

LAST MONTH NIGEL SHARED HIS VISION TO BUILD ONE OF THE MOST POWERFUL RUSH V8S TO BE UNLEASHED ON THE BRITISH HIGHWAYS. HAVING PLACED HIS ORDER WITH D J SPORTSCARS AND PREPARED THE DEAN GARAGE, ALL THERE WAS LEFT TO DO BEFORE THE BUILD COULD COMMENCE WAS TO SOURCE THOSE ELUSIVE COSWORTH DONOR COMPONENTS. DEMANDING NOTHING BUT BRAND NEW HARDWARE, HOWEVER, PRESENTED OUR TECH ED' WITH A SIGNIFICANT CHALLENGE....

RUSH

CW460

CHAPTER 2



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

There is not a single kit car in production which does not rely on at least one donor component. Apart from the engine and gearbox, many braking, steering and drive components are courtesy of mainstream car manufacturers. This can pose a problem: you either get the kit manufacturer in question to source the lot or do the dirty work yourself. The former option is

undoubtedly less stressful, but you will probably pay a premium for avoiding all the grease and oil. However, this so-called dirty work is rather less messy than you may first imagine. Gone are those Sunday afternoon visits to the local scrapyards, scrambling across stacked rusting donors looking for that elusive switch. Today, Internet-based specialist breakers and eBay are the stalking grounds for many kit car builders. A few key strokes, a credit card number and, hey presto, a box arrives on your doorstep in a couple of days. You may be faced with a little degreasing and painting at this point, but at least it's all in your own garage. Unsurprisingly this convenience does incur a small premium compared to the scrapyards

scramble, in addition you lose the opportunity to fill your pockets, but it is so much easier!

My Rush, like many other medium-sized kit cars, relies on the Ford motor company for its donor shopping list:

Component	Quantity
Front uprights	2
Front hubs	2
Differential unit	1
Driveshaft assemblies	2
Rear bearing carriers	2
Rear wheel flanges	2
Rear splined stub axles	2
Steering column	1



Preparations were made for the new arrival; next came the sourcing of those all-important donor components.

As explained last month, my challenge was to source all brand new donor components bar one. The logic behind this thinking was that my baby would then be entitled to a current registration: an '85' or '09' plate (depending on how long I take

to complete the build), a rare sight indeed because 99.9% of Rush builders opt for secondhand donor components and are subsequently issued an age-related registration mark. Call me fussy, but I like to make my life challenging!

FRONT UPRIGHTS, STUB AXLE AND FLANGES

The Rush utilises front uprights and hubs from the Ford Sierra. Sounds a little demeaning when one is trying to build a supercar slayer, but these units are extremely versatile, compact and offer a front end geometry set-up well-suited

to a kit car of the Rush's character. In reality, sourcing these units brand new was relatively straightforward and surprisingly inexpensive. For the princely sum of £105.75 inc. VAT, I took delivery of two brand spanking new uprights, stub axles and flanges, complete with bearings and studs. The source? Rally Design who

are advertised elsewhere in this magazine.

On receiving the units, the preparation work began in earnest. Yes, I know they were new, but protection against the elements is still a worthwhile investment. This was a several stage process:

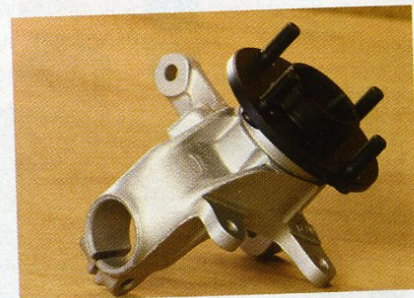
1. The whole assembly was degreased with Power Clean from Innotec (tel: 01722 411744 or www.innotecworld.com). This is a superb degreasing agent and comes in a 750 ml aerosol. Very powerful and quick-drying, it does not leave any residue. A seriously impressive consumable.

2. First to be painted was the main casting. Surfaces which would eventually mate with other components were masked. If this precaution is not undertaken, the

paint can degrade over time and potentially loosen the components in question - not advisable when it's the front brake callipers!

3. A coat of silver smooth Hammerite was the order of the day and still remains my favourite paint for such jobs. I continually experiment with alternatives, but the Smoothrite wins every time. Good adhesion, easy to apply, amazing heat resistance, it provides a flawless oem finish.

4. Finally, the flanges were painted with Innotec Black Body Paint.



Brand new Ford front upright, stub axle and flange, courtesy of Rally Design.

DIFFERENTIAL UNIT

The rear differential used in the Rush was fitted to Sierras, Granadas and Escort Cosworths throughout their entire production. Numerous ratios were produced in varying volumes but here is a selection: 3.36:1,

3.77:1, 3.92:1, 3.842:1, 4.056:1, 3.31:1, 3.14:1, 4.29:1, 3.58:1, 3.62:1, 3.33:1, 3.59:1, 4.27:1, 3.82:1, 3.26:1, 3.12:1, 3.56:1...! The vast majority of these ratios are extremely rare but selecting the right one for your project is of paramount

importance. Factors influencing this choice of gearbox selection are wheel/tyre size and how the car will be driven. To calculate the optimum differential ratio for my beast the following statistics had to be considered:

Tyre width: 245 mm

Tyre profile: 40

Rim size: 17 inches

Gearbox ratios: 3.35, 1.99, 1.33, 1.0, 0.68

Gear change point 5,500 rpm

Diff ratio: 3.12

1st to 2nd	39 mph
2nd to 3rd	65 mph
3rd to 4th	98 mph
4th to 5th	130 mph
Top Speed	191 mph

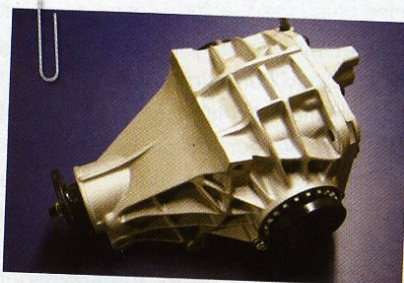
Diff ratio: 3.36

36 mph
61 mph
91 mph
120 mph
177 mph

Diff ratio: 3.62

33 mph
56 mph
84 mph
112 mph
164 mph

Although these figures look very similar, the difference in driving these three different ratios is significant. Even though I have a shift point of 5,500 rpm, the Rush will be cruising at low revs for the majority of the time. After taking considerable advice from D J Sportscars and my engine builder, I eventually and reluctantly opted for the 3.36 ratio - reluctantly, because it's the rarest ratio Ford ever produced. Typical! After several weeks of searching to no avail, Rally Design came to my rescue once again. Even though they only sell the more common ratios, a call to their gearbox and differential supplier unearthed a



Ford 3.36:1 differential: an extremely rare find but the ultimate ratio for V8 grunt.

3.36 crown-wheel and pinion. Fortunately, it was the larger and stronger 7.5 inch variant,

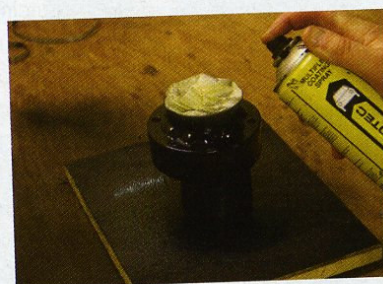
a must-have for my leviathan. Housed in a totally reconditioned aluminium casing complete with new Timken bearings, I opted for the desirable bolt-on driveshaft format. Considerably stronger than the plug-in type, this allowed me the luxury of turning to Cosworth for the remainder of my donor components. The differential was stunning: painted, brand new back cover bolts, drain plug and a polished stainless steel tag identifying the ratio. No work for me and I was a happy bunny, even though the outlay was a little higher than first anticipated: £564 including the dreaded VAT.

DRIVESHAFTS, REAR STUB AXLES, FLANGES AND BEARING CARRIERS

At the beginning of this project I was extremely concerned as to how I could source brand new Ford driveshafts, stub axles and bearing carriers. They are simply not produced any more! Luckily, as many readers will have read last month, I found a rally specialist called ATM Sport Ltd (01376 585125) who have a stash of such components hidden away deep in Essex. Taking a drive to the Aladdin's cave I managed to source all my outstanding

hardware in one hit, even better, they were all Cosworth Group 'A' rally spec' parts. This included the sought-after rear bearing carriers which can accommodate the big brake package - a real bonus designed to withstand the rigours of rallying, I'm sure this little lot will be more than man enough for Wiltshire tarmac!

The cost was £587.50 inc. VAT, again a little higher than first envisaged but these components are incredibly rare and desirable. As with the front uprights, all were degreased and painted. Even though not



Brand new Ford Cosworth Lober joints painted with oem quality paint from innotec.



Cosworth rear driveshaft assemblies ready for the Rush. Repacked with high temperature lithium-based grease.

strictly necessary, the driveshafts were disassembled and the Lobro joints repacked with new molybdenum disulphide lithium grease. The exact amount packed into each joint is fairly precise (10 g boot side and 60 g the other) - an ideal use for the wife's electronic kitchen scales! To bolt the driveshafts in situ, twenty four high-tensile Torx bolts were purchased direct from Ford at a rather hefty 78p each.



Cosworth Group 'A' rally specification rear stub axles and flanges. Again, finished with Innotech paint.

STEERING COLUMN

Yet another item no longer produced by Ford, the Sierra steering column was also a little tricky to source. However, a friend of a friend had one tucked away still in its Ford plastic wrapper. How lucky was that! At £100, it completed my hunt for donor components. A summary of the cost of these items is as follows:

The final figure may sound a little high, but if you source secondhand components and recondition them yourself this can be reduced significantly.

Description

Front uprights, stub axles and flanges

Reconditioned differential

Driveshafts, rear stub axles, bearing carriers and rear flanges

Lithium grease and Torx bolts

Steering column

Paint and degreaser

Cost

£105.75

£564.00

£587.50

£23.52

£100

£29.38

Total £1,410.15

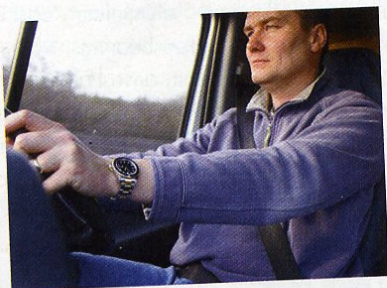
Refurbishing donor components

Time 8 hours

Difficulty 2 - straightforward

Cost £1,410.15

Tools Selection of hand tools

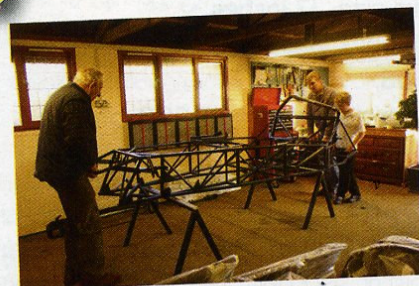


White van man. Notice the concentration, but with a few grands' worth of hardware in the rear who could blame him?

This alternative is only possible because the Rush body panels are rather compact, especially the main tub. The largest panel is probably the rear section.

Setting off nice and early, this white van man arrived at D J Sportscars at around mid-morning. The usual coffee, chat about the industry and wander around the factory ensued. Eventually, the time came to load her up and, somewhat surprisingly, the pile of components was rather large compared to my last DAX, the Tojeiro. The difference this time was rather than taking delivery of a rolling chassis, I was starting from a bare frame. It's truly amazing how much extra room unassembled parts occupy compared to the finished article. With the chassis first, suspension components, brake pipes and multiple boxes were subsequently squeezed into the Sprinter. The last parts to be loaded were the body panels, finished in flawless black gel coat.

Four hours later I pulled up outside my garage, safe in the mind all the components stacked neatly in the back were undamaged and dry. It seemed the whole family decided to help me unload, even my father decided to appear.



The chassis was lowered into position by three generations of the Dean family: father Graham, Nigel himself, and son Barnaby. I wonder who was the most excited?

Piling components in one corner of the garage allowed a clear passage for the powdercoated chassis to be rested on the awaiting stands. Complete with highly polished stainless steel roll bar, the triangulated spaceframe structure looked extremely purposeful and very strong.

Running through my checklist it became apparent that a few small components



Bodywork neatly stacked ready for storage.

The big day

Even though donor component sourcing can be on-going for a few weeks, the true starting point of any project is when you collect the chassis. For me the big day was February 6th 2008 and everything was in place. Pristine garage, chassis stands in situ, donor parts lined up on the tidy work bench. I had even given the build area a quick Hoover! Transport for the day was a Mercedes Sprinter van (white, naturally) borrowed from a friend for the princely sum of a bottle of malt whisky. The option of using a van is a real bonus compared to hauling a trailer several hundred miles.

were missing from the build packs, nothing too major but worth an email to Dax to expedite their arrival. Something I have learnt over the years of kit car projects is to

ensure you have all the components well ahead of time. A single shortage, however small, can instantly halt progress and spoil a pre-planned build day.

Deciding to retire after my rather exhausting day, I poured myself a long drink and settled down with the build manual to plan my first jobs.

CHASSIS PREPARATION

Many build manuals (DJ's included) tend to jump straight into panelling the spaceframe chassis with aluminium. Initially this may sound absolutely fine, but with any irreversible job - those panels are bleedin' hard to remove once

bonded and riveted in place - it is worth taking a step back and asking this question:

- Once this task is completed will any future ones become more difficult as a result, or even impossible?

Chances are the latter will not be true because most build manuals are fairly accurate. However, the former point is easily overlooked. In the case of the Rush I decided to undertake the following even before unpacking those aluminium panels.

POWDERCOATING

Paying a premium and having the chassis and suspension components powdercoated is a sound investment in my opinion. There is one downside, however: due to the thickness of the coating it plays havoc with tolerances. To elaborate, any pre-drilled holes in the chassis will be reduced in diameter. Any threaded stud or hole, even if protected

during the process, will also suffer slightly. In summary, everything gets a little clogged up. Hence, the first job was to clean all the threads with a tap (or a bolt of the correct size), especially the seatbelt mounts. Without the aluminium panels in place this job was a doddle. Next, I trial fitted all the front and rear suspension bolts. As suspected, most would not go home with hand pressure alone and

required the removal of excess powdercoating using a file. The alternative (and rather brutal) solution was to use a rubber mallet to simply bash the bolts home. Quicker maybe, but this approach can not only damage the threads but also crack the powdercoating. Once cracked, moisture ingress is only a matter of time and corrosion will start to take hold.

DIFFERENTIAL BUSHES

The construction of most kit cars relies on the use of numerous rubber bushes. They are primarily used to accomplish one of two distinct tasks:

- To isolate a component from the chassis, such as a differential.
- To allow a component to rotate about the axis of the bush, such as a suspension arm.

flexible rubber outer can cause irreversible damage. To avoid such a disaster it was essential to coat the outer surface with a lubricant prior to insertion, Fairy Liquid being an ideal candidate. Next, a length of high tensile studding (threaded bar) was inserted through the bush and, using a large washer and nut at each end, the assembly was

pulled into place with a little spanner work. This process was repeated for all six differential bushes.

Chassis Preparation

Time	3 hours
Difficulty	2 - straightforward
Cost	Parts in kit
Tools	Half round file, hand tools



Differential bushes and lubricant. Washing up liquid is ideal: it is easily sourced and there is no fear of it attacking the rubber.



Insertion of the first differential mounting bush.

Amazingly, these items are merely pushed home by brute force - a fair amount of it, mind you. The problem is if the housings (small tubes) are buried deep in the chassis, access can be hindered by other components. Consequently, my differential bushes were pushed home at this early stage.

The insertion of rubber bushes must be accomplished with a fair amount of care. Applying too much force directly to the

allowed the panels to be trial fitted. Inevitably, fine trimming was required and, in particular, allowance had to be made for the gearbox mounting plate and handbrake cable brackets. A little more depressing was the realisation I had to remove 8 mm from the entire length of both panels - simple if you own a guillotine, but

a complete b*****d if you don't. Jigsaw, tin snips or scroll nibblers were my options. Even though automation had its appeal, past experience with a jigsaw had seen some rather chewed up aftereffects. Deciding on the scroll nibbler as my weapon of choice, I set to work. Eventually (and I mean eventually)

ALUMINIUM PANELLING

Having totally prepared the chassis, I unwrapped the aluminium panels - ten in total - and laid them out neatly on the garage floor. Following the sequence suggested by the build manual, the large floor sections were first. Inverting the chassis (with my father's help)

the additional material was removed. Moving my attention to the handbrake brackets I used my other secret weapon: the notch nibbler. This amazing, yet simple, device 'eats' about two square millimetres per actuation, allowing a slot of any size to be produced. Both of these tools are worth their weight in gold and can be purchased from Car Builder Solutions (01580 891309). The scroll nibbler comes in at £16.45 and the notch nibbler £18.80, both prices include VAT.

Offering the panels up to the chassis once more, I was rewarded with a perfect fit. Preparing the panels for pop riveting involved the following steps:

- Holes were marked out at 2 inch intervals.

- Each proposed hole location was centre popped.
- A 3/16 hole was drilled in each corner and located with skin pins to avoid panel movement.
- The remaining 3/16 holes were then drilled.
- The panel was removed and all holes were deburred.
- Anticorrosion product was sprayed into the chassis.
- Powdercoating was removed from the chassis to allow a key with the panels.
- Silicone sealant was applied to the chassis.
- The panel was placed accordingly and pop riveted into place.

The rivets supplied with the kit are fairly large and the use of lazy tongs (see

picture) or an air-powered rivet gun made life a whole lot less painful.

Repeating this process, the attachment of all aluminium and a few additional fibreglass panels took the best part of three days in the workshop. This stage is always time-consuming regardless of the kit being built and can be rather demoralizing due to the slow progress. However, to add one final detail, I decided to spray all my aluminium panels prior to attachment with Innotec Multiplex coating spray. This has an extremely durable finish and is used extensively in bodyshops to provide a quality oem satin black appearance. Take a look at the pictures and see what you think. I know the vast majority will be covered at the end of the build, but that's not the point!



With the chassis on its back, the first panels fitted were the floors.



Using a notching tool to accommodate the handbrake cable brackets.



Once the panels were cut to size, the holes were marked and then drilled.



To avoid the panel from moving, skin pins were inserted into the first holes.



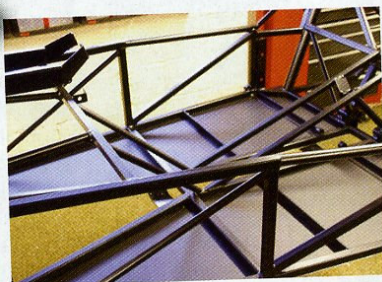
Fussy devil: even though the panels will be covered with trim, Nigel insisted on giving them a satin black finish prior to fitment. Notice the marked areas which will be bonded to the chassis.



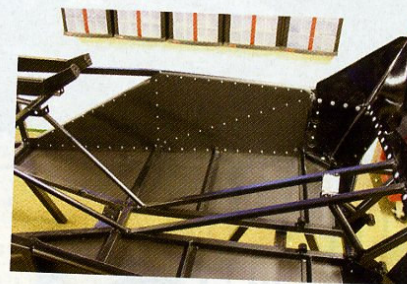
Once sealant had been applied the panel was placed in situ and the pop rivets inserted.



Lazy tongs are the best way to insert hundreds of pop rivets without crippling your hand.



Floors in situ.



Chassis panelling completed, including several fibreglass sections. As you can see, the satin black finish gives the assembly a professional appearance.

Chassis Panelling

Time	24 hours
Difficulty	2 – Patience required
Cost	Parts in kit
Tools	Drill, files, sheet metal tools

EXPENDITURE AND BUILD TIME TO DATE

Every month I'll sum up the accumulated costs and time invested to give you a clear idea of what's involved in creating a 'Nigel Dean' show car.

Build	Activity summary	Time (hrs)	Cost
Part 1	Order build packs 1 - 5	0	£5,434.00
Part 2	Source and prep donor parts	8	£1,410.15
	Collect build packs from DAX	8	£75
	Chassis preparation	3	£0
	Panel chassis	24	£0
Totals to date		43	£6,919.15

NEXT MONTH

This seems a good point to round up this month's activities. Remember to visit www.nigeldean.co.uk for further updates on the build, including additional images of each

stage. Please feel free to ask any questions concerning the build via email at kitcar@nigeldean.co.uk. Lined up for next month is the fitment of the differential, driveshafts and suspension. This will mean a

significant ramping up on the time front but not necessarily the cost, as most of the components are now patiently residing on my bench. I guess all there is to do is hand over to my darling daughter for her monthly update!

TEENAGER'S TAKE

Hi there again, keen kit car readers. It's me, the daughter of a kit car maniac. Things in the garage have been, surprisingly, pretty calm: no tantrums, spanner throwing, swearing, nothing at all. Maybe that's because Dad hasn't actually started any serious work on the car yet! However, have no fear, there has been some exciting news! The baby has arrived!

There's something slightly worrying, though. The other day I asked Dad whether he thought the new arrival was a boy or a girl. Guess what told me – a boy! I mean, for goodness sake, as far as I'm concerned all men call their cars 'she'. 'She drives well,' or 'She's got nice curves'.

I'm pretty sure Dad took more care carrying the car frame into his garage than he actually did when my brother and

I came home from hospital as newly born infants! No, I'm not kidding! He even managed to rope in his 78 year old father to help lift his pride and joy.

I came home from school and walked into my drive to find a massive white van parked outside our house. "Hi Dad, is this the car?" I asked in a positive, friendly manner. Out came Dad with a very, very serious look on his face. "Oh, cool," I said and ran inside. Believe me, when Dad and Popsy are about to lift a very heavy, very precious object you do not want to hang around.

All week Dad has been receiving different kinds of foreign objects that must be to do with his car. On a number of occasions I've had to sign for a large, very heavy box appearing at my front door. The other day I went into Dad's immaculately organised office to find a strange-looking object sitting on the cack-coloured carpet. I

looked at it a couple of times – it closely resembled a silver dog's head (differential to you and me – Tech' Ed!). Goodness knows what it actually is. I'm sure I'll be given a guided tour of the part another time. Joy!

Farewell for now. Join me next month when the real work will begin. I bet you can't wait. Neither can I. Tee, hee, hee!



Evie, Nigel's daughter, gives her view of this month's events.