'I had heard all sorts of stories about the problems of fitting the six-ratio gearbox to the Series 2 Coupé...'

From five to six...

David Harrison decided that his Coupé quattro needed a six-ratio gearbox, rather than the standard five.

I HAD HEARD all sorts of stories about the problems of fitting the six-ratio gearbox to the Series 2 Coupé. They suggested that modifications to the tunnel were necessary and there would be grief trying to get the shift working properly. But, not one to be put off by other peoples' problems, I contacted Patrick Carlier again. He has a house full of parts (I am not kidding when I say his loft is crammed with engines and gearboxes), and a garage full of milling and other metal working equipment. He set about designing ways of overcoming all the problems, with the brief that it had to look original, especially from inside the car, and would not need tunnel alterations. He achieved this and thoroughly tested it on his own Series 2 Coupé quattro before he built a duplicate set of parts for my car.

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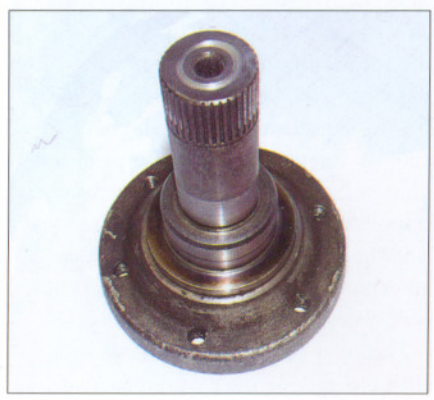
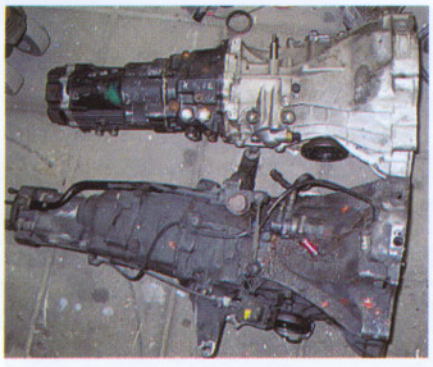
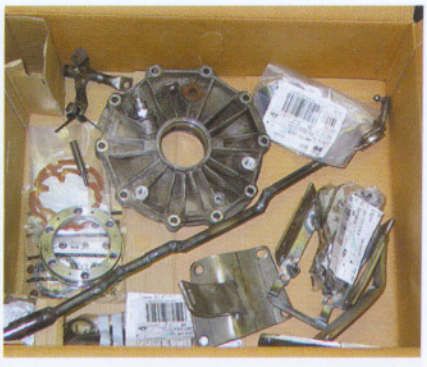
The first job was to make some mountings to mate the gearbox to the subframe. As I wanted these to be substantial and durable, Patrick made mine from stainless steel, using a special jig to ensure the positioning and alignment are correct for the Coupé quattro subframe.

The driveshaft flanges posed something of a problem. The flange mounting distance is slightly different, being more central compared to the five-speed, so Patrick dragged out his supply of shafts and found that the ones from the Series 3 20V quattro were the exact length required. Even better, the Coupé quattro CV joints fitted straight on. All that was needed was to remove the flanges from the six-ratio box and fit the Coupé quattro flanges in their place. They were a perfect fit, once 3 mm had been removed from the splined end of each flange to match the length of the original ones. This proved

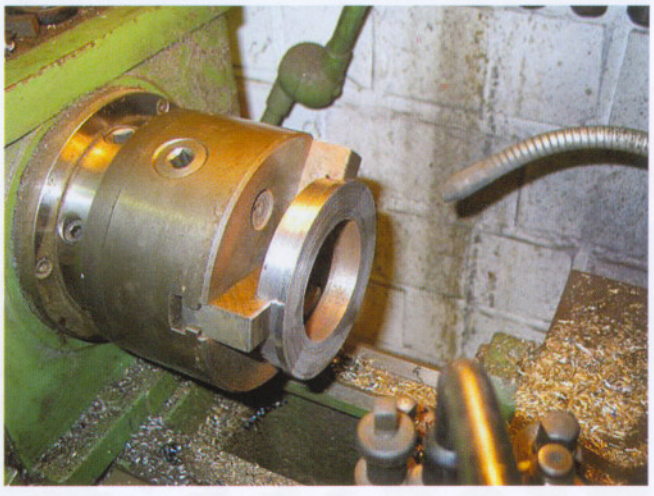
Below: *Driveshaft flange with 3mm removed from the splined end.*

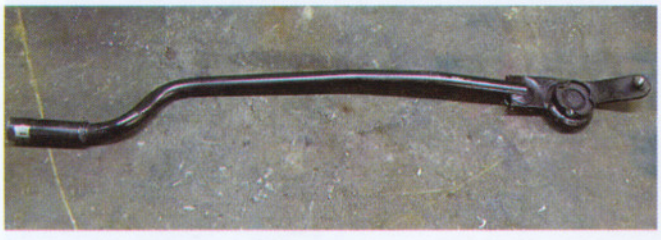


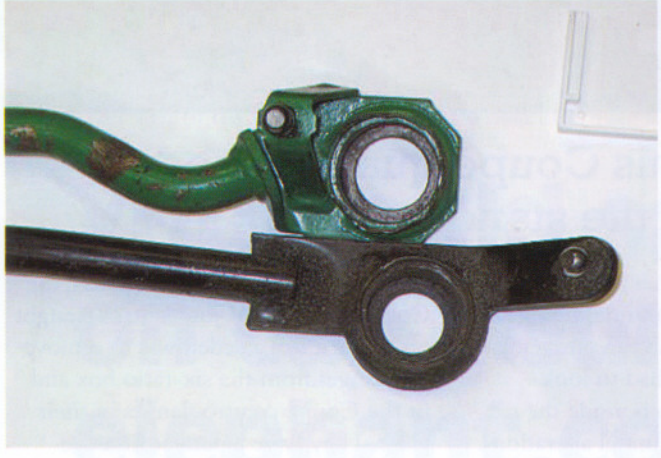


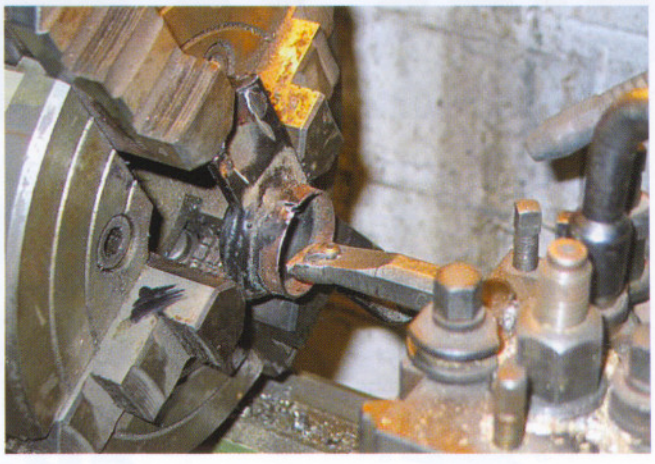


Above: *Six-speed CGR gearbox (top) is 15mm shorter than the five-speed.* ***Above centre:*** *First job was to fabricate new gearbox mountings. This picture shows Patrick Carlier's 'prototype' (left) and the final stainless steel version.* ***Above right:*** *All the six-speed parts needed arrived in a box from Patrick.* ***Right:*** *Milling the spacer to take up the gap between the propshaft coupling and the gearbox.* ***Below:*** *The old five-speed shift rod.*









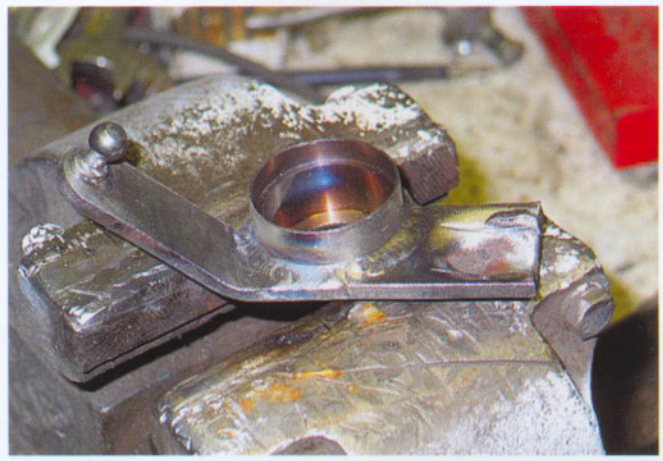
to be an easy solution to what could have been a real problem.

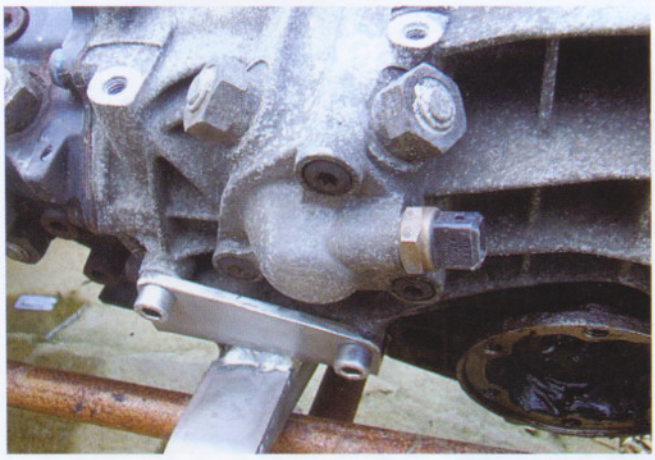
The six-speed gearbox, whether it is one of the CBL series from the early S4 or the CGR from the S2, is shorter than the five-speed by some 15 mm. This is fortunate; if it had been longer, the solution could have been much harder to resolve. All that was needed was to manufacture a metal spacer to take up the gap between the propshaft coupling and the gearbox. This was an opportunity for Patrick to put his new milling machine to the test, achieving an accuracy of 0.1mm for the locating bolt holes.

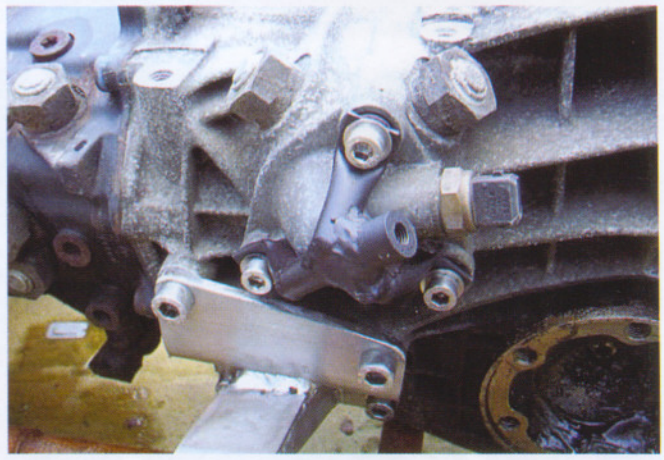
The next thing to sort out was the shift linkage. Because of the lack of space, this caused most of the problems, and required some ingenious solutions. It was decided to try and use most of the parts from the old gearbox and modify the six-speed to accept them, rather than struggling to make the CGR shift mechanism fit the Series 2 vehicle. This allowed me to remove the six-speed gear shift plate to provide much-needed room. The changes also involved removing the main ball joint housing from the Coupé quattro and making a special adapter from scratch to accept the much larger six-speed ball joint. Doing this also allowed it to be positioned slightly lower.

Once I had double-checked everything, it was welded into position and I re-routed the remaining shift linkage to match. I had to crawl under the car numerous times to make slight adjustments. I had used a later six-speed gearbox, which has the Procon 10 plate cast as part of the gearbox casing, rather than the early version which is bolted on. Because of this, I had to modify Patrick's linkage and it took me over a week to get it right.

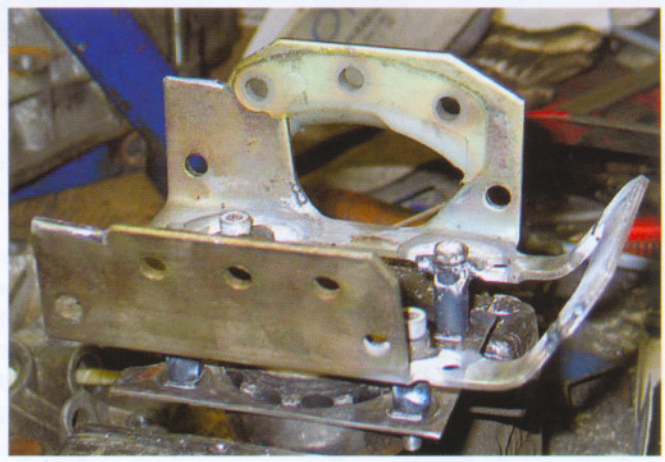
Above left: *This picture shows the difference between the six-speed (top) and five-speed ball joint housing.* ***Above:*** *modifying the old housing to accept the adapter which would allow use of the much larger six-speed ball joint.*







'It looks like a matchstick person, but it overcame the problem...'

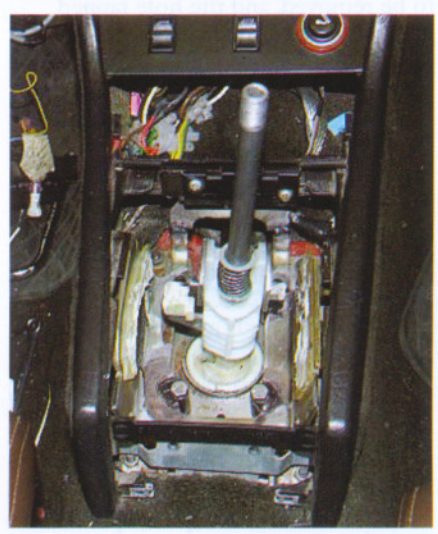


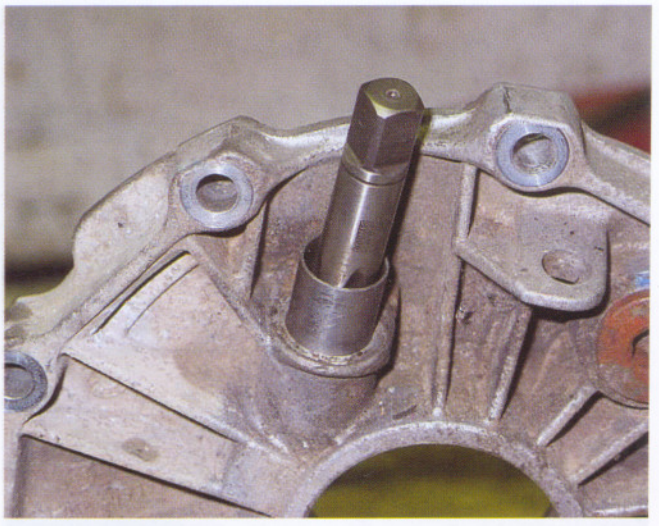
Top: *The modified housing and adapter.* ***Top right:*** *Housing and adapter, welded up and ready to be reattached to the shift rod.* ***Above:*** *The six-speed CGR 'box has no provision to attach the five-speed reaction rod. Patrick designed and fabricated an extension piece* ***(above right)*** *to overcome this.* ***Right:*** *Modifying the shift cage for the new reverse gear position.* ***Below right:*** *The modified shift cage installed inside the car.*

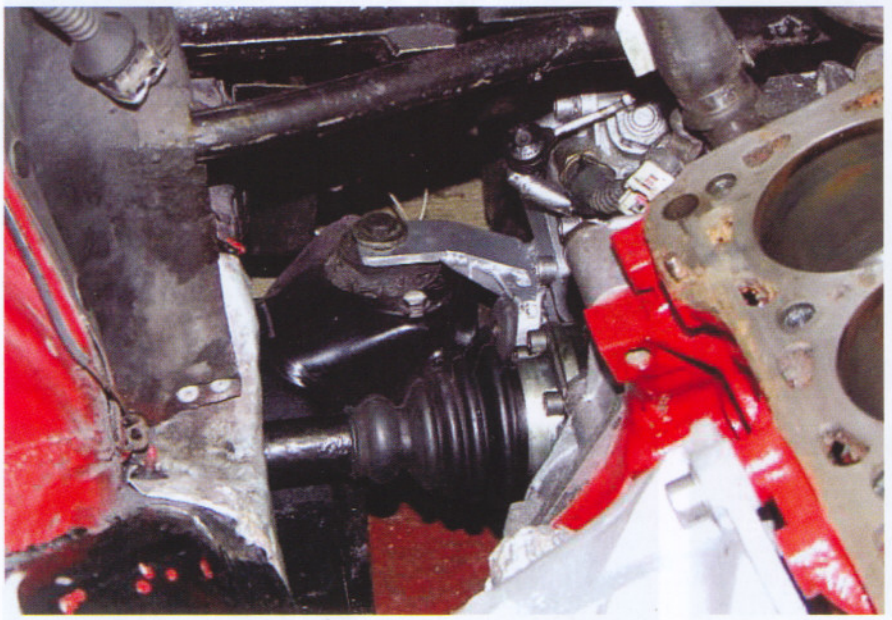
The section of rod from the gearlever itself also had to be modified to mate up with the rest of the linkage. Raising everything up to allow it to miss the bodywork and gearbox was quite an achievement when, in places, there was just 15 mm to play with.

Finally, to enable the system to work as before, the five-speed reaction rod from the shift linkage to the gearbox had to be fitted, but there is no provision for this on the six-speed CGR 'box. Patrick designed an extension piece to add to the cover where the ball-joint sits on the five-speed 'box. It looks like a matchstick person, but it overcame the problem. All that was then needed was an extension piece to the reaction rod itself to provide the correct gearchange operation.

The last of the work on the linkage was redesigning the shift cage in the car, as sixth gear takes up the position of reverse on the old 'box, with reverse now next to first gear. In order to enable the reverse lock-out to work properly, the cage had to be altered using parts from the old five-cylinder S4, welding supports so it would align with the Coupé quattro mounting position. Then the plastic five-ratio selector piece was swapped for the







Above left: *The plastic five-speed selector piece was swapped for the six-speed version to allow reverse gear to work properly.* ***Above:*** *Gearbox housing was tapped to accept the mechanical speedo drive using a special guide which Patrick made to ensure it was perfectly straight.* ***Left:*** *Six-speed gearbox fitted.*

six-speed version to ensure that reverse worked on the opposite side. The final touch is a six-speed gearknob.

The last issue was the speedo drive. On the S2 the speed sender is electronic, whereas mine has a mechanical drive. To get around this, the housing had to be removed, and the hole tapped to accept the mechanical worm drive gearing. A two-piece special adapter had to be made up; although tapping the hole might seem a trivial job, there is a catch: it has to be perfectly straight. If it is not, the gear would not work smoothly and, if the internal collar is damaged, it is likely to cause an oil leak from its O-ring. Patrick made a special guide to ensure this and, once completed, the mechanical drive from my five-speed could be installed.

The mechanical gear on the end of the cable which was used for the five-ratio box was, thankfully, a direct swap for the magnetic pick-up used for the six-ratio gearbox.

The rear differential has the same 4.11:1 ratio as the S2, so no further changes are necessary. Had I been fitting this into a Ur quattro, the rear differential would have needed replacing.

The six-speed gearbox has the Torsen centre differential. Because of this, there is no longer any need for the rubber hoses which went to the centre differential actuator on the car originally, and so they were cut back and plugged.

If you want to mate up the six-ratio gearbox with the KV engine, you will need to replace the flywheel and clutch, using one from a 3B or 7A unit. This is due to differences in the output shaft size and the clutch mechanism. Fortunately for me, the six-speed will mate perfectly with the 3B turbo engine which is going to be part of the next stage in the long story of modifying my Coupé quattro.

Gear ratios (mph per 1000 rpm)

	Five-ratio	Six-ratio
First	4.5	4.6
Second	7.7	8.5
Third	11.2	12.2
Fourth	15.2	15.7
Fifth	21.0	19.0
Sixth	-	23.0

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Fitting rear anti-roll bar	Nov '97
Rear diff overhaul	May/Jun '98
(From Volkswagen Audi Car)	
Front subframe overhaul	Nov/Dec '00
Strut overhaul	Jan/Feb '01
Steering overhaul	Sep/Oct '01
Master cylinder overhaul	Nov/Dec'01
Rear suspension bush replacement	Jan/Feb '02
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