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CRUISIN' TIGERS GTO & ALL PONTIAC CLUB

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The ONLY All-Pontiac Magazine

Reunited with Original Engine: 1968 Ram Air II Firebird

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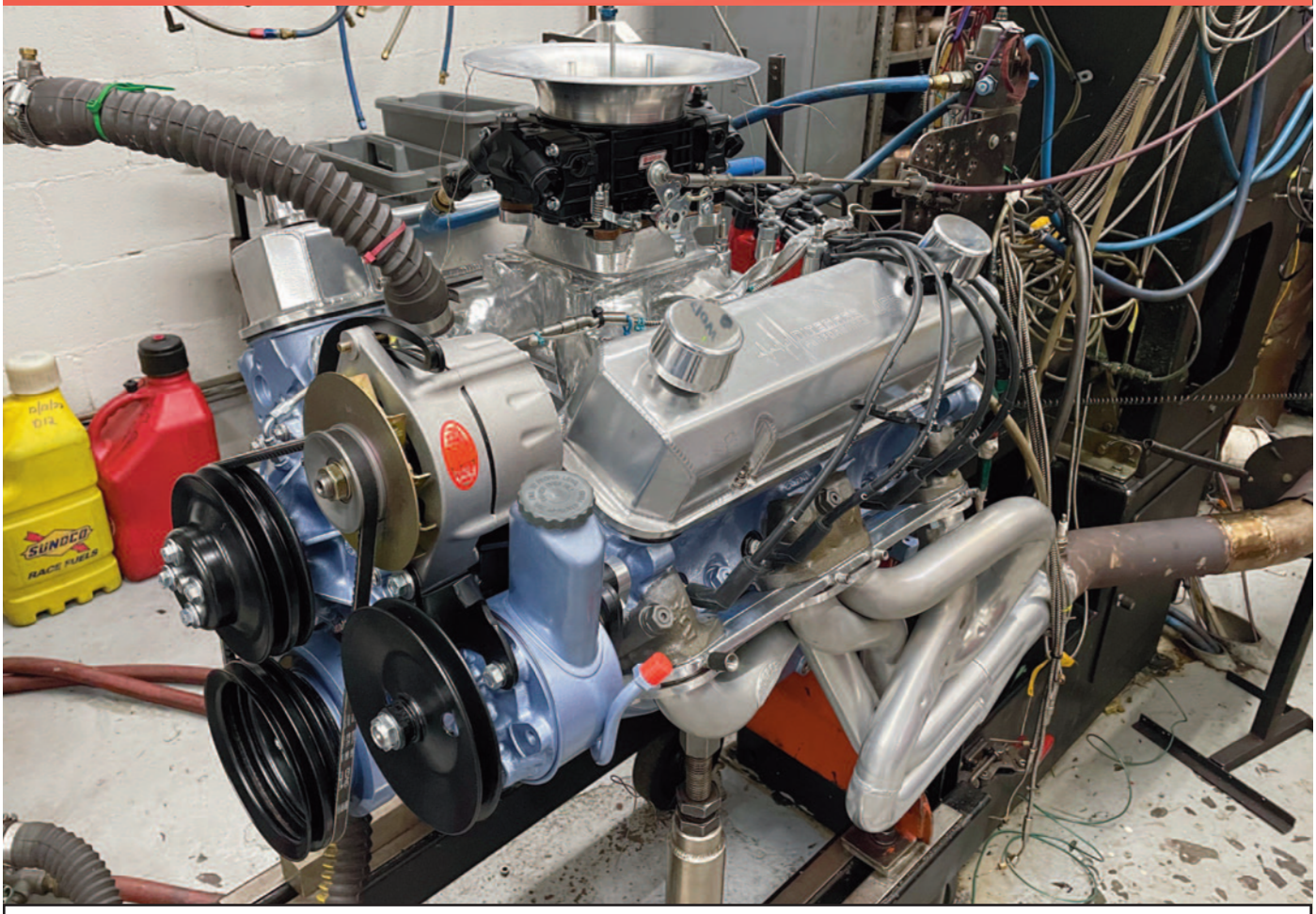
Engine Build: Nitemare Performance Ram Air IV 455

Event Coverage: MCACN 2022

Short-Deck Intake Manifold Update

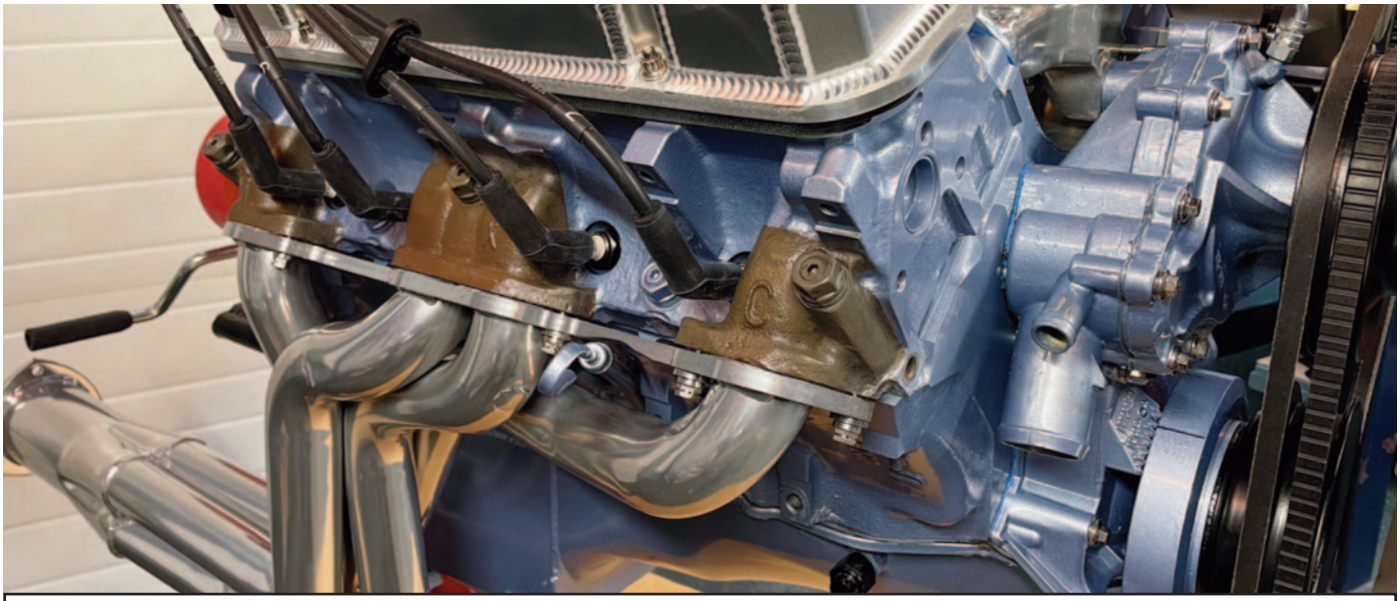
Good Things Come...

When you own your own business building high-performance Pontiacs for your customers, sometimes your own personal projects have to take a back burner for a while. It took Nitemare Performance's Darrin Magro more than a decade to complete his 664-horse, Ram Air IV-headed "455." We'd say that was worth waiting for. Wouldn't you?



It's taken Nitemare Performance's Darrin Magro more than a decade to complete his personal 462-inch Ram Air IV-headed engine while he focused on customer engines and cars. On dyno, it made 664 horsepower and 545 pounds-feet of torque through a single four barrel. It was worth the wait!

By Jason Scott
Photos by Darrin Magro



Magro says he built this bottom end like he builds all of his customer's engines: bulletproof. The real magic is in the heads: 1970 #614 Ram Air IV round-ports that he's massaged to improve intake flow by 29 percent over stock!

There's an old saying: "The cobbler's children have no shoes." It means that the cobbler is so busy repairing shoes for his customers that he doesn't have time to make sure his own kids' shoes get repaired, so they must do without.

Well, Nitemare Performance's Darrin Magro has been so busy building high performance Pontiac engines for customers for the last couple decades, that he never quite had the time to finish building his own dream engine for his 1968 GTO, dubbed "The Cleener," that Magro used to use for a variety of driving competitions before work got in the way. Until recently, that is.

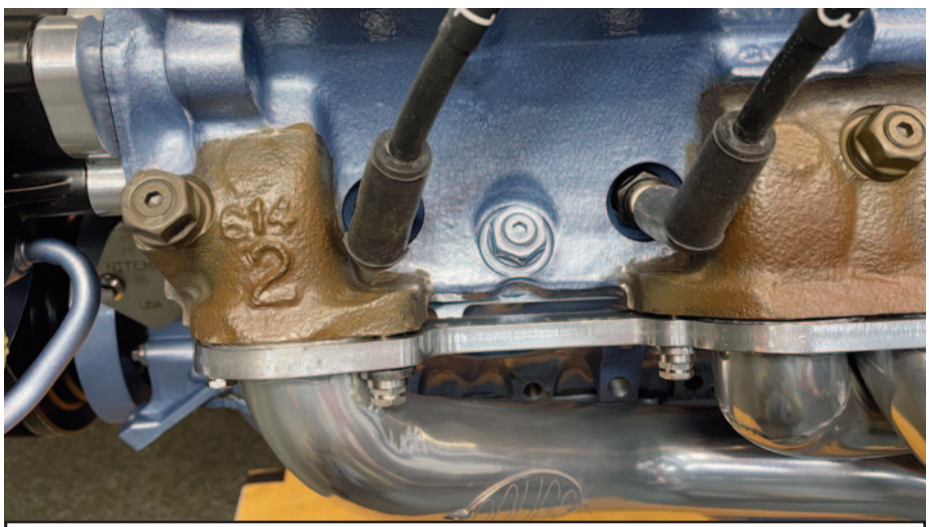
Magro's New Year's resolution for last year — 2022 — was to make time throughout the year to finish a very special engine he'd started building nearly two decades ago for The Cleener: a 455 short block topped with heavily massaged #614 Ram Air IV heads and a very trick intake manifold.

Spoiler alert: The engine hit the dyno in February of 2023 and maxed out at 664 horsepower and 545 pounds-feet of torque! And that's naturally aspirated through a single four-barrel carb!

What did Magro do to his Poncho engine to get that kind of power out of it? Read along as we share with you what Magro told us about his approach to building big power for his Pontiac, so you can for yours, too.

A Simple Approach

As we spoke with Magro about his high-horse 455, he repeatedly emphasized that he approached this engine much like he approaches every



Round-port heads like Magro's #614s flow significantly better than all other Pontiac factory heads except the ultra-rare Ram Air V castings. Magro spent untold hours porting the 614s and verified his improvements on his company's SuperFlow flow bench: 318 cfm on the intake side and 215 cfm through the exhaust ports, each at 0.700-inch lift.

Venolia forged pistons are fairly conventional, save for the dome that provided a whopping 14:1 compression with the 614 heads. Race fuel? Yes, please!

engine he builds for customers: make sure it's durable, first, then make it make power.

Based on that simple approach, Magro built a bulletproof short block to make sure the engine would survive pull after pull, pass after pass, and mile after mile.

To make plenty of power, he focused on maximizing airflow into and through the engine.

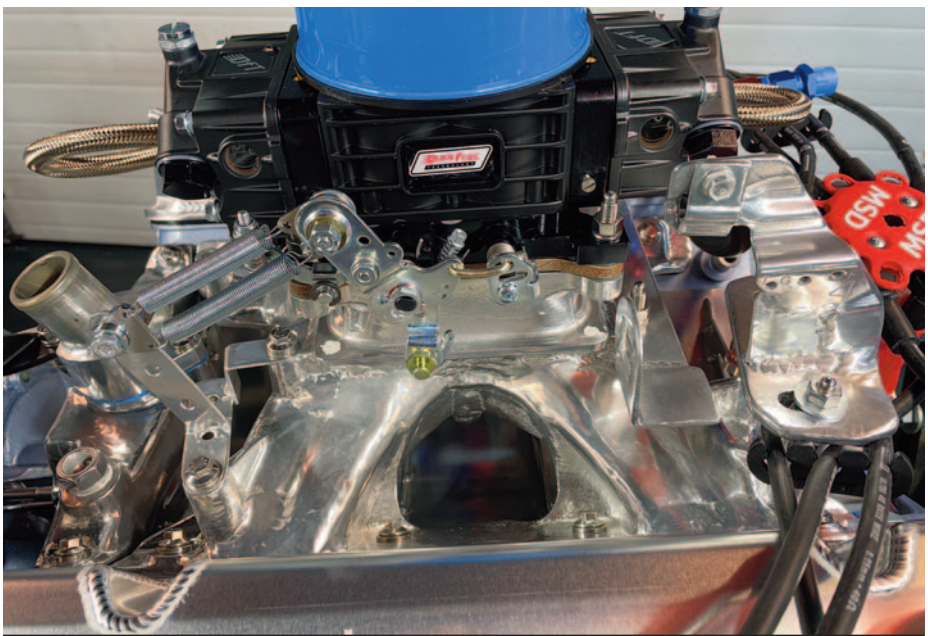
Short Block

The bottom end of Magro's Ram Air IV "455" is technically a 462, thanks to a mild .010-inch overbore for its cylinders, to 4.161 inches, and to its 4.250-inch stroke. Magro explained that he build it the same as he does any Nitemare Performance crate engine...with a couple deviations. "I actually got the block—a 455 H.O. service replacement unit—from Nunzi (Romano) years ago. But I wanted to base the build on the same platform that all my crate motors are built on. So, it's basically like all my crate motors...except it runs race gas and happens to use a 455 H.O. block." He went on to explain that just like the blocks for Nitemare's crate motors, his was cleaned and inspected for cracks. He then treated it to the optional step of sonic checking the cylinder wall thicknesses, in case there was any core shift or troublesome voids (i.e., inclusions) within the casting.

Tried and true Carillo forged connecting rods are slightly longer than stock, measuring 6.80 inches, as opposed to the production length of 6.625 inches. It provides a more favorable rod-to-stroke ratio with the stroker crankshaft.

Even though the H.O. block was a New Old Stock block that came complete with factory pistons stuffed in the cylinders (sans connecting rods), the cylinders needed a slight overbore to ensure they were round, top to bottom, so it was bored with Nitemare's special torque plate attached and the decks were machined to ensure flatness. Since the 455 H.O. already had four-bolt main caps (for the center three journals), Magro stuck with those, then added his company's custom, slightly-oversized dowel pins to prevent the caps from walking, and installed ARP main studs to ensure the caps keep the crank where it belongs.

Speaking of the crank, it's a Sonny



Good head flow won't matter if the carb or intake are a bottleneck. For the engine to fit under a stock '68 GTO hood, Magro started with an Edelbrock Torker I intake and heavily modified it. It's capped with a 950-cfm Quick Fuel Black Diamond four-barrel.

Bryant ultra-light forging with a 4.250-inch stroke, as mentioned. It swings Carrillo forged H-beam rods that measure 6.800 inches long—a bit longer than factory 6.625-inch rods—and are fitted with Carrillo's Multiphase, 285,000 UTS, 7/16-inch CARR fasteners. Rounding out the rotating assembly are custom, domed, forged pistons from Venolia, which has since gone out of business. Combined with the Ram Air IV heads' chambers, compression works out to a tight 14:1 squeeze—something that Magro concedes does require race gas, which is one of only a couple differences between this engine and the crate engines Nitemare Performance usually prepares for customers. Aside from the compression ratio and their only-slightly-larger-than-stock diameter, the pistons aren't particularly unusual—they still feature standard 1/16-inch top and secondary rings, with a typical 3/16-inch oil control ring pack. Oh, and the bearings are typical Clevite bearings, carefully selected and size-matched to journals to provide optimal oil clearances.

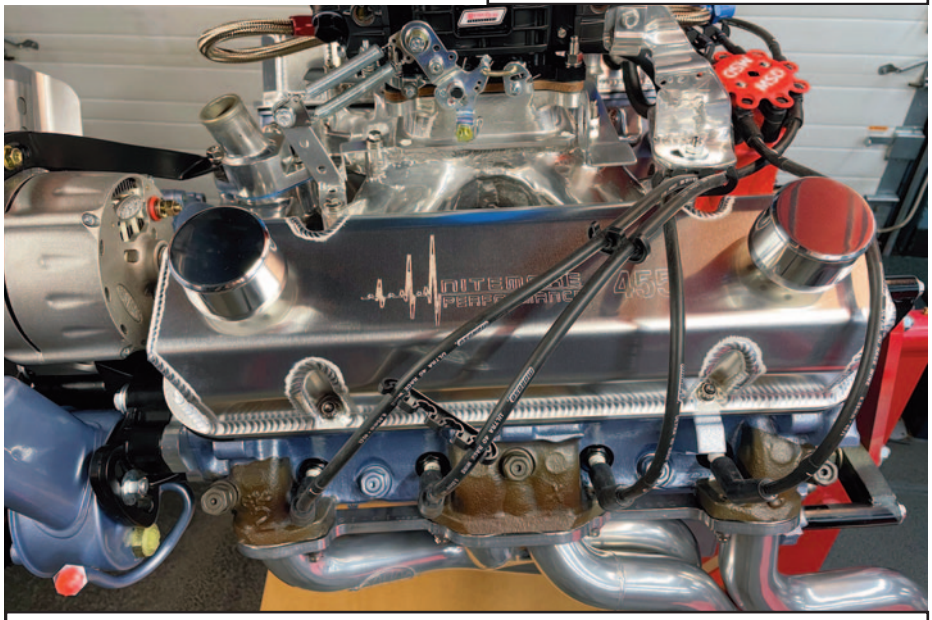
Oiling System

Some of Magro's very first custom-engineered performance parts were upgraded versions of factory oil system components intended to improve lubrication to minimize oil starvation issues. Given that, it should come as no surprise that Magro's personal engine features the full catalog worth of oiling enhancements.

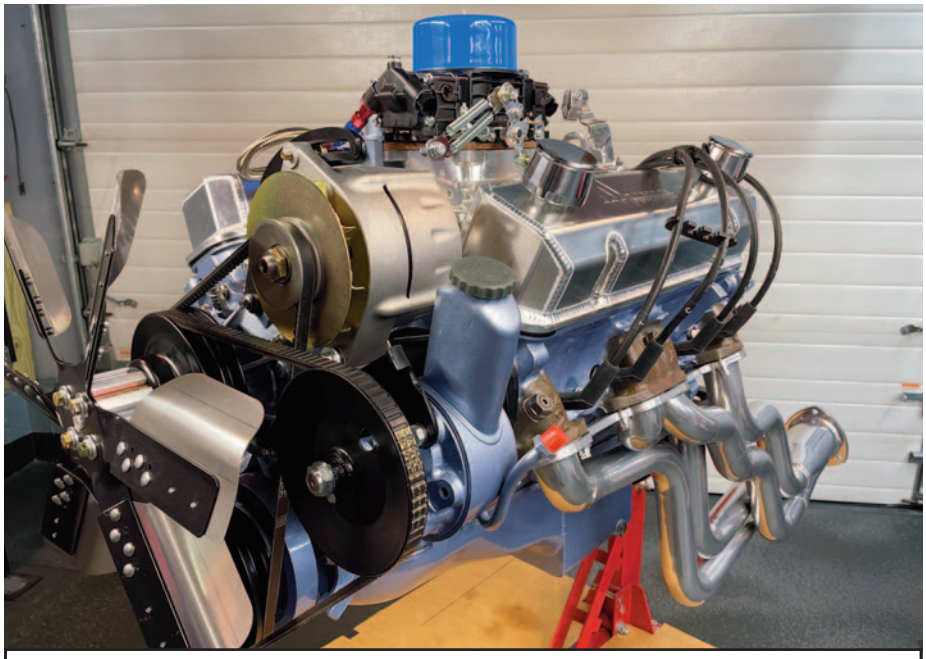
A blueprinted, high-volume oil pump with Nitemare's extra-thick "Pro" oil pump plate that prevents pump distortion ensures a steady flow of oil throughout the engine and features two circular oil grooves to minimize pump gear-to-plate contact. The pump is bolted to the block with one of Nitemare's custom copper oil pump-to-block gaskets to virtually eliminate pressure loss. Finally, the pump is driven by Nitemare's custom-engineered Pro oil pump driveshaft that features a billet collar to keep it positively engaged with the pump's input shaft. A Nitemare-engineered road race oil pan is bolted to the block with a one-piece gasket and, of course, a matching pickup is used for proper clearance.

Another Nitemare-exclusive item is an experimental oil filter housing adapter based on their custom designed, O-ringed, billet aluminum, remote filter adapter. The lines are gargantuan -12 braided hoses—an upgrade over Nitemare's usual -10 lines—to route oil to and from a monster-sized filter that's twice as

Camshaft is a custom Comp Cams mechanical roller. Magro didn't reveal all the specs but said the duration was in the 285-degree range, with .750-inch lift on both sides. It uses Crower solid roller lifter. A lifter brace is used to protect the block.



Ignition duties are handled by an MSD distributor and coil, Moroso Ultra-40 low-resistance wires, and tried and true AC Delco spark plugs. For street use, the Nitemare Performance fabricated valve covers are fitted with an M.E. Wagner two-stage PCV system that helps keep the plugs and the oil clean.



Doug's Headers have 1-7/8-inch primaries and 3-1/2-inch collectors to minimize exhaust flow restrictions out of the engine. Super-thick 3/8-inch flanges help prevent warpage to minimize any leaks.

large as the one in their standard "Pro" oil filter system.

Magro also mentioned that he carefully deburred the heads and block and contoured oil drain back passages to maximize oil flow back to the pan. And the front oil gallery plugs are threaded and feature minute holes to improve oiling of the timing chain.

Camshaft

While the bulk of the bottom end of Magro's engine may be "business as usual," a second area in which it differs from a typical Nitemare Performance crate engine (in addition to the 14:1 compression and H.O. block) is the camshaft: it's a Nitemare-specified custom profile ground by Comp Cams, and features .750-inch lift on both the intake and exhaust. The cam is still a bit experimental and part of the secret sauce that Magro isn't quite ready to divulge to his competitors, but he did share that duration at .050-inch was "in the 285 degree range." It's held in place by a Nitemare Pro cam plate and driven by their .005-undersized timing set that includes a bronze washer.

Riding the lobes are Crower solid roller lifters, which Magro pointed out raise a particular concern for most factory Pontiac V-8 blocks: their weak lifter bosses. Roller cams and lifters generate different side-loading than flat-tappet cams and lifters, which can cause the bosses in which the lifter bores are machined to crack—a known issue with max-effort Pontiac blocks. Magro utilized a lifter boss brace kit that's no longer in production and which required a fair amount of hand-modifications to fit the block properly, but he mentioned that he recently found CNC-machined Big Brace kits made by Kristinn Rudolfsson out of Iceland and is using them in several builds that he currently has in progress.

Cylinder Heads

It's often been said that internal combustion engines are basically just glorified air pumps: the more air that moves through them, the more fuel can be added to that air, so the more power can be generated.

In the case of Magro's engine, he knew he was going to need it to flow a lot of air to make the kind of power that he had in mind. He said he thought about going with more exotic heads—like Ram Air Vs or some of the aftermarket heads—but ultimately wanted his engine to showcase what he can do for any of his customers without them having to sell their house to be able to afford nice heads.

So, Magro selected a set of original 1970 "614" Ram Air IV heads, which he said flow quite well in stock form, but flow "exceptionally well" after he's done porting them.

Nitemare's SuperFlow flow bench tells just how well "exceptional" is: Factory IV intake ports flow 246 cfm at .700-inch lift; Magro's modified IVs flow an astounding 318 cfm! That's 72 more cfm—a more than 29 percent improvement over stock!

And what about the exhaust side? Magro explained the 614's round exhaust ports already flow 180 cfm at 0.700 inches, which is pretty good. But to ensure the exhaust ports weren't a bottleneck, Magro cleaned-up the bowls, removed casting flash, and subtly reshaped things for a healthy 19 percent improvement to 215 cfm! Only the cavernous tunnel-port Ram Air V heads flow better from the factory.

Like the block, the head's deck surfaces were machined for flatness, and Magro performed a multi-angle valve job, installed new guides and milled them to accept Viton seals, and cut the spring pockets to optimize installed heights, among other machining done on Nitemare Performance's high-tech Rottler cutters and resurfacing equipment.

The heads were fitted with Ferrea stainless valves, while springs, retainers, locks, and lash caps from Comp Cams keep valve events under control.

Magro also selected Comp Cams 3/8-inch tapered, chromoly pushrods to tip the rockers in the T&D rocker shaft system that features 1.6:1 rockers.

Intake and Carburetor

To feed air and fuel to the cylinders, Magro needed a highly efficient induction system ... but he also needs it to fit under a stock, 1968 GTO hood. Tunnel rams and high-rise single planes won't clear.

So, for the intake, Magro used an old Edelbrock Torker I that he'd used on a few of his personal engines before. But it was treated to significant porting and port-matching to the oversized Ram Air IV head intake ports, as well as "other modifications" that Magro wouldn't go into in detail to get it to flow enough air to feed his 455 at full song.

The intake was low enough, though, that he was able to squeeze a 1/2-inch phenolic spacer between it and the Quick Fuel 950-cfm Black Diamond four-barrel carb that mixes fuel and air, while a Holley VoluMax hi-flow, adjustable fuel regulator optimizes fuel pressure, which will be supplied by a Holley electric fuel pump, once the engine is installed in The Cleener.

Beneath the intake, Magro installed one of his Nitemare Performance stainless steel, gusseted valley pans that saves a bit of weight and improves airflow under the intake compared to factory pans, to better help keep the intake cool.

Ignition System

To light the air and fuel in the cylinders, Magro relies on a highly-effective, tried-and-true combination of an MSD distributor, coil, and multi-spark box, Moroso Ultra-40 low-resistance wires, and AC Delco plugs.

Timing always varies depending on specific parts, but given Magro's 14:1 compression, custom cam, Ram Air IV heads, and other components, the engine made its best power on the dyno with timing locked in at 36 degrees total timing. But, as the saying goes, your mileage may vary.

Exhaust

One of the hallmarks of Pontiac's

Magro's 455 is fitted with factory pulleys, which conceal a Nitemare/BHJ press-on balancer to minimize engine vibrations. An Evans water pump is fitted to a factory timing cover, and one of Nitemare's Pro Series billet water necks houses a high-flow thermostat.

Nightmare Performance 455 Pontiac Corrected Dyno Data

Engine RPM	Corrected Torque	Corrected Horsepower
4,000	498.6	379.8
4,100	507.0	395.8
4,200	514.6	411.5
4,300	523.2	428.4
4,400	530.7	444.6
4,500	535.4	458.8
4,600	539.4	472.4
4,700	540.6	483.8
4,800	541.2	494.7
4,900	542.0	505.7
5,000	541.0	515.1
5,100	538.0	522.5
5,200	532.4	527.1
5,300	531.4	536.3
5,400	532.9	547.9
5,500	537.1	562.4
5,600	542.7	578.7
5,700	544.8	591.2
5,800	541.5	598.0
5,900	539.1	605.6
6,000	538.7	615.4
6,100	539.4	626.5
6,200	536.2	633.0
6,300	533.5	640.0
6,400	531.4	647.6
6,500	528.1	653.6
6,600	523.7	658.1
6,700	518.8	661.8
6,800	512.9	664.1
6,900	504.8	663.1
7,000	493.9	658.3

Ram Air IV (and Ram Air II, and H.O. and SD-455) heads are their round exhaust ports. To complement them, Pontiac engineers sculpted gorgeous, free-flowing, cast-iron exhaust manifolds that were far more efficient than standard log-style manifolds.

But even the factory round-port manifolds—or even the oversized aftermarket variations that are available—don't flow well enough to fully evacuate exhaust gases from the cylinders of Magro's 455. Instead, he bolted on a set of metallic ceramic-coated headers from Doug's, which feature nice, beefy flanges to prevent warpage when subjected to significant heat. The primary tubes ares 1-7/8 inches in diameter, while the collectors are 3-1/2 inches. Magro says that he did have to massage the headers in a few spots for bolt clearance and to ensure a perfect seal against the heads, but says the Doug's headers are still among the best-fitting and best-functioning headers on the market for high performance Pontiacs.

In the car, the headers will bolt to a custom 3-1/2-inch exhaust system, to maximize flow, while chambered mufflers will keep the rumble to (mostly) legal levels.

Miscellaneous

An assortment of other components complete the build. Most notably are a Nitemare/BHJ press-fit balancer, factory pulleys and brackets, a TCI flexplate, one of Nitemare's billet water necks, and—for a little bling and valvetrain clearance—a set of Nitemare's custom, fabricated aluminum valve covers with an M.E. Wagner tunable, two-stage PCV system that dramatically improves spark plug and oil life on street-driven vehicles.

Proof Is In The Pudding

Having made 664 horsepower and 545 lbs.-ft. of torque, the engine is a beast. Magro has nestled it between the frame rails of his 1968 GTO "The Cleener," which Magro completely rebuilt over the last 18 months, too. He plans to trot out The Cleener at a number of events this year, including land speed racing, where the Ram Air IV 455's high-rpm and high output should make for some outstanding runs. We'll bring you more about The Cleener and its performance achievements in future issues. We're very excited to bring you the next part of the story and we're looking forward to bringing it to Pontiac events! ***PP***