

So it's April and it's still cold. With spring approaching I'm disappointed that it is still cold and none of my Camaros have transformed into a killer robot. I wish at least one of my Camaros would turn into a killer robot so when I break down on the side of the road and some good looking female tells me I have a high rise double pump carburetor, on an engine that very clearly does not, I can take her out with my killer Camaro (I originally said punch her square in the forehead, but was advised this may be insensitive to females). I would do this of course because she surely has to be an alien. Only an alien would mistake a throttle body for a carburetor and only an alien would say "high rise double pump carburetor" instead of a "double pump carb on a high rise manifold". But, that would have been wrong too and she still would get punched... I mean taken out by my killer Camaro. That whole scene makes my body shake with discomfort. What would have been completely, cosmically, and epically super-hot and awesome was ruined by some lame kids sci-fi writer. I got more excited about Melissa Tomei telling the judge Chevy didn't make a 327 in '55. At least that was accurate. Now those writers are making me hate Megan Fox, aliens, and whatever the hell a high rise carb is. Damn aliens.



I have received in the mail what I can only describe as jewelry for my 489 cubic inch big block. Brodix sent me a very nice set of cnc'd chamber RaceRite heads. From our last discussion, if you were paying any attention at all, you will understand that I had some cleanup work done to the combustion chamber



to help make the bang more efficient. When I opened the box and placed them on the bench, I very clearly heard what can best be described as a combination of angels and mermaids singing in chorus and a warm glow surrounded the hunk of aluminum from above. What sat before me was the key to 600 glorious all motor horsepower. But, time will tell. Before we get into any tech stuff let me pass on a life lesson. First, immediately punch aliens in the forehead, or attack them with your killer Camaro. Second, don't buy motors off craigslist. I have so many bad stories. This last one was weird. I found a brand new, sealed, all forged stroker shortblock in DE. I had my machine shop take it apart anyway, well, just because. I found the mains full of glass bead. It would not have lasted 5 minutes. Why? Aliens. I don't know. But I have never ever bought a 2nd hand motor and had it come out right.

But, maybe I'm just unlucky or cursed for something my family did back in the... ok we wore that the hell out. I don't see any reason to avoid china cabinets, WWE action figures, or tool boxes but I can wholeheartedly insist you stay away from internal combustion engines and probably ads for undergarments.

We had a request from a club member for me to gabber on about power adders. So, gabber I will. I'll preface this by saying anyone with connectivity to the Interweb can search and find just about

everything you need to know about power adders. With that in mind, I am going to give you my opinion and comparison. Like everything else in these articles, take it for what it's worth. But like I tell my wife, at some point you will realize I'm always right. It's been 8 years and she still finds lots of opportunities to show me that is not the case.

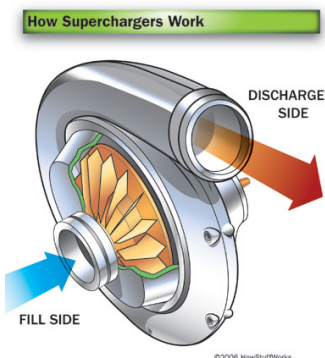
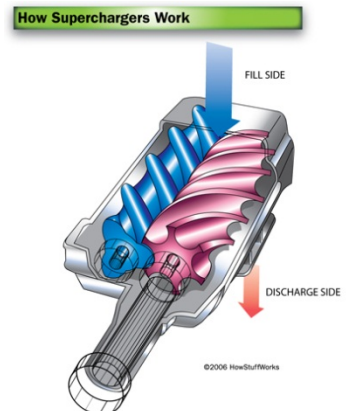
Power adders are systems you incorporate with your current engine to *ding, ding, ding* get more power. Yes my street name is Captain Obvious. But what is important is the word system. There are



lots of things you can do to get more power, but a system is an outside entity that works with your set up. It's not improving this or that, it's *ding, ding, ding* adding some new whizz bang that was not there before. (I just did my Captain Obvious ninja pose. Like literally. People are staring at me). These are generally forced induction, turbos and superchargers, or nitrous oxide. I don't count meth because by itself it adds nothing, it needs to work in conjunction with FI (Forced Induction, aka superchargers and turbos) and tuning. If you can think of another power adder please let me know. Fuels don't count, on a setup without tuning race fuel can

make less power than pump gas. GASP! What did I just say? Yes folks, lower octane fuel can make as much or more horsepower over higher octane. Its science. Race fuel makes more power because you can run more compression and timing. Without that you are wasting your dollars and going slower. But we can debate that another time.

Superchargers come in 2 types that I can think of. Centrifugal and twin screw or positive displacement. They both do the same thing, compress air, they just each do it a little different. Twin screws are exactly that. 2 screws that are mated together. They turn by a belt run by the crankshaft, force air in between them, compress it and jam it directly in the motor. Most, if not all factory superchargers, from the Grand Prix to the ZL1 are twin screw. Why? I am not sure but probably because twin screws feel less peaky than centrifugals and they are just a cleaner/easier install. They bolt to the top of the motor in place of the intake which means there is less piping and fewer things that need to be moved out of the way. Here comes more RJ opinion. I don't like the twin screws. In my experience, they cause too much heat soak and run inconsistently on the street. They do make torque early, but the power seems to peter off a bit on the big end. Cooling the charge is difficult and less effective than on a centri. But, they work, sound real cool and like I said they are easy. "But RJ, if they are not as good why does every factory FI muscle car come with one"? I guess every factory car doesn't come with giant fire



breathing big blocks either. Maybe they are cheaper to source, maybe they are cheaper to install, maybe aliens run GM and Ford. Run a twin screw car back to back to back against a centri over time and it WILL get slower. Nuff said, my opinion.

Centrifugal cars use an impeller to suck air and compress it. They are also belt driven. They are usually mounted to the front of a head (not your head the car) and piped to an intercooler in front of the radiator, then back

up to the throttle body. See, I just proved to you why they are not the choice of US muscle. You have to add all that crap, it takes time and time equals money. Back in the day I installed these things for a speed shop. It took me about a day and a half taking my time. I charged \$500 labor. To me they are more consistent, the intake charges are cooler and they are easier to tune because of it. The centri will tend to make less torque and make it later, but like I said they pull a little better up top. One way to compensate for this is to run a huge crank pulley. It spools the centri impeller up fast making power quicker. I had a 4.6 Ford I ran like this and made gobs of torque early. Another way is to run a small pulley and a restrictor plate. It clips the top end so you don't make too much boost, but hits early. I've done this a few times with very good success.

Both of these systems will require extensive tuning. They will also require additional fuel support. For up to around 10psi, the factory pumps in the 5th Gens are ok if you add a boost a pump (BAP). The boost a pump will increase voltage to the electronic fuel pump to increase pressure. Yes it provides more than factory voltage. Yes in theory it will shorten the pump life. Yes someday our sun will become a red giant and devour earth. I've run many boost a pumps and never had a pump failure. Ever. But I get why people are scared. ZL1s and 1LEs are a little better off than standard SSeS as they use the higher capacity fuel pump. Depending on the setup they may or may not need a BAP, but I would probably run one either way. You can install the ZL1 pump on your SS, but the installation is a PIA and for the trouble I'd do an aftermarket system.

So, back to supporting mods. I had a 2012 centrifugally charged Camaro that made 600rwhp with no other mods whatsoever. Bone stock. Just bolted a centri to it, tuned it and off I went. I probably should have turned it down a bit, it was right on the edge. But, it never blew up and ran like a champ. So, you can make power with just the supercharger. You don't need anything. However, the mods I would suggest for any type of supercharger is first, longtubes (LTs). The factory exhaust will actually build up boost to the point where it gets a little hairy. I was seeing north of 12 psi where if I had long tubes I would have probably seen 9. You don't need to spend a lot of money on heads, they are forced to work. Camshafts will net 50 plus horse easy and an NA cam is not necessarily the best cam for boost. You want it a bit looser to allow boost to build in the cylinder. So, if time and money permit a cam is nice. If you go nuts on boost, you will need a much better fuel system, but if you go nuts on boost you need a forged bottom end. How much boost can an LS motor take? Depends on the tune. Seriously. I've seen them run all day at 13psi with meth. Remember meth is a tuning aid not a power adder. Cools the combustions, allows for more timing and pressure. It's like adding 120 octane fuel when you need it. Finally, at some point you will need a clutch or a converter. So, any of these systems start snowballing. I've seen it a hundred times. Enough is never enough.

The last thing I wanted to talk about is how you control boost. With both systems boost is generally controlled by pulley size on the supercharger. The smaller the pulley, the faster the charger spins, the more boost you make. Too small and the belt will generally start spinning. You need to find the sweet spot. Today's superchargers usually need to be choked down though on stockish motors. They are making very good boost with a decent pulley size.

On to turbos. I love turbos. But, I rarely use them on my hot rods. Why? They are a pain in the ass. They usually require all kinds of acrobatics to get them in and they usually require all kinds of mods to make em work and they usually require a sledge hammer in at least one situation to get it to fit. Not always but usually. The big drawback for me on most turbo setups is the down tubes and having to re-run the entire exhaust. If you are doing that anyway it's ok, but still not fun. But, I get ahead of myself. Turbos are sort of like centrifugals in that they use an impeller to suck air in, compress it and deliver it to the motor. But, instead of being driven by a crank belt, they are driven by the exhaust. What? What black voodoo magic makes this happen? Yes, you sacrifice a pig or something and the exhaust from your engine moseys on by the turbo, spins an impeller and do-se-does on out the tail pipe. That should give you a clue as to why they are a pain.

The headers or exhaust need to be modified to accept the turbos. This is usually done close to the engine, but it can be done farther along in the exhaust. If you hear "rear mount" turbo it is not what happens when I eat chilli, it is a turbo that is mounted out near the rear of the car. Where ever you put it, the compressed air needs, well should be, routed to an intercooler. You have already taken up a bunch of room with the turbo, now you need to find a way to run piping back to the front of the car to an intercooler. Once we get there, it goes to the throttle just like a centri, but getting there is harder. Unless of course, you are drunk, in command of a sawzall and care little for what your car looks like. Turbos take a bit of time to spin up, especially larger ones. I like to build the motor specifically for the turbo. If you do that, the motor can and will carry itself until it makes good boost. Problem with that is a motor that carries itself is going to be limited on the psi you can run. Your results may vary. You can reduce the spool time by running a smaller turbo, or pair of smaller turbos and you can get all crazy with impellers to help reduce the lag. I actually like the lag. In my daily I get all giddy waiting for the turbos to spool up. Then when they hit, they hit. You know they are there. Boost is controlled via a wastegate. One of the pros is that you can adjust your boost all over the place and have a tune for each level. It can be quick and easy. You can basically go from daily driver to "kill" with the flip of a switch (so to speak). Turbos don't rob power from the motor and will pull hella hard up top. And because turbos stress the motor less, you can theoretically make more power at a given PSI. Belt driven power adders are different as they rob a bit of power to spin the pump.

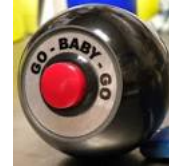


Turbos do make some heat. They will also require a fuel system of sorts just like the supercharger to support them. If any of you gear heads want to drool, Googly a picture of Nelson Racing Engines Big Block twin turbo. If I had \$50k... Turbos are a little harder to tune. Not really sure why, but I've found them to be a bit finicky at times. At the turbo, you will need to exhaust the exhaust and run it back into the exhaust. Yeah I said that and meant it. This usually requires all new piping, again, more piping, but I have seen some kits get creative and somehow plug back into the existing exhaust with minimal cutting and fabbing. These installs are usually much longer and more involved than the other kits.

Lastly I will briefly touch on Nitrous Oxide. Please don't say "NOZ" or "NOS". You will likely be either an alien or one who watches too much Fast and Furious. We will just assume alien and punch you square in the forehead or sick the attack Camaro on you. "NOS" in case you are wondering is the brand name of a system. Nitrous Oxide Systems. You may have that system in your



bangin Honda but you may just be equipped with Nitrous Oxide. NO2. Newt just doesn't sound as cool. Anyway, of all the systems I shy away from this one the most. Not because it doesn't work, it does. I just don't want to fill a bottle all the time. You basically take a tank of highly combustible stuff, throw it in the back of your car and spray it in the motor when you want to go fast. There is a lot of tuning that needs to take place, usually done with the jet size of the nitrous and by pulling timing. Wet systems spray both nitrous and fuel and you have the ability to also adjust fuel jet sizes to help tune.



Any appreciable amount needs fuel (wet) to be added. This requires not only plumbing of the nitrous to a solenoid, but also fuel as both are sprayed when you hit to go button. On the 67 I'm going to run a separate fuel tank and pump just for the nitrous system. It's small and self-contained and mounts in the engine bay. Again, in my opinion you can get a safer, more reliable boost in power from the other systems and it is there all the time. Big nitrous hits most definitely require a stronger bottom end. But, they are cheap and simple up to a point. Then you get into progressive hits and controllers and stronger engines. The thing is, you can probably safely tune for 150 supercharged or turbo horsepower with a stock LS3. I don't think I'd spray 150 rwhp on nitrous and have it last long even with a super tune. Again, my opinion. For grins I'm throwing a 100 shot at the big block to see what happens 😊

So, that is that. All of these goodies will cost you money. The kits are around \$6-8k. Install and tune will run you around \$1500. The nitrous is cheaper, \$600 for a wet kit, but I don't think you can get the power unless you go big and that is going to cost you one way or the other. If you are considering one of these give me a shout. I can probably help you decide based on what you want to do. They all drive different. I will say that one of my proudest car moments was my first power adder. I felt like I was in the big boy league, in reality I wasn't, but I felt good. The whine made me smile. The blow off valve whooshing between shifts was more exciting to me than anything. It pulled hard. There was just nothing like it and the difference was more than any bolt on could ever deliver. Do your research, they are all fun. If you want to save on the install swing on by with grilled cheese sandwiches and beer.