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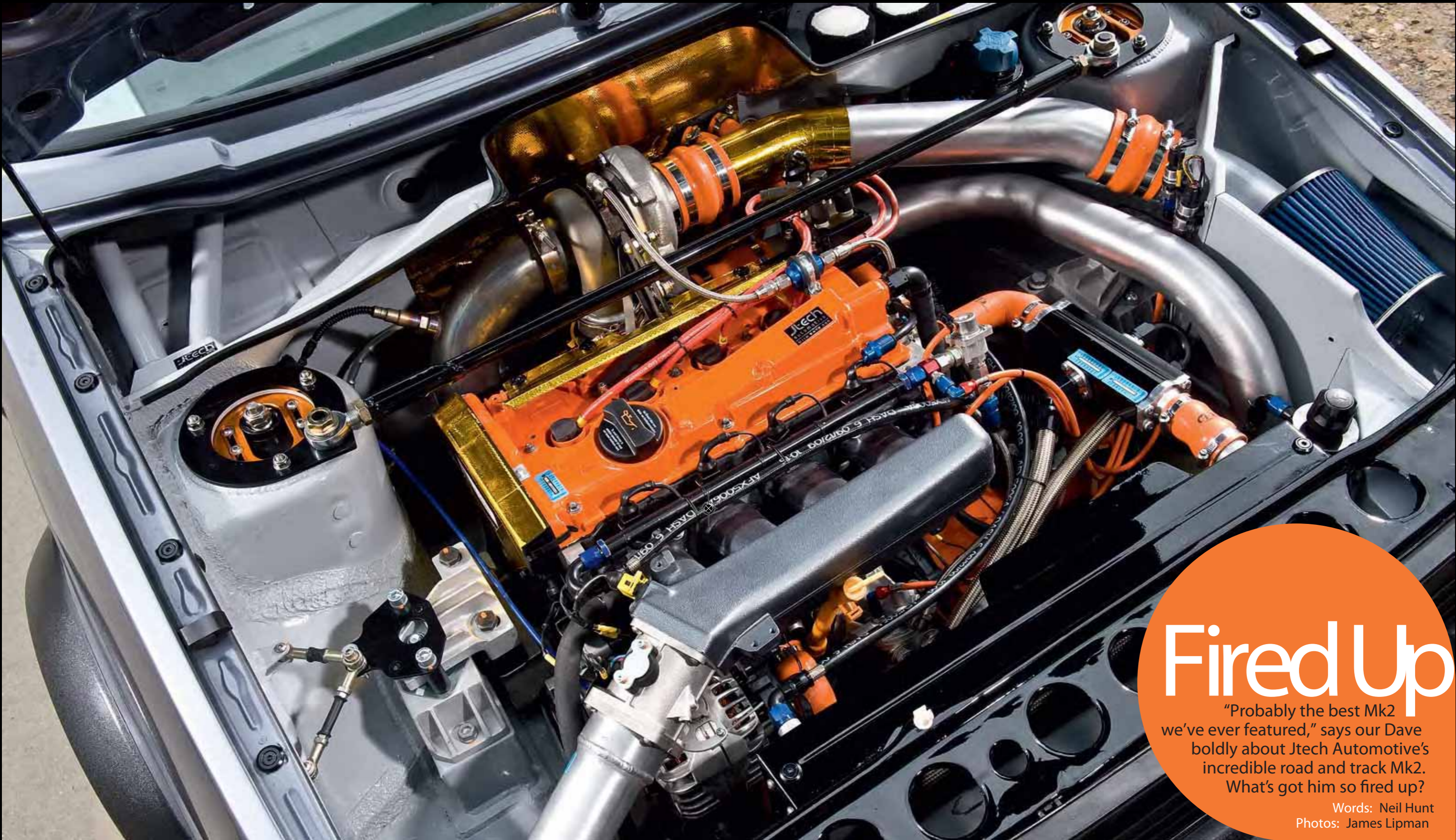
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# Hard Candy

The hardcore power trip  
continues with Jtech's  
ballistic 382bhp Mk2 Golf.  
You're not ready for this...



# Fired Up

"Probably the best Mk2 we've ever featured," says our Dave boldly about Jtech Automotive's incredible road and track Mk2. What's got him so fired up?

Words: Neil Hunt  
Photos: James Lipman

**P**lenty of 20v Mk2 Golfs get built all over the world these days; it's nothing new. Accessible, affordable and shit-loads of fun, it's easily the single best thing to ever hit our scene. But don't for one minute think Jtech Automotive's road and track racer here has been built like anything

before it. In fact, don't even say it's been built; something this special can only have been crafted, and that's why it's taken years. The car belongs to Ben Packham. His brother Jamie runs Jtech Automotive in Reading and they drafted in the help of their dad when a serious amount of precision fabrication was called upon. Ben takes up

the story of the Mk2 that stands out as our best feature car yet according to our power-loving Dave. "I had an old 20v Mk2 for years before this but it was getting a bit long in the tooth," starts Ben. "We planned to look for another shell and swap everything over. That was the plan, anyway. While I was on holiday I remember getting a call from Jamie as I

stood on the beach in the Dominican Republic saying he'd found a mint three-door K-reg shell locally that we could buy. Without even seeing it I said yes, knowing how rare it was and after hearing it had recently had a £3500 paint job, I knew we had to have it." Ben spent the next two weeks planning the build of his Mk2, much to the annoyance of

his patient girlfriend. First up would have to be a cage, but not some Mickey Mouse show affair: as fast car/race car builders, Jtech only do things properly. Back at the unit, the team started out with a six-point cage that located at the A- and B-pillars and to the rear turrets. A year's worth of weekends and evenings saw the cage slowly grow, but

rather than just brace the shell, they wanted the car to be as usable as possible on the road so engineered the cage around the sunroof and even allowed easy access through the doors for 6'3" driver Ben. After 45 metres of cold drawn steel tubing had been cut and welded, Jtech had created arguably the coolest feature of the car.

Nailing down every possible point on the car, the cage is braced and welded everywhere to keep the shell as stiff as possible, to the extremes of bracing through the dash to pick up the tops of the front turrets. Ben points out: "We want to run slicks so to keep the geometry right we can't have any movement in the shell. We build many cars, both race and road, and we wanted to take all the coolest features we'd done over the years and bring them all together in the Mk2. It's that intricate that if you stripped all the panels off the car, then you're effectively left with a space frame the shape of the car and it would stand up on its own!" The boys have even created a battery box that's gusseted to the cage.

Ben admits to being inspired by one of the very first impressive Mk2s in Europe: Anders Ranbo and his amazing 8V Oettinger Mk2 that pioneered so many cool tricks and a serious roll-cage combined with white Compomotive MOs. Anders nailed stance, motorsport rims and proper tuning way ahead of anyone else. Ben says: "It's a shame we couldn't run 17s like Anders but we reckon he would approve of the rest of our car."

With Jamie and his dad working to clean up the engine bay, it fell to Ben to paint the cage. Ben's normally smiling face turns dark at this point: "I hated this part. Being over 18-stone and 6'3" I was the least likely one to squeeze inside the car but yet I ended up having to take the whole interior back to bare metal over the following three months. You see, where we'd welded the cage in, the old Tornado red was starting to show through so we figured the inside had to look as good as the outside. I spent many unhappy hours contorted around the cage in the back of the car cursing."

Using their motorsport experience, Jtech welded in the custom seat mounts and a floor mounted pedalbox as low and far back in the car as possible to help the weight distribution and also for Ben the giant to be able to drive it! Ben admits at this point that the car had to be no compromise and that meant absolutely every feature of the road car working, as it should. "Dad and I trial fitted the dash and worked out how it would work with the cage," says Ben. "My last Mk2 had a few annoying bits that didn't work like the handbrake light and so that couldn't happen here. The car had to be completely MoT-ready and drive like a road car off the track."

Just before the shell and cage could be painted, the boys welded in the brackets for things like the fire extinguisher, fuel lines and brake pipes, as well as provision for the custom wiring loom that would be needed later. Ben and Jamie's Dad also got to work cleverly re-routing the bulkhead around the bigger turbo and even hand-formed the factory swage line with insane attention to detail.

With the engine bay work continuing, the idea was to keep the bare metal time to a minimum to save the chances of corrosion setting in. Before going to the paintshop, Jtech started work on creating the mounts for the engine and gearbox. Ben reveals one of the biggest engineering headaches they overcame here: "With any big-power FWD cars like the Mk2, torque steer is impossible to avoid with the passenger driveshaft being way shorter than the driver's side. Also, for drag or track use, you need more neutral handling to get the power down properly and equally through both front wheels. We knew this compromise wasn't an option and so had to come up with a way of using equal length driveshafts. We lost the Mk2 Golf rear mounts (engine and gearbox) to make room, and used Mk4 Golf engine and gear box mounts. These needed extensive grafting into the Mk2 chassis legs. At this point we changed the engine height for the driveshaft angle and sump clearance. This enabled us to utilise the bolt holes on the back of the engine block to hold a bearing carrier where the OE Mk2 mount would have gone, with the equal length driveshafts still in development. When we get time the car will run two custom driveshafts, both the same length as the normal passenger side one. The driver's side shaft will run from the hub up to the bearing carrier where it connects to a smaller torque tube that connects it to the gearbox. You've effectively got three driveshafts. We used a billet front engine mount, Vibra-Technics gearbox and engine mount and fabricated our own Mk2 sub frame to accept a Mk4 dog bone mount. This is a much harder way of mounting the motor but it's much stronger and when we run slicks on track the engine definitely won't move!"

Instead of just swapping the BAM-code 225bhp engine from Ben's old Mk2 over, the desire to get closer to a usable 400bhp saw the old engine get stripped and rebuilt again by Jamie, who has a passion for engine building. Using custom 81.5mm JE pistons 1.9-litre capacity Scat rods, the complete rotating assembly was balanced for reliability. The bigger port AGU engine head was used and was given a hefty dose of attention with gas-flowing and port matching. This is where Jtech has enlarged the ports in the head to closely match the size of the exhaust manifolds to avoid any steps in sizes that can slow gas-flow down. Ben tells us: "The cast Dahlbäck exhaust manifold has a 42mm diameter port and we managed to get the exhaust ports out to about 41mm but soon we're going to design our own equal length, top-loading stainless manifolds to help get even better flow on the exhaust side. The head gained uprated valves and valve train gear from Supertech that converts the normally three-piece valve collars to one piece to allow the engine to really rev out much higher. The plan is to ditch the factory profile AGU cams for a pair of our own spec CAT Cams when the tubular manifold goes on."

After all this work Jtech wasn't going to just pick a run of the mill turbo to power this perfect Mk2. Ben explains: "We spoke to Owen Developments and came up with an awesome hybrid based around a GT28 core. We could have gone bigger but decided to use the '28 to keep lag to a minimum. It uses a Tial stainless steel exhaust housing and WRC-spec caged



"We wanted to take all the coolest features we'd done over the years and bring them all together in the Mk2"



Everywhere you look the quality of work that's gone in is just mind-blowing; pedalbox, race dash and exposed management are all works of art by themselves



thrust bearings. Even the compressor impellor is Owens HPA billet alloy wheel. It's as far as you can take a '28 and keep it reliable. We're running 1.5-bar but it's still good for another 0.5. The turbo is the same spec as the ones used in the Formula Palmer Audi and BTCC cars."

The end result of this very special blower is an impressive 382bhp, but delivered smoothly and progressively throughout the revs to make for optimum traction and no scary laggy surprises on the track. Fuelling the hungry engine is a set of 630cc injectors, and the intake temp is kept cool with a custom front-mount intercooler based around a Garrett core with custom end tanks from the US. To minimise boost losses Ben's hard piped it all. "We've even welded the intercooler pipe to the Jenvey 70mm throttle body," he says. "There are a couple of tiny bits of silicone interconnecting pipes where we absolutely had to use it, but that's kept to a minimum."

To run the car, Ben explains their choice of management: "The boys have used so many systems on race cars but for this relatively simple engine we ruled out high profile systems like MoTeC because we'd have only been using a fraction of its capacity and paying for more than we needed. For that reason we went for Emerald K6 and that would also mean we could use our racing buddy, Jabbasport, to map the car."

Anyone who runs a 20v engine will testify to the rubbish factory coil packs that often cause misfire issues and aren't cheap to replace. Ben and Jamie had other ideas. "Instead of using one coil pack per cylinder we decided to use a single coil pack and had a set of custom Magnecor leads made," explains Ben. "So far we've found this a much more reliable set-up. We now produce a wasted spark conversion for the 20v 1.8T engines."

Ben and the boys opted to drop in a ATB Quaife limited-slip differential. Ben explains: "We used a TTS steel flywheel with a Spec Stage 3+ clutch that's more than up to the job of this level of power. But when you give this car some serious abuse the 'box starts to let us know it's on its limit. For that reason we've lined up a six-speed 'box already. We use one in the Leon BritCar we run and even after three endurance races, it never complains. It's way stronger than the five-speeder and takes all the abuse that the 9" slicks and 330bhp give it."

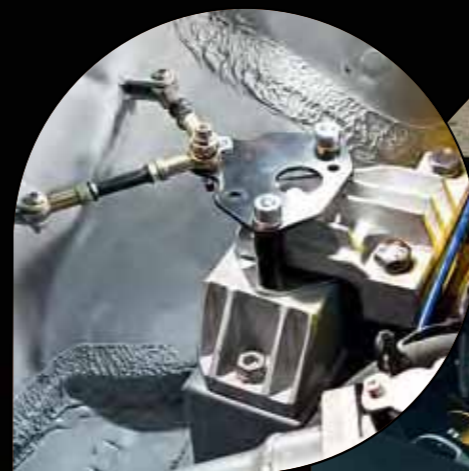
At the front of the engine bay, the boys ditched the flimsy Mk2 tin cover that normally holds the radiator in place and in its place fabricated a tough steel tubular setup that acts as a strengthening brace to tie the front end together. The radiator is far from stock being made from an alloy safari core, and was originally designed for a 500bhp Cosworth-powered Mk2 Escort. In the gap between the headlight and the giant rad, the boys' Dad stepped up again and built a ram air system that force feeds the custom air box when the Mk2 is on the move. Even the hand-fabricated air box system is a work of art.

With what Ben reckons is an excessive amount of Aeroquip hose line and fittings on the car “thanks to Jamie’s OCD”, it was time to turn to the single most extreme suspension setup we’ve ever seen on a Mk2. Ben loves suspension but not as much as his brother who’s a qualified suspension engineer. Ben tells us proudly: “Jamie was lucky enough to be able to buy a pair of TTX World Touring Car front struts made by Ohlins. He decided to make it his mission to get them to work on the Mk2. I just helped where I could. The front struts use a separate oil damper reservoir and because they’re built for the highest level of motorsport, they are four-way adjustable with almost infinite adjustment for bump and rebound damping. We can go from a comfortable road setting to perfect track manners in a few careful clicks and possibly a spring rate change. We’ve used a more traditional Ohlins two-way damper and spring setup on the rear with H&R extreme anti-roll bars. Jamie wouldn’t have let anything less go on the car. Without even taking into account the custom work we’ve had to do to make the WTCC struts work, we’ve probably got nearly £7000 just in dampers alone.”

The Mk2 suspension arms have been stitch welded to keep the pressed steel halves as stiff as possible. Tubular wishbones are coming soon with revised pick-ups. The end result of Jamie’s intense devotion to handling perfection has paid off on the track and road. “We’ve done some great testing in the car and it’s amazing how it just can’t be upset,” Ben reveals. “B-road blasts see the Ohlins being really compliant giving enough body roll to allow the tyres to dig in through the bends. Traction’s pretty good too! In fact, you don’t really have to back off for bends at all; the Mk2 just loves long sweepers, which it’ll easily take at plenty over 100mph, especially on smooth track surfaces. You can really drive it hard on the throttle like a track car, feeding in the power to pull hard from apexes without the uncertainty of normal FWD handling that could spit you off the road. We can’t wait to see what it’s like on slicks.”

The last area Jtech turned its hand to was the braking. Insisting on running 16x8” rims so as to not upset the geometry and to help the handling further. The boys could only go for a maximum disc size of 310mm to squeeze under the Compomotive rims and although they may be relatively modest in diameter, they’re a beefy 32mm thick and are clamped with Wilwood Superlite calipers. With no brake servo assistance, the Mk2 is fitted with a Tilton floor-mounted pedalbox. The master cylinders are connected straight to the calipers so when the boys first started out with Ferodo DS3000 pads, they had a few brown pants moments, as Ben recalls: “You used to have to drag the brakes for 15 seconds to warm them up enough to just about stop at the end of a slip road. But now, using different pads for the road, there’s plenty of bite, thankfally.”

Unsurprisingly, the whole braking system uses stainless steel fixings and Aeroquip lines and bends. Ben reveals just how high the engineering standards are here: “We had the



“I drive it for five minutes and want to stay out for an hour. I just can’t put it down”

#### Dub Details

**ENGINE:** 20v 1.8T BAM code block and crank, capacity increased to 1900cc with 81.5mm JE forged pistons, Scat rods with uprated race shells, ARP rod bolts and main bolts, Baffled sump. Large bore head gasket, AGU large port head lightly skimmed. Exhaust and inlet manifold matched and lightly flowed by Dave Cresswell. New shortened valve guides, Supertech Nitride and Inconel valves with single slot collets, Titanium retainers and Supertech uprated valve springs, ARP head bolts, AGU cams and Cat Cams adjustable cam vernier. Modified rocker cover. Jtech wasted spark modification, with Magnecor 8.5mm leads. Dahlback exhaust manifold with Jtech external wastegate adaptor. Owen Developments F2 hybrid turbo based on a GT30 core with WRC-spec caged bearings, billet compressor wheel and Tial exhaust housing with V-band fittings. Tial 44mm external wastegate. Custom boost pipes, Jenvey 70mm throttle body, port matched to AGU inlet manifold. Garrett core front-mount intercooler. One-off rad with custom Jtech rad and intercooler housing. Custom catch, breather and PAS tanks all with Aeroquip lines. Bosch 044 fuel pump and Jtech swirl pot and fuel system relocated to the spare wheel well. Dash 6 braided fuel lines throughout leading to a custom fuel rail with Siemens 630cc fuel injectors. OE oil cooler blanked and replaced with laminova oil cooler. Full Jtech 3” stainless exhaust with two silencers. Lightweight steel flywheel with SPEC stage 3+ clutch, O2A five-speed gearbox fully rebuilt with Quaife ABT differential and uprated bolts. Standard cable change system through the bulkhead leading to custom Jtech shift tower. Full custom engine loom with Emerald K6 management

**CHASSIS:** 8x16” Compomotive MO wheels with 205/45 Toyo T1R tyres for road use. Partially seam welded shell, full custom Jtech roll cage with braces and gussets tying into the shell where possible. Cage taken through bulkhead to front turrets. Modified front suspension turrets to accept AST adjustable top mounts. Rear suspension turret brace with gussets to hold harnesses. All OE seat mounts removed and new lowered mounts for bucket seats fitted. Re-mounted and lowered steering column. Floor-mounted Tilton bias pedalbox with remote reservoirs relocated to rain tray. Wilwood 310mm four-pot calipers with EBC track pads. Full braided brake lines throughout. Standard 16V rear brakes with Pagid fast road pads. Mk4 platform engine mounts grafted into Mk2 bay. Heavily modified Mk2 sub frame now accepting Mk4 dog bone mount. Stitch welded Mk2 engine mounts and wishbones. Solid front engine mount. Full custom front crossmember and front panel. Fabricated air box with ducting from the front grille. Large scallop taken out of rain tray to accept turbo. Ohlins TTX four-way front dampers with remote reservoirs and 350lb springs. Ohlins two-way rear dampers with 350lb springs. H&R front and rear ARBs. Super Pro polybushes throughout

**OUTSIDE:** K-reg 1993 16v shell painted in metallic gunmetal with full G60 wheel arches and skirts. Quick release front bumper. Bonrath five-slat single headlight grille. Smoked crosshair headlights. Smoked indicators and repeaters. Smoked/red crystal clear rear clusters. Removed unused wiper mounts in scuttle. Rear badges removed and rear plinth smoothed. Rear wiper removed from tailgate

**INSIDE:** Half dash with all original switchgear. Custom mount for Race Technologies Dash 2 model and Serial interface to ECU. Tilton bias pedalbox with custom mounted to floor. Custom shift tower using standard shifter controls for 1.8T. ECU and battery cut-off switch located in passenger footwell. Battery relocated to rear of the car in bespoke battery tray. All seatbelt brackets removed from car. Custom carbon door, tailgate and rear quarter panels. Lifeline fully plumbed-in fire extinguisher system. Innovate wideband lambda controller. Cobra Imola bucket seats, with OMP side mounts and four-point harnesses. Deep-dish OMP steering wheel with quick release boss. Relay box relocated to the glovebox. Entire inside of the car caged and prepped by hand, and painted in light grey (RAL 7040)

**THANKS:** Thanks firstly to my brother Jamie (owner of Jtech) and my dad (it’s all his fault for the car thing), without them I wouldn’t have had the time, skill, resources and funding to be able to craft and develop such a car. Thanks to my ever-patient fiancée Jemma, she has stuck by me when I’m constantly skint and frustrated with the years of building the Mk2. Thanks to Paul Ellis (Jtech engineer) for sorting all the issues, Tim Sharples for the paint and Phil Robinson for all the late nights and mini eggs. Simon at Sileck for the wiring loom. Kevin Glover and all the team at Jabbsport. Compomotive Wheels. Paul Jones at Demon Tweaks



Ben looks pretty happy with himself, and so he should be! Just don't call it a show car, alright?



chance to buy some of the fittings when a certain Formula One team went under the hammer. If you look closely, the fitting nuts have been ground down to save weight so they only have two flats for the spanner position."

With the spare wheel well plated over, an alloy plate is the base for the Bosch 044 fuel pump, which is fed from the inline fuel filter that in turn is fed by the in-tank lift pump. Ben continues: "We chose to use a fuel swirl pot to eliminate fuel surge, so dad stepped up again to hand-fabricate the goods. The fuel lines run through the car up to the B-pillar where they dive under the car and up into the engine bay."

Finally, before the Mk2 could be run, it would need a custom wiring loom. Using their motorsport experience the guys decided on two looms: one for the car and its features and another separate loom dedicated to just run the engine. This way it's so much easier to isolate problems if they occur. The glovebox was lost with the cage so the space left is used to house the car's relay system and a further 'Jtech dad-spec' bespoke panel was made from alloy to hold the fuses, ECU and electronic battery isolation. Just like track cars, Jtech needed easy access to all electrical parts to make for simple removal if anything needs replacing. Ben points out: "We didn't want any compromises and everything works on the car, right down to the heated rear window and handbrake light. The dash itself is a Race Technologies Dash 2 mounted in a custom-built dad-spec housing that allows the driver to see the entire display through the gap in the top half of the steering wheel."

Ben admits he felt a little apprehensive about attending the big VW shows at the end of the season as they were a little out of his comfort zone: "We build fast cars and spend our lives in pit garages or our workshop. To see what the VW show scene was capable of really impressed us but we weren't sure if people would 'get' the car. We needn't have worried, apart from a few muppets asking random questions, we were staggered by how many hours some people would spend pouring over the stuff we'd spent four years developing." And the guy's hard work and innovative approach was reflected in a haul of trophy wins. At Edition 38 we (well, Dave) couldn't get enough of the Mk2 and it was awarded winner of 'PVW's Sponsor's Car of the Show'. That was followed by also receiving third in 'Best Mk2' and 'Best Engineering' honours too. Players show saw the adulation pouring in with more silverware added to the Jtech mantelpiece - 'Best Engineering' again! So much for people not getting it!

But this Mk2 is at its best on the move and we have to ask Ben just what it's really like to drive? "I could go on at length about power, handling, braking and just how incredibly the whole car comes together when you really push it. But the easiest way to sum it up is that it's bloody noisy, really uncomfortable but a bloody good laugh," grins Ben. "I drive it for five minutes and want to stay out for an hour. I just can't put it down."

We feel for the poor Ferrari 575 driver that was humbled by Ben on the M40: "My missus was behind me as we cruised home one day from a mapping session. The 575 came up in the fast lane and my missus flashed me to give it some. She says afterwards she heard the Ferrari drop gears and floor it but I left the Mk2 in fifth and instantly pulled 15 car lengths in only a few seconds, embarrassing the poor driver by being humbled by the 'old Golf'. I laughed as the female passenger blew me a kiss as it finally came past me."

Jtech's Mk2 can take on exotic supercars and spit them out crying, haul the trophies at shows and then take to the track and be untouchable.

What's not to love?!

