



The MR-1A is an awesome site to behold on the dyno, fitted with Kauffman Racing Equipment D-port heads and Hooker coated headers. The power it made was even more impressive!

The Power of Inspiration

Tin Indian Performance puts together the ultimate Pontiac street engine ... without a single stock Pontiac part.

Story by Jason Scott | Photography by Delbert Rogers

A few months ago, we asked *Pontiac Enthusiast* readers what kinds of engine stories we should feature, one of the most commonly requested were the aftermarket Pontiac engines.

When we mentioned this to Kevin Swaney of Tin Indian Performance (www.tinindianperformance.com), he invited us to follow along on one of his latest build-ups of a customer's ultimate street/strip engine based on an aluminum version of the K&M Performance MR-1 engine block, the MR-1A.

As most Pontiac enthusiasts know, GM hasn't manufactured any Pontiac V-8s since 1981, when the last 301s rolled off the line. While it's still possible to find engine blocks that are suitable for rebuilding, desirable blocks – like the Ram Air IV, Ram Air V, Super Duty or

any 455 block – are becoming harder to find and more expensive. Even if you do have one, they have their limitations, not the least of which are that they're almost irreplaceable and they truly aren't well suited for all-out performance use anyway, due to loose manufacturing tolerances, less-than-ideal metallurgy and design weaknesses.

K&M Performance solved all those problems by developing the cast-iron MR-1 engine block, which not only accepts any standard Pontiac components and accessories, but features numerous improvements, as well. For

starters, the MR-1 is cast with a superior iron alloy using far more accurate, modern casting and machining processes to ensure the blocks are strong and dimensionally correct. Those two improvements alone would be welcome, but K&M also saw fit to revise the design to eliminate the typical weak points in the Pontiac design: the block decks are thicker to resist cracking and remain flatter; the lifter valley is more solid and features three beefy cross-webs to resist flexing; similarly, the main bearing webs have more material and feature splayed, four-bolt main caps to secure the crank; siamesed cylinder add strength, too, plus allow for larger bores. To provide additional room for aggressive cams,

the block can be ordered with a cam tunnel that's been raised either 50 mm or 55 mm, depending on your needs. The blocks even feature dual BOP and Chevy bellhousing bolt patterns to simplify transmission attachment.

To one-up themselves, K&M then introduced a cast aluminum version of the MR-1, the MR-1A, which has all the same features, but shaves a hefty 106 pounds from the MR-1 to a feathery 125 pound bare weight. The only machining difference is that the aluminum block ships as a dry-deck block and would need coolant passages drilled for street use.

Still not quite satisfied, the K&M crew even offers the MR-1A Pro billet block now, for the seriously serious racer or discerning custom car builder.

Since the MR-1 series of blocks accepts stock Pontiac parts, Tin Indian could have used any old heads, crank and other parts they had laying around. But a new block really deserves all new components. Fortunately, Kauffman Racing Equipment also manufactures some of the best-flowing Pontiac heads around, as well as a number of other components needed to put together a Pontiac engine, including a new timing cover and oil filter housing. And while the Kauffman's PR folks are quick to point out that KRE is an entirely separate business from K&M, which manufactures the MR-1 blocks, the "K" in "K&M" is short for the very same Kauffman family. But from our standpoint, that's a good thing, because the Kauffmans have been building and racing Pontiacs for roughly four decades and know a thing or two about their strengths and weaknesses and what's needed to build a potent Pontiac motor that will last.

Armed with a pile of Kauffman Racing Equipment and healthy assortment of other aftermarket parts, plus the K&M Performance MR-1A block, Tin Indian was ready to what would have been impossible even a few years ago: build a Pontiac engine that doesn't contain a single part made by or ever sold through Pontiac.

To fill the block, Swaney selected a Scat 4.5-inch, forged-steel stroker crank, Crower 6.7-inch forged rods, and 4.250-



1 The foundation of Tin Indian Performance's build is the MR-1A block from K&M Performance, which is a joint venture between Steve Kauffman and Bill Mellott. The 125-pound MR-1A – and the 231-pound iron MR-1 block – are both patterned after traditional Pontiac V-8 blocks, so they accept standard Pontiac

components, but feature numerous improvements, mainly for strength.

2 Major upgrades are the billet steel, splayed four-bolt main bearing caps and beefed-up main bearing webs. Wider caps and a 4-bolt front cap are optional, but require a non-standard oil pan.

inch Ross forged aluminum pistons with file-fit Total Seal rings resulting in 510 cubic inches and 10.75:1 compression under the 85cc chambers of the KRE D-port heads. A custom-ground, Tin Indian-spec'd Comp Cams hydraulic roller cam pushes on Scorpion roller rockers to open the Ferrea valves. To feed fuel, Tin Indian ran the engine with two different Holley carbs that had been prepared specifically for this engine by Pro Systems. Hooker headers and MSD ignition system round out the assembly. Of course, Tin Indian always uses its own line of gaskets to seal up most of

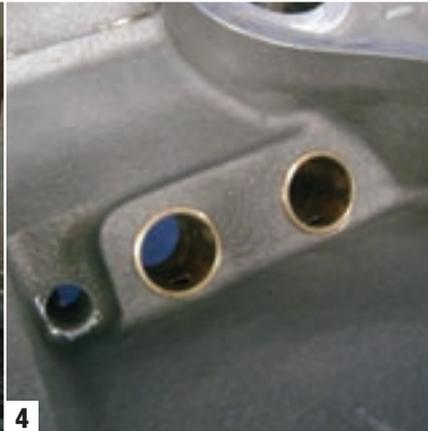
the engine; the only notable exception are the head gaskets, where Swaney used Fel-Pro gaskets because this engine is intended for street driving for which the Fel-Pro's perform very well and help maintain cylinder head fastener torque for low maintenance.

The end result is an engine that any Pontiac owner would be proud to have under their hood ... even though Pontiac contributed little more than inspiration to its construction.

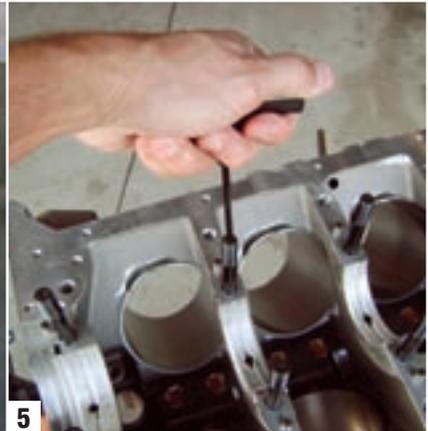
Read along to see how the engine went together ... and how it made out on the dyno.



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3 Before the MR-1/MR-1A blocks leave the K&M shop, they're hyper-accurately machined on the company's CNC equipment. All that's needed is to perform a bore and final hone job per your piston and ring package needs. Tin Indian Performance also takes the extra step to carefully debur the entire block to remove stress risers that could lead to a crack, and of course, the block is meticulously cleaned, as are all parts prior to assembly.

4 Bronze lifter bore sleeves are

an available option. Tin Indian Performance strongly recommends the sleeve treatment for serious cast-iron race engines, and they're standard issue in the MR-1A.

5 Installation begins the same as a standard engine. In this case, Tin Indian Performance's Kevin Swaney started by hand-tightening the ARP main studs in the block.

6 Tin Indian opened up the oil feed holes in the Federal Mogul bearings before installing them.

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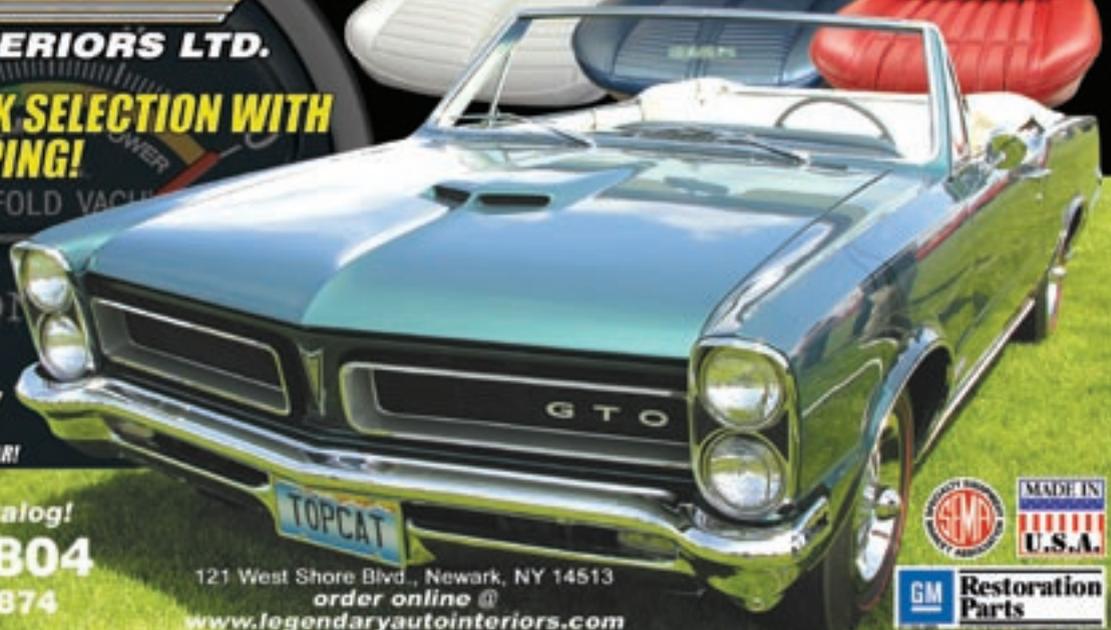
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7 Brass freeze plugs fill the core holes in the sides of the block. Brass won't rust like standard steel plugs.

8 Tin Indian's Viton rear main seal is a vast improvement over the factory rope-type seal and only costs a few bucks. It's one of our favorite improvements for an engine, because ... well, who wants a leaky rear main?

9 The Viton seal fits great in the rear main cap and the block with just a bit

of silicone to ensure a leak-free install. Swaney recommends torquing the cap in place for a few hours after installing the gasket with silicone to give it a chance to set up, before installing the crank.

10 Swaney selected a forged steel Scat crank with a 4½-inch stroke to swing the rods. The Scat crank has exceptional strength, reasonable weight and a terrific price. Our kind of combo.



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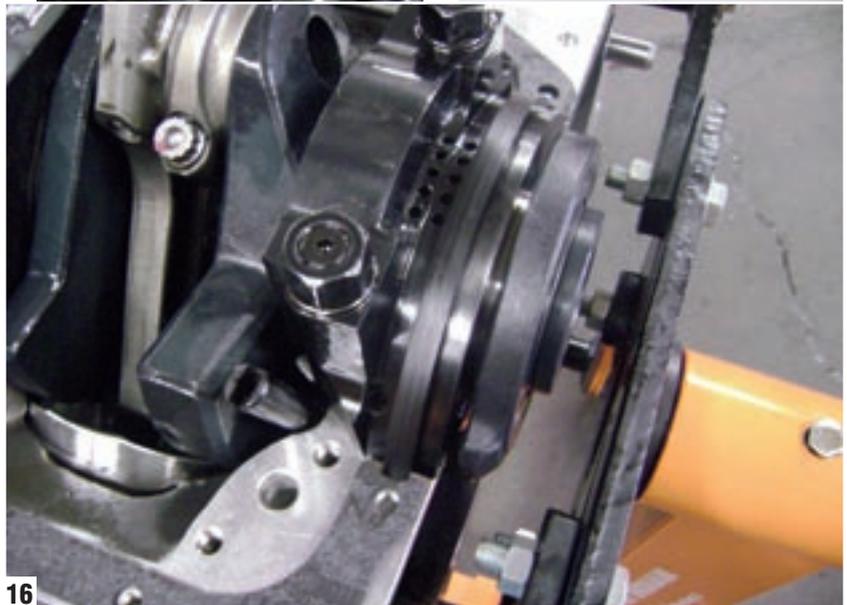
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11 After nestling the Scat crank in the block, Tin Indian Performance attached the main caps starting with the center two studs and nuts, then the outers. Swaney carefully taps the caps with a dead-blow hammer until fully seated before attaching the ARP nuts. This prevents damage to the block. Each cap is then torqued in place, one at a time, starting with the center cap and checking for free crank rotation as you go. Swaney says this makes it easier to detect clearance issues or crank warpage.

12 As on any stroker application, crank clearance has to be checked carefully. Make sure that you check crank end-play, and measure clearances at both extremes of the crank's fore-aft movement to ensure sufficient clearance.

13 Stroker applications also require adequate clearance at the bottoms of the cylinders, and may require notching, as shown here, to clear the rods. The cam tunnel is also visible in this shot; if you're running an aggressive cam, you may need the 50 mm or higher 55 mm raised cam tunnel options to avoid problems.

14 Each of the 6.700-inch Crower Sportsman rods had excellent clearance. They were fitted with forged Ross pistons with a 13cc dish to keep compression down.

15 This MR-1A's oiling duties are handled by a Melling M54DS high-volume (but not high-pressure) pump fitted with a suitable pickup screen to match the Moroso oil pan. One of Tin Indian's own hardened oil pump driveshaft turns the pump, while ARP rod bolts attach it to the block. Note that the engine was not fitted with either a windage tray nor a crank scraper.

16 The Tin Indian Performance oil pan gasket needs minor work on a belt sander to fit snugly into the machined groove of the MR-1A rear main cap and minimize the chance of a leak. The Tin Indian pan rail gaskets will seal up the sides and front of the pan well, especially when a thin bead of silicone is applied at final assembly time.



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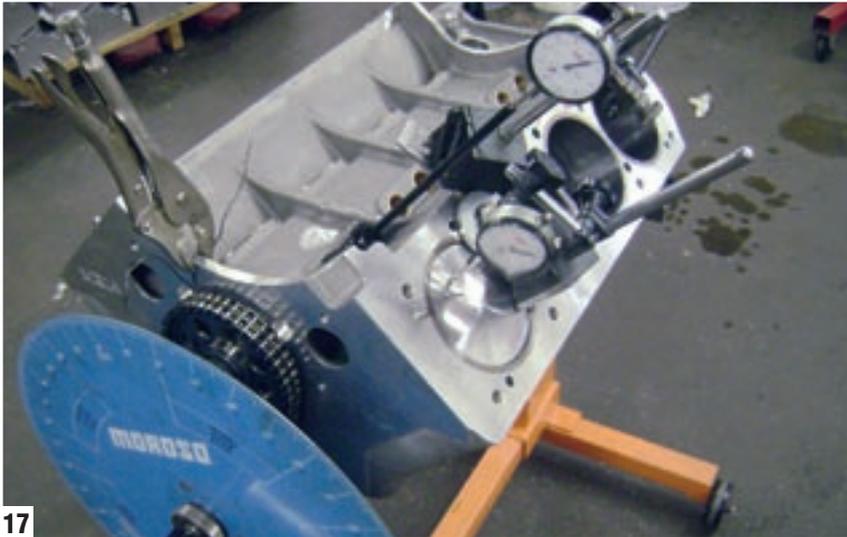


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17 Swaney installed a custom-ground Comp Cams hydraulic roller stick with .562"/.571" lift and degreed it to a 4.5-degrees advanced position with a Rollmaster true, double-roller timing chain and gear set.

18 Rather than mess around with questionable old timing covers, Swaney installed one of Kauffman Racing Equipment's new castings, after fitting it with a new TIP crank seal.

19 Here, the Scat crank, Crower rods and Ross pistons with Total Seal rings have all been installed and all clearances for each cylinder properly checked. Before the Moroso pan was installed, the torque was re-checked on each of the ARP studs and the Melling oil pump was installed. Swaney warns that it's important

to trial-fit everything because some parts – like lower-quality oil pans – may require elongation of bolt holes or other mods to fit or work properly.

20 After applying a bead of silicone to the pan rail and timing cover gaskets, the pan was installed with ARP bolts and Tin Indian's new heat-treated hold-downs to spread the bolt's force and minimize warp, which could cause a leak.

21 The Kauffman Racing timing cover housing fit better than a factory cover and installed without complications.

22 Tin Indian Performance also installed a Kauffman oil filter housing and a new Wix filter. As with the KRE timing cover, the KRE filter housing bolted up better than factory and

should provide a bit better header clearance, thanks to its revised filter angle.

23 Kauffman Racing Equipment D-Port heads were fitted with Comp Cams valvesprings to match the cam grind. The heads feature heart-shaped, fast-burn, 85cc chambers that provide a 10.75:1 compression ratio with the 13cc dished pistons. This shot shows the exhaust ports prior to being CNC ported to match the Tin Indian Performance gaskets.

24 The KRE heads' seats and guides are machined on a state-of-the-art Rottler SG8 and fitted with only the best quality components. Out of the box, they flow 260 cfm and can be max-ported to flow 340 cfm given the ample meat in them to allow for custom port work.



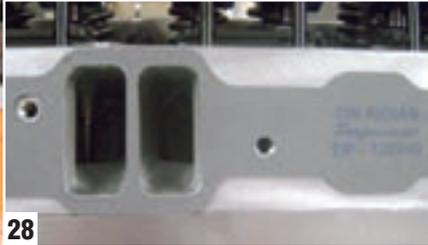
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25 The heads were set in place and bolted on using ARP studs.

26 Comp Cam's hydraulic roller lifters fit the MR-1A sleeves bores perfectly. Comp Cams 5/16-inch pushrods measuring 9.250-inch in length were just what was needed to achieve proper valvetrain geometry. Note the solid center section of the lifter valley and the beefy cross-braces.



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28 The KRE D-port heads were CNC ported to flow 340 cfm and are a perfect match for Tin Indian Performance intake gasket # TIP-120240 for optimal flow.



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27 Scorpion 1.6:1 roller tip and fulcrum rockers open the 5.200-inch long, 2.19/1.66-inch Ferrea stainless steel 6000 valves. The retainers and keepers are from Comp, and PC seals keep oil away from the bronze guides.



29

29 Topping the engine is a modified Edelbrock Victor single-plane intake that's been CNC milled 0.625-inch to provide hood clearance for the '70 GTO into which the engine is to be shoehorned. Two Pro Systems-prepped Holley carbs were used during testing – an HP1000 and 1050 Dominator, seen here. MSD's Pro Billet distributor, Blaster coil and 6AL box provide the spark through Taylor 8mm wires.

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30 On the SuperFlow 901 dyno, the engine was set up with a Meziere electric water pump that both improves coolant flow (especially after the engine is shut off!) yet minimizes the parasitic drag on the engine. A Star Machine vacuum pump is used to de-pressurize the engine of built-up gases. An ATI Super Damper further minimizes the harmonics of the finely-balanced reciprocating assembly.

31 Here, Kevin Swaney of Tin Indian Performance, gives owner Wally Becker a “tour” of the engine’s various components. Note the stylish CNC machined Tin Indian Performance Billet-TEK aluminum valve covers that also provide plenty of clearance in case Becker chooses to add stud girdles later.

32 During testing, Swaney tried various timing settings and carb adjustments, but found the engine made the best power with 32-degrees total timing (14 initial, 18 mechanical). The dyno headers were used for break-in and the first dyno pulls. They feature 1¾-inch primaries with 3-inch collectors.

33 The best pull with the 1050 Dominator netted 645.4 horsepower at 5,700 rpm and 692.9 lb-ft of torque at 4,400 rpm! Swaney then changed to the Pro Systems-built Holley 4150-style HP1000 carb – a job made easier thanks to Tin Indian’s Teflon carb gaskets – and made a best pull of 637.8 horses at 5,700 and 685.4 lb-ft at 4,400 with much improved throttle response and a 950 rpm idle speed. ■

SOURCES

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