

Dept X: 2003 G6  
Concept

Don Keefe's  
**PONCHO  
PERFECTION**

Volume 4, Number 8 August 2018  
\$9.99 US \$11.99 Canada

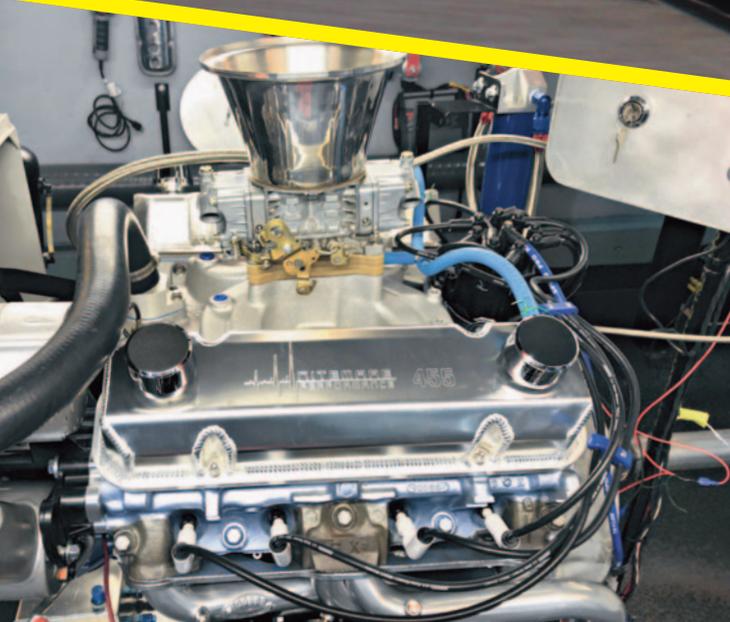


# Pro-Touring '65 GTO



The ONLY All-Pontiac Magazine!

What If? 1933 Pontiac  
Boattail Speedster



Pontiac V-8  
Engine Tech:  
Final Assembly



## Blueprinting Basics: **Finishing Touches**

**Tips and Tricks for Completing Final Assembly and Performing a Proper Initial Fire-Up and Break-in**



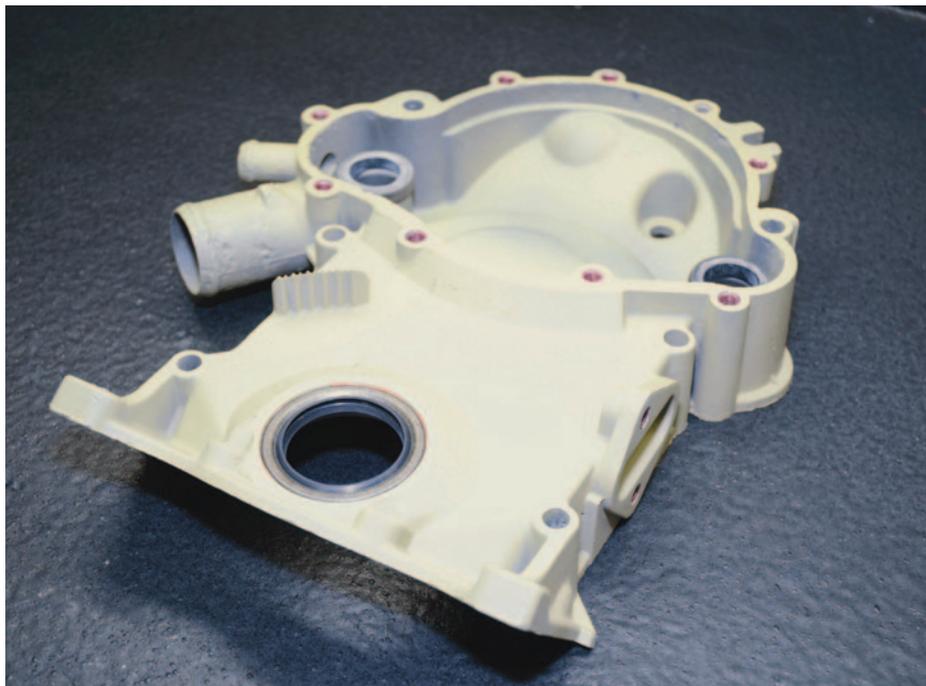
Nitemare Performance wrapped up the build of its to-be-raffled-off crate engine with a host of high-performance "accessories" and a heaping helping of processes aimed at optimizing its performance and reliability for the lucky winner. Will it be you?

**Story by Jason Scott**  
**Photos by Darrin Magro**

**I**t's tempting to think that once you bolt the heads on your engine for the final time that you're in the homestretch and you can just throw the rest of the engine together. But the truth is, just about everything that still has to be installed needs to be given just as much care and attention as you gave to the bottom end, the oiling system, the cam and valvetrain, or the heads.

The final assembly stage of your Pontiac's engine will affect how well it will run, how long it might last, and how good it will look under the hood. So there's a lot riding on these final processes.

Nitemare Performance has developed its final assembly protocol over decades of rebuilding countless Pontiac V-8s, and the shop owner, Darrin Magro, volunteered to share some of their best-practices with you, to help improve the outcome of your next engine build.

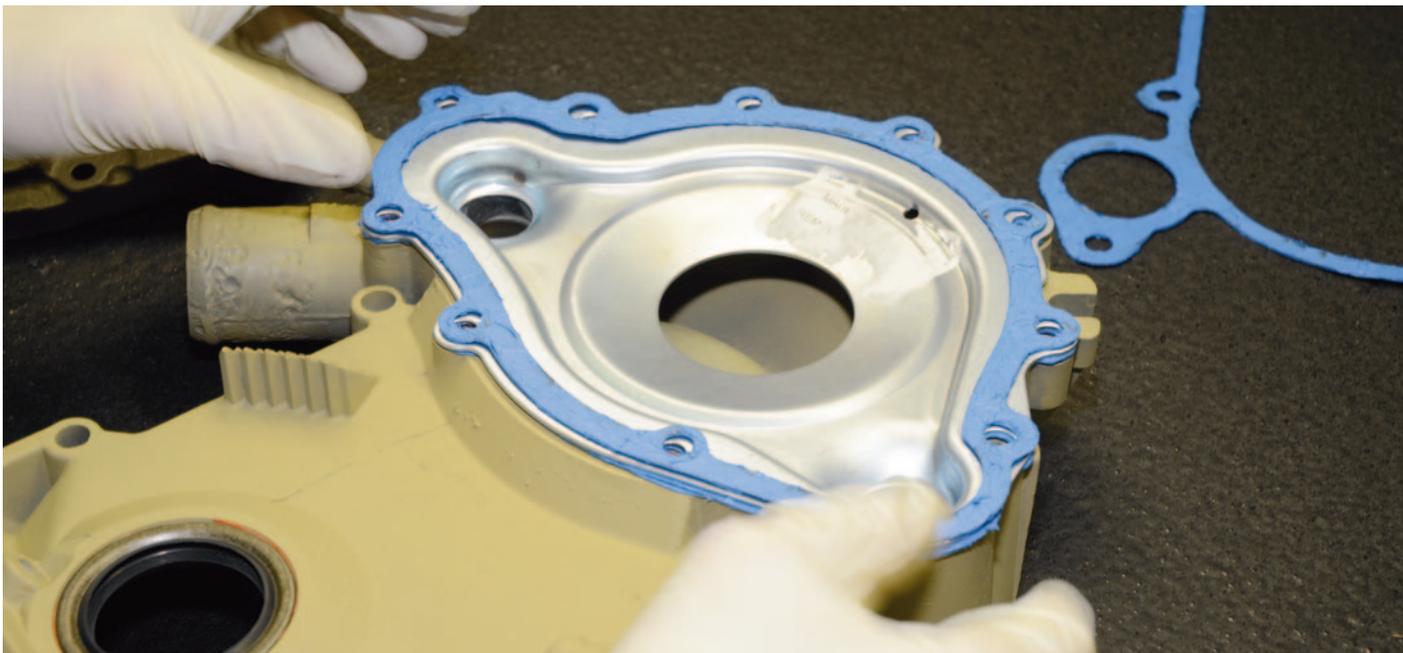


**Magro had to install the timing cover way back before he could install the oil pan, but we didn't show you what was involved with that, then. Magro starts with an undamaged factory timing cover, has it media blasted, then heli-coils every bolt hole to ensure the threads are perfect. He then primes it and installs a new crank seal.**

So follow along as Magro shows us the steps that Nitemare Performance takes to wrap-up an engine, and some of the tricks it employs to im-

prove the reliability, performance, and appearance of the crate engine that they are raffling off later this summer.

**PP**



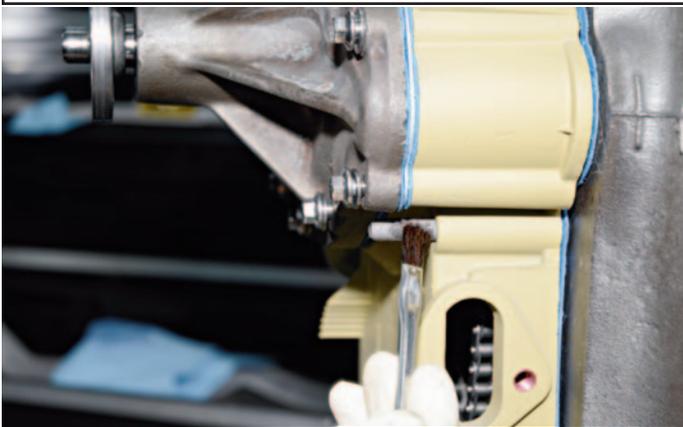
**After installing two new GM water pump inserts with fresh rubber seals, he lays down a Cometic water pump gasket, a new GM water pump plate, another Cometic gasket. While Magro says the Cometic gaskets tend to be good-to-go right out of the box, he test fits and preps them ahead of time to ensure that they fit perfectly and will provide a leak-free seal. This is yet another example of the level of detail that goes into blueprinting an entire engine.**



Magro installs a new water pump that he modifies with a drilled and tapped hole next to the center rib, which will help reduce cavitation caused by trapped air. We'll show you more about this in a bit.



The water pump and timing cover assembly is installed on the block with another perfect-fit Cometic gasket. Note how the gasket is ideally aligned with the mounting studs, the dowel pins near the pan rail, and the bolt holes above the water jacket.



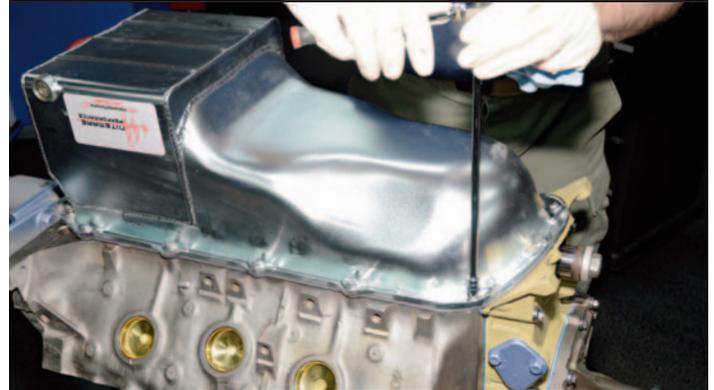
Another easily (and often) overlooked step: Magro applies a light coat of oil to the timing cover mounting stud threads. The oil not only lubricates the nuts as they're installed, but helps prevent rust and corrosion that makes the nuts harder to get off later.



A Nitemare Performance external dipstick tube is installed, since factory ones are often damaged and impossible to find new.



Magro then applies a dab of sealant to the timing cover-to-block mating surfaces, as well as the corners of the rear main cap.



After setting a BOP Engineering one-piece, silicone oil pan gasket with anti-crush sleeves in place, the Nitemare Performance road racing-ready oil pan is installed and the bolts are tightened in multiple steps and in the factory-recommended sequence, all of which helps minimize the chance of leaks.



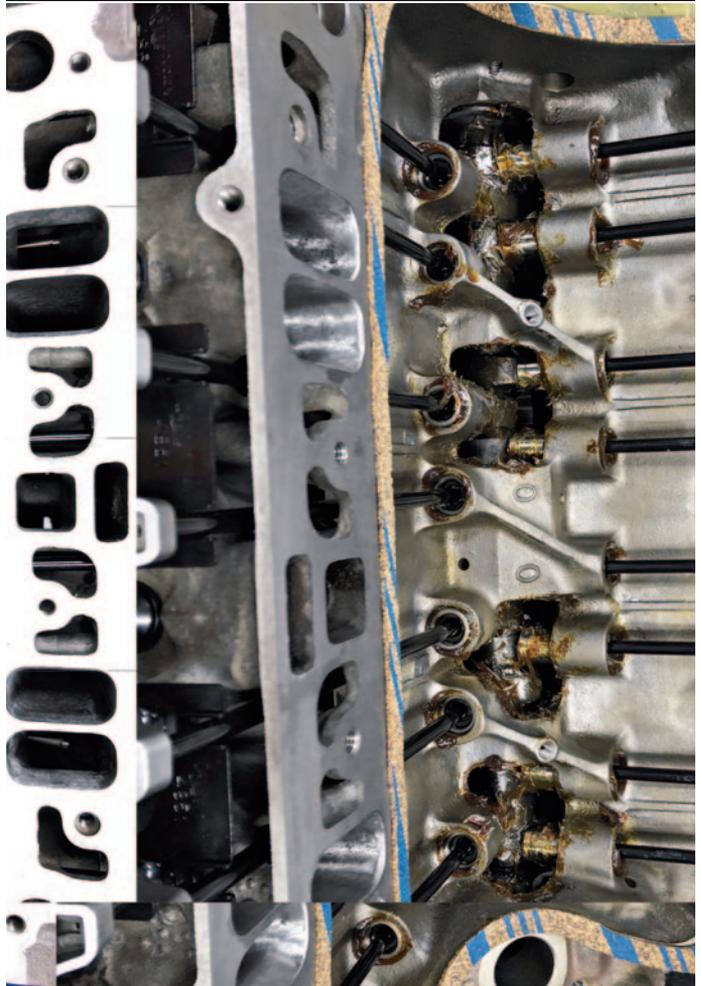
Left: Back up top, Magro will close-up the lifter valley with one of Nitemare Performance's custom-designed, precision-shaped and trussed Pro-series stainless steel valley pans. Many factory valley pans have succumbed to rust over the years; the stainless Nitemare pan will eliminate that as a concern and fits better than most factory pans ever did.



Before the valley pan can be set in place, it needs a gasket, and to keep it properly located, Magro applies a thin coat of rubber cement to both china walls and the bottom edge of each cylinder head, beneath the intake ports.



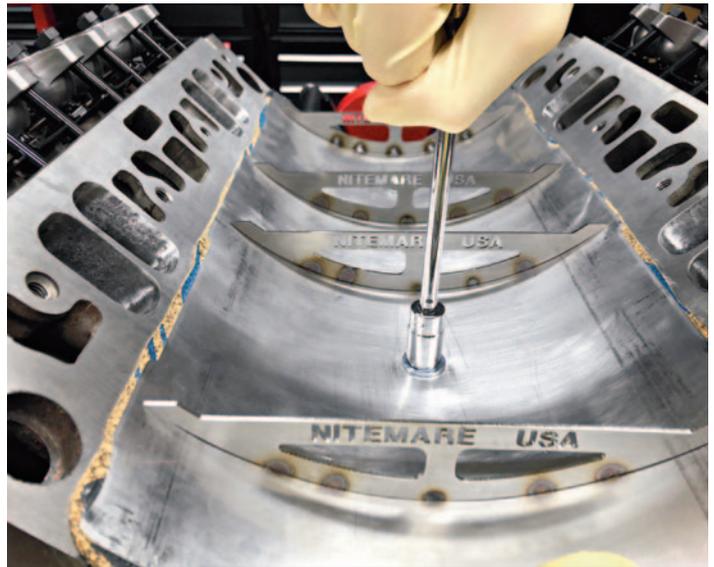
As with the oil pan, Magro applies a thin coat of sealant to the corners, where the heads meet the block, to further minimize the chance of any leaks.



Next, Magro sets the one-piece cork gasket onto the rubber-cemented surfaces, being careful to get the placement correct, then he gently presses it down everywhere – especially in the corners – to make sure the gasket is properly seated on the engine.



After a couple more small dabs of sealant on the corners of the cork gasket, the Nitemare Performance Pro Series Valley Pan is set in place.



Magro then bolts the valley pan in place, being careful not to over-tighten it, which could either deform the pan or hamper how well the gasket seals.



For the final step of the valley pan installation, Magro uses a utility knife to trim the excess valley pan material to prevent it interfering with the intake gaskets, when they're set in place.



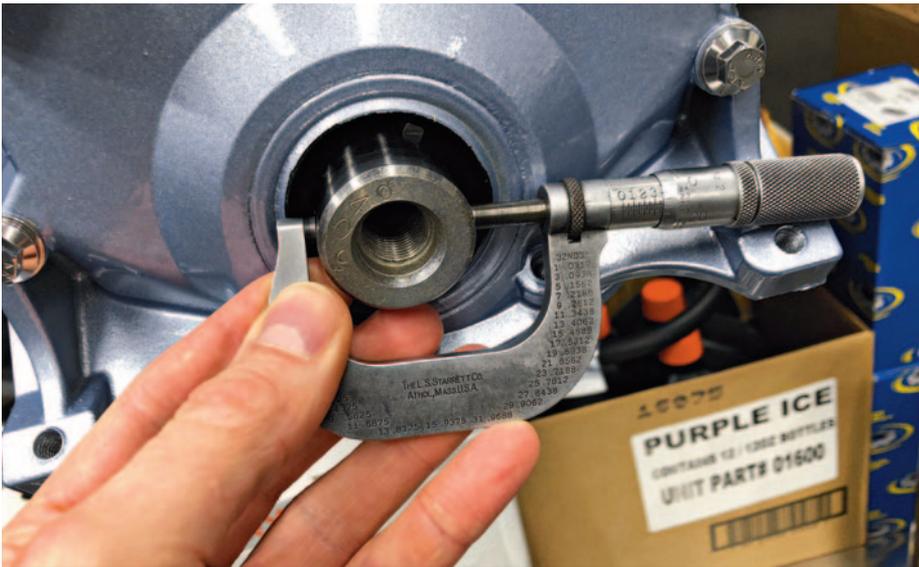
At this point, Magro masks off the intake gasket surfaces, various fasteners, and – notably – the space above the exhaust ports, where engine paints always burn, anyway. He then sprays the engine with a high-quality, high-temp primer.



Once the primer has dried, Magro applies several light coats of a specially-formulated, highly-durable, high-temp engine paint.



The factory didn't do this, nor do many other engine builders, but it pays to take the time to rotate the engine upside down so that you can ensure that the entire engine – including its underside – gets properly coated with paint, to prevent rust or discoloration.



With the paint dry, Magro moves on to installation of the harmonic damper, starting with measuring the diameter of the crank snout with a micrometer.



Magro then compares the snout dimension to the inside diameter of a Nitemare Performance/BHJ Dynamics Pontiac-specific damper. Magro insists on a slight interference fit, which varies between 0.0005-0.015-inch, depending on the crank snout dimension, to ensure the damper doesn't wobble on the crank—even at high RPM.



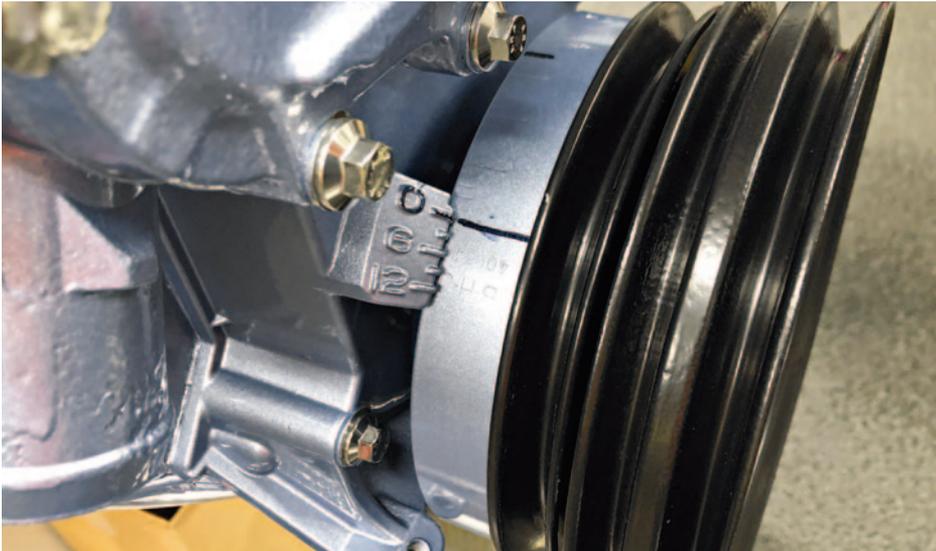
Another simple step: verifying that the thickness of the Cometic multi-layer steel head gaskets are correct. Installing the wrong gaskets – too thick or too thin – could be disastrous, and it only takes a few seconds to measure them with a caliper, as shown here.



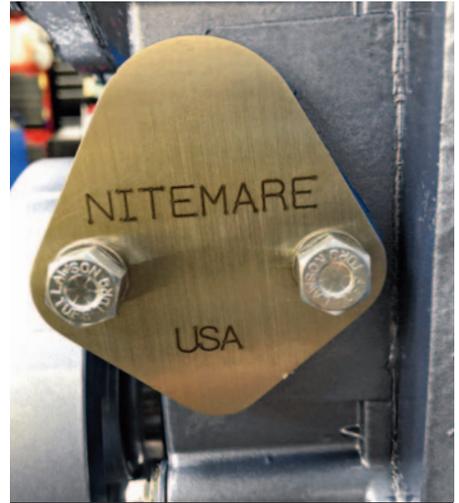
After damper installation, a factory GM retaining bolt and washer are installed, to secure the damper on the crank.

Right: A couple things worth noting about the Nitemare/BHJ damper: First, there's its interference fit on the crank. Second, it's SFI-approved, so it's safe for strip duty. Third, the front face of Nitemare's damper is specially beveled to provide clearance for factory air conditioning pulleys, which have an unusual rear offset. And, finally, the Nitemare/BHJ dampers feature the proper diameter to fit beneath the factory timing cover's timing tab. Many aftermarket dampers lack these features and can cause a variety of installation issues.





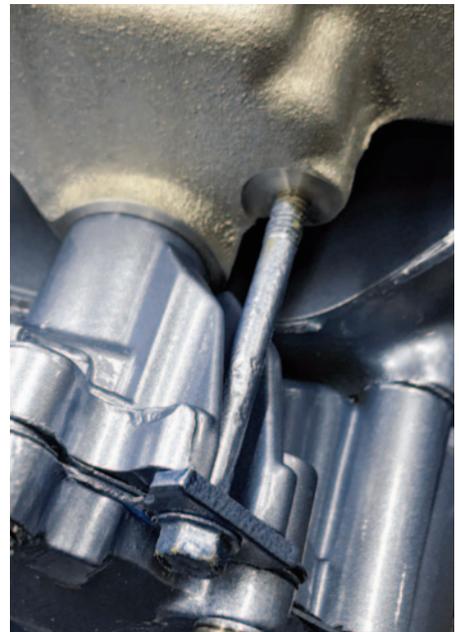
Powder-coated factory AC and crank pulleys are installed. Magro recommends marking the balancer's timing groove and the 0 degree line on the timing tab to make spotting the lines when setting the timing that much easier later on.



Installation of an extra-thick, Nitemare Performance stainless steel fuel pump block-off plate completes the timing cover assembly. Magro recommends use of an electric fuel pump, because they ensure sufficient fuel flow that will produce optimal power. More importantly: an electric pump should prevent the engine from leaning out under heavy loads, which could cause damage to pistons, rings, or even valves.



The engine really starts to take shape with the installation of an intake manifold, in this case, a single-plane, aluminum Edelbrock Torker II that Magro port-matched to the heads and intake gaskets, to minimize flow restrictions.



To minimize the chance of a leak at the intake/timing cover coolant crossover, Magro recommends tightening the crossover draw bolt before tightening the rest of the intake bolts, that allows the intake to be pulled tight against the timing cover for a good seal.



Nitemare Performance typically recommends either a 160- or 180-degree (F) thermostat for non-emissions-controlled engines, depending on your driving conditions.



With the supply of NOS GM water necks all but gone and original water necks succumbing to corrosion or cracks, Nitemare Performance developed its own milled billet aluminum water neck.



The underside of the Nitemare Pro Series Water Neck is milled to produce a smooth transition for coolant from the thermostat to the upper radiator hose. The base is extra thick and milled perfectly flat for a superior seal, minimal warpage, and improved resistance to cracking.



Nitemare installs a braided stainless steel water pump "jumper" line from the specially-drilled and tapped hole at the highest point of the water pump to a drilled and tapped hole on the water neck. The line allows any air trapped in the water pump to escape, preventing cavitation of the pump and improving cooling system efficiency.



Satisfied that the Cometic gaskets are good to go, Magro sets the heads on the block, and ensures that they stay properly located by the dowels.



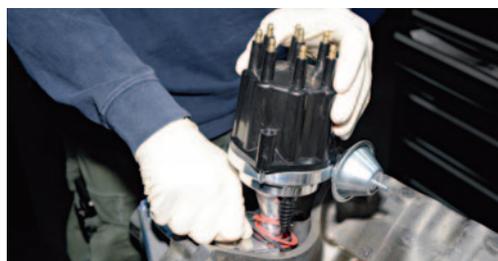
While at the back of the engine, Magro also installs a high-quality oil pressure fitting, which will be vital leading up to and during the break-in process.



A set of Nitemare Performance fabricated aluminum valve covers not only add some visual pizzazz, their extra thick base surfaces resist warping to improve sealing, plus they provide clearance for taller valve-train assemblies.



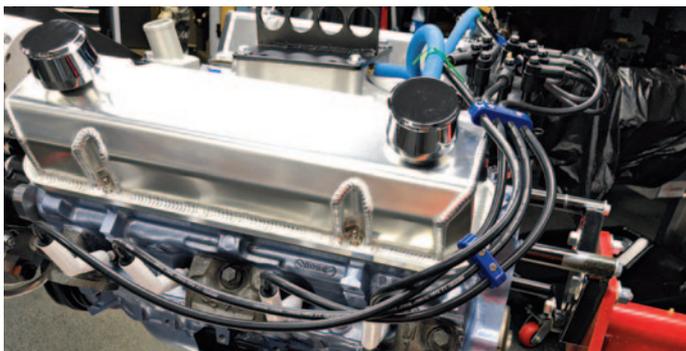
Nitemare plumbs the rear valve cover breathers via hoses and "T" to a fitting at the rear of the carb mounting flange. The minimal amount of oily crankcase vapors don't tend to cause any performance or plug-fouling issues, and Nitemare's venting method definitely minimizes oily smoke and residue under the hood.



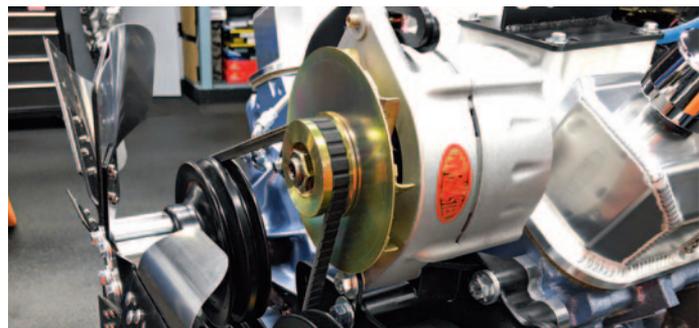
For the ignition system, Nitemare Performance is equipping the raffle engine with a Pertronix Plug-n-Play Billet distributor, seen here being test fit earlier in the build. The unit is far superior in construction and performance to factory points-style distributors, yet looks enough like a stock distributor to fool at least casual observers.



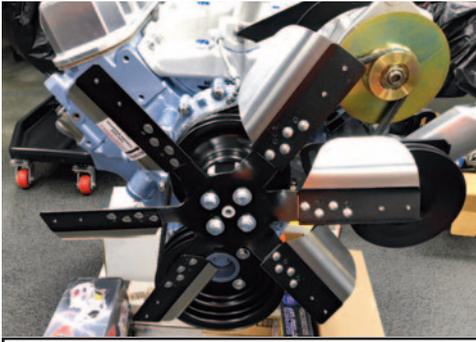
Left: Perhaps the most important upgrade in the Pertronix distributor is its Ignitor III electronic ignition module that eliminates points in favor of a vastly more reliable Hall-effect trigger, with its built-in multi-spark capability, adaptive dwell and timing curves, plus an adjustable rev-limiter. Thanks to the Ignitor III, the raffle engine's ignition system will be more reliable and provide for a more thorough burn of the air/fuel mix for more power and better economy. Not bad for something that fits inside a distributor cap.



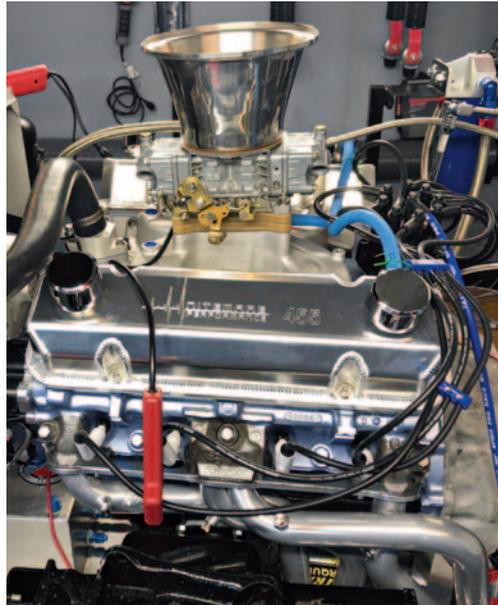
Paired with the Pertronix distributor is a 45,000-volt high-output Flame Thrower coil that produces a hotter spark with a faster recharge time, plus customized 8mm Flame Thrower ignition wires with ceramic boots that are practically impervious to exhaust heat yet offer low resistance to deliver more spark energy to the plugs.



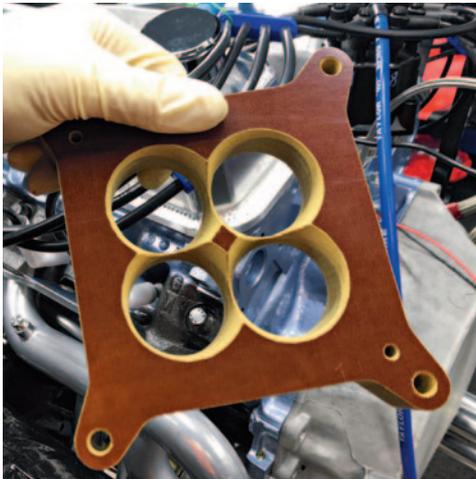
On the front of the engine, Nitemare installs a Powermaster high-output alternator that provides nearly double the amperage of an original 1960s unit yet fits in the stock brackets. Nestled beneath the alternator is a B&B Performance factory-style power steering pump, also in powder-coated factory brackets. V-belts from B&B allow the crank pulley to power all the accessories.



A B&B Performance aluminum flex fan and spacer are bolted to the water pump snout to complete the front end and will help draw plenty of air through the radiator to keep the healthy Poncho cool yet will flatten out at higher RPM to minimize parasitic drag on the engine.



A key process at Nitemare is breaking-in and run-testing each and every engine they build on their custom run stand, based on the front frame section from a '68 GTO. A pair of shop headers are used for break-in but will be replaced by a new, ceramic-coated set of Doug's Headers for the lucky winner of the raffle. A special upside-down Nitemare Performance/Powermaster high-torque mini-starter was bolted on to engage with the new TCI Automotive SFI-approved flex-plate among other items to get the engine ready to run.



A one-inch "Power Cone" phenolic carb spacer from Jomar Performance will improve airflow into the intake and help isolate the carb from engine heat.



Engine break-in is performed with an already proven, dialed-in Holley carb that Nitemare keeps to ensure a quick initial fire-up and minimize the chance of issues during the critical break-in process. After break-in, the Holley will be replaced by a Quick Fuel Street-Q 850 cfm carb that Magro will tune for optimal performance.



One of the final steps prior to fire-up is to remove the distributor and dump in several quarts of Driven's high-zinc Break-In oil to prevent wear of the cam, lifters, or other components during those critical first few minutes of life.



Then Magro primes the oiling system using an electric drill and priming shaft to drive the oil pump. This step is vital, as it ensures that all wear surfaces in the engine have an immediate supply of oil to prevent wear during fire-up.



With the distributor back in place, coolant ready to circulate, and other vital connections made, the engine is cranked over and immediately brought to 2200 rpm for 20 minutes to break in the cam and lifters. Note that during break-in, only the outer valve springs are used, to minimize pressure on the cam lobes.

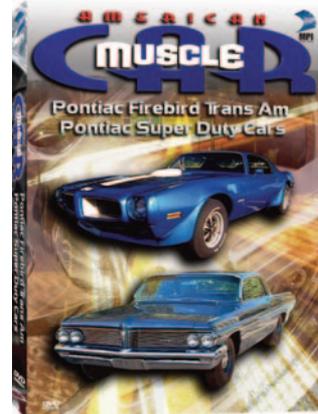
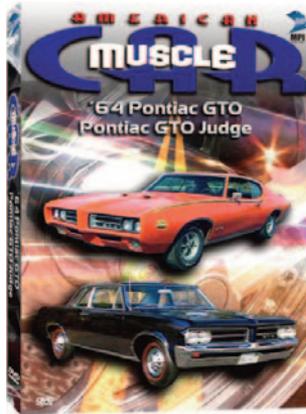


To protect the hearing of Nitemare's staff (and be kind to its neighbors), Magro runs exhaust from the Doug's Headers through a pair of turbo-style mufflers before venting out the shop door.

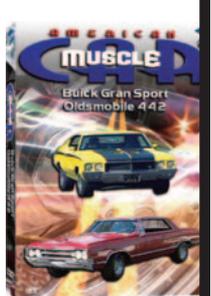
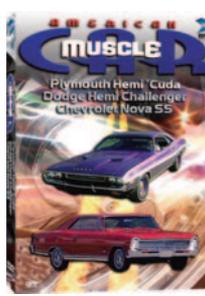
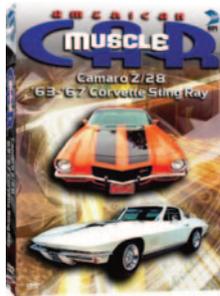


With the break-in complete, Magro reinstalls the inner valve springs, swaps on the Quick Fuel Street-Q 850 cfm carb, and gets everything tuned for delivery to the lucky winner, later this summer.

# AS SEEN ON SPEED CHANNEL



THE ORIGINAL AMERICAN MUSCLE CAR TV SERIES  
NOW AVAILABLE ON DVD



EACH DVD CONTAINS 2 COMPLETE SHOWS!  
EACH COMPLETE SEASON (2 DVDS) IS 12 SHOWS

ORDER INDIVIDUALLY (\$7.99) OR ORDER COMPLETE SEASONS (\$12.99) FROM

SEASON 1

SEASON 2

## CustomAutoApparel.com

Largest distributor of the finest Pontiac embroidered apparel anywhere!



PONTIAC



CHEVROLET



BUICK

Polos shirts, hats,  
tee shirts, denim shirts,  
jackets, sweatshirts, hoodies, and more!

**412-678-8402**

**Gnx547@comcast.net**

*We also do custom embroidery!*



## Sources

**Nitemare Performance**

[www.nitemareperformance.com](http://www.nitemareperformance.com)

Pro Series aluminum water neck with jumper line, modified water pump, stainless valley pan, aluminum valve covers, fuel pump block-off plate, external dipstick tube, full factory pulley and bracket system, final assembly, custom painting, break-in, tuning.

**B&B Performance**

[www.bbperformance.com](http://www.bbperformance.com)

Fan, spacer, V-belts, power steering pump, lift plate, various fittings and plugs.

**BHJ Dynamics**

[www.bhjdynamics.com](http://www.bhjdynamics.com)

Harmonic dampener.

**Central Connecticut Coatings**

[www.centralctcoatings.com](http://www.centralctcoatings.com)

Powder-coating for pulleys, brackets; high-temp, dry film coatings for valley pan.

**Cometic Gaskets**

[www.cometic.com](http://www.cometic.com)

Timing cover, water pump, intake manifold, valve cover, and carburetor gaskets.

**Competition Cams**

[www.compcams.com](http://www.compcams.com)

Valve springs.

**Driven Racing Oil**

[www.drivenracingoil.com](http://www.drivenracingoil.com)

Break-in and general-use motor oil.

**Doug's Headers**

[www.pertronix.com/prod/ex/dougs](http://www.pertronix.com/prod/ex/dougs)

Metallic-ceramic coated exhaust headers.

**Holley Performance**

[www.holley.com](http://www.holley.com)

Quick Fuel 850 cfm carburetor; air cleaner assembly.

**Jomar Performance**

[www.jomarperformance.com](http://www.jomarperformance.com)

Phenolic carb spacer; AN wrench set.

**National Performance Warehouse**

[www.nationalperformance.com](http://www.nationalperformance.com)

Engine fastener kit.

**Pertronix**

[www.pertronix.com](http://www.pertronix.com)

Distributor, electronic ignition module, ignition wires.

**Powermaster Performance**

[www.powermastermotorsports.com](http://www.powermastermotorsports.com)

High-performance starter motor and alternator.

**TCI Automotive**

[www.tciauto.com](http://www.tciauto.com)

SFI-approved flexplate.

## Win This Engine!

One hundred tickets are being sold at \$100 each, with all proceeds from the raffle going to The Tomorrow Fund and Alex's Lemonade Stand Foundation charities to benefit children afflicted with cancer. Each \$100 ticket gets you a 1-in-100 chance of winning this very engine. The engine build-up will be covered here in the pages of *Poncho Perfection*, and the drawing for the raffle will take place on September 23 at the Pontiac Registry's "Pontiacs With A Purpose" event in Warwick, Rhode Island.

To purchase a ticket, make out a check or money order to Pontiac Registry Fund and send it along with a self-addressed, stamped envelope to:

**Nitemare Performance**

**11 Belmont Rd**

**North Haven, CT 06473**

Don't forget to include your full name, daytime phone number, and email address for notification purposes.

For more info about the raffle, visit [nitemareperformance.com](http://nitemareperformance.com); event info: [pontiacregistry.com](http://pontiacregistry.com).



**CELEBRATING  
PONTIAC'S  
RICH HISTORY**

**2018**

**PONTIACS**  
with a  
**Purpose™**

# **A PONTIAC CELEBRATION**



## **EASTERN REGIONAL MEET**

Warwick, Rhode Island • September 21-23, 2018

**ALL PROFITS GO TO FIGHT  
CHILDHOOD CANCER**

- **Friday Night Parking Lot Party and "Teddy Bear Cruise" at Host Hotel- all cars welcome!**
- **Informative Technical Seminars**
- **Saturday Afternoon ALL Pontiac Show**
- **Saturday Night Family BBQ Party**
- **Sunday Farewell Breakfast**
- **Swap Meet & Arts and Crafts -**



FOR INFORMATION: E-Mail: [info@pontiacregistry.com](mailto:info@pontiacregistry.com)  
or [frdigi@cox.net](mailto:frdigi@cox.net) / call 941-792-6279 or local (RI) 401-934-0663