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**E60 5-Series: New-model Five for under £10k**



**M3 Touring**  
Factory-style  
343 bhp E46

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# Modifying the 3-Series

**Make yours go, stop and handle better**



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## Alignment and corner weighting done, we're out on track in the M3.

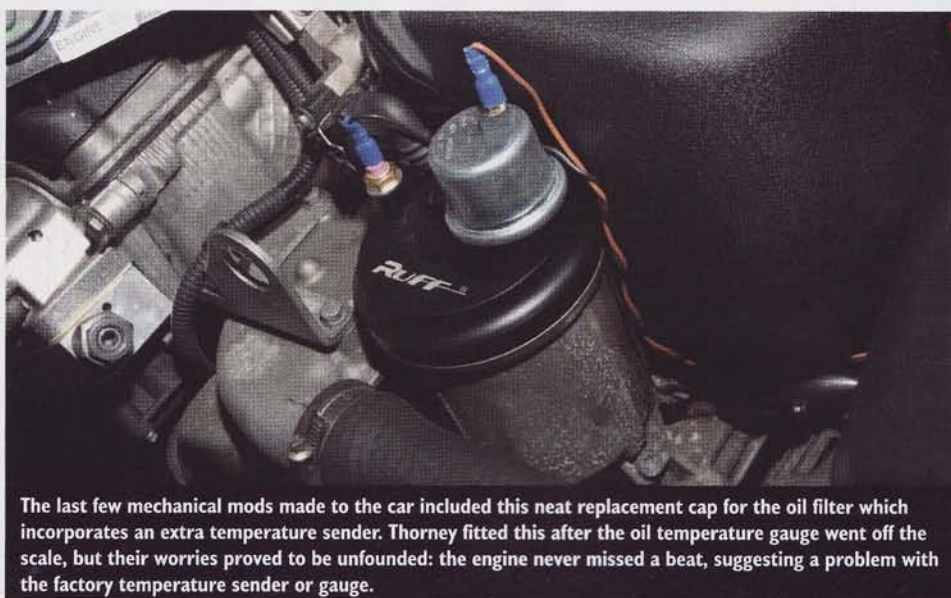
Words: Paul Wager Photography: Paul Wager, Matt Woods



# Balancing Act

Last month saw us ripping as much weight as possible out of the M3 and all the new parts in place. Given the nature of the series the car is due to compete in, this is about as far as you can go and took the car to the point where all that stood between the workshop and the track was the final setting up.

No matter how carefully specced and put together a race car is, the final set-up can make the difference between all the work paying off at the podium or being wasted in a gravel trap. Here's what goes into making an M3 handle on track: and believe us, we've experienced the results first-hand, so we know how well it works. Shaving that weight off has created an M3 which really goes as hard as you'd expect from a 350 bhp car weighing just 1300 kg, while the handling and stopping are just like an everyday road M3 but twice as impressive.



The last few mechanical mods made to the car included this neat replacement cap for the oil filter which incorporates an extra temperature sender. Thorne fitted this after the oil temperature gauge went off the scale, but their worries proved to be unfounded: the engine never missed a beat, suggesting a problem with the factory temperature sender or gauge.



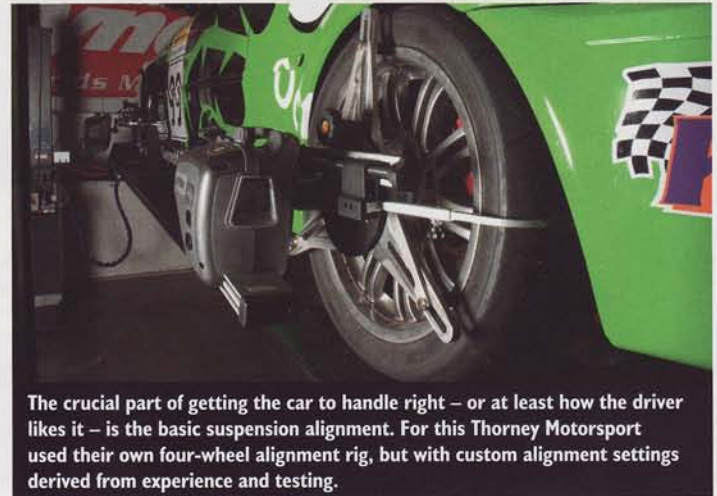
Thorney also added this sender to keep an eye on the gearbox oil temperature during longer races. Both this and the engine oil temperature sender are linked to...



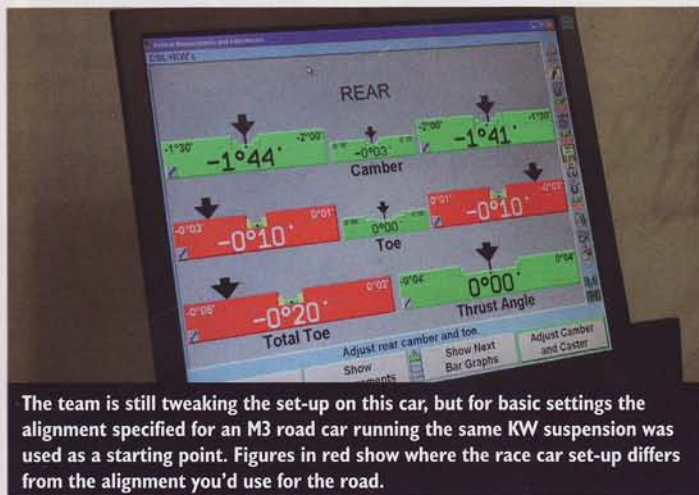
... this gauge panel, mounted where the climate control and radio used to live in the standard dashboard - or what's left of it after some extensive weight-saving work means it can now be lifted in one hand.



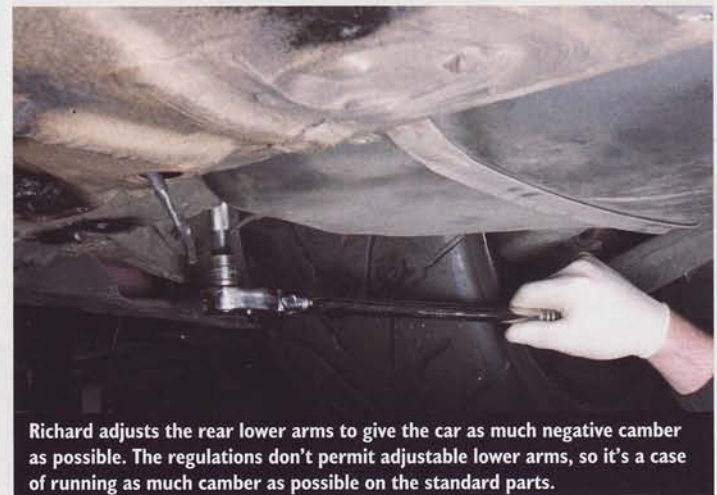
Oh and the front bumper is now a quick-release part, which gives easier access to the front of the engine, including the newly-fitted M3 CSL oil cooler.



The crucial part of getting the car to handle right - or at least how the driver likes it - is the basic suspension alignment. For this Thorney Motorsport used their own four-wheel alignment rig, but with custom alignment settings derived from experience and testing.



The team is still tweaking the set-up on this car, but for basic settings the alignment specified for an M3 road car running the same KW suspension was used as a starting point. Figures in red show where the race car set-up differs from the alignment you'd use for the road.



Richard adjusts the rear lower arms to give the car as much negative camber as possible. The regulations don't permit adjustable lower arms, so it's a case of running as much camber as possible on the standard parts.



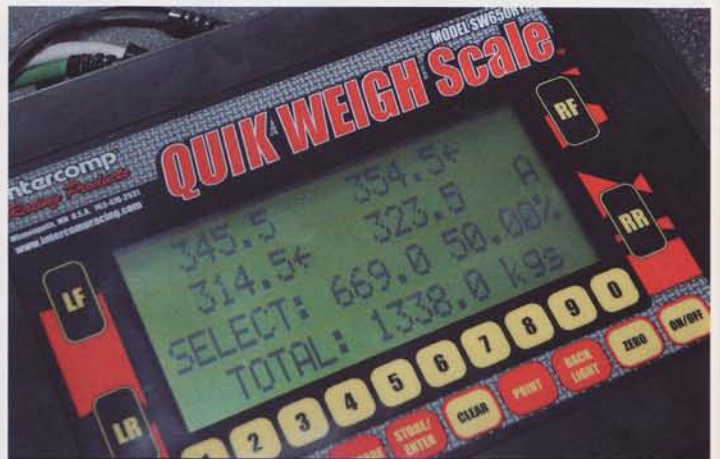
At the front end, Richard sets the toe-in differently for different circuits. Increasing the toe-in makes for a sharper turn-in but at the expense of high-speed stability, so on fast tracks like Snetterton the team will run a neutral toe-in, while twistier venues will run more toe-in to a maximum of around 1 degree. Camber on the front end is set to 3 degrees negative, which is achieved using adjustable top mounts, since the standard BMW parts don't permit that much camber. The Sportmaxx series doesn't actually permit adjustable mounts, so the scrutineers have allowed the car to run them only if they're marked with tamper-evident seals.



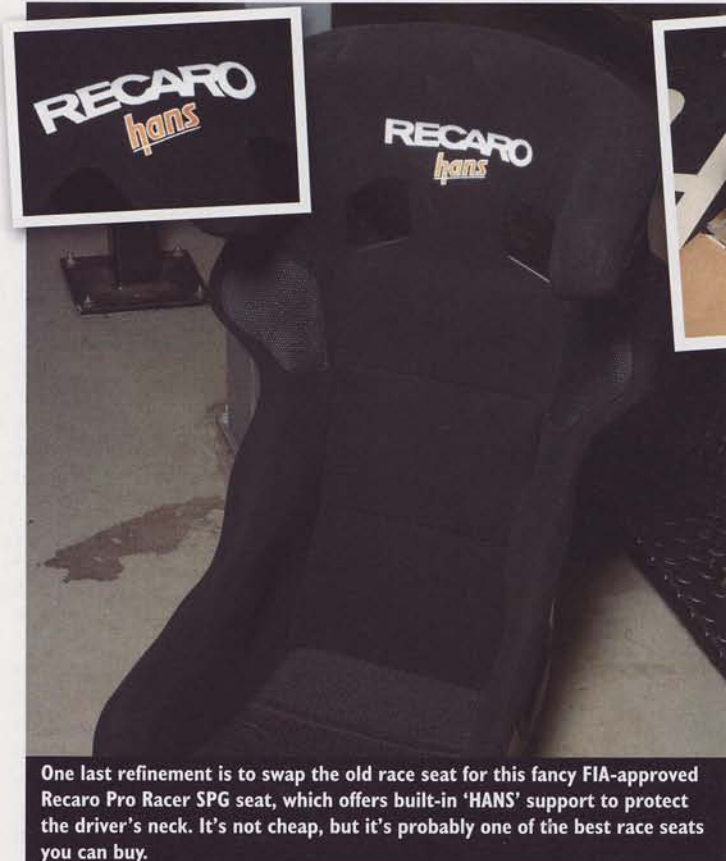
With the alignment set up, it's time to grapple with the technicalities of corner weighting. Essentially this involves getting the car's weight distribution as even as possible in the interests of balanced handling. The process involves using a scale under each wheel...



...with the four scales linked to a central computer which can show the difference between any two selected corners. In the case of a car like the M3, the weights are adjusted by changing the ride height on the relevant corner, which of course requires a height-adjustable suspension like a coil-over set-up. On very lightweight racers, teams will even add weight inside the car for a precise set-up. The theory goes that if you manage to get the weight distribution across two diagonally opposite corners to 50 per cent, then the other two corners would automatically be correct.



After judicious tweaking of the KW coil-overs, we saw the M3 sitting at a near-perfect 50/50 which perfectly underlines all BMW's advertising about perfect weight distribution. The corner weighting is carried out with the car as near as possible at race weight, which for the M3 means fluids all brimmed, the quarter-tank of fuel it needs for a 20-minute race and of course the driver in race suit and helmet. The corner weighting process also proves the effectiveness of the lightening work: it's now just 1320.5 kg without a driver.



One last refinement is to swap the old race seat for this fancy FIA-approved Recaro Pro Racer SPG seat, which offers built-in 'HANS' support to protect the driver's neck. It's not cheap, but it's probably one of the best race seats you can buy.



Recaro supplies the seats complete with these neat aluminium brackets, which in a race car are simply bolted to the fixed seat rails in the floor.



Thorney has also teamed up with Recaro to source the correct adjustable brackets for fitting harness-ready race seats to road M3s and CSLs, so watch this space for more details.



With the car finished just the night before, the Germantrack track day at Snetterton seemed like an ideal venue for a shakedown and after much adjustment of the suspension in the pit garages, driver John Thorne was grinning like a man with high hopes of slaughtering the opposition in the Kumho series.



**Next Month:**  
On the grid for real, as the car enters its first event and we find out whether the promise it showed at Snetterton can translate to the Sportmaxx series.



On the fast but twisty Snetterton circuit, the M3 was reeling in hard-driven GTs like Shopmobility carts. And remember, the BMW was running street-legal tyres on its standard factory wheels, while plenty of the Porsche pilots were on semi-slick trackday rubber. The handling became noticeably more lairy as the road tyres went off, but the car remains superbly controllable and those AP brakes are astoundingly good. If you've ever overcooked your M3's standard brakes on a track day then trust us, this is the upgrade to have.