

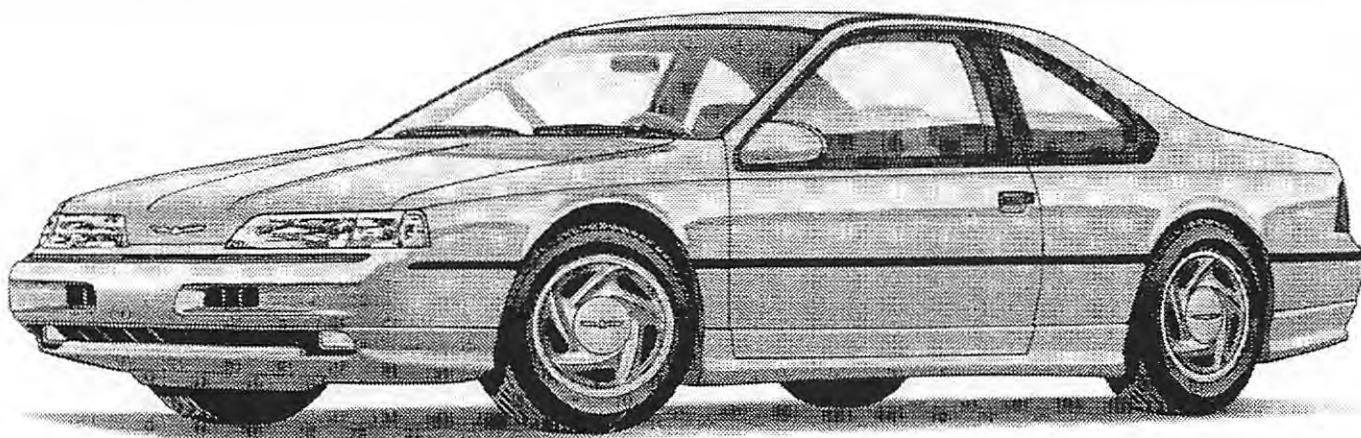
# CHARGIN' THUNDER

VOLUME III

FEBRUARY 1999

## THE OFFICIAL NEWSLETTER OF THE SUPER COUPE CLUB OF AMERICA

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*Dedicated to the Preservation and Performance  
of the Thunderbird Super Coupe  
1989 - 1995*

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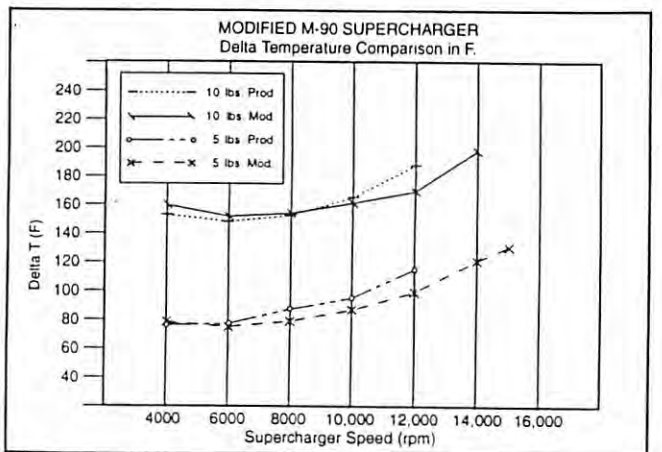
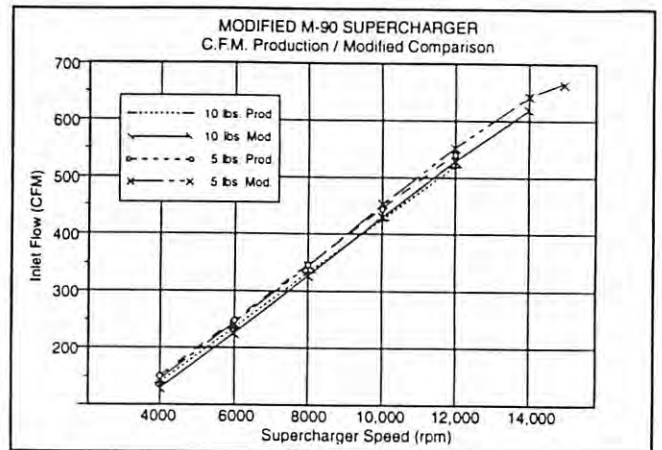
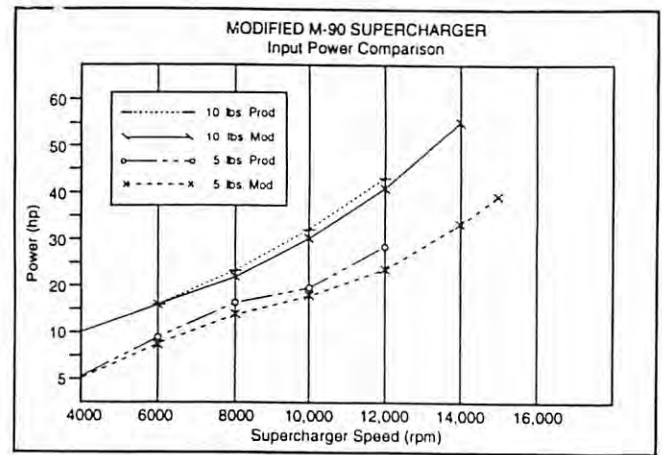
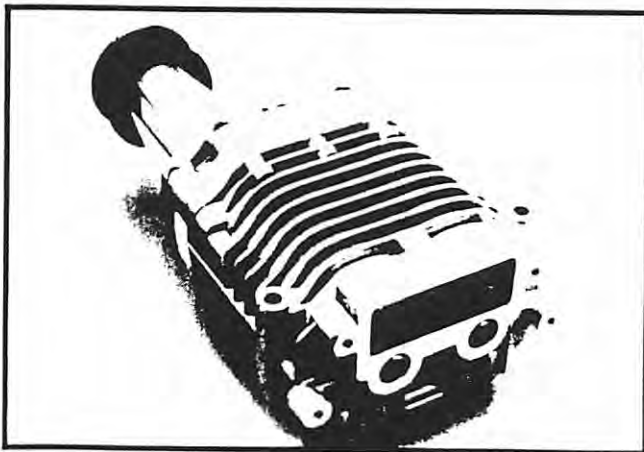
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Bill Evanoff

# ***From The*** ***Birds Nest***

**W**ell, here it is 1999 already and this is the last issue of CT that is included with your '98 dues. I'll bet many of you thought you were going to get shafted this year and only get one or two issues. Didn't you! Come on...admit it. They were very slow arriving this year, but the SCCoA always does its best to keep its end of a deal with its members. Although six issues had been talked about for '98, we decided to at least make four as in years past.

Since the first issue of CT was printed in March of '96, that month has been arbitrarily considered the renewal month for annual membership. Therefore, membership runs from March until February 31<sup>ths</sup> of the following year. If you're over the shock of actually having another new CT in your hands, I hope you realize there are not 31 days in February. But that was just a test to see if you're an astute reader.

Dues for '99 will remain at \$40 and four issues of CT will be provided again this year, hopefully arriving regularly in your mailbox every three months. I had asked in the last issue if members would care to have dues reduced and this magazine eliminated and to my knowledge no one has voted in favor of this. At least Bill Hull has not mentioned any of these negative comments to me. Possibly he is sparing me from the poor reviews so not to sour my writing spirit and ruin his relationship with his new editor. I was at least hoping for a small faction of those who hated the old Chargin Thunders so I could get out of this job and devote my time to more useful pursuits like pulling weeds out of my lawn or washing dishes for my hard working wife.

I did appreciate the numerous positive comments about the last issue that I received from members via. E-mail and over the phone. So it looks like the magazine will continue and dues will remain at the same level they have for the past three years.

The weather here in the Midwest since the new year has been nothing but snow, rain, and more snow. The temperature for about two weeks also did not get above 15 degrees (that's Fahrenheit, not Celsius for you Canadian members). I have been planning to work on my personal car to add some SCCoA short tube headers, "S" model supercharger and a SCCoA 2-1-2 exhaust for the past two months. Because of this wild weather, I have been in a virtual "I don't want to work on my car" funk. To date, all my modifications have been done in my own garage and I'd like to keep it that way, as I really don't trust anyone else to do a good job. I plan to let a local muffler shop do the exhaust for me, but I'll be present to supervise their work.

I hope to get over this problem and knock these jobs out as I realize spring is fast approaching and warmer days are ahead. I plan to buy a box of Band-Aids for the header installation job, as I'm positive it will be a knuckle buster. The effort will be well rewarded though. I am positive of that, as I've never heard anyone complain about the performance increase headers guaranteed. The only mod I have recently have actually done is to install a set of multi-adjustable Koni shock absorbers. These are considered by many in the performance industry to be "THE BEST" shocks available for most cars. I plan to do a further write up on them regarding the install and driving impressions in the next issue, so I won't waste any space here. I am very impressed with them so far, but have not had much chance to play with them because of the weather. This issue does contain a very detailed article about shocks that should make everyone an educated consumer the next time you need to purchase a set.

## Thunderbird Museum:

I recently received an e-mail from John Matthews who has decided to initiate the first steps necessary towards creating a National Thunderbird Museum. No details are available yet, but he has asked Bill Hull to be on their National Board of Directors to represent the interests of Supercoupe owners. Hull is quite excited and hopes to help this project be successful. Presidents from five or six other national Thunderbird clubs will make up the board and there will likely be a press release within six months of what their plans are. With the SCCoA represented on the board, I'm sure the Super Coupe will receive its place in history along with the other classic Birds from the past.

Basically,  
anything goes,  
and everything  
is welcome!

## '99 Shows:

I mentioned a few of the early big shows in the last issue and thankfully many of you have taken the time to book your hotel rooms early. I'll warn everyone again, that there are very few rooms left on our group booking. If you plan to attend either the World Ford Challenge or Carlisle, Book your rooms NOW, or you will not be able to stay with the rest of the club at our hotel of choice. We have a lot of fun at these outings and you would miss much if you were not staying at the same place as the rest of the group.

## CT Features:

In the past, CT issues have had a buy/sell section for members to list their items they are looking for or wanting to get rid of. This issue will resume that feature and I would encourage everyone who wants to participate in the section to e-mail or regular mail me a letter explaining what advertisement you wish to place in the next issue.

Also, I can only pontificate so much before I become VERY boring. Therefore, I am asking....**NO PLEADING**, with every member to send me letters, articles, virtually anything you would like printed about your car or the Super Coupe in general. There are many

technical aspects of the car that we would love to have articles written about. Most have been covered in the past, but a few I know that have not are the ABS system and the adjustable ride control system. Also, if you have more detailed or additional information about a subject that has been discussed previously, we will certainly use it to further our understanding of that subject. For instance in this issue, Duffy Floyd wrote an article covering in detail the numerous changes that make a SC engine different from a regular 3.8L engine. Basically, anything goes, and everything is welcome!

This magazine will continue to cover member's cars such as Micah Millers' in the last issue and Mike Puckett's, and Fred Holzhauer's in this one. If you would like to have your car featured, please send us a letter. Also, don't feel that if your car has not been modified that it won't apply because we are certainly interested in hearing from those owners that have kept their cars in their pristine stock condition as well. Keeping a car in original condition is also becoming difficult because the stock parts are getting harder and harder to find. Again, everyone is welcome to submit articles and feature cars.

## Roles and responsibilities:

I would like to clarify my new role as editor of the CT. I am simply putting this magazine together and am responsible for all of its content. Although being the editor of the CT is a large role, that is all that I am responsible for with regards to the SCCoA as a whole. I am **NOT** in charge of its printing, labeling and mailing. Bill Hull is still doing those activities. So please don't call me if your address has changed. This should still be given to Hull. I am also not responsible for any of the SCCoA parts orders. I have been called several times over the last few months by people asking for parts quotes or inquiring about orders. Please phone, fax or write Hull for these type inquiries.

Hull and I have decided to split responsibility though for questions related to member's cars that are not running properly. Up until recently if a member's car was making a strange noise, Hull received all the calls and was expected to miraculously diagnose the problem and suggest a cure over the phone. Most of the time, he explained that he was not a mechanic (a self proclaimed "poor mechanic" actually) and could not help them. Sometimes, he would suggest they change their spark plugs and wires and this often solved someone's problems.

But NOW for '99, as our club is about to enter the 21'st Century, Bill Hull and I are offering a new service to members. Virtually ANY mechanical problems can now be expertly diagnosed over the phone!! If you're experiencing any clicking, clacking, bumping, rubbing, banging, clanging, or knocking noises you are to call Bill Hull. If your experiencing any hissing, grinding, slipping, air whistling, burping, or screeching noises or leaking of fluids, low fluids, no fluids, smoke emanating from your car, slow movement or non-movement of your car you are to call Bill Evanoff. Hull and I have given this much thought and we feel this splitting of responsibility will give our membership faster service when it comes to problems. We have developed a computer database that is plugged into every Ford dealership across the country and will expertly diagnose any mechanical problem. Our answers will likely range from, "Gee, that sounds serious, but I'm a poor mechanic so I can't help you", to "how about you change your plugs and wires". Finally, if you have a loud squawking and banging sound coming from the rear end, don't forget to check and see if your mother-in-law has been (accidentally, of course) locked in your trunk. We look forward to our first call to try our new hi-tech system out.

On the drawing board, is a similar database that would cover virtually every single electrical problem that a SC owner may experience. The answers that we have developed so far are (1) "Gee, I wouldn't touch that wire while its smoking if I were you". (2) "I'm not a certified electrical technician". (3) "Have you checked

your EEC controller for error codes yet?". We are still working on the electrical database, so don't call us with these questions just yet but I would suggest you keep a fire extinguisher handy.

Seriously, we do continue to get calls like this every week and one of these answers are usually what we offer to the caller. It's not that we are purposely being rude. We honestly cannot do the owner justice because we are not able to look at the car and access everything before giving an answer. Everyone is encouraged to buy a service manual specific to these cars. The SCCoA sells a very good Haynes manual and your Ford dealer can tell you where to get the more expensive Helmes manuals that are extremely detailed. Also, if your check engine light or another light is coming on your dash, buy an inexpensive code scanner and a manual that interprets these codes. Please don't expect Hull and I to diagnose your car over the phone. We cannot and will not do it properly!

### **Web Site:**

The SCCoA web site has continued to be a popular gathering place for members on the Internet. We are rapidly closing in on 40,000 hits to the cover page in less than three months. Ron DiPaola, our Chief Master Mechanic and Internet Guru (a.k.a., the head SCCoA Webmaster) actually states the site is receiving over 75,000 total hits throughout the site per month. The reason for the differences is that not everyone visiting the site is coming into the site via. the front page where the counter is located. If you have not visited, give it a try when you get access to a computer hooked up to the Internet. See us at <http://www.scco.com/>

Bill Hull, President  
2239 Banbury St., Charlottesville, VA 22901  
804-974-6659, fax 804-974-9965

**NOTE:** Bills brother, Bob Hull is also at the SCCoA headquarters now to help in all club related matters.

**Welcome Bob!**

Bill Evanoff, Editor  
6239 Fay Court, Loveland, OH 45140  
513-697-6501 (6 to 9 p.m. only please)



# Faster....Faster

By Mike Puckett

Ever since I bought my Super Coupe I've always wanted it to be just a little bit faster, no matter how fast it got. I don't have any explanation for this but nonetheless I have strived to tweak it towards the maximum. Friends have asked me; "why?" I can't answer that. A man's just gotta do, right? I guess it's just the sheer exhilaration of acceleration in a beautiful machine. After all I still get compliments on my SC. I suppose it's good that we can't make these cars so fast that they're totally uncontrollable and leap away from the light at light speed like a AA fueller. I'm sure there would be someone who would try if it were possible but I'll keep mine somewhat reasonable.

Like many of us I started out with a 'chip' and an overdrive supercharger pulley. I had a Hypertech module and an SVO pulley for the first couple years. Eventually, I added 3:55 rear gears and kissed my 30mpg on the highway good bye. I knew that the improvement would show up in the 1/4 mile and 0-60 times, though. I found out about the TIX (Thunderbird Information Exchange) publication and subscribed hoping to find out as much as I could. Like a lot of you I found out that there just wasn't much available for the SC. From TIX I then found out about and joined the SCCoA. Finally, a source for performance parts. The next thing that I added was the SCCoA raised adapter top.

I was really enjoying the new performance when all the controversy over the performance enhancing "chips" started. So, I decided to test it out for myself. I removed the Hypertech module and drove the car. Could've fooled me! I didn't notice a bit of difference after removal. It seems that the little bit of pickup that I experienced originally had been swallowed up by the additional changes that I had made. A technician at Hypertech confirmed that indeed on a pure stock engine, the chip is an enhancement but when the engine performance is increased beyond stock through other means it loses its effectiveness. So I sold it to a fellow who had no further plans for other add-ons, even spurning an SVO pulley, and thought about what else I could do to the car.

What has made the biggest single performance difference so far has been the SCCoA headers and 2 1/2" to 3" exhaust system.

About this time the 60,000-mile bomb went off. I was deluged with maintenance and breakdowns. I decided that it was either time to buy a new car or spend the money to fix everything and bring it up to the level of performance that I really wanted. After replacing a leaky blower nose cone assembly and finding out that that does not fix the rattling noise inside, I lucked into a '95 model blower and inlet plenum with only 57,000 miles and no leaks and no rattles. Now this made a difference. It is currently at Magnuson for an S-porting job and hopefully will be back before this goes to print. I had Bill Hull port the inlet plenum to match the throttle body, a 70mm BBK, and a 3" diameter stainless steel intake tube connects it to a 70mm mass air meter. I have a K & N flat panel type air filter and the inlet air baffle has been removed along with those useless fog lamps. I've got a 10" electric fan behind the stock intercooler that is switched on via the old fog lamp switch and a relay. The fuel pump has been enlarged to a 190 lph while the injectors remain stock. The valve cover gaskets are new Felpro so hopefully I won't have them leak again.

I've just changed out my clutch for the first time and put in the Centerforce dual friction. Wow, what a clutch; silky smooth and lighter than the stock unit. Much easier on the ol' arthritic joints. And g-r-r-r-i-i-i-p, this thing grips! What has made the biggest single performance difference so far has been the SCCoA headers and 2 1/2" to 3" exhaust system. That tire spinning, gut wrenching torque has been spread out over the mid range and high end. It still jumps at the traffic light but now the tires tend to stay planted. And what used to spin them now makes it go like the wind in third and fourth gear. I use a resonator in the exhaust for the quietness along with turbo mufflers. I guess I'm just too old for a loud roaring exhaust.

I appreciate the more refined rumble, thank you. The brake disks have been grooved and the pads changed out for carbon metallic giving me much improved stopping ability. I have changed the oil and filter regularly and only use 10W-30 synthetic oil. When we replaced the valve cover gaskets at 60,000 miles the heads were clean as a whistle, not a spec of sludge or build up. As for cleaning the K&N air filter, PEP Boys stocks K&N cleaner and oil. I've had new Tokico Illumina II struts installed with Tokico lowering springs. They only dropped the car 1 1/4" which just keeps the exhaust from scraping at the top of my driveway. Tokico says that they tune

their springs and struts together for best handling and I thought that it was good that they were engineered as a package.

By the time I was on my fifth set of tires in 65,000 miles, I was wondering when I would find a tire to last more than 16,000. I grew to dislike Goodyear Eagle's and was very disappointed in the Yokohama's. The Firestone FTX's been good but difficult to keep balanced. I've got Michelin X one's on now and they seem to wear OK. I'll get around 20,000 miles off of these. I get a new set under warranty if they wear out in less than 3 years. Although they are not a performance tire, they are fine for driving back and forth to work and cruising. Although I tend to drive the car pretty hard, I do avoid street racing. I'm planning to run Goodrich Drag Radials at Fun Ford Weekend. Still, the X one's gave me a 14.797 in the quarter last year.

Here is where I learned about wheelspin first hand. The strip is much slicker than the street. I learned not to drive through the water on the burnout pad and not to waste time doing a burnout. It doesn't seem to help street tires at all and just resulted in

excessive wheel spin. The less that I spun the tires the quicker my times got. Wheelspin of any kind slowed me down. The next thing I learned was to watch my shift points. The engine seemed to pull right up to 6000 rpm but my quickest times were when I shifted at about 5300 or so. I also watched my boost to make sure it didn't go past 15. Since I have to drive it home I don't need to blow a head gasket, or anything else for that matter.

My goal is to eventually run in the 13's without nitrous assist. About the only other major change planned then, will be to do the heads. Maybe next year I'll get them ported, enlarge the valves, and add roller rockers. Often, though, simply doing the upkeep is a project in itself. I see the Super Coupe becoming one of the all time great classic Thunderbirds. While the other years concentrate on being kept in showroom condition, The SC's will specialize in performance as well. I'm planning on keeping mine for a long time, yet, and enjoy it as long as I can.

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## S H O C K I N G

By Lee Grimes

### **Whether They're Called Shocks, Dampers, or Struts, These Pieces Are Critical for Performance**

**I**f you, like many motorsports enthusiasts, were hungry for any racing action as the 1997 season began winding up, you likely paid attention to the practice and qualifying sessions for the Daytona 500. The big story there was the new stronger spring rule mandated by Nascar, and which teams could now get their suspensions to work the best. The buzz was all about shock absorbers and how they were the key to keeping the rear end stable and predictable so the driver could put the precious horsepower to the pavement.

Daytona isn't the only place where proper suspension tuning is vital to car control and fast lap times; it has been accurately said that many of the recent gains in suspension control have been made with shock absorbers. They can be the difference between who is on the track and who is on the trailer. But it doesn't matter if you are struggling for the last tenth of a second on track or simply trying to nail those esses through your favorite Sunday drive;

suspension motion and transitional control is what handling is all about. Most enthusiasts begin transforming their street cars to performance machines with the installation of higher performance tires. The next big gain is going to be with a set of performance shock absorbers. Although the naked eye may not be able to see any difference between average and performance models, inside these shocks you'll find a world of difference. And while automobile manufacturers are making strides each year in bettering suspension designs and improving car control, too many models still come off the line with basic shock absorbers that are better matched to the general public and the financial bottom line. It is up to the individual owner to understand what shocks do and select what will improve his car.

### **BASICS AND TERMS**

In the pursuit of shock knowledge there are a few basic ideas to be grasped. The term "shock absorber" is really a misnomer, as "damper" is really more appropriate, but for our purposes we will use them interchangeably. The shock doesn't really absorb the impacts taken by the suspension, but dampens those motions by converting the kinetic energy of the spring (up and down motions) into thermal energy (the heat built up by flowing oil through valves). The damper controls the oscillation

rate of the spring. A good way to think of a damper in a performance application is as a timing device. The spring carries the vehicle load and establishes how much the suspension will travel for a given input. The damper times how long the suspension takes to react to the input or to dissipate the energy. An undamped spring will cycle or bounce very quickly and continue to do so until it has used up all of the input energy. The damper restrains the spring and helps it process the energy. The higher the spring rate, the greater the restraining ability the damper must have to control its energy. The more subtle and controlled the spring's motion, the more vehicular control you have. Many years ago, the term "double-action shock" was used, implying that the shock offered damping action in both directions of travel. More modern suspension understanding has double-action taken pretty much for granted, as most people realize that a suspension requires damping both up and down. Any time there is a discussion of dampers, the primary words used are rebound (extension) and bump (compression). The rebound damping characteristics control the sprung weight of the car, which is basically everything above the suspension (body, driver, engine, etc.) and part of the suspension weight (half of the spring, shock and some axle weight depending on type). Bump, sometimes known as jounce, controls the car's unsprung weight (wheels, tires, brakes and the other half of the suspension). In a cornering situation, the vehicle's weight transitions from the inside of the turn to the outside. The inside damper extends (rebounds) and thus determines how long it takes for the weight to transfer. Too little rebound valving will let the transition occur too quickly, upsetting the smooth balance of the vehicle. Too much rebound can make the transition too slow or possibly cause lift of an inside wheel. At the same time, the compression damping plays a lesser role in establishing how far or fast the outside suspension will compress in accepting that transfer. A low compression rate will allow the acceptance to occur quickly and force the spring to do the work, but in the following reaction there will be a greater requirement for rebound as the spring responds back. A high compression rate will make the acceptance slow and act as a booster, seemingly increasing the spring rate. When you hit an obstacle or undulation in an otherwise straight and smooth road, the damper compresses and determines how easily the wheel goes up into the wheel well or how much it resists the compression and makes the entire body raise.

Too little compression damping can let the suspension travel farther up than needed. Adding

more compression damping can help the road-holding ability by reducing how far the suspension moves upward and therefore will need to move downward. Too much compression damping will push the entire car into the air and reduce the footprint of the tire on the ground, which will risk making the car feel like it is skating. After the wheel stops traveling upward and the spring has stored the energy, it must release the energy and extend and use the rebound function. Too little rebound damping will let the spring go farther and faster than it needs, and it will continue to cycle and bounce until its business is through. Too much rebound damping can overcome the spring's ability to expand and hold it falsely short. This can make a car literally "jack" itself down and, over a series of bumps can cause the car to lower itself to a point where it is riding on the bump stops and has no suspension at all.

### DAMPER DESIGNS

There are three basic designs of shock absorbers: twin-tube hydraulic, twin-tube low-pressure gas, and mono-tube high-pressure gas. Each of the three has its own abilities and functions, and you will find all three in street or street-derived racing applications.

One of the most common misconceptions is that a gas shock is filled entirely with gas and no oil. In fact, all three damper designs use hydraulic oil—they just may have a nitrogen gas charge pressurizing the oil in the shock. Do not select a shock simply because it does or does not contain gas. Look into its actual capabilities.

The twin-tube hydraulic (Figure 1), as the name implies, has two cylinders (or chambers) and no nitrogen. The inner cylinder is where the rod and piston live and work, and the outer chamber is a reservoir for oil and air. As the rod travels in and out of the inner cylinder during stroking action, it displaces oil from the inner to the outer cylinder, then draws it back inside. Although this is the oldest of the three designs, it still maintains certain benefits and has a place in performance damping.

The twin-tube low-pressure gas shock is much the same as the hydraulic, except that it has a low pressure (usually 5-15 bar/70-210 psi) nitrogen charge in the outer chamber instead of the air pocket. Some manufacturers seal the nitrogen in a plastic bag, while others will allow the nitrogen in solution with the oil. The original theory behind placing the nitrogen inside was that it would put the oil reservoir under pressure and therefore raise the oil's boiling point,



reducing the tendency for heat-related fading or foaming as it passed through the valves. That really isn't much of a concern today as the quality of oil has increased in performance dampers. Plus, modern performance shock design has moved away from needle valves and o-ring seals that are affected by heat and viscosity changes, and most street cars and many race cars simply will not generate enough heat to challenge the oil in a proper performance shock. However, when the nitrogen gas is in solution with the oil, it can give the added effect of damping really minute harmonics and motions that otherwise would not be big enough to make the damper's piston move. The final design is the mono-tube high-pressure gas shock. The mono-tube's entire body serves as the chamber allowing for a larger piston area, and therefore it has the ability to transfer more damping information over a smaller stroke area. Displacement of oil by the incoming rod is handled by a chamber at the bottom of the unit that contains a high pressure (20+ bar/ 300+ psi) nitrogen charge and is separated from the oil by a floating piston.

Each design style offers certain advantages and disadvantages, so the best choice will depend upon the intended application. A twin-tube design, when compared to a mono-tube, has a longer stroke capability and greater oil volume in a similarly sized unit. Therefore, the twin-tube will tend to give a smoother or more forgiving ride characteristic and still supply the firmness for proper handling control in vehicles that see average or long suspension stroke length.

The larger piston area of the mono-tube will give more control over much shorter stroke lengths or at the lowest piston speeds, but also tends to ride more harshly for exactly the same reasons. In racing applications where heat generation is more likely to be a factor, a mono-tube can cool itself more quickly because the shock body is the wall of the working cylinder. You are likely to find mono-tubes on non-production based racers cars, where control over very short strokes is mandatory and ride quality is not an issue, or on production cars where designers tend not to want as much suspension travel. Some racing shock manufacturers use external reservoirs with mono-tubes to help with displacement lengths and oil volume, but in return add extra weight and some delay to the reaction ability.

Gas pressure in the shock can extend the oil's heat tolerances, but can also affect ride height because the greater pressure can act as a slight booster to the spring rate. Cars that run lower spring rates

(drag racers are a good example) don't want the boost, so they usually use hydraulic shocks or must be willing to compensate for the gas pressure. Mono-tubes can also operate while mounted on their side or at any angle, so they are more conducive to racing pushrod suspensions, while twin tubes must operate from upright to no more than 45 degrees from upright, which is still fine for most production-based suspensions).

## **VALVING DESIGNS**

The piston's speed of travel will determine how much damping force will be created, so the shock engineer can use the opening and closing of several valving tools to get different damping characteristics. They can use bleed-through holes in the rod that let oil entirely miss the piston and its valvings. This affects the lowest piston speeds and deals with low rate transitional control. Next they can use orifices in the piston and valve discs to control mid-range or medium piston speeds. Finally you have bypass—additional piston orifices and valves used at high piston speeds to release or blow off extra pressure that can't get through the other valves. The bypass sets the maximum damping rate and keeps the ride and control from being overly harsh when the suspension hits really big obstacles.

On twin-tube shocks, footvalves are used to control the flow of oil from one cylinder to the other and set up much of the compression damping rate. By working with these tools, control is obtained based upon the functional suspension and damper stroke lengths and the expected piston speeds. An Indy or Formula 1 car will typically see piston speeds of 0-3 ips (inches per second) and strokes of under one inch. Combine that with very high vehicle speed, and you must have superior valving control and immediate response. A production-based racer (SCCA Improved Touring, IMSA Endurance Challenge, etc.) or autocrosser will work in the 0-8 ips range, based on track and driver smoothness. A street car typically runs at 8-15 ips, with jumps into the 20s for really rough roads. Compare that to up to 60 ips seen by a motocross bike racer. Add these requirements to the number of suspension designs and geometries, and you will quickly see that no one damper design or valving can cover all of the bases. Proper valvings are developed and needed for each situation.

(NOTE: Graphs referred to in the following paragraphs have not been reprinted in this article...sorry) Shock absorbers are tested for design and control by a shock dynamometer. The damper is tested at a single or multiple piston speeds with the damping forces

noted. When printed in graph form comparing speed to damping force (measured in Newtons or pounds), certain trends become evident. Figure 2 shows the basic three types of graphs: progressive, linear and digressive. The progressive graph is typical of what one might find on a low priced, commodity grade shock. The valving does very little up to a certain point, then gets progressively firmer at a rate faster than the increasing speed. This will have minimal low-speed control but lots of damping at really high speeds. It would not be a good selection for a performance car and would probably ride hard on really big bumps. A linear graph forms a straight line that grows at matching rates for damping and piston speed, so it will serve better as a performance handling shock. It displays much better low piston speed capabilities, but will still feel pretty hard over big bumps. The digressive graph initially grows at one rate at low speeds, but then the rate of damping slows down and begins leveling off at high speeds. This is going to give very good low- and middle-speed transitional control, but will not be harsh or upsetting at high piston speeds. This is the type of performance graph you are most likely to want. Figure 3 shows a comparison of shock dynamometer graphs for the rear shocks from a second-generation Honda CRX Si. The first graph charts the original-equipment selection by Honda; it reveals an emphasis on sportiness, but generally not awe-inspiring handling. Next is the rebound-adjustable KONI street shock, which puts greater emphasis on low and medium piston speed, as well as vehicle transitional control and a ride quality that will be firm but not harsh. The broad adjustment range lets the owner compensate for other modifications, including wheel and tire and suspension upgrades. This is a popular selection for tuned street and autocross cars and offers the option of revalving if the owner wants more development. The last dyno sheet is for the KONI rebound-adjustable road racing shock developed for Firehawk/Endurance Challenge, Improved Touring or similar racing. These shocks can also be made independently compression adjustable if the owner so chooses. The most noticeable change is the large addition of bump stiffness and not as much rebound change. The firmer valving is used to help keep the car flat and stable while using much heavier springs. They also help the rear end rotate the car more quickly. Road racing front-wheel-drive cars need the added help with rotation for cornering, so the front wheels can be pointed straighter for putting the power down sooner and better. As you'd expect, these shocks

Damper adjustability enables you, the driver, to further tune the engineer's decisions to fit your driving style and pavement situation.

are made for the relative smoothness of race tracks and so ride harshness is not an issue.

## APPLICATION

Now that you have attended Shock Tech 101 class, you need to ask the question: "Do I need better shocks?" If your aim is better handling, and your car is not one of the high-performance packages already fitted with adjustable performance shocks (Neon ACR, Mustang Cobra R, Camaro 1LE, etc.), then the

answer is likely "yes." You now have several choices: research what is available and make your selection (good idea); or develop your own shocks (if you really want to and think you are smarter than the engineers are). Technically, if you are armed with the correct geometry, spring, other measurements and math equations, you could calculate your suspension and get the "critical damping" (exact damping required for a specific spring) and other neat numbers. The trouble is that this only gets you into the ballpark, because there are so many variables that you can't define. A critically damped car may technically cover the spring's capabilities, but would be so harsh at most piston speeds that you wouldn't want to ride in it. Manufacturers have teams of engineers who develop products based on lab findings, test tracks and real world seat-of-the-pants feel. A damper is no good if it has "that Cadillac ride" but no low-speed handling control, or if it has slot car response on perfect roads but turns your brain to guacamole at the first bump.

Damper adjustability enables you, the driver, to further tune the engineer's decisions to fit your driving style and pavement situation. Even more importantly, you can tailor your shocks to work with other performance modifications. The engineers probably made their decisions based on a stock car, but if you have added performance wheels and tires, springs, anti-roll bars or—heaven forbid—more horsepower, then you need to become the engineer. If your class rules limit modifications and you require the car to do something it was not designed to do, you can use shock adjustment to attain the desired effect. A good example is a stock class autocross car. This situation involves shoveling a car designed to get Grandma to the market through a ultra-twisty track at speeds that would cause Grandma to faint. Getting the understeer or oversteer out of a 1995 Sniveling Wombat to make it a fast-rotating snarling Wombat can be accomplished with proper adjustable shocks.

Stiffer suspension is not always better. As a matter of fact, once you are in a desired range of performance and everything is working properly, a slightly softer setup can give you more leeway for unexpected situations. Simply clamping the car down as hard as it can go may mask the suspension's true abilities and functions, and the result will be a flat-running, harsh-riding, high-compromise skateboard. Developing the appropriate settings for your combination can take some experimentation but will be very rewarding in terms of lap times and fun. Beware of the recommended "ultimate setup." There is no perfect combination for all cars and drivers. That setup will likely get you in the ballpark, but again, your variables will define your own needs.

If Driver B is faster in the same kind of car, don't expect the same adjustments to be the answer. He may have gotten his suggestions from Driver A, who may have known what he was talking about or who may have been covering up some other inadequacy. As racers we tend to want to mimic "the fast guy," but at best this can put us even with him; at worst, it can put us way off base—even if you can trust the info he supplies. You should take what you have learned and find the fast way for you.

## TUNING

The goal you are seeking is getting your car to react to the ground, so you must remember that suspension tuning is actually making your tire work harder and more efficiently. Realize that a very soft suspension can give the tire too much motion to do its job, and a very stiff suspension can give too little. An example of working the tires in a different way is a test we did last year with one of the North American Touring Cars. The track was smooth, and the suspension was plenty firm. In successive tests and adjustments, we slowly raised the rebound until good balance was achieved, but then a hot lap produced a nasty hopping motion. Although the pavement was smooth, Touring Cars have a tendency to use curbing and berms to their greatest advantage. After firmly popping a berm, the car launched slightly and then hopped on landing. We realized that the hopping motion wasn't from spring bounce (which would mean it needed more rebound), but was actually from the tire's sidewall flexing because the suspension was firm enough that the only compliance to dissipate the energy came from the tire. A softer tweak on the rebound let the suspension and tires do their own jobs, permitting

Beware of the recommended "ultimate setup."

the car to stay on the ground and the driver on the throttle. The initial setup was good for smooth driving, but when the berm variable was introduced, an adjustment needed to be made. By the way, the driver, Randy Pobst, won the North American Touring Car championship on those shocks.

The rule of thumb says that greater rebound dampens that end of the car, so a front-drive car that won't turn in can use some more rear rebound. Couple that with enough front rebound to slow body roll, but not so much as to cause inside wheel lift, and you are on your way. A tail-happy rear driver could probably use more front rebound (to loosen the front) and less rear rebound (to reduce rotation) in the pursuit of balance. Your other thumb tells you that if you can isolate handling responses to corner entry and corner exit, then you

know which end to work on. In a decelerating corner entry situation, the rear suspension is extending and transferring its load to the front, so adjusting the rear rebound can control the transfer rate. On accelerating at the corner exit, the front is extending as the weight is transferred to the rear (usually more subtle unless you have big power or soft springs), so the front rebound will be adjusted. Increasing compression damping will also affect how quickly the other end of the car accepts that weight transfer. Too little compression can overwork or literally stun the contact patch, while too much can give too little input and also start acting like added spring rate. If you are allowed to change springs, do so and let them do their job and share the work. If your rules mandate that you can't change springs, consider more compression, but remember the other compromises involved. Ride quality and skittishness on intended and unintended bumps must be factored in.

Manufacturers can alter the different valving tools in the adjustment procedure to get their desired effect. Some use bleed holes in the rod to make the changes and therefore vary the amount of oil missing the piston valves. The clue for this style is if it adjusts both compression and rebound in one motion. Other manufacturers (usually more racing oriented) will adjust valving independently, either by making only rebound adjustable and using an optimized, preset compression for many situations, or with a double-adjustable unit that allows independent adjustments. This style usually effects changes with rod bleed and orifice and valve stack spring preload pressure, and therefore can make changes over the more possible piston speeds.

The days of the old 50/50 (same rebound damping as compression damping) and 90/10 drag race shocks have gone by. Today a 50/50 shock would have either way too much compression or, more likely, too little rebound. A 90/10 design just isn't paying attention to the evolution of suspension design and aerodynamics. Today, street performance shocks have rebound damping rates that are two or more times greater than compression damping rates. The single action of adjusting bleed to affect bump and rebound is, by definition, a 50/50-style change, so the overall damping proportion will change as more bleed is dialed in. Independent adjustments allow the alteration of one characteristic while not affecting the other; this is therefore more precision and involves less compromise.

Rebound and sprung weight adjustments will cover 90-plus percent of most autocross and grassroots racers' needs. Making compression adjustments of the unsprung weight has traditionally been the realm of more hard-core race tuners, but as the stakes in the pro and national levels of autocross and club racing go up, so does the need for more tweaking and tuning ability. As you can see (and probably know from firsthand experience), simply jumping into a car and counting on your heroic driving abilities to carry you to the front is the stuff of daydreams. Proper research and use of your suspension system is a safer spot to place your bets. Some of the most pivotal yet much misunderstood

parts of your suspension package are the dampers. If your goal is a favorite road or competition class, maximizing your dampers' capabilities will take you far and fast. Autocross is a great example—it is vehicle transitional control at the limit. A nationally-recognized autocrosser recently confirmed this by stating that suspension control is everything, and handling gains get you seconds whereas horsepower gains usually just get you to the next corner. Road or oval track racing is not as extreme in transition, but the vehicle speeds are higher and the necessity for control at the limit makes damper understanding critical. Your car manufacturer probably didn't have you in mind when they chose the original dampers, so it is up to you to select and tune the best performance set for your unique needs.

Lee Grimes is the Street Products Manager for KONI Shock Absorber in North America, where he oversees street performance and street-based racing shocks. He has served as a contributor and technical advisor to GRM on several occasions. Lee is a 20-year member of the SCCA and has been club racing and autocrossing for over 15 years.

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Editor:

I read Dutch Mandel's article in a recent issue of Autoweek and found it amusing. It also reminded me of the September '96 issue of CT which stated these "requirements" for any SC enthusiasts dream house:

- ⇒ 8-car climate controlled garage with an attached shop.
- ⇒ Outside parking for 6 cars, a motorhome, a crew cab dually, a 28' enclosed trailer and a 34' 5th wheel.
- ⇒ 3 phase 220V outlets in the garage for your welder.
- ⇒ Grease pit.
- ⇒ Convenient to a hazardous waste disposal site.
- ⇒ 15' ceiling in the garage for a lift.
- ⇒ Deaf neighbors.
- ⇒ Across the street from a paint/body shop and near a muffler shop with mandrel bending equipment.

⇒ Some sort of house with a working toilet on the property somewhere and hookups for the motorhome.

## A man's home is his, um, garage

By Dutch Mandel  
Reprinted from Autoweek magazine

I sat around with a couple buddies doing what buddies who sit around do: talk cars. Actually, we talked about the care, and feeding of cars. We talked about garages. It sure sounds sexist, but we came to the conclusion that garages are to guys what kitchens are to gals. It was agreed women don't have the same reverence for garages as men. There. It's out in the open. And sure as Flicka made little road apples, mail from tranny fluid-spittin', garage-lovin' women will rain down on us. So be it. I will say that while that generalization holds true for most members of the fairer sex, other women will admit we must pry their cold, dead fingers from their garage-door openers...I could not agree more.

Think about this: Kitchens and garages have much in common. Total square footage is key, the more the better. Accessible work-space area is a must. Hardware is of primary consideration-just how are you going to outfit them? Each room requires good drainage. I would salivate if a Viking range or Subzero refrigerator were in my kitchen...or in my garage. Despite the semi-Neanderthal comment above, I think of myself as a Renaissance guy who enjoys whipping up something semi-exotic in my kitchen...or in my garage. I've been known to oil cast-iron skillets far more frequently than every 3000 meals.

This whole conversation started with my buddy, Lewis. Lew is adding unto his house, and he's going all out. There's a new family room. A new master suite with lava and Jacuzzi. An enclosed porch. Another bathroom. Several walk-in closets. And a new triple-in size kitchen (with a Subzero built into the plans and budget).

And a garage. A man's garage. A 22-by-28-foot garage. A garage to keep his '65 Mustang notchback well-tended. A garage with six windows. A heated garage with an insulated upstairs space where he can watch F1 or Nascar races and hockey games and smoke cigars and not darken the walls of his new addition. It's a garage that has the neighborhood men aluminum-sided with garage envy.

Naturally, his wife went nova. Absolutely exploded. She wasn't angry about the heated, carpeted living space above the garage, into which he plans to throw a refrigerator and big-screen television. She was furious that he had bumped the footprint out by four feet more than the plans had specified. Hey, Therese, think of it as increased space for tools, he said. It's a place for the children's toys, for their bikes, and for all the other kit flotsam and jetsam. His pleas fell on deaf ears. She smelled conspiracy commingled with 30-weight. She asked if he was getting another car. (He now admits it was a mistake not to have told her about the Mustang before he drove it home.) She wondered aloud whether he was having the garage heated for some illicit reason beyond comfort in the winter months.

No, no, no, and no, he said, and still she would have none of it. Therese knew Lew was getting his oversized garage to satisfy a primordial urge, and she thought that extravagance could be used elsewhere-perhaps on a Viking range?

In some ways I sorry for Lew, having to go through the trauma of building onto his house. In other ways I'm just plain envious, what with his garage bigger than mine. The fight is not over, though the garage foundation is poured and the walls are up. I wonder how it is he's going to sell the idea of why he needs to get a hydraulic lift for the kids.

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## SCCoA Buy/Sell/Trade

(To place an add for future issues, contact the editor)

**For Sale:** \* Lincoln Mark VIII center section gear housing with 3.08:1 gears. All aluminum and 20 pounds lighter than a T-bird housing. No miles \* 1990 SC rebuildable short block assembly. \* Intercooler tubing and stock intercooler. \* 1990 AOD transmission in good condition. \*1992 M5R2 5-speed, needs rebuild. \* Titanium color split folding leather back seat in excellent condition. \* Good used early model superchargers \* Pair of XR7 16 x 7 wheels/tires in excellent condition and a pair of early style SC wheels in good condition. Will sell individually. \* JBL head unit/speakers/subwoofer \* Many other interior and mechanical parts for SCs. Contact Bill Evanoff for more info./pricing at 513-697-6501 (6 to 9 p.m. only please) or e-mail at: [xs\\_tork@usa.net](mailto:xs_tork@usa.net).

### **For Sale: Custom Embroidered Thunderbird Apparel**

- heavyweight t-shirts - denim button down shirts - polo/golf shirts - hats  
on the Internet: [www.scco.com/apparel/](http://www.scco.com/apparel/) or contact Ron DiPaola (607) 748-0581 evenings

**For Sale:** 89 XR-7, Black, North Carolina car since new, Absolutely no rust, 5-speed, loaded, clean grey cloth interior, new brakes, rotors,clutch,and many other parts over the years. 130,000 miles, mostly highway. asking \$4,995...will take \$4,500. Charlotte NC, 704-357-2828. Marc Zimmerman SCCOA # 304



# **Ever wonder what changes Ford made to the standard 3.8 L engine to turn it into a S/C?**

By Duffy Floyd

Here is a synopsis of the changes made by Ford for the Model year 1989 to make the standard 3.8L Engine into the S/C version we all love (and hate at times).

To allow for the additional power generated by the engine there were new designs for reinforcement made on the following components:

Block

Main bearings

Crankshaft Bearing Caps

Crankshaft (Dura-cast initially and forged steel for the majority of the production run)

Steel crankshaft sprocket

Timing Chain

Cylinder head

Head bolts

Rocker arms.

The throttle body was designed new for the S/C motor.

Water routings in the engine were redesigned for the S/C motor.

## **Intake Manifold:**

Of course to accommodate the supercharger the intake manifold was changed to provide a way to mount all the upper engine components such as the SC, air bypass valve, inlet plenum etc.

## **Exhaust Manifold:**

These two were redesigned for the S/C version. Each side houses a Heated Exhaust Gas Oxygen sensor (HEGO). The use of the HEGO allows accurate sensing of O<sub>2</sub> level in a lower temperature exhaust gas (200C- 392F) when compared to a EGO (unheated) sensor. On the SC the HEGO sensor on the right side is located in the exhaust pipe just downstream from the exhaust manifold for that side. On the left side the HEGO is located in the exhaust manifold itself.

## **Cylinder Block:**

The cylinder block was redesigned and reinforcement was added to increase durability and strength of the block. The water passage opening locations were also moved.

Both the ATX and MTX camshafts (Automatic transmission equipped cars and Manual transmission equipped cars) were redesigned to allow for newly designed roller tappets. Roller tappets have the advantage of reducing sliding friction and improving fuel economy. Because of the choice made to include the roller tappets it was necessary to include guide plates and retainers to secure them.

The main bearing caps were made one inch taller and the cap bolts were increased in length to allow the caps to be secured properly to the block.

Initially Ford planned to use an improved method of manufacturing the crankshaft to add strength to the unit. It was referred to as Dura-cast. Due to production issues with the Dura-cast process, the vast majority of SC cranks were forged steel. Note that if you rebuild your SC Motor...the main journals can only be refinished to 0.025mm (0.010-inch) undersized and the rear main journal can not be refinished since it is already 0.010-inch undersized. The reason for the undersize rear journal was to prohibit any standard cast iron cranks being run down the line in an SC engine which would surely result in a warranty problem. If a standard crank would possibly be tried in a SC short block, the main bearing caps would not bolt down properly.

The balance shaft used on the standard 3.8 L (a feature used to reduce engine vibration) was eliminated and replaced by a spacer in place of the balance shaft drive gear.

A knock sensor was added to increase ignition performance. This is a piezoelectric accelerometer sensor that is designed to vibrate at the same frequency as the engine knock (pre-detonation). The sensor operates in consort with the EEC IV engine control system to retard ignition timing and hopefully eliminate the detonation before real engine damage occurs. If you ever have to replace one make sure you get the correct version since there are sensors made for at least 4 different frequency ranges depending on the application.

The rear main oil seal was modified to improve the sealing characteristics and to provide more durability. Some of you may have experienced rear oil seal failure in other Fords. Before approximately this vintage engine for Ford, the seals were mainly two piece and over time the rubber seal would actually wear a groove in the steel crank. The only true fix was to replace the crank. Now with this redesigned seal it is a one-piece unit which allows the use of a "sealing ring" which can be installed over the groove and allow a new seal to be installed and the leakage to be stopped.

### **Cylinder Head:**

The cylinder head was redesigned to increase the bolt boss diameter and deck thickness. The water passages (between the cylinder head and block) were revised to improve the sealing between the two components. The valve springs were improved by strengthening and made smaller in diameter. The spring seats were changed to accommodate the new spring design.

The cylinder head bolts are larger and have been made stronger.

### **Crankshaft Damper Assembly:**

The crankshaft damper was changed to a cast aluminum piece to reduce weight.

The rear of the damper was fitted with a cutter for the Distributorless Ignition System (DIS) system. It has three vanes which when passing past the block mounted Profile Ignition Pick-up (PIP) sensor generates a signal to both the DIS Module (mounted on the top of the engine beside the Ignition coil pack) and the Electronic Engine Control Assembly (ECA {EEC IV Module}) and gives the base spark timing.

### **Camshaft:**

There were two different types of camshafts designed. Automatic and manual transmission cars each had their own unique camshafts. They were color coded yellow for the ATX version and pink for the MTX version. The paint was applied to the rear end of the camshaft.

### **Timing Chain Tensioner:**

A tensioner and corresponding snubber were added to the engine.

### **Pistons:**

The piston domes for the pistons were redesigned to increase the performance. The pistons were also constructed of high silicon aluminum (hypereutectic). The compression ratio was 8.2:1.

### **Oil Pan:**

The oil pan was diecast to reduce noise and vibration.

The oil level sensor was modified to also double for an oil temperature sensor.

### **Oil Cooler:**

A Modine oil cooler was added to increase both engine and oil life.

### **Valve Covers:**

The valve covers were diecast from magnesium for weight reduction.

Platinum tipped spark plugs were added for increased life and performance concerns of the engine.

# **HISTORY of a 350 HP BUILD**

by Fred Holzhauser  
fredholz@concentric.net

## **Introduction:**

I used to be very involved in cars. I wrenched the money I spent on college. Besides restoring a '29 Rolls Royce Phantom II with my Dad ☺, I also built a 500 hp smallblock Challenger R/T for street/strip. I miss it every spring. These days I have a much nicer car, my '90 SC. No longer do I have a machine shop. Out of the blue, just cruising, the engine lost a rod bearing. No sign of heat or poor oil supply. I never did figure out why, but it was **Rebuild Time**.

## **Goals:**

At first, I thought, "This is a great running car, but wimpily cammed. I'll just slip one in while the engine's out . . .". I wondered how many **bolt-on** horsies you could put on a Super Coupe and still retain its good manners. It had to be a "**stealth**" job because the emissions nazis in the Denver, Colorado metro area don't allow any "performance" modifications on post 1982 vehicles. It also had to remain **roadworthy** enough to drive 20,000 miles per year for my job.

## **The Vehicle:**

1990 SC with Ford factory supplied "later" AOD. White with maroon leather interior, JBL stereo system. Ford bra. 83.3K miles. Rebuilt the brake system with all new Ford parts.

## **Research:**

No aftermarket adds targeting the T-bird could be found in any hotrodding magazines. So, I called Ford Motorsports. They said, check with the SCCoA. Even the old page was cool. I was impressed and inspired by the entire web community that had sprung up around these cars. I got excited reading the articles by Charles Warner on intake and exhaust. Next, I spoke with Bill Hull and Coy Miller about my goals. Each had tremendous knowledge of the car. It became obvious that just camming and overdriving the SC would cost me a set of headgaskets. The way to Nirvana was the exhaust system. Coy said, after that, the top of the blower was next.

As the project progressed, I found more information in the web community, all the while witnessing the rebirth of the SCCoA page. Nice job, guys! and it keeps getting better . . . Special thanks to Bill Evanoff, Sir William, George Davenport, Charles Warner, and Rich Thomson for valuable E-mails and/or BBS posts. My apologies if I missed anyone!

I also would like to acknowledge my employer, BIRKO Corporation, for time and resources granted.

I built a spreadsheet model to record parts orders and general info, test assumptions about the car, and to predict performance. I looked at the Chargin' Thunder's torque curves from various engines, and input one closest to my own configuration. I looked up the performance curves of the Eaton M-90, inputting the power efficiency and temperature rise curves. I had to accept the elevation factor, living in Denver. At least there's less drag. I compared the theoretical maximum from the blower to the maximum from the "test" engine. Pretty close with a 10% OD. My new impression of the motor was one of good original design followed by Ⓢ systematic detuning. My longest debate was which gear set to choose. I settled on 3.55s, since I do so much over-the-road driving. But the math and the gurus screamed out for 3.73s.

For my chosen configuration, the best estimated power is 376 HP at sea level on a cool, dry day. Predicted performance for smooth acceleration (no holeshots) is 14.7 sec ¼ mile at about 100 mph here in Denver. We get high trap speeds for our times due to the thin air. Sea level looks like 13.7 at 97 mph. Top speed is near 180 mph. I'm looking forward to verifying all this by springtime. Bandimere Speedway is so serene sitting in the pastoral foothills . . .

BTW, Popular Hot Rodding had a shootout article on mufflers showing the best power-to-noise compromise being Dynomax mufflers.

### **Configuration:**

This is what I chose. It involved no machine work. The Bill's call it a 350 HP kit. I elected to wait for a BBK throttle body because of having to fabricate a linkage, port the plenum, etc. By this writing, MN12 Performance is offering the piece with linkage . . .

- \* Stock ATK Long Block – added high strength main & rod bolts
- \* Windage Tray
- \* Stock Heads, other than port matching, minor shaping & polishing
- \* 10 % Overdrive Pulley for Blower
- \* Gates K080390 Blower Belt
- \* NAPA 3" Idler Pulley
- \* ¾" SCCoA Enlarged Blower Top
- \* C & L 70 mm Mass Air Flow Meter & 36# sample tube
- \* K & N Panel Filter
- \* Bosch 36 # per hour Fuel Injectors
- \* 190 liter per hour Fuel Pump
- \* 180 °F Thermostat with matching Radiator Cap
- \* SCCoA Intercooler Fan
- \* Complete SCCoA Exhaust System –
  - Shorty Headers, Stainless
  - Downtubes with Hiflow Cats
  - 2 ½" to 3" to 2 ½" cat back system with Resonator & Dynomax Mufflers



- \* Coy Miller Stage 1 Camshaft –  
     276 ° duration seat-to-seat  
     220 ° duration at .050"  
     112 ° lobe centers  
     .495" lift
- \* Coy Miller Custom Pushrods, over by .057"
- \* SVO 3.55 Locker & speedo gear
- \* Colorado Custom License Plate – " BLUES Z "

### **Lookouts:**

"Experience is what happens when things don't go the way you plan."

If I had to do it over again, I'd have bought a used 94-95 engine and rebuilt it, instead. It would have had a better blower, a little higher compression, and bigger injectors. I'd have gotten a bit better performance. The stock '90 fuel pump is not adequate for this kit.

Here are some of the things I stumbled on:

- \* The first ATK block had a cam bearing loose ! Had to get a different one.
- \* I dinged the spacer plate between motor and transmission on installation.  
     Had to straighten that.
- \* I shortened downtubes just a bit to make exhaust fit tighter up to the car.  
     The exhaust system is heavy; I might add a set of hangers.
- \* The stock pushrods were too short. Most often, they work out okay.
- \* The stock blower belt was too long. The BBS's are mixed on this.
- \* Vacuum / Pressure leaked at the Intercooler. I Orange RTV'd that.

### **Results:**

Just as it's getting broken in, we get SNOW. Here are my observations, so far.

It's a tiny bit cold blooded, now, but no troubles starting, just a burble ☺ on idling. It heats up to 180 °F now much quicker than it did to 195+ °F when stock. When the weather heats up I'll have to charge into the mountains, watching the temperature gauge. I like the exhaust note – not too loud or droning but authoritative when you push it. Low speed driveability is quite nice.

Part throttle acceleration doesn't get into the blower as often since the delivered torque is big-time improved. Half throttle boost is quick to 6 or 7 psi, though, used to be about 3 psi. Haven't nailed it, yet (still < 500 miles), but Coy says look for as much as 12 to 15 psi at full tilt. I might temper that prediction, for elevation. The former maximum was 11 psi. I'm not sure the factory gauge is on the money.

Excellent half throttle tire pyrotechnics going into second gear. 0 to 120 mph way ahead of my neighbor's Z-28. Again, not full tilt. BLUES Z, indeed!

My bird has gone from a winter-touchy car to a full-blown ☺ snow skateboard.

### **Future Plans:**

- \* The BBK Throttle Body / Plenum Porting
- \* Ram Air System – Intake and IC
- \* Blizzaks for Winter Driving
- \* Baumann Engineering Shift Kit for the AOD
- \* Custom Computer Chip

I'm convinced, that with proper direction (no black boxes), a good chip can be developed for this car. I guess I'm going to try. That'll be another story.

### **Post Script:**

The sun is now out, roads are dry, air is cool, and the motor somewhat broken in. I've seen 11-12 psi on the gauge, and 5500 on the tach. It feels like that's about best power. This car is as fast as you dare to drive it. I chickened out at 160. There's more, but I'd have to help out the suspension and brakes, and I don't really need it.

My neighbor and I have had our rematch, and I'm sorry to say he got me good out of the hole this time. I passed him at about 105 mph, a bit past the ¼ mile. Nothing but taillights after that!

My opinion? A SCCoA T-bird is definitely a contender. Delivering the goods in all the important departments.

I'm very happy with the choice of the car, because I don't feel a Vette, Z-28, Trans Am, SHO, or Mustang would give me the roomy, classy ride of the T-bird. I wish the AOD was easier to shift. The supercharger setup delivers when asked, then relaxes, enhancing the economy, the cruise, and longevity of the car. And face it, MN-12's just look great.

# **SC AIR CONDITIONING BASICS**

By Mark Zimmerman

**I**t's 95 degrees in the shade. You just got off work and your ac won't cool your car. A greasy mechanic informs you after a 30 second look at your car...well you need a new air conditioning system and it'll cost you \$1,300. The fact that you are driving a SC sometimes means that the shop will try to charge you even more than is fair, just because they are not familiar with the car. As your SC ages this scenario could be an all too real event. How did this happen? Could it be prevented? What could you do to protect yourself against this situation? Do you have any alternatives?

As a MACS certified mobile air conditioning technician, and a fellow SC/XR-7 owner I am going to try to answer those questions. You can help prevent problems with your ac system just like you prevent problems with you engine, with regular maintenance. Problems with your system can be predicted by regular inspections. You can be informed about the cost of some things before you take you car in for work, and there are alternatives such as conversion to R-134 you may consider. Costs and Conversion to R-134 will be discussed in a future article.

The main components of your air conditioning system are as follows:

1. Compressor
2. Condenser
3. Accumulator/Dryer
4. Orifice tube
5. Evaporator
6. Other components

## **MAINTENANCE:**

### **Compressor**

Your compressor should be maintained monthly. Why do you suppose that a great majority of ac problems happen in the spring? Besides the obvious...that's when people start to use them...there is another reason. Your ac system is lubricated with refrigerant oil that circulates as a mist in the refrigerant as it is pumped from one part of your ac system to the other. This oil keeps the seals in the compressor and lines moist and soft. When the system is left without running for a long time...more than a couple of months...the seals tend to harden, causing leaks at the compressor shaft and other locations. Sometimes running the system will restore the seals' ability to seal. The best plan is to regularly run the ac in the cool mode once a month, or at the least every time you change oil in your car. Inspect for oil at the bottom of the clutch, and listen to hear if it's noisy.

### **Condenser**

Check for bugs and dirt every three months or so, also look to see if any road junk has bent fins or damaged the coils. Check where the hoses enter the condenser for binding or crimping and oil residue.

### **Accumulator/Dryer**

Check the line from the Evaporator to Accumulator, it should be cold to the touch.

### **Orifice Tube**

You can't check the orifice tube because it's inside a line but you should have a hot line from the condenser and a cooler line at the dash.

### Evaporator

Not much to check here. But if you can find the drain where water comes out when the air is on, check it for oily residue.

### Other Components

Check lines and fitting for abrasions, kinks, and oil residue. Check the outlet temperature. (40~47 deg at outside temp of 90 deg) If you have auto temp. control set it to max to check the outlet temp.

Make sure the engine cooling fan comes on when the ac is on.

### Summary

All these things can be checked without special equipment or tools and will give you an indication of your systems condition. The compressor should be quiet with regular cycling of the clutch on then off. If it cycles rapidly there is a problem with the system. All fittings should be free of oily residue. Oily residue should be noted because lack of lubrication in the system will kill a compressor. The condenser should be clean and free of bugs and bent fins. The system should cool and be free from unusual smells. Find a mechanic you are comfortable with and talk about your system before you need the work, springtime is prime ac repair time for all shops. Try to avoid the rush.

### SERVICE:

Actual repair of an ac system takes equipment, tools and certified technicians not found in most basement workshops. The Federal government has tightened up requirements on sales and service of R-12 systems. To legally service the internals of an R-12 system the technician must be certified by one of several agencies to safely recover R-12 with approved equipment. Here is a list of equipment used in the servicing process.

1. Recycling /Recovery machine
2. Manifold gauges
3. Charging Cylinder (You can also use cans)
4. Oil injection tool
5. Vacuum pump
6. Refrigerant scale

For service, please find a shop you are comfortable with and let them do the work. You will be happier in the long run with the result.

### GENERAL SERVICE ITEMS:

As a general rule in any air conditioning service, any gaskets or O-rings need to be replaced with new ones. Everything should be lubricated with fresh refrigerant oil. I will discuss the servicing the following parts briefly.

1. Hoses and lines
2. Orifice tubes
3. Accumulator/Dryer
4. Compressor & Clutch
5. Evaporator/Condenser

### Hoses and Lines

I have found that OE hoses and lines seem to provide better service and fit than many aftermarket lines. Replacement lines need to be fastened just like the originals, to protect from vibration damage. If

converting to R-134 (discussed in a future article) be sure the line is compatible with the new refrigerant. Pro shops can make custom lines, and if they warranty them I don't see any reason not to use them in a pinch.

#### Orifice tubes

The \$.50 Orifice tube for your SC is crimped in the middle of a \$ 65 line and cannot be replaced without replacing the whole line...one of Ford's better ideas. It should be replaced with major service. There is an alternative called an orifice tube repair kit. The part is only about \$10, but takes more labor to install and adds two more seals that can leak. The choice is yours, I prefer to replace the line because of warranty concerns.

#### Accumulator/Dryer

This one can't be serviced or repaired. Any time the system is opened it should be replaced. Ford OE Accumulators come with a new pressure switch, a \$16 item if purchased individually. I have used aftermarket Accumulators with no problems whatsoever, but you must use the old switch.

#### Compressor and Clutch

Problems with the clutch can be caused by low voltage to the coil, failure of the coil, wires, or pulley bearing. The coil can be replaced, wires can be fixed, and the pulley bearing can be replaced, but if the clutch looks blue from heat the whole clutch assembly needs to be replaced.

The compressor can fail from lack of lubrication, shaft seal leaks, defective valve plates, bad bearings or problems due to high head pressure or excessive heat.

#### Evaporator/Condenser

The evaporator core and condenser can also develop leaks, they are serviced by replacement only.

#### Summary

This is a basic description of some of the problems that may cause your SC to quit cooling on a hot day. As with most technical articles this does not cover everything about SC air conditioning, but hopefully it will give you a look into the basic parts of your ac system and what causes problems. Next time out of the box I will give some typical repair costs based on Chiltons labor rates and some parts costs. Also a description of R-134a conversion so you can decide if it's for you and your T-Bird or Cougar.

Marc Zimmerman  
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<b><u>Production Figures: *</u></b>		
<b><u>YEAR</u></b>	<b><u>Automatic</u></b>	<b><u>Manual</u></b>
1989	4768	8041
1989 XR7	2225	2238
1990	15742	6067
35'th Anniv.	3371	
1990 XR7	3288	841
1991	5134	1905
1992	2956	1256
1993	2853	1038
1994	1925	722
1995	5167	574

\* The SCCoA believes these figures to be correct, as they came from a reliable source, but we have seen slightly different production figures listed in other literature. (Of course, they are wrong and were right!)



### **A list of cars and what they say about their owners:**

Acura Integra: I have always wanted to own the Buick of Japanese sport sedans  
AMG Hummer: I have a daughter named Bitsy and a son named Cole  
Buick Park Avenue: I am older than 34 of the 50 states  
Cadillac Catera: I learned nothing from the Cimarron  
Cadillac Eldorado: I am a pimp  
Cadillac Deville: I am a very good Mary Kay Salesperson  
Chevrolet Camaro: I enjoy beating up people  
Chevrolet Caprice: I enjoy having people slow to 55 mph and change lanes when I pull up behind them  
Chevrolet Cavalier coupe: I start 11th grade in the fall  
Chevrolet Chevette: I like seeing people's reactions when I tell them I have a 'vette.  
Chevrolet Corvette: I am having a mid-life crisis  
Chevrolet El Camino: I am leading a militia to overthrow the government  
Chevrolet Tracker: I start 12th grade in the fall  
Chrysler Cordoba: I like seeing people's reactions when I tell them I have a Mercedes Benz product.  
Datsun 280Z: I have a kilo of cocaine in my wheel well  
Dodge Aries: I teach third grade special education and I voted for George Bush  
Dodge Diplomat: I used to enjoy having people slow to 55 mph and change lanes when I pull up behind them  
Dodge Durango: I will not be caught dead in a Ford Explorer  
Dodge Neon: I cannot stand the Macarena  
Ford Crown Victoria: I enjoy having people slow to 55 mph and change lanes when I pull up behind them  
Ford Explorer: I will not be caught dead in a minivan  
Ford Mustang 5.0: I slow down to 85 in school zones  
Ford Mustang 2.3: I avoid Yugos and VW microbuses at the stoplights  
Ford Ranchero: I am leading a Militia to overthrow the government  
Ford Tempo: I teach fourth grade special education and I voted for Bill Clinton  
Ford Thunderbird SC: I am continually at odds with my brain restraining the abundant power under my right foot  
Honda Civic: I just graduated and have no credit at all, but I could afford this whale tail spoiler and 4" exhaust tip  
Honda Accord: I lack originality and am basically a lemming  
Hyundai Accent: I delivered pizza for years in order to get this car  
Hyundai Tiburon: I miss the tasteful, conservative and understated styling of the 1974 AMC Matador  
Infiniti Q45: I am a physician with 17 malpractice suits pending  
Isuzu I-Mark: I have always wanted a Japanese car even more inferior than the Daihatsu  
Jaguar XJS V-12: I am so rich I will pay \$60,000.00 for a car that is in the shop 280 days of the year  
Kia Sephia: I learned nothing from the Asian economic crisis  
Lexus LS400: I am the lawyer suing the owner of the Infiniti Q45  
Lincoln Navigator: I don't bother comparing gas prices and think chrome trim is making a comeback  
Lincoln Town Car: I live for bingo and covered supper dishes  
Mazda Miata: I do not fear being decapitated by an eighteen-wheeler  
Mercedes 600SL: I will beat you up if you ask me for an autograph  
Mercedes 600SEL: I have a daughter named Bitsy and a son named Cole  
MGB: I am dating a mechanic  
Nissan Altima: I don't know what it means, either  
Nissan Maxima: I am still in the closet  
Nissan 300ZX: I have yet to complete my divorce proceedings  
Oldsmobile Cutlass: I just stole this car and I'm going to make a fortune off the parts  
Oldsmobile Cutlass Cruiser: I get carsick driving minivans  
Oldsmobile Delta 88 Diesel: I am on the EPA's Ten Most Wanted List  
Plymouth Neon: I enjoy the Macarena  
Pontiac Firebird: I still watch Rockford Files reruns  
Pontiac Trans Am: I have a switchblade in my sock  
Porsche 928: I am dating big-haired women who would otherwise be inaccessible to me  
Range Rover: I do not care about J.D. Powers or his surveys  
Rolls Royce Silver Shadow: I think Maggie Thatcher is a touch too Whig for me  
Rover 3500: I am married to a mechanic  
Saturn SL1: I hope someday to make it to a gathering in Spring Hill  
Saturn SL2: I made it to a gathering in Spring Hill  
Toyota Camry: I have always wanted to own the Oldsmobile of Japanese family sedans  
Volkswagen Beetle: I still watch Partridge Family reruns  
Volkswagen Cabriolet: I am out of the closet  
Volkswagen Jetta: I enjoy putting out engine fires  
Volkswagen Microbus: I am tripping right now  
Volkswagen New Beetle: I still watch Partridge Family reruns  
Volvo 740 Wagon: I am afraid of my wife  
Yugo GV: I miss the rugged durability of the Moskvitch

## 350 HORSEPOWER "KIT" - BEST BANG FOR THE BUCK?

I receive, almost on a daily basis, questions from SCCoA members as to what parts make up the Super Coupe 350hp "kit", and more specifically, where can their hard earned dollars best be spent in upgrading the performance of their SC's. There is scepticism on the part of some as to the true effectiveness of this 350hp package, as car magazines are full of advertisers who make exaggerated claims for their particular products, thus making many of us wary - buyer beware! This cynicism for the after-market auto parts business is well deserved, as so many different companies compete for a limited number of consumer dollars. In particular, the 5.0L Mustang market just exploded in the mid-80's, creating, almost overnight, a "sub-culture" amidst the general automotive aftermarket parts business, the likes of which no one (even those of us who lived thru the horsepower crazed 60's) had ever experienced! As more & more Super Coupes are being purchased second or third hand by increasingly younger buyers who may or may not have the necessary technical acumen to make sound decisions regarding upgrades to their "babies", I feel the need to address the feelings of some that the SCCoA is "just another aftermarket parts supplier out to get rich on the ignorance of unsuspecting consumers". Case in point - some of the very ones who doubt the effectiveness of headers & up-graded exhaust components, for instance, are the first ones to go out and spend \$300 on an aftermarket computer "chip", falling prey to the false & greatly exaggerated claims made by most, if not all, of these "Super Buffalo Chip" charlatans"! Not growing up in this golden age of computers, I have always had an inherent distrust (admittedly, mostly based on my own ignorance), of anything controlled by a "chip". The more I become acquainted with my own "puter", the more amazed I am as to what these electronic monsters are capable of doing! However, when it comes to automotive applications, in particular hp upgrades, the Laws of Physics still prevail, & there is no getting around the fact that increased airflow (efficiency) thru an engine is still the only way to substantially increase horsepower - just as it has been since the first days of the internal combustion engine! There is just no magical "black box" that can simply overnight, turn your SC from an already stellar performer into a rompin', stompin', Viper-eater! One can, however, turn their beloved SC's into an very competent contender, both on the highway & as a "week-end warrior" (whether your taste is for the quarter-mile, autocross, or road racing), without mortgaging the farm or "hocking the family jewels"!

While I am on this subject of aftermarket parts & the widespread (probably) inherent abuse of making false & mis-leading claims which seems to run rampant in this industry, I feel the need to address a question which has been put to me by several SCCoA members (some of who I consider my closest friends). I have been asked if the SCCoA is a car club or a business? My response to that is, for me, it is both. The SCCoA has a large & ever growing membership, for which we charge annual dues of \$40. These dues support the expense of running the club (publication of Chargin' Thunder, \$300 monthly phone bills, the SCCoA web-site, & many other miscellaneous costs). I also have made a living off of (primarily) SCCoA parts sales, which for the past 2-1/2 years has been my full-time & only source of income. It has been suggested to me that it borders on the unscrupulous for me to make a profit from members of the SCCoA, that a car club should exist only for the benefit of the members & that the SCCoA should technically be a "non-profit" organization. I has further been suggested that the SCCoA, as a club, should be split from the SCCoA parts business, and attempts have been made to do just that. Although some club responsibilities have been delegated to others, Bill Evanoff as editor, Ron Dipoala as Web-meister, these moves were made on my part due to lack of time (Chargin' Thunder) & lack of expertise (web-site), not due to any basic change in my approach to running the SCCoA itself! I have always said that the SCCoA is a "we" club, not a "me" club & I still believe this. If it were not for the support of you, the club members, obviously the SCCoA would not exist. However, I will never "split" the parts business from the club as a whole - it would just not make sense or be productive for me to do so, especially since I personally do not feel the need!

Those of you who have been members since 1996, the first year of the club, know that I was a painting contractor for 20 years, that the beginning of the SCCoA was the direct result of a very serendipitous event, & that previous to starting the SCCoA, I had not even been a member of a car club, much less been the president of one. The SCCoA membership grew so rapidly in 1996, & began consuming so much of my time I was soon forced to make a big decision; should I give up my well established & profitable paint contracting business, or take a big "leap of faith", & begin devoting my full-time to the SCCoA, as it was clear that I could not continue to do both. Obviously, I chose the latter path, for which (although there have been times of second guessing), I am glad. One of the first things I wanted to do for club members, not for myself (remember, I already had a good job), was to make parts available which I knew would increase not only the performance, but also the

"fun factor" of the member's SC's. I also felt the need to pass on as much technical information as possible (Chargin' Thunder averaged over 60 pages per issue in 96-97), as a knowledgeable consumer can make better decisions. In 1996, there were very few aftermarket parts for the SC, & even less info on these seemingly "forgotten" cars. Until Super Ford magazine did the two page feature article on my 91 SC in August 1996, there had never been an article in any publication (to my knowledge), on modifying a 3.8L SC! Remember, the SCCoA was not established until March 1996, fully a year AFTER Ford ceased production of the SC! There are now other T-Bird Clubs & T-Bird parts outlets - both of the primary ones which directly compete with the SCCoA sprung from the SCCoA itself! My question to those two club presidents especially, & to those who would question my integrity for making a profit off of SCCoA parts sales, is: Where were YOU for the seven years between the introduction of the Super Coupe in 1989 & the establishment of the SCCoA in 1996?? Why did not YOU take the initiative & start a club "Dedicated to the Preservation & Performance of the Super Coupe - 1989-1995?? I do not mean to unnecessarily "toot my own horn" here, but the fact remains that these "Johnny-Come-Latelies", are in reality, "Copy Cats", who for THEIR OWN PROFIT, ARE MAKING MONEY OFF OF THEIR OWN CLUB MEMBERS! They are not running a non-profit club for the sole benefit of their members! Indeed, they both have well paying positions with large companies - they don't even NEED the income! Yet they have the gall to question my motivation! This is a free country where the American enterprise system reigns supreme. I welcome any competitors who base their success on the merits of their own products or service. What I do not appreciate is the hypocrisy exhibited by some who feel they must try to smear my reputation, or question the integrity of the SCCoA just to enhance their own profits or ego's! No one has recently "re-invented the wheel", at least not to my knowledge, & some of these "copy cats" remind me of buzzards or wild hyenas, who don't kill their own food, but rather subsist on the efforts of others who have gone before! One thing is for certain, I could not have afforded to continue the SCCoA had it not been for the incentive to make a profit! I would never have given up my secure painting business had I not felt that I could make a living on SCCoA parts sales; & thus there would NOT HAVE BEEN a SCCoA for the past three years except for these parts sales. Remember also, it is not a prerequisite that anyone buy parts to either join or remain a member of the SCCoA. Neither is it mandatory for any one to join the SCCoA in order to buy parts, although we do have package specials which are for SCCoA members only. As I have previously stated,

this is a free country - anyone who feels that the SCCoA is rip-off, is free to start up their own Super Coupe Club - I WELCOME THE CHALLENGE! Fortunately, the vast majority of SCCoA members appreciate the info contained in Chargin' Thunder, & the availability of parts designed specifically for their SC's! If this was not the case, obviously I would no longer be in business, & the SCCoA would have failed on it's own "lack of merit"! The fact is, membership is still growing at the average rate of one per day, & parts sales have absolutely exploded (especially during the past year)! I rest my case!

Back to the subject of the 350hp bolt-on parts kit for the Super Coupe! I have never owned an automobile that responded so well to every sensical modification I made. Starting in 1991, when there were so few parts for my SC, I just started doing the things I had been doing to my cars for over 30 years - that is, improving air flow into & out of the engine. I never saw any car respond to these improvements like my 1991 3.8L SC. I remember thinking to myself: "This baby appears to have tremendous potential, but Ford has intentionally corked & bottled up this little V-6 in order to preserve the Mustang as it's "hot-rod image" car." This is actually the case. Remember, the Super Coupe, while it did win the Motor Trend "Car of the Year Award" in 1989, was never meant to be a "hot-rod". Ford marketed this car for the mid-Thirties, mid-to-upper level executive types, who had (supposedly) outgrown their "need for speed", or at least their teen-age, squirrely, tire-burning ways! The Super Coupe was designed to be, and is, a very comfortable highway touring car, with great ride & handling characteristics, more than adequate power, & the looks to go along with the rest of the package. I have seen & heard reports where pre-production SC's, with nothing but a full-size blower top & a 5% pulley, made over 280hp! These prototypes were blowing the doors off the much lighter Mustangs - much like the Buick Grand Nationals did to the Corvettes of the late '80's! Unlike GM however, Ford did not like the idea of a full-size family car putting the hurt on their performance-image car. Thus, Ford intentionally slowed down the 3.8L SC, primarily by ordering Eaton to install the restrictive s/c top & going with a larger s/c pulley. A high-flowing exhaust (like the Mustang) was obviously not a priority either (probably advantageous in Ford's scheme of things), in trying to keep the output down to only 210hp. What Ford did however, was to give us a great starting platform from which to launch our own personal "project cars"! THANK YOU FOMOCO! As you & I soon found out, however, no one



knew much about these fine cars, & there were even fewer parts designed specifically for them! Did I hear someone say "SCCoA"?

How about the claim that one can safely & reliably make 350hp without even removing the valve covers on a Super Coupe? Coy Miller has never dynoed a stock SC, but he has dynoed several of his Stage 2 monsters. This week he is dynoing his first Stage 1 engine, with two Stage 2's waiting to go on the dyno back to back! However, when I started modifying my '91 SC, I would go to the drag strip after each & every change was made, in order to verify any improvements - using the computerized timing as an open air test facility. I can tell you that these parts do work very effectively, while still absolutely maintaining streetability (even the Coy Miller Stage 2 monsters!). I have said from day one, that the biggest bang for the buck, especially on 89-93 AOD cars, is a set of gears, preferably 3:73's. One can expect at least a 80HP improvement with simply the addition of short-tube headers, down-tubes, an SCCoA cat-back exhaust system, & a modified s/c top! Once the restrictive exhaust & stock s/c top are removed & replaced with hi-flow units, then everything else will work like it should. A larger throttle-body, mass-air, & hi-flow air filter will add another 25HP, which brings us to 315HP, all this with a stock, early-style blower. Adding an intercooler fan, 180 degree thermostat, 36lb injectors, & larger in-tank fuel pump (got to feed this suddenly hungry monster!) will allow you to make an honest 325HP, & can even enhance the durability (especially head gasket problems) by allowing the engine to run freer & cooler by expelling all the hot exhaust gases. The addition of an S-model supercharger, especially to 89-93 SC's, will give you asphalt ripping TORK & honest 350HP, suddenly putting you in the "Big Leagues" in comparison to all of the Bow-tie products & Japanese rice-burners out there! That's what I'm talking about! Another option is the larger hi-flo SCCoA/Spearco intercooler, not to mention Coy Miller type head work & camshafts - then the fun really begins multiplying! Over 50 SCCoA club members have opted for the 350HP package during the past two years, two of whom have written letters which are published in this issue of Chargin' Thunder. Thanks Fred & Mike!

Well, this issue must go to the printer's today, & I am the only person holding it back from publication, so I must quit typing & thank you all for listening!

Bill Hull

## BEAK TO BEAK - Hi-Tech advice & other twitter from the SCCoA web-site BBS

By Bill Hull, Grand Pooh-Pah, SCCoA

**BROUGHT BACK BY POPULAR DEMAND....BEAK TO BEAK!!!!** After a lapse of a couple issues (due to lack of time AND imagination), this award-winning section of Chargin' Thunder returns. Beak to Beak will become a permanent addition to the fine newsletter which springs so effortlessly from the desk of our new Editor, Bill Evanoff, assistant Grand Pooh-Pah, SCCoA. Previous renditions of Beak to Beak had so completely captured national attention that this section alone almost vaulted Chargin' Thunder into the Top 10 best seller list! Anyway, as I routinely spend at least 1 hour each day responding to questions which are posted on our web-site BBS, (N/M another 1 hour answering E-mail - that's right, my E-mail is back on line - SCCoA @Juno.com), I have decided not let this valuable time be spent only on our web-site visitors (many who have chosen not to join the SCCoA), but also to share this info with the entire SCCoA membership (most of whom do NOT access the web-site). Those of you who are both SCCoA members & who also visit the web, may find some of this material redundant, but I trust you may still find it interesting, informative, & maybe useful for future reference.

The info included in this new, revised version of Beak to Beak comes from many different (ie: odd & unusual) sources: other club members, myself & my many imaginary cohorts, alter egos, & other alias', as well as from official SCCoA seances' & of course, from regular sessions with my personal Guru, Ambrose P. Ozone, Esq. In some cases, the identity of my sources must remain secret. Being the top-flight reporter that I am, I will face imprisonment or even torture before surrendering my first amendment rights!

As impressed as I am with our new editor's knowledge, integrity, & love for the SCCoA, I must beg to differ with him on one point. He mentions in this issue, that I am a self-proclaimed "poor" mechanic. Now, in past issues, I have admitted to not being a particularly "good" mechanic, but never have I proclaimed myself to be a "poor" mechanic (except, perhaps as compared to a "rich" mechanic). The main reason for this modest appraisal of myself, was to discourage certain club members from adopting me as their personal "phone mechanic" (in lieu of purchasing a shop manual) & hoping that I was both a fortune-teller & mind-reader, could diagnose their SC problems from two thousand miles away. Even though I am in a unique position, as the pivot man for the SCCoA, & do receive abundant feed-back from club members concerning problems generic to the SC, even certified S.A.E engineers & A.S.M. mechanics cannot & do not diagnose without hands-on knowledge of a particular automobile. In addition, as both "good" & "poor" are relative terms, I have hesitated to make any great claims as to my ability to fix cars. Although I have been messin' around with automobiles for 40 years (started out hot-rodding bicycles & lawn mowers), my definition of a "good" mechanic is one who has at least some formal education in the field, much experience in repairing many different types of cars over a long period of time, & last, but not least, has an appropriate work & diagnostic facility to accomplish such tasks. By this yard stick, I am

not a "good" mechanic.. However, having worked on/ extensively modified two Super Coupes over a period of 8 years, I do consider myself a pretty good SC mechanic & I have two SC's up on cinder blocks to prove it! Anyway, Bill & I may soon have the opportunity to go "head-to-head", & determine who is really telling the truth about my skills. I plan on attending a SEMA show with Bill this month in Cincinnati, OH, & also helping him install his SCCoA headers, S-model blower, & 36 lb/hr injectors. Having gone thru these exercises so many times on my own personal SC's, I have threatened to do the above while blind-folded (just to "show-up" Mr. Bill). In reality, I will probably just find a comfortable chair, & armed with nothing but a Haynes shop manual & past issues of Chargin' Thunder for reference, will sit there looking important (only appropriate for a Grand Pooh-Pah), & dictate directions to Bill, thus saving much on Band-Aids & hand cleaner! If, after this work session, Bill & I still cannot agree as to my mechanical ability & knowledge of SC's, then we will be forced to seek mediation from the only person in the world powerful enough to settle SCCoA disputes - that's right, we will consult with 'DA JUDGE, a.k.a. Dwight "Dick" Adams, Chairman, SCCoA Rules & Bylaws Committee (also a Grand Pooh-Pah). 'DA JUDGE, as always, will render the final & binding (non-appealable) verdict! The loser of this arbitration is subject to an official SCCoA censure-motion, the ultimate "slap-on-the-wrist"! Better confess this undeserved "character-assassination" Bill E., while there is still time!

Well, enough of my rambling - I am keeping you all from what I know you really want - to view & assimilate the great wisdom to be found in this new, improved, version of BEAK TO BEAK!

Bill Hull, Un-impeachable "President-for-Life", SCCoA



The two protagonists - Bill & Bill - soon to go head-to-head - may the best Grand Pooh-Pah win!

Script Started: 02/09/99 at 05:40:27

# Super Coupe Club of America BBS

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## Re: HELP: Intercooler tube sealant

Posted on: 02/09/99 at 05:39:35

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **HELP: Intercooler tube sealant**

Posted by: **John Van Divier** -- 02/08/99 at 15:59:07

- > I need to remove my intercooler for a repair and my
- > Ford dealer will not sell me the teflon sealant tape #ESE-M4G168-B
- > to reseal the i/c tubes. They will only sell me a kit for
- > \$38.00 which includes manifold gaskets, etc. Is there a
- > substitute that I can use to effectively seal these tubes?
- > Thanks for any help.

John - allow me to throw in my \$.02 worth. I have been working on/modifying SC's for 8 years now - bought my first one new in '91- my how time does fly by when you are having fun! I have many times in the past used hi-temp RTV sealer (even recommended it to many SCCoA members)& also the special OEM sealing tape from Ford (when I could get it - no one sells the tape separate from the kit). I highly advise sealing the four I/C connections & blower top with something (ie - as opposed to not sealing them at all), as I am firmly convinced that a leak will occur over time. Remember, in addition to constantly flexing with engine TORK, the I/C tubes/connections are continually subjected to heating/cooling cycles (up to 350+ degrees under full boost), & this alone, IMO, can eventually lead to leaks.

Speaking from experience (believe me!), I/C system leaks can be very difficult to locate/diagnose, are a real pain to correct (especially the lower tube), adversely affect performance greatly, N/M the time & frustration involved in going back thru the system to fix a leak. Regular teflon tape is definitely not a satisfactory substitute for the OEM tape which is at least 4X thicker than plumber's teflon tape. In addition, the OEM tape has a self-adhesive (peel-off)side which, once attached, tends to remain in place even during alignment adjustments.

RE: Hi-temp RTV sealer - both myself & Coy Miller have had trouble with these sealants actually melting under heat & "blowing out" under boost conditions, thus causing a leak.

The OEM sealing kit, which does include parts you may not need at the time (TB, EGR, & Intake manifold adapter gaskets), but may come in handy at a later date, also includes a tube of the special

aneorobic hi-temp sealer (for the s/c - s/c top mating surfaces), a tube of anti-seize (for the big collar nut), a roll of the special tape (enough to seal 5 I/C joints), & directions straight out of Ford's shop manual on how to correctly seal the system, & how to check for leaks should they occur. These kits were on national back-order from Ford for several months until Magnuson Products came up with the identical OEM components. They are now supplying these OEM kits to Eaton, who will then be supplying them to Ford (the supply pipe-line has thus been reversed). Magnuson highly recommends using this kit & even supplies one with each S-model.

The SCCoA stocks these kits, highly recommends using them, & sells them for \$30. These kits are now supplied with each SCCoA modified s/c top, the price of which remains at \$450, but is now an exchange price (\$30 core for a stock top). Hope this helps!

Bill Hull

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## Just recieved membership package

Posted on: 02/05/99 at 05:14:44

Posted by: Brad Fielder [1995 SC -- 3.8 SC - 5 Sp.]  
Fairbanks, AK

Know I know why a little while back everybody was voting to keep charging thunder coming. Not only keep it coming, but I would like to purchase all of the back issues from March '96 till December of '97. I can't wait to start making improvements on my SC, so far I have purchased some Antera 18-8 wheels, Dunlop Sp 8000 (245/45), and the eibach pro kit. But I have to wait till winter ends up here in the frozen north. Right now it's 45 below zero, so it will be a little while to I bring the SC out to play.

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# CHARGIN' THUNDER MUST LIVE

Posted on: 01/16/99 at 05:00:28

Posted by: Steve Schecter [1993 SC -- 3.8 SC - Auto]  
Aviano Italy, N/A

I Received my Dec issue of chargin thunder and this issue was great. I read about whether it should continue or not. MY VOTE IS KEEP THEM COMING!!!!!!!!!! The articles and tech tips are great along with the Bill and Bill sarcasm. Keep up the good work!

Steve

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## I Vote - Keep it coming!

Posted on: 01/16/99 at 16:56:02

Posted by: Jon Holder [1992 SC -- 3.8 SC - Auto]  
Irvine, CA

In response to: Re: CHARGIN' THUNDER MUST LIVE

Posted by: **Dick Adams** -- 01/16/99 at 09:27:08

The issue was excellent. If we have the same high quality as this issue demonstrated, then Chargin Thunder must go on!

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## I Even Busted My Wife Reading It!

Posted on: 01/17/99 at 01:19:50

Posted by: Kurt Sunday [1992 SC -- 3.8 SC - Auto]  
Las Cruces, NM

In response to: CHARGIN' THUNDER MUST LIVE

Posted by: **Steve Schecter** -- 01/16/99 at 05:00:28

Her Vote is PLEASE KEEP THEM COMING! She's even going to let me get the raised blower top!!! Thanks Bill(s)!

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## Re: Am I losing my mind?

Posted on: 02/05/99 at 05:17:23

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Am I losing my mind?

Posted by: Michael Maroschak -- 02/04/99 at 18:32:06

- > I know ( at least I think I do) that around 1990, the
- > Ford Motorsport catalog offered an intercooler option for
- > the SC's. Is this correct and does anyone have an old catalog
- > to confirm the part number?

Michael - the only after-market I/C that was ever offered specifically for the SC was the one made by Spearco. They quit producing this unit after losing their source for upper & lower tanks (inlets & outlets). Ford had the molds destroyed which meant that the OEM manufacturer of I/C's could no longer supply Spearco with the needed tanks to go with their (Spearco's) specially designed cores. The SCCoA started producing essentially the same unit 3 years ago, using the identical Spearco core. Having one made does require a donor stock I/C, in order to obtain the U&L tanks. This unit does offer significant improvements in both air flow & heat absorption/dissipation compared to the stock unit as it is 1-1/2" wider, 1/2" thicker, & weighs 3lbs more, & comes with a greatly improved aluminum inlet duct, which replaces the flimsy rubber duct. The larger SCCoA/Spearco unit is a direct bolt-in. SVO did offer an up-graded supercharger for a couple of years. It was based on the 89-93 blower, had teflon coated rotors & came with a 5% OD pulley (now known as the SVO pulley). I actually owned one of these back in 1995-96, but traded it in to Magnuson for one of their superior S-models. As we all know, the S-model, based on the third generation Eaton M-90, has custom porting on the inlet & outlet ports, a larger, more durable front nose bearing & high performance torsional spring isolator, as well as the standard upgrades which were part of the factory 94-95 s/c; that is, the larger rectangular inlet port, epoxy coated rotors (allowing tighter clearances & better efficiency), plus, a redesigned & more effective entry angle at the inlet port to the rotors. The S-model is a real "kicker"; Coy Miller picked up an honest 50hp on his dyno over an old style (89-93) blower that had only 70,000 miles on it. The old blower could only maintain 10 lbs of boost, switching to the S-model allowed a steady 15lbs of boost with only a 5% pulley! Another little known fact about the S-model, although Magnuson will not officially make this acknowledgement. The standard 94-95 Eaton M-90 has a design limit of 14,000rpm (remember Ford used a larger pulley (slower) on these units from the factory than in previous years). The S-model has an unofficial design limit of 16,000rpm, (because of the stronger nose bearing, etc.), & is capable of flowing almost 200cfm more air than early blowers (over 700cfm total), technically enough to support 500hp. Coy Miller engines require only 600cfm to produce 425hp @ 15lbs of boost! Turning a CMRE engine 6000rpm (which they quickly & easily do) with a 5% pulley actually exceeds the 16,000rpm design limit of even the S-model! Unfortunately, we may lose our access to the S-model blowers, as Eaton has said they do not feel obligated to provide the needed components to Magnuson much longer (already, the required matching inlet plenums are very scarce). Eaton is obligated to Ford to keep supplying the old style blower components until the year 2005, but not necessarily the 94-95 components. One year ago, I usually kept an S-model in stock, or, I could call Magnuson & they would have several on their shelf & would ship the same day. Now, delivery time is up to 6 weeks due to scarcity of parts from Eaton. Better order one now while they are still available! Bill Hull

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# Re: Am I losing my mind?

Posted on: 02/06/99 at 10:50:44

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **Re: Am I losing my mind?**

Posted by: **Jimmy** -- 02/05/99 at 13:19:33

- > Bill, Is there any differences between having a 94/95
- > blower upgraded to the S-model and a new S-model from Magnuson.
- > I'm a little confused on that. Thanks.

> Jimmy

Jimmy - so far as I know s-models are all the same - that is, it makes no difference whether they do yours, or you buy one of their's. Personally, if I owned a 94-95 SC, which has the late model blower/plenum already, I would put my money into a modified s/c top, rather than spend almost as much having an S-port done. Reasons - 1. An S-port adds maybe 15hp, but your basic late model blower already adds perhaps 35hp (over an old-style 89-93), so the difference is not as great as going from an early model to a full-boogie S-model. 2. I would wait until your blower needs rebuilding anyway, as you can expect your car to be out of commission for 2-3 weeks waiting for your S-port to be returned to you (shipping time, etc.). 3. The stock s/c top cannot flow enough air to keep up with even an old style blower, much less an S-model, so without the larger s/c top, you will not realize the full potential of the S anyway. Just my opinion. Hope this helps!

Bill Hull

# Re: Is racing a grand national a bad idea?

Posted on: 02/05/99 at 21:16:14

Posted by: **Sheriff Buford "Tee" Justice** [1997 Limited Edition -- Custom Engine]  
White Water, AR

In response to: **Re: Is racing a grand national a bad idea?**

Posted by: **Scott Saarinen** -- 02/04/99 at 20:55:33

- > From personal experience, I can tell you to not bother
- > with GN's unless your SC is extremely modified. They are
- > very fast even in stock form and will blow the doors off
- > a stock SC.

> scott

NOT IN MY COUNTY, BOYS! Ifn I catch any of you squirrely boy racers "cuttin' & dicein" in my county - YO' ASS IS MINE!! I'll lock youse guys up in my calaboose & throw away the key. Ifn any of you low-down, society-threatening, juvenile delinquents, think you can out run my blown Crown-Vic, jest cause you got some SCCoA Go-Goodies, THINK AGAIN! I will follow any of you skunks to the ends of the earth, IN HOT PURSUIT! SCUM-BUMS!!

Sheriff Buford "Tee" Justice, THE LAW IN THIS TOWN!



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# ATTN: SCCoA Chapter Parts Discounts

Posted on: 01/19/99 at 06:31:04

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

Attention to all SCCoA Chapter Presidents - effective immediately! Any "volume" purchases of SCCoA parts will qualify for substantial price discounts. In particular, two parts which are, IMO, vital for SC performance & LONGEGITY, are headers & the raised/enlarged s/c tops. If any SCCoA chapter wishes to combine an order for 5 or more s/c tops or short-tube headers, prices for these key parts will be reduced from \$450 to \$395 for the tops, & from \$695 to \$625 for the 304 stainless headers, \$525 for the mild steel headers. Group purchases for any other SCCoA parts will qualify for similiar price reductions!

In addition, the SCCoA is undergoing some long over-due changes. I am in the process of re-arranging & expanding my storage & work area (much needed!) & may be hiring some help (either a secretary and/or a packaging/shipping clerk). Please bear with me while we under-go these changes! Most of you know that Bill Evanoff has taken over as Editor of our quarterly newsletter, Chargin' Thunder. This Club publication is just going to get bigger & better in the near future, featuring (among other things) members SC's & updates from the numerous Chapters which are now established nationwide. In this way, all SCCoA members can be informed as to what activities are taking place throughout the US of A.

I have been told that I am a victim of my own success - that is, I have been totally overwhelmed (particularly in the past year) by the rapid rise in new memberships & parts sales (4 times the volume of the previous year, 1997). Although it is true that I alone started the SCCoA almost 3 years ago, the success of the SCCoA has been the direct result of the support of the Club members, not me! I have just been going along for the fast & (sontimes) bumpy ride! The SCCoA belongs to the members, not me, even though I am the self-appointed President! I stated over two years ago in Chargin' Thunder, "This is a WE Club, not a ME Club" This still stands true! Thanks everybody for listening!

Bill Hull

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> Bill,

> It's true that the club is a we not me club and has  
> to be to survive. It's also true that had you not taken  
> the iniatiative 4 years ago to get this started it would  
> not be where it is today. There is now other clubs and part  
> suppliers springing up and this is good, but you single-handed  
> got all of it started. You are the "SC Godfather".  
> Now if you could figure some way to get at least one of  
> your SC's off jackstands and drive one of them to our events!!!  
>

> Da Judge

JUDGE! - How many times do I have to tell you?! - my two coupes are not up on jackstands!! I am much, much too sophisticated & cultured to leave either of my SC's sitting out in my driveway on jackstands - this would show very BADD taste & embarrass both myself & my neighbors. What do you think I am, anyway - some kind of REDNECK?!- some kind of lowly scoundrel & rogue who would listen to David Allen Coe music?? Give me a BREAK! Besides, you KNOW both of my SC's are sitting on good, solid, West Virginia cinder blocks (no unsightly rust), not JACKSTANDS.! NOW GET OFF MY CASE OR I WILL HAVE YOU DISBARRED FROM THE AHTBA (American Honky Tonk Bar Asso.).

Bill Hull, Esq. (also D.U.I & D.O.A) President, SCCoA

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> JUDGE - upon further consideration - if you persist in your constant attacks upon my good name, & if you do not immediately "cease & desist" from disseminating false & misleading information about myself &/or my property, I will summarily have you "IMPEACHED". I have recently learned that it is very easy to impeach a JUDGE - even for something as innocent as "belching in public"! I have also recently learned that it is IMPOSSIBLE to impeach a sitting President, of which I am one, or even a STANDING President (which I also do sometimes). A sitting, standing, kneeling, or even lying down President cannot be impeached even for lying, cheating, stealing, abusing young women, obstructing justice, witness tampering, or even murdering his helpless grandmother in front of a crowd! BEWARE & consider your sorry-self FORE-WARNED!

Bill "Un-impeachable" Hull President-For-Life, SCCoA

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## Re: ATTN: SCCoA Chapter Parts Discounts

Posted on: 01/20/99 at 17:48:14

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Re: ATTN: SCCoA Chapter Parts Discounts

Posted by: Brando -- 01/20/99 at 15:45:38

> Bill,

> Is it possible to get a discount on a Header/Blower  
> top combo? Just the headers and not the whole exhaust. Also,  
> when are this years membership dues due?

> Thanks and keep up the good work, Brando

Brando - Thank you for an excellent idea! These two items are IMO so critical for the SC they would indeed make a good package deal. How about a \$100 package discount for the both of them? 99 membership dues are due anytime between now & Mar 99, when the SCCoA year begins. Thanks again for your suggestion!

Bill Hull

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## Re: Running a little Rich and Low Vacuum (about 10 at idle)

Posted on: 02/04/99 at 07:07:32

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **Running a little Rich and Low Vacuum (about 10 at idle)**

Posted by: **Fred Holzhauer** -- 02/01/99 at 13:06:55

> No, there are no air leaks, and the blower doesn't  
> slip. Car runs fast and smooth, except for spastic cold  
> idle, low vacuum across the board, early blower response  
> at part throttle, and VERY thirsty. Maybe this is normal  
> with my setup.

> I've got a C & L MAF w/ 36 # tube, and, I thought,  
> 36 # injectors, but maybe 38's ??? I didn't install them.  
> Is there a color check ? They're blue and came from SCCoA  
> with \$429 list price.

> Also 10% OD, stage 1 cam, raised top, full smaller  
> SCCoA exhaust, 190 lph fuel pump, K&N panel filter, IC fan.  
> Fred -if you only have 10" of vacuum at idle(engine warm, in N or Park), you definitely have a vacuum leak, probably somewhere in the I/C tube/system. Usually this also causes a loss of boost (boost leak) under full throttle. Because unmetered air is entering the engine, the O2's read a lean condition causing the 'puter to richen the mixture. This is why your mileage is down. This excessively rich fuel mixture can also cause your headers to run very hot (even glow red), as some of the fuel actually burns in the header (I found this out the hard way!).

You purchased 36lb/hr injectors (blue top) from the SCCoA (\$379) & a properly calibrated C&L MAF (36lb sampling tube for an 89-93 SC). There is much confusion about C&L sampling tubes - any SC, regardless of year, with stock factory injectors, uses the same sampling tube as a 19lb Mustang. Because you changed your injector size to 36's, I provided the correct tube for your application, which is the same tube used for a 24lb Mustang. Coy Miller engines using 42lb/hr Lucas injectors, require the same tube as used on 30lb Mustangs. So, when referring to sampling tubes, one must state for which application it is intended for, & as the SCCoA does not "fool around" with Stangs, (except at the strip!), we always talk in SC terms. Hope this helps!

Bill Hull

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## Re: Modifications

Posted on: 01/27/99 at 01:25:03

Posted by: Mike P [1990 SC -- 3.8 SC - 5 Sp.]  
Norcross, GA

In response to: Modifications

Posted by: Ed KAUL -- 01/27/99 at 01:02:37

- > I'm in the process of replacing my exhaust system with
- > a scooa compete exhaust system minus header and would like
- > to know in what order would be the best way to continue
- > my upgrades. thanks Ed .

I'd put the headers on, too. Tremendous difference, moves the torque up to a higher rpm. S model '94-'95 blower and inlet would be good, too.

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Mike - excellent advice on the correct order of upgrades on an SC. I would differ on the statement that headers raise the torque band up in the rpm range however, as this would suggest to me that one LOSES low rpm tork when installing the SCCoA headers. The SCCoA has sold over 150 sets of headers over the past 3 years & the unanimous feed-back I have received as well as my personal experience has shown that tork is actually increased in all rpm ranges (as well as tremendous increases in HP). I would prefer to describe the performance increases is this way - I believe the SC inlet & particularly the stock exhaust system is so restrictive, that installing the SCCoA headers & cat-back exhaust allows the SC to finally breath well at higher rpm levels, so it APPEARS that the tork band is raised, when it actually is increased at all rpm levels, but is just much more noticeable at rpm levels above 4000rpm, when the stock system "gives up". I will back up my opinion by stating that 1. the rpm band where any engine makes peak tork & HP is primarily dictated by the camshaft, not the exhaust system (although all systems should be compatible, ie - intake, exhaust, & cam & head work etc.). IMO, the factory cam is good to 5000rpm, whereas the stock exhaust is done by 4000rpm, probably sooner, depending on intake & other mods). 2. The 3.8L SC engine is rated at 315-330lb/ft of tork (similiar to a 350cid engine), but only 210-230HP, due to primarily intake (SC top) & exhaust restriction. As HP is primarily a function of total airflow thru an engine (tork X rpm), the HP of the stock SC is necessarily limited by these restrictions to airflow, particularly above 4000rpm. Of course, as we all know, Ford designed the SC engine this way so their ponycar could carry the high-performance banner for Ford on the street, even though the T-bird was Ford's banner carrier in NASCAR! 3. Even the Coy Miller engines, with high-lift cams, big valves (& much, much more) & all of the SCCoA bolts-ons only raise the tork peak up from the stock 2600-2800 to approx. 3400rpm, while the HP peak is raised from the stock advertised 4000-4500rpm level to approx. 5000-5500rpm (although they easily rpm to 6000rpm while still making great power). Even the much larger long-tube headers realized a 40ft/lb increase in tork over the snorty's, & this at the tork peak of only 3400rpm! Again, thanks for the input!

Bill Hull

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# Re: All MN-12's had same exhaust set up....

Posted on: 01/21/99 at 07:45:17

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **Re: All MN-12's had same exhaust set up....**

Posted by: **Steve Schecter** -- 01/20/99 at 17:49:40

- > Tommy, I hate to say it but you are wrong all mn-12
- > did not have the same exhaust. A friend of mine with a 94
- > SC that has three cats. I didn't believe it my self till
- > I looked. after the pipes come from the manifold the go
- > into the cats then from there they go into another cat and
- > come out as one pipe then into the resonator. Tonight I
- > was looking in my ford shop manual and found that Ford made
- > three differnt exhaust for the MN-12 one for the 3.8L MFI
- > engine 2 into 1, 3.8L MFI SC 2 into 1 into 2, and 5.0L HO
- > 2 into 1 into 2, and the one for the 5.0L has three cats
- > and looking at my friends car looks like the factory put
- > the 5.0L exhaust on his car.

> Steve

Steve - you are absolutely correct on the MN-12 exhaust systems coming in basically three different configurations. I have seen many SC exhaust systems thru the years as the SCCoA has sold over 150 aftermarket systems over the past 3 years, many of which have been installed on members cars while I watched. Further, there are variations on even the 2 basic SC exhaust systems. All of the 5-speed SC's I have seen have the third cat directly behind the trans cross-member (forming essentially a Y-pipe), followed immediately by a small resonator mounted on a 2-1/2" tailpipe which runs past the gas tank before splitting back into (usually) dual 2-1/4" pipes to the mufflers. This is also the V-8 system I believe (as you have noted). The reason for the third cat on the 5-speed cars (& V-8 too) is they tend to be "dirtier" so far as emissions are concerned - I believe the primarily reason is that between shifts (on the 5-speeds) when one's foot is removed from the gas pedal during shifts the car is in a de-cel mode temporarily % a certain amount of excess unburned HCO's escape from the cylinders. AOD cars have a smoother delivery of power thru the gears, as one's foot stays in the gas even during up-shifts. In addition, whereas most SC's have dual 2-inch downtubes off the manifolds, & into the resonator, then have a 2-1/2" tailpipe around/thru the gas tank before again splitting into dual 2-1/4" tailpipes, Spiro's 92 5-speed SC had only a single 2-1/4" pipe after the resonator, not a 2-1/2". His downtubes also came off the stock manifolds as 2-1/4" for only a couple inches before reducing to the standard 2" just before entering the cats. One thing I believe we can all agree on is ALL stock SC exhaust systems, starting with the cast iron manifolds (same as on grandma's N/A 145hp 3.8L), are very restrictive & undersized even for a stock SC, much less a modified SC. It is also my sincere belief that all of the other aftermarket cat-backs (Borla, Flow-Master, Dyna-Max, & MN-12 Performance which uses the Dyna-Max (or stock) rear section), while still more effective than the stock systems, remain undersized in pipe size (although they do provide hi-flo mufflers, etc). Both the 3" & especially the 3-1/2" 2-1-2 cat-backs sold by the SCCoA will out-flow ANYTHING else currently on the market for the SC-GUARANTEED! Remember - a 3" pipe has over 40% more flow capacity (7.06 vs 4.9 sq/in) than a 2-1/2". The single 3-1/2" Big-Dog system has 9.62 sq/in of surface area, the same as DUAL 2-1/2" pipes! Is this much flow area needed? Is this just over-kill? Consider this fact - Coy Miller engines, for example, need over 600cfm of intake air to make 425HP, but because the exhaust gases are super-heated, the thus greatly expanded, Coy Miller engines need 1200cfm of exhaust flow, much more than even dual 2-1/2" into a single 3-1/2" pipe can provide without back-pressure raising it's ugly head! Nuff said!

Bill Hull

## Re: Exhaust manifolds

Posted on: 01/05/99 at 10:35:40

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Re: Exhaust manifolds

Posted by: **spiro** -- 01/05/99 at 08:52:46

>

> The stock headers have a 2 1/4 collector.

Gentlemen - stock SC manifolds have a collector i.d. of only 1.75", much too small & are the identical cast iron manifolds Ford used on the regular 3.8L(145HP). One can use a die grinder to enlarge the opening to almost 2", then install 2-1/4" down-tubes w/or w/o hi-flo cats (still too small for even mildly modified SC's). SCCoA short-tube headers have a collector i.d. of 2.4", ideal for the required 2-1/2" D.T.'s w or w/o hi-flo cats - primary tube o.d. is 1-3/4". Short tube headers are sufficient for HP levels of up to 350, increase both low & high rpm HP & torque! SCCoA long-tube headers have 1-7/8" primaries, with a 3" 3-bolt flanged collector, do not require down-tubes, & can be used with or w/o hi-flo converters. L.T's not recommended unless head & cam upgrades are done, as a loss of some low-end torque could result. The SCCoA has sold over 150 sets of S.T. headers over the past 3 years, & over 20 sets of L.T's since March 98. A free flowing exhaust (starting with the headers) is THE key to making these blown Bird's fly, as well as making them LAST, as allowing all the hot exhaust gases to leave the combustion chambers lowers head temperatures, saving head gaskets! Also, most people have reported gas mileage increases as well - low back pressure means a free running engine!

Bill Hull

## Re: Intercooler Dimension's

Posted on: 01/28/99 at 04:43:01

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Intercooler Dimension's

Posted by: **Scott Saarinen** -- 01/27/99 at 20:26:57

> Does anyone know the dimensions of a stock SC intercooler  
> (Inlet/Outlet diameter). My car is in storage so I can't  
> check it. Also I am wondering about the internal dimensions  
> (ie. quantity and size of the internal slats). Thanks for  
> any Help.

> scott

Scott - the i.d. of the inlet & outlet flanges are approx. 2.3". The stock i/c has 10 charge-air rows, each 3/8" wide X 2-3/4" deep for a total flow area of approx. 10.3 sq/in.

Bill Hull

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# Re: Porting the inlet plenum: What about the other end?

Posted on: 01/28/99 at 04:23:38

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Porting the inlet plenum: What about the other end?

Posted by: Randy -- 01/27/99 at 21:58:00

- > I'm going to be getting an inlet plenum for porting.
- > It will be ported and polished to match my 75mm TB. Question:
- > If the TB end is resized to match the cross sectional area
- > of the new TB size(read "ported"), is the whole
- > plenum ported so that the same cross sectional area exists
- > all the way to the outlet(the end that connects to the SC)?
- > Or does the outlet already have a cross sectional area equal
- > to or greater than my new size of 75mm? And if it's not,
- > and the outlet is increased in size, does the supercharger
- > air inlet have to be enlarged to match? I ask these endless
- > technical questions in hopes of maximizing the intake efficiency.
- > Anyone who thinks they can help, have a go at it!

Randy - The I.D. of the stock inlet plenum at the TB end is 65mm so it is a good idea to port match a 70 or 75mm TB to the inlet. Just mount your TB to the inlet & scribe a line around the inside circumference of the TB, then use your die grinder. It is impossible to enlarge the throat of the inlet plenum throat out to 70mm much past the first 2" without grinding thru the wall of the inlet, so it is a matter of blending or tapering from the the new 70/75mm opening down to maybe 68mm or so. This is very effective & relatively easy. Extrude honing is also very effective on not only the inlet plenum, but also the intake manifold adapter & both I/C tubes. There are better "bangs for the buck" however (ie. modified s/c top, for about the same \$). The s/c end of the intake plenum could be ported out slightly, just do not make it larger than the intake port on the blower or you will have a mismatch, which would be a step backward. If you do decide to Extrude-Hone your plenum, have this done BEFORE you port the opening, as the reduced wall thickness which results will cause the wall to crack under the 250-300psi pressure of the Extrude-Hone process (I found this out the hard way!). Even a ported & Extrude-Honed plenum can be a slight restriction on a Coy Miller type engine. On mv 425HP CMRE engine, the 75mm TB only picked up 3HP over the 70mm, although it theoretically should outflow the 70 by 15% (depending upon engine demand), which lead us to believe the plenum itself was the limiting factor. Thankfully, help is on the way - as the supply of late model plenums is very limited & may soon be exhausted, the SCCoA has already prototyped & will soon have available a new, improved, high flow (90mm worth), intake plenum w/ a 80 or 90mm TB to match. These items would only be beneficial for 400+HP applications however. Remember also, because of the restriction/turbulence caused by the throttle blade/shaft itself (being in the direct path of the airflow thru it), a 70mm TB only flows approx. 65mm of air, a 75 flows only 70mm worth, etc., but it is still a big improvement over the stock 60mm piece (depending again upon engine demand. Hope this helps!

Bill Hull

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# Re: Roller rockers

Posted on: 01/27/99 at 00:25:02

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Roller rockers

Posted by: RJ -- 01/26/99 at 19:09:21

> Anyone purchase the SCCoA roller rocker kit? I'm about  
> ready to dimantle the entire induction system and since  
> the valve covers will be exposed - maybe it's time to crack  
> the case.

> What are your performance gains? How easy (or not)  
> is it to install 'em?

> Many thanks,

> rjp

RJP - IMO roller rockers are primarily a reliability/durability item, more than a HP adder, although most manufacturers of R/R's advertise 10-25 HP increases due to greatly reduced frictional losses (& heat buildup), reduced valve-train weight (less chance of valve float @ high rpm), & a more constant "ratio" due to reduced flex & closer tolerances (compared to most stock R/R's). Cars with high lift cams & higher rate valve springs benefit the most (a necessity w/ Coy Miller type engines), but even stock SC's would probably realize a 10HP gain. The SCCoA R/R's are a true bolt-on provided your heads are stock - if you change your installed valve spring height you may need to use different push-rods. One thing to avoid IMO - some R/R's are cast instead of extruded (forged) aluminum, & tend to be both heavier & weaker. The SCCoA R/R set is highest quality extruded aluminum & manufactured by Crane, although neither Crane or any other company (except SCCoA) has a packaged set for the 3.8L. Hope this helps!

Bill Hull

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>

> Sounds like an addition I want on my bird. Does the  
> SCCoA offer the identical R/R that CMRE offers (so when  
> I have the engine rebuilt, I don't have to buy R/R again)?  
> What is the difference between the sets you offer?

> rjp

RJP - The SCCoA has both bolt-down non-adjustable as well as stud-mounted fully-adjustable R/R's (require machine work on the head pedestal seat & drilling & tapping for 3/8" studs). Coy Miller uses the even better & more expensive Comp Cams chromemoly fully-adjustable R/R's on his 500ft/lb high-revving TORK-monsters!

Bill Hull

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# Re: What 94 SC Engine Parts are better than 92

Posted on: 01/26/99 at 06:13:09

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **What 94 SC Engine Parts are better than 92**

Posted by: **Kurt Sunday** -- 01/26/99 at 01:25:56

> Hello Cool Super Coupe Dudes! Thank you for all of  
> your help.

> I bought a 94 SC engine with 40K on it. What parts  
> from it should I move to my stock 92 SC to gain performance?  
>

> Ford made several mechanical upgrades to the 3.8L in 94, in addition to the restyled interior, exterior, & revised computer-controlled, electronically shifted AOD/AOD-E/4R70W. The rods were upgraded, as well as the water pump & head gaskets (both will retro-fit all SC's). The major upgrade was the 3rd generation Eaton M-90 blower - the only part you could easily swap to your early model SC. Ford increased the advertised HP & TORK of the 94-95 SC's by 15 each, this with a LARGER factory-installed pulley which, while turning the blower SLOWER than previous years, because of it's greatly increased capacity & efficiency, still resulted in the above increases! Remember to swap the newer intake plenum w/ the blower, as the early style of either will not interchange with the new style. Hope this helps!

Bill Hull

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> Due to the effect of two cups of strong coffee at this early hour 5:00 a.m., I forgot to mention two other important upgrades made in 94-95 3.8L SC's. Ford increased the injector size from 30 to 36 lb/hr (must switch MAF w/ injectors), & increased the in-tank fuel pump capacity from 110 to 125 liter/hr. There were several other significant changes in the 94-95 cars, particularly the addition of traction-assist & DELETION of traction-lock rear-ends w/4R70W cars. Also, all 94-95 SC's were equipped w/air bags (not your mother-in-law, which in my case, is a HOT-AIR BAG!)

Bill Hull

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# Re: Are the Superior Scoundrels and SVT Cobra R's the same?

Posted on: 01/25/99 at 05:53:04

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **Are the Superior Scoundrels and SVT Cobra R's the same?**

Posted by: **Micah Miller** -- 01/25/99 at 03:00:06

- > I see ads in MM&FF under "Kar Kraft" for
- > 17 X 7 Cobra R SVT rims. Are these the same as the Superior
- > Scoundrels? Just wondering, because the Superior Scoundrels
- > and the VPR 17 X 9 inch rims that Rich Thomson sells look
- > different. They have minor differences that would be easy
- > to see if they are held next to each other (like the sharpness
- > of curves and the size of the lug holes). I had planned
- > on putting a 17 X 9 inch rim in back (VPR 17 X 9) and the
- > SVT rims up front (17 X 7), but I want to make sure that
- > they will both look the same. Anyone have some answers?
- > Micah P.S. If you guys are wondering why I don't just get
- > the 17 X 9's all around....it's because I don't want a higher
- > coefficient of drag up front with a 9 inch wide rim. A 225
- > on a 7 inch wide rim up front could drop .1 in the 1/4 as
- > opposed to a 255 up front on a 9 inch wide rim.

Micah - The SVT Cobra R rims (17X7", as sold by SVO & Kar Kraft) are reproductions of the original wheel which would have come on the SVT T-Bird had it become a production vehicle. This wheel has a Ford part number cast into it in the location of the valve stem. The Scoundrel wheel, manufactured by Superior Industries, is an almost exact duplicate of the SVT wheel, except for the additional 1/2" in width (17X7-1/2") & has no part number cast into the face of the wheel. The 17X9" wheel (soon also to be available in 16X8") is manufactured by Dante, a large company who for years has both designed & manufactured wheels for other companies. This Dante wheel, although almost identical to the Scoundrel, does have subtle difference. I have put them side by side, & at first glance I could not notice any differences - then I thought I could notice a few areas where they differed - but I had to actually put a tape measure on them to confirm these small variations. I, like you & others, wanted to put the 17X9's on the back (for "the look", as well as for the added traction the 275-40's would offer), & use the 17X7-1/2" up front. It all boils down to which is more important to each individual, SHOW or GO. For me, I do not think these small variations will be noticeable by the AVERAGE person when actually on the car, unless they know in advance, that there are indeed these small differences.

The SCCoA markets & stocks all of the above wheels. In addition, the SCCoA will match anyone's advertised sale price on these wheels, even the SVT wheel, as we are also an authorized SVO dealer. Prices per set - 17X&7 SVT wheel - silver \$695, chrome \$995 - Scoundrel 17X7-1/2" painted \$595, chrome \$895 - Dante 17X9", silver \$795, chrome \$1095. In addition, for a limited time to SCCoA club members only, we will include either free shipping (UPS & insurance), or a McGard locking lug & stainless regular lug nut set, plus 4 stainless valve stems!

And remember, "Those who go around in circles, shall be known as BIG WHEELS"!

Bill Hull

# Re: Are the Superior Scoundrels and SVT Cobra R's the same?

Posted on: 01/26/99 at 06:49:21

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Re: Are the Superior Scoundrels and SVT Cobra R's the same?

Posted by: Richard -- 01/25/99 at 12:05:33

- > Bill: Would using wider tires in rear vs front (assuming
- > approx. same overall tire height) have any adverse affect
- > on handling? Richard in Las Vegas.

Richard - using 275/40-17's on 9" rims in the rear & 245/45-17's on 7-1/2" rims in the front (for example) would, I believe, result in more BITE in the rear, especially under hard cornering maneuvers (also more traction in the rear during banzai launches). Just how much this increased rear "bite", or understeer ("push", in NASCAR lingo) would affect the over-all handling of the SC, I cannot say, as I have not actually run this combo. The larger ADDCO rear sway bar should theoretically have much the same effect, but oddly enough, in the experience of those who have installed this piece (I have one on both of my SC's), the larger rear bar seems to make the cars more NEUTRAL under hard cornering & transient maneuvers! I still do not fully understand how this can be the case (something to do with the IRS?), as the rear-drive T-Bird (as are most Detroit built rwd cars), generally are designed to understeer (supposedly for safety reasons - they would rather you enter a ditch or road shoulder going frontwards rather than have you "swap ends" in the case of driver error or incompetence. In any event, the big rear bar works like a charm, without affecting ride to any noticeable degree - it is just MAH-VA-LUS!

Bill Hull (still ditch & road-shoulder free, knock-on-wood!)

## Re: Does anybody know of a good rebuild kit for the aod?

Posted on: 01/26/99 at 05:43:57

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Does anybody know of a good rebuild kit for the aod?

Posted by: DAVID -- 01/25/99 at 18:58:37

- > is there one available. i called b&m and they dont
- > have one but i was wondering if anybody knows of one.

Art Carr has done it longer & IMO better than anybody. The SCCoA has extensively used, marketed, & stocks only A/C AOD rebuild/upgrade components, as we truly believe they have no equal. This is not to say there are not other companies who market similar products, just that you will never go wrong with A/C. Many of your major AOD rebuilders use A/C components, but wish you to think they manufacture their own (ie. Level 10, for example). Depending on the level of performance you desire, A/C has a HD AOD rebuild kit (soft parts - new gaskets, o-rings, additional clutches & steels, & more) SCCoA price \$190. Don't forget a shift kit to update your valve body - the SCCoA stocks only the Trans-Go, as again, we feel that having done it longer & better than anyone else, it has no equal (including a real, functional full-throttle up-shift into over-drive).

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# Re: Lightning Supercharger Attn: Bill Hull

Posted on: 01/21/99 at 08:44:30

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Re: Lightning Supercharger Attn: Bill Hull

Posted by: Dick Adams -- 01/20/99 at 21:33:30

>

- > They are both Eatons. The SC is a M-90 and the Lightning
- > is a M-112. I don't think there is much chance of getting
- > this to fit on a SC, at least not without SERIOUS modifications.
- > Our fearless Prez and Coy Miller have worked with Manguson
- > on this issue because they have outgrown the M-90 on their
- > monster engines. Maybe Bill can shed more light on this
- > subject.

JUDGE - according to Magnuson products, although the M-112 has the potential to flow approx. 25% more air (112ci vs 90ci per engine revolution), because of the lengthened case & snout, not only will not fit SC's (without MAJOR mods), the longer rotors are comparatively "flimsy" (Magnuson's exact word), tend to flex more under centrifugal (rotating) force, & therefore cannot be safely spun past 12,000rpm (design limit). Although the M-90, has only 90ci capacity, it can safely be spun to 14,000rpm, the S-model to 16,000rpm (bigger front nose bearing, stronger nose tensioner spring, & coated rotors etc.) it is therefore (again, according to Magnuson) more reliable under max rpm/boost conditions.  $112\text{ci} \times 12,000\text{rpm} = 1,344,000$  total ci.  $90\text{ci} \times 16,000\text{rpm} = 1,440,000$  total ci. The M-112 is used on the Jaguar, some SVO applications (new Lightning, etc), but is turned relatively slowly & designed to only provide 6-8lbs of boost. On the other hand, the SC that FOMOCO took to Bonneville, which produced over 450HP, used an early prototype M-112, an extensively modified intake system (& a Jack Roush built engine). Of course, this car was a single-purpose built SC, long-term reliability & warranty were of no concern to Ford - just the "E-production supercharged" land speed record, which, as we all know they succeeded in capturing.

On the first Coy Miller dyno engine, we had trouble maintaining even 12psi of boost. We thought the S-model was unable to keep up with the greatly improved flow capability of the engine. Turned out to be primarily a belt slipping problem, not an inherent problem of the S-model itself. Further dyno runs have proved (at least to me) that the M-90 is not really a restriction even at the 425hp level, as the S-model M-90 can provide 700cfm of air flow (according to Magnuson), & 425HP @ 14psi of boost requires only 600cfm, so there is "theoretically" still an excess capacity. To further substantiate my point - once my CMRE engine was installed in my 90 SC, with a 1" raised top (w/3" discharge snout), 3" I/C tube system, triple-sized Air-to-Air I/C, plus large Air/liquid I/C, this engine can still peg the boost gauge w/ a 10% pully (with no lag)!

Bill Hull

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# Re: Lightning Supercharger Attn: Bill Hull

Posted on: 01/22/99 at 08:30:47

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **Re: Lightning Supercharger Attn: Bill Hull**

Posted by: **George Clarke** -- 01/21/99 at 19:11:18

- > Bill Hull: Please provide more info on the Ford Bonneville
- > SC. Also info on the 1" raised top, air to water intercooler
- > please. I have felt for a long time that air to liquid (water
- > or oil) would be far superior to air to air. Allen Engineering
- > in Camarillo, Ca agrees with me.(4.6L M90 kit).

George - Air/Liquid I/C's can be very effective (even more so than an air/air), but their use is generally limited to competition events only. Unless one uses an auxiliary heat exchanger (i.e. small radiator) & a large ice or dry ice reservoir, A/L I/C's quickly lose their effectiveness. Air to air I/C's are far superior for general street use on the SC, although several factory & aftermarket air/liquid systems are on the market (tend to be somewhat complicated, however). On my Coy Miller engined 90 SC, I use both a large air to air mounted behind my grill (no A/C), then a air/liquid I/C thru which I pump dry-ice chilled coolant. I never really had a chance to sort all of this out before winter hit & drag strips closed down. Hopefully, spring will bring great things! The best I/C for (especially modified) SC's is a larger than stock Spearco or SCCoA "double" I/C. Either of these is a great improvement over the small stock unit & a relatively simple bolt-on.

As for the Bonneville SC, I do not know many specifics other than what I have already stated. I do have a picture of the engine, & of course there is a picture of the car on this web site somewhere (I think) - pictures courtesy of Bill Evanoff. 1" raised tops are probably over-kill for most SC applications as the 3/4" tops (of which we have sold over 250) probably flow as much as the I/C tubes can handle. In addition, as they will not fit under all stock SC hoods, require an aftermarket raised hood. Hope this helps!

Bill Hull

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# Re: What do you think of Coolflow

Posted on: 01/23/99 at 04:55:44

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: What do you think of Coolflow

Posted by: **Paul Christenson** -- 01/22/99 at 13:21:43

- > Could using the airconditioning to cool the charge
- > overcome the power loss? Coolflow Intercoolers

Paul- The following is an excerpt from Spearco's fine booklet "All About Intercooling". "Occasionally, we have customers ask if they could somehow use their air conditioning compressor and/or air conditioning system to assemble a refrigerated type of charge cooler. This should not be considered as the basic problem is that the heat rejection required, even on a 2.0L engine, is far beyond the capacity of the normal or even high capacity air conditioning compressor or system. A 2.0L engine @ 6000rpm, 15psi boost, would require about 35,040 BTU/hr of cooling to reduce the charge temperature 150 degrees & a 5.0L engine at the same condition would require about 87,600 BTU/hr to cool the charge temperature. The BTU rejection of a typical A/C system is in the 30,000 - 35,000 BTU/hr range, so it is clear that this is not workable.

In addition, it requires a lot of horsepower to drive the compressor, so even if the compressor was large enough, the power required to drive the compressor makes it unattractive."

Also, IMO, because of the already overcrowded & complex SC engine compartment, it would be difficult to come up with a system which would work, even if one were willing to "give up" the normal function of the A/C - that is, to cool the occupants inside the car. One last point, SC's have a computer-controlled A/C cut-out switch when under full-throttle conditions & although this could no doubt be over-ridden (with a chip?) where the A/C system would continue to operate under full-throttle in order to cool the air charge, this feature, it seems to me, just adds another piece to an ever growing puzzle. However, I am one of those people who believe in NEVER saying "NEVER" - 100 years ago everyone told Wilbur & Orville Wright that man would never fly! Hope this is helpful!

Bill Hull

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# Re: If thats the case then BEWARE Coy Miller Motor Owners!!

Posted on: 12/29/98 at 08:31:56

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Re: If thats the case then BEWARE Coy Miller Motor Owners!!

Posted by: Dennis -- 12/27/98 at 14:12:50

- > Rich usin your formula for determining the requirements
- > of a \*safe\* injector the Coy Miller motor puts out 420hp
- > (we'll round down)  $420 \times .65 = 273$  lb/hr of fuel...So on a SC
- > motor  $(273/6) \times (1.15) = 52.315$  or rounded up to 55lbhr..So
- > correct me if im wrong but if we intend to go up above 400
- > hp we r gonna need to get MSD 55lbhr injectors (which sell
- > for about \$500)...

> Dennis

Coy Miller's Super-Flo Dyno constantly monitors A/F ratio, scfm (air-flow), fuel consumption (both lb/hr & BSFC), volumetric efficiency, & individual cylinder exhaust temps. & feeds back this info to his display console in real time. There are many factors which influence fuel requirements incl. effective compression ratio & boost levels (real cylinder pressure), timing, chamber design, inlet air & engine coolant temps, VE, altitude, humidity, cam timing, fuel rail pressure, & others. Most of the articles I have read concerning injector sizing for blown engines are "guides", as not one size fits all. That is, what works for a SC may be different than what works for a 3.8 Buick GN, or a Vortech 5.0L Mustang - all making comparable HP.

Coy Miller 3.8L SC engine #2, which was built for Joe Sarcona - dynoed 417HP @ 5200rpm & 481lb/ft TORQ @ 3200rpm with peak VE of 170% at 3400rpm. At peak HP, his engine required 223 lb/hr of fuel, 569 scfm of air, for an AF ratio of 12.32 & BSFC of .569 lb/hph. The exhaust gas temps on this engine averaged 1318 degrees at peak HP. This was the first CMRE SC engine using a stage 2 cam. Coy felt this first cam had too much duration, so on the next engine, mine, Coy shortened the duration slightlv. while retaining the .575 lift.

Coy Miller 3.8L SC engine #3, using a PRO-M MAF & long tube headers dynoed 425.5HP @ only 4800rpm @ 524.5lb/ft TORQ at 3400rpm with peak VE of 186.4% at 4100rpm. At peak HP, this engine used only 189 lb/hr of fuel & 544 scfm of air, for an AF ratio of 13.20 & BSFC of .483. The exhaust gas temps on this engine were much lower than #2, averaging only 1216 degrees, over 100 degrees cooler than #2. As Coy had suspected, because of the longer duration of cam #2, it was actually blowing "boost" & unburned fuel out the exhaust - proven by the lower VE figures, higher exhaust gas temps, & the greater A/F required to make LESS hp & tork than engine #3!

Spiros' engine had the same cam as engine #3, & made good HP & TORQ efficiently considering his engine was dynoed using a stock I/C & short-tube headers. 42lb/hr injectors on these CMRE engines seem to be optimum (252 lb/hr total @ 100% duty cycle) - 38lb/hr were definitely not big enough & the next size up 50+? would be too big.

As a side note as to the limit of injector size, etc - Neal Frisbee, who still holds the official SCCoA record for "Fastest SC in America" @ 12.5 @ 112mph tells me he uses 36lb/hr factory injectors. He uses an unspecified shot of nitrous to make a true 450hp, while running fuel rail pressures of 80 psi at full boost. This is not the approach I am using or would recommend, but, so far Nitrous Neal is the official SC "king of the quarter-mile"!

Bill Hull

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# Re: Look at that you learn something new everyday

Posted on: 12/30/98 at 08:31:54

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Look at that you learn something new everyday

Posted by: **Dennis** -- 12/29/98 at 09:33:57

>

- > I was brought up to believe that the longer duration
- > u have the more power u make at the sacrifice of driveability...
- > As for the bigger injectors... Doesnt the injector work
- > with the requirements of the engine? if u have 55lb injectors
- > and the motor needs 45lbs of fuel isnt it goin to inject
- > 45lbs of fuel not 55? Isnt the adjustable fuel pressure
- > regulator just a cheaper way of getting bigger injectors?
- >

> Dennis

Dennis - Duration (as well as lift) can determine the potential power output of an engine, but it also determines at what rpm LEVEL this power is produced. Generally, longer duration cams raise the power band for both torque & HP, sacrificing some of both at lower rpm levels. In N/A engines, longer duration can be beneficial as the engine has more time (during valve overlap) for the exhaust to "scavenge" the cylinder & (with properly matched parts), to actually help draw in the fresh intake charge (inertial tuning). Supercharged engines do not need any help from the exhaust cycle to "pull" in the fresh air charge - the inlet tract is under pressure (boost). Any book on supercharging or any cam maker will state that long duration cams will reduce both the efficiency & the power on a blown street engine by "blowing boost" out the exhaust during valve over-lap.

Injectors should be matched to engine air-flow requirements for the same reasons carb jets should be matched to carb size/air-flow needs. Injectors are either "on" or "off" - they do not open only 1/4 or 1/2. The amount of fuel they can flow is determined by size (pre-determined & constant), rail pressure (controlled by the FPR), & "on time" (pulse width), which is controlled by the engine processor (with inputs from several sensors, T.B., MAP, MAF, RPM, coolant & charge-air temp, etc.). These sensors, along with the O2 sensors, control the A/F ratio during closed loop (part-throttle) operation. Under open-loop (full-throttle) conditons, the knock-sensor & O2 sensors still send their signals to the processor, but these signals are "ignored", & the processor instead uses pre-programmed fuel & timing "look-up tables" to determine injector on-time (flow). Injectors which are not closely calibrated to engine air flow needs, &/or precisely calibrated to the engine processor, can result in rich/lean conditions.

An adjustable FPR IMO is a great tuning tool, but do have limits & do not take the place of properly sized injectors. Hope this helps.

Bill Hull



# **Re: Look at that you learn something new everyday (LONG)**

Posted on: 12/30/98 at 11:21:25

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: **Re: Look at that you learn something new everyday (LONG)**

Posted by: **spiro** -- 12/30/98 at 10:24:51

But Bill, isn't pulsewidth how much fuel you are dumping? I understand, correct me if I'm wrong, that pulsewidth is equal to fuel required divided by the size of the injector. The size of the injector is hardcoded into the EEC-IV, but the fuel required is not & is calculated by all those variables like air density, MAP, etc. I think that what the Pro-M & C&L do is trick the computer to read different non-real airflow requirements such that the pulsewidth will be the proper value for that kind of injector.

Well, if you have a chip made to put in the correct value of the injector size then if the injector is too big for your car (within the operating parameters of the injector) then the computer will adjust the pulsewidth to deliver the correct fuel to the engine. If the injector is a little big will not matter, but of course you can't put in 72 lb/hr injectors when you are stock because those 72's will be able to operate at such a small pulsewidth it will surpass their pulsewidth operating range. Please tell if this makes any sense?

Spiro

Spiro - Pulse width (also called pulse time) is defined simply as "the amount of time a solenoid injector has to inject fuel". You are correct about the injector size being hardcoded into the processor; the amount of fuel needed (or the amount of fuel the processor "thinks" the engine needs), is determined by the above sensors & pre-programmed fuel tables. This normally works fine for stock applications, but on modified engines, when increasing air-flow, injector size, etc. one must use an after-market MAF, which "fools" the processor into "thinking" it is still firing stock size injectors. This is the basis for using different sampling tubes on the C&L, & modified electronics on the PRO-M's - that is, to maintain the correct calibration of the processor to the MAF & to the factory programmed fuel tables. (An after-market chip could do the same thing, or even alter the fuel tables, etc., but you know what I think about after-market buffalo chips for SC's!). In other words, injectors have no "brain" of their own, therefore they cannot, nor do they need to, determine engine fuel flow needs; they are either on or off, are slaves to the engine processor & FPR, & therefore need to be closely calibrated to the engine processor & air-flow needs.

Remember, I am not an engineer, can hardly spell "puter", & don't even claim to be a very good mechanic! My main source of info on this subject is a book I highly recommend to everyone - "Ford Fuel Injection & Electronic Engine Control" by Charles O. Probst, SAE - Robert Bently, publishers. Price \$30 & advertised in several Ford mags as well as sold in major book stores. Worth it's weight in gold!

Bill Hull

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Script Started: 02/04/99 at 08:54:02

# Super Coupe Club of America BBS

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## Re: Interesting 3.8L head data

Posted on: 02/04/99 at 08:53:17

Posted by: **Bill Hull** [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

> I ran across the following on a mailing list:

> lift SCI SCE SPI SPE 0 0 0 0 0 0.1 52 38 61 48 0.2  
> 81 69 117 92 0.3 112 87 165 109 0.4 145 103 188 122 0.5  
> 167 111 202 127

> SCI - SC intake SCE - SC exhaust SPI - split port intake  
> SPE - split port exhaust

> "These were with stock untouched ports. There  
> was a pretty bad mismatch on the SC exhaust between the  
> seat insert and the port, so we smmothed it out and flowed  
> them again, exhaust flow for the SC head dropped a peak  
> of 105 if I remember after this. The exhaust port is just  
> too big for the valve size and has terrible seperation thru  
> the port. The diameter of the SPE is probably half that  
> of the SCE and flows a good amount more."

> Duane Nettles

Duane - the split-port head (as used on the new 99 Mustang 3.8L, 4.2L truck engine & the 3.8L Windstar) uses a dual-runner intake & matching dual-into-one intake ports in the head, retaining single intake & exhaust valves, both of which are slightly smaller than the valves on the standard (or SC) 3.8L head. Combined with more aggressive cam timing & other upgrades, this hi-po inlet system has increased the HP ratings from 145hp up to around 200hp, @ 5000-5500rpm (depending on application). These upgrades have vastly improved the performance of the 3.8L engines, while maintaining driveability, EPA,& CAFE requirements, as well as allowing Ford to almost match the output of GM's 3800 engine, which has been exceeding 200hp for several years.

The SCCoA & Coy Miller Race Engines investigated the possibility of adapting this dual-inlet head for Stage 2 applications 2 years ago, & decided that it was not feasible, as a new intake manifold, (among other things) would be needed. In addition, although the dual-port head out flows a stock

3.8L head (while increasing available low-end torque), these heads do not even come close to matching the air-flow of even a Stage 1 CMRE head, much less a Stage 2. Exhaust flow is critical for a stock 3.8L SC, even more so for a highly modified 3.8L CMRE engine & is dictated/limited first by the cam profile/valve/port size, then by the header & exhaust configuration. A stock 3.8L exhaust port is more than sufficient for the stock 1.45" exhaust valve, but it is NOT so big as to hurt performance on a stock engine. The stock exhaust flow is approx. 118cfm @ .5" lift, & averages 68 cfm from .1-.5" of valve lift. Coy Miller Stage 2 exhaust ports (1.62" valve) flow 175 cfm @ .5" lift, & average 110 cfm from .1-.5" lift, an increase of almost 50% at .5" & over 60% average flow from .1-.5" lift. (The average lift figure is the most important, as few engines spend much time at peak lift). The most impressive result of CMRE head work is the vast improvement in intake vs. exhaust flow, which on a blown engine would ideally be over 100%. Coy has succeeded in approaching this figure with an I vs. E flow of over 93%, that is, his exhausts flow over 93% of what his intakes do, & this with a greatly improved intake flow (over stock) of over 35%. As a matter of fact, CMRE Stage 2 heads have enough flow capacity to support over 500HP (with matching components, ie. intake & exhaust upgrades), Now, if we can only find this additional 75HP without turning 7000rpm & losing driveability! How this helps!

Bill Hull

The statement that "improving" the flow of the stock exhaust port actually results in 105cfm LESS flow, just does not make sense, as a stock exhaust port only flows a peak 118cfm to begin with (& this on a flow bench, probably much less on an actual SC because of the very restrictive exhaust), which would mean that if these ports actually lost 105cfm, they would only be flowing 13cfm after "improvement", in which case the engine would not even run!

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# SPEED LIMITER / UPSHIFT ARROW

Posted on: 02/04/99 at 14:19:22

Posted by: BOMBOY [1992 SC -- 3.8 SC - Auto]  
Boise, ID

Anyone - Does the 92 automatic have a speed limiter? Where is it? Can it be removed? All I have seen is the yellow upshift arrow on the dash at times, I just release the gas and the arrow clears and I can continue accelerating. On another note - my 1/4 mile speed is 93 stock. Why do people think they need all the extra stuff?

Posted on: 02/04/99 at 18:11:14

Posted by: Henry Johnson [1989 SC -- 3.8 SC - 5 Sp.]  
Mumford, MA

In response to: SPEED LIMITER / UPSHIFT ARROW

Posted by: BOMBOY -- 02/04/99 at 14:19:22

Speed Limiter....NO

Your MPH in the quarter is VERY high for a stock SC. Most are 88 to 89 MPH when bone stock. Is this something that you received from a race track? I doubt your statement very much. A 5 mph increase in speed takes approx. 40 to 50 extra HP. You must have a pulley or some other mod. done to the car that possibly a former owner installed.

You may have the factory HO motor that was a big secret back in '92. They had just started playing with makin' more power for '94 and they made a limited run of HO engines with a few of the '94/95 goodies on them. That is why your car is so fast!

Uuuuummmmmmm, maybe I'm mistaken on that last point.

Posted on: 02/05/99 at 06:10:33

Posted by: Bill Hull [1991 SC -- 3.8 SC - Auto]  
Charlottesville, VA

In response to: Re: SPEED LIMITER / UPSHIFT ARROW

Posted by: Henry Johnson -- 02/04/99 at 18:11:14

> First time I ever heard of a "secret" 92 HO Super Coupe! TELL ME MORE! Maybe I got a "secret" 91 HO SC, after all, I DID order it special! The only real power adder for the 94-95 SC's was the improved blower, most of the other engine changes were durability upgrades to support the additional 20 hp & to address previous deficiencies (head gaskets, rods, water pump, larger injectors & fuel pump, additional cooling fan, etc.), not to mention the menacing "twin-snorkel" front fascia, meant, no doubt, to intimidate any Bow-tie challengers. Unfortunately, this new front fascia also scared off many potential buyers, so that many 94-95 SC's languished in Ford dealer showrooms for months, unloved & unappreciated until Ford decided to quit producing the best all around automobile they ever offered to the general car buying public! UMMMMMMM! Maybe they should have made a few "secret" 94-95 HO SC's with the beautiful 96-97 front facias!

Bill Hull (as sceptical & sarcastic as ever!)

# Hey Bomboy!

Posted on: 02/05/99 at 10:16:45

Posted by: Percival Q. Fudpucker [1989 SC -- 3.8 SC - Auto]  
Somewhere in the ozone layer, N/A

In response to: SPEED LIMITER / UPSHIFT ARROW

Posted by: BOMBOY -- 02/04/99 at 14:19:22

Bomboy (by the way, what is a bomboy?? Something like a cross between a Tomboy, & Middle-eastern terrorist bomber?? I've heard about your Idaho white-supremacist's/survivalist's organizations. Are you a bomb maker for the Ayrian Nation group, or what?? If so, why do you let them call you "boy". Maybe you have just eaten too many freeze-dried LRRP (Long-Range Recon Patrol) rations & thus lost your masculinity - please explain. The SCCoA has no room for white supremacists - however, we are all for survival & preservation, both for ourselves & our beloved SC's! Anyway Bomboy, your 1/4 mile top speed does sound high for a stock SC, unless, of course you have a "secret" HO motor, in which case it is too LOW for one of these muscular babies. The limited-production HO SC's were so fast they came with a trunk-installed parachute, computer programmed to deploy at speeds over 200mph - talk about a speed limiter!! I read about it in the National Enquirer!! Why do people feel the need to go faster? It all has to do with our prehistoric origin. As dinosaurs evolved into larger, meaner, stronger & faster meat-eaters, cave-men of the day necessarily found it beneficial to also become faster, for the sake of self-preservation. This "need to go faster" naturally became part of early man's "gene pool" & has thus been passed down to all man-kind (except Chevy lover's)! Hope you find this informative & useful - no embarrassment intended! Percival Q. Fuddpucker, PhD Professor of Anthropology & Archaeology Hard Knocks U.

## Re: What is actually done when you get an alignment??

Posted on: 01/25/99 at 06:33:56

Posted by: John Maddox [1993 SC -- 3.8 SC - Auto]  
Spokane, WA

In response to: Re: What is actually done when you get an alignment??

Posted by: Magnum Motorsports -- 01/21/99 at 20:10:50

> The front camber is adjusted by the eccentric on the lower arm,  
> Caster is adjusted by the break strut (attached to lower arm and  
> frame)

> Tommy

> Magnum Motorsports

Actually my Chiropractor does it a little differently. After several stretching maneuvers & spine crackling adjustments, he aligns my vertebrae all in a row vertically, from the base of my skull to my sacroiliac, so that they form a straight line when viewed from either the front or back. When viewed from either side (X-rays, of course), he maintains a slight spinal curvature, in order to preserve the fine lines of my "middle-age" tummy. These alignments have done nothing for my E.T's, much less for my on/off ramp performance, but it does allow me to use less "pump-up" on my SC seat bolsters & lumbar support!

Big John

SPEED COSTS MONEY - "HOW FAST CAN YOU AFFORD TO GO"?

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ELECTRONICS

MAGNECOR Competition 8.5mm Metal Core Sprial Wound Plug Wire Set	99.00
COMPETITION LIMITED High Performance Headlight kits w/ 2 80w, 2 100w	
Halogen bulbs, wiring harness w/fuse link, instructions 89-93 T-Birds	139.00
94-95 T-Birds, same as above but w/ 2 80/100w 9007 halogen bulbs	129.00
Double your headlight power!	
50w Halogen back-up bulbs ea.	18.00

ENGINE

K&N Lifetime Panel Air Filter - drop-in replacement	42.00
K&N 9" cone filter -	38.00
SCCoA fresh-air induction system, incl K&N 9" cone filter, March Ram-Air box, 3" inlet tube w/pcv fitting, bolt-on 15HP	179.00
C&L/Vortech 73mm Max-Flow Mass Air Meter w/30, 36, 38 or 42lb sampling tube	189.00
Replacement sampling tubes	40.00
Pro-M 77mm MAF, custom calibrated module, incl. inlet tube - for 350HP+ engines	429.00
Pro-M 75mm Bullet MAF, custom calilbrated module, bolt-on chrome	209.00
black plastic	199.00
EATON-MAGNUSON PRODUCTS S-Model Hi-Flow Supercharger - complete w/custom inlet&outlet porting, matching inlet plenum, pulley of choice exchange	1550.00
SCCoA Modified SC Adapter Air Outlet - 3/4" raise, brand new castings, exchange	450.00
OTC Spanner Nut wrench for SC's - needed to switch SC tops	55.00
Blower Pulleys stock 89-93, or 94-95 SC	50.00
SVO 5% or SCCoA 10% OD	60.00
SCCoA 3-piece Accessory Underdrive Pulley set	179.00
SCCoA 10" Lo-Profile 900cfm Hi-Flo Intercooler Fan	99.00
SCCoA/Spearco Hi-Flo Intercooler - w/custom aluminum inlet duct - Exchange only	750.00
SCCoA "Double-Intercooler" w/ported inlet & outlet flanges - Exchange only (2) with optional ice tray	600.00
	750.00
BBK Throttle Bodies - modified w/SC throttle linkage	65mm 249.00
	70mm 259.00
	75mm 269.00
BBK custom SC Throttle Body - new production item	70mm only 249.00

Griffin Hi-Capacity all aluminum radiators, race quality, direct fit, 50% increase in capacity, incl. SCCoA pressure release cap, Manual or AOD trans	595.00
Robert Shaw Hi-Po Thermostats 180 or 195 degree w/Fel-pro gasket	10.00
SCCoA Pressure-release radiator caps, a must for all SC's	12.00
SCCoA Roller-rocker set, 1.73 ratio, race quality extruded aluminum, bolt-on, non-adj.	299.00
SCCoA Roller-rocker set, 1.73 ratio, Stud mounted (ARP) adjustable, w/CMRE custom guideplates, polylocks - race-quality extruded aluminum or chrome-moly	499.00
SCCoA Hi-Flo fuel pumps w/filter screen, direct fit	155lph 99.00
	190lph 119.00
	250lph 149.00
SCCoA adjustable fuel pressure regulator, great tuning tool for hi-hp engines, bolt-on	89.00
Vortech T-Rex In-line pump 60 gal/hr @70psi w/wiring & instructions - a must for NO2	299.00
Hi-Flo fuel injectors, set of 6	Bosch 30lb/hr 299.00
	Bosch 36lb/hr 359.00
	Lucas 38lb/hr 399.00
	Lucas 42lb/hr 449.00
SCCoA/ARP Head Studs, 190,000psi, 11mm w/12pt nuts, HD washers set	119.00
SCCoA/ARP Rod bolts, 190,000psi, 9mm set	79.00
SCCoA/ARP Rocker studs, 170,000psi - 3/8" - 7/16" for stud mounted rockers	79.00
SCCoA/ARP Main studs, 190,000psi, 12mm, w/12pt nuts, HD washers, set	119.00
SCCOA/CMRE main stud support girdle, CNC'd billet steel, incl ARP main studs	469.00
SCCOA crankcase windage tray, prevents oil captivation & foaming, aids oil drain back	49.00
EXTRUDE-HONE Power Flow incl UPS to & from E/H inlet plenum	140.00
	manifold adapter 140.00
	upper I/C tube 140.00
	lower I/C tube 190.00
	complete set 10% discount 549.00
SCCoA custom porting	inlet plenum 70mm or 75mm 75.00
	intake manifold, inlet port & runners 95.00
Fel-Pro gasket sets, upper engine head set, w/late design head gaskets, all years	150.00
	lower engine set, all years 75.00
	complete upper & lower engine sets 215.00

## EXHAUST

All SCCoA cat-back exhaust systems are street legal. SCCoA headers & downtubes are sold "off-road" only (Too expensive to have EPA & CARB certified although the converters ARE EPA & CARB certified). The short tubes headers will pass emissions, even in CA.

SCCoA short-tube headers - 1-3/4" primaries, 2.4" I.D. collectors	304 Stainless	695.00
incl FelPro header gaskets & new 8mm bolts	16ga mild steel	595.00
SCCoA long-tube headers - 1-3/4" primaries, 3" 3 into 1 collectors	16ga mild steel	995.00

SCCoA 2-1/2" down-tubes for short-tube headers incl O2 fitting	w/hi-flo converters	300.00
	w/o converters	125.00

2-1/4" down-tubes for factory manifolds prices same as 2-1/2"

SCCoA 2 into 1 into 2 cat-back exhaust systems, , factory fit, dual 2-1/2" into 3' into

dual 2-1/2, incl Magnaflo resonator, 2 Dynamax or Magneflo Super Turbo's, uses factory hangers, etc Guaranteed to out-flow any other system on the market, except the "Big Dog" below!	749.00
Dual 2-1/2 into 3-1/2" into dual 2-1/2" "Big Dog" system w/o resonator for over 350HP applications incl 2 Dynamax Super Turbo's 92-up gas tanks only	749.00
Magneflo resonator dual-inlet, single outlet	119.00
Jet -Hot Metallic-Ceramic Thermal Coating, inside & out	180.00
short tube headers	80.00
Down-tubes w/o cats	150.00
Down-tubes w/cats	300.00
Long-tube headers, inside & out	

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HD Aliminum driveshafts - all models - custom order only	AOD	499.00
	5-sp	449.00
Centerforce Dual-Friction Clutch Kit - a racing clutch-pressure plate for the street w/release bearing, 89-93 SC's only		449.00
Art Carr 10" HD Super Torque street converter, 2500rpm non-lock-up, AOD		529.00
High-tech valve body shift improver kit AOD or 4R70W		79.00
AOD or 4R70W HD rebuild kit		190.00
Billet steel 1-piece input shaft		280.00
Finned aluminum AOD pan w/magnetic drain plug, new metric bolts, filter		179.00
Trans-Go shift kit - fully adjustable, w/full-throttle 3-4 up-shifts, holds OD (AOD only) incl. Hi-Rev kit (6000rpm upshifts - a \$50 part if purchased separately) ,w/instructional video. Absolutely the best on the market - used by most major trans shops!		119.00
SVO AOD Wide-Ratio/Upgrade Kit - (factory installed on 94-95 SC 4R70W), incl. 2.84 1 <sup>st</sup> gear, HD planetary gear set w/higher torque capacity, sun shell assembly, reverse assembly w/HD 2" OD band, HD low inertia 6-plate direct-clutch assembly, reverse/forward clutch assembly, 6000rpm intermediate one-way clutch w/pressure plate, clutch steels & friction plates, & high rpm #2 thru #9 needle pinion bearing thrust washers. A high performance/durability upgrade for 89-93 factory AOD's.		645.00
Lakewood Hi-Po U-joints w/o grease fitting (not internally cross-drilled), super-strong, ea		42.00
Speedometer gears 21T for 3.73 AOD		12.00
23T for 3.55 5-sp		18.00
SCCoA custom urethane trans mounts NEW!		129.00

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Air Bag for rear coil springs - helps cure wheel hop in 5-sp cars ea.	55.00
pair	95.00
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Baer High Performance & Racing brake packages	call for prices
Eibach Pro-kit 1-1/2" lowering springs	279.00
Tokico Illumina Electronic Adjustable Shocks - factory replacement -30% firmer 2 frt	295.00
2 rear	245.00



Performance Friction brake pad sets front only	89-91	49.00
	92-95	59.00
Raybestos brake pads, rear, all years		49.00
KVR Carbon-Fiber Semi-Metallic, Rotor friendly, race quality, frt or rear, all years		69.00
Hi-Po cross-drilled rotors, factory replacement, front or rear, all years ea.		99.00
black, gold, or silver cadmium plated - no rust! Ea.		20.00
Cobra/SVT T-Bird wheels 17" X7.5"	ea.. silver painted	149.00
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Cobra/SVT T-Bird wheels 17"X 9" NEW!	ea. silver painted	199.00
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16"X 8" NEW! avail. Jan. 99 prices not yet released		
Incl with any 4 wheel purchase - SCCoA members only - free shipping (\$40-\$60 value), or a complete McGard locking lug, regular lug, & chrome valve stem package (\$50 value)!		
"Fat-shaft" the "Big-Dog" 5-sp right side half-shaft, ea. while they last, new, OEM		299.00
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Key chain w/enclosed 6 ft ruler (standard & metric), T-Bird logo	5.00
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### SCCOA PARTS PACKAGE DEALS

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SCCoA headers, downtubes, cat-back exhaust, & modified SC top combo - minimum 75 HP  
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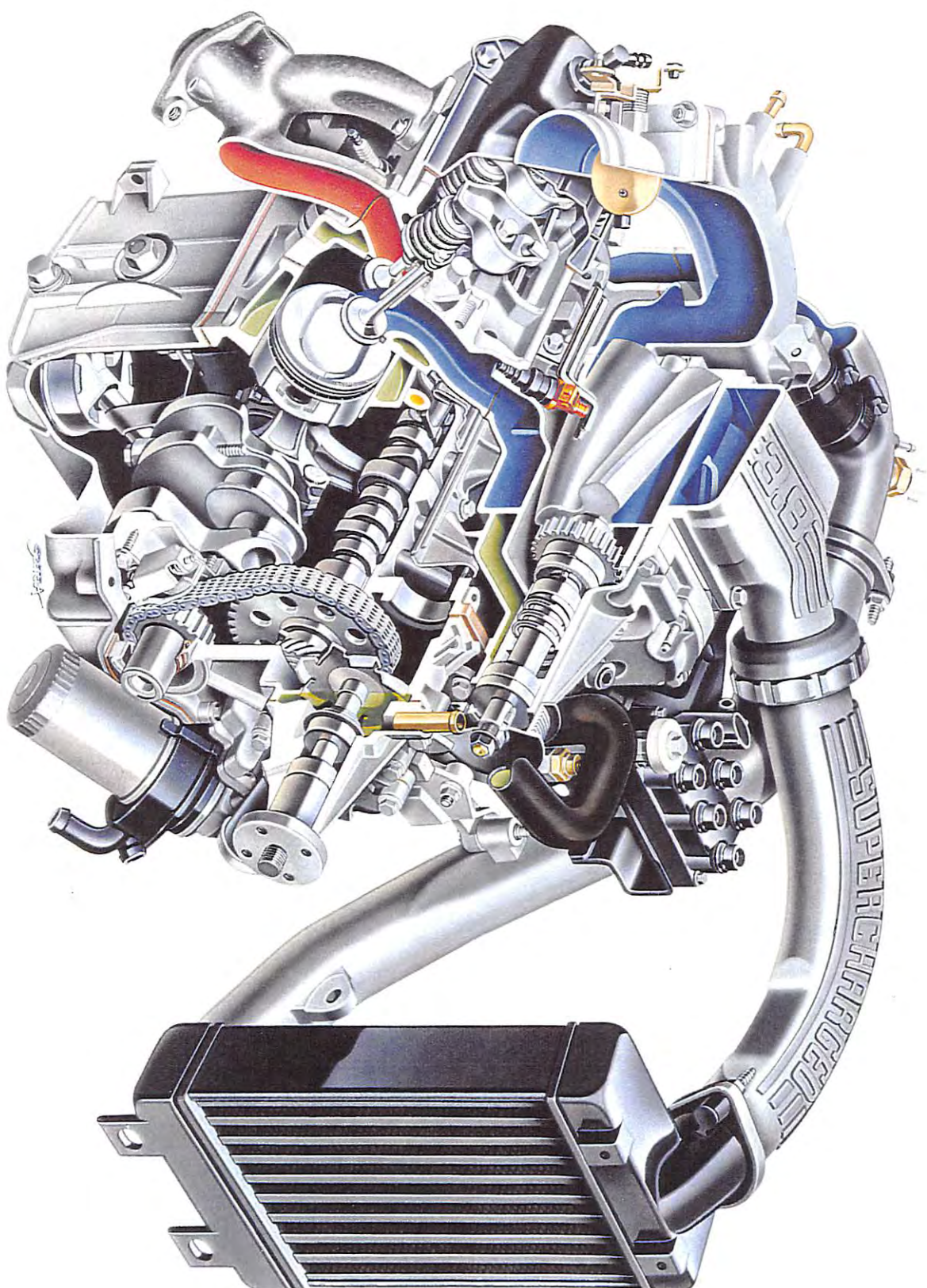
Magnuson S-Model blower & SCCoA modified SC top combo minimum 50 HP - \$100 off

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For the complete SCCoA 350HP bolt-on package, call for special pricing - For CMRE cams, head & engine work call Coy Miller @ 540-433-0545

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