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## Budget Bird – PHR June 1987

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This article is from the June 1987 Popular Hot Rodding that shows a bolt-on parts impact on a (new) 1987 LG4 Firebird Formula. The article shows the impact in both power (RWHP) and also the 1/4 mile performance of Edelbrock tubular headers, 3" cat, stock TPI exhaust, Performer 3701 EGR intake manifold, and a custom cold air kit. The car picked up 48 hp at 4500rpm and gave a 1/4 mile performance of -1.28s and added 8.4mph!

Enjoy!



# BUDGET 'BIRD

Easy Steps To Increase Horsepower—The Legal Way

BY JIM LOSEE

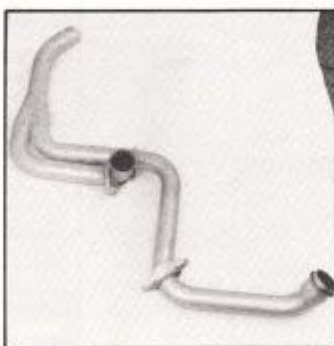


**T**his month's installment of Budget 'Bird involves some basic performance improvements that have some surprising and somewhat confusing results.

The first thing we did was to check out how well our cold air package worked. The only way to see how much power was gained at the rear wheels was to take the car to Jennings Dyno Service in Sepulveda, Calif. and run the car on the chassis dyno. The results were quite surprising. Knowing that the cold air package worked better at the higher rpm ranges we tested the car without the package at 4000 rpm and again at 4500 rpm. The first run was made with the stock air cleaner lid in place. The results were 142 horsepower at 4000 rpm and 134 horsepower at 4500 rpm.

The surprise came when we installed the cold air package seal and shut the hood. At 4000 rpm the power was up to 155 horsepower and at 4500 rpm it hit 152. This meant that at 4500 rpm we got an increase of 18 horsepower over stock to the rear wheels. And the car wasn't even moving to be able to utilize the ram air effect of the hood.

The next step involved installing an Edelbrock intake manifold that would



To improve exhaust flow over stock headpipe, Edelbrock incorporated smooth bends in their headpipe. This pipe will bolt up to stock catalytic converter on LG4 305-equipped Firebirds and Camaros.



Helping to reduce back pressure are Edelbrock tubular exhaust manifolds. All emission control parts are retained, including oxygen sensor and heat riser stove.

be compatible with our emissions control equipment. The manifold suggested by Edelbrock was their totally revised version of the Performer series for the small-block Chevy V8, part number 3701. Revisions include swapping the runners from one side to the other and changing the size of some of the runners so they're not all the same size. Because of our tight schedule, we weren't able to take the car back to Jennings after each step, but we were able to obtain on-the-road results by using Edelbrock's

Vericom VC2000 test instrument. We used 0-60 mph times along with 1/4-mile times and speeds to verify power gains.

Budget 'Bird was first tested bone stock making 0-60 in 8.56 seconds, and turning 16.13-second 1/4 mile with a trap speed of 85.1 mph.

The results of installing the intake manifold with no other changes were astounding. The 0-60 time dropped to 7.95 seconds and the 1/4 mile was covered in 15.64 seconds at 89.2 mph. This run was also done with the

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stock air cleaner lid in place and the stock catalytic converter.

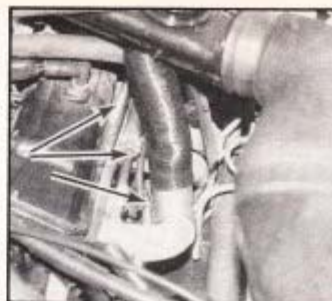
For our next improvement we wanted to try a set of tubular exhaust manifolds that Edelbrock is starting to produce. These manifolds are designed to fit the 1982-1987 Firebird and Camaro equipped with a carbureted 305 LG4 V8. These manifolds have provisions for all the emission control equipment and even put the oxygen sensor in the right place. Along with the manifolds comes a free-flowing headpipe that fits around all obstacles and hooks up to the stock three-way catalytic converter. The reason for going to the Edelbrock system is that it is an emissions-legal system and won't run afoul of any inspection and maintenance emissions check.

With no other changes from our previous test other than installing the Edelbrock tubular exhaust system, the results were again astounding. Our 0-60 mph times went from 7.95 seconds to 7.42 seconds and the 1/4-mile time dropped from 15.63 seconds to 15.14 seconds with the speed climbing from 89.2 to 92.2 mph. This was almost a full second drop in the 1/4-mile time and a 7.1 mph speed increase, while still utilizing the stock air cleaner. This kind of performance improvement is substantial and was achieved with bolt-on items and a cost of less than \$500, excluding installation. The Budget Bird is also much smoother and easier to drive with the improvements. Now, when the car is launched from 3500 rpm it will do nothing but smoke the tires until you back off the throttle.

Because the stock three-way catalytic converter has such a small opening and is quite restrictive, our next improvement involved the installation of an exhaust system from a Tuned Port Injected 305 Firebird. This system features a large opening cat-con and a 3-inch diameter pipe going back to a twin 2 1/2-inch diameter outlet crossflow muffler. In the past we have seen this system provide a big power increase over the stock three-way cat-con.



*This is how Edelbrock headpipe fits on car. Note smooth bends, yet all obstacles are cleared. Each tube on headpipe is 2 1/4-inches in diameter.*



*Instead of having to use hose clamps and tube arrangement, standard with most headers for heat riser stove, Edelbrock's comes welded on. Stock tube fits right in place.*



*When installing tubular manifold on passenger's side, be sure and route hoses away from heat source. Even with stock manifolds we found melted wiring and hoses.*



*A lot of work went into designing these tubular manifolds so all stock components would bolt up. Note generous radius on bends for easy bolt installation.*



*Having oxygen sensor in correct position helps car perform better. Putting sensor down at collector on regular 4-into-1 headers won't allow enough heat for sensor to work properly.*

*Large opening catalytic converter helps exhaust flow better for more power. In order to hook large opening converter to Edelbrock headpipe, special adapter had to be fabricated.*

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TPI  
EXHAUST

Not so this time. The 0-60 times dropped from 7.42 seconds to 7.18, but the 1/4-mile times and trap speeds were basically a standoff. Times were 15.16 seconds versus 15.14 previously, while both trap speeds were 92.2 mph.

Popular reasoning said we had reached the limit of airflow capacity of the stock air cleaner setup. So the next step was to install the cold air package and see what happened.

The results were almost predictable. With the added air capacity 1/4-mile times dipped to 14.85 seconds from 15.14 seconds previously, while trap speeds went up from 92.2 mph to 93.5 mph. 0-60 times dropped from 7.42 to 6.87 seconds.

Now came the dilemma. Did the times increase because of the TPI exhaust system, or was it all due to the cold air package? We don't know what the answer is right now, but we'll be working on it in the months ahead.

As the final test for this month's modifications we took the Budget Bird back to Jennings Dyno Service for a check of rear wheel horsepower improvement. The results are a little disheartening for the amount of work involved in installing the parts and their relative cost. At 4000 rpm we saw 170 horsepower at the rear wheels and at 4500 rpm we saw the exact same amount.

While we were running our tests, Nick Jennings suggested we try going to a taller air cleaner element as a way of gaining more airflow through the engine. After changing the filter and verifying hood clearance, we proceeded. The result: 168 horsepower at both 4000 and 4500 rpm; a net loss of two horsepower.

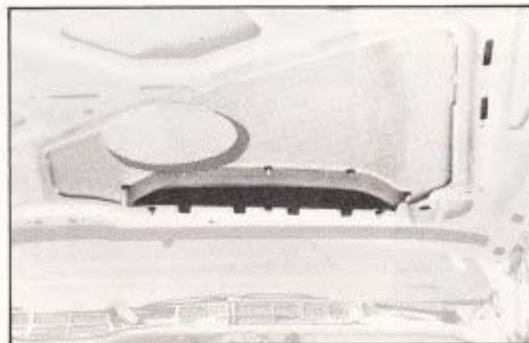
After examining our cold air package Nick suggested we try opening up the hole for the element and see about getting more air around the outside of the element. After using some Jilson 44/JUNE '87

sheet metal nibblers and opening the hole in the hood-to-air cleaner plate by about 20 percent, we were ready to go for it. This time the rear wheel horsepower jumped to 180 at 4000 rpm and up to 182 at 4500 rpm. With this simple use of a basic idea we got a 12 horsepower increase in power to the rear wheels.

With these performance improve-

*Larger of two pipes on muffler is three-inch diameter factory intermediate pipe coming from catalytic converter. This pipe is a bolt-on retrofit on any V8 equipped Firebird or Camaro.*

*Muffler is from Tuned Port Injected 305. Has increased flow capacity over standard carburetor version and also has 2 1/2-inch diameter outlets to increase power.*



#### Edelbrock Corp.

411 Coral Circle  
El Segundo, CA 90245  
213/322-7310

#### Jennings Dyno Service

9517 Sepulveda Blvd.  
Sepulveda, CA 91343  
818/894-3811

#### Edelbrock

3701-Performer with EGR  
6871-Tubular Exhaust System

#### Pontiac

14089473-Headpipe  
25057130-Catalytic Converter  
14089477-Intermediate Pipe  
14085395-Muffler and Tailpipe Assembly

#### Motorcraft

FA71R-Air Cleaner Element



*Underneath all that emissions hardware is Edelbrock 3701 Performer manifold with EGR. Just bolting manifold on stock engine was worth a half-second decrease in quarter-mile times.*

*After examining hole in cold air package hood plate, Nick Jennings cut excess material away to allow tall element to breathe properly. Power went from 168 to 182 from simple cure.*

(<https://thirdgenbody.files.wordpress.com/2011/03/phr-pg44.jpg>)



ments we have seen an increase over stock of 48 horsepower to the rear wheels. These are basic modifications and so far have kept the car within the intent of the law by not defeating any of the emission control devices.

Stay tuned for next month's installment as we investigate what a set of heads with minor port work and a good valve job along with some basic drag racing tricks will do for Budget Bird Power Increases. 🏁



Nick Jennings' valuable experience paid off when we made final run with opened-up cold air plate hole in hood. All runs on chassis dyno were made in fourth gear with engine temperature at 220+ degrees.

#### BUDGET 'BIRD POWER INCREASE CHART

**STOCK REAR WHEEL HORSEPOWER — 142 @ 4000 rpm, 134 @ 4500 rpm**

#### ROAD PERFORMANCE NUMBERS

##### Road Performance Numbers

TEST 1. Stock Configuration — 0-60 mph; 8.56 sec., 1/4-mile time and speed; 16.13 sec. @ 85.1 mph

TEST 2. Edelbrock 3701 Performer Intake with EGR — 0-60 mph; 7.95 sec., 1/4-mile time and speed; 15.64 sec. @ 89.2 mph

TEST 3. Same as previous with addition of Edelbrock tubular exhaust system — 0-60 mph; 7.42 sec., 1/4-mile time and speed; 15.14 sec. @ 92.2 mph

TEST 4. Same as previous with addition of 305 TPI Firebird catalytic converter, intermediate pipe and muffler — 0-60 mph 7.18 sec., 1/4-mile time and speed; 15.16 sec. @ 92.2 sec.

TEST 5. Same as previous with addition of cold air package — 0-60 mph; 6.87 sec., 1/4-mile time and speed; 14.85 sec. @ 93.5 mph

Modified Rear Wheel Horsepower\* — 180 @ 4000 rpm, 182 @ 4500 rpm

\*Includes addition of Motorcraft FA71R tall air cleaner element and opening up of cold air package hood plate by Jennings.

Edelbrock Performer manifold reduced 1/4 mile e.t. by one half second. Great feature of manifold is it has provisions for all emission controls.



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