

2a.) The Engine Control Module (ECM) is a computational device that helps to monitor a car's engine. The two main tasks of any ECM is to control the air-to-fuel mixture and the engine idle speed. Some companies offer programmable ECM's which a car "tuner" can program themselves. The artifact shows how the ECM affects the car and that it is just one of the many Electronic Control Units (ECUs) within a modern car. The ECM's are only prevalent in electronic fuel injection motors.

2b.) I used Google Drawings to create my artifact. I then used a PNG maker to make transparent images so that they could fit better on the page.

2c.) One Beneficial effect is the riddance of Carburetors, which put air and fuel through a common funnel and "There, the fuel is mixed with air, and that mixture passes through the intake manifold to the engine's combustion chambers" (allpar). Electronic Fuel Injection allows the motor to have equal supply to all cylinders instead of the middle cylinders getting the most and the outermost getting the least amount of Air and Fuel. This has made it safer and ultimately more emission controllable and better on gas mileage. This in turn has affected the economy as it has allowed for smaller motors to emerge and become more reliable and financially stable while keeping the power output relatively large. "The most immediate advantages of injecting gasoline directly into an engine cylinder are increased fuel economy and power."(knowyourparts). However, this has created a more complex working of a motor, which means that there are more wires and many other parts, such as the ECM itself, that could rot or break instead of replacing a carburetor. "Lastly, the ECM controls the hydraulic pumps which determine the rate of fuel injection that maximize the valve rate of opening per intake stroke to improve engine performance." (fixdapp)

2d.) The data that ECM's use are mainly INT. This is because the math used constantly changes to accommodate the needs of the motor that is being controlled by the person. Many applications constantly change within seconds to make a smooth and almost unnoticeable change as most people will not know how this operation works. The input is user generated by the gas pedal being pressed. The ECM then calculates how much fuel and the velocity being sprayed into the Cylinder. Encryption is enabled to prevent people messing with the ECM as it could cause serious harm if not done modified properly, such as over revving of the motor and situations where the motor could blow. Altering with any Electronic Control unit without proper knowledge can cause major harm.

2e.) Bibliography

<https://www.knowyourparts.com/technical-resources/fuel-system/direct-fuel-injection/> 2018

<https://www.allpar.com/cars/desoto/electrojector.html>

<https://www.fixdapp.com/blog/what-is-an-engine-control-module-ecm> Nov, 2, 2018