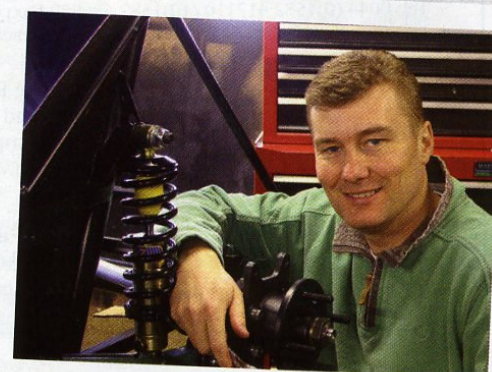


AS NIGEL'S CW460 PROJECT SERIOUSLY STARTS TO TAKE SHAPE, SIGNS ARE IT'S CAUSING A BIT OF A STIR. INTERNET FORUMS ARE CHATTERING, E-MAILS ARE COMING IN THICK AND FAST AND NIGEL HAS HAD TO INCREASE THE BANDWIDTH OF HIS WEBSITE. INTEREST IS AT BOILING POINT, WHICH SHOULD BE OF NO SURPRISE TO US IN THE KIT CAR OFFICES SINCE MR. DEAN IS RENOWNED FOR HIS RATHER SPECIAL ONE-OFF MACHINERY. CHAPTER SEVEN SAW THE ASTONISHING RAPTOR F85 IN SITU, COMPLETE WITH TREMEC BOX, SIDEPIPES AND, OF COURSE, THOSE AMAZING IMAGE THREE PIECE ALLOYS. THIS MONTH'S CHAPTER FOLLOWS NIGEL AS HE COMPLETES A SELECTION OF SMALLER JOBS. NATURALLY, MOST HAVE A TWIST ... WELL, WHAT ELSE WOULD YOU EXPECT?

RUSH

CW460

CHAPTER 8



Nigel, Kit Car's Tech' Ed' and in-house builder.

I'm now at the stage in my CW460 build where I could quite easily be fooled into thinking the end is in sight, just around the corner in fact. In reality the list of jobs still to complete is so long I haven't even bothered itemising them all. I have learnt over the years the best approach is to periodically pour myself a very large glass of wine, sit in front of the PC and list the next ten tasks - no more, no less. Against each entry I itemise any parts required and order them immediately. I also run through the job in my mind and detail any questions which need answering prior to getting stuck in. This approach ensures when I decide to spend an evening in the garage I can choose a job

with no shortages or uncertainties. It doesn't always work and I still occasionally find myself pacing the garage being unable to start a job, but thankfully this is the exception rather than the rule.

This month's chapter, therefore, comprises of a variety of smaller tasks. Each may seem rather mundane in isolation, but as per usual I have added the odd upgrade here and there. Before I begin, however, I must draw your attention to the first picture on this page (not the one of me!). The image - which should have been included last month - is of the 'Dean team' attempting to lower the CW460 from its chassis stands, a rather stressful procedure to say the least and obviously too much for our dog, Pip!

RADIATOR AND COOLING FAN

The first job on my wine-stained list was the fitment of the radiator. DAX offer two options in this department: a steel variant ideal for smaller engines and an aluminium multi-core unit for higher power outputs. In my case, the predicted 300 plus bhp at the flywheel dictated my choice rather and a call to D.J.'s stores soon saw a cardboard-clad aluminium matrix standing in my garage. There is little scope as regards positioning the radiator due to the inlet and outlets just missing the Rush's upper and lower chassis rails. Rather than use the large self-tappers supplied in the kit, I dusted off my trusty thread insertion tool from Make Ends Meet Ltd. This amazing piece of kit, covered in Tech Products a few months back, has now become one of my favourite and most-used tools. The design allows the simple insertion of a wide selection of threaded inserts, four of which were needed to mount the radiator. To ensure the delicate matrix was not in contact with the cross-stays positioned in the



How to get a Rush off chassis stands!

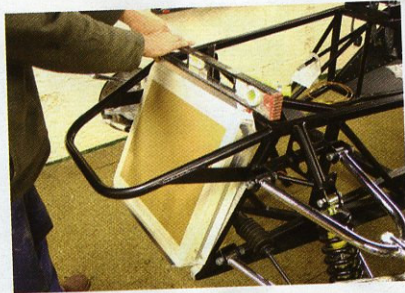
engine compartment, spacers were fabricated on my father's trusty lathe. Using stainless steel set screws and spring washers, the final installation is totally unstressed, a common cause of matrix failures.

Apart from the high performance radiator, my cooling strategy for the Raptor F85 has a few additional upgrades:

1. **A high performance thermostatically-controlled cooling fan with manual boost control.**
2. **The design of a bespoke high capacity header tank to maximise coolant volume.**
3. **An oil cooler and remote filter. This increases the oil capacity of the system and allows the lubricant to cool outside the block.**
4. **Fitment of ducting within the CW460's nose to ensure all air is directed through the matrix.**

As you can see, I tend not to take short cuts when it comes to keeping a high performance engine cool!

The oil cooler, header tank and ducting would have to wait for another day: the fitment of the cooling fan was next on my list. After considerable research I discovered the optimum cooling technology on the market comes from Kenlowe Ltd. Luckily they have just launched a new fan range and I selected the largest and most powerful variant on offer. I promptly ordered a 17 inch diameter curved vane (or 'stator') design along with a full installation kit. On arrival, the impressive box not only contained the gargantuan fan - and I



High performance alloy radiator positioned prior to fitting.



Machined spacers to ensure radiator is firmly positioned away from chassis rails.

mean gargantuan - but also two mounting kits, thermostatic controller, wiring, switches, relays and comprehensive instructions. Mounting the assembly on the matrix was relatively straightforward and once in situ I stood back and admired the rather astonishing installation. In fact, the frontal view immediately reminded me of Thrust 2! The stator vanes look just like an intake of a jet turbine, probably because that's where the technology was originally founded and, of course, fitted to the world record-breaking car. Obviously, fitment to the rear of the radiator would have been the optimum solution since air flow would not be interrupted, but the Rush chassis members dictate the position of the installation. Anyway, the rather aggressive view through the car's nose will undoubtedly set the CW460 apart from any other.

Fitment of the control unit and relays required the fabrication of a mounting bracket. This type of job always takes a fair amount of time so I decided to kill two birds

with one stone and also mount the remote oil filter on the same bracket. The need for such remote plumbing is due to the Rush's chassis not allowing the luxury of fitting the Rover V8 filter in its normal position. Tight engine bays demand convoluted solutions but, on the plus side, increased oil capacity will help keep the Raptor cool.

Step 1: Cardboard template painstakingly cut and folded to shape.

Step 2: Use of nibblers to replicate shape in aluminium. **Step 3:** Bracket folded at desired points. **Step 4:** Powdercoated in satin black. **Step 5:** Fixed with socket head stainless steel set screws.

This equated to four hours of labour! Since I had written the whole evening off to undertake the job, I also fabricated a mounting plate for the chrome coil, always a challenging item to fit. The picture shows the brackets prior to powdercoating.

DESCRIPTION

High performance alloy radiator.

Kenlowe 17 inch stator vane cooling fan, mounting kit and thermostatic controller.

COST

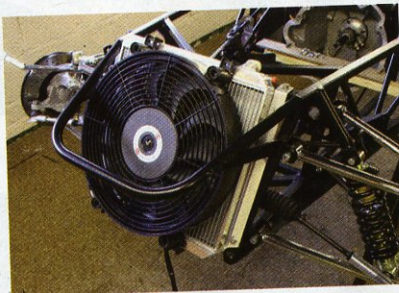
£423.00

£200.00

Total £623.00



Radiator mounted.



Kenlowe 17 inch fan in situ. You don't get much bigger than that!



Fan controller and coil brackets bolted to chassis.

SCUTTLE

Crossing the radiator and cooling fan tasks off my list revealed the next challenge being in the form of the scuttle. Even though this is a piece of bodywork (the part of the build I had always planned to leave to last) its positioning and population was required for future jobs. Unlike bolting items to a chassis, the first time you start handling gloss black gel-coated components the consequences of a mistake multiply considerably. The first challenge was to remove a section of fibreglass from the front of the scuttle to allow it to clear the pedals and master cylinders. After many years of trying different methods and tools for cutting fibreglass, I have found the best by far to be an electric angle grinder equipped with a fine disc. A rather aggressive tool in the wrong hands, the high rpm is great for slicing through gel coat without the fear of chipping.

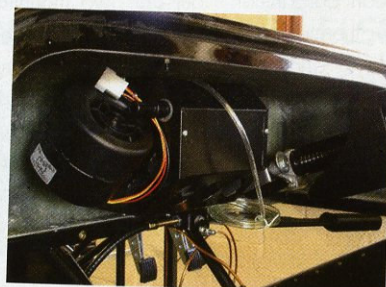
With the hole removed, and covered from head to toe in itchy dust, I sat the scuttle squarely on the chassis. Apart from



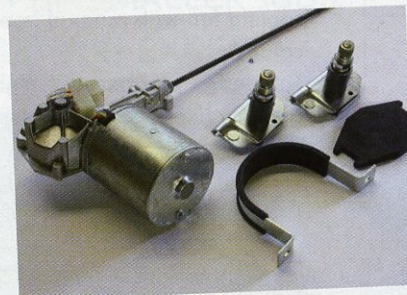
Marking scuttle to allow for pedal box.



Demister vents.



Heater motor bolted to underside of scuttle.



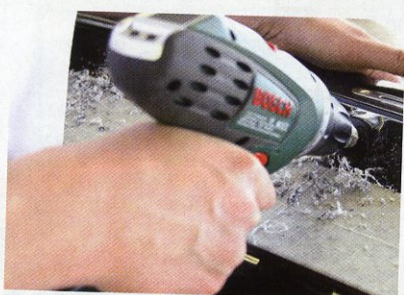
Wiper motor kit from DAX.



Connecting rods bolted into wheel boxes.



Wheel boxes prior to insertion in scuttle.



Drilling scuttle for windscreen wiper assembly.



Bonding wiper motor bracket in place.

housing the heater, demisting hoses and wiper system, rather a lot of hardware has to be installed in this small space: ECU, loom, relay board, instrumentation, rev limiter, traction control unit and a few other gizmos

besides. I dread to think how it will all fit, but I'm sure I'll cross that bridge when I come to it ...

First angle of attack was to attach the polished stainless steel demister vents,

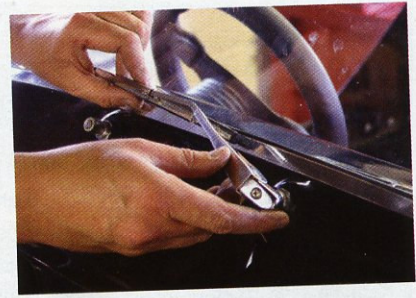
only after which the demisting ducting supplied with the Rush kit could be bonded in place. Bearing in mind I want the CW460 to be a usable road rocket, I had planned on fitting a heater from day one. Again supplied by DAX, the compact unit was bolted on the inside of the scuttle just above the tunnel. Apart from keeping toes warm and allowing a demisting capability for SVA, the increased coolant capacity and additional small matrix in the heater box will all help to keep the Raptor cool.

As with many kits, the use of a Lucas wiper motor and boxes was no surprise. First, holes were drilled in the scuttle to accept the wheel boxes. Accurate positioning was relatively straightforward due to the gel coat being marked at the factory during fabrication. Once installed, the rather heavy wiper motor was mounted on a bracket and subsequently bonded onto the underside of the scuttle. This only left the trimming of the interconnecting tubes and internal rack. Taking the best part of a day, the list of rather mundane tasks was slowly depleting; leaving the fitment of the screen as the last hurdle before the scuttle was complete. Even though the screen is held on by a mere six button head set

screws, the amount of checking and rechecking which ensued to ensure perfect horizontal alignment would drive a sane mortal mad. This was, in part, due

to my father helping me with this task. Anyway, after half an hour we reached an agreement that the screen was perfectly level and the drill could be unleashed on the fibreglass.

At this point the clock was showing about 4:30 p.m. and the CW460 had slowly but surely grown a windscreen and associated features, such as wipers, washers, heater and glass. Another milestone in the project ... and time to hit the mini-fridge.



Wiper arms being pushed onto splines.



Nigel lining up windscreen prior to drilling fixing holes.

DESCRIPTION

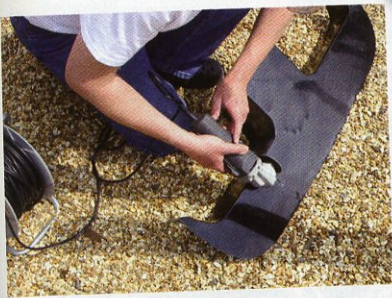
| DESCRIPTION | COST |
|----------------------------------|------------------|
| Heater kit | £312.79 |
| Windscreen wiper and washer kits | £370.13 |
| Windscreen and supports | £351.62 |
| Total | £1,034.54 |

CENTRE TUNNEL AND DASH

With the scuttle firmly bolted to the chassis it made sense to fit the centre tunnel and dashboard. Both made from fibreglass, the

process was simply measure, cut, file, trial fit and back to the start again. With the Tremec in place, accurate positioning of the hole for the gearstick was relatively straightforward.

As for the recess for the steering column shroud in the dash, this took a considerable amount of fettling before it passed scrutiny.



Nigel hard at work trimming the dash with his angle grinder!



Creating hole in centre console for Tremec gearstick.



Dash and centre tunnel in situ.

THE CARBON FIBRE MOMENT

Having built numerous Seven style cars in the past I want the theme of the CW460 to be slightly different. One material I have never been closely acquainted with is carbon fibre and having never worked with the product I was a little dubious, even though the inherent strength and exquisite finish had always appealed. As luck would have it, I met the boys from Carbon Mods earlier this year and was assured working with the material was straightforward. Purchasing a small panel, cutting wheel and sanding block I set aside the following morning to experiment.

Sitting down at my bench, my trusty Dremel was equipped with the rather

small cutting wheel. The plan was to cut a square from the carbon fibre panel ready to be shaped further if necessary. To my absolute astonishment the whole process was incredibly straightforward, far easier, in fact, than cutting gel-covered fibreglass. The small cutting disc seemed to slice through the panel like butter, even allowing a curved profile to be formed where necessary. Once the cutting was complete, the rather nifty sanding block was used to clean the edges in a matter of minutes. I was immediately sold on the idea and got back on the phone to Carbon Mods, ordering enough carbon fibre to populate my CW460 in various high visibility areas. One area in particular is the tunnel top and footwell end panels within the engine bay. The vision was that



Cutting carbon fibre sheet with a Dremel and special Perma-Grit disc.



Filing block removes any carbon fibre shards remaining after cutting.

the high gloss panelling would complement the Raptor's carbon fibre ACT plenum and swept intake scoop perfectly.

As with my powdercoated panels, I started with a trusty cardboard template and progressed onto the cutting wheel and sanding block. Once I was happy with the fit, holes were drilled using standard drill bits. No dramas, no stress. It was all too easy; why had I not used this material before? After finishing the edges with the sanding block, I sourced some superb 'U' channel from Car Builder Solutions (#TRMCU2). Measuring only 5 mm x 3 mm, the brushed aluminium channel clipped onto the panel edges covering any slight frays resulting from the cutting process.

Carbon Mods advertise elsewhere in this magazine, so if you are building a kit car or simply want to upgrade your completed project take a look at their website www.carbonmods.co.uk. They stock a large range of carbon fibre sheet, aero components and bespoke mouldings for specific kit cars. Prices start at just £11.95 plus VAT for an A5 sized sheet of wet lay (carbon fibre on one side and E-glass fabric on the other). If it's pure carbon fibre you require, all sizes are available at a premium. Cutting discs, jigsaw blades and sanding blocks all designed specifically for working with this amazing material are also available at very low cost. I plan to write a more detailed feature on this technology very soon, so watch this space for more information.



Engine bay panel finished. Looks sensational.

DESCRIPTION

Carbon fibre sheet – 1 square metre (2 mm thick)

Cutting disc and sanding block

COST

£169.14

£27.00

Total

£196.14

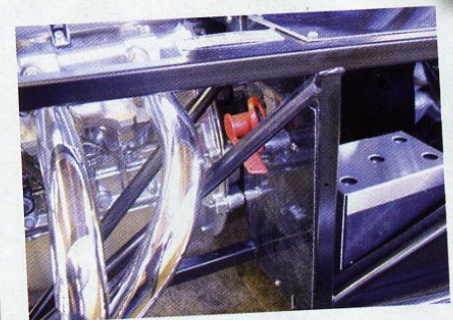


Driver's tunnel end in carbon fibre. This complex shape took a good few hours to create.

BATTERY INSTALLATION

Nearly every kit car is designed to take a standard lead acid battery found in motor factors and the likes of Halfords. The problem with this solution is it's bulky, heavy and limited on cranking capacity for a given size. An alternative technology used extensively in motorsport and the aerospace industries is produced by a company called Powervamp Ltd.

CW460 is the PVR35, able to provide a cranking current of a staggering 925 amps for a duration of five seconds. Specifically designed for V8s up to 5 litres, the other advantages of this battery include its long life (8-10 years) and ability to be mounted in any orientation. This was of particular interest to me as it was my desire to mount the battery on its side behind a firewall at the end of the passenger footwell. Why would I want to do this rather than within the engine compartment? The answer is space - or more accurately - the lack of it. My Raptor F85's induction hardware is rather large, a prerequisite to ensure copious amounts of air can supply the hungry 4.6 litres. Hence, the battery had to be moved and the only available location near the starter motor was the passenger footwell. Legroom will be limited slightly, but in my experience an angled footrest is

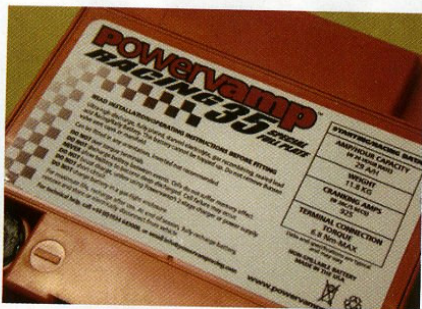


Cut-off switch and jump pole in place.

a must to avoid a passenger getting cramp, so this set-up will do nicely.

Another advantage of the Powervamp technology is its resistance to 'g' forces. Interestingly, under extreme loads (as in aircraft and race cars) the liquid in a lead acid battery can obviously move under hard acceleration and cornering, reducing output voltage. Since my CW460 will be pulling a fair few 'g', the Powervamp alternative sounds like a wise investment.

Complete with a bespoke aluminium carrier, installation of the unit only took a few minutes. As for the leads, Powervamp fabricated these from my own drawings using extra-flexible, high quality cable. Since the battery is going to be hidden I took the opportunity to

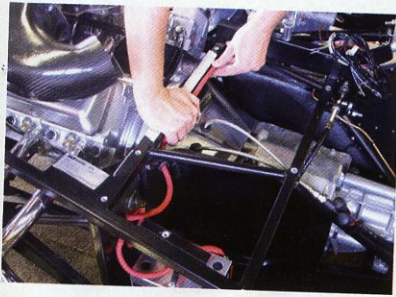


The ultimate battery from Powervamp Ltd. This will crank the Raptor F85 with some vigour.

The Powervamp range of batteries utilise thin plate technology (TPT) to produce a power pack with exceptional performance characteristics. Designed to cope with extreme cranking demands, the size of battery compared to output far exceeds that of a lead acid alternative. The battery selected for my



Battery positioned at end of passenger tunnel. This will be panelled in due course.



Powervamp leads being carefully routed through chassis.

add a positive jump pole for charging it, and a master cut-off switch. This latter addition is always worthwhile, allowing total isolation of the vehicle's electrics at a flick of a switch.

If you are interested in Powervamp's full range, visit the website at www.powervampracing.com.

DESCRIPTION

PVR35 TPT battery

Mounting bracket

Leads

COST

£141.58

£38.19

£11.75

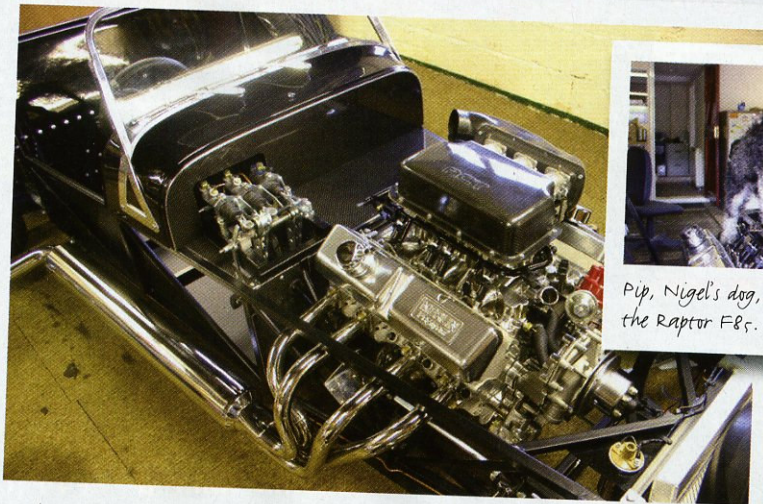
Total

£191.52

THAT'S IT FOR THIS MONTH

This stage of a kit car build requires the completion of many smaller jobs and all are critical to ensure a top quality finish. Next month I'll be moving onto the electrics and engine plumbing. The cost of the build to date is £30,266.73, and as you can see I've exceeded my budget of £30,000. Having said this, the vast amount of expenditure is complete. Heard that before?

I would just like to say a big thank you to both Powervamp and Carbon Mods for their help in this project. Utilising the best of the best often requires some professional guidance and these two companies definitely know their beans. Over to Evie for her usual rendition of this month's activities.



Looking good!



Pip, Nigel's dog, inspecting the Raptor F8s.

TEENAGER'S TAKE

Hi there Kit Car readers and budding enthusiasts. Brace yourselves, it's me with my usual 'Teenager's Take.' I don't know why Dad calls it that, it makes me sound like a bit of a freak or something. Yes Dad, I'm between the ages of 12 and 20. Get over it!

Well, as I'm sure you are all aware, most of us are pretty skint at the moment and worried that our homes are worth about 80p. The credit crunch is the hot topic of the moment and, once again, Dad has gone over his original car budget. He tried to reassure Mum there is absolutely nothing else he needs to buy. Yeah, right, famous last words. Strange, then, that mysterious heavy boxes reading 'fragile' keep being delivered to the garage door.

Just to put Dad in more of a bad mood, Mum broke the undercarriage of her VW Golf by driving over a rather stubborn rock. Her defence was that it was covered in long grass. My brother, Barnaby (being a typical eleven year old boy), thought it hilarious that she actually swore. He boasted her expletive was that

of a piece of poo for several days. Dad definitely did not think it was hilarious: he was seriously unimpressed. He had visions of having to spend more money (suddenly the overspend on his kit budget was forgotten ... or perhaps it wasn't). Probably more upsetting to him was the fact that he'd have to spend some time on a car that wasn't his own. Enter Popsy to the rescue once again, with his years of experience. I really don't know what Mum and Dad would do without him and Nanna.

Anyway, back to the boring ... I mean, the interesting stuff. Dad, being Dad, had to buy the biggest cooling fan for his car, of course, and gave me a lesson on how it was the best - I almost fell asleep. There was also great excitement and lengthy detail over the

small, but very powerful battery he has now purchased. P-le-a-se. Feigning interest is definitely getting harder as this build progresses.

Something else I had no interest in, Dad and I were watching Biker Build-Off the other day while we were waiting for tea (that's another story, but never mind now). The programme was a competition between a British, Australian and American team. Being an American show there are no prizes for guessing who won. Well, actually, their bike was the best I guess. Oh, don't worry, I haven't been mesmerised by Dad's strange, addictive motor shows. I was bored. No, really, I was very, very bored, killing time before Mum shouted "It's on the table". Oh, ok, so I asked Dad to record the ending 'coz I didn't want to miss it, but it doesn't mean anything you know, it's not like I'm going to become a mechanic or anything.

Well, that's it for now, see you next time. Honestly, living in our house is like being part of a tv drama - and you think I'm kidding ...



Nigel's daughter, Evie, with another of her Teenager's Take.