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Last month, we introduced you to our latest diesel project—an '08 Ford F-250 with the 6.4L Power Stroke. Since we get a lot of emails and letters from readers about this truck, and since they are becoming readily available on the used truck market, we found an enthusiast who picked one up for around \$23,000 with roughly 70,000 miles on the clock as our guinea pig. Besides doing the easy stuff, intake, exhaust, programmer, we also hope to show you the maximum potential hidden away in these trucks.

# Project **6.4L** Power Stroke

## Part II: Making Big Power With the Stock Turbo

BY J.S. HANSEN  
PHOTOGRAPHY: J.S. HANSEN



The AFE Stage II cold air intake not only offers easy breathing for the sequential turbochargers, it offers effective filtering through a five-layer reusable cleanable filter. Installation took just 30 minutes with basic hand tools.

Last issue, we talked about what to look out for when buying these used; what problems seem to be most common with the power plant; and general maintenance tips after finding the right one. We showed what kind of performance could be had with just your basic cold air intake and DPF back exhaust system. So this time around, we've taken things a few steps further by removing the factory exhaust for an aftermarket "off-road only" exhaust system and an aftermarket tuning device from H&S Performance. We've been taking good notes and records of fuel mileage changes throughout the build, and we were even able to spend some time on the dyno, giving real-world

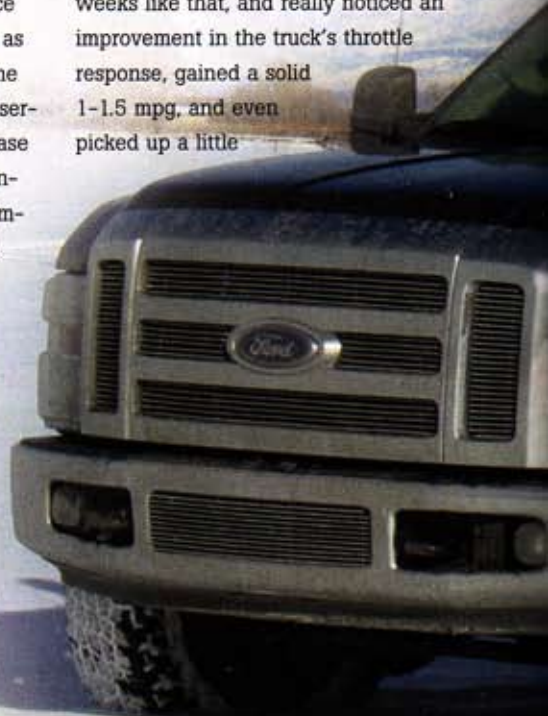
test results, information you can actually use, and hopefully help you make some decisions when it comes time to modify your own truck.

After we completed the long list of maintenance work, such as replacing the fuel filters, servicing the transmission and transfer case

and replacing the fluid in both differentials, it was time to get some dyno numbers and baseline fuel mileage results before looking into performance upgrades. Dyno testing at Gillett Diesel Service in Bluffdale, Utah, showed a pretty impressive 303 hp and 542 lb-ft of torque to the rear tires; not bad for a OEM stock light-duty diesel running some pretty restrictive emissions equipment. The first couple tanks of fuel were showing around 12.6-12.8 mpg, hand-calculated of course, with a few regeneration modes in there for cleaning that factory diesel particulate filter.

While we were impressed with the dyno results, the fuel mileage was quite disappointing. Especially when we considered that old 7.3L Power Stroke we'd traded in for this 6.4L that had been averaging over 15 mpg.

At that point, we called up our friends at aFe Power, and installed its Stage 2 cold air intake system along with the 4-inch DPF back Mach Force exhaust. Both items, which were extremely easy to install, fit and finish, couldn't have been better. We drove the truck a few more weeks like that, and really noticed an improvement in the truck's throttle response, gained a solid 1-1.5 mpg, and even picked up a little



power and torque on the dyno. At that point, it was time to look into some aftermarket tuning software and opening up that factory exhaust system even more.

### The DPF Issue

Looking to improve the fuel mileage dramatically, we knew removing that DPF and catalytic converter that was bolted on under the truck was really our only option, as the constant filter regeneration every couple of hundred miles was the culprit in late-model, Super Duty fuel economy issues. Lucky for us, this truck is in Canada where the strict U.S. emissions requirements don't apply. In fact, urban legend in Canada has it that removing the DPF on a 6.4L Power Stroke can yield up to 40 more hp on the dyno, and up the fuel economy somewhere between 5-8 mpgs.

So on this truck, installing "off-road use only" equipment wasn't really a problem. However, for the rest of us living in the United States, it is against federal law to remove any factory-equipped emissions equipment on vehicles used on public roads and highways. Removal of the diesel particulate filter and catalytic converter can only be done in a specific "off-road use only" vehicle use such as a race



*While the AFE filter looks smaller, it flows much better and doesn't require replacing, just rinse it out, re-oil it, and clamp it back in.*

truck. With that being said, we wanted to know just exactly what could be gained by opening up that exhaust system and to see if this urban legend is true.

We got in touch with H&S Performance, a company based out of St. George, Utah, which specializes in off-road tuning and equipment for these 2007-and-newer, light-duty trucks. You may remember seeing information about its tuner on an '08 Chevrolet Duramax in one of our recent issues. In speaking with Casey and Terence at H&S Performance, we ordered up one of their complete, aluminumized, down-pipe back 5-inch exhaust systems, one that would remove not only the muffler, but the catalytic converter and DPF, as well. With the factory sequential turbo system under the hood, working as a form of muffler, we decided

that going the straight-pipe route would most likely offer the least amount of restriction while not being unbearably loud in the cab.

The 5-inch exhaust system is a well-put together kit, and once the factory system had been removed this one went together pretty quickly. The fit was perfect, with no interference anywhere, and we even had plenty of tailpipe clearance past the spare tire. The nice mandrel bends in the system offer good unrestricted exhaust flow and the large diameter is sure to be enough for 500-plus hp (we'll get to that shortly). Overall, we are pleased with the exhaust system, plus it added a very unique and aggressive tone to the truck. Also to our surprise, inside the cab the straight-pipe system is relatively quiet, no real problems with exhaust drone and with the windows up, it's not much louder than stock. Outside the truck is a different story however, it's definitely got that sound a high performance exhaust system should. We capped the 5-inch exhaust system install with a 6-inch polished stainless tip, which was purely for cosmetic reasons.

### Black Maxx Tuner

With the new exhaust under the truck,



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The new 5-inch downpipe back exhaust system, complete with a 6-inch tip, from H&S Performance really opened the door for some big performance gains and a deep throaty exhaust note.

we needed a way to turn off the factory sensors installed in the stock exhaust system, since regeneration would not be an issue now on this truck. So again, we turned to H&S Performance for one of their Black Maxx tuners and monitor setup. The Black Maxx is an "off-road use only" race tuner with the ability to override the factory computer programming that controls the DPF sensors and EGR system. The Black Maxx offers some options that make it very unique in the 6.4L Power Stroke market since it's the only available DPF Delete tuning software with shift-on-the-fly tuning capabilities, according to H&S. It also allows you to completely remove the factory exhaust systems sensors from the truck, where some of the other tuners on the market require you to retain those sensors, even in the aftermarket off-road exhaust systems.

We opted to order and install H&S Performance's custom formed dash mount, even though the Black Maxx came with a nice window mount. The plastic dash mounting pod makes for a little cleaner install giving you the ability to tuck the one wire required to run the monitor away behind the molding. This made for



H&S Performance offers this molded dash mount, making for a nice clean install, the wire can be stashed away behind the door molding and down behind the dash, total install of the Black Maxx took less than 30 minutes.



The Black Maxx's color screen monitor is equipped with a small SD card for easy software updates and user adjustable tuning options, such as torque converter lockup speed and transmission shifting strategies.

an almost stock appearing install and looks as if this truck came equipped from Ford with the Black Maxx monitor.

Installation of the tuner couldn't be simpler, after mounting the pod, monitor, and running the wires down under the dash, there were just two connections to make: Just plugging into the truck's OBD-II port and the other being a wire tap onto a key-on power source found in a factory wiring harness bundle stashed under the dash. This truly is a set-up that can be installed in less than 20 minutes and you won't even need to open the hood.

The 6.4L Power Stroke is equipped from the factory with a couple exhaust gas temperatures probes (pyrometer), so the Black Maxx can use them to help you monitor your egt's. No need to drill and tap an aftermarket sending unit and pyrometer. Once everything has been installed, downloading the new software into the truck's computer is pretty straightforward. The Black Maxx offers step-by-step instructions and the download takes just 4-5 minutes to complete. Upon completion of the download, H&S Performance highly recommends going through a pretty simple transmission relearn process. This will allow the 5R110 transmission and computer to adjust for the newly added horsepower.

The transmission relearn needs to be done with the tuner in the Hot performance level and is as simple as making one 0-60 mph run at quarter throttle and then coming to a complete stop. Make a second 0-60 mph run directly after, this time at half throttle. Lastly, a third run of 0-80 mph needs to be made at full wide open throttle. After completing these three runs the trans relearn process is complete



The H&S Performance Black Maxx not only installs easy, but the monitor looks nice and clean once it's installed using their custom dash mount. The monitor is easy to read and navigate. The on-the-fly tuning adjustability is also an industry first and only for the 6.4L tuner market.

and you can enjoy the new performance of the truck and tuner. Running the Black Maxx on Hot will quickly show you just how much there really is in these 6.4L power plants. See the dyno charts for actual horsepower results.

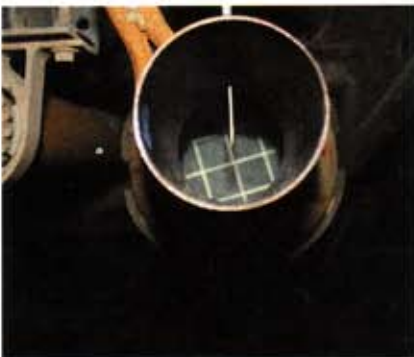
The Black Maxx offers three performance levels, Mild, Wild and Hot, all of which run extremely well with little to no smoke and very manageable egt's in the two lower settings. Towing with the Black Maxx set on Mild is an absolute dream, the increased torque really adds to the truck's overall response to driver input. Quicker throttle response, quicker spool-up from the turbos, and just overall better drivability are all qualities we've been very pleased with in this tuner. The Black Maxx also helps improve the shifting strategies in the transmission, fine-tuning its performance, as well.

The H&S Performance Black Maxx is also supplied with an SD card that can be removed from the monitor for easy free internet updates as they become available. H&S also offers a couple different shifting strategies and fueling options on



With the factory diesel particulate filter and catalytic converter removed from the truck, you can plainly see just how large and restrictive these units can be.

Continued on page 142

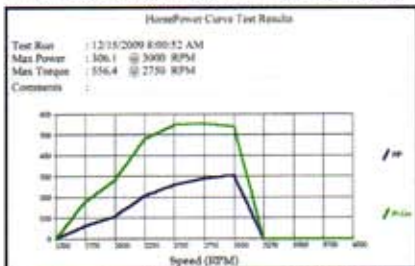


This photo shows just exactly what can be found inside that factory DPF, notice the factory probe used during the regeneration cycle to monitor exhaust temperatures, before and after the DPF.

their website for those guys looking to fine-tune it to their liking. The online options will allow you to tune to your preference, whether you prefer nice easy near stock shifting characteristics or a firmer more aggressive shift with its race-shifting strategies. They also give the option to choose your own torque converter lock-up speed.

We found that the standard Black Maxx shifting strategy was best suited for those that like that feel of the Allison transmissions, with the drawn out smooth shift points. If you're the kind that prefers a quick firm shift, like a built 4R100 transmission offers, the Race Shifting might be more to your liking. On trucks running larger tires and lift kits, H&S recommends installing a set of aftermarket ladder/traction bars to limit axle wrap the 1,000-plus of torque can create. (We'll be doing this next).

After a few thousand miles of driving the truck with the Black Maxx installed and taking very meticulous records of every gallon of fuel burned and every mile it's been driven, we're pretty happy



With the factory exhaust removed and the H&S Performance 5-inch system installed we were able to get back on the dyno to see what kind of improvement we'd made. Comparing these two charts side by side you can really see our results. Running the Black Maxx tuner on the stock setting, you can see we picked up about 10 hp from running stock tuning with the DPF intact. Notice the torque though, that's an increase of almost 75 lb-ft it also made that peak torque and horsepower a couple hundred rpms quicker. That's a big jump considering all we've done is remove the factory restrictive exhaust. That's a performance gain you really notice with a heavy load behind you.

to announce we've picked up a solid three mile per gallon over stock. Running the wild tune on the Black Maxx has shown the best fuel mileage results, with a best of just over 16 mpgs. On average though, with mixed city and highway driving, we're seeing a pretty consistent 15.3-15.8 miles per gallon. That puts us right back there where that old 7.3L Power Stroke was running, but we're doing it with a lot more power and performance on tap.

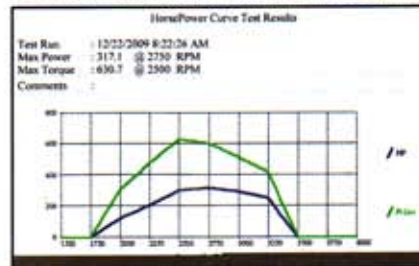
The Black Maxx color screen monitor is very easy to read and has quite a few built-in options we've really been impressed with. The option to switch from



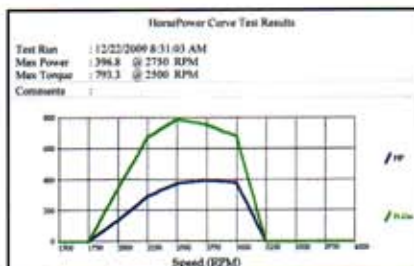
The Black Maxx tuner installed in just 30 minutes, with just one wire to tap into for power to the monitor and this OBD-II connector, it's a pretty straight forward and easy installation.

one performance tune to another while driving is nice, as well as being able to monitor things such as egt's, boost, coolant temperature and transmission temperature all at the same time has become quite handy. The Black Maxx will also read and clear Diagnostic Trouble Codes and offer things like peak egt and boost recall.

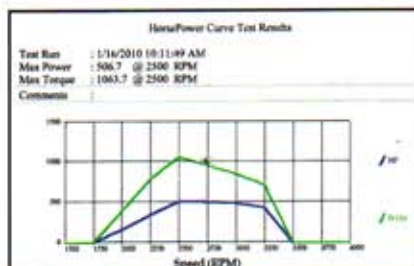
We are very pleased with the H&S Performance products. The exhaust and tuner have surpassed our every expectation for this truck at this point. With over



500 hp on tap now, it's got more than enough to set you back in your seat, while still being manageable for daily driving and towing tasks in the lower horsepower levels. Stay tuned for next month's issue as we look into improving the trucks cosmetics with a new Icon Suspension leveling kit, a larger tire and wheel combo, and some Wide Open Performance traction bars.



With the Black Maxx tuner on the Mild setting, a 60-hp tune designed for heavy towing, you can see that we actually picked up almost 80 hp and over 160 lb-ft torque. At nearly 800 lb-ft to the rear tires for such a broad rpm range, this tuning will really improve the truck overall drivability, especially while towing. The added grunt will really help keep all that weight moving, while still offering good manageable exhaust gas temperatures and virtually no smoke.



With the Black Maxx turned up into its highest horsepower tune, what they call the Hot programming, we were able to break past that ever so impressive 500-hp mark. Cresting out at 506 hp and 1,063 lb-ft. An increase of just under 200 hp and 450 lb-ft torque. Remember, this is still a basically stock truck, simple cold air intake upgrade, free flowing exhaust system, and the H&S Performance Black Maxx tuner, that's it. In this Hot tune, boost levels have reached 44 psi, so we'd probably recommend installing some aftermarket head studs if you were planning to run this horsepower level a lot, to avoid any head gasket problems. We should also note that these dyno numbers were uncorrected on a Mustang Dyno at over 4,300-foot elevation in Utah. On dyno closer to sea level, with a little denser air we'd expect you to see dyno results with this tuner to be 540-plus to the wheels.

## SOURCES:

AFE Power  
www.afepower.com

H&S Performance  
888.628.1730  
www.hsperformance.com

Gillett Diesel Service  
800.638.4679  
www.gillettdiesel.com