

Featherweight Five



McCarty Racing Builds the Ultimate Show and Go Pure Pontiac Powerplant

By Don Keefe

Photos By Scott Scheel

Suppose that you are building a unique Pontiac street rod and the tried and true small-block Chevy just won't be a satisfying choice to achieve your goals—because the words “unique” and “small-block Chevy” don't usually appear in the same sentence. You want something really different and eye-catching—unique, if you will ...

Lynn McCarty of McCarty Racing

contacted us a few months back and told us about one of his customers and his plan to separate his 1931 Pontiac from the rest of the crowd. He wanted a large-displacement, all-aluminum Ram Air V Pontiac in the engine bay and, of course, it had to be polished to a mirror finish. What good is going fast if you can't blind them with shine?

As you may already know, the

idea for such an engine has danced through enthusiasts' minds for decades and the classification had previously been “unobtainium.” Quite simply, an aluminum Ram Air V was an impossibility—while a few experimental aluminum Pontiac blocks had been cast over the years, most suffered from casting problems and were never really suited for high-power builds without a lot of prep work.

Then there was the other portion of the deal- Pontiac never built Ram Air V heads out of anything other than good old Detroit Wonder Metal- cast iron.

As the years went on, the necessary components to make the dream became a reality. AllPontiac.com released the aluminum version of their extreme-duty Pontiac V-8 and McCarty Racing brought their aluminum Ram Air V heads to the Pontiac faithful. While the cost to build such an engine was pretty steep, it was possible. Finally, someone with the financial resources and the will came forward and the project began.

"The customer, Bill Ewing, of Lancaster, Pennsylvania, wanted something that was going to show as well as it would run," said Lynn McCarty, the President of McCarty Racing. He wanted a fairly mild engine that could make big power without being on the ragged edge."

Those objectives could be achieved with a lot of displacement, mildly ported Ram Air V heads and a street-oriented camshaft that allowed the large ports to work with the displacement, yet keep the powerband in a reasonable rpm range.

Block Prep

Although the shiny exterior of the block grabs your attention, it's what's inside that is the real story. The buildup of the engine took place at BES Racing Engines in Guilford, Indiana, under the watchful eye of Tony Bischoff.

Starting with the aforementioned



Lynn McCarty of McCarty Racing shows off the polished aluminum pieces that will go into the build of this all-aluminum 535 cubic-inch Ram Air V. AllPontiac.com block is topped with McCarty Racing reproduction tunnel port heads and matching tunnel ram intake manifold. The polishing was handled by P&C Metal Polishing in Cincinnati, Ohio. This engine will be installed in a 1931 Pontiac street rod. Even in a mild state of tune, this will be a delightful dose of overkill.

tioned aluminum AllPontiac IA2 block, Tony added steel sleeves and finish bored them to 4.35 inches. ARP studs hold down the main caps and heads.

A set of Ross forged pistons are mated to Eagle 4340 forged-steel rods. The combination has been a staple of McCarty's engine combi-

nations for years and have provided trouble-free service regardless of application.

The crank is another McCarty favorite, the 4.5-inch Eagle 4340 forged-steel crank. It was installed with Clevite bearings, which work well with the harder steel surface.



The aluminum IA2 is a beefy block and will be more than strong enough for twice the horsepower that this engine will be making. The 3-inch mains will support an Eagle 4340 4.5-inch, stroke forged-steel crank. Like much of the engine, it is overbuilt in case the owner is interested in turning up the wick with a hotter cam and head porting.



The McCarty aluminum heads look stock on the outside but benefit from improved porting and a modern clover-leaf combustion chamber.



The tunnel-ram intake is designed to accept a variety of tops and has injector bung pads cast in for use with both carbureted and EFI induction systems. There is also plenty of material cast-in for porting. This particular build will have it mounting a pair of Holley carbs.



The piston and rod combination is the tried and true Ross forging with a 4.35-inch bore size and Eagle 6.8-inch 4340 forged steel rods. This build required a 20 cc dish in the piston to keep compression at 10.5:1.

Top End Details

This particular build has been something that Lynn has been wanting to do for a long time. He wanted to see what a mildly ported set of Ram Air V heads would do in a street application. The idea was that having such large ports would negate the need for spending a large sum of money porting a set of Edelbrock or other street-oriented heads to achieve the flow numbers that a set of tunnel-port heads would flow out of the box.

Additionally, McCarty's heads feature improvements in port and combustion-chamber design and flow more than the factory Ram Air V heads would. These aluminum reproductions flowed about 350 cfm out of the box, versus about

Aluminum 535 Ram Air V Engine Specifications

General Information

Block: AllPontiac.com Aluminum IA2
Total Displacement: 535 cubic inches
Prep work: Sleeves installed, finished bored to 4.35 inches
Engine builder: Tony Bischoff, BES Racing, Indianapolis, IN

Induction System

Carburetor, brand, type, cfm: 2 850 cfm Pro Systems Holley 4-barrels, square jetted at 85, progressive linkage
Intake Manifold: McCarty Racing Aluminum Ram Air V tunnel ram

Heads

Brand: McCarty Racing aluminum reproduction Ram Air V heads
Mods: Custom seats, 400 cfm unported
Valves, brand, type, size: Ferrea hollow 2.25-inch intake and 1.75-inch exhaust
Valvesprings, brand, type: Comp Cams 4340
Pushrods, brand, type, size: Manley 4340
Built by: BES Racing

Bottom End

Pistons, brand, type (i.e. forged, flat-top), size: Custom Ross forged flat-top pistons and pins, 4.35-inch bore size
Rings, brand, type: Total Seal, custom ring set
Rods, brand, type, length: Eagle Big Block Chevy rods, 6.8-inch center-to-center length, King rod bearings
Compression ratio: 10.5:1
Crankshaft, brand, type, stroke, preparation: Eagle 4340 forged steel, 4.5-inch stroke, journals ground to big block Chevy size of 2.2 inches, Clevite main bearings, ARP stud kit for entire block

Oiling System

Oil pump: Melling MELM54F oil pump and screen
Oil pan: Canton Road Racing

Camshaft

Brand, type (solid or hydraulic, roller or flat tappet): LSM Engineering Solid roller cam, ground to R/A-V lobe pattern, ground on a 112-degree separation installed straight up; .424-inch lobe lift
Duration at .050, intake/exhaust: 252 degrees, single pattern
Lift with specified rocker arms, intake/exhaust: .700-inch gross lift
Rocker arms: Comp Cams 19044-1 Ultra Gold roller tip, 1.65:1 ratio
Lifter type and brand: Crane 28750-16 solid roller lifters
Valvesprings: PSI, 200 lb/in seat press.
Retainers: PSI titanium

Ignition

Distributor, brand, type: MSD 8563 Electronic distributor
Total Timing: 31 degrees
RPM that total timing is reached: 3,000

Exhaust

Headers, brand, type: McCarty Racing street 2-inch primary, 4 tube, tunnel port headers 3.5-inch collectors to dyno mufflers

Special Information:

Head gaskets: Cometic CAGC5846-040 4.380 MLS

Special thanks to: Casey, Stacy and Sheila McCarty and to Rich at BES

301-308 cfm for the factory design.

With the oversized valve combination and their \$2,000 street port, the heads flowed 400 cfm. "Adding the larger 2.25-inch intake valves really woke up the flow," Lynn reported. "The 2.19-inch valves were quite a choke point."

While the Ram Air V heads require matching manifolds, camshafts and headers, they are

priced in the same ballpark as their D-port or Round-port aftermarket equivalents, so if you need to buy all of the components anyway, you will probably be money ahead going the tunnel-port route. With a displacement of 535 cubic inches, these heads make a lot of sense.

The castings received hardened K-Loy valve seats and were fitted with Ferrea 2.25-inch and 1.75-inch

Aluminum 535 Ram Air V Engine Dyno Results

Engine RPM	Corrected Horsepower	Corrected Torque
4,900	670.5	718.6
5,000	665.5	699.1
5,100	668.7	688.7
5,200	675.9	682.6
5,300	680.4	674.2
5,400	686.7	667.9
5,500	692.1	660.9
5,600	694.7	651.5
5,700	700.3	645.3
5,800	701.1	634.9
5,900	699.0	622.2
6,000	695.1	608.4
6,100	689.4	593.6
6,200	682.6	578.3
6,300	680.4	567.2
6,400	678.3	556.6
6,500	678.2	548.0

Notes: Both carbs square-jetted at 85, 31 degrees total timing, all in at 3,000 rpm. Produced 680 foot-pounds of torque down to 4,000 rpm.



The inner contours of the McCarty tunnel ram show the smooth, well thought-out design. A variety of tops are available for single or dual four-barrels or Holley-based throttle bodies. A custom top for an EFI throttle body could also be fabricated and used, depending on the design requirements, making this intake a great choice for forced-induction applications.



Running two 850-cfm carbs on any size street engine is going to make for sluggish performance but Lynn thought ahead. The sideways-mounted carbs feature a progressive Enderle linkage kit, which only opens the front barrels of each carb under part-throttle operation, dramatically improving driveability. Here, Rich adjusts the linkage in preparation for a dyno pull.

exhaust valves. They are actuated by an LSM Engineering solid roller camshaft, which is ground to the correct R/A-V valve layout. It is a single-pattern design that features 252 degrees of duration at .050, .700-inch lift and is ground with 112 degrees of lobe separation, which goes a long way toward its remarkably good street manners. The cam uses Crane roller lifter and Comp Cams 1.65:1 roller rockers.

Topping off the heads is a McCarty Racing Ram Air V tunnel-port intake. Like McCarty's single four-barrel intake, his manifold was

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a clean-sheet design, which doesn't resemble any of the factory Pontiac tunnel-port intakes. This unit features a smooth interior, plenty of meat for porting and a choice of tops. Lynn's customer opted for the dual-quad top.

In addition to the mild cam, the other concession to street use was the use of a clever Enderle progressive throttle linkage that opens only the front barrels of each carb under part-throttle conditions. Make no mistake, we're not expecting Prius-like mileage numbers by any stretch but the engine will be quite docile under normal operation and there will be immense amounts of power available when the need arises. In a 2,500-pound car like the 1931 Pontiac street rod this engine will go in, things will happen very quickly once the throttle is mashed.



Lynn (standing) looks a bit anxious as the aluminum 535 waits for the first series of pulls. This engine would not even exist if not for the loyalty of the traditional Pontiac V-8 market being so willing to step up and make the business case for companies like AllPontiac.com and McCarty Racing, to take the large risks needed to bring these parts to market.

Dyno Time

When it came time to put the alloy Indian on the dyno, tensions were running high. Would it run the number that Lynn predicted? The goal was 700 horsepower, and after some dyno tuning the numbers came in and yes, they made it.

The magic pull came in at 701.1 horsepower at 5,800 rpm, with 718.6 lb-ft of torque at 4,900. Without a doubt, there is an additional 250-300 horsepower waiting to be tapped with a hotter cam and some additional porting but that really wasn't the point. McCarty Racing's 535 Ram Air V is a big docile teddy bear with the ability to really roar. It also will blind you with its shine, so for a street engine, this is a huge win-win! **PP**



The 535 delivered on its promise for 700 streetable horsepower with a maximum of 701.1 horsepower at 5,800 rpm, with 718.6 lb-ft of torque at 4,900. This should not only wow the troops with its beautiful appearance, it will also be a torrid street performer when installed in the 2,500-pound '31 Pontiac coupe.

Sources:

AllPontiac.com
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