Proposal: Making Roads Safer, One Honk at a Time

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Summary

There is a problem with the communication between drivers when they are on the road. The overcrowding of cars during rush hour makes road rage common in New York City. This is the very reason that has caused New York City to be prone to noise pollution in the past years. Drivers honk at each other in situations that are not necessary contributing to the issue of poor communication and noise pollution. According to the CDC, prolonged exposure to sounds over 70 dB can cause hearing loss. The current honk is as loud as 110 dB. Noise pollution poses safety and health concerns to people. The proposed solution to this problem is to add the option for honking sounds significantly quieter than the 110 dB honk. It promotes a safer pedestrian life, allowing citizens to move freely in a less noise-polluted environment. In situations where signals are hard to see due to heavy traffic or poor weather conditions, our program proposes the idea of a new signaling system. This new signaling system has the option to change the speed of blinkers and the intensity of them as well. Further improving the communication between drivers promoting more safety for drivers and pedestrians. The anticipated budget for the proposed program is $120 for every modified car.

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1. **Press Release:**

Living in a city like New York means that there are cars everywhere. These overcrowding cars are swarming our roads with noise pollution. Despite the loud exhaust that some cars may have, all cars share one loud, annoying, noisemaker in common, the horn. Most cars are equipped with a deafening horn that is used usually by angry drivers without limit. With that, we can replace the "harsh" blaring horn with a lighter horn that is significantly quieter than the 110 dB that average cars are equipped with. This, will not only replace the ear-splitting car horn, but, will also allow for more options and modes of communication that the drivers can use to communicate with other drivers on the road, allowing for a safer, smoother, and specifically, a quieter New York City that you can enjoy an afternoon nap in. Our proposal is to replace traditional car horns with a quieter, more versatile communication system that allows drivers to communicate more effectively and safely on the road.

2. **Introduction:**

The communication problem that exists between cars and drivers is being able to convey a level of severity to other commuters. The normal, regular horn that exists within current modern day cars only has a jarring single tone when in use. The horn should be used for warning others of the presence of your vehicle, but lately has been abused to the point in which it can lead to road rage and further noise pollution.

For minor interactions within drivers, this loud horn is too unconventional and delivers a loud honk for situations where it was not really needed. For example, as you are backing out of a grocery store, a loud honk is too much of a disturbance of those around you. In that situation a nice soft honk would greatly decrease the amount of noise pollution that exists within our

country, and many major cities that exist all over the states. To add on, some other reasons why you would use this soft honk is to prevent miscommunication on the road. Using the soft honk can allow drivers to alert others that they are providing the other driver the space to switch lanes. Using a loud honk in this case can cause other drivers to not only be annoyed, but also assume that the person honking does not like what they are doing. On the road, 12,610 people were injured and 218 murders have been caused by road rage over a seven-year-period in the United States (The Zebra, 2023). In situations like these, the quieter horn would be used to not only reduce noise pollution but also provide drivers with smoother ways of communication without enticing a fist fight.

For major interactions that can harm the drivers, you would use the regular horn to really grab the attention of the other drivers. Due to the original horn being used for emergencies, this would be harder to reach for and also would require you to have a real reason to actuate it, as abuse of the horn will result in punishment. An example in a situation where you would use this button is when the other drivers are not practicing safe driving. If someone is trying to change lanes without their blinker and without room on the highway would be the perfect chance to honk and alert to the other driver that they are not properly driving, as it can endanger everyone surrounding them. Another great case of using the original honk is when a driver starts getting too close for comfort in the neighboring lane. If the neighboring driver does not realize this, the original honk would be used to grab the attention and tell them they are too comfortable in their lane. Using this original horn will still effectively insure safe driving among those on a commute and reduce the amount of road rage.

3. Proposed Program:

Our proposed program is a revolutionary car communication system that aims to improve the communication between drivers on the road along with reducing noise pollution in beautiful cities such as NYC. Through this program, we will introduce new, innovative features that have never been widely used on cars before.

3.1 Additional Car Horns:

Our first key feature of our proposed program is the use of additional car horns that can be integrated into the car itself. The traditional car horn is often used excessively and even aggressively by many drivers on the road, especially in a busy city that is overcrowded with traffic such as NYC. This leads to unnecessary noise pollution to residents of the city, drivers, and pedestrians. Replacing the “harsh” sounding car horn by a “lighter” sounding car horn, that is significantly less than 110 dB of traditional cars, on the steering wheel will significantly reduce noise pollution and road rage. With reduced road rage, safer roads are created for everyone: pedestrians, drivers, and even passengers. Despite replacing the harsher car horn with a lighter one, we can integrate additional car horns that can be used by drivers on the center console, that way, drivers would only use it when needed, rather than using the horn excessively.

The 110 dB loud car horn that is already present on steering wheels is too loud for pedestrians that are present on the road with cars, especially in urban areas. Exposure to sounds that high for only 15 minutes can lead to permanent damage to one’s ears (CDC, 2019). With this in mind, we plan replacing the steering wheel default car horn with a lighter one. Additionally, we will place the original car horn along with courtesy car horn and an additional car horn that the driver may program to his choice in the center console.

Figure 1 The buttons shown in this image demonstrate their placement in the car, which is just above the gear shifter stick that is located right below the radio. This location is good especially for drivers who tend to overuse the 110 dB normal car horn where they would have to reach to this location to use it. (Rober, 2017)

For the placement of the actual, physical horn speaker in the engine bay is shown in the image below.

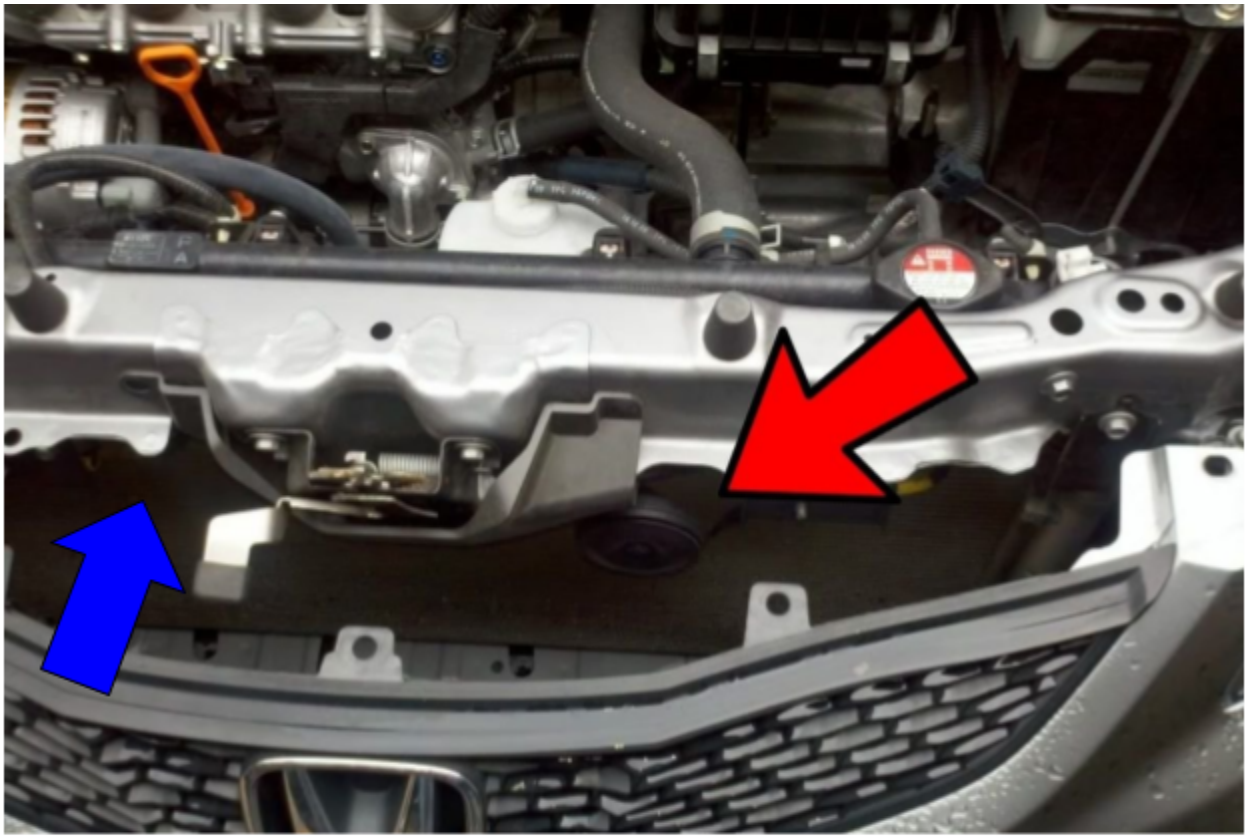


Figure 2 Car horns are usually located in the front of the car, behind the front grille, and in front of the radiator of the car. They are easily accessed, and some cars can have additional car horn mountings as pointed to by the blue arrow. (Cesar, 2020)

Overall, it is shown how practical, and safe it is to access each of the components that may require replacement with the addition of car horns. The wiring of these components, however, will be discussed in a later section. But, car manufacturers have already made it easy for consumers to access these components and integrate additional car horns into the car. Therefore, it is essential that as people who encounter cars and are exposed to car horns almost everyday of their lives should call action to this project in order to create calmer, quieter, and most importantly safer roads for everyone who uses them.

3.2 Adaptive Brake Lights

Part of our proposed program also introduces an updated and a more advanced light signaling system. We recognize that traditional turn signals and brake lights are often limited in certain situations and can be difficult to see. To counter this, we can introduce an advanced light signaling feature that allows drivers to communicate more easily and effectively on the road. Furthermore, drivers can rest assured that they will not be rear ended by installing an additional adaptive brake light module that flashes the taillights when drivers come to a sudden stop. "Research by Mercedes engineers has shown that driver reaction times are shortened by up to 0.2 seconds if a flashing red warning signal is given instead of the conventional brake light during emergency braking" (Peter, 2009). Through this module, brake lights can be programmed to flash in different patterns to indicate emergency stops.

Through this module, when drivers brake hard when going over a specific speed, the hazard lights will automatically go off, and the brake lights will also start flashing a number of times before going solid. These modules are usually very easy to install, and their installation requires drivers to intercept the wiring of their brake lights with this module. To do this, drivers need to access the brake lights located through the trunk for almost all cars.

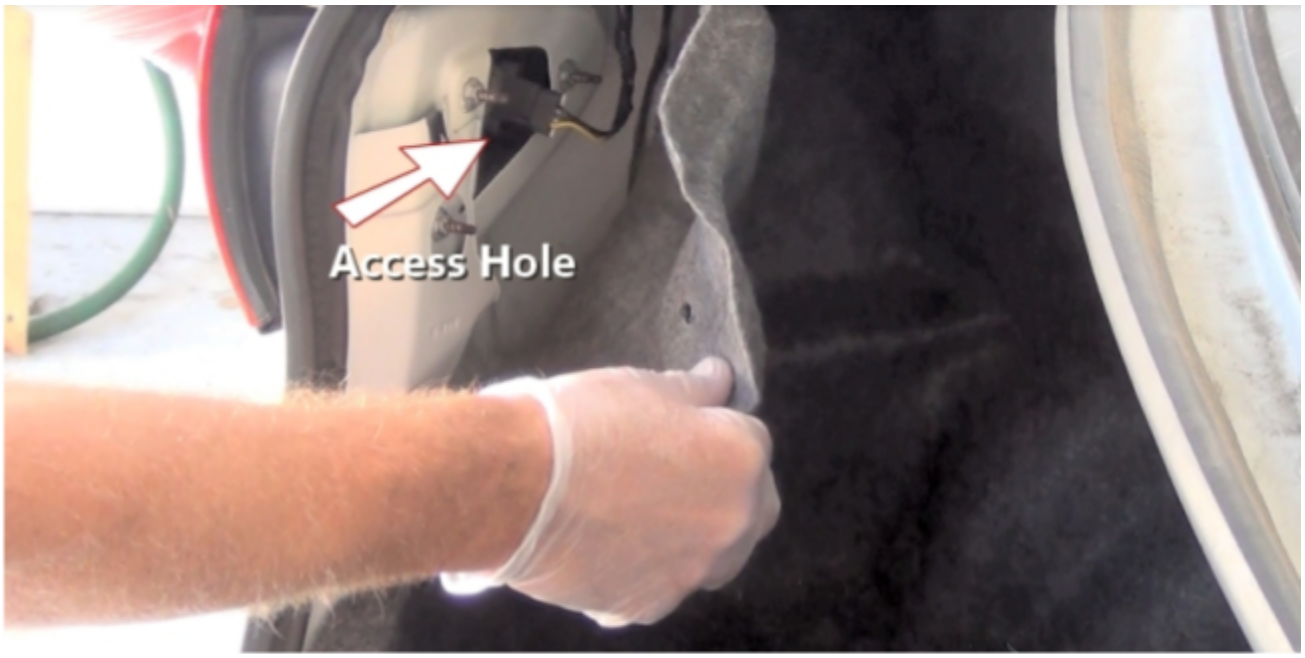


Figure 3 Access to brake lights is relatively easy. It is usually done through the trunk, where some form of cover has to be removed from the side of the trunk to access the brake light bulb, where the wires from there can be intercepted. (2CarPros, 2020)

The number of times of flashing and the intervals between each flashes depends on the type of module that one buys. But, usually, most modules flash 4 times before going solid, enough times to grab the attention of other drivers on the road and to emphasize braking, making roads safer for everyone.

3.3 Wiring

After establishing the access points of both, the brake module and the horn, it is important to go over the wiring of these two items. After installing the horn in the engine bay, wires can run through the engine back to the driver's side of the car through a hole that is located near the end of the engine bay on the driver's side that allows wires to run through, as shown in the image below.

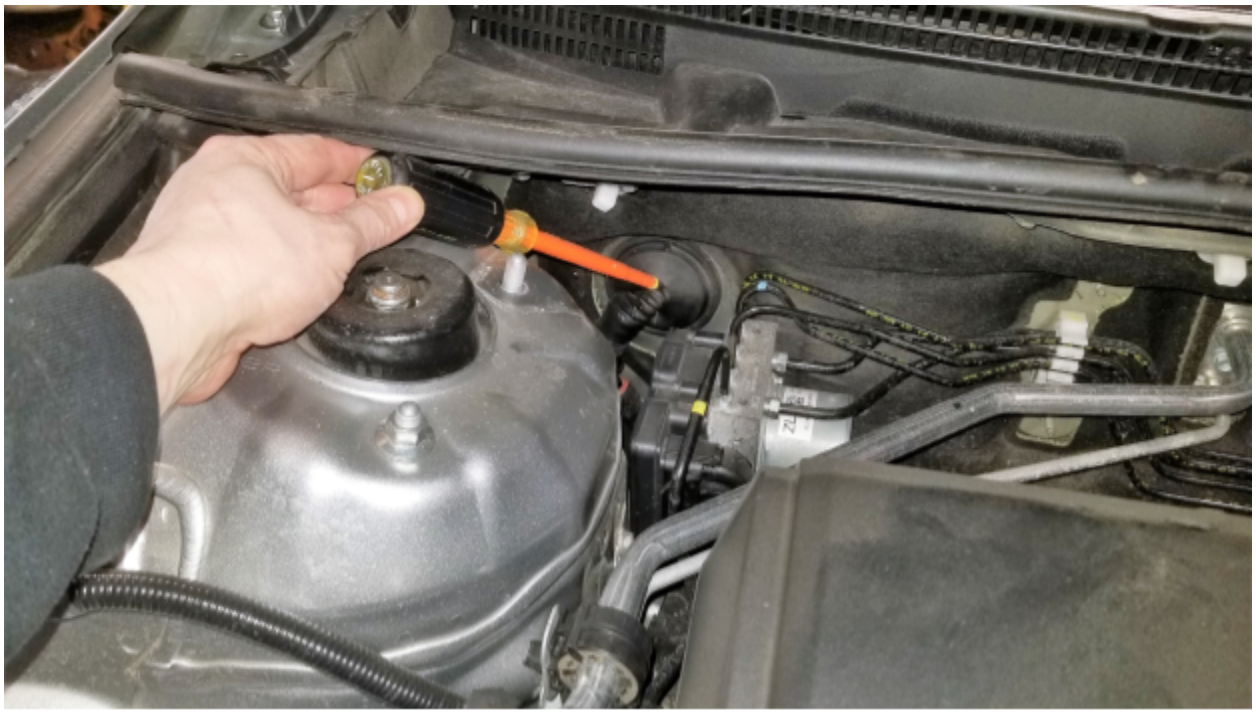


Figure 4 As pointed to by the individual with the screwdriver, the hole that allows wires through the engine bay back to the cab, or the "firewall", is located on the side at which the fuse box is located in the cabin, usually on the driver's side of the car. (Cesar, 2020)

After wiring the speaker through the engine bay to the cabin of the car, it has to be either wired back to the fuse box, which is also usually located on the driver's side of the car under the steering wheel, or directly to the center console, where it can be fed power through one of the car electrical outlets.

After wiring the horn, individuals can wire the brake light module by simply intercepting their brake light wiring and adding the brake module in series. A demonstration of how the brake light module should look like when wired with the back lights is shown below.

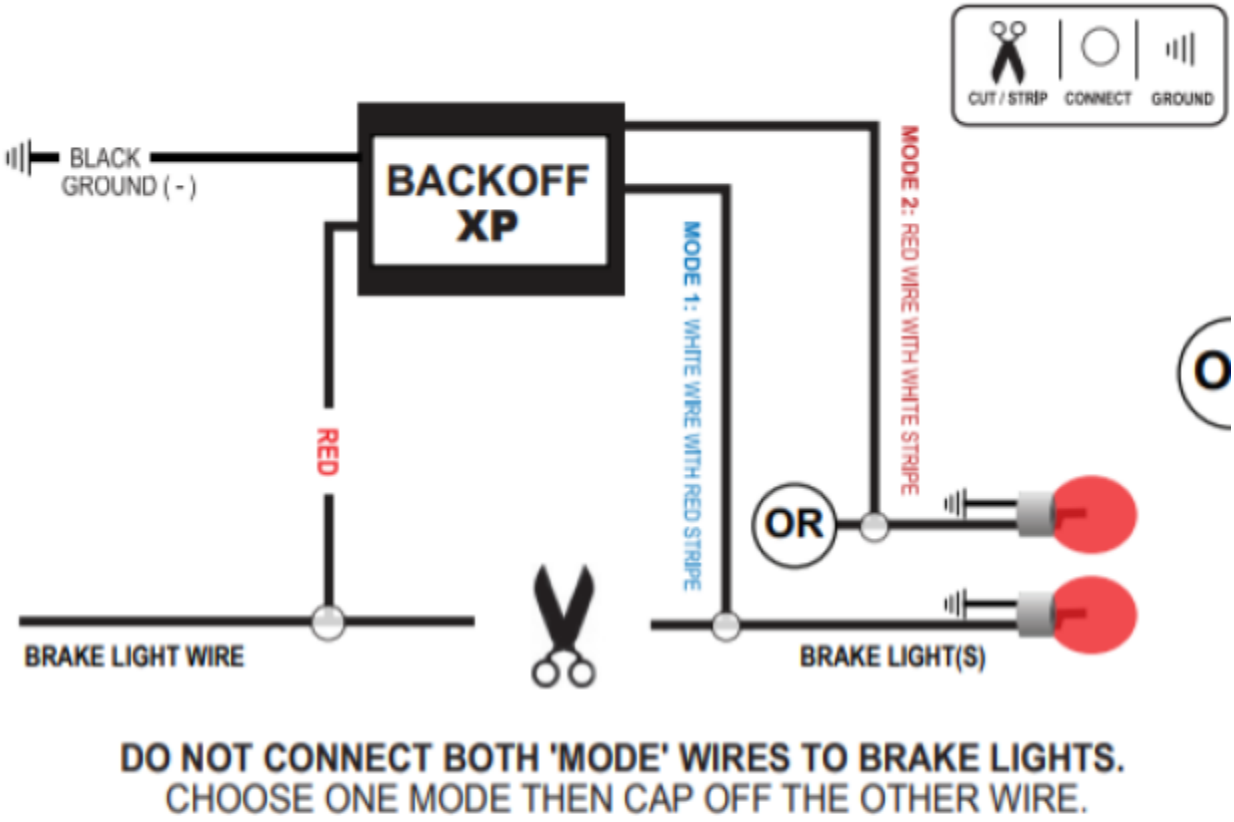


Figure 5 This figure is from an instructions manual demonstrating how the "Backoff XP" brake module should be installed with the brake lights. As shown, the module is installed by intercepting the wiring of the brake lights and wiring the module in series. Access points to the wiring of the bulbs are shown in the figure before. (SignalDynamics, 2020)

With this program, the car industry can take a significant leap forward. We believe that these details, though minor, will lead to a safer, more efficient, and more pleasant driving experience for everyone on the road, including pedestrians. This program has the potential to transform the way that drivers communicate with each other on the road, all while reducing noise pollution that cloud our beautiful cities.

4. Innovation Process:

The cost for the installation of our proposed program can be separated into two different sections. The first one being the cost of materials and the second being the cost of labor.

4.1. Cost of Materials:

The installation of a new honking and signaling system has been done in the past. For example, a YouTuber and engineer, Mark Rober, proposed a new honking system which allows the driver to have access to a quieter and softer honk (Rober, 2017). His system proposed five key components which are listed in Table 1. Along with materials for the honking system we also considered the materials for the new signaling system which is also listed in Table 1.

Table 1: Material Costs

Product	**Description**	**Cost**
Adaptive Brake Module	Used to signal drivers from behind and is compatible with any motor vehicle.	$8
Adafruit Audio FX Soundboard	Used to store audio files of the hanks with a high quality sound	$32
Momentary Speaker Horn Push Button	Push buttons that are operated by the driver.	$9
PA Horn Speaker	Weatherproof PA Speaker that is adaptable to CB and Ham Radios.	$45
12V and 5V wires	Connects the soundboard to the amp	$12
Amp	The amp is connected to the PA Speaker to transmit the audio from the soundboard	$13

	Total	$119

4.2. Cost of Labor:

To get these materials the easiest source to look at is amazon the cost to get the materials estimated to $ 120 labor that would depend on the mechanic spots you go to but roughly around $100 more. This would be put into old cars that don't have the same horn feature as the newer cars. Making it economy friendly, others can buy and install it in their cars.

-**Adaptive Brake lights Module** cost $20 labor will cost depending 30-40 dollars

(Amazon, 2023)

-**Horn** cost $45 dollars labor would cost 69 - 87 dollars

(Grainger, 2023)

-**12V and 5V** wires cost $12 labor would cost 200+ dollars since it has something to do with

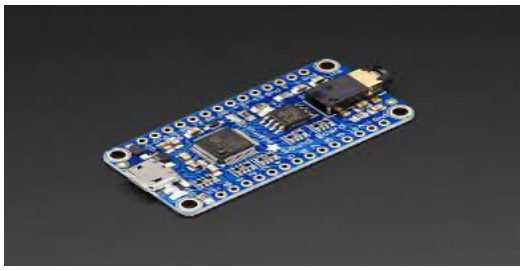
wiring

(AliExpress*,* 2023*.)*.

-**Momentary Speaker Horn Push Button** cost $9 labor cost 100+ dollars including with the soundbar ,and 12v and 5v .

(Amazon, 2023)

-**Adafruit Audio FX Soundboard** cost $32 labor cost 100+ dollars same as the 12V and 5V anything involved with wiring cost more because it might involve turning off the car, and plugging wires.



(Amazon, 2023)

-**AMP** cost $13 labor depending the amp box it may cost $850 - $1,100

(BestCarAudio, 2018)

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6. Appendix: Team Roles

Group Member's Name:	Tasks:
Karem Alsaman	Proposed Program, Press Release, Works cited
Jennifer Reyes	Summary, Cost of Materials
Mouahemd Tounkara	Labor cost
Darren Viloria	Introduction