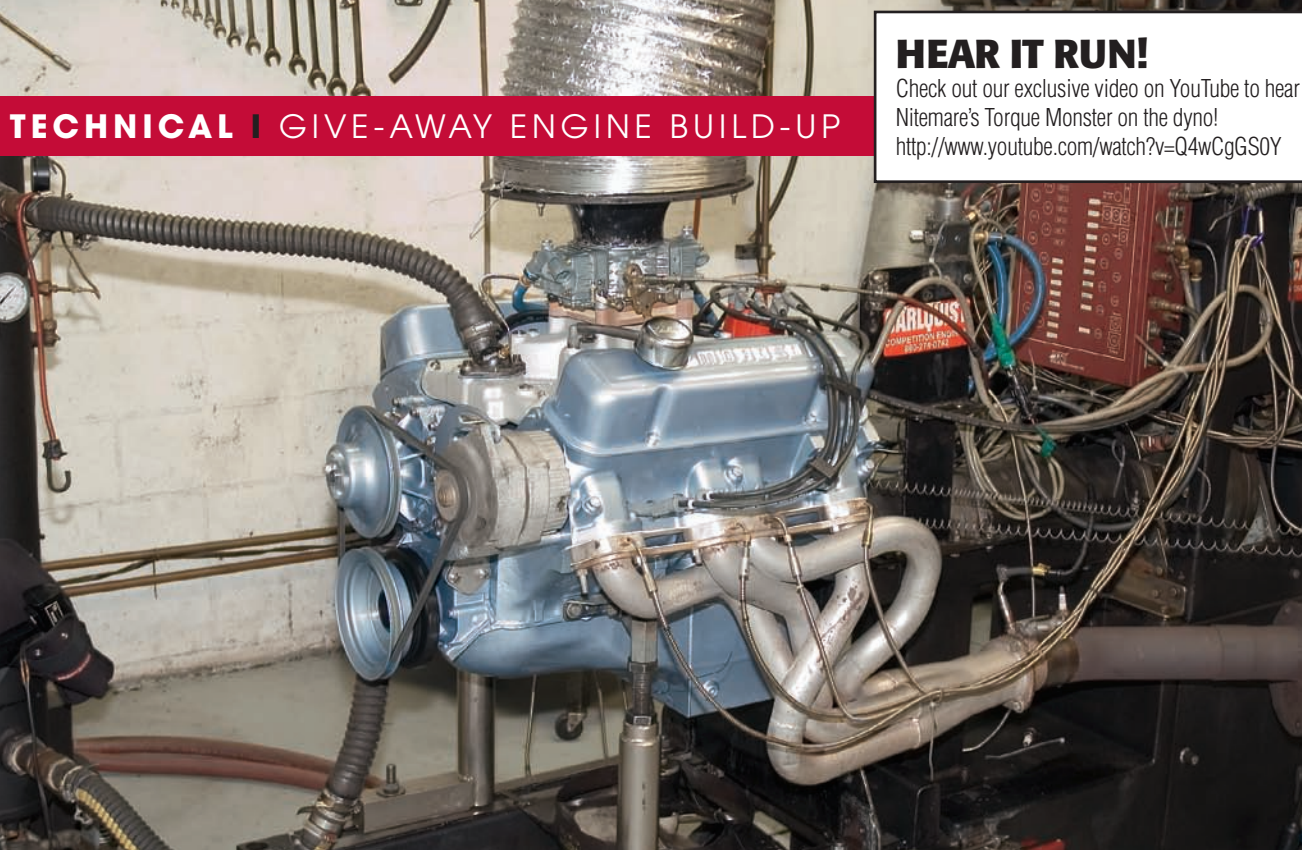
HEAR IT RUN!
Check out our exclusive video on YouTube to hear Nitemare's Torque Monster on the dyno!
http://www.youtube.com/watch?v=Q4wCgGS0Y



Nitemare Performance's torque monster crate engine develops 575 lbs-ft of torque at just 4,200 rpm! It makes an astonishing 445 lbs-ft at just 2,500 rpm. Horsepower isn't bad either: 545 at 5,800 rpm. The best part? You could win it at this year's All-GM Nationals in Carlisle, Pennsylvania, June 26-28.

Torque Monster

Nitemare Performance puts together a 462-inch stroker motor that makes 575 lbs-ft of torque *on pump gas!* And you can win it at the Carlisle All-GM Nationals!

Story and photography by Jason Scott

This is an engine story that starts out about a tent – specifically the Pontiac Pavilion hospitality tent at the Carlisle All-GM Nationals. You see, we debuted the tent at the 2008 show, and following the event we were checking with enthusiasts and vendors who were at the show to find out how they thought things went.

When we spoke with Darrin Magro, the head-honcho of Nitemare Performance & Restoration, he said "It was really good" … then paused. "But you know what the event really needs?" he added, rhetorically. "An engine give-away contest!"

"Hey, that's a great idea!" we agreed … hoping the conversation was going where we thought it was.

"Yeah, and I think I know just the engine combination to give away," Magro continued – saying exactly what we were hoping he'd say.

Magro went on to explain that he'd been working on a new engine combination that would develop tons of torque at very streetable engine speeds on plain old pump gas – 87 octane, even. And he offered to put one together for one lucky attendee of the 2009 All-GM Nationals event to win!

Torque Talk

Most enthusiasts know that horsepower isn't really real – it's a calculation. Torque is *real* power – the twisting force that you feel as acceleration when you stomp on the gas.

Torque also happens to be a strong point for Pontiac engines. You see, back in the muscle car heydays, Pontiacs rarely claimed the honor of highest horsepower. On paper, engines like Chevy's 375-horsepower L78 396, Ford's 375-horse Super Cobra Jet 429 or the 390-horse Mopar 440 Six Pack engines out-gunned even the mighty Ram Air IV Pontiac. But luckily for us Pontiac enthusiasts, races aren't run on paper. They're run on dragstrips (and maybe a public road or two), and that's where Pontiacs have often proven to be more than a match for the competition despite being at a horsepower deficit.

One reason that Pontiacs didn't get spanked more often is that the Pontiac V-8 naturally produces lots of torque.

That's a characteristic that Magro realized decades ago while racing his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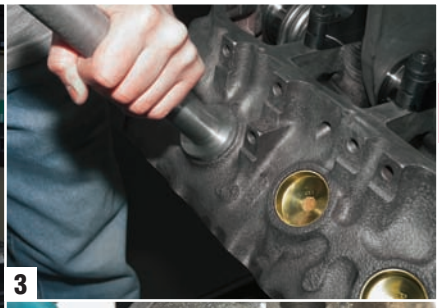
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Win This Engine!

Don't miss your chance to win this engine! Just be at the Carlisle All-GM Nationals in Carlisle, Pennsylvania, on Saturday, June 27, 2009 when the winning number will be drawn. If it matches the number on your ticket, you'll take this engine home!

1 Nitemare starts with a garden variety 400 block that has been thoroughly deburred and blueprinted, including boring and honing with the company's custom torque plate, which Magro is torquing here.

2 Cylinders were perfectly concentric, top to bottom after the maching.

3 Nitemare installs brass core plugs for improved corrosion resistance.

4 In addition to precise decking, line-honing and cylinder boring and honing processes, Nitemare carefully deburs the block to remove casting flash and sharp edges that could promote cracking.

5 Clevite cam bearings are installed as are all new oil gallery plugs with, sealant.

6 Clevite main bearings that are 1/1000th (.001) inch undersize are utilized to optimize the main journal-to-bearing clearance. Note the block has been drilled for four-bolt main caps.

'68 GTO at tracks around New England, New York, and New Jersey. Now, he specializes in building high-torque Pontiac crate motors for his clients' street and race cars.

"We want all our engines to be streetable enough that you can drive them to church on Sunday morning … but powerful enough to take them racing Sunday afternoon," Magro said. "And with this combination, you definitely can."

The Game Plan

Magro's new combination wasn't a radical departure from traditional Pontiac engine rebuild practices. Instead, it focuses on a well-matched total combination of parts and careful preparation and assembly of each and every component to optimize performance.

To keep the combination cost-effective and convenient, Nitemare starts with a thoroughly blueprinted 400 block fitted with steel Pro-Gram four-bolt main caps. A 4.250-inch long-stroke forged steel Scat crankshaft makes a long lever on which the longer-than-stock 6.800-inch rods can push to create more torque. Keith Black forged pistons provide a reasonable 10.4:1 compression, which with the Edelbrock heads should work just fine on pump gas. And the "secret sauce" of the build is the cam that Nitemare has ground to their specifications by Comp Cams. Blueprinted Edelbrock Performer RPM heads and the Torker II intake and Holley 950cfm carb make for an almost ideal combination for flowing air and fuel to the cylinders.

"The bottom-end is over-engineered for the top-end," said Magro of the combination. "Some [engine builders] do the reverse – they make all their power with great flowing heads on an inexpensive bottom-end. But putting the money into the foundation lets you move up to more airflow or nitrous for more power in the future without having to worry about the bottom-end staying together."

The cam, Magro explained, is what makes the combination really work: "This cam will idle almost as well as a hydraulic flat tappet cam, but will pull as well as a solid roller cam." To put it in practical terms, Magro pointed out: "If someone decides to race the engine, they can do their shifts at 5,500 to 6,000 rpm but go through the traps in high gear at 6,500 or so because of the cam."

So check out what went into the engine and how it performed on the dyno. Then plan on being in Carlisle for the weekend of June 26-28, because you've got to be there to win it!


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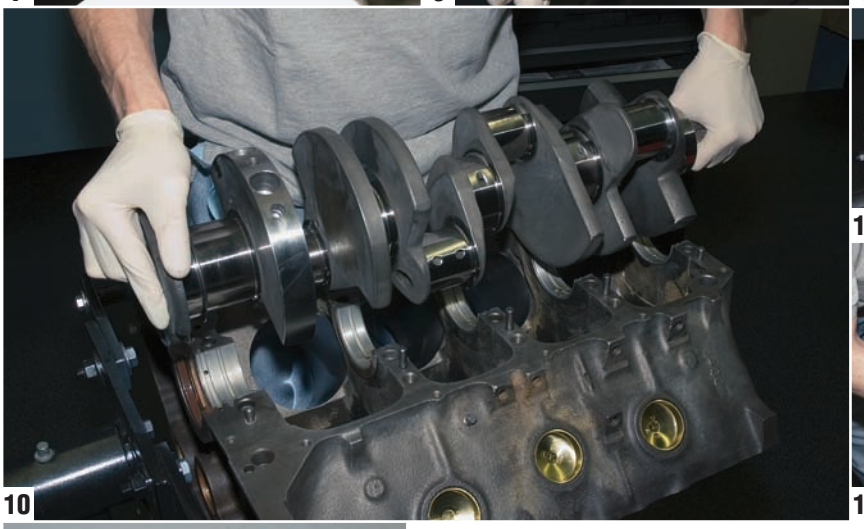
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7 Nitemare also installs oil restrictors in the blueprinted lifter bores.

8 If there's a "secret sauce" to the Nitemare engine, it's the nitrited solid, flat-tappet camshaft that's custom-ground to Nitemare's specs by Comp Cams. The nitride process hardens the cam to minimize wear, while the custom specs help it idle like a hydraulic flat tappet motor but rev easily to 6,500 rpm.

9 Nitemare secures the cam in the block with it's exclusive cam plate with a circumferential oiling groove to minimize friction and wear.

10 Nitemare selected a Scat forged crank with a 4.250-inch stroke to sling the rods – just slightly longer than a factory 455's 4.210-inch stroke. The long stroke is a big factor in the engine's torque production. Of course, Nitemare blueprints it to ensure each main and rod journal is the precise diameter, and the crank is neutral-balanced to the weights of the piston/pin/rod/ring combination.

11 The crank is secured in place by billet steel, four-bolt main caps from Pro-Gram. The caps are far superior in strength and precision than factory caps. Nitemare uses extra-long, oversize dowel pins in the block to keep the caps properly located, while ARP studs provide the clamping force.

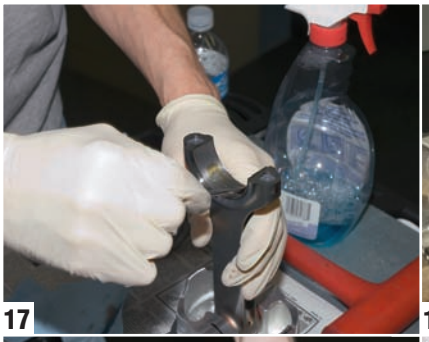
12 Here, Magro is measuring crankshaft end-play, or run-out. If too much play exists, the crank will move backward and forward, causing accelerated wear of rings, cylinders, piston skirts and the rods and bearings.

13 Keith Black forged aluminum pistons with two valve reliefs are used. Due to the stroke and rod length, the pistons actually stick up out of the bore by 3/1000ths of an inch. The full-floating pins are secured by spiral locks.

14 Here, Magro is fitting a Scat forged-steel, H-beam rod to the piston, using ample assembly lube to prevent wear on initial fire-up. The Scat rods are 6.800-inch long (.175-inch longer than stock) which improves rod angularity and increases piston dwell at the top (and bottom) of the cylinders.

15 Nitemare files the rings by hand for a perfect, precise gap.

16 Next, the rings are installed on the pistons in the proper groove.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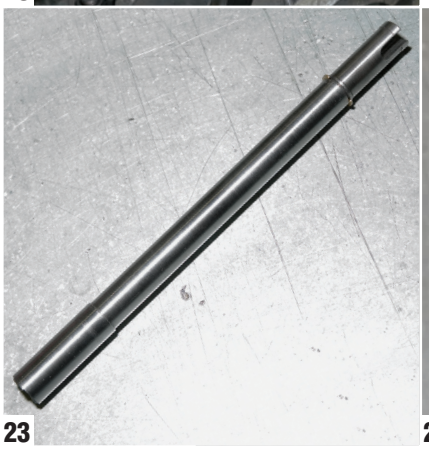
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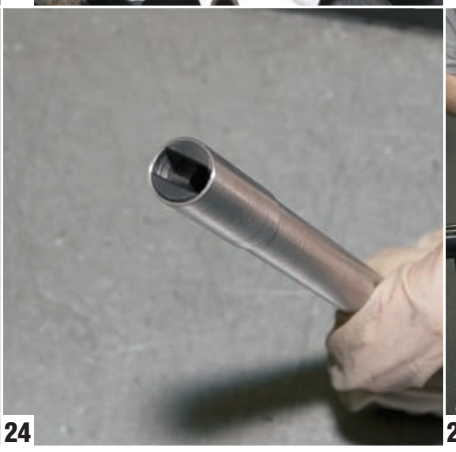
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17 With a Clevite bearing shell in the rod, Magro applies some oil before fitting it into the cylinder.

18 Here, Magro gently taps the piston and rod combo into the cylinder using a rubber mallet, while being careful to guide the rod onto the crank journal, without nicking it. Tapered spring compressors are one of God's greatest gifts to engine builders!

19 Here you can see the generous journal radius of the Scat forged crank, as well as the ample clearance of the rod and bearing.

20 Rod caps are installed with ARP bolts and torqued to spec.

21 After each rod was installed, Magro checked for ample clearance everywhere to ensure there wouldn't be any trouble.

22 As part of its blueprinting process, Nitemare equips the Melling high-volume oil pump with the company's extra-thick, Ram Air IV-style pump cover plate to prevent flex and gear binding. The pickup is from Canton and matches the pan design.

23 One of the trickest components in the engine is Nitemare's own oil pump driveshaft, which features a collar that encircles the pump's drive stud to keep the two from disengaging.

24 Here you can see the shaft's collar, which fits around the pump's drive stud.

25 A stock Pontiac windage tray was fastened to the Pro-Gram main caps, and later a Nitemare-modified Canton road racing oil pan was installed, using rubber-cemented FelPro gaskets.

Hot Heads At Edelbrock

When we checked with the folks at Edelbrock for some of the stats and specs about the company's aluminum Performer RPM heads, they let us in on a little secret that we're passing on to you: later this year, Edelbrock plans to introduce two new Pontiac heads! The first will be a revised version of the popular Performer RPM, as used on the Torque Monster engine, but with standard D-port header flanges to simplify swaps for folks who don't already have Ram Air IV-style manifolds or headers. The second head will be a race-quality Victor series head that will flow even better out of the box. Watch for more on both heads as soon as we can get more info and wring 'em out on engines!

26 Nitemare installs an SA Gear timing set. The cam gear is billet steel and features a bronze washer to minimize friction against the cam plate.

27 After installing the SA Gear timing chain (which is .005-inch undersize, to compensate for the line-honing), Nitemare measures gear alignment, to ensure there will be minimal drag or movement of the cam.

28 The camshaft was degreed using a Jomar Performance degree wheel, which has full 360-degree markings, as well as indicators for various opening and closing events. The adjustable Jomar indicator was far superior to the old bent-wire indicator most degree kits have you use. Here, Magro measured the opening and closing specs at the lobes for ultimate accuracy.

29 Before the heads could go on, Nitemare installed multi-layer Cometic gaskets, which will sustain far higher cylinder pressures than stock gaskets or most aftermarket units.

30 Edelbrock Performer RPM aluminum heads were selected for the build, because, as Magro says: "Dollar for dollar, out of the box, the Edelbrock heads are very good heads – they flow really well." With the 72cc chambers, the engine's compression works out to a streetable 10.4:1. Valves are 2.11/1.66-inch with 215cc intake ports.


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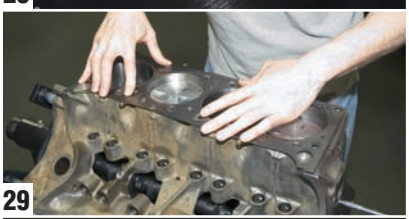
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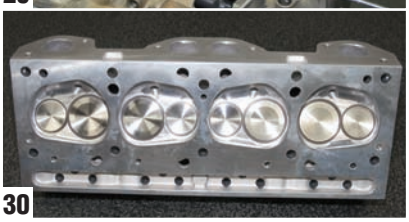
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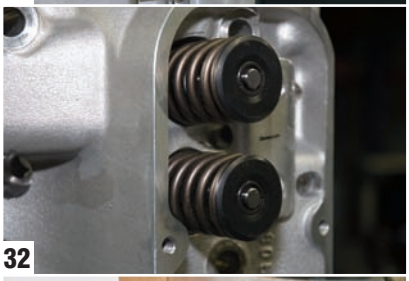
31 For degreeing purposes, the stock Edelbrock springs were replaced with degreeing springs. The final reassembly of the heads utilized Comp Cams valvesprings matched to the cam, and the springs were shimmed as needed to achieve the desired seat pressures.



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32 Here, you can see the high-strength Comp Cams spring retainers and keepers designed to accept lash caps, which protect the ends of the valves from premature wear.

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33 Before the heads were installed on the block, Magro performed a simple check to ensure he had the right head bolts in the right holes by inserting them fully into the head, then looking at how much of the bolt extends below the head's deck surface.

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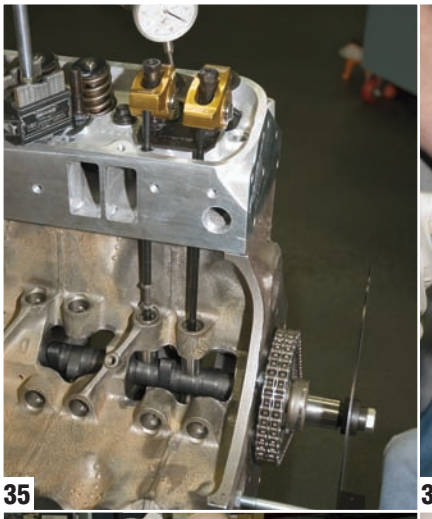
34 Finally, the heads could be bolted on and torqued to spec, using ARP bolts.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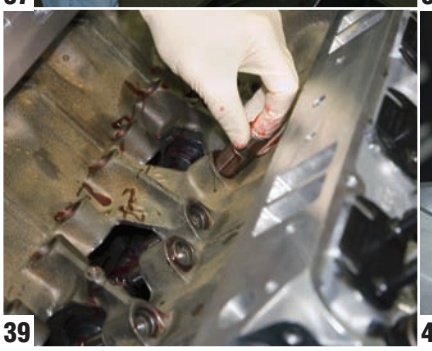
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35 With the heads on, Nitemare also measured the valvetrain events at each rocker, valve-to-piston clearance, pushrod-to-head clearance, and the required pushrod length. The rods needed to be nearly ½-inch longer than stock, and consequently lightly rubbed the walls of the pushrod holes, until slight clearancing was performed.

36 Nitemare uses Evans coolant pumps, which feature a scroll-design impeller with eight long, curved vanes that improve pump efficiency. An oversize, heavy-duty bearing ensures the pump will stand up to the punishment of high-performance street and racing driving.

37 With the coolant pump bolted to a refurbished factory timing cover housing and gaskets rubber-cemented in place, Magro installed the timing cover/coolant pump assembly.

38 Next, Comp Cams lifters were installed. The lifters feature a Nitemare-specified oil hole drilled in the center of the lifter face. The hole lets just enough extra oil through to ensure the cam lobe stays well lubricated and therefore lasts a good long time. The lifters are .100-inch shorter than usual, which did require longer pushrods to restore proper valvetrain geometry.

39 With a healthy coating of assembly lube, the lifters were inserted into their bores.

40 The Comp Cams lash caps are a breeze to install – just set them on the valve tip.

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41 The longer-than-stock Comp Cams moly pushrods were then installed. During the mock-up assembly, it was determined that the pushrods rubbed slightly on the holes in the heads, so the holes were clearanced with a hand-held grinder.

42 The 1.65:1 Comp Cams Ultra-Gold full roller aluminum rocker arms were installed and lash was set to .018-inch on both intake and exhaust valves.

43 Next, a reconditioned factory valley pan was set atop FelPro gaskets.

44 Magro then installed the Jomar Performance rocker stud girdles, to keep everything up top from wiggling around. The Jomar Pieces are available for either Edelbrock or factory heads and are made of CNC-machined billet aluminum.

Want To Know More About The Assembly Process?

Due to space restrictions, it's impossible for us to cover all the details of this build-up in one issue. In future issues, we'll be looking more closely at the various components and systems of this engine, to explain things in more detail. If you can't wait until then, you can contact Nitemare Performance directly (see Source Box for info) or meet Darrin Magro at the All-GM Nationals, June 26-28, where he'll be showing off the engine and answering questions about it.


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45 Nitemare engines are treated to a self-etching primer prior to painting. The valve covers are just for painting.

46 For final color, Nitemare applies a custom-blended, super-durable Dupont Imron that's impervious to chemicals and even stands up to heat incredibly well.

47 Just prior to break-in, Nitemare installed the Edelbrock Torker II single-plane intake. Magro explains that a dual-plane Performer RPM would make slightly more torque at low rpm, but the Torker II quickly surpasses it and allows for better higher-rpm breathing. The engine was finished off with numerous, miscellaneous items from B&B Performance.

48 For break-in purposes, Nitemare uses a set of well-worn Hooker Super Comp headers with two-inch primaries. Doug's Headers will accompany the engine for give-away.

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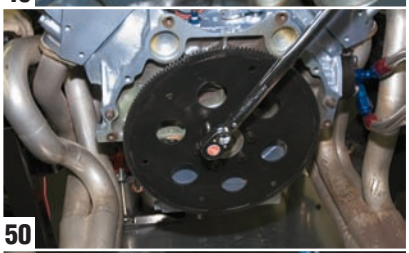

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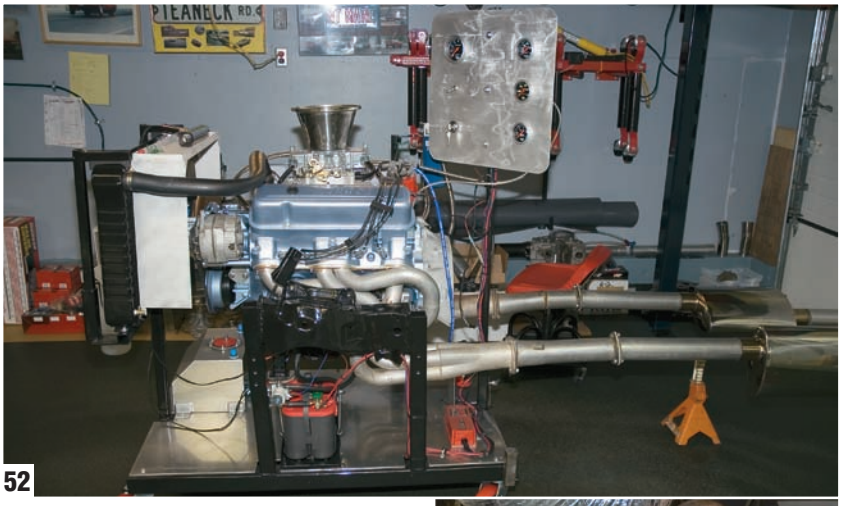
49 An MSD Ready-to-Run distributor was installed on the give-away engine, to simplify installation a bit for the winner, because it requires almost no effort to install it.

50 An ATI flex plate was torqued in place with ARP bolts to give the starter something to grab onto. The flexplate will also accompany the engine when it's given away at Carlisle.

51 Nitemare prefers to equip its engines with a remote-mount oil filter kit with an oversize filter that provides considerably more filter area and oil volume. Earl's lines run from the Nunzi block plate to the Moroso filter base.



52 Fully set up on Nitemare's break-in stand, the engine was broken in for 30 minutes at 2,200 rpm with only the outer valve springs in place, and running Nitemare's break-in carb – a 750cfm Holley. Thanks to Nitemare's extreme care in assembly, we didn't have so much as a single drop of oil, coolant or fuel leak.

53 After reinstalling the inner valve springs and switching to the give-away carb – a Holley 950cfm unit – and installing the Jomar Power Cone Spacer, the engine was hooked up to the dyno at Carlquist Competition Engines outside Waterbury, Connecticut. After a brief warm-up period, the engine made peak numbers of 575 lbs-ft of torque at 4,200 rpm and 545 hp at 5,800 rpm right out of the box. Carb and timing adjustments proved to be spot-on, as adjustments only cost power. ■

Dyno Data

RPM	Torque (lbs-ft)	Power (bhp)
2500	445	212
2600	453	224
2700	463	238
2800	469	250
2900	472	260
3000	476	272
3100	483	285
3200	491	299
3300	498	313
3400	507	329
3500	518	345
3600	532	364
3700	544	383
3800	553	400
3900	560	416
4000	566	431
4100	572	447
4200	**576**	460
4300	**576**	471
4400	573	480
4500	570	489
4600	568	497
4700	565	505
4800	559	511
4900	550	513
5000	543	517
5100	535	520
5200	530	524
5300	526	530
5400	520	535
5500	516	540
5600	508	541
5700	500	543
5800	493	**545**
5900	478	537
6000	465	531

SOURCES

NITEMARE PERFORMANCE
(203) 239-6868
www.nitemareperformance.com

SCAT
(310) 370-5501
www.scatcrankshafts.com

EDELBROCK
(310) 781-2222
www.edelbrock.com

COMP CAMS
(800) 999-0853
www.compcams.com

HOLLEY
(270) 782-2900
www.holley.com

MSD
(915) 857-5200
www.msdignition.com

ARP
(800) 826-3045
www.arpfasteners.com

CANTON RACING PRODUCTS
(203) 481-9460
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