

# Supercharged WS6 Firebird Formula



A tank for the air-to-liquid intercooler was mounted near the radiator-core support (arrow). It held a mild glycol solution that was pumped into the cooling element in the blower manifold to reduce charge-air temperatures.

**By Don Keefe  
Photography by the author**

**D**uring the 1990s, Pontiac's Special Vehicle Engineering (SVE) department was a hotbed of activity, building up

one-off machines with an eye toward future production. Though many enthusiasts might think that because the Pontiac V-8 was gone,

there was actually a lot of really fascinating projects going on, from building mule cars for testing upcoming powertrains, building and

# Good Things Can Come in Small-Displacement Packages



Pontiac Special Vehicle Engineering built this Firebird Formula with a supercharged 4.3L L99 V-8 engine to test the performance potential of a smaller-displacement engine in a Firebird application. The steel-roofed Formula was an early '93 model, upgraded to WS6 specs.

maintaining NASCAR Pace Cars and taking existing factory parts and putting them together in innovative ways that really showed off their expertise. Your editor had a front-seat view and an all-access pass to the things going on there at the time. It was one of the high points of my career.

One of the more interesting periods during that exciting decade was the time before the introduction of the LS1 V-8. In the early

1990s, Pontiac SVE was exploring alternatives to large-displacement V-8s as a possible fallback position in case future CAFE standards rose to where they couldn't be used in anything other than trucks. This concern sent Pontiac back to the drawing boards to seek alternatives should those scenarios actually play out.

One of the exercises was this red, steel-roofed Firebird Formula. It was an early '93 model upgraded

to WS6 specs, featuring a smaller-displacement, supercharged V-8 engine. It also ran as if there was a much larger engine under the hood.

For this particular exercise, the engine used was the 4.3-liter, 265 cubic-inch L99 V-8. It had seen duty as the base engine in the Chevrolet Caprice, which had ceased production in 1996. Externally identical to the LT1 used in the Firebird Formula and Trans Am,



**The Ram Air system used a production hood with a non-production airbox that routed air to the driver's side of the engine compartment. This housing used a stock WS6 air filter. Plastic ducting routed air to the LT1 throttle body.**

it used a 3.75-inch bore and a 3-inch stroke, just like the '55-'56 265 Chevy V-8.

In its stock form, the L99 was rated at 200 horsepower at 5,000 rpm and 240 lb-ft of torque at 2,400 rpm- not bad, but not that great, either. If the performance reputation of the Firebird was going to be upheld, there was some work to be done on the mini LT1, and that is just what happened. Pontiac SVE beefed up the little V-8 considerably, adding a set of ported 350 LT1 heads with 1.94-inch intake and 1.50-inch exhaust valves, which were actuated by a stock LT1 camshaft.

Then things got interesting. The stock L99 induction system was removed and replaced with a custom intake manifold that mounted an experimental Eaton 112ci roots-

style supercharger and a one-off air-to-liquid intercooler. The blower was driven at a 1.93:1 ratio and maximum boost was set at 8.5 psi.

The supercharger displaced 112 ci per revolution and was larger than either of the units used on the production 3800 V-6 engines. Note the orientation of the throttle body to the blower. A large pulley kept boost down to 8.5 psi.

Pontiac had been using forced induction for more than a decade. They learned the advantages of making small engines run like big ones, while maintaining frugal mileage and light weight. The '80-'81 Turbo Trans Ams, the Sunbird Turbos of the '80s, the '89 Indy Pace Car Trans Ams, and more recently, the SSEi supercharged V-6 Bonnevilles showed that performance was indeed possible using

smaller engines.

Aluminum ducting routed air from the throttle body, under the windshield, and into the blower.

Due to the blower's top-facing inlet, the air made a rather unusual journey to the combustion chambers. From the Ram Air hood, air entered a non-production airbox, which ducted it to the throttle body on the driver side. The dual 58mm LT1 throttle body was mounted on an elbow like the black V-6 car, but the assembly was located on the driver side. From there, custom-fabricated aluminum ducting routed behind the blower and then up into the Eaton's air inlet.

Once compressed, excess heat was picked up by the intercooler's finned element, which was mounted inside the intake manifold. Then the compressed and cooled air entered the cylinder at more than 1.5 times atmospheric pressure. After the combustion event, the spent gasses passed through factory LT1 manifolds to a prototype single-exhaust system, a later version of which ended up on the '98 WS6 Formulas and Trans Ams. Though it was a single-outlet system, it actually flowed substantially better than the duals used on non-WS6 V-8 Firebirds.

The reason for choosing this less macho-looking system over a traditional dual-outlet system was clever and delightfully sneaky. A single outlet was positioned on the driver side because engineers learned that the EPA decibel test procedure always located the measuring microphone on the pas-



With the conventional top-entrance of the blower design, the air was routed into the throttle body and then behind the blower and around the other side. All of the ductwork to accomplish that task was custom fabricated. An air-to-liquid intercooler sat just under the supercharger.

senger side. The distance between the outlet and the mic was far enough that a substantially louder and freer-flowing exhaust system could actually pass EPA drive-by noise standards.

A beefier L99 was the end result of the modifications. The boosted 265 put out 339 horsepower at 5,750 rpm, with 364 foot-pounds of torque at 3,250. This was an increase of nearly 140 horses and 125 foot-pounds over the production version with only 8.5 psi. With another 5 pounds of boost, this little V-8 would have been at 425-plus horsepower, though the durability of the stock rotating assembly would likely have been diminished.



The supercharger was a prototype 112 cubic-inch Eaton unit similar in design to the 90 cubic-inch version used on the Grand Prix GTP's L67 V-6. The larger pulley kept the boost to about 8.5 psi, though more boost and power was available if needed with a smaller-diameter pulley.



Though tough to see, the rear-bumper fascia for the stock Formula has an empty spot where the passenger-side exhaust pipe would have gone. This car received a prototype version of the high-flow, single-outlet system that made it to production on the '98 WS6 Firebirds.

The performance was quite impressive and clearly indicative of the potential for a lot more. Coupled to a stock six-speed transmission and 3.42 gears, the Firebird ran 0-60 in 5.2 seconds, with a best of 13.47 at 106 mph in the quarter.

Though your author was not the one who piloted the Formula down the dragstrip, I did have a chance to drive the car quite hard in the summer of 1996. My impression was that the numbers didn't represent the actual performance this car was capable of at 8.5 pounds of boost. This engine revved very freely; the 3-inch stroke allowed the 265 to whiz up to six grand with enthusiastic ease. Overall, it felt like it should have been in the high 12s and there were more than 339 horses in there somewhere.

However, it didn't seem like the supercharged V-8's engine man-

agement programming had been sorted out completely. The engine had a tough time firing up and running from a cold start. When it did finally warm up, it was still running pig-rich. Soot on the rear bumper was excessive, and the throttle response was a bit sluggish, though being a prototype, one has to expect some problems.

Once the throttle was mashed, the soggy response was forgotten. After about 1,800-2,000 rpm, things happened very quickly. The 265 roared and felt like a much larger engine, and the torque output was very impressive and felt like it had an extra inch or so of stroke.

With nearly two decades more of PCM tuning technology we have today, I often wonder how much easier it would have been for SVE to dial in the combination. Perhaps

a modern Megasquirt system with a laptop would have wrung some more power and better driveability out of the little 4.3.

Alas, it was not to be. Pontiac SVE was shut down and this particular Firebird, along with many other cars, were crushed back in the summer of 2000. In the end, cubic inches were easier and less expensive to develop, so the big V-8 stayed in passenger-car production as the threat of tightening regulations subsided.

In any event, this Firebird Formula and the SVE cars of the era offer insight as to what was going on with Pontiac's performance-car research and development. These little footnotes in Pontiac's history help us understand the Division's path in bringing certain cars to market, as well as some of the roads not taken.

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