

Second Strike

The Newsletter for the Superformance Owners Group

March 31, 2001

Volume 4, Number 1

SECOND STRIKE ON TRACK VIRGINIA INTERNATIONAL RACEWAY – FALL 2000



Sunday morning. Dawn breaks. Fourteen of the thirty eight Cobras ready to attack the track.

Dawn breaks over the rolling Virginia Piedmont. The drivers gather in the morning mist. Their leader gives them the mission for the day and the rules of engagement. They turn and walk to their waiting machines, slip into the cockpit and strap themselves in. They pull on their helmets and goggles. One pump, a second pump, then hit the starter. The starter whines. One cylinder lights off, then another. The engine bellows to life. The sweet perfume of high octane fuel permeates the air. A few revs to clear the plugs then taxi to the starting grid. Oil pressure - check. Water temperature - check. Oil temperature - check.

Then it is your time to launch. Revs up and holding. Breathe deeply. The flag drops. Tires claw for traction. The engine screams to the redline, then second, then third, then fourth. Speed builds rapidly - then it is time to brake and turn. Heavy g forces pull you forward against your harness, then sideways, then back in your seat again as you apply full throttle toward the next turn, the engine thundering in your ears. ***And now you know! This is your destiny! Your machine was born to run!***

Also in this issue:

Upcoming Events: VIR Spring 2001, VIR Fall 2001
Fourth Annual Owners Survey
Readers Rides: Dual quads, blown, fuel injection

The Event

On a warm sunny September weekend, 38 Superformance Cobra owners, 18 Mustang owners and 6 owners of other high performance machines gathered at VIR - Virginia International Raceway - for two days of fast cars and fine camaraderie. The weather could not have been better - clear bright skies with temperatures in the mid 80's.



Dennis Olthoff in SP245 "The Race Car" and Bob Olthoff in the Coupe round Oak Tree corner and nail it down the Back Straight

Olthoff Racing, the Southeastern Superformance dealer, and Second Strike, the Superformance Cobra Owners Group sponsored the event. We had the

South Course and a Porsche group had the North Course.

Registration and tech we completed early Saturday morning, then it was on to the track. First timers, and others who wanted to, went to the Autocross area in the North Paddock for "Introduction to Driving at the Limit of Adhesion" hosted by Dennis Olthoff and Bob Jordan. The rest started with a few preliminary runs to get the groups sorted out.

The run groups were:

- Experienced Cobras
- Intermediate Cobras
- Experienced Mustangs
- Intermediate Mustangs

We didn't have any slow cars, so we didn't need any slow classes.



A lot of horses champing at the bit on the Starting Grid

Within groups, cars were released onto the track at about 5 second intervals to give everyone some room on the track. Passing was allowed only on the straightaway. Drivers were able to run at their own pace without being pressed from behind or blocked in front.

While one group was on the track, the next group staged in the pit area. As soon as one group pulled off the track, the next group was released. Each session was 15 to 20 minutes, so everyone got a session every hour or so. The intervals between sessions were filled with tweaking of machines and some first rate bench racing.

We broke for a buffet lunch at the North Paddock and got serious in the afternoon.

Saturday evening was filled with more bench racing by the pool back at the Holiday Inn in Danville. Groups broke off to invade the local restaurants.

Some folks elected to retire early. Others resumed by the poolside, visited the local nightlife hotspots, or joined the local cruisers.

Sunday was another fine day. We started early and by lunch, everyone had completed a number of sessions on the track. We returned after lunch and ran as long as there were cars on the track. All in all, a great opportunity to learn to drive a truly fine high performance car a little closer to its very high limits. And just as much fun, a chance to renew old friendships and make new ones. Does it get better than this?



The One Lap cars reunited - The Coupe and Doug Reed's two time winner SP116.

The Track

Opened in 1957, Virginia International Raceway had more in common with the long fast European circuits than the shorter tighter American circuits of the era. The course was 3.27 miles long with 12 turns - known as the "dangerous dozen" - and two fast straight-aways - the longest at 4000 feet allowing the competitors the chance to really stretch their legs. The rolling hills of Piedmont Virginia contribute 150 feet of elevation changes to the challenging course.

The first race was won by Ed Hugus in an Alfa-Romeo on August 4, 1957. Ed went on to drive one of the first two Cobras at Le Mans in 1963. The first feature race was won by Carroll Shelby in a Maserati 450s. Carroll described the course as: "One lap here is like a hundred at Watkins Glen."

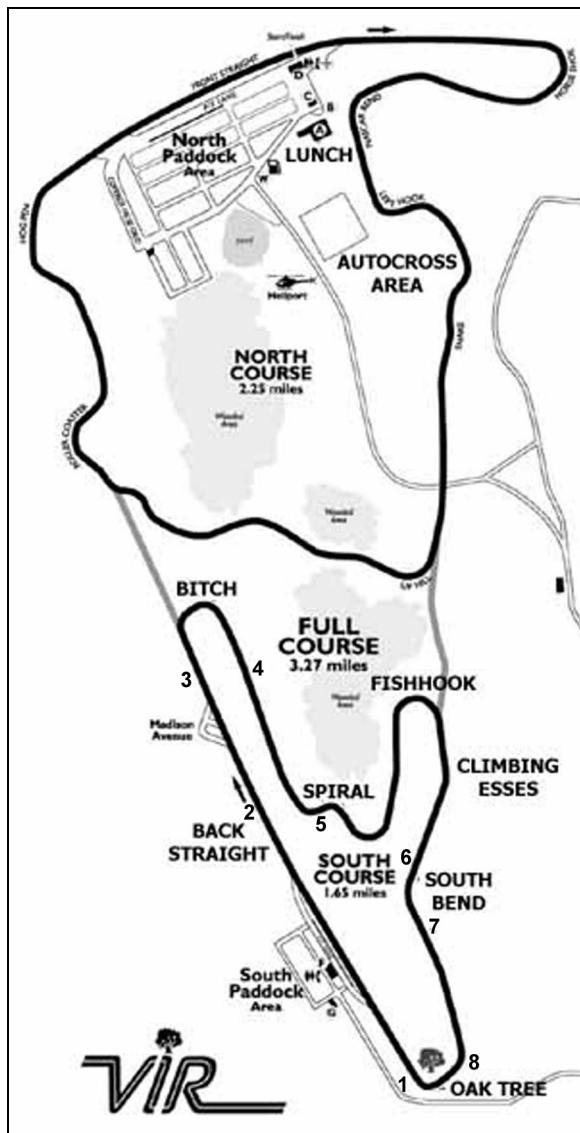
Distant from major population centers, the track did not draw the crowds it needed to be successful and reverted to a cow pasture in 1974.

A few years ago, a group of enthusiasts purchased the track and re-opened it as what can best be described as a motorsports country club. The facilities are first rate. The buildings are in a Virginia colonial style that adds a vintage touch.

The track has been divided into a North Course and a South Course so that two groups can use the facility at the same time.

The 1.65 mile South Course has 8 turns, a 2300 foot straightaway, and 80 feet in elevation change.

One Hot Lap



To give you an idea of what a lap is like, Pat took a couple of laps with me and snapped some shots at key points along the way. I did need to remind her that, "this is not art and we don't have much time for framing and focusing. Just shoot it!" That Mars Venus thing again.

So follow our "hot lap" coming out of Oak Tree corner in second gear and heading down the Back Straight. The black marks were left by those learning about decreasing radius turns.



The 2300 foot straight drops 40 feet (that is a 4 story building) over the first half, then gains it back in the second half.



Into third and then fourth. Speeds can reach 135 mph heading up the hill. At this point the Bitch is invisible.



Cresting the rise reveals the Bitch. Cones on the rise marked the braking points, but if you ignored them and still have your foot on the right pedal at this point, it's time to look for the escape road. Several people made this wise (and safe) choice. This is a fast second gear or slow third gear corner, but the line is more important than the gear. The Bitch is not constant radius and requires careful attention to line to achieve best speed. It is aptly named.



A short 900 feet straight follows the Bitch. Speeds of 100 mph in third are attained before braking for the Spiral. Watch the braking points. The track topography makes the Spiral a blind entry.



The Spiral is left-right-left combination that is fast enough to be taken in third gear. It is perhaps the most interesting part of the South Course. The track drops an undulating 80 feet from the Bitch through Spiral to Fish Hook. The elevation changes combined with the turns makes it seem as much like flying as racing. The lead car is headed for Fish Hook, a flat second gear right-hand U-turn that lured a number of drivers into the grass.



Out of Fish Hook, into third, and accelerate 800 feet

to the kink called South Bend. It seems fast enough to take flat out. It isn't. Tap the brakes, set the car, and continue to accelerate.



An up and down 650 feet straight after South Bend allows red line in third at 105 mph before braking for Oak Tree.



Oak Tree is a double apex decreasing radius turn requiring a heel-and-toe downshift into second while turning and braking. It takes some skill to extract the potential of the car in this complex turn and to set up correctly for the run down the straight. Abundant tire marks coming into, inside, and exiting the turn testify to the learning experience going on.

A Really Hot Lap

Well, we had this raffle, see. And the winners got to go for a hot lap with Dennis in the Race Car or Bob in the Coupe. Both cars are fast - 550+ ponies under the bonnet and both drivers know hot to extract the full potential. I won a lap in the Race Car with Dennis.

My car is fast, but this car is *FAST!* Where I was hitting maybe 135 at the end of the straight, Dennis was going maybe 155. I couldn't tell for sure because the car has the low competition windshields and I forgot my goggles so my naked eyes were out in the wind. At 155, the wind glued my eyelids shut. I couldn't see unless I bowed my head and looked in

my lap. So all I could do was check for visible wetness. I didn't wet my drawers and none of the other raffle winners did either, at least not that they would admit. We all admitted that it was a real possibility, however. What great fun.

I did learn a lot about lines and breaking and getting on it. Dennis is a terrific instructor. I go faster every time I ride with him.

And I learned that my car is fast enough for me. I'll stick with the street tires and slide around and have a great time at speeds that suit me. A bigger motor and stickier tires will just make me and the car work harder to have a good time. Which will wear me and the car out faster. And after all, this is not about being fastest. It is about having the best time.

A Really Fun Lap

I found myself on the track behind Bob Olthoff in the Coupe. I was running hard and he was kind enough not to run off and leave me. We circled the track a couple of times hood to tail. I must tell you that the view out of my windshield was worth the price of admission - slipping and sliding with one of the great Cobra drivers of all time.

The Sights at VIR



Dennis and Bob instructing a couple of rookies on the correct technique for water-skiing on asphalt.



Billy and Rosemary O'Briant with matching driving suits. Way cool dudes!



OK Pat, we're back. You can open your eyes now!



Tony and Angela Spence with Billy O'Briant exhorting the Mustangs to greater speed



Not as weather resistant as the factory top, but it goes up quicker!



The King of the Cobras and the King of the Mustangs duke it out down the straight



Jeff Robb launches the beautiful and quick Malachite Green SP443



A fan watches Mark Ray stage his 2000 Mustang with Vortex supercharger



A potent 2000 Mustang Cobra R followed by a 1967 Mustang with a wild 427



Lee Davis showed up with his Datsun Z based 300 Berlinetta GTO. This gave rise to some historically interesting images on the track.



Steve Sunshine brought his CSX 4000 down from New Jersey

The Folks

There were quite a few families and a number of spouses and other family members taking a turn behind the wheel.

The Superformance Cobras

Dick Abbott	SP 195
Lee Brock	SP 427
	Becky Brock
	Sons - Eric and Tyler (both went with Bob and Dennis around the track)
Kenny Brown	SP 285
	Sharon Brown
	Son David
Daren Cave	SP 580
	Mickey Cave Co-driver - Daren's brother
	Wife Annette (she also drives the car often)
	Daughter Rachel. Daren took Rachel around the track in his T-Bird during the open session - she was absolutely thrilled (Age approximately 4)
Mike Caveness	SP 311
	Beth Caveness Co-driver
	Sons Brian and Christian
Dean Coates	SP 606
	Mike Allen Co-Driver
	Dean's girlfriend Avis was also in attendance
Dan Cullather	SP 648
	Joyce McEwen Co-driver
Terry Freck	SP 263
	David Freck Co-driver Terry's brother
Kevin Frederick	SP 774
	David Frederick Co-driver
	Kevin's dad
	Kevin's wife Lynette also attended

Jerry Hall	SP 615 Francine Hall Jerry's wife attended.
Gene Harris	SP 670 Sandy Harris Gene's wife - passenger
Bob Jordan	SP 181
John Klein	SP 572 Jake Klein Co-driver John's son
Ralph Lovelace	SP 544 Carol Lovelace Co-driver
Mac McCombs	SP 732 Bill McCombs Co-driver - Mac's son Mac's wife Peggy also attended
David McRae	SP 151
Walt Malcolm	SP 313 Bubba Saunders Co-driver - Walt's brother-in-law
Lou Matthews	SP 256 Carol Matthews Co-driver
Billy O'Briant	SP 453 Rosemary O'Briant Co-driver Son Slade also attended
Carl Page	SP 735
Chris Phelps	SP 674 Scott Lalone Co-driver
Richard Pike	SP Cobra
Gerry Poynter	SP 534 Angie Poynter Co-driver
Marvin Preble	SP 607 Scott Surrent Co-driver Eric Preble (Marvin's grandson) attended.
Richard Price	SP 746
Doug Reed	SP 116 One Lap Car Ronnie Reed Co-driver. Doug's brother
Chuck Bacigalyn	Other Bordeaux One Lap car. Pete Tufaro Co-driver Pete Jr Co-driver
Mark Rhoades	SP 603 Bradley Davis Co-driver
Jeff Robb	SP 443
Tony Spence	SP 197 Angela Spence Passenger
Mike Stenhouse	SP 218 Pat Stenhouse Passenger
David Sugg	SP 239
Bill Sullivan	SP 487 James Thomas Co-driver
Rod Waltermann	SP 227 Lisa Waltermann Co-driver
Alan Wisne	SP 345 Kathy Wisne Co-driver
Jerry Witt	SP 410

Ed Zaptin	SP 714 Ed Zaptin Jr Co-driver
John & Amy Klacik	SP 421 Attended but didn't enter their car
Mark Smith	SP 803 Attended on Saturday. He is doing his own installation and his car isn't ready yet.

The Mustangs

Wade Brown	Mustang Cobra
Dr Ed Bull	86 SVO Mustang Vicky Chafin Co-driver
Bobby Byrd	93 Mustang Kevin Underwood Co-driver
Rich Fekete	'84 Mustang
Andy Killian	Mustang
Andy Kirby	'90 Mustang Dean Ruth Co-driver
Anthony Moretz	Ford Mustang Nathan Moretz Co-driver
Chad Moretz	Ford Cobra Mustang Rick Long Co-driver
Earl Morris	'85 Mustang Mike Morris Co-driver
Jerry Mullins	'86 Mustang
Don Pendleton	Mustang GT Patsy Lyda Co-driver
Steve Pendleton	Mustang Don Pendleton Co-driver
Mark Ray	Mustang 2000
Will Sadler	Mustang Kim Sadler Co-driver
Jerry Schneider	'69 Mustang Craig Ring Co-driver Mark Lamaska Co-driver
Bryan Shugg	Mustang
Robert Thornton	Mustang Cobra
Ed Turner	Mustang

The Others

Bill Bradford	Ford Thunderbird Fred Washam Co-driver
Lee Davis	300 Berlinetta GTO Wade Schaible Co-driver
Mitch Franklin	NAF Cobra
George Moretz	Porsche
Dan Ostrower	Porsche 944 Walter Holle Co-driver
Steve Sunshine	Shelby CSX 4000 Series Cobra

A Special Thanks

A number of folks put in a considerable effort behind the scenes to make this event work smoothly and enjoyably for everyone. Many thanks especially to Bob, Baby, and Dennis Olthoff for putting the event together.

Officials:

Clerk of the Course: Larry Miller

Starter: Jimmy Smith

Registration:

Kathy Miller

Sue Smith

Pat Stenhouse

Angela Spence

Tech Inspection:

Bruce Weber

Paul Whitlock

Corner Workers:

Beth and Mike Caveness

Hal and Chris Copple

Terry Freck

Lynette Frederick

Bob Jordan

Rick Pearce

Pete Petoskey

Linda and Jerry Plummer

Eric Preble, Jr.

Bruce Weber

Jimmy Witty

A special thanks to Bob Jordan for producing the Second Strike T-shirts.

A special thanks to Paul Whitlock (a.k.a. Ace Mechanic) for the assistance he rendered to the wounded machines.



Bob Olthoff, Jim Smith, and Larry Miller at the Driver's Meeting



Susan Smith giving Jim his instructions at the starting line



Nice digs for technical inspection

UPCOMING SECOND STRIKE TRACK EVENTS AT VIR

Second Strike has grown to the point where we can host our own track events. We are doing that this year on the East Coast with **two** events, a spring event and a fall event, scheduled at Virginia International Raceway. Hopefully, with the support of owners in other areas of the country, we can begin to host other events.

These events are a lot of fun. They also provide valuable instruction and practice in handling a very

high performance automobile. The events are also expensive and a lot of work. If everyone pitches in and helps out, it will continue to be fun for everyone. Support our efforts by:

- Registering early for events
- Helping out with the organization of events
- Working at the events - registration, tech, corner workers, etc.

With your support we can continue to offer these events.

VIR Spring 2001

Hosts

Second Strike, our owners group, and Olthoff Racing, the Superformance dealer for the Southeast, are hosting the Spring 2001 tract event at VIR.

Olthoff Racing

Bob Olthoff
9850 Mooresville Road
Mt. Ulla, NC 28125
704-647-9924
bolthoff@salisbury.net

Second Strike

Mike and Pat Stenhouse
400 Avinger Lane Villa 902
Davidson NC 28036-6708
Email: Mike@SecondStrike.com
Phone: 704-655-1902

For additional information, see our club web site - www.SecondStrike.com or contact Bob Olthoff.

Schedule

Friday, May 25	Check in and registration
Saturday, May 26	Track day at VIR
Sunday, May 27	Track day at VIR

VIR Fall 2001

The fall event is open to Superformance owners, even

Hosts

The Spring 2001 track event at VIR is being hosted by Second Strike, our owners group; Olthoff Racing, the Superformance dealer for the Southeast; and Nostalgia Motorcars, the regional Shelby-American dealer.

Olthoff Racing

Bob Olthoff

Second Strike

Mike Stenhouse

Nostalgia Motorcars, Ltd.

Jim Harrell
965 South Anderson Road
Rock Hill, SC 29730
803-324-2277
nosclas@rjsonline.net

Schedule

Friday, September 7	Check in and registration
Saturday, September 8	Track day at VIR
Sunday, September 9	Track day at VIR

For additional information, see our club web site - www.SecondStrike.com - or contact your host.

Daily Schedule

The schedule for the both events is the same:

Friday At Event Hotel

4:00 pm	Motel Registration
5:00 to 7:00 pm	Event Registration and Tech Inspection

Saturday At VIR

7:00 am	VIR gates open
7:30 to 8:30 am	Event Registration and Tech Inspection
8:30 am	Driver's Meeting
9:00 am	First Group Launches
Noon to 1:00 pm	Lunch
1:00 pm	Restart
5:00 pm	Close for the Day

Sunday At VIR

7:00 am	VIR gates open
8:30 am	Driver's Meeting
9:00 am	First Group Launches
Noon to 1:00 pm	Lunch
1:00 pm	Restart
5:00 pm	Event Wrap-up

Hotels and Camping

Parties calling either hotel should notify reservations clerk that they are with the "Cobra" group - not Olthoff Racing - not Superformance - not Second Strike. This has been a source of confusion at Holiday Inn.

Event Hotel

Holiday Inn Express	Phone: 1-804-793-4000
2121 Riverside Drive	FAX: 1-804-799-5516
Danville, Virginia 24540	

Overflow

The Holiday Inn may already be full. The Hampton Inn in Danville is our overflow hotel. It is directly across the street from the Holiday Inn. The local number for reservations is 804-793-1111.

Camping

There is a campsite called Hyco Lake that is only 10 minutes away from VIR. It's in North Carolina off of Rte. 57 heading towards Roxboro. The cost is \$15 for motor homes and \$10 for tents (per night). This includes water, electricity, and a garbage dump. They can be reached at 336-599-4343.

FOURTH ANNUAL OWNER AND CAR SURVEY

The Owner's Survey appears every year in the first issue of Second Strike. This is the fourth annual owner's survey. It is based on the 673 registered cars as of March 19, 2001. The totals will not always be 673 since data is incomplete for some of the cars.

Cars Registered

I cannot tell exactly how many cars Superformance produced or sold in a particular year. I can tell the highest car number registered during the year and that is a pretty good measure of the total number of cars produced. The oldest car in the registry is 007 in South Africa, which was purchased in 1994. Several cars, up to 044, were sold in the US in 1994.

Year End	Max Car Number	Registered Cars	Percent Registered
1997	299	22	7%
1998	443	58	13%
1999	725	343	47%
2000	1002	622	62%

The registry was started in 1997. The number of registered owners has grown dramatically since then, from 22 at the end of 1997 to 622 at the end of 2000.

The percent of cars registered has grown dramatically as well. The percentage shown is of cars produced. The percentage of cars sold is higher since there are approximately 100 or so unsold cars in the pipeline (on the water or in the showroom). This represents a significant effort by the owners, dealers, and factory to get all cars registered. The goal is 100%. We still have a ways to go.

Car Number	Registered	Percent Registered
001-031	3	10%
032-099	56	82%
100-199	77	77%
200-299	77	77%
300-399	81	81%
400-499	74	74%
500-599	81	81%
600-699	68	68%
700-799	61	61%
800-899	44	44%
900-999	29	29%
1000-1099	5	5%
1400-1499	1	1%
Total	657	

The 001-031 range is shown separately since the

first car in the USA was 032. The oldest car in the registry is 007 registered to John Shires of South Africa. Some of the 001-031 cars were engineering prototypes. I am not sure that all of them survived.

We have now registered 72% of all cars up through 799. Registrations are up throughout the range. Registrations for the 032-099 cars jumped from 57% to 82% in the past year, for example.

Registrations in the 800-1099 range are a bit weaker because there are a number of the cars in the production and delivery pipeline.

In addition to the 657 cars listed, there are 15 cars for which the owners have not supplied the car number. The Coupe is also included in the total count. Car number 1427 has been ordered, for the number I presume, and is in the registry. Typically, however, cars are now registered at the time of delivery, not the time of sale.

There are 13 owners who have owned 2 cars, although not necessarily at the same time. There are 7 owners who currently have 2 cars registered.

In terms of resale, there are 68 cars that have been registered to more than one owner including 4 cars that have been registered to 3 owners. I don't track sale or resale prices, but what I hear talking to owners and dealers is that our cars typically bring 90% to 110% of their price new, depending on condition and owner upgrades.

State and Country

State/Country	Cars	Percent	Rank
AK	2	0.3 %	
AL	4	0.6 %	
AZ	4	0.6 %	
CA	131	19.7 %	1
CO	9	1.4 %	
CT	3	0.5 %	
FL	29	4.4 %	6 (tie)
GA	16	2.4 %	
HI	1	0.2 %	
IA	3	0.5 %	
ID	5	0.8 %	
IL	16	2.4 %	
IN	16	2.4 %	
KS	3	0.5 %	
KY	10	1.5 %	
LA	15	2.3 %	
MA	7	1.1 %	

State/Country	Cars	Percent	Rank
MD	7	1.1 %	
ME	1	0.2 %	
MI	49	7.4 %	4
MN	6	0.9 %	
MO	5	0.8 %	
MS	1	0.2 %	
NC	56	8.4 %	3
NH	2	0.3 %	
NJ	14	2.1 %	
NV	5	0.8 %	
NY	14	2.1 %	
OH	74	11.1 %	2
OR	6	0.9 %	
PA	21	3.2 %	9
SC	5	0.8 %	
TN	8	1.2 %	
TX	26	3.9 %	8
UT	1	0.2 %	
VA	30	4.5 %	5
WA	4	0.6 %	
WI	18	2.7 %	10
WV	5	0.8 %	
Total US	632	93.9 %	

Belgium	1	0.2 %	
Columbia	1	0.2 %	
France	1	0.2 %	
Germany	3	0.5 %	
Italy	1	0.2 %	
South Africa	29	4.4 %	6 (tie)
Switzerland	1	0.2 %	
The Netherlands	4	0.6 %	
Total Outside US	41	6.1 %	
Total	673		

Our owner's group is now clearly international with 632 cars registered in 39 states in the USA and 41 cars in 8 other countries.

California leads with 131 cars followed by Ohio with 74, North Carolina with 56, Michigan with 49, Virginia with 30, and Florida and South Africa tied with 29. Allan Garrow from Boksborg, South Africa has done an excellent job of getting the South African owners on board.

Colors

Color	Cars	Percent
Royal Blue	174	26.4 %
Guardsman Blue	98	14.9 %
Black	81	12.3 %
Red	75	11.4 %
Silver	67	10.2 %
Yellow	32	4.9 %
Titanium	25	3.8 %
Malachite Green	22	3.3 %
Portofino Blue	17	2.6 %
Laser Red	6	0.9 %
Wimbledon White	6	0.9 %

Color	Cars	Percent
White	4	0.6 %
Bordeaux	3	0.5 %
Indigo Blue	3	0.5 %
Posilipo Blue	3	0.5 %
Black Metallic	2	0.3 %
Black Pearl Rose	2	0.3 %
British Racing Green	2	0.3 %
Ferrari Blue	2	0.3 %
Green	2	0.3 %
Jewel Green	2	0.3 %
Medium Royal Blue	2	0.3 %
Monza Red	2	0.3 %
Pearl White	2	0.3 %
Performance Yellow	2	0.3 %
Acura Red	1	0.2 %
Avus Blue	1	0.2 %
Blue Pearl	1	0.2 %
Chrome Yellow	1	0.2 %
Cloisonne Blue	1	0.2 %
Dark Portofino Blue	1	0.2 %
Electric Blue	1	0.2 %
Ford Blue	1	0.2 %
Galaxy Blue	1	0.2 %
Garnet Red	1	0.2 %
Metallic Blue	1	0.2 %
Olive Pearl	1	0.2 %
Pewter Metallic	1	0.2 %
PPG Blue/Green	1	0.2 %
PPG Titanium	1	0.2 %
Quasar Blue	1	0.2 %
Solar Yellow	1	0.2 %
Stratos Blue	1	0.2 %
Titanium Metallic	1	0.2 %
Toreador Pearl	1	0.2 %
Viper Blue	1	0.2 %
Wild Strawberry	1	0.2 %
Wildberry	1	0.2 %
Total	659	

Colors are ranked by count then color name. Blue remains the overwhelming favorite color with Royal Blue and Guardsman Blue accounting for 41.3% of registered cars. Altogether, there are 48 colors.

Stripes	Cars	Percent
White	364	55.40%
None	113	17.20%
Black	84	12.80%
Silver	34	5.20%
Gold	14	2.10%
White/Black Outline	8	1.20%
Viper Blue	5	0.80%
White Willment	5	0.80%
Titanium	4	0.60%
Wimbledon White	4	0.60%
Blue	3	0.50%
Royal Blue	3	0.50%
Red Willment	2	0.30%

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Stripes	Cars	Percent
Woodland Green	2	0.30%
Black Can Am	1	0.20%
Black Diamond	1	0.20%
Cap Blue	1	0.20%
Dark Blue	1	0.20%
Dark Portofino Blue	1	0.20%
Ivory	1	0.20%
Laser Red	1	0.20%
Purple	1	0.20%
Satin Black	1	0.20%
Silver/Red	1	0.20%
White (SP. PT.)	1	0.20%
White/Grey Outline	1	0.20%
Total	657	

Stripe are ranked by count then stripe color name.
White is the most popular stripe, followed by no stripe at all. Altogether, there are 25 stripe colors.

Color	Stripes	Cars	Percent
Acura Red	White	1	0.2%
Avus Blue	None	1	0.2%
Black	Gold	11	1.7%
Black	None	41	6.2%
Black	Silver	22	3.3%
Black	Titanium	1	0.2%
Black	White	6	0.9%
Black Metallic	None	1	0.2%
Black Metallic	Silver/Red	1	0.2%
Black Pearl Rose	None	1	0.2%
Black Pearl Rose	Silver	1	0.2%
Blue Pearl	White	1	0.2%
Bordeaux	White	3	0.5%
British Racing Green	None	2	0.3%
Chrome Yellow	None	1	0.2%
Cloisonne Blue	White	1	0.2%
Dark Portofino Blue	Dark Blue	1	0.2%
Electric Blue	White	1	0.2%
Ferrari Blue	Wimbledon White	2	0.3%
Ford Blue	White	1	0.2%
Galaxy Blue	Wimbledon White	1	0.2%
Garnet Red	White	1	0.2%
Green	White	2	0.3%
Guardsman Blue	None	4	0.6%
Guardsman Blue	White	93	14.2%
Indigo Blue	Titanium	2	0.3%
Indigo Blue	White	1	0.2%
Jewel Green	Ivory	1	0.2%
Jewel Green	None	1	0.2%
Laser Red	Gold	1	0.2%
Laser Red	None	2	0.3%
Laser Red	Silver	2	0.3%
Laser Red	Titanium	1	0.2%
Malachite Green	None	6	0.9%
Malachite Green	Silver	2	0.3%
Malachite Green	White	13	2.0%
Malachite Green	Wimbledon White	1	0.2%
Medium Royal Blue	White	2	0.3%
Metallic Blue	None	1	0.2%
Monza Red	None	1	0.2%

Color	Stripes	Cars	Percent
Monza Red	White	1	0.2%
Olive Pearl	Gold	1	0.2%
Pearl White	Black	1	0.2%
Pearl White	Blue	1	0.2%
Performance Yellow	Cap Blue	1	0.2%
Performance Yellow	White/Black Outline	1	0.2%
Pewter Metallic	Satin Black	1	0.2%
Portofino Blue	Dark Portofino Blue	1	0.2%
Portofino Blue	None	1	0.2%
Portofino Blue	Silver	1	0.2%
Portofino Blue	White	14	2.1%
Posilipo Blue	None	1	0.2%
Posilipo Blue	White	2	0.3%
PPG Blue/Green	None	1	0.2%
PPG Titanium	None	1	0.2%
Quasar Blue	Silver	1	0.2%
Red	Black	2	0.3%
Red	Gold	1	0.2%
Red	None	10	1.5%
Red	White	61	9.3%
Red	White Willment	1	0.2%
Royal Blue	None	9	1.4%
Royal Blue	Purple	1	0.2%
Royal Blue	Silver	2	0.3%
Royal Blue	White	157	23.9%
Royal Blue	White (SP. PT.)	1	0.2%
Royal Blue	White Willment	4	0.6%
Silver	Black	48	7.3%
Silver	None	15	2.3%
Silver	Royal Blue	2	0.3%
Silver	Woodland Green	2	0.3%
Solar Yellow	Black Can Am	1	0.2%
Stratos Blue	White	1	0.2%
Titanium	Black	12	1.8%
Titanium	Black Diamond	1	0.2%
Titanium	Laser Red	1	0.2%
Titanium	None	11	1.7%
Titanium Metallic	Black	1	0.2%
Toreador Pearl	Silver	1	0.2%
Viper Blue	Silver	1	0.2%
White	Blue	2	0.3%
White	Red Willment	2	0.3%
Wild Strawberry	Silver	1	0.2%
Wildberry	White	1	0.2%
Wimbledon White	Royal Blue	1	0.2%
Wimbledon White	Viper Blue	5	0.8%
Yellow	Black	20	3.0%
Yellow	None	2	0.3%
Yellow	White	1	0.2%
Yellow	White/Black Outline	7	1.1%
Yellow	White/Grey Outline	1	0.2%
Total		657	

Color/stripe combinations are ranked by color name.
The most popular color/stripe combination is Royal Blue/White followed by Guardsman Blue/White.
Altogether, there are 91 combinations of color and stripe.

Model

Model	Cars	Percent
427 S/C	628	95.7%
427 Roadster	26	4.0%
427 Competition	1	0.2%
Coupe	1	0.2%
Total	656	

The 427 S/C remains the overwhelming favorite. The number of roadsters grew from 11 to 26 in the past year. A number of these were the new hybrid model which combines S/C features with under the car exhaust.

This year also saw the first Superformance Coupe added to the registry.

Drivetrain

Ford has given specific family names to their engines. These engine families show the engine choices by owners.

Engine	Cars	Percent
302	3	0.5%
351	311	53.4%
90° V Family	314	54.0%

351C	8	1.4%
335 Family	8	1.4%

390	8	1.4%
406	1	0.2%
427	54	9.3%
428	21	3.6%
FE Family	84	14.4%

429	1	0.2%
460	174	29.9%
385 Family	175	30.1%

Chevy 502-502	1	0.2%
Other	1	0.2%

Total	582	100.0%
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Other than the first year, which was based on a relatively small sample, the choice of engine families has remained pretty consistent.

Family	90° V	335	FE	385
1998	61.3%	0.0%	25.8%	12.9%
1999	57.0%	1.2%	17.4%	24.4%
2000	50.3%	1.3%	15.8%	32.3%
2001	54.0%	1.4%	14.4%	30.1%

The most popular engine by far is still the 351 Windsor.

Stroker motors continue to gain in popularity. There were 113 351 strokers, 15 427 strokers, and 21 460 strokers reported by owners.

The transmission types, ranked by cars then name, are:

Transmission	Cars	Percent
Tremec (5-Speed)	411	73.5%
Tremec TKO (5-Speed)	72	12.9%
Tremec 3550 (5-Speed)	40	7.2%
Ford Toploader (4-Speed)	14	2.5%
Borg Warner T-5 (5-Speed)	6	1.1%
Automatic	2	0.4%
Ford AOD (Automatic)	2	0.4%
Ford C-4 (Automatic)	2	0.4%
Ford C-6 (Automatic)	2	0.4%
Borg Warner Automatic	1	0.2%
Borg Warner T-10 (4-speed)	1	0.2%
Borg Warner T-5 (5-speed)	1	0.2%
Cosworth (5-speed)	1	0.2%
Doug Nash (5-speed)	1	0.2%
FMX Automatic	1	0.2%
GM 700-R4	1	0.2%
Tremec T-56 (6-Speed)	1	0.2%
Total	559	

The Tremec 5-speed remains by far the most popular transmission type with 93.6% of all transmissions. This past year saw the addition of a number of new transmission including Cosworth, Doug Nash, and the Tremec 6-speed. The number of cars with automatics is also up from 2 to 10.

The engine/transmission combinations, ranked by engine then transmission, are:

Engine	Transmission	Cars	Percent
302	Borg Warner T-5 (5-speed)	1	0.2%
302	Tremec (5-Speed)	2	0.4%
351	Automatic	1	0.2%
351	Borg Warner T-10 (4-speed)	1	0.2%
351	Borg Warner T-5 (5-Speed)	3	0.5%
351	Cosworth (5-speed)	1	0.2%
351	FMX Automatic	1	0.2%
351	Ford AOD (Automatic)	2	0.4%
351	Ford C-4 (Automatic)	1	0.2%
351	Tremec (5-Speed)	244	43.6%
351	Tremec 3550 (5-Speed)	38	6.8%
351	Tremec T-56 (6-Speed)	1	0.2%
351	Tremec TKO (5-Speed)	13	2.3%
351C	Borg Warner T-5 (5-Speed)	2	0.4%
351C	Ford Toploader (4-speed)	1	0.2%
351C	Tremec (5-Speed)	5	0.9%
390	Ford Toploader (4-Speed)	1	0.2%
390	Tremec (5-Speed)	5	0.9%
390	Tremec TKO (5-Speed)	1	0.2%

Engine	Transmission	Cars	Percent
427	Borg Warner T-5 (5-Speed)	1	0.2%
427	Ford Toploader (4-Speed)	8	1.4%
427	Tremec (5-Speed)	34	6.1%
427	Tremec TKO (5-Speed)	8	1.4%
428	Borg Warner Automatic	1	0.2%
428	Ford Toploader (4-Speed)	4	0.7%
428	Tremec (5-Speed)	15	2.7%
428	Tremec TKO (5-Speed)	1	0.2%
429	Tremec TKO (5-Speed)	1	0.2%
460	Automatic	1	0.2%
460	Doug Nash (5-speed)	1	0.2%
460	Ford C-4 (Automatic)	1	0.2%
460	Ford C-6 (Automatic)	2	0.4%
460	Tremec (5-Speed)	106	19.0%
460	Tremec 3550 (5-Speed)	2	0.4%
460	Tremec TKO (5-Speed)	48	8.6%
Chevy 502	GM 700-R4	1	0.2%
Total		559	

Last year there were 11 engine/transmission combinations. This year there are 36. And this only includes the engine by type. It certainly does not include the huge numbers of variations in intake systems, heads, cams, and displacement.

Interestingly enough, the number of cars with an "original" drive train are few - 8 with a 427 and toploader and 4 with a 428 and toploader.

Communication Via E-mail

	Owners	Percent
E-Mail Address	361	54%
No E-Mail Address	305	46%
Total	666	100%

Fifty four percent of the owners have an e-mail address entered in the registry and 46% do not. If we assume that an e-mail address is reasonably indicative of access to the internet, then about half the owners have indicated by not supplying an e-mail address that they may not have routine access to the internet.

For this reason, the newsletter and "snail mail", which reaches all owners, will continue to be the primary method of communications with owners. Articles such as the VIR Fall 2000 event in this issue will continue to appear on both the Second Strike web site and in the Second Strike newsletter.

And In Conclusion...

As our group has grown it has continued to diversify. We began as a regional group and are now a national and international group. Even as the number of Superformance cars grows, the number of unique combinations of configurations, options, colors, stripes, engines, and transmissions keeps our cars distinctive and personal - reflective of each owner's tastes, dreams, and aspirations.

BITS AND PIECES – READER'S WILD RIDES

Fred Hamilton - 351W Dual Quads

Story and photo by Fred Hamilton

From the day I got the Cobra home there was one item that I wanted to change. I didn't have the 427, but I was going to have the Dual Quads. After driving the car for the summer, I decided that it was time to get those 2X4. Little did I know the problems that I would have. This is the story of installing those 2X4 on a 351W.

Thanks to the Internet and Cobra Dave from ClubCobra.Com, I was put in contact with Price Motorsport Engineering (PME). They make an manifold adapter plate so you can use a 289/302 F-28 style 2X4 set up. Sounded easy enough but, this is where it gets interesting.

To start I had taken several different measurements at different locations to make sure I would have hood clearance as these plates lift the manifold up 1.25 inches. Along with the plates you have to get a distributor kit. This will raise the distributor to clear

the manifold. I took the distributor kit to the local machine shop and had it all pressed together. Time to install the plates after setting the valley plate down and the side plates along with the bolts. I find that the bolts are just a tad short for my liking. Too late at night to get new bolts, so off comes everything and all the RTV is taken off.

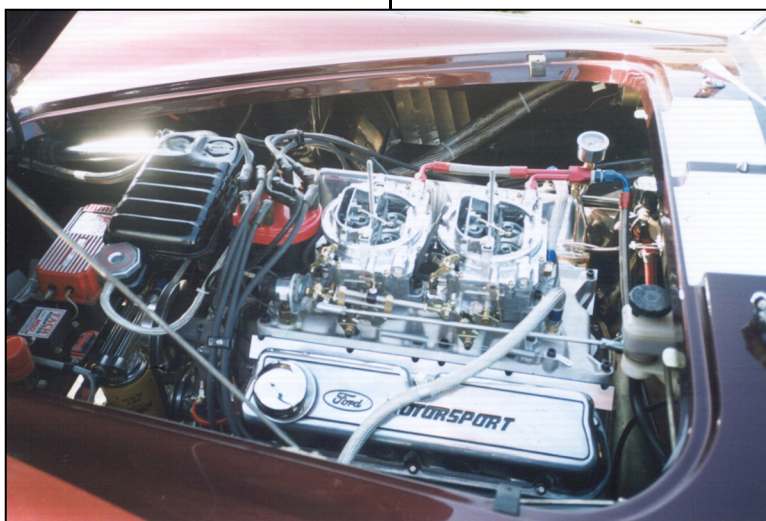
New bolts the next day along with a new set of gaskets. That night the plates go back down and everything gets torqued. The manifold is ready to go down, but this time I do a bolt length check first. You guessed it, but this time my bolts are too long. Back to the store for more bolts.

The manifold is down and torqued and is looking good. Time to install the distributor. It won't go in. I find the lower casting is sloppy and is hitting the distributor. One hundred yards of tape and 14 rags and a drum sander and that problem is fixed. With the distributor in and the carburetor studs in, now the carburetor won't fit. That's right - back to the store for some more bolts.

Carburetors on and now I find that the air cleaner base is too long and it hits the distributor cap. About this time I am thinking it would have been a lot easier to just go with a big block. I took a 1/8 aluminum plate and made my own base plate added spacer to clear the top of the carburetor and all is well. Top fits fine and I close the hood and no touchy any where. Luck is going my way for a change.

I go and hook up the PCV and I need a 90 fitting only have a straight, go to hook up the power brake and need a straight and only have a 90 and neither is the same size. Went to hook up the heater hose and the fitting won't screw in because it hits the distributor cap. That comes out, fitting goes in, and everything else fits. Throttle linkage hook up went well.

Now all I have left to put on is the thermostat housing that has the expansion tank welded to the housing. Just when I think all is well and slowly let the hood down I find that it won't close. Hood hits the radiator cap, the end results was I had to have the cap hole plugged and a elbow welded to the right side so the cap was no higher than the tank itself.



After a short engine run to check for leaks it was time for the road. After getting back home all I could say is 4 barrels are great, but 8 barrels are a kick in the ass.

If any one is thinking of doing this to their 351W you can e-mail me and I will help you in any way, and tell you where I got all the required parts and I have some extra parts that I made. Dry fit everything prior to putting the sticky stuff on.

The Rest Of The Story

With about 240 miles on the new set up it was time to take her out for a drive with the some other Northwest snakes. Ten miles into the drive the engine gave out a very LOUD back fire and went silent. Being tail end Charlie I coasted to the side of the road and tried to fire the beast up as it had never failed me before. No fire so I opened the hood and

found the coil wire had BLOWN off the coil. I also found that part of the boot had blown off also.

Reinstalled every thing and tried to start it up again still no fire. On a whim I pulled the distributor cap off and turned the key. This is when I found out why the coil wire had blown off. The rotor was not turning! And this is also when I knew I was dead in the water. About this time my fellow snakes have all turned around and came looking. I told them to have a nice drive and got the cell phone out and called for a tow.

While waiting for the tow to show up I decided to pull the distributor out and have a peak. All I had left on the distributor gear were about 4 teeth. This was getting to look expensive. The tow shows up and we put it on the trailer and head home.

I asked around for some ideas as to why this happened and got several ideas and then I measured the length of the distributor. The distributor was .035" over the max that it was allowed. Now I knew what took the gear out, but what else had went south. Found a lot of teeth in the pan, but also found them in the oil

pump. Time for a rebuild.

The desire to have 2X4's setting under the hood has not only been interesting but it has made for some interesting conversation at the dinner table. The one question that is asked me is did it help the performance over the original set up and I can't really say. You see when the motor was apart a whole lot of other goodies went in to it. That's another story at another date.

If any one has any questions on this little project please feel free to contact me.

Fred Hamilton SP158
cobrasc@home.com

Ed: Persistence pays off again. Fred's car is a Wildberry 427 S/C with white stripes. Wildberry is a deep metallic maroon. His tag is ASPBITE.

Gary Sharapata's Paxton Supercharger

Story and photo by Gary Sharapata

I purchased my Superformance Cobra (#081) in April 1999, used with only 500 miles on it. The car was one of 40 delivered through Bob Bondurant (then Superformance Dealer) and sold new to a Ford Dealer in Dallas, Texas (April 1998) after he attended a Ford Incentive Trip to the Bondurant's driving school. I'm the Operations Manager for the Southwest Region - Ford Customer Service Division and this is now my second Cobra. I decided to buy this used Superformance, versus a new one, because of the custom blue color, only 500 miles and a deal I just couldn't refuse from one of my dealers.

After purchasing the car I was considering replacing the SVO 351 crate motor with our new 514 SVO crate motor. Thinking again that a Cobra should have a big block. Having many Ford Muscle Cars, Hotrods and now my second Cobra, it appeared to me; I'm a small block guy, who likes that high RPM and power to weight ratio! But I really wanted something faster and different. You all have heard the words, "Is that a 427?"

I attended the Tulsa Oklahoma Shelby meet, in June 1999 (without the Cobra) and saw three 1965 Shelby Mustangs GT 350s that had Paxton Superchargers. I was really impressed on how they performed in the road course and drag races. It was really interesting watching them pull away from the big and small block Cobras coming down the straight! I thought about a supercharger, prior to the meet, but really didn't want the new look, fuel injection etc. But a 60's Shelby Paxton with a carburetor, now that sounds pretty neat and other than Carroll's dual Paxton Cobra, I really haven't seen many.

I called Paxton and found out that Paradise Wheels in California (Craig Conley) 760-740-0954 was the re-manufacturer for all the old Paxton Superchargers. I called Craig and he said he rebuilds and sells individual parts and complete systems.

Most of his Customers are Shelby Mustang and GT Mustang owners wanting to replace their Paxtons or install one. He did sell a couple of systems for 302 Cobras, but that was it.

The systems are really designed for the 289/302 Ford Small Block. He believed it would work with a 351 with some modifications. He sent me three pieces, the bonnet, supercharger casing and the engine bracket, to determine if it would even fit under the hood. The kit comes with the bracket, pulleys, supercharger, carburetor bonnet, hoses, clamps, bolts, belt, manual fuel pump, air cleaner, fluid, and the original Shelby Paxton parts list and instructions.

My SVO 351 has the Victor Jr. intake so I thought it might hit the hood. I installed the bonnet, closed the hood and "Wow", it fit! About an inch clearance to

the top of the scoop but the hose inlet was very close to the left side of the hood scoop. Under acceleration it would hit, but a strap on the engine and a small filing on the underside of the hood, eliminated any concerns.

Next was the engine bracket and supercharger itself. With a 351 being a

bit wider and taller than the 302, I knew a few modifications would be necessary. I first started with mounting it off the driver's side head bolt and having the Supercharger inlet hose be a straight piece directly into the supercharger, like the GT 350s. Wrong! The supercharger hits the hood and keeps it open about 10 inches. Drop the bracket to pick up the two water pump bolts, like the 289, and the supercharger fits under the hood. You will need to make a small bracket to pick up the head bolt. I used a piece of 2 inch by 5 inch 1/8 inch steel plate painted black. Use a piece of cardboard and make a pattern, lining up the top and bottom head bolts and then the center hole will pick-up the top of the supercharger bracket.

I decided I wanted to keep the water inlet tank where it was from the factory, which created another problem. If you do not mind moving it, you could save this step. By keeping the tank in its place you have to space the supercharger bracket out away from the engine about 1 inch. I had a 1 inch



aluminum crankshaft pulley spacer made. I used the SVO aluminum water pump pulley, but the aluminum SVO crankshaft pulley will not work as the center is too small for the blower pulley to fit inside. Craig has the original steel 289 pulley that works perfect. Either use some washers or make some 1 inch spacers for the two water pump and head bolts and you are ready to bolt it all on. You will need some longer bolts. The local hardware store has them.

If you have a 700 or 750 CFM Holley, you can send it to Craig and he will set it up for a supercharger. Implosion proof floats, jetting etc. I didn't, so I purchased a 750 double pumper from him ready to go. I went with the double pumper, as I wanted all out performance.

He also has the fuel and boost Paxton gauges, which not only look great under the dash, but also give you the readings on what's happening. I mounted the air cleaner right in front of the engine and took a 3 inch hose down under the right side of the car for air inlet. The air cleaner comes with the filter, 60's paper cleaner. Toss that and pick up a K & N six inch cone filter (for 94 5.0 Mustang) and drill 4 holes in the backside and attach it to the air cleaner.

How Does It Run?

What I'm going to conclude with took me about 6 months to figure out. The engine sounded great but fell on its face at 5,800 rpm. If you do the following, you will take your 385 HP SVO 351 to 500 HP with the power and torque of a big block and a great power to weight ratio. I just put 17 inch P & S Engineer wheels and Michelin Sport Tires (Like the One Lap Car) just to get the power to the ground. It looks great and flies!!!!

OK, first the stock blower is too small for the SVO 351. Will work great on the 289 or stock 302. You need the upgrade race blower, which has a 4 inch (vs. 3 inch) inlet and a bigger blower disc inside. Pushes more air and the 351 needs it. That's why Carroll had two Paxtons on his 427! Order a 1994 T-Bird air inlet hose. Works great to make the bend from the supercharger to the bonnet.

Next, forget the manual fuel pump and put a electric pump on. The Holley blue pump will work, but I stepped up to a B&G 280 pump, 1/2 inch stainless line up to the regulator and 1/4 lines into the carburetor inside the bonnet. Make sure you put some rubber washers (toilet bowl rubber ones work great) on both sides of the holes to seal the air inside. Tie straps hold them in place. Don't use the regulator for a carburetor. Buy the Mallory fuel regulator with

the boost inlet. You run a hose from the supercharger boost outlet to the fuel regulator. Set the regular at 7 PSI. For every 1 PSI of boost your regulator will add 1 PSI of fuel pressure. When you are at 8 PSI of boost you need 15 PSI of fuel. The carburetor is pressurized inside the bonnet so to keep the fuel pressure at 7 PSI net, you need 15 PSI of fuel pressure at 8 PSI of boost.

Put 76 jets in the primary side and 88 jets in the secondaries of the carburetor. A 3.5 or 4.0 power valve works the best. Just tell Craig these are the settings you want in the carburetor. Accelerator linkage - just re-bend the factory bar to meet the bonnet lever.

I have a MSD distributor and also purchased the 6BTM boost controlled module. If you go this route, set your timing at 36 degrees, put a tee in your fuel pressure regulator hose and hook up the module boost. As the supercharger builds boost the module will reduce your timing by 1 degree for every PSI of boost. So at 8 PSI of boost your timing will retard to 28 degrees. If you have the Ford distributor I'd recommend setting you total timing at 30 degrees.

How Much Does It Cost?

▪ Basic kit	\$2,500.00
▪ Upgrade race Supercharger	\$400.00
▪ 750 Holley double pumper and extra crankshaft pulley	\$400.00
▪ One inch aluminum crankshaft spacer (Machine shop)	\$190.00
▪ Fuel pump (Holley blue)	\$89.00
▪ Mallory fuel pressure boost regulator	\$110.00
▪ K & N air cleaner cone element	\$39.00
▪ Paxton gauges and lines	\$200.00
▪ MSD distributor	\$180.00
▪ MSD boost control module	\$280.00
▪ T-Bird intake hose	\$15.00
▪ Bolts, spacers and hoses	\$150.00

My total was \$4,600.00 (without the gauges and MSD equipment it is \$3,900.00).

The power is unbelievable and sound of the Paxton and the engine is really a head turner! Open your hood at a local cruise or car show and you will draw a crowd and no one asks me if it's a 427 anymore!

Gary Sharapata SP081
Plano, Texas
972-417-6219 (Work)

Fuel Injection

Story by Mike Stenhouse. Photo from Bruce Walsh and Dean Woodruff

A perfect intake system would:

1. Precisely mix air and fuel in the correct proportions
2. Evenly distribute this mixture to all cylinders
3. Ram tune the mixture for best power
4. Have no pressure losses

These objectives would be met at all rpms and all throttle settings, of course.

This is not a perfect world and there are no perfect intake systems. All have design compromises. However, the current generation of fuel injection systems have fewer compromises than carburetor based systems. The primary advantages of fuel injection are better drivability, improved fuel economy, and lower emissions. All the comparative tests I've seen show that peak horsepower is about the same when both systems are designed for peak power.

Neither carburetors nor fuel injection "make" power. The real question is how much power is lost through the metering, mixing, and distribution that must take place. The pressure drop in these processes causes a loss in power. One to one. A 5% pressure loss is a 5% power loss. The lower the loss in pressure in the metering, mixing, and distribution processes, the lower the horsepower loss and the more power the engine makes.

Carburetor Systems

A carburetor based system has compromises that fuel injection doesn't. The fuel and air are mixed in the carburetor before it enters the manifold, which distributes both the fuel and air to the cylinders. This is called a "wet" intake system. The manifold has three conflicting objectives:

- (1) to pass the maximum amount of air,
- (2) to ram tune the intake charge, and
- (3) to evenly distribute both the air and the fuel by holding the fuel in suspension in the air stream.

High airflow speeds promote good fuel/air mixing, good fuel distribution, and good cylinder filling. But high airflow speeds have pressure losses. The airflow has to be fast enough so that the aerodynamic forces and turbulence keep the fuel in suspension and not too fast so that the pressure losses are not excessive. This optimum speed range is fairly narrow. You can get it on the low end, mid-range, or top end - but not all three. The best design for

maximum power and the best design for every day driving are worlds apart.

For maximum power, you want a large carburetor and large straight runners to the heads. Pressure losses increase with airflow speed squared. Pressure losses are decreased with clean design - straight smooth flow paths - and by increasing the cross sectional area to reduce airflow speed. Two Holley Dominators on a tunnel ram and a huge single Holley on a single plane manifold are examples. At high rpms, the high (high enough) air speeds through the carburetor and intake manifold give adequate mixing of fuel and air and hold the fuel in suspension for relatively even distribution to the cylinders. The large flow areas reduce air speeds enough to reduce the pressure losses. The straight short runners provide ram tuning at high rpm.

Unfortunately, the maximum power setups typically have fuel metering, fuel distribution, and cylinder filling problems at low rpm, which give poor power, poor drivability, poor fuel economy, and high emissions.

For best drivability at the speeds where a street machine spends 95%+ of its time, you want a small carburetor for good mixing and a manifold with small runners to keep the airflow speed up to keep the fuel in suspension and to fill the cylinders. A dual plane manifold design provides evenly distributed airflow that assists in fuel distribution and the design provides ram effect at mid range rpm.

However, the smaller runners and complex flow path cost top end power. Not much - maybe 10 ponies, but in racing people sell family members for 10 ponies.

For Example, Carburetor Size Selection

Four barrel carburetors are rated by the airflow at a 5% pressure drop. For example, a 750 scfm Holley has a 5% pressure drop at 750 scfm, which is a 5% power loss. This is the cost of metering and mixing.

A larger carburetor has a lower pressure drop at a given airflow, but airflow is required to drive the mixing and metering processes. A carburetor that is too big will not mix or meter properly and will cost horsepower.

A 460 at 100% volumetric efficiency consumes 800 scfm at 6000 rpm. So an 800 scfm carburetor will have a 5% pressure drop which is a 5% horsepower loss. Switching to a 1000 scfm carburetor will change the pressure drop to 3.2% for a reduction in power lost of 1.8% in horsepower. This is about 9

horsepower in a 500 horsepower engine. The question is, is it worth it for the loss of metering and mixing on the low end. For a street engine, probably not. For a drag race engine, certainly. For a road race engine - maybe. It would depend on the course.

Fuel Injection

Fuel injection does not have these compromises. The fuel is injected individually in each intake port right above the intake valve. (There are also throttle body systems referred to as fuel injection. Throttle body injection is a wet flow system and is really an electronic carburetor as far as this discussion is concerned. For this discussion fuel injection refers to direct port injection.)

With direct port injection fuel distribution is spot on all the time. This "dry" system only has to be concerned with distribution of air. The only real design trade-off is optimizing ram charging for low, medium, or high rpm. This will determine runner area and length.

The "dry" flow allows design features not possible with "wet" flow since there is no consideration for what happens to the fuel. Variable geometry intakes can be optimized for both low and high speed

operation. The intake can have a single high speed runner to the cylinder for low speed power and open a second runner to double or triple the airflow for high speed power. The runner length can be varied mechanically or aerodynamically to provide long runners for low speed ram tuning and short runners for high speed ram tuning.

The runners can be designed for optimum airflow alone, giving more equal cylinder to cylinder airflow distribution. The precise metering of fuel at each cylinder gives more precise and uniform mixtures in each cylinder. The electronic brain and feedback control systems give more precise air/fuel ratios throughout the full operational range of rpm and throttle setting.

This is not to say that there are not compromises in fuel injection system design. For production engines, cost and target performance are the primary cause for compromise. Cost rules out many of the fancy variable geometry features for most cars. And if the target horsepower is 200 ponies, then the metering devices, runners, and fuel injection nozzles are sized for 200 ponies. Upgrading to 400 ponies requires replacing just about everything but the wiring. And that is expensive.

There are two basic types of fuel injection metering - throttle position sensing (TPS) and mass airflow (MAF).

The TPS system uses the throttle position, rpm, intake manifold pressure, external air pressure, and air temperature to estimate the airflow based on a

multi-dimensional map stored in the electronic brain of the system. The estimated airflow and desired fuel/air mixture are then used to calculate the fuel flow requirements.

The TPS system is not affected by changes on the exhaust system. It is affected by changes in the intake side.

Any change to

the intake or cam requires a modification in the map. This can be a difficult iterative computer programming procedure. It is impossible if no provision is made in the computer for modifying the map.

The MAF system uses an airflow meter to measure the airflow directly. Many also use an oxygen sensor based feedback system to check the results of the fuel metering calculation and make precise adjustments based on the composition of the exhaust gases.

Since the MAF system measures airflow directly, substantial modifications can be made to the engine and the brain will automatically adjust for them.

For electronic fuel injection systems, the best



Bruce Walsh's stunning electronic fuel injection system in SP489 at Dean Woodruff's Engine Specialties, Orange CA.

technology is a direct port injection MAF system.

The MAF system requires all airflow to pass through a single metering device. The TPS does not. If you see an electronic fuel injection system with individual stacks such as Bruce Walsh's Weber look alike system, it is probably TPS.

OK OK Already, Which Is Better?

If the engine is being built for all out performance such as drag racing, then the compromises necessary for low end performance and drivability can be ignored in designing a carburetor system. Both carburetor and fuel injection systems can be designed to deliver the fuel and air with minimal pressure losses in the high rpm peak horsepower range. For peak power, there is no clear cut advantage. Carburetors are cheaper. Carburetors are easier to tune (much easier), being mechanical and not electronic, particularly if you only have to tune for high end. So carburetors will be around in racing for quite a while.

And for the street, for all around drivability and performance at an affordable price, it is hard to beat a

single Holley 4-barrel on a dual plane manifold. A Holley and manifold is around \$600. EFI is around \$4,000 installed.

Fuel injection is a better all around solution, albeit more expensive. I have driven a Superformance 427 S/C with a 347 CID small block with MAF fuel injection. Very similar in top end power to my 357 CID rig which has a Holley 750. The difference is drivability is very noticeable. It pulls cleanly from 1000 rpm in 5th. None of the below 2000 rpm stumbles (however slight) that the Holley produces. It will pass emissions in NC without a catalytic converter. It is hard to believe that an engine with this low end grunt will scream on the top end, but it does.

As much as I would like to have a visually stunning Weber setup or EFI setup, it would be a lot of money for little gain. My artistic right brain craves it. I look at Bruce Walsh's system and I'm a goner. My practical left brain can't rationalize it. I'm getting a headache. I'm going to take an aspirin and go to work.

SECOND STRIKE - THE SUPERFORMANCE OWNERS GROUP

SCORE

We have a registry. The Superformance Cobra Owners Registry, or **SCORE** is a registry of Superformance cobra owners and their cars.

The goal is to register every Superformance Cobra and track the ownership history. See the Annual Owners survey, page 10 this issue.

Second Strike - The Newsletter

We have a quarterly (more or less) newsletter. This is the first newsletter for 2001. You may have noticed that there were only three newsletters in 2000. True, but they were big ones.

This is your newsletter. All contributions are appreciated and nearly all are used. Please submit all contributions in writing or via e-mail to Mike Stenhouse.

In "Upcoming", not necessarily "next", issues you can expect a fact filled article of the fabulous Ford 90° V Windsor Engines. Also Run and Gun 2000. I would include an Article about SAAC Does Vegas if someone would send me one. I am also aware of a Show Day on 27 January 2001 in South Africa, but I have no story and no pictures to share. Hint!

www.SecondStrike.com

We have a web site. It is updated frequently with articles of interest, a calendar of upcoming events, and a store with a growing number of goodies.

Track Events

We have track events. Upcoming are:

VIR Spring 2001 - see page 8 this issue.

VIR Fall 2001 - see page 8 this issue.

Publications

We have bound sets of back issues available as individually printed full color bound sets. For registered owners the fees are:

- Volume 1 for 1998 is \$15.00
- Volume 2 for 1999 is \$30.00
- Volume 3 for 2000 is \$35.00

We have registries for registered owners:

- Standard Registry is \$10.00
- Deluxe Registry is \$30.00

This includes shipping and handling in the USA. Add \$5.00 per order for shipments outside the USA.

Mike and Pat Stenhouse
400 Avenger Lane Villa 902
Davidson NC 28036-6708

Mike@SecondStrike.com
704-655-1902