

THE OPEN SOURCE CAR: A DESIGN BRIEF

The time is right for a true people's hybrid vehicle. By Saul Griffith

In his essay "In the Beginning Was the Command Line," Neil Stephenson uses a car metaphor to describe the various players in the operating system dilemma. Apple had "sleek Euro-style sedans"; Microsoft had "colossal station wagons"; and BeOS (now defunct) had "fully operational Batmobiles." And then there was Linux — "a tank ... of space-age materials and jammed with sophisticated technology" capable of 100mpg, reliable and robust, being given away for free.

Today, oil prices are rising. Demand for hybrid vehicles in the U.S. is higher than production. Can the last piece of Stephenson's metaphor be turned around? Is it worth contemplating an open source car?

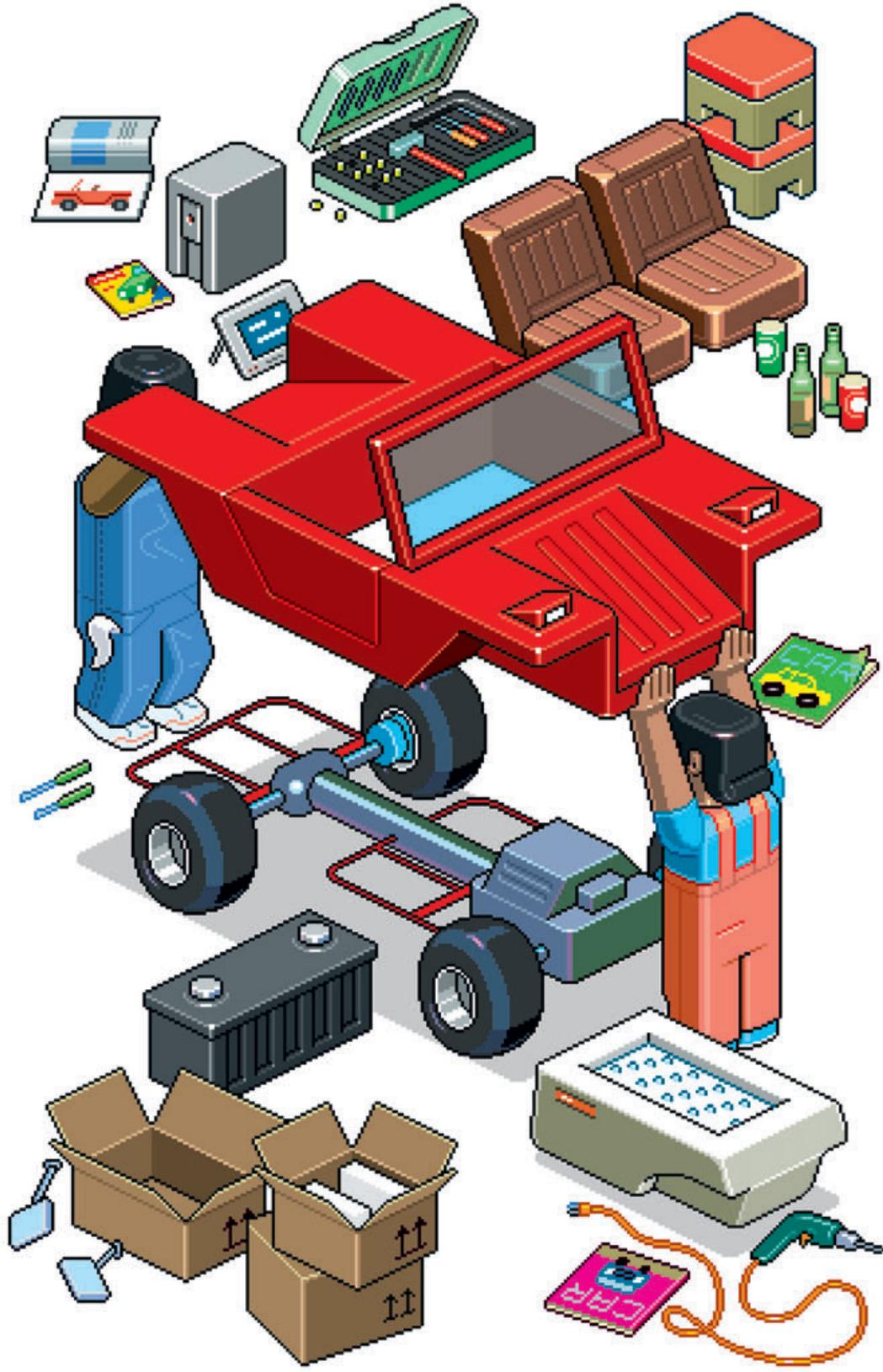
On July 21, 2003, the last (old-style) VW Beetle was produced in Puebla, Mexico. It was car number 21,529,464. One of a host of incredibly successful cars with common features harking to their original "design briefs," the Beetle and its peers — the Citroen 2CV (3,872,583 cars made), Land Rover (2,400,000), Mini (5,250,000), Trabant (3,096,000), and Fiat 500 (3,678,000) — were utilitarian, efficient, maintainable, flexible, and the antithesis of the modern industry. The briefs were often charming: Boulanger (designer of the Citroen 2CV) was tasked with designing an "umbrella on four wheels" capable of getting two peasants and their 100Kg of farm goods to market at 60km/h

(and 78mpg!), traversing a ploughed field without breaking the eggs it was carrying.

While none of these vehicles were "open sourced," all of them endured any number of modifications and demonstrated modularity and flexibility in their lifetimes. Third-party industries arose to supply parts and modifications. This was taken to an extreme in the early 1960s when Bruce Meyers retrofitted a fiberglass body to a shortened VW chassis, giving birth to the "Manx" dune buggy. Only 7,000 Manxes were produced, but the phenom was so successful that nearly 300,000 clones were made worldwide. The vast majority were assembled and built with all types of modifications by end users.

After a 30-year hiatus, Meyers recently began producing dune buggy kits again. The new "Manxter 2+2" has improved safety features, but otherwise stays close to its Spartan and immensely fun roots. A "95 percent kit" is also now being offered to appeal to a time-short population that desires the fun of putting together a car without the attendant frustrations (and delights) of hacking it yourself. It is, in essence, a mail-order car: fill out a few web forms, bolt an engine in when it arrives a few weeks later, and drive away.

Other than this example, modern consumers accustomed to choice find that the auto industry doesn't offer much outside a bland mean. If you can



Make: 45





Maker

personalize your desktop, why not your car? A few savvy players like Mini and Scion are now offering the illusion of large choice via online ordering systems with "personalization" of body panel colors, wheels, stereo, and upholstery.

But why not go a lot further? Drive-by-wire technology, better electric motors, better batteries, within-hub motors, and (of course) hybrid concepts are changing the modularity of cars. The dominant architecture is up for challenge. Now you can choose your own optimal combination of gasoline engine and electric motor to tailor your hybrid to your driving style and conditions. Electro Automot

overhead. In time, one can imagine cottage industries rising to support the project with custom parts, assembly services, Manxter-style bodies, interiors in many configurations, and complete parts kits.

There are millions of Americans tinkering with hotrods, antique autos, and old clunkers every day in this country. There are hugely popular TV shows inspiring these people: *Monster Garage*, *Orange County Choppers*, *American HotRod*. Want to see innovation in the hybrid electric automobile market? There's an R&D department composed of a million people in a million garages around the world. The digital tools for support are here: search Yahoo!

Groups for auto-tech chat groups; eBay is a junkyard of parts; and eMachineShop and McMaster-Carr will deliver parts to your door.

A true people's car is doable. It just needs a Linus Torvalds (or maybe 20) and a user community. But before we throw down our Linux boxes to save the world with a publicly built 100mpg tank, here's the biggest catch: legislation and registration. Most kit cars fly under the radar because they are registered as the original vehicle of the chassis "donor." A recent Californian bill allows for "Special Construction" vehicles, but it's limited to 500 per

year, and the demand already exceeds the allotment.

Unless a new, popular "donor" chassis is appropriated from industry, a group or organization would have to agree on a chassis/body and have it crash tested. This is an expensive process, BUT NOT IMPOSSIBLE.

There are, however, 21 million VWs still out there...

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ive (*electroauto.com*), founded in 1979 as a source for components to turn standard gasoline-burning cars into battery-powered electrics, will sell you a plugin (pun intended) electric conversion kit that, with minimal modifications, could bolt into the Manxter. (This could be the Red Hat of the bunch!) For \$35,000 and minimal assembly, you'd be driving your own four-seat electric vehicle with a roll cage, 75mph-plus top speed, and 50-100mpg range. This might be the first electric vehicle you'd ever feel sexy in. Add one of the new, clean-burning, four-stroke engines found in snowmobiles and four-wheelers, and it'd be a long-range hybrid.

The web is peppered with how-to sites for converting your old car into an electric vehicle, but why not develop SourceForge-style documentation for an open source hybrid? Call the site *opendesignhybrid.org*, and publish the code for motor controllers and the CAD files for transmission-conversion parts. Annotate the demand for parts so multiple users can lower their individual costs by sharing tooling

Saul Griffith thinks about open source hardware while working with the power-nerds at Squid Labs (www.squid-labs.com).

Open Source Electric Vehicle Projects

A preliminary step toward an open source electric vehicle is the solar-powered Vee 9, with downloadable plans available at www.solarvehicles.org.

Open source plans for a solar tricycle are available here: www.uprightsolar.com.