

Supercharging and a manual transmission transform this Touring from grocery-getter to go-getter.

# TRANSFORMED TOURING

By Jay Jones Photography by Jay Jones



**B**MW has never been particularly generous with its wagon offerings in the U.S., having just two in the current lineup. That's fine if you happen to want a 325xi or 530xi wagon, not so fine if you want something a bit more potent. It's also something of a disappointment to those who'd become accustomed to having the choice of two 5 Series wagons: During the previous E39 generation, both 528i (later 525i) and 540i wagons were available, though the latter forced buyers to settle for an automatic transmission if they also wanted V8 power.

Necessity is the mother of invention, however, and the lack of ready-made options has forced Bimmerphiles to get seriously inventive if they want a hot rod BMW wagon. One DIY special to result is the wagon shown here, which is owned by Gregory Lavoie of Axiom Tuning in Santa Ana, California. Lavoie's BMW stable has also housed a number of E21 323i's as well as an E30 M3, and it still includes a rare 1983 Alpina C2-2.7 E30 Baur Cabriolet. This Orient Blue wagon started as a 1999 528i Touring with an automatic, but Lavoie's ministrations have made it considerably more enthusiast-oriented.

It had previously belonged to Axiom customer David Beekman, who lowered the car with KW coilover suspension and fitted it with AC Schnitzer anti-roll bars front and rear. Lavoie had been working on the car for about eight months before acquiring it from Beekman, who sold it to get an E46 M3 for

club racing. (As Lavoie said, "Although this wagon is a potent car, it will never be as fast and nimble as a well set-up E46.")

Once the wagon was Lavoie's, the modifications really got going. First to go was the automatic transmission, which Axiom replaced with a close ratio ZF 5-speed from an E36 M3. BMW's complex modern electronics made this difficult, and Mickey Miller of Bullet Performance spent nearly a week using a factory BMW GT-1 to reprogram everything affected by the transmission swap, including the general module, EWS for anti-theft and the lighting control module. Lavoie also tapped the knowledge base of Koala Motorsport's Brett Anderson, whose transmission conversion expertise proved invaluable.

Along with a manual transmission, the car also received a Rogue Engineering short shift kit and clutch pedal stop. The Rogue short shift kit, at least in this car, feels just right, without being too short, too heavy or too notchy as is common with some other shift conversions.

Axiom also installed a 6.5-lb. lightweight flywheel with a unique spring center clutch disc that has a nine-puck Kevlar side running against the flywheel and a full-diameter organic friction surface that damps the energy through the clutch pressure plate. According to Lavoie, the higher-force Sachs competition pressure plate is a 1,900-lb. unit designed for use in the E36 M3.

Unlike the Rogue shift kit, the clutch and flywheel combination seemed wrong for this car, requiring finesse and a strong left leg to get the car moving. In addition, it took careful technique to reduce chatter during clutch engagement, which limited enjoyment in traffic. Lavoie told us he was assembling the parts needed to install an 11-lb. flywheel with a more reasonable clutch, which will probably be a nice compromise between the current setup and the OEM dual-mass flywheel that few drivers really like.

Finally, Lavoie exchanged the 4.10:1 differential ratio for a less aggressive 3.46:1 ratio, anticipating a horsepower increase that would make the short gearing unnecessary. The lower ratio doesn't provide such quick acceleration, but it did give the wagon a higher top speed.

### More air equals more power

The horsepower increase came by way of an Axiom Stage 2 Supercharger System, which uses a polished Vortech V1 centrifugal supercharger unit cranking out nine psi of boost. A six-rib serpentine belt drives the supercharger and engine accessories, making everything more compact and easier to service.

Neatly tucked behind the AC Schnitzer "egg crate" grill mounted in the M5 front air dam/bumper cover is a massive air-to-air intercooler that helps to significantly reduce inlet temperatures for a denser inlet charge. Axiom fabricates the intercooler piping out

of mild steel that's first TIG-welded, then ceramic-coated for a silver chrome appearance. All of the intercooler tubing is then connected with Thermal Flex blue silicon hose with a five-ply polyester rating.

In order to keep the air entering the efficient S-trim impeller of the Vortech unit particle-free, an AFE air cleaner from Eurobahn Performance is tucked discretely behind the wagon's front bumper. To ensure the reliability of the supercharger bearings, Axiom neatly mounted an oil cooler behind the double-kidney grille to circulate the oil through the cooler and bearings before it drains into the engine block.

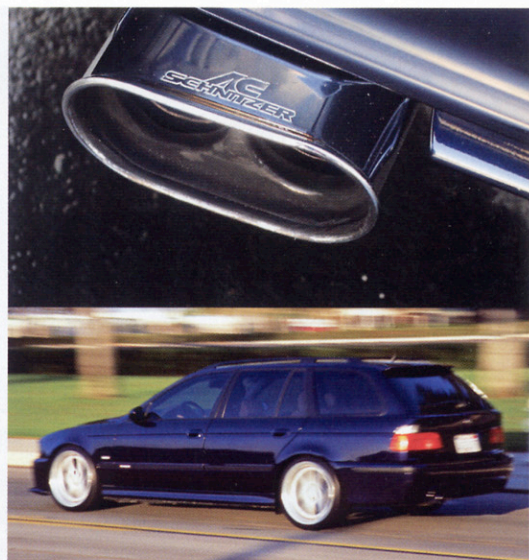
The correct fuel/air mixture for combustion begins with flash programming by Active Autowerke, where Karl Hugh modified the baseline ignition and fuel curves as well as raising both the top speed and rev limiters. For added fine-tuning of the ECU, Axiom turned to Mark Amarandos of Split Second to incorporate that company's FTC1 Fuel/Timing Calibrator. "This was necessary due to the higher boost level that we used on this car compared to our Stage 1 system," Lavoie explains. The engine bay aesthetics,

meanwhile, get a boost from a neat pair of carbon fiber covers from Axiom, one for the cam cover and one that replaces the OEM injector/fuel rail cover.

An increased inlet flow usually requires an improvement in exhaust gas flow, so Axiom turned to local fabricator Jose Pulido of JP Performance for a set of long-tube 3-into-1 headers with TIG-welded construction and a titanium-colored ceramic thermal coating by Embee Performance. Using a high-efficiency OBD-II catalytic converter, JP constructed a three-inch TIG-welded stainless steel exhaust that flows through a Magna Flow muffler to an AC Schnitzer stainless exhaust tip, producing a raspy sound that's full of attitude.

The sound is backed up by real performance, power having increased from a baseline of 147 rear-wheel hp at 5,700 rpm and 147 lb-ft of torque at 4,700 rpm (with the automatic transmission and 4.10:1 gearing) to a much more impressive 266 hp at 6,200 rpm and 229 lb-ft at 5,000 rpm following the installation of the supercharger, manual transmission and 3.46:1 differential. (Measurements were taken on the same

**The very tidy engine bay of the Axiom wagon features the company's carbon cam cover and Stage 2 supercharger system, with Vortech blower and Axiom's own intercooler piping. The wagon's interior still looks stock, but its transmission tunnel is now topped by a shift lever for the manual gearbox where the previous automatic's PRNDL lever once resided.**



chassis dyno.) That's a gain of 119 hp and 82 lb-ft—an impressive improvement on the 2.8-liter six.

More power generally requires better brakes, so Lavoie installed Zimmerman cross-drilled rotors in place of the OEM parts along with PBC brake pads in a performance street compound. Traction was improved via fat Nitto NT555 tires in 245/35ZR-19 front and 275/30ZR-19 rear sizes mounted on AC Schnitzer Type II Racing five-spoke modular wheels. With silver centers and polished outer rims, the wheels measure 9.5 x 19 inches up front and 10 x 19 inches at the rear.

### Track day Touring

Styling enhancements include AC Schnitzer mirrors, roof spoiler and grille for the M5 front valance. Also sourced from the



M5 are the splitters, fog lights and impact stripes along the doors and sides. The rear valance is an M-Technik item. Jimmy Correal of Prestige Auto Collision in Santa Ana color-matched the updated body components to provide a well-integrated appearance.

Euro E39 Touring taillamps provide a clean appearance on the rear, while the look at the front is bolstered with a conversion to angel eyes self-adjusting HID projection headlamps.

The interior of the car remains clean and unspoiled. Only an enthusiast would notice the M-Technik steering wheel and the new center console, shifter and boot that were required to accommodate the manual transmission.

During our photo shoot, the wagon drew a lot of attention from passers-by driving everything from conventional cars to

SUVs—not surprising given that this Touring straddles the two segments. Most onlookers seemed to enjoy its strong but inoffensive exhaust note, as well as the sound of the Vortech supercharger whirring away underneath the wagon's raked hood.

From behind the wheel, we found the wagon very user-friendly despite the finesse it takes to get it underway from a complete stop. As with most supercharged cars, this one surges a little at idle, but get it out on the road and all of that disappears. Normal throttle application is smooth, and rolling into the power brings the enjoyable whine of the underhood blower and the attendant acceleration that builds along with rpm.

Powering through the gears, the *g*-forces press you nicely into the seat if you explore

the boundaries of the rev limiter before selecting the next gear. The upgraded brakes are just fine at normal speeds, and the steering remains nicely weighted even on the fatter 19-inch rubber. The KW coilovers retain enough compliance to prevent the car from feeling harsh even over rough pavement and railroad crossings. At the same time, the lower ride height and firmer damping combine with the thicker AC Schnitzer anti-roll bars to tighten handling and reduce body roll significantly.

The Schnitzer bars also work with the wider, lower-profile rubber to improve turn-in response. We didn't have the opportunity to drive the car on a racetrack, but this modified E39 Touring felt like it would be plenty of fun at a track day even though it will never be as nimble as 3 Series thanks to its additional weight.

Performance tuning a wagon is certainly out of the ordinary, but we like it. Axiom's E39 Touring looks great, is enjoyable to drive and has plenty of room for carrying high-performance car parts or athletic gear out back. As a fairly heavy car powered by a 2.8-liter engine, it's no rocket ship, but neither is it as anemic as the stocker. Between the supercharger and the manual transmission, Axiom has transformed a mundane grocery-getter into a real enthusiast's car, one that could send any soccer mom straight from the schoolyard to traffic court. Case closed. 🚗

**19-inch AC Schnitzer wheels complement the wagon's M5/M-Technik aero parts and Orient Blue metallic paintwork. Grille-mounted oil cooler keeps the supercharger bearings from overheating.**

