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# 5.0



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TURBO '94 G



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2.3 vs. 2.9

**TECH:**  
**5.0 MODULAR! 363HP**  
NA TWO-VALVE BUILD



MARCH 2011

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# Two New

CONTINUING OUR SERIES ON STOCK-TO-STOUT PERFORMANCE UPGRADES FOR '96-'04 GTs ... By KJ Jones Photos courtesy of Anderson Ford Motorsport

This is the second segment of our diary on the power improvement of Nikki Wilson's ragtop '02 'Stang. If you missed our first report ("Breathe In, Breathe Out," Jan. '11, p. 108), we're following this three-part upgrade effort to show '99-'04 Mustang GT owners some basic mid-level and higher-end engine upgrades that are doable in the driveway, and offer tremendous bang-for-the-buck performance.

In initial tests, Nikki's once-stock

Pony was treated to both of Anderson Ford Motorsport's bolt-on horsepower packages. The 30hp package consists of BBK's 78mm throttle-body/plenum; an ASP crank damper and underdrive pulleys; and Bassani mid-length headers, off-road X-pipe, and after-cat exhaust system. To that, we also added AFM's N-22 camshafts, Power Pipe, and Abaco DBX 97B programmable mass-air meter.

In total, those additions are worth 60 horses at the feet, and brought our test Mustang's naturally aspirated grunt up to

291 hp (from its anemic 227.40 baseline) and 309.30 lb-ft of torque. Now, when you consider this kind of naturally aspirated horsepower in the grand scheme of things, anything even remotely close to 300 ponies is excellent for a Two-Valve 4 especially an engine with stock cylinder heads.

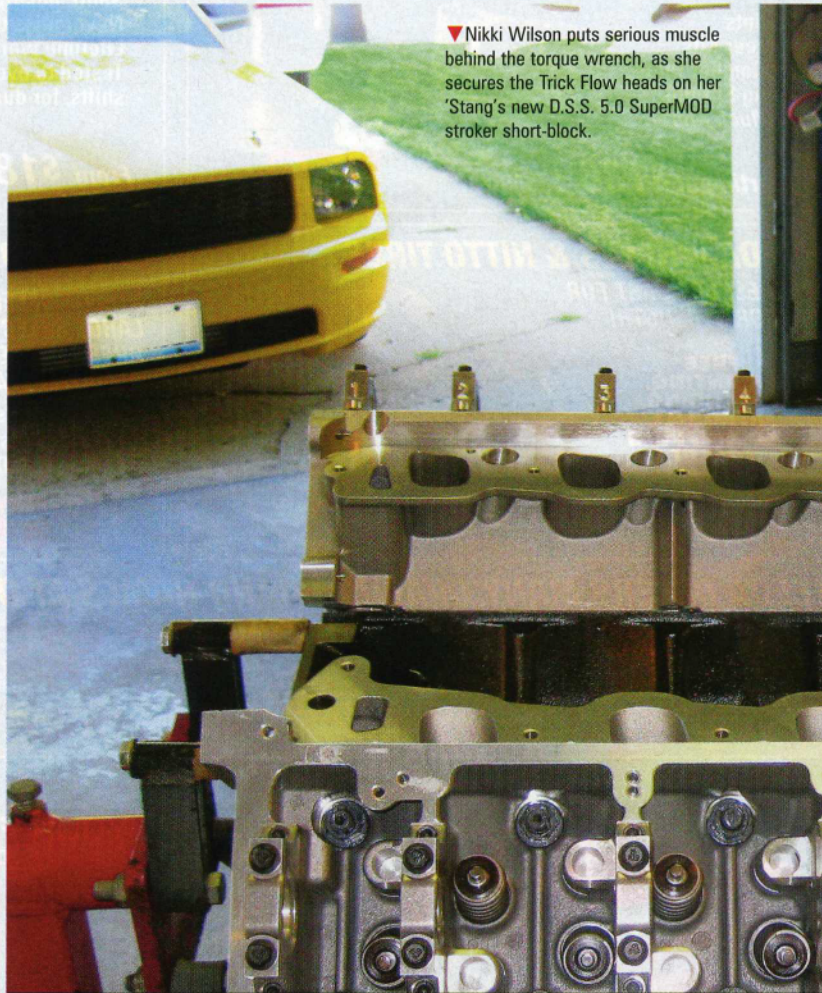
However, as adding a Kenne Bell 2.6-liter Twin Screw supercharger ultimately is the final plan for Nikki's GT—and the subject for our third and final report that will appear in a future issue—we decided



▲ With wiring harnesses, plumbing, exhaust, and other pieces disconnected or removed, Nikki's upgraded Two-Valve is lifted from the engine bay. Of course, the complete AFM Stage II Performance Package (Bassani exhaust, Abaco DBX 87 digital mass air, ASP underdrive pulleys, Anderson Power Pipe) that Nikki installed in our first report is destined for the new bullet.



▲ A modular-engine swap doesn't require a full-on shop to accomplish. Sure, having such equipment luxuries such as a twin-post hoist and air tools is preferred. However, as Nikki and her crew demonstrate, the job definitely is doable in the friendly surrounds of your driveway—where the back of a pickup serves as a great workbench.



▼ Nikki Wilson puts serious muscle behind the torque wrench, as she secures the Trick Flow heads on her 'Stang's new D.S.S. 5.0 SuperMOD stroker short-block.

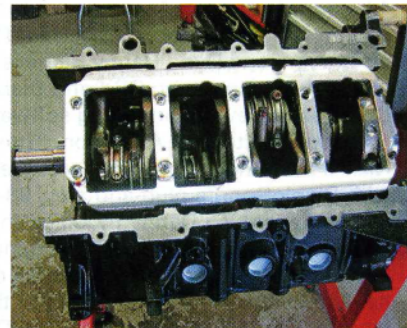
**HORSE SENSE:** Nikki Wilson really is our kind of Mustang enthusiast. As the lead mechanic (that's right, fellas, Nikki spins her own wrenches) for the '02 Mustang GT convertible being featured in this project series, it's cool to see that passion for performance goes beyond being a "boys-only" quality.

to swap the stock engine with a D.S.S. SuperMOD 5.0-liter short-block (PN FE 50SM BOOST), which was topped with Trick Flow's 4.6 heads (PN TFS-5190002-M44), intake manifold (PN TFS-5180003), and Anderson's N-52 camshafts (PN AFM N52).

Making the move to this hopped-up engine makes all good sense, mainly because despite the increase in cubic inches and naturally aspirated horsepower it brings, the new engine essentially is the same thing (structurally) as the bullet that is being removed from Nikki's 'Stang. The exhaust system, wiring, and all other necessary pieces fall right into place with this exchange, making for a clean (and stealth) transformation that will really make big steam when topped off with KB's blower.

As you'll see in the following photos, Nikki and her crew perform the entire transition process in the driveway and garage. The weekend project is something any ambitious and mechanically inclined 'Stangbanger can accomplish with the help of good friends and a six-pack or two.

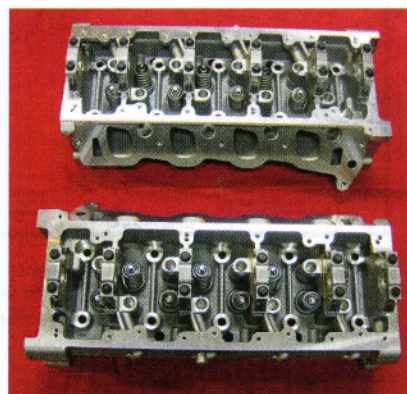
## NIKKI'S ONCE-STOCK PONY WAS TREATED TO BOTH OF ANDERSON FORD MOTORSPORT'S BOLT-ON HORSEPOWER PACKAGES



▲ Nikki selected a D.S.S. 5.0 SuperMOD short-block as her Pony's new motivator. The short-block features D.S.S.' Extreme-X forged dished pistons (9.6:1 compression); a KPC micro-alloy forged, 3.750-inch crankshaft (eight-bolt); 5.850-inch forged-steel, H-beam rods; and a D.S.S. Pro Mod Main Support System, which, along with ARP main studs, will keep bottom-end harmonics stable at high rpm.



▲ Nikki uses a clean rag and a little oil to give each cylinder in the Level-10-prepped short-block a final cleaning and a small amount of lubrication before final assembly begins.



▲ While D.S.S. sells SuperMOD 5.0 long-blocks with its own mega-ported Power Improved cylinder heads, the company also offers Trick Flow's new, Twisted Wedge 4.6 heads as extra-cost options. We've already done extensive research with these castings, on naturally aspirated ("Natural Progression," Feb. '10, p. 92) and supercharged 4.6-liter ("Light and Lively," Aug. '10, p. 58) engines. What's the bottom line? These heads make killer power either way they're used, and they're perfect for the higher-lift N-52 cams that are part of Nikki's upgrade.

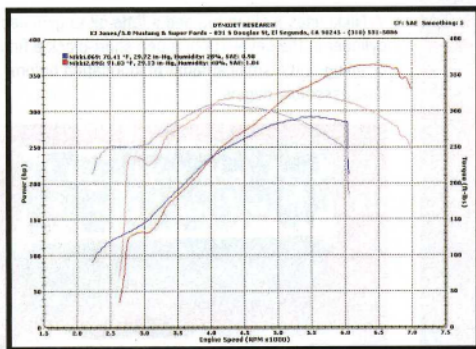
## ON THE DYNO

Upon completion of the Two-Valve engine swap in Nikki Wilson's '02 Mustang GT convertible, the 'Stang was delivered to the ever-ready Dynojet chassis dyno at Anderson Ford Motorsport; the same dyno that was used for Part 1 of this 4.6 upgrade project. As expected, the new powerplant brings about a need for PCM calibration, and Dyno Danny Biggs is AFM's man behind the Abaco DBX and DiabloSport Chipmaster Revolution tuning software.

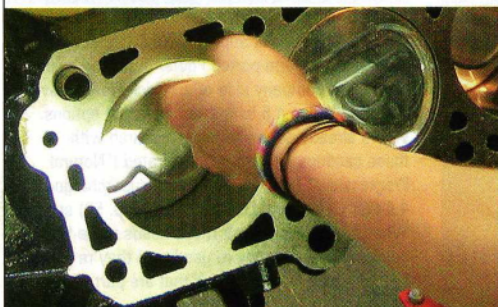
According to Rick Anderson, "Tuning Nikki's new engine was not hard. We started with DiabloSport's plug-and-play, 93-octane calibration, which Danny modified to achieve optimum air/fuel. This engine has 9.6:1 compression. I really think we could have made 10 more horsepower at the wheels with the 10:8-to-1 SuperMOD stroker (still with pump fuel), but since we plan to add a supercharger next, the lower-compression engine is the best way to go."

You may recall us mentioning our interest in seeing how the 75mm throttle body works with this combination. Rick says the "small" 75mm piece actually hurt the setup by about 10 hp (remember, a 78mm 'body was used in the first project).

"If you can find an '01 Bullitt throttle cable (the part has been discontinued by Ford), going with a ported, oval-shaped 100mm throttle body is the better option for a naturally aspirated 5.0 modular with Trick Flow heads, intake, and hot cams," Rick says.

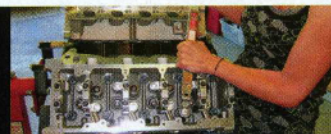


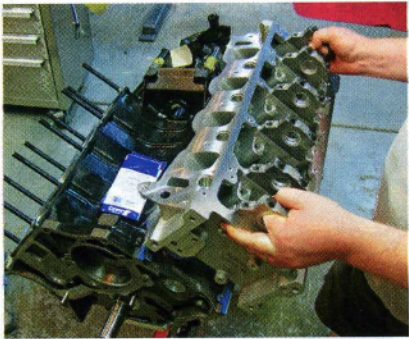
▲ Dyno results for this test are measured against the '02 Mustang GT's rear-wheel performance, with Anderson Ford Motorsport's 60hp Performance Package installed on the original 4.6 (see "Breathe In, Breathe Out," Jan. '11, p. 108).



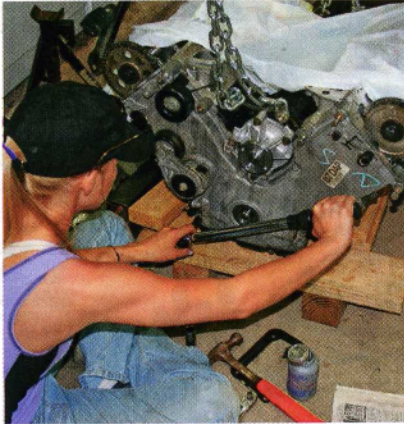
RPM	AFM		D.S.S./Trickflow		Difference	
	HP	TQ	HP	TQ	HP	TQ
2,600	123.80	250.10	00.00	00.00	-123.80	-250.10
2,700	128.70	250.40	71.32	138.40	-57.38	-112.00
2,800	132.80	249.20	126.03	236.40	-6.77	-12.80
2,900	138.40	250.70	130.44	236.24	-7.96	-14.46
3,000	145.00	253.80	131.26	229.80	-13.74	-24.00
3,100	152.00	257.50	133.32	225.86	-18.68	-31.64
3,200	162.60	266.90	143.62	235.70	-18.98	-31.20
3,300	171.80	273.40	161.56	257.10	-10.24	-16.30
3,400	181.70	280.70	173.79	268.46	-7.91	-12.24
3,500	190.80	286.30	182.39	273.68	-8.41	-12.62
3,600	199.80	291.50	191.41	279.24	-8.39	-12.26
3,700	209.50	297.40	201.17	285.56	-8.33	-11.84
3,800	218.60	302.20	210.53	290.96	-8.07	-11.24
3,900	228.10	307.10	222.48	299.59	-5.62	-7.51
4,000	235.60	<b>309.30</b>	231.99	304.60	-3.61	-4.70
4,100	241.40	309.20	244.10	312.68	2.70	3.48
4,200	247.20	309.10	252.60	315.88	5.40	6.78
4,300	252.20	308.00	259.95	317.51	7.75	9.51
4,400	256.30	306.00	266.36	317.94	10.06	11.94
4,500	261.30	305.00	271.94	317.39	10.64	12.39
4,600	265.60	303.30	277.74	317.12	12.14	13.82
4,700	271.00	302.80	284.62	318.04	13.62	15.24
4,800	275.40	301.30	292.41	319.95	17.01	18.65
4,900	279.60	299.70	300.16	321.72	20.56	22.02
5,000	281.90	296.10	308.74	324.30	26.84	28.20
5,100	283.90	292.40	316.12	325.55	32.22	33.15
5,200	286.30	289.10	323.81	<b>327.05</b>	37.51	37.95
5,300	287.60	285.00	327.81	324.85	40.21	39.85
5,400	290.50	282.60	331.71	322.63	41.21	40.03
5,500	<b>291.00</b>	277.90	335.98	320.83	44.98	42.93
5,600	290.60	272.60	340.28	319.14	49.68	46.54
5,700	289.30	266.50	346.09	318.89	56.79	52.39
5,800	287.70	260.50	350.98	317.83	63.28	57.33
5,900	286.70	255.20	353.71	314.87	67.01	59.67
6,000	285.10	249.60	357.67	313.09	72.57	<b>63.49</b>
6,100	283.50	244.10	360.17	310.11	<b>76.67</b>	66.01
6,200	n/a	n/a	362.22	306.82	n/a	n/a
6,300	n/a	n/a	362.62	302.31	n/a	n/a
6,400	n/a	n/a	<b>363.51</b>	298.31	n/a	n/a
6,500	n/a	n/a	363.09	293.38	n/a	n/a
6,600	n/a	n/a	361.00	287.27	n/a	n/a
6,700	n/a	n/a	358.72	281.21	n/a	n/a
6,800	n/a	n/a	354.08	273.50	n/a	n/a
6,900	n/a	n/a	345.83	263.24	n/a	n/a

THIS ENGINE HAS  
9.6:1 COMPRESSION





▲ The heads are dropped down over Fel-Pro multi-layered-steel head gaskets and secured with a set of ARP studs.



▲ After cleaning up the timing cover, Nikki bolts the OEM piece on her 'Stang's new Two-Valve bullet. A new water pump also is installed at this time, as are the original belt tensioner and idler pulleys.



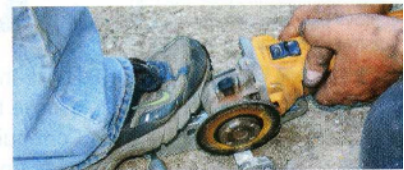
▲ The new D.S.S. powerplant is lowered between the fenders of Nikki's '02 ragtop. Once the engine is secured on the K-member and mated with the tranny, all of the accessories, pulleys, exhaust and other reused pieces (that were disconnected for the original engine's extraction), are now bolted in place.



▲ For the move from the stock engine's flat-top pistons to the supercharger-compliant, dished slugs in the SuperMOD stroker, AFM's N-22 camshaft had to be replaced with a pair of N-52 bumpsticks. The new cams are designed to work well in engines with aftermarket pistons, and Trick Flow or ported PI heads. The N-52s are healthy and don't like driving under 2,400 rpm, according to Rick Anderson. As the cams' rev range (3,500-7,200) is about 1,000-rpm higher than that of the N-22 camshafts (2,400-6,200 rpm), 4.30 or even 4.57 gears are perfect for great street performance with this type of engine.



▲ Anderson's Stage I Hi-Rev clutch system (PN KITHRC1A-468) is Nikki's choice for ensuring smooth engagement of her five-speed's gears. The clutch is designed for supercharged engines that rev through 7,500 rpm, and it features a 10.5-inch organic clutch disc and AFM's Super Light eight-bolt (SFI rated) flywheel. The significant weight difference between the factory flywheel and Anderson's SFI-rated 'wheel definitely will have a big impact on the GT's quick acceleration once the blower is installed.



▲ Trick Flow's 4.6-liter Track Heat intake manifold is being used for the new engine setup, so the alternator must be installed backward (turned around so the pulley faces the firewall) to achieve proper serpentine-belt alignment. This is where the engine swap's *only* modification happens. By slightly cutting and grinding on Trick Flow's alternator bracket Nikki's crew is able to achieve enough clearance for the belt as it travels across the larger ASP water-pump pulley.

## SOURCES

### ANDERSON FORD MOTORSPORT

(888) 715-6497  
www.andersonfordmotorsport.com

### DIABLOSPORT

(877) 396-6614  
www.diablosport.com

### D.S.S. RACING ENGINES

(630) 587-1169  
www.dssracing.com

### DYNOJET

www.dynojet.com

### FORD RACING PERFORMANCE PARTS

(800) FORD-788  
www.fordracingparts.com

### TRICK FLOW

(330) 630-1555  
www.trickflow.com



▲ The D.S.S. 5.0 SuperMOD is completely installed and ready to rock in Nikki's '02 GT. In addition to the aforementioned Trick Flow Track Heat intake (PN TFS-51900002-M44), a Professional Products (www.professional-products.com) 75mm throttle body (PN PP-69223) and Ford Racing Performance Parts' 30-lb/hr fuel injectors (PN M-9593-BB302) have been added as completion parts for the new mill. We're interested in seeing how the manifold works on this naturally aspirated setup. The intake's symmetrical port and the 75mm throttle body should generate a substantial increase and even distribution of airflow to each cylinder. **5.0**