

**TESTED: M3 INTAKE SWAP & SUPERCHARGER INSTALLS**

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## VERSION M3.4

- 560WHP
- 3.4 LITER MOTOR
- SUPERCHARGED
- BLOWN AWAY



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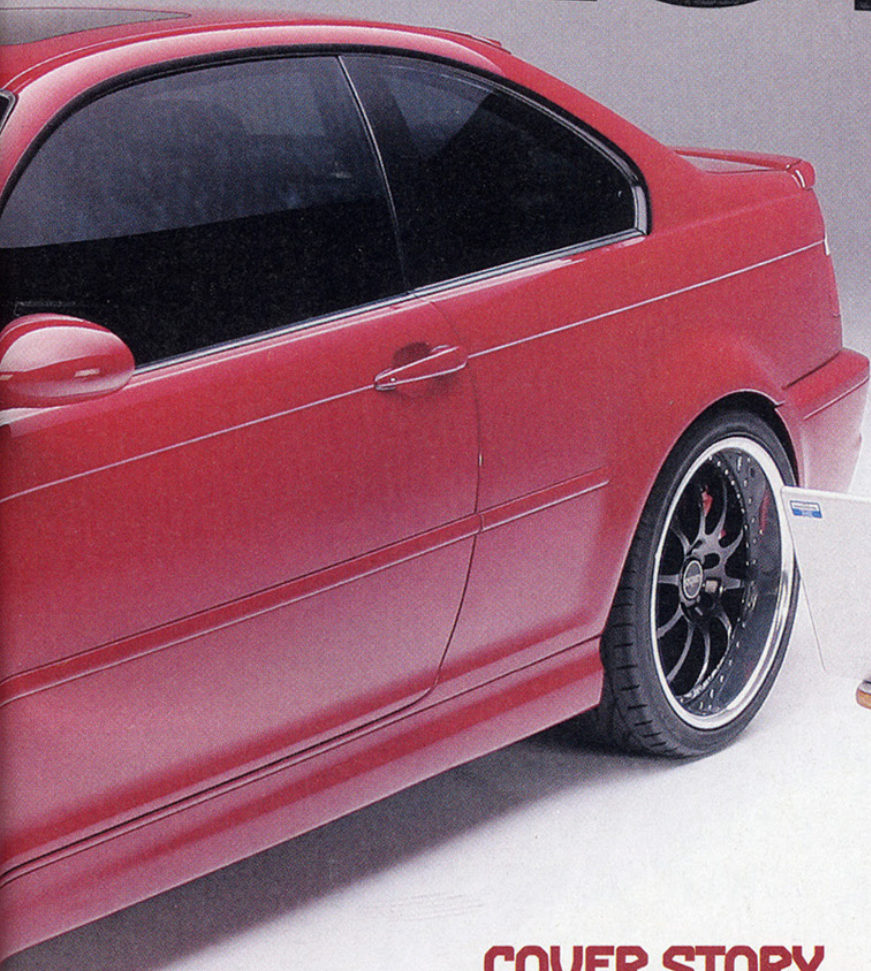
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WORDS GREG EMMERSON  
PHOTOS SAM DU



# BORED & BLOWN

THERE'S SOMETHING  
COMPELLING ABOUT THIS  
560WHP SUPERCHARGED  
M3 WITH A 3.4 LITER  
BORED MOTOR.



## COVER STORY

**T**he owner of this Imola red '02 M3 was previously a player in the import scene. In fact, he still owns a 350Z turbo. Yet 28 year-old Ronnie Cheung from Sunnyvale, CA inevitably saw the light and bought his first Euro. Except he was a little wiser than many who take their first tentative steps into Euros: He was smart enough to buy a project car that formerly belonged to Eurobahn Performance.

As you probably know, building a project car is a labor of love. You pour gallons of blood, sweat and tears into the car, as well as a ton of money; money you'll never see again when it comes time to sell. Few of us are prepared to pay for somebody else's modified car, not wishing to take a chance on buying a potential nightmare. Yet this attitude permeates down to

our own projects when it comes time to sell.

Those who are brave enough to take a chance on a modified car are often rewarded with a load of mods for almost no money.

For example, at an early stage in this M3's life, it received an RMS supercharger. Over time, both the motor blew and the supercharger apparently failed, so Eurobahn sent it to Axiom Race Engineering.

We're told the Axiom crew addressed the blown motor with a set of CP pistons matched to Eagle rods, retaining the stock forged crank. With a damaged block, it made sense to bore the block slightly, allowing them to stretch the motor's capacity to 3.4 liters. They also machined the pistons to drop the compression to a boost-friendly 9.5:1.

Up top, the head was ported and polished.



19" powdercoated Kinesis with Brembo GT big-brakes

A set of Ferrara valves and springs were also fitted with a three-angle valve job.

The carbon fiber RMS intake remains, while the exhaust is Supersprint from the headers to race cats, X-pipe and the stainless steel muffler.

The next job for Axiom was to recreate the supercharger kit, which they did with a Vortech V2 blower. To feed the beast, the ignition timing was altered within the stock ECU, while a Split Second PSC1 works on the fuel supply. It's assisted by Split Second's AIC1 that controls the secondary bank of six RC440 injectors. These are mounted on a separate fuel rail under the painted aftercooler and squirt into the throttle bodies.

The aftercooler itself is essentially a water-cooled plenum chamber, replacing the plastic factory plenum. As the supercharger pushes pressurized air into it, the air is chilled by water that's circulated through the cooler and back into its own radiator mounted behind the front spoiler. Such aftercoolers (or chargecoolers) are very effective, and not as prone to heat soak as conventional intercoolers.

Because the car spends its life in southern California, Axiom also decided to swap the stock radiator for a Fluidyne unit, and fit a separate oil cooler.

The transmission is BMW's paddle-shift SMG. While it remains stock, there's a lightened flywheel, six-puck clutch and a Quaife diff with lower 3.91:1 gearing for even



**"It's happy in traffic, but if you want to go fast you just hit the gas and it goes crazy."**

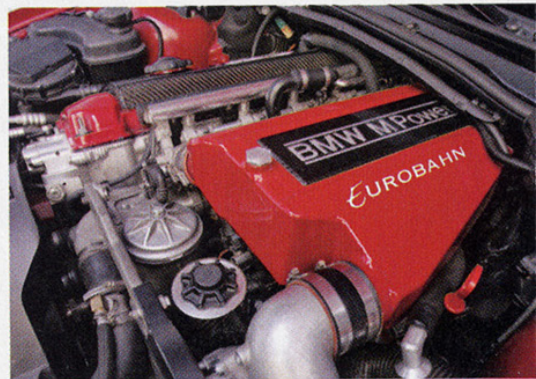
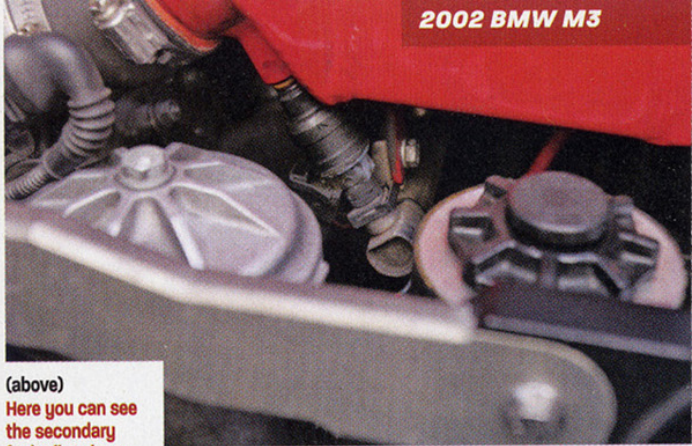




(above)  
Here you can see  
the secondary  
fuel rail and one  
of the RC440  
injectors

(right)  
Top-mounted  
cast aftercooler  
replaces stock  
plastic plenum

(below)  
Previous engine  
damage meant  
motor was bored  
to 3.4 liters, head  
is ported and  
polished as well



better acceleration. "First gear is so short it barely reaches 25mph," Ronnie reported.

The Vortech blower is currently producing 12psi boost pressure, allowing the motor to make a claimed 511whp at 7800rpm on 91 octane fuel. Running 100 octane its seen 560whp, which is almost double the output of a stock M3.

Apparently the car's very fast, but speed isn't everything to Ronnie. "What's nice about this car is you can drive it every day. It's happy in traffic, but if you want to go fast you just hit the gas and it goes crazy," he said.

"The ride is really comfortable; it has a plush interior and it's a nice car to drive. The only problem is the extra injectors. These run rich on cold-start, so it idles unevenly until the engine warms up," he continued.

With such a potent motor, Eurobahn took the precaution of fitting Brembo brakes all round, adding 14" rotors up front and 13.5" rear. Both are grabbed by four-piston GT calipers, as you'd expect.

Upon delivery, the M3 sat on Eibach springs, which Ronnie combined with Koni adjustable dampers. He contributes much of the car's ride comfort to these struts.

When Ronnie took possession of the car

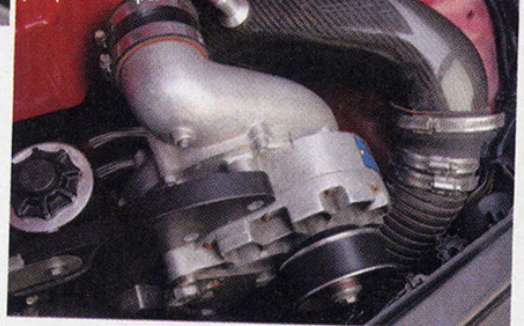
it was mechanically complete, so most of his energy has been devoted to giving the M3 some visual muscle to match.

One of his first tasks was to select 19" Kinesis K19R wheels. He had the centers powdercoated Phantom black, which gives off a slight pinkish tone in the light. This started off the car's red/black theme, but they aren't purely for show; at 10" wide on the rear, it's allowed the new owner to fit meaty 285/30 Toyos under the rear to control those rampant ponies.

Since he'd chosen to contrast the red paintwork with black accents, it was inevitable that carbon fiber would figure somewhere. In fact, it's everywhere, from the vented Vorsteiner hood and rear diffuser to the MVR front lip. You'll even find it on the kidney grilles and side gills.

Carbon has also infected the interior like a rash. You find it on the instrument surround,

Vortech V2 supercharger  
pumps air at 12psi



door handles, dash and console. It's also on the e-brake handle, shift knob and the shift console, and found its way onto the SMG shift paddles and the steering wheel they sit behind.

European Auto Source supplied much of the carbon, with additional items coming from JLevi Streetwerks. Although Ronnie confessed he'd shopped around so much he'd forgotten several suppliers.

Talking to the owner, it's obvious that

# TECH SPEC **et** 2002 BMW M3

**Owner:** Ronnie Cheung

**Location:** Sunnyvale, CA

**Occupation:** Scientist

**ENGINE:** S54 3.2 liter i-6 stroked to 3.4 liters with custom CP pistons and rings (9.5:1 compression), Eagle lightened and shaved rods, ported and polished head with three-angle valve job on Ferrara valves and springs, Axiom Tuning titanium retainers, Vortech V2 supercharger system, air-to-water aftercooler with front-mount heat exchanger with Bosch water pump, new Bosch oil and water pumps, Fluidyne Racing radiator, Motorsport low temperature thermostat, custom oil cooler with auxiliary cooling fans, Ignition Solutions plasma coils with active LEDs, six secondary RC440 injectors with Split Second AIC1 injector controller, Supersprint headers, race catalytic converters, X-pipe and stainless steel lightweight muffler, modified ECU ignition timing, Split Second PSC1 for fuel tuning, carbon intake tube and valve covers, painted aftercooler

**DRIVETRAIN:** BMW SMG II transmission, lightweight aluminum flywheel, Axiom carbon/kevlar clutch, Sachs Racing pressure plate and bearing, Quaife 3.91:1 gear set  
**BRAKES:** Brembo 355mm front



(right) Double-DIN head unit is fitted in custom housing, as are gauges behind the carbon SMG console

and 345mm rear two-piece cross-drilled rotors with four-piston calipers

**SUSPENSION:** Koni struts, Eibach springs and sway bars

**WHEELS & TIRES:** 19x8.5" front, 19x10" rear Kinesis K19R three-piece wheels powdercoated Phantom black with polished lips, 255/35 front, 285/30-19 rear Toyo Proxes TIR tires

**EXTERIOR:** MVR carbon front lip, Vorsteiner GTP red carbon vented hood and rear valance, carbon kidney grilles, washer grille, side gills and roundels, Schnitzer roof and trunk spoilers,

painted eyebrows, 10% tint, carbon headlight housings, Phillips 6000k head- and foglight bulbs, Depo clear corners, Hyper-white side markers, Euro tail lights

**INTERIOR:** SPA boost and temp gauge, AEM Lambda gauge in custom pod, carbon instrument surround, door handles, dash and console kit, e-brake handle, shift knob and surround, SMG paddles, and steering wheel trim, aluminum pedals, Pioneer AVIC-D3 head unit in custom mount

**THANKS:** Jeff Zusman at Eurobahn Performance ([www.eurobahn.us](http://www.eurobahn.us)), Axiom Tuning, Lawrence Bogert, Bo Zweig at Bay Car Stereo, Jason Rigor and Ian Sutherland at East Bay BMW, my family, Margaret, Team Jinsoku, Dennis Matsunaga, Justin Choi, Ravi Bhatia, Stephen Chan, Karen Choy, Alex Yao, Greg Gong, [www.jlevistreetwerks.com](http://www.jlevistreetwerks.com), [www.europeanautosource.com](http://www.europeanautosource.com)



despite it's impressive spec, the project isn't in full swing yet. We learned of plans to add side skirts; "But I haven't found any I like yet."

He's also working on an audio system, which he hoped to have fitted for our photos. But the most ambitious plan calls for a widebody conversion in the future, at which point we may well see Ronnie's supercharged M3 3.4 return to these pages... **et**



Sexy Vorsteiner carbon hood with carbon grilles to match

