



Product designers should follow these five rules

# The Elements of Repairable Design

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**R**OCKET SCIENTISTS have embraced design for repair, with companies such as SpaceX making spacecraft with standardized parts that can be reused, repaired and replaced. But just because rocket scientists are doing it doesn't mean it's difficult. Making everyday products that are repairable rather than disposable isn't complex and helps both our wallets and the planet.

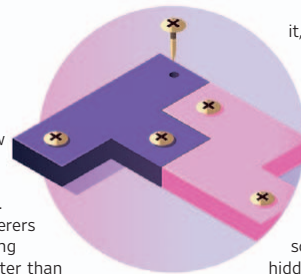
I work for iFixit, the free repair manual, which has guides for how to fix everything from phones and laptops to musical instruments. We tear down new gadgets and score them from zero to 10 based on how repairable they are. Lately, we've been working directly with manufacturers to help them develop repairable designs. Our advice boils down to one simple rule: Any component critical to keeping a device in service should have a viable repair strategy.

Here are some things we think should be at the top of every device designer's priority list.

## USE STANDARD FASTENERS

So, parts should be removable. But designers also need to consider how they're removed: Choose robust connectors and easy-to-remove fasteners.

Some makers and tinkerers have been saying for a long time that "screws are better than glues." Nothing makes our teardown team groan more than strong adhesives that break our tools, leave sticky residues and require painstaking reapplication. Sure, glue might make a device two millimeters thinner, but in several flagship smartphone brands, new devices are already thicker than the previous ones, meaning that "thinner every model" is no longer the selling point it once was. Rubber gaskets and hydrophobic mesh are preferable for ensuring water resistance.



it, but there are ways to make glass more durable that don't make repairs more difficult, such as changing internal weight distribution and the size of the bezel, which is the ring that holds the phone glass in place.

The best designs tell you how to get inside, with visible screws or clips—not fasteners hidden behind trim pieces or stickers. Clips aren't a panacea. They have to be strong enough to hold up to repeated disassembly. Screws are usually reliable, as long as they don't strip. But they should have standard heads. We advocate for Phillips heads because most people have a few Phillips screwdrivers lying around.

If you've got screws of the same drive type and differing lengths, it's a good idea to use a different color or width of head for each length. That can keep repairers from ac-