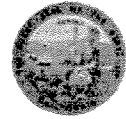




**Matthew Rodriguez**  
Secretary for  
Environmental Protection

# Air Resources Board

**Mary D. Nichols, Chairman**  
1001 I Street • P.O. Box 2815  
Sacramento, California 95812 • [www.arb.ca.gov](http://www.arb.ca.gov)



**Edmund G. Brown Jr.**  
Governor

July 21, 2015

Ms. Jacqueline C. Charlesworth  
General Counsel and Associate Register of Copyrights  
United States Copyright Office  
101 Independence Avenue S.E.  
Washington, D.C. 20559-6000

Dear Ms. Charlesworth:

The California Air Resources Board (ARB) appreciates this opportunity to provide comments on Section 1201 Rulemaking – Proposed Exemptions for Vehicle Software (Docket No. 2014-07, Proposed Class 21: Vehicle Software – Diagnosis, Repair, or Modification), the regulatory proceeding currently before the U.S. Copyright Office concerning the proposed exemption of vehicle software from the prohibition to circumvent technological protection measures.

ARB is the state agency charged with protecting air quality in California, conducting research regarding the causes and solution to air pollution, and enforcing the State's laws for the control of air pollution emissions from motor vehicles in California (California Health and Safety Code (H & S) §§ 39002, 39003, and 39500). ARB is also charged with adopting and implementing standards and regulations applicable to various sources of air pollution, including on- and off-road motor vehicles, vehicular fuels, and other carcinogenic, teratogenic, mutagenic, or otherwise toxic air contaminants (H & S §§ 39656, 43013, 43018, 43018.5, and 43101-104.)

The federal Clean Air Act (CAA), 42 U.S.C. § 7401 et seq., authorizes the United States Environmental Protection Agency (U.S. EPA) to, among other things, establish emissions standards for new motor vehicles. The CAA also allows only California to adopt and to enforce new motor vehicle emission standards that are distinct from, and more stringent than comparable federal emission standards, provided U.S. EPA issues California a waiver for such emission standards.

The ARB has adopted and implemented an array of measures to control emissions from on-road vehicles that have been instrumental in improving the air quality in California and which are vital to making the substantial further progress that is required to bring the state into compliance with federally mandated ambient air quality standards. The

*The energy challenge facing California is real. Every Californian needs to take immediate action to reduce energy consumption. For a list of simple ways you can reduce demand and cut your energy costs, see our website: <http://www.arb.ca.gov>.*

California Environmental Protection Agency

ARB frequently consults with the U.S. EPA in a variety of matters, and has been informed via your letter to U.S. EPA dated May 12, 2015, of the Section 1201 regulatory proceeding to consider exempting vehicle software from the prohibition of circumvention of technological measures protecting copyrighted works.

As discussed in more detail below, the ARB is deeply concerned that any action taken that would further facilitate or appear to legitimize the modification of on-board vehicle programming would likely create negative consequences for the environment, vehicle safety, and the vehicle owners themselves. The ARB further believes that the exemption sought by the petitioners would not significantly further the stated goals under which it was submitted (i.e., the lawful personalization, improvement, or repair of vehicles by vehicle owners or those working on their behalf).

**1. Modifications of vehicle programming for the purpose of improving performance or fuel efficiency are highly likely to negatively impact emissions.**

Modern vehicles employ sophisticated emission control systems that reduce tailpipe and evaporative emissions by well over 90 percent compared to the levels emitted just a couple decades ago. These systems rely on the precise control of fuel quantity, delivery, and combustion in coordination with an array of other emission control systems and components that are highly integrated to reduce and remove engine out pollutants before they are released to the atmosphere. Even minor modifications to the operation of the powertrain and the emission controls (and even those that are seemingly beneficial) can significantly increase vehicle emission levels. For example, the most common method of modifying a gasoline powered vehicle to improve fuel economy may be to raise the ratio of air to fuel into the engine to provide for more complete combustion of the fuel. However, doing so greatly reduces the ability of the vehicle's catalytic converter to eliminate oxides of nitrogen (NOx) pollutants coming from the engine before they are released into the air. NOx emissions are one of the primary precursors for the formation of ozone<sup>1</sup> in the atmosphere. On the other hand, modifications to improve vehicle performance in terms of added horsepower or torque often involve a reduced air fuel ratio which results in an increase in carbon monoxide and hydrocarbon emissions (another ozone precursor) or, in the case of performance modifications on diesels, diesel particulate matter or "soot," which is an air toxic.

Such modifications can also affect the durability of the emission control system. For example, modifications that increase exhaust gas temperatures and/or the

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<sup>1</sup> There are federally mandated air quality standards for ozone. Most areas in California are not currently in attainment for these standards.

greater discharge of engine out pollutants can elevate the operating temperature of the catalytic converter, which over time will shorten its life.

**2. Increased activity in the modification of vehicle On-Board Diagnostic (OBD) systems could greatly undermine emission inspection programs conducted throughout the U.S.**

On-road vehicles sold in the U.S. have been equipped with sophisticated OBD systems since the 1996 model year. These systems are comprised of programming in the on-board computer that works with the various input and outputs to the on-board computer. OBD systems are designed to monitor the performance of vehicle emission control systems, and to alert the vehicle operator of the occurrence of emission-related malfunctions. When a problem is detected, the Malfunction Indicator Light (MIL), also known as the "Check Engine" light, will illuminate, and the on-board computer will store a prescribed set of diagnostic data including diagnostic trouble codes to help service technicians to efficiently repair emission-related problems.

In more than 30 states that are currently using emission Inspection and Maintenance (I/M) programs as a strategy to meet ambient air quality standards, every state but one (Colorado) uses information from the vehicle OBD systems as the primary mechanism to evaluate the emissions performance of inspected vehicles. Changes to the programming for the OBD system can hinder its ability to detect emission-related malfunctions and/or to correctly communicate the system information necessary to evaluate the vehicle at the time of an inspection. Such changes may be inadvertently made in the process of "adjusting" the on-board programming, or they may be designed to intentionally disable OBD system functions for the purpose of fraudulently getting a vehicle through the inspection process without making necessary (and sometimes costly) repairs to the emissions control system. I/M fraud is already a significant issue that states including California must continually address to ensure their programs remain effective. Increased activity by owners, hobbyists, or others to alter on-board computer programming would likely increase this burden on emissions inspection programs.

**3. The assessment of whether or not powertrain modifications are "lawful" from the perspective of emissions is well beyond the capability of most vehicle owners and hobbyists.**

Under both California and federal law, vehicle modifications that reduce the effectiveness of the emissions control systems are illegal. Manufacturers certify

the emissions performance of the vehicles they produce using a series of complex test procedures carried out in multi-million dollar test facilities equipped with transient dynamometers and sophisticated emissions-measurement instruments. The impact of modifications on the effectiveness of the emission-control systems can only be truly ascertained by subjecting vehicles to such testing in their modified state. Companies that currently offer products that modify emission-controlled vehicles must invest thousands of dollars to purchase necessary testing at ARB recognized laboratories to demonstrate that the modifications do not violate the anti-tampering provisions contained in Section 27156 of the California Vehicle Code. The testing must include an assessment of the modification's effect on vehicle OBD systems.

Due to the complexity and sensitivity of emission control and OBD system designs, the ARB believes that a high percentage of modifications made by owners and hobbyists would likely reduce the emissions-performance of their vehicles, but the process of conclusively making or refuting that determination is impractical in such cases for both the regulatory agencies and the owners/hobbyists. Therefore, the ARB believes that increased activity in this area will ultimately undermine the progress and goals of state and federal vehicle emission control programs.

**4. Greater access to on-board computer reprogramming is not necessary for the purpose of vehicle maintenance and repair.**

Section 1969, Title 13, California Code of Regulations requires vehicle manufacturers to make available to independent service providers the same emission-related service information and tools that dealerships use. That includes tools and information necessary to install software updates developed and released by the vehicle manufacturers. The tools do not provide for the alteration of the software; however, in ARB's opinion, customization of the software is never necessary in order to repair or maintain a stock vehicle. Replacement parts are designed to function in all material respects identically to the original equipment, and as such, they are compatible with the vehicle programming that is made available by vehicle manufacturers. The U.S. EPA has adopted similar service information requirements that apply federally.

Ms. Jacqueline C. Charlesworth  
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**5. Although California emission regulations do not currently require the use of anti-tampering measures for vehicle computer programming, the ARB considers the use of such measures to be critical to the success of its emission standards and requirements.**

For the reasons discussed in the sections above, proper emissions and OBD system performance for in-use vehicles is critically dependent on limiting third party opportunities to alter vehicle programming, and the lack of specific tamper resistance requirements in the current California regulatory structure is not an indication of any lack of importance. When on-board computers first made their way into on-road vehicles in the 1980's and into the 1990's, ARB regulation required manufacturers to implement anti-tampering measures to deter third party alteration of the on-board computer's programming. However, as on-board computer technology evolved from using programmable read only memory chips that contain vehicle programming to designs that can be re-flashed in the field through the vehicle network, it became clear to the ARB that the vehicle security issues that manufacturers face would lead them to implement anti-tampering strategies on their own that would meet or exceed any requirements the agency could reasonably set forth and maintain. The ARB believes that removing copyright protections could significantly alter these circumstances and require both manufacturers and regulatory agencies to reconsider how the security of vehicle programming can best be ensured.

Thank you for considering the Air Resources Board's comments and concerns regarding this issue. Should you have any questions or require additional information, please contact Ms. Annette Herbert, Chief, Emission Compliance, Automotive Regulations and Science Division at (626) 450-6150 or [annette.hebert@arb.ca.gov](mailto:annette.hebert@arb.ca.gov).

Sincerely,

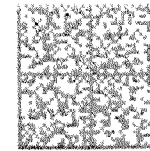


Alberto Ayala, Ph.D., M.S.E.  
Deputy Executive Officer

cc: Annette Hebert, Chief  
Emission Compliance Automotive Regulations  
and Science Division

California Environmental Protection Agency

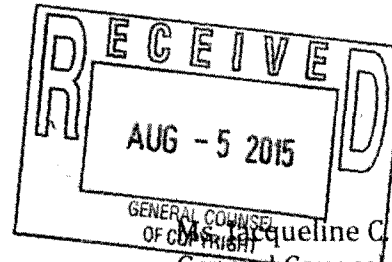
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