

Weekend Warrior

This Turner Motorsport 330i will gladly take you to work during the week, but it really lives for weekend days at the track or scouting out deserted back roads.



STORY AND PHOTOGRAPHS
BY DAVID HAUETER

Chief Kancamagus ruled a group of several Indian tribes in central New England back in the late 17th century, a union known as the Penacook Confederacy. Known as “The Fearless One,” Kancamagus tried to maintain a peaceful relationship between his people and the growing number of English settlers, but the tribes of the Confederacy

were ultimately forced out around 1691, with most of them moving north to New Hampshire and Canada. The chief would certainly find it ironic today to find a highway named after him that cuts right through the White Mountains of New Hampshire—a highway that carries his enemies’ descendants on leaf-watching and hiking excursions.

Though most residents in New Hampshire are familiar with the Kancamagus Highway—the “Kanc” to locals—I ran across it during a Google search for interesting roads within a few hours of Amesbury, Massachusetts—the home of Turner Motorsport. I was up in the area to drive Turner’s latest project-car creation, a 330i Performance Package sedan with all of the

latest aftermarket upgrades available from Turner Motorsport (TMS). The 34-mile Kanc seemed like the perfect destination, as it starts in Conway, which is only a two-hour drive from Amesbury, which sits right on the border of New Hampshire. The trip would provide a good mix of highway driving before tackling the twists and turns of the Kanc.

It didn’t turn out that way.

Turner’s goal with the latest project car was to get as close as they could to the performance of the 330i they race in the Grand-Am Cup Sport Touring Championship (see sidebar) without sacrificing reliability or everyday practicality. Since any car designed for the street is going to be compromised on the track to some degree—or vice-versa—it is often a thin

line that divides going too far with such a project, or not going far enough. The difference, of course, comes down to the type of driver who will ultimately own it—and as the goal was to commemorate their Grand-Am Cup race car, this 330i leans more toward performance than comfort. Yes, it is perfectly capable as a daily driver, but you’re going to need a real bias



TURNER MOTORSPORT 330i PRICING	
StopTech big brake kit	\$1,995
Limited-slip differential	\$2,275
Finned differential cover	\$110
Schrick camshaft set	\$1,152
Power pulley upgrade kit	\$250
OBDII software upgrade	\$369
TMS/Conforti intake	\$360
Supersprint headers/sport cat	\$3,285
Supersprint muffler	\$715
H&R RSS coil-over kit	\$1,950
TMS sway bar set	\$370
TMS fixed camber plates	\$140
TMS adjustable rear camber arms	\$300
Rear subframe reinforcement kit	\$145
BBS LM 19" wheel set	\$4,976
TMS carbon fiber shift knob	\$100
Carbon fiber valve cover	\$350

The TMS/Conforti air intake is the same used on the Grand-Am Cup 330i. Turner has dressed the engine compartment up with carbon fiber, and the fixed camber plates are visible through shock towers. A carbon-fiber gear lever handle is nice touch in the Performance Package interior.

toward performance to appreciate this car and give it the kind of life that it was intended for, which should involve several trips to a track during the year.

This car started its life as a 2004 330i with the performance package, ordered with the six-speed manual transmission, xenon headlights, Harman/Kardon stereo system, and fold-down rear seats. While Turner could have chosen a bone-stock 330i for the project, he chose the performance package because it was more of a limited-edition car and came with the body kit from BMW already installed, as well as the grippier Alcantara seats and steering wheel. While many tuned cars have the prerequisite wheel/tire and lowering suspension upgrades, this car goes way beyond that to deliver meaningful upgrades that significantly improve the performance of the already competent 330i.

We'll start with those prerequisite wheels and tires. For their 330i, TMS installed a set of 19x8.5" BBS LM wheels wearing Michelin Pilot Sport PS2 tires—an upgrade that gave the car the same size contact patch front and rear (8.5"), which helps to reduce understeer from the stock set-up with its staggered wheel/tire sizes. The larger wheel size was also chosen to make more room for the StopTech brakes, which run 32-mm-thick rotors 332 mm across in the front with four-piston calipers. Turner doesn't use these in the Grand-Am Cup 330i (rules require stock brakes in that series), but the team does use them in the Grand Sport class M3 and considered them



a real competitive advantage on the track. Rear brakes are kept stock, though the rotors have been slotted to better match the fronts in appearance.

As Will Turner comments, "Our goal was to build a street car that handles really well but is still okay to drive on the street—we wanted it to handle better than it accelerates." Handling is what gave the Grand-Am Cup car an advantage over many of its rivals, and the road car is set up rather like the racer. The TMS 330i uses an H&R RSS coil-over suspension kit, which has the firmest settings of any coil-over kit in H&R's street product lineup; it's designed to be usable on the street but greatly improve handling for track work. In fact, the new owner of this car swapped the RSS kit out for a suspension with more comfort for the street (wimp). To reduce body roll and sharpen handling further, TMS installed their own adjustable sway bars, which measure 27 mm in the front and

21 mm in the rear, along with adjustable rear trailing arms and solid bushings.

TMS also installed camber plates that allow adjustments from -2.5 to -3.0 degrees, and the car was running a fair amount of negative camber on the day we drove it. The E46 3 Series rear subframe problem has been well documented, so with all the other changes made to this car, TMS naturally installed the reinforcements on it. Turner's shop has been repairing a lot of rear subframes on the E46s and interestingly, they have found that the problem doesn't seem to have a particular pattern; they are failing on some cars with 25,000 miles while other customer cars have 100,000 miles and are doing fine. They also say it's affecting street-driven as much as track-driven cars. BMW dealers now have a method for doing the repair, but it simply involves squirting epoxy foam solution into the area that then hardens, while TMS uses sheet metal to reinforce the area.

While Turner certainly focused on handling with this car, they also made several changes to improve power, including an upgrade to Schrick cams that have 10.5-mm lift on the intake and 10 mm on the exhaust to improve power delivery in the mid to high rpm ranges. Engine software developed between Turner and Jim Conforti increases power by altering fuel enrichment, cam timing, and ignition timing while increasing the factory rev limit; it goes even further by re-mapping acceleration enrich-

ment and transition fueling, which affects how the car responds to rapid changes in the throttle pedal. When the throttle is squeezed with the stock software, the injectors open more but spray no extra gas into the cylinder, while the TMS/Conforti software does spray in more fuel, resulting in more responsive acceleration.

Turner also worked with Conforti on the intake, which replaces the factory air box with an ITG foam air filter attached to a mandrel-bent intake tube that provides a freer flow of air to the engine. The intake

on the project car is also used on the 330i Grand-Am Cup car; along with the software upgrade, it adds around 17 horsepower. Other upgrades shared by the TMS 330i road and race cars include the pulleys that underdrive the water pump, the power steering pump, and the alternator to deliver a 10-20% reduction in drive to these systems, freeing up more horsepower to drive the rear wheels. For the exhaust, Turner installed a Supersprint sport catalytic converter, exhaust, and headers. With all of the performance improvements under the hood

and the exhaust, the TMS 330i puts out 252 horsepower at the rear wheels. The power gains are especially noteworthy at the top end; at 6,700 rpm, the stock 330i makes 220 hp, while the TMS car makes 251.

Another upgrade that Turner is particularly proud of is the limited-slip differential, which provides a very worthwhile addition to just about any late-model 3 Series, since BMW stopped putting LS diffs on the cars in 1995. "Not only does the limited slip make for a better autocross or track car, it will also be better in the rain and snow,"

says Turner. "There's no downside to having a limited slip—BMW just doesn't do it because of the cost." Turner's diff has a 3.64:1 final drive, uses the factory bearings, and fits into the factory housing with all dimensions identical to the factory unit.

With all of the upgrades made to this car, the ideal place to test it would have been the track, but with only one day to spend in it before it headed off to its new owner, the decision was made to head to the Kanc for some quick driving on one of the most scenic highways in the Northeast.

The Turner 330i looks just about perfect with its stock body kit, BBS wheels, lowered stance, and larger exhaust tips. As soon as the key is turned and the engine turns over, the Supersprint exhaust sounds *really* good, with a note that may be considered loud by "normal" drivers but which sounds perfect to those of us who lean heavily toward sport.

Another immediately noticeable improvement on this car is the throttle response, which provides a surge in acceleration as soon as the throttle pedal is

Take A Flying Lap In Cub Scout Colors

I have become pretty familiar with the blue-and-yellow race cars of Turner Motorsport over the last few years, but most of that familiarity came from photographing them on many occasions, as well as writing about their various race exploits in the Grand-Am Cup and Speed World Challenge racing series. I was able to get much more up close and personal with the team's Grand-Am Cup 330i racer last October, as I took the wheel of

their credit in those two years and have yet to win a championship. What they *have* done is rack up 25 top-five finishes in the last two seasons with their two 330i's—but they finished twice behind the factory-backed SpeedSource Mazda RX-8 in the championship. The lone win came at Watkins Glen in 2004, when Bill Auberlen made a pass on the last lap of the race to get the victory for himself and co-driver Tim Pappas.

shouldn't be, since I'm familiar with the Grand-Am Cup rules, which keep the cars pretty close to their road-going counterparts. To start with, the engine, brakes, and gearbox, as well as the clutch and flywheel, are stock. The only changes made to the engine are a more aggressive intake and a free-flow exhaust attached to the stock manifold—but with these minor changes the engine still puts out only 260 hp.

The biggest changes from the stock car are in the suspension, as the race car uses H&R springs with Moton adjustable shocks, which have eleven settings for compression and nine for rebound. Turner uses different springs for different tracks, but the team tends to like their cars with a stiff set-up, so uses at least 1,000-pound springs all the time. The race car also weighs around 400 pounds less than the stock 330i at 2,875 pounds, the minimum weight for the series. And with its roll cage welded in, the race car is obviously much stiffer than the road car. Grand-Am Cup uses a spec Hoosier racing tire for the series, which is almost but not quite a slick, but is much stickier on the track than the road tires that come on the street car.

My first time driving at NHIS almost didn't happen, as the Great Rain of 2005 caused flooding in many parts of the state and had put the track under water less than a week before. I think SCDA president Ian Prout had a

deal with the devil, as it somehow drained in time for our track day and the forecast was dry—though it rained the day before and was forecast to rain the day after. Signs of the flooding were still evident in the infield tunnels, as we had to drive through standing water to get in. To avoid looking totally clueless to the Turner guys, I brought along a Subaru WRX STI (part of my *therace-site.com* writing gig) and went out for two sessions in that car to get familiar with the track before climbing into the 330i.

To get into the 330i racer, you put your left hand on top of the driver's door and your right hand on the window frame and hop into the air while sliding your legs in under the steering wheel and sliding your butt into the seat. Will Turner and Don Salama make it look easy, and I manage to get in—but not nearly as gracefully.

Turner is about my size, so the racing seat feels pretty comfortable, and the seating position is nearly ideal after getting strapped in with the racing harness. The dash is recognizable as 3 Series hardware, but not much else is, as the usual climate control buttons and knobs have been replaced with toggle switches and circuit breakers with carbon-fiber faceplates behind them. A proper racing steering wheel gives more room for my knees, and the usual gauges have been replaced with the Motec display, which shows everything from oil, differential, and water tempera-



David Haueter steers the Turner 330i through the esses at NHIS.

TRACKTIME



Track time in somebody else's race car: life is good.

DYKE ABERNETHY

the car during a Sports Car Driver's Association track day at New Hampshire International Speedway.

Turner Motorsport has been competing in the Grand-Am Cup Sport Touring (ST) championship for the past two seasons and has been one of the most successful teams in the series, though they have only one win to

Our track day with the #95 Turner 330i at NHIS came only nine days after the season finale at Virginia International Speedway, where Don Salama put the car on the pole and along with teammate Will Turner ultimately finished third in the race. Turner told me before I got into the car that I would be surprised at how stock it feels—but I really

tures to lap times, estimated lap times, and fuel pressure.

NHIS is most famous, of course, as the host for a round of the NASCAR Nextel Cup Series, though thankfully we didn't have any Robby Gordon types around who would get mad and start throwing helmets at other cars. The 1.6-mile course we drove on included a portion of the oval (broken up by two chicanes) and the road course portion, which is one of the few "rovals" in the U.S. that goes outside of the oval and features elevation changes. The most interesting section of the track is the first mile of the road course, which takes a sharp uphill right-hander, goes up and over a hill, then back downhill into the Carousel or "Bowl" turn, which has a lot of positive camber and

goes back uphill through a left-right transition before going back downhill into the infield of the oval.

My first few laps in the Turner 330i racer were enlightening, just as Will said. Even though I knew the car had a lot of stock parts and wasn't much more powerful than the road car, the racing war paint on the outside and the stripped interior with the rollcage on the inside make you think that the car is going to be so much faster—but it isn't. The engine feels very similar in power to the stock car; and to be honest, it might just be the noise from the straight exhaust that makes your mind think it's faster than it really is. The brakes are excellent with their stock set-up with Pagid pads (which Will says have held up very well in racing condi-

tions)—though again, there is nothing really noticeably different from the road car.

Where the car is noticeably different is in the suspension and the grip of the Hoosier tires. With 400 pounds less to carry around, along with a much firmer suspension set-up, the race car has much less body roll than the road car and is much sharper in transitions—very noticeable in the Bowl and the esses that lead back onto the oval after coming off the road course. I'm used to doing track days on street tires, so the grip of the Hoosier racing tires takes some getting used to; it allows for much faster cornering speeds and better braking. The tires are very predictable as well; when they do start to slide, you get plenty of warning and it is

easily correctable.

After spending around thirty minutes in the Turner 330i, it was easy to see why the car has been so successful in Grand-Am Cup, particularly with great drivers like Turner and Salama at the wheel. The car is very predictable, has great braking and handling abilities, and is very easy to toss around and get comfortable driving fast—not only a testament to Turner's ability to build a quick race car, but also a verification of the inherent strengths of the 3 Series, since so many stock parts are used. It was a real pleasure to drive and get to know a little better, and I will have a new and fuller appreciation for the car when I see it through my viewfinder on my camera in the 2006 racing season.—David Haueter



The TMS 330i puts out 252 horsepower and has handling that makes it an effective weekend warrior. The H&R RSS coil-over kit lowers the car and the BBS wheels really improve the sporty look; TMS rolled the inside of the fenders to avoid rubbing.

pressed; it's reminiscent of the E46 M3 in Sport mode. With the shorter-geared limited slip, the sharp throttle response, and the extra power, the TMS 330i feels somewhere between a stock 330i and the M3 in pure speed. This car also feels similar to the M3 in top-end power on the open highway, as there is stronger acceleration in the upper rpm range, even while in higher gears. Being used to the stock 330i, it's surprising how much power is on tap when cruising at 3,300 rpm in sixth gear at 80 mph.

I've lived in the Northeast for over twenty years now, and often vacation in New England, but I had never been to the White Mountains until my drive in the Turner 330i. Once the mountains come into view on the approach from the south, they are simply stunning—which really raised my anticipation of driving through them on the Kanc. There must be hordes of moose roaming the woods if the amount of road warning signs is anything to go by. I never did see one, but later learned from a local that the state is extra careful to warn drivers given the sheer size of the animals. Since they are so tall, most cars that hit them cut them off at the knees, causing them to fall on the car, crushing it and whoever is in it.

Well, I didn't hit a moose, but here's the downer from this trip: The Kanc is a beautiful road, but it has way too much traffic on it, even in the non-peak summer season on a weekday. It seemed like every time a stretch of road would open up, it would just as quickly close, thanks to an RV moving at a snail's pace or a dump truck heading



to a construction site. Instead of getting frustrated, you'll be better off just accepting that you're not going anywhere fast and enjoy the view.

A quick look at the atlas to plan a better return route to Amesbury revealed a promising alternative: Route 118, which starts on the west end of the Kanc right after it ends and heads southwest before turning back and connecting with Interstate 93. After 34 miles of slow-moving traffic on the Kanc, R118 was like going to heaven, with a good fifteen miles of smooth roads, elevation changes, and plenty of curves. Best of all, there was absolutely no traffic, just moose warning signs. With this opportunity presenting itself, I decided to take the risk of having my life ended by a moose and went for it.

The TMS 330i was absolute magic on R118, as all the handling benefits from the Turner upgrades revealed themselves in a big way. With the H&R suspension, sway bars, and negative camber dialed in, the car was phenomenal through the curves, with minimal understeer and body roll,

sharp turn-in, and crisp transitions, combined with excellent throttle response and power delivery. The StopTech brakes are also pretty incredible; they're probably more brake than this car really needs, as they bring it down from speed so quickly that it almost catches you by surprise and can force the front tires to slide if you get on them really hard. These brakes were made for cars wearing warm slicks!

While we didn't get to drive this car on the track, I have no doubts after spending over 250 miles in it that Turner accomplished their goal, which was to create a car that could easily transition between road and track driving without giving the driver serious compromises one way or the other. The car is certainly designed for serious drivers and has a firm ride on the highway, but for those of us who search out empty back roads and routinely take our cars to the track, this car could be the perfect all-'rounder. With four doors, it also fills the gap that was left by the E36 M3 sedan—and takes handling and braking to an even higher level than that car did. ♦