User interface designer Derek Kuschel has set out to change the automotive hacking world: His Kickstarter campaign “CANBus Triple – The car hacking platform” lets users log CAN data and even add functionalities to a vehicle. Kuschel describes his device as “an Arduino for your car”.

CAN CARRIES DATA ALL AROUND A VEHICLE while driving. Most of this data is hidden, which is why in order to access this data, it is necessary to install secondary sensors. Derek Kuschel wants to change that. The interface designer says: “While attempting to hack my in-dash navigation system, I had an idea. I could physically separate the CAN bus signal to my dashboard and augment the data. So I built a breadboard prototype, and a toner transfer prototype, and finally a real prototype. Soon I had a working system with three independent CAN busses that allow me to collect all the data on both busses in my Mazdaspeed3. I can easily monitor all of the sensors that those sneaky engineers tried to hide.”

When he posted the project on a Mazda forum, many people wanted one of their own. He assembled 50 beta devices and shipped them all over the world. He turned to Kickstarter to do a larger run on hardware.

How it works

The CANBus Triple (CBT) gives the user a way to read and write raw CAN data packets, and perform operations with that data. It’s like a personal, programmable CAN node. It uses an ATMega 32u4 microprocessor, a Bluegiga low energy Bluetooth module, and three independent Microchip MCP2515 CAN controllers. Users can employ it to watch all data on their CAN network, or send their own packets out to the network. Attaching the two CAN High and Low lines is all the user needs to do in order to send and receive raw CAN data packets.

Kuschel explained: “The real fun comes in when you physically cut the CAN bus and use the CANBus Triple to read and augment the packets. Each packet is read and processed, then optionally sent back out and your car doesn’t know the difference. Using this method, you can listen for all of the hidden data on the bus and send it over Bluetooth or even send out your own packets to an in-dash OEM display.” He added: “We’ve made the CANBus Triple compatible with the Ardunio IDE. This lowers the barrier and gets you running quick. You can even flash pre-compiled programs from your mobile phone or tablet completely wirelessly over Bluetooth LE from the app.”

The device does not come with any vehicle specific functionality. It is a platform for building “own great CAN hacks” as Kuschel calls it. “While we do expect the community to develop great open source firmware, and we supply all the code written thus far, implementing something new will require some coding skills. Bluetooth LE was added into the mix to bring your CAN application into the wireless Internet of Things. You know, so your smart watch can remind you how much gas you have in your tank!” he says.

CBT is a toolkit for adding to and augmenting a vehicle. The Bluetooth LE firmware, the Atmega bootloader, and program code, as well as the desktop and mobile app for Android and iOS are all open source. The Atmega program as well as the Bluetooth firmware are flash-able without any additional hardware. The user can add functionality to the Bluetooth module and upload the firmware over USB. According to Kuschel, they are going to publish the Eagle CAD files at Github after the kickstarter campaign has come to a close. Depending on the final outcome of the campaign some minor upgrades may be made to the design before they send it off for manufacturing.

The unit is intended for makers and car hackers who want a platform to augment any CAN system, whether it is a car, a robot, or a model train system. It is compatible with Mac, Windows, and Linux, if a USB port is provided. According to Kuschel, the app of the product (in development) is compatible with USB OTG for hacking or flashing the firmware without a Laptop.

The Kickstarter project will finish on Sunday, September 28th at 2:26 am. Kuschel has already met his $18 000 goal though. As of this writing he has reached $56 711 with 676 backers. This means, in addition to the CBT, he will also be able to develop an open source Android Wear application to talk to the CBT.

Editors’ comment

Clearly hacking your car is not riskless. Besides the fact that changing the layout of your car is illegal in many countries, hacking your car can make you a danger to yourself and to others. Even if a user knows what he is doing, what happens if he mistakenly exchanges two numbers? Instead of lowering the window, he could inadvertently do something much more dangerous. And that is the best case scenario: any amateur could buy and use this hacking tool. With the ability to send messages to the CAN network, the possibilities for dangerous effects are endless.

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