

Free and Open Source Hardware (FOSH)

Closed vs Open Biryani

- ✗ Licensed
- ✗ Only one company can prepare it
- ✗ Extremely costly
- ✗ We don't know the recipe

- ✓ Libre Licence
- ✓ Anyone can modify and prepare it
- ✓ Price is decided by market
- ✓ Recipe is open

“Hardware design (i.e. mechanical drawings, schematics, bills of material, PCB layout data, HDL source code and integrated circuit layout data), in addition to the software that drives the hardware, are all released under free/libre terms”

- Wikipedia

Schematics - Circuit diagrams

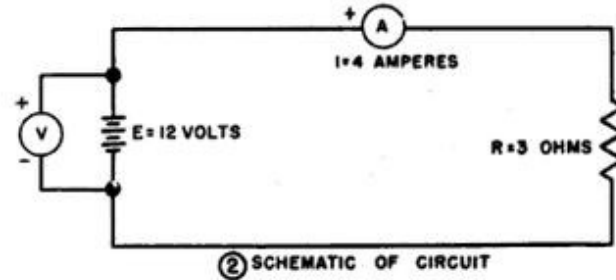


Figure 48. Diagram of a basic circuit.

Bill of materials

Bill of Material

Customer name: ABC Company

Customer address: 10 Jane Avenue, New York

Date: 1/1/2010

Item #	Description	Vendor	Part Number	Quantity
1	FGHT sun model	MNF	GHY253	7
2	120 w photovoltaic module	Food FG	2543-I	14
3	Hardware	Mottle	1452-UKJ	2
4	4-module for GHN	IFS	256BN	1
5	822 air G	Mood plc	947673 IOL	4
6	SMA Model Sunny Boy Inverter	MNF	8 GH	2
7	9B, 700 GHT	IFS	f58	1
8	Fused Disconnect Switch	Food FG	56e	1

Printed circuit board



HDL - Hardware
description language

```
LIBRARY IEEE;  
USE IEEE.STD_LOGIC_1164.ALL;  
  
ENTITY not1 IS  
    PORT(  
        a : IN  STD_LOGIC;  
        b : OUT STD_LOGIC;  
    );  
END not1;  
  
ARCHITECTURE behavioral OF not1 IS  
BEGIN  
    b <= NOT a;  
END behavioral;
```

What is wrong with
Closed Hardware?

MINIX: Intel's hidden in-chip operating system

Buried deep inside your computer's Intel chip is the MINIX operating system and a software stack, which includes networking and a web server. It's slow, hard to get at, and insecure as insecure can be.



Written by **Steven Vaughan-Nichols**, Senior Contributing Editor
on Nov. 6, 2017

Apple fined \$27.4 million for slowing down iPhones without telling users

France's competition watchdog DGCCRF (Directorate General for Competition, Consumption and the Suppression of Fraud) has announced that Apple will pay a fine due to the iOS update that has capped performance of aging devices.

BMW asks consumers to pay subscription for features already installed in car

Tuesday, 19 Jul

By Dylan Ca

Home › Devices › HP blocks customers from using third-party ink with its printers

Devices

HP blocks customers from using third-party ink with its printers

13/03/2023

Mercedes-Benz is introducing a new 'acceleration fee' to make some cars faster

Here's how the new software feature will work and why many aren't happy with it.

By: **Tech Desk**

Mumbai | Updated: November 26, 2022 10:28 IST

 **NewsGuard**

Amazon Dash Buttons



Release
v1.4.0



amazon **dash** HACK
BUTTON

*Do whatever
you want!!*



Still alive!

A hand holding a red Huggies Dash Button in front of a computer screen. The screen shows a Google Sheet with a table of data and a terminal window with Python code.

	A	B	C
1	Timestamp	Measurement	
2	8/9/2015 3:07:00	Poopy Diaper	
3	8/9/2015 3:08:00	Woke from Sleep	
4	8/9/2015 10:49:00	Poopy Diaper	
5			
6			
7			
8			
9			
10			

```
33 print sniff(prn=arp_display, filter="arp", store=0, count=10)
34
```

Openness in Consumer Electronics

Openness in Consumer Electronics

- Easy to Repair
- Widely available spares
- Clear user guides and manuals
- Long lifetime
- Wide service network

Smartphone **Repairability** Scores - ifixit.com



Samsung Galaxy S22 Ultra

2022

- + Standard Phillips screws throughout the phone.
- The battery is strongly glued and requires extensive disassembly to service.
- Screen repairs require a lot of disassembly while battling tough adhesive.

3



Fairphone

4

2021

- + The pop-out battery can be replaced in seconds, with no tools required.
- + Display repairs are easy and well-prioritized.
- + The OEM supports all common repairs with clear instructions and publicly available replacement parts.

10

Laptop Repairability Scores - ifixit.com



MacBook
Pro 15" Touch Bar
2019
2019

- The processor, RAM, and flash memory are soldered to the logic board. Repairs and upgrades will be impractical at best.
- The top case assembly, including the keyboard, battery, speakers, *and* Touch Bar, is glued together—making all those components impractical to replace separately.
- The Touch ID sensor doubles as the power switch, and is paired with the T2 chip on the logic board. Fixing a broken power switch may require help from Apple, or a new logic board.

1



Framework
Laptop
2021

- + Every important component in the laptop is easy to access and replace.
- + Inside the laptop, most components are helpfully labeled to help orient and guide the fixer.
- + The Framework Laptop repair guides are free and easily accessible, and Framework is already selling spare parts right on their website.


10

Right to Repair Laws



Europe's right-to-repair law asks hardware makers for fixes for up to 10 years

Smartphones and tablets would also be added to the EU's list of devices that must be repairable under new rule

 [Brandon Vigliarolo](#)

Consumer Rights

Warranty-Voiding Stickers Are Illegal. These Companies Still Use Them

Man shocked after Apple sends him a 36-kg kit to repair iPhone mini

Tech journalist Sean Hollister tried Apple's Self Service Repair program, and criticised the company for making it unnecessarily complicated.

The Pentalobe Screw, and Apple's War Against Self-Repair

By [Lloyd Alter](#) | Updated October 11, 2018

MOTHERBOARD
TECH BY VICE

Apple Begins Selling iPhone Repair Parts to Customers (Finally!)

In 2009, Apple started putting proprietary screws on iPhones, MacBooks, and other devices. Thirteen years later, it's finally selling the screwdriver.

What can You Do?

What can You Do?

- Support Open Hardware
- Purchase easily repairable hardware and save money
- Use free software
- Learn to modify and upgrade your electronics
- Follow Five R principle