

Modifying the Z3M

part 2

by Jon Beckett

In the last issue, I covered my introduction to the BMW marque, and my initial views on the Z3M Roadster that I had purchased, commenting on both the good and bad points of the car. Now I will look at how the car can be improved for both fast road and track work.



The Z3M Roadster can also make a sound race car. These Z3M Roadsters compete successfully in a Sportscar series in the Far East

The Z3Ms run as standard on 17" Roadstar lightweight alloy wheels, which I think are among the prettiest alloys BMW has ever fitted to a road car. The chrome finish (be it satin or shadow) is superb and width to diameter lends them a purposeful yet ultimately aesthetically pleasing appearance. It's the main reason that I never opted for Schnitzer 18s or 19s (other than price). My wheels are shod as standard with Michelin Pilot Sports (225/255/40s) as used by BMW and I have to say they are a good all round tyre. However, I was aware that committed cornering would eat them for breakfast in 10 minutes flat as demonstrated by Neil and Steve at the last Crail track day.

This began a list of sensible modifications required for the track day enthusiast. So where to begin? Well first I think it's best we split this into two lists – the first being a 'ClubSport' trim that suits the entry-enthusiast and doesn't compromise the M as a day-to-day car and tourer. The second will be the 'TrackSport' – which will evolve all of the other modifications and match this with an Atkins-style diet. The point to remember here is that you are modifying a great road car to be fun and usable on track rather than building a racecar, which normally do not make good touring companions. Therefore all modifications should be judged on 4 key points:

- Safety
- Durability
- Performance
- Flexibility

With this in mind I personally aim to follow the 'ClubSport' approach and indeed much of what I will list follows my own intentions over the coming 12 months, which will include:

Already Fitted

- Schnitzer Sports Suspension (BMW supplied). £900-1200
- Strong Strut – 'CL' front strut (supplied direct from USA). £225

- GruppenM Ram Air Induction (supplied from GruppenM Europe Ltd). £650
- Eisenmann Sports exhaust (supplied direct from Germany). £850
- Replacement Bi-VANOS system at 44,000 miles (BMW supplied). £1200
- ARP F1-Titanium Composite con rod bolts (BMW fitted). £700
- Toyo Proxes T1-S road tyres (235/255/40s). £400
- Spare set of rear 9J Roadstars shod with used Michelin Pilot Sports. £100
- New OEM front disks, braided hoses, Dot 6+ brake/clutch fluid and Pagid Blue pads. £200-300
- Castrol RS 0w/40 fully synthetic Motorsport grade engine oil. £75

Planned

- Dastek programmable engine mgt and rolling road (booked for May 2004) £400
- Supersprint de-kat system (may 2004)
- Custom rolling road and ECU re-map – including 8000-8150rpm.
- Hand held fire extinguisher (Jan 2004) £30
- 4-Pot brake calliper conversion (new parts tba) £1200
- Paddle Clutch (tbc) £280
- Lightweight alloy flywheel (tbc) £500-600 approx



Schnitzer's conversion of the Z3M Roadster and Coupe may be more subtle, but they still hit the visual G-Spot

- Vented side panels to aid brake cooling (tbc) £200
- Vented carbon fibre bonnet (2005) £700

I expect that little lot could stretch to a £4-5,000 on top of the £2,000 already spent. Not cheap but a lot less than many would spend. It's worth pointing out that I judge this to be the basic outlay to get on track and preserve the car. Of course one can save some money by sourcing second hand, while lots more can be spent if you become seriously interested in lap times or over-obsessed with modifying. For me I know the Roadster is dynamically challenged for track work, so I do it purely for the enjoyment.

Brakes

Other than the ARMCO – cooked brakes are the enemy of all track day enthusiasts and many enthusiasts experience warped discs each year and the infamous 'judder'. Awareness is improving so many track enthusiasts now fit after market heavy-duty conversions. One problem with full brake conversions is that they are expensive, the other is that many track packages are poor on cold wet mornings when you reach the first roundabout and hit the brake. The last problem with big brake conversions is that they can often lead to overweight/over-braked systems that are simply overkill for a particular car/driver and only leads to reduced handling through increased corner weight.

The alternative is to improve your current system through upgraded (drilled and grooved) discs with fade-resistant compound pads and competition grade brake fluid. The problem with using competition pads is that they normally take longer to warm up and provide uneven performance until they do. It is therefore better to strike a compromise between road and track use. Thankfully the ZM is over-braked for road use and so can afford a



Schnitzer's Z3M Coupe racing car has been quite successful in sportscar endurance racing in Germany

small detriment in order to reduce fade and improve heat dissipation on track. If standard callipers are used then disc diameter cannot be altered and so you have to be careful that the amount of braking surface is not unduly reduced when specifying the number of slots and grooves. Grooved discs are good as they can act as wear indicators but both drilled and grooved achieve the same purpose of channelling brake film away from the disc. It is also worth having the disc alignment checked and if necessary adjusted so as to produce more even wear and better contact since even a good disc and calliper set up will be rendered worthless if parts are worn or make an uneven contact.

With callipers checked, new pads and discs in place, alignment and plumbing double checked it should provide a usable set up for limited track time that will require little maintenance over and above the standard set up. Lastly it's worth looking to see how cold air can be fed into the front brakes. Contemporary M-spec brakes are a triple layer vented system that should respond well to brake ducting. Both Hamann and Zender can supply replacement front air dams although both do little to improve the car's front aesthetics. A preferred approach is to run brake ducting from the front valance through to the front callipers. The standard front valance makes an attempt at this but it could be improved further.

Ultimately for committed track users a full multi-piston conversion is recommended as systems are available from Schnitzer (2-pot), Tar:Ox (6-pot), GruppeM (4-pot), Brembo (4and6-pot), G-Power (4and6-pot), AP racing (4and6-pot) and Move-It (4-pot). Porsche 4-pots are also available though pricey if bought new. Of all the systems available – AP probably

carries the best reputation and if it's good enough to stop a TVR...It is worthwhile discussing suitability with a specialist as the performance of each system will vary and some systems are designed to work with the standard master cylinder while others are not. In terms of price a full front conversion kit will retail somewhere between £1,500-£3,000 whereas the more budget-aware among us may be glad to hear that replacement discs and pads can be obtained for £250-500. Tuning specialists such as Birds recommend that a full conversion is performed and warn that some systems are best left for road use only. Discs and pads are available from EBC, Black Diamond and Red-Dot and many brake manufacturers cover the M range although (in general) fewer options are available for the Z3M. What's interesting is that the track day fraternity are far less keen on so-called 'track' discs than users who are road-bound. Instead they either opt for traditional upgrades involving pads, fluid and hoses or else invest in a full conversion. The message with regard to disc/pad conversion is that they are not worth the additional outlay and that they will fade as quickly as standard brakes. It is also necessary to check that replacement callipers and discs will fit inside the diameter of your wheels. As the ZM comes with ABS then make sure you have the necessary equipment to perform the conversion or get a specialist to do the work for you. Given the price of brake conversions – spending a few more £££ to have your brakes set up correctly makes sense.

More importantly – check condition, particularly discs, pads and hoses. Choosing brakes for aesthetic purposes is a quick way to lose money and ultimately the wrong reason upon which to choose a set-up. Instead approach brakes as a consumable. Something that will wear out through hard use and cheaper solutions replaced more often will often be a better route than buying an expensive system that isn't serviced regularly. Take time the day before to clean everything inside the wheel – check for leaks and signs of wear and replace if you have any doubts. Check pad wear (front and rear) and replace the brake fluid if you haven't done so within the last year. Maintaining a standard system will often prove better than a neglected multi-pot affair. As the rear brakes only give about 20% braking power then they are usually the first to be neglected. The main test will of course be the track day – do a few laps and come in to check temperature. Be aware of pedal pressure and any adverse noises or steering 'judder', which are all possible pointers that a system is beginning to cook and ultimately fail. To preserve the condition of your brakes (and car in general) – break your laps into small sessions and give your car plenty of time to cool down and for you to check everything over – just wear thick gloves – those brakes will be hot! If you do pit then remember not to sit with your foot on the brake pedal – otherwise you can warp the discs as they begin to cool down.



The authors car showing the GruppeM induction kit

Wheels and tyres

Wheels are also an important factor and one that cannot be neglected. Superior rubber will not only shave seconds off your lap time but also improve safety though increased mechanical grip. The trick is to balance wheels (grip) with your suspension (stability) so that you get crisp turn in but also predictable loss of grip when the limit is reached. Failure to get the balance right can lead to cars being snatchy at the limit.

Tyre choice must also be with reference to weather and tarmac quality. Full-on track tyres (not allowed on most of the clubs 'Better Driving Days') often need time to heat up and respond poorly to damp conditions. Coming from Scotland such rubber makes little sense since most track days occur in cold damp rainy conditions. Unless you can budget two sets of wheels – one with dry treads and the other wets then an intermediate tread is the best way to ensure sufficient grip in all conditions. Most road tyres have soft sidewalls and this has a big effect on track whereas tyres with stronger sidewalls to enjoy less tyre deformation during hard cornering. Initially when I bought the ZM I liked the Michelin tires but soon grew weary of 'skittish' handling in the damp. The likes of Dunlop, Eagle and Toyo all carry good reputations for progressive manners, acceptable dry grip and excellent wet/damp performance. On track you want a tyre that breaks traction/grip progressively rather than snap into oversteer as with the Michels. Personally I aim to obtain a spare set of Z3M or E36 M3 alloys and have them shod with either Toyo Proxis, Kumho ECSTA or Yokohama AVS' to give good grip in the dry and sufficient traction should conditions turn wetter. In the case of the ZM I know that any dampness will un-stick the rear end quicker than a Jeremy Clarkson sarcastic comment.

Before the track day check tyre pressures and the condition of your rubber paying particular attention to splits or uneven wear. Checking pressures throughout the track day check will maintain reliable levels of grip and handling. Normally, track day drivers will over-inflate their tyres to counter the loss of pressure throughout the day and to strengthen sidewalls. If you cannot source a spare set of wheels/tyres then the best advice is to take it easy on the corners and keep careful watch on tyre wear, which includes taking wheels off to check inside tread. Remember also that if you change the size/profile of your wheels and

The authors gleaming engine bay, complete with colour coded cam cover and 'strong strut' brace





Hamann's Z3M Roadster is at home on road or track

tyres then this will have an effect on geometry. If you do not want to have to adjust your set up between road and track then you are best advised to stick with similar dimensions. I intend to increase front width to increase steering weight as pre-2001 Z3Ms suffer from an overly light steering rack – particularly on the straight ahead which is particularly concerning at high speed. I also intend to increase rear width by 10mm to 255 to increase dry rear grip and traction. Having checked the rolling diameter and consulted various tyre and BMW specialists – I am confident that the changes should not effect acceleration, speed or ABS. With rear rim width at 9J – sidewalls will also not be compromised with the right pressures but allowing a greater footprint to work with.

Suspension

Suspension is all-important as loading effects both handling and braking. A stiffer set up will reduce roll and control concerning manners. How this is done has much to do with the car's inherent nature. In the case of the ZM it is prone to initial understeer followed by whip oversteer, caused largely by sudden weight transfer through the sloppy body. The Roadster also suffered from bump steer although this seems largely cured by the lowered suspension, which has also slightly increased the negative camber at the rear. Of course too much negative camber makes for a car that is hard to catch at the limit. Again it's all about balance than outright performance. If you opt for 'glass top' suspension then you'll also find the car hard to live with on normal roads. A front strut brace will help reduce initial roll under hard cornering and an adjustable bar would allow the settings fine-tuned so as to improve turn in without invoking increased understeer. Adjustable suspension (coil over) is the optimum choice but costly and you need to know what you're doing if adjusting a set up. At my initial outings at Crail the car did understeer more than I would have liked and I knew some stiffening could be introduced to make the car corner more neutrally (as neutrally as a front heavy car can be that is). Introduction of a front strut brace at Knockhill found the strut worked and complemented the ACS set-up superbly. Now the car understeers far less allowing more time to exploit the rear on the throttle. The car will now bite onto its line quicker and seems more inclined to drift rather than wash on fast third gear sweepers. Only on tight second

hand hairpins or severe compressions does the car show some signs of its old bump steer and front-rear snap. For the committed – strong strut also offer a rear body brace and strut to reduce roll and flex even further. I hope the introduction of better tyres will give me some feedback as to when the car is nearing the end of adhesion.

Engine

You will note that nothing has been said about the internals of the M-spec straight six. This is mainly because the car is already well set up to compromise between performance and reliability and has a strong bottom end. Stretching out the top end can lead to longer-term problems. Up-rating an engine that already produces 100bhp p/litre will never be cheap. Capacity can be increased but this can often be at the sake of the engine's free revving nature. I prefer to find a balance between outright performance, flexibility and driveability. Besides I have no problem with the straight-line performance of the 3.2.

If the red line is to be extended significantly then up-rated engine bolts, head gaskets, head bolts, cam gear, pistons, conrods and even valves all have to be considered as well as effects on fuelling. Boosting power at the top end by extending the engine's red line will only be of real use where the circuit has reasonably long straights and curves. As I intend to attend Knockhill and Crail then I know such top end is largely redundant as you rarely get into fourth. Instead low-end to mid-range torque will make more of a difference through Duffus into McIntyre's, Brabhams through Clark Curve and onto Daewoo straight. Out of Taylors, which is the last hairpin, and up the short inclined pit straight the ZM was truly brutal – swallowing up lesser powered Lotus Exiges and Elises very rapidly (I enjoyed very minute!). Other modifications such as camshaft re-profiling, titanium valves etc are only worthwhile to those soles seriously interested in track times rather than track enjoyment, in which case don't start with the Roadster.

Since tuning the 3.2 isn't really a priority then it's fair to say that my fitting of a GruppeM ram air induction kit with a cat-back exhausts and de-cat system is an expensive exercise of aural enjoyment. To get some of the benefits of the better breathing I intend to have the car out on the rolling-road while fitting a custom exhaust and Dastek piggyback ECU in May.



Hartge's Z3M Coupe looks mean and menacing with the shark gill type bodystyling. This brute packs a 370bhp V8 under the bonnet

The Dastek uni-chip is a very fancy piece of kit. Dastek's kit offers you a fuel/air/timing mgt system that piggy-backs the ECU to allow a custom map from reading the crank at 400rpm intervals. Think of it as a cost effective alternative to a Motec stand-alone fuel mgt system for a fraction of the price, which is much closer to your typical re-chip. Dastek allows a more sophisticated set up – allowing finely tuned adjustments. The uni-chip can be also used to control NOS and forced induction as well as be profiled for two settings and easily re-mapped for new performance parts be added (e.g. cams). The chip optimises the fuel/air/burn mixture under load but, as with all modifications, the chip should be notified to insurance and dealers will be more than happy to invalidate your warranty. However as a set up it offers the advantages of a custom engine mgt system at a fraction of the cost. In conjunction with the new exhaust and induction the optimum set up can be reached at 400rpm intervals with a target output of 345-360bhp and torque in the region of 365-390Nm. I had expected mpg to drop from 25 to 20 (combined) and most likely mid teens on track but Gerry informed me that the uni-chip usually makes the engine management more efficient and less prone to burn rich. Therefore you get more performance and better fuel economy as well as reducing the likelihood of detonation at extreme loads. However, it's worthwhile looking at the tracks you intend to visit. If it is full of long sweepers then you may need to pay attention to possible oil starvation. Oil surge also needs to be carefully watched and the oil level adjusted before and after the track day. Never run your car with the oil level sitting at the max. Instead run the level (from cold) somewhere between the minimum and maximum levels. If in doubt check the dip speed after each session so you can measure the extent of 'surge' and look out for any leaks or oil blowing through the exhaust on and off throttle. The flywheel as fitted by the M boffins is a reasonably lightweight item and this can be seen by the way an engine will often show an immediate reluctance to lose revs under acceleration, which makes for excellent throttle response and a real bonus on track. An upgrade would be to switch to an all-alloy flywheel, which shouldn't prove much lumpier than the standard yet offers reduced circulating mass for even better pick up. As with many parts flywheels are not cheap and the gain per £££ has to be weighed up. They are available through most good BMW suppliers such as CA Autotech and cost approx £600-800.

Gearshift

Gearshifts in the ZM are best characterised as having a positive, albeit slightly 'notchy' action, which ultimately leads to relatively slow changes (it's no Honda). On road this matters not one ounce given the torque delivery of the 3.2 but on track when gear changes (particularly downshifts) occur far more frequently then a shorter more accurate shift is desirable. Schnitzer offer a quick-shift kit but

The author on track in his rapid Z3M Roadster



Rogue's Octane is available at a fraction of the price and has an even shorter throw. What suits you will be down to driving style. I have found short-shift kits to reduce the time it takes to make gear changes but increase the chance of missing a gear and enhance the existing 'notchiness'. Jury remains out until I have a chance to try the Octane kit. In the meantime I have fitted a quality aftermarket alloy gearnob from Momo, which provides a weighed action and shortens the stick slightly. The increased size of the Momo item makes for more comfortable changes and gives you something to really grip when driving with gusto. Unfortunately when following a 400bhp WRX Impreza, the standard plastic/leather M gearnob broke in my hand when reaching aggressively for second. I will miss that novel illuminated shift pattern and I'm sure my wife will work out where reverse is over the next couple of months.

If performance is greatly enhanced then transmission also needs to be considered, including strengthening the ZM's final drive and considering a better quality differential lube. The ZM is already blessed with a finned differential cooler, which E30 M3 owners have since discovered to be a useful mod for their cars. Regardless of tune, a paddle clutch such as that available from AP racing is widely recommended and does not degrade in town manners too severely. The sheer power of the ZM is more than enough to ground the clutch into submission and clutch smoke can be detected even when up shifting close to the limiter on the straights such is the ferocity of forces in play. Changing final drives to increase acceleration will add some pace though the standard ratio is well match to the ZM's 5-speed box but this has to be weighed up against the additional strain on the transmission.

Roll protection is also important and if you

have a Coupe then get a bar fitted. Having the twin roll-hoops on the Roadster I intend to chance my luck though I expect a more heavy-duty bolt-in, bolt-out bar is only a question of time. Aerodynamics are also important but I can't bring myself to spoil the looks of the car and Schnitzer's rather neat rear diffuser is no longer produced leaving only a bolt-in spoiler or Hamann's rear diffuser as the only means to reduce rear end lift. There are many available kits but there seems to be real lack of evidence as to how these affect lift, not to mention brake and engine cooling. A cheap adjustable allot bolt-on spoiler may be the answer, if I can find a clever way to conceal the bolt-holes. At least this way you can adjust the settings to gauge whether benefits are achievable. A gurney style spoiler on the rear would certainly help push down the light rear end.

You'll also note that I've made no mention to lightening the ZM. It would be easy to talk about ripping out trim, air conditioning, carpets, using GRP or carbon fibre but I prefer to leave the looks and comfort of the car untouched. I'm not looking for a track car, that's still to come. All I want is the opportunity to enjoy the performance of the ZM away from the Queen's highway and be able to do it without breaking either the car or myself. One of the best upgrades I can recommend is to make sure you have a support vehicle armed with spares, tools, warm clothing and beverages. It's reassuring to know that you don't have to rely on your track car as your only means to get home.

As to choosing a focused track day car – well you may recall my earlier heresy of talking about Stuttgart s**t shovels in my first article. However the love for something pure 'race-car' has mutated. For now I want to aspire to owning an awesome M1 Procar and all I need to do now is convince the wife. For the next article I will evolve the article to cover a 'TrackSport' set up, by covering ways to lighten the ZM as well as more hard-core mechanicals. If anyone would like to lend his or her experience then please contact me via the club office or email me at JandJBeckett@aol.com Many thanks to Kevin at Birds, Roy at CA Autotech, Z Register and the boys on the M Power Forum. Here's to the rest of 2004 – see you all on a 'Better Driving' day soon. ●

Warning: Any modifications can invalidate your warranty

Zed Power!

by Jeff Heywood

There are numerous tuning products out there for the Z3M models, with some of the best coming from the German tuners. Hartge offer tuning products like exhausts, filters etc, plus wheels and styling products. They also offer a full-blown conversion featuring a tuned naturally aspirated 5.0-litre V8 that produces 370bhp and 376lb ft of torque. AC Schnitzer now offer only styling products, wheels and exhausts for the Z3M models, but supercharging gurus G-Power offer some radical solutions for owners searching for never ending power. They offer three stages of tune, a 385bhp kit, 480bhp kit and a mind-boggling conversion that produces 530bhp. They also offer a de-limiter allowing all of these conversions to exceed the factory set 155mph limit, with the 530bhp model comfortably able to exceed 310kph – work that one out! Hamann offer similar tuning packages to Schnitzer, going down the exhaust, chip and induction kit route, which gives an honest 350-355bhp, but with the styling they are on another planet. They have styling packages that range from mild to wild (see contact details below), and can guarantee to give your Zed the eye-catching look!

As I stated in the side-bar accompanying the Zed article in the previous issue of the club magazine they are bargain basement supercars, and equipped with some of the modifications mentioned by Jon and in this piece below, they can be transformed into machines that will seriously frighten the best in the world of expensive supercars.

Contacts: G-Power was formed by two engineers who formally worked for Alpina who decided to set up their own company tuning BMWs. They had total admiration for the engineering excellence that Alpina are respected for, but they found the conversions a little 'conservative'! They are well respected in their homeland, but at present they do not have a UK distributor. To take a closer look at their products, visit www.g-power.de they market some really nice products, and some of their conversions for all BMW models are awesome. For Schnitzer products either contact your local dealer or give Rossiters a ring on 01485 540000. For Hartge's range of quality components and conversions, give UK distributor Birds a ring on 01895 810850. Finally, Hamann products can be viewed on-line at www.hamann-motorsport.de or purchased in the UK through Autovogue who can be reached on 01785 227102.



Hamann's 'yellow hammer' Z3M Coupe is at the extreme end of the modified scene