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RACING

Project Acura TSX

Part 3: More power-with stock bottom end

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PHOTOGRAPHY BY JOSH JACQUOT AND SKUNK2

➤ **Is it possible for our Project TSX to skin an E46 M3 on the track?** We posed this question in our first installment of Project TSX back in December 2004 and we're still exploring the idea. So far, we've changed out the stock suspension, wheels, brakes and tires, all in effort to wring some M3-like handling numbers out of the Acura. Part II involved the installation of a few bolt-on parts; including intake, exhaust, headers and a Hondata K-Pro ECU. These mild modifications netted us 184 wheel-hp.

Ultimately, our TSX could probably nudge the M3 in handling numbers, but horsepower is another story altogether. It would be tough, considering the difference between 3.2 vs. 2.4 liters is night and day. Sure, Project TSX can keep most cars honest with its streetable, naturally



ProjectAcura TSX



Skunk2 ported and polished the stock intake ports (right) to accommodate the higher flow rate. The ported head (left) is necessary for the added rpm and more aggressive cam profile that was used.

aspirated engine, but to beat BMW's rocket chariot, the TSX's power output needs to be upped.

We're convinced the plan is still realistic. So, Project TSX went back to Skunk2 for a barrage of modifications designed to inject some much-needed horsepower into the 2.4-liter. To help keep build costs down, we chose to keep the stock bottom-end intact. Hence, all the work done was designed to improve flow and raise volumetric efficiency at

higher rpms.

An M3 will put down roughly 280 wheel-hp out of the box. All the bolt-ons in the world won't get Project TSX near that kind of output, so we had to get serious work done on the head and turn our motor into a hybrid K24A2 with K20 parts.

HEADWORK

Skunk2 started with a standard 30-, 45-, 60-degree three-angle valve job on the intake and exhaust valve seats. The exhaust

ports were radiused below the 60-degree cut to better transition into the ports.

The majority of the head work consisted of porting the K24A2 head. Since the stock engine only spins to 7100 rpm, the head was designed to deliver more low-end response and torque, which meant smaller ports to increase flow velocity through the head. That's all fine on a stock car, but when the rev and flow range are stretched higher, the port

profile has to change significantly. The valve guides were also ground down to minimize restrictions.

Skunk2 replaced the stock valves with lighter one-piece forged valves with hardened tips. Though valve size and compression were not altered, springs and retainers were replaced with slightly stiffer double-wound coils and titanium retainers to perform better at higher speeds and reduce reciprocating mass.

The Stock TSX valve train was replaced with lighter one-piece forged valves, slightly stiffer double wound valves springs, and titanium retainers to reduce reciprocating mass for the higher engine speeds anticipated.



Skunk2 Stage 1 RSX cams, along with stock RSX cam gears, give the K24 the added range of i-VTEC cam phasing and high-end flow above the stock 7100 rpm redline.



Project Acura TSX



We bolted on a K20 intake manifold from a Japanese RSX Type-R, 68mm billet throttle body and custom intake.

BOLT-ONS

Even with the significant porting, Skunk2 felt its Stage 1 RSX camshafts and stock RSX cam gears best fit the flow and engine speeds that Project TSX was capable of. We switched to RSX hardware because it was designed to operate at higher engine speeds and raise the powerband. The RSX cam gear has a wider range of i-VTEC cam phasing, from 0-50 degrees BTDC, compared to the TSX cam gear, which had only 30 degrees of cam advance. The added range of i-VTEC operation lets us retain the K24's low-end torque, while making more power up top.

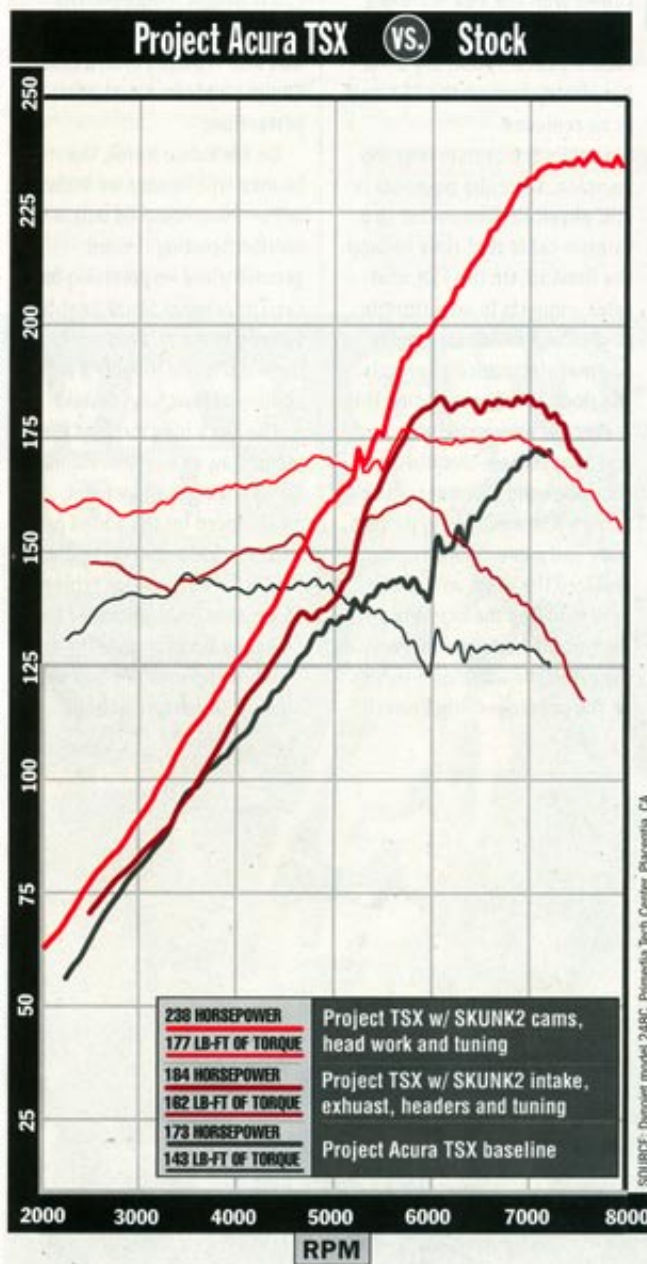
We threw on all the bolt-on parts we could from Honda's RSX parts bin to keep the car driveable with its new lungs. Honda spent a lot of money designing and casting manifolds that are versatile in response and flow; we'd be stupid to not take advantage of that.

Skunk2 chose to use the intake manifold from the Japanese RSX Type-R, or K20A. K20 manifolds generally have shorter runner lengths designed for increased flow at higher rpm, which fits our bill. According to Skunk2, the

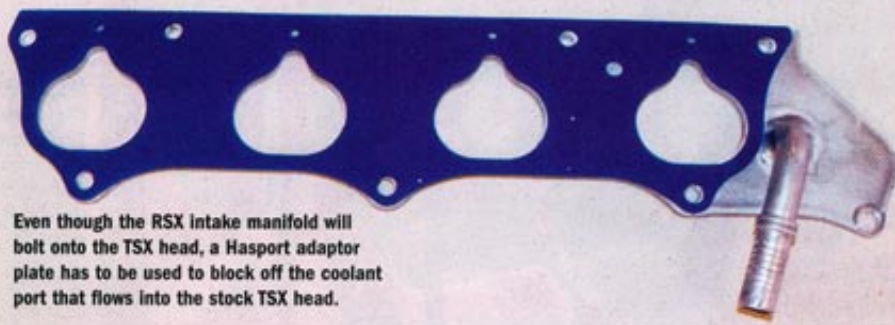
manifold from the K20Z found in the new Civic Si is worth 6 to 7 hp just as a bolt-on.

Although the K20 and K24 manifolds share the same bolt pattern, using a K20 manifold requires an adaptor plate from HASport to block off the coolant port on the K24 head. The plate will leave the manifold 3/8-inch farther forward in the bay, but since everything is soft-plumbed into the manifold, the change in positioning doesn't create any interference issues. The slight change in spacing is one of the reasons Skunk2 used a custom short-ram intake for this application.

If you're on top of your Honda game, you're probably wondering what happens to the drive-by-wire e-throttle that



SOURCE: Dynojet model 248C, Pinella Tech Center, Placentia, CA



Even though the RSX intake manifold will bolt onto the TSX head, a Hasport adaptor plate has to be used to block off the coolant port that flows into the stock TSX head.

ProjectAcura TSX

comes with the TSX manifold. Since the RSX manifold uses a mechanical throttle, the drive-by-wire system on the TSX had to be removed.

Luckily the system isn't too complex, since the go-pedal is still physically connected to a throttle cable that runs through the firewall. On the TSX, that cable connects to an e-throttle control unit inside the engine bay that electronically controls the stock TSX throttle body. This makes life easy, since you can just bypass the e-throttle controller and TSX e-throttle by using a K20 mechanical throttle body and cable. Skunk2 simply replaced the cable with a RSX unit, modified the brackets on the throttle body and threw away the e-throttle actuator mounted on the passenger side firewall.

Call it weight reduction. The stock 64mm RSX throttle body was also replaced with a billet 68mm unit from Skunk2 for better flow.

On the exhaust side, the Skunk2 Tri-Y header we installed in Part I was replaced with a race version, sporting revised geometry and no provision for a cat. The original Skunk2 cat-back exhaust remains. Combined, these parts add roughly 8 percent additional flow, says Skunk2.

The stock injectors and fuel pump stay, as does the Honda K-Pro engine management, recalibrated for the added power and new 8200-rpm redline. It's in the last 2000 rpm that Project TSX makes its huge power gains: 65 wheel-hp over baseline and 54 wheel-hp over our last test. That's a 38-percent gain in



output—on a stock bottom end!

With power up, the tuners get to work on style. This means clean engine bays, intact interiors and most of all, no Krylon black spray paint. Skunk2 installed more supportive RSX seats in Project TSX. The seats plant in with mild modifications to the

stock mounting tabs—grinding and welding was necessary. Since the new seats are black, Skunk2 also replaced all of the interior trim, from roof liner to speaker grilles, with parts from black-interior TSXs. The results look great—the huge effort invested in aesthetics pays off.



Skunk2's 68-mm billet throttle body gives some flow advantages, but more importantly, it replaces the e-throttle at the end of the stock TSX manifold.

SOURCES

SUSPENSION

Coil-overs (full coil-over system)

Skunk2

(951) 808-9888

www.skunk2.com

DRIVETRAIN

Short-throw shifter

Skunk2

(951) 808-9888

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ENGINE

Tri-Y race headers

Cat-back exhaust

Grounding kit

K-Series 68mm billet throttle body

Stage 1 camshafts

Forged valves, double-wound valve springs and titanium retainers

Skunk2

(951) 808-9888

www.skunk2.com

RSX intake manifold adaptor plate

HASport

(602) 470-0065

www.hasport.com

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Finally, the TSX's 18x8-inch Volk GT-7s were replaced by forged 18-inch Volk Racing CE28s, and Michelin Pilot Sport 2s now sit where BF Goodrich g-Force KD tires once did. As tested, the PS2s had less grip and underperformed in the slalom and skidpad compared to previous tests on the KDs. We

also raised the ride height slightly to give the TSX some badly needed suspension travel, but the relentless body roll still isn't quelled, so we have some work to do on that front.

The majority of the work on Project TSX is done. We'll need to do some final suspension tweaks and step up to R-

compound tires before we attempt to kick BMW M3 ass. Then all that's left is to see how it holds up against our rival in the real world. ■

PREVIOUS INSTALLMENTS

December 2004

Part 1: Suspension, brakes, wheels and tires

May 2005

Grunt = grins

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