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Race for the Ultimate Car Hacks

By Michelle Delio December 16, 2004

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People have been tinkering with their cars since the first horseless buggy hit the road. Now, thanks to onboard computerized systems that control everything from engine management systems to radios, hackers can customize their rides in ways that are likely to have Henry Ford doing back flips in his grave.

Feeding this need for speed with aftermarket computer chips and simple upgraded components gneerates $25 million per year. There's even a *Car Hacks & Mods For Dummies* book available. For enthusiasts, though, ramping up horsepower or performing simple tweaks isn't the point. They hack to gain a deeper understanding of their car, save money by doing their own work, and add new features that circumvente what they believe are flawed design decisions.

"Car makers definitely make their share of stupid or annoying user-interface decisions, such as requiring the ignition key be turned to engine-run position before the power windows will work," says a hacker known simply as "Hobbit". "One of my hacks is a simple switch that enables all the power windows with the key out."

Most hackers modify their own cars because the DIY approach is the only way to implement really interesting ideas, says

NOTEBOOK

The Car Hacker Toolkit (according to Hobbit):

- Socket-wrenches
- Jack-stands
- Special tool # J-3398QN-271 for the rear oxygen sensor
- A volt/ohm meter
- An oscilloscope for watching waveforms and timing
- A couple of sharp needles for probing through wire insulation without having to strip it away
- Logic analyzers and EPROM burners for the truly hardcore
- A cheap OBDII adapters to connect a laptop to the diagnostic port and read/reset all the trouble codes

Getting to Know Your Car:

You can obtain diagnostic software which will let you make sense of the messages produced by your car's OBD II (On-Board Diagnostic systems) for virtually any post-1995 car.

Google your car's make and year, or browse through the offerings at

Damien Stolarz, CEO of Carbot, an in-car computer company. There is no conventional auto shop where you can add video conferencing or voice-activated instant messaging.

"As a result hackers have had to take matters into their own hands," says Stolarz.

The idea of not having access to all the fun features on cars is decidedly American. Owners of foreign cars, for instance, can simply order and install a ready-made European factory navigation package, says Stolarz.

Factory navigation packages are hardware and software units that are typically mounted in a car's dashboard (portable models are also available). At the minimum, they contain a radio tuner and an LCD screen intended to display maps and navigation information from a DVD or CD. These units -- which are often found on Ebay -- can be upgraded with options such as a TV tuner and ports that allow you to connect computers and video game consoles to the units, says Stolarz.

There aren't as many entertainment features (or capabilities) built into cars sold in the U.S. since the automotive industry worries that drivers will get into an accident and sue the manufacturer, Stolarz says.

"But if you've ever seen the cockpit of an airplane, you've seen how many screens and dials a human could conceivably deal with," said Stolarz. "I hope that a good precedent is sent that puts responsibility where it belongs -- with the driver -- and lets some of these very useful automotive devices reach the U.S. market."

Barring some radical change, though, it will likely be up to hackers to modify their cars.

Autotap, Rinda and Software for Cars.

Favorite Hacks:

Stolarz drives a 1950 Nash, and his favorite car hacks include setting up a remote control surveillance camera that lets him use a cell phone to look at what's happening around his car. Another hack he's working on is car-to-car music sharing; not MP3 swapping but figuring out a way to allow people to listen to the music that a nearby driver has in their onboard sound system.

"Another very cool hack we're integrating into our CarBot products is a video jukebox -- you can copy all your DVDs onto a hard drive, connect it to your car computer, and let your passengers watch any DVD from your collection like a hotel video on demand system," said Stolarz.

Krikorian's favorite hack is the custom mounted touchscreen LCD in the dashboard of his Corolla that's connected to a CarBot entertainment system in his trunk. He's thinking about installing a stealth radar detector system in his Corolla which would be integrated into the car's computer.

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Adding a computer system in intriguing for enthusiasts since it creates a car more suited to the individual needs of the driver, says Raffi Krikorian, director of Synthesis Studios, a design and consulting firm.

"Not only is it your entertainment device, providing access to MP3s, videos, XM radio, games, etc., but it also allows you to integrate everything the car is thinking about," says Krikorian, who envisions a truly self-service car capable of diagnosing impending problems and assisting its owner in fixing them.

With one modification, drivers can have a GPS unit logging their car's performance in different locations, allowing the vehicle to spot any developing problems. That information could also be used to tweak the car's systems to better suit the driving patterns of the owners -- whether open highway or city stop-and-gos.

If nothing else, Krikorian says, the car's computer could indicate whether the "Check Engine" light that just flashed on indicates a real problem that requires a dealer check up, or if it's something simple that can be fixed with a quick whack of a wrench.

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Many agree that the worst likely outcome of a failed hack is a blown engine and a wrecked bank balance, since unsanctioned modifications might void manufacturer's warranties, says Staten Island mechanic Steve Ferrello. Even the most devoted car hackers suggest proceeding with caution, since even small system tweaks can adversely affect the car's overall driving performance.

But many feel the end result is worth the risks.

"Sure, making changes away from the engineered design carries certain risks, but if the manufacturer refuses to tell you why a design was engineered in the particular way that it was, what else are you going to do," says Hobbit. "Other than what's in the service manuals, one has to guess fairly often as to what the designers were thinking and how much consideration they might have given to reliability or serviceability."

The most successful car hacker is going to be someone who already knows how to do repairs, Ferrello says, someone who has had a lot of grease under their fingernails, not necessarily someone who is simply skilled with computers.

At the end of the day, enthusiasts have a near-free reign over what they can do with their vehicles. Manufacturers aren't apt to legally smack hackers for car modifications, unless those modifications can be proved to have caused injury or loss to someone else, says attorney Mark Simnon.

"The federal government has shown no interest in what owners do to their own cars," Simnon said. "State agencies are a different issue, each state sets its own standards and you may need to prove your car meets those standards before your license plate or registration is renewed.
"Make sure your modifications don't put you off the road and turn your car into a two-ton driveway decoration."

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