals

● Define John Deere Tractor CAN commands
  ○ Expand on existing library

● Attempt to get a bench ECU (Engine Control Unit) working.
  ○ We bought one. Record signals from live tractor, play back on ECU
Required Skills

- Minor knowledge of electronics
- Knowledge of oscilloscope & function generators
- Programming
Implications

- Help farmers around the world save time and money
- Learn how “Security through Obscurity” can be brute forced
Deliverables

- More CAN library commands
- Create oscilloscope symbol table
  - https://about.keysight.com/en/newsroom/backgrounders/CANdb0