The TR4 is quite different in appearance with its very pretty Michelotti-designed body. Underneath, it was not so different, however, and took advantage of the best features of the sidescreen model's engine and running gear. The TR4 offered greater comfort in the form of higher door lines and wind-up windows, and provided the basics for two subsequent models.

TR4 (1961 to 1965) (photograph 1-5).
For the TR4 Triumph revealed its clever "one major change at a time" development policy retaining an almost unchanged chassis, suspension and engine design, but introducing an Italian redesigned body style - the Michelotti shape, that was, in fact, retained for the subsequent TR4A and TR5. There were some other improvements - notably rack and pinion steering and a wider track (no doubt intended to improve handling), and synchromesh on all four forward gears. Manufacturing volume was retained at the 10,000 units per annum level with a total of 40,253 cars produced, of which a very creditable 36,803 (over 90%) were exported.

However, the competition leapt ahead by introducing the MGB in 1963. This was significant by virtue of its unitary construction that integrated a new redundant chassis into a stress-carrying bodyshell with significant weight and rigidity benefits.

There are thought to be about 4000 TR4s worldwide, with the majority (2250) Stateside. The model has a UK valuation spread of £4000, £7000 and, in show condition, £13,000.

The TR4A (1964 to 1967) (photograph 1-6)
Whilst the competition fundamentally took a development "time-out", Triumph TRs took their own leap forward with the introduction of the TR4A, with its new chassis and IRS (Independent Rear Suspension). Critics of the day complained that the engine had not been updated, and that the car was under-powered. They may have been right, but it is my view that Triumph probably got its development program about right, and the introduction of a new chassis and IRS was enough to swallow in one step.

Besides, the TR4A was more different than it appeared at first sight as the body had numerous under-the-surface changes, although the outer panels remained the same. I wonder if the critics of the day realized or cared about such detail?

However, that is hardly material to our current day review of the offerings available to you, the prospective TR er, so let us conclude with the current numerical assessment. Of the 28,465 TR4As produced, 22,826 were exported and about 4000 remain worldwide. Some 1400 to 1500 can be found in the UK, but the US can boast something approaching 2500. Valuations range from a low of £4500, excellent examples are valued at £7000, and up to £12,500 is asked for show standard examples.

The TR5/250 (1967 to 1968)
In 1967, MG made what appeared to be, and should have been, a significant development, with the introduction of the 150bhp, straight-6, 2912cc MGC. This MG appeared initially to have the major advantage of a unitary constructed bodyshell.

Fortunately, Triumph TRs also developed - at least in the engine department, and at least in some markets - with the introduction of the TR5 (photograph 1-7) and its US version, the TR250 (photograph 1-8). Both variants were fitted with a 2498cc,
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3-2. This Michelotti shell, however, is already looking like a candidate for floor and sill replacement, and, therefore, for cutting and removing the front half separately from the rear; so much so that I have marked the probable cut line to adopt once the car is completely stripped.

3-3. Since the whole body tub is rebuilt around its doors, the doors are the initial restoration task. Here, the new door skin is being offered for the first time to the already repaired door frame. A full photographic sequence of a door rebuild will be found in chapter 4.

3-6. This TR4 chassis has not seen the light of day for many years but looks in good shape. This one was repatriated from California and, therefore, had a less corrosive life than many.

3-7. Remembering to keep the door-braces in place, this TR4 tub has been welded as required and lightly sand blasted. Did you spot the LHD steering column hole?

Example 1 - Ladder chassis TR4/one-piece body repair
- Start by procuring or repairing the doors such that they are primed and ready to use (photograph 3-3).
- Don’t forget to brace the door apertures and carry out body tub repairs on the chassis (photograph 3-4).
- Complete the panel (e.g. wings) repairs. Offer all panels to the body tub and, when satisfied, remove (photograph 3-5).
- Separate the body tub from the chassis - although you may chose to transport the tub to the blaster on the chassis (photograph 3-6).
- Sand blast and prime paint the body tub. Finalise body welding, make good final body details and touch-in primer, as illustrated by photograph 3-7.
- Carry out as much finish body tub painting as you plan at home (photograph 3-8).
- Send the body tub and loose panels to the painter, noting the importance of transporting the lot very carefully, and retaining the door braces (photograph 3-9).
- Repair and paint the chassis at home. Sand blasting the chassis will have to be sub-contracted (photograph 3-10).
- Refurbish the front and rear suspension components and affix to the chassis (photograph 3-11).
- Take the rolling chassis to the painter, as per photograph 3-12, and marry the body to the chassis (using the appropriate body fixing kit) at the painters.

The final phases of the plan are fairly obvious and virtually identical to the conclusion of Plan 2. Consequently, I will summarise both under ‘Conclusions’ to avoid unnecessary duplication.

Example 2 - IRS TR4A/two-piece body repair
At the other end of the complexity scale I have chosen to plan the IRS car on a worst-case scenario. The following plan
4-2-2. You know you are making progress when most of the turned-over lip starts to hang loose from the door frame.

4-2-3. There will always be some local tack welds where things are not quite so easy, and you will need to give each weld some attention with your angle-grinder. In due course, however, you should be able to effortlessly fold the old skin back.

4-2-4. After the door skin, the base of a TR door is the most vulnerable to corrosion. There is little option but to cut out and replace the pressing with a new panel, as shown here.

4-2-5. It really is a good idea to keep everything until you are sure it can serve no further useful purpose. Here we see the old bottom pressing being compared to the newly repaired door bottom. It does look a significant improvement, although you may need to drill two water drain holes in the new bottom before skinning and painting the door.

4-2-6. As we discovered in chapter 2, the door frames on our TRs are also prone to corrosion, and cracking at the top, too. Here is an example with both top corners showing signs of rust; the front corner (left of the picture) is in need of replacement.

4-2-7. It always looks worse before it improves. Note how the reference point of the hole almost central to the picture has been retained, along with the great majority of the edge references. A sizeable right-angled piece has been cut away to remove corroded material.

4-2-8. With excellent results, although the resultant repair piece was more complex than you may have first thought when you looked at picture 4-2-6!
5-21. This picture shows part of an IRS chassis’s bottom ‘T-shirt’ plate. An outrigger/rear suspension mounting arm exits the photograph bottom-left, while one main chassis leg exits the top of the picture. All the fore, aft and side loads brought about by acceleration, braking and cornering pass through this absolutely safety-critical focal point. The severely corroded condition of the pressed gusset plate bears witness to the vulnerability of this crucial part of the IRS cars. In fact, this bottom gusset has rotted away almost completely, as will all the internal interconnected chassis members above this plate thus reducing the structural integrity if this area of this car to nil. All this is bad news, but what is even worse is to note that someone has previously tried to make the car appear roadworthy by welding a top gusset over the top of the rotten material, as evidenced by the part-corroded strip along the rear suspension mounting arm. Who is he kidding? Even a thicker than average gusset welded to nothing provides no structural integrity whatsoever, and the owner risks a rear end chassis failure with possibly horrific consequences. This, therefore, is a crucial detail to examine very closely indeed when carrying out a pre-purchase inspection. If you miss this point you will certainly be in line for an expensive body-off repair at a later date, and you could be putting life and limb in danger in the meantime. If in doubt, get a second expert opinion.

traversing a bumpy road. Older rusty cars have been known to ‘lose’ a trailing arm box section completely, when the corroded and fatigued metal separates from the cruciform. Without putting too fine a point on it - this area is vitally important to the car, so do the job properly, and get the stiffening ‘T-shirt’ plates off and have a real good look!

The additional details to check/consider are as follows:
- Assuming you need to replace one or both box sections that carry the rear suspension trailing arms, it’s important to position the new box sections at the correct angle (about 45 degrees) to the longitudinal axis of the chassis, when

5-22-1. The sequence in which you proceed with an IRS chassis repair is not always crucial, provided you remember the need to retain ‘reference-points’. However, it is important is to get the angle of the rear suspension mounting leg correct, and some explanation of this is included in the main text. It’s equally vital to ensure the integrity of the welding between each chassis leg and its respective chassis member is first-class before you give any thought to tackling the T-shirt pressings in place. Here we see that both T-shirt pressings have been cut longitudinally in half, and the left side of the chassis is being used as a mirror reference while the right side of the chassis is repaired.

5-22-2. With the inside of the right side rear suspension mounting leg securely welded to the inside chassis member, it’s time to repair the outer end. Remember the upward angle of the rear part of the chassis shown in photograph 5-29.

5-22-3. Do the same with the left side too!

5-22-4. Like the TR4’s ladder chassis, the IRS cars also had an upward slant to the rear of the chassis. Here we see an IRS chassis undergoing a major repair. Although it’s inverted, you can see the tacked spacer ensuring the upward slant is maintained throughout the repair.

5-22-5. Some closing pieces can be added to the open chassis sections, almost whenever it suits you. However, it’s vital to have the workshop manual’s chassis dimensions to hand, and to align the two halves very carefully indeed.
7-14-7. Both pairs of thrust washers come in two halves. Each pair has a plain half, which we have already positioned either side of the central main bearing. So now it’s time to fit the tanged half, shown here, on either side of the main bearing cap. The same rules of ‘what faces what’ apply and must be followed, so, if you are still in doubt, get a local TR club member to call in to check your work. You can just see the grooved faces (arrowed) ready to meet the crankshaft once the cap is married to the block.

7-14-8. Use lots more lubrication on the crankshaft’s journals and fit, not only the central mains cap (after which it’s a good idea to double check the crank end-float for the last time), but the front and rear bearing caps too.

7-14-9. The front sealing block goes in next. Don’t forget the ‘T’ shaped cork seals that go in at each end, and to get the front completely flat ready for the timing cover that will go on later. Did you spot the hole drilled as part of the crankshaft-balancing operation?

7-14-10. The rear main bearing cap has to be sealed on both sides with felt, which is best cut into 1in lengths and soaked for 30 minutes in Wellseal before being rammed (fairly forcibly) home. These need to get right to the bottom of what is an apparently bottomless void, one after another, until no more can be packed in. Cut the top off flush with the crankcase to allow the sump gasket to sit flat. It’s a messy operation so you may be pleased to hear that Hammerite Paint Thinner is invaluable for cleaning the engine, your tools, and, indeed, yourself! After the clean up you need to turn the engine over.

7-14-11. The reliability of the engine depends upon the integrity of the seal between liner and engine block, so a carefully applied ring of gasket dressing (in this case Wellseal) needs to be painted on the block’s shoulder, on both sides of the Fo8 gaskets shown in the foreground, and ...
9-5. Some examples of 'roll pins' ... mostly too long for this application but, nevertheless, useful for identification purposes. Extra length can always be ground off after fitting, provided you protect your gearbox from grinding dust. Note that the drill size should always be smaller than the diameter of the roll pin you plan to use, and you should seek advice as to the size of the hole required for your particular pin. These examples are 2, 3 and 4mm in diameter, the 3mm probably being the optimum for four-cylinder applications. Roll pins are no longer available in the UK in 'imperial' sizes.

The Gearboxes

The TR4 and 4A should, strictly speaking, only be fitted with the earlier 'A' type gearbox and/or overdrive unit, as shown in photograph 9-6. However, there are those who may have purchased a car with a later ('J' type) gearbox/overdrive already fitted, or those who feel that the cost, availability and reliability benefits of the later transmission warrant some loss of originality. Consequently, I propose to review both Triumph gearboxes here. Pictures 9-7 and 9-8 will help you identify each of the gearboxes with their respective overdrives.

9-6. For comparison, here are two 'A' type gearboxes with overdrives - identified at a glance by the large brass sump nuts. The one on the left is the variant from a saloon (2000 and/or 2500) or a Mark 1 Stag as revealed by the horizontally-mounted solenoid and vertical mounting studs. Were this gearbox from a TR, the solenoid would be mounted vertically as per the unit on the right. You will have noted the flat rear platform for the rubber Metaelastic mounting pad on the right unit, confirming this to be of TR origin. Note, too, the solenoid lever and through shaft, and how vulnerable they are.

9-7 and 9-8 (above). Three gearboxes, all with overdrives fitted. On the far side of the first photograph we have the correct TR2 to early TR6 'A' type gearbox and overdrive. The central gearbox is a 'J' type, correct for later TR6s, but which will fit most earlier TRs with care. Note the extra support for the gear change casing. Nearest the camera, the vertical mounting tells us this is a saloon gearbox, confirmed by the fact that the speedometer drive exits the 'box high on the casing and horizontally. The TR speedometer drive will be low down and angled at about 30 degrees to miss the tunnel cover, as can be seen in both other examples.

and possibly the 3 or 4mm examples seen in photograph 9-5 will provide you with the piece of mind, and your car’s clutch with the extra strength needed to ensure a long and trouble-free life.

what type of gearbox it was. Your car's commission number will not be reflected in the gearbox number, which comprises a prefix and number, and is stamped in various positions on the left side of the gearbox. However, as we will discover, there are lots of good reasons why the case of your particular ‘box
can overload the bearings or even bring about seizure, while too much can bring equally serious consequences. This is, therefore, a task you should subcontract if you do not have the necessary skills, experience, or a DTI (dial test indicator).

- Start with the same thickness of shims each side (about 0.08in), reassemble the half-shafts, hubs and back plates, and fully tighten all setscrews. Check the end-float between the back plate and the hub assembly, using a DTI as shown in photograph 12-10. This 'short-cut' is not recommended as you near your final readings, but you will see that we used a G-clamp to pull the hub together to check the initial shim adjustments. Re-shim until 0.004-0.006in end-float is achieved each side. As far as possible, the shims and end-float of one side should roughly equal the those of the opposite side.

- When reassembling the brakes, check you are about to use the correct rear wheel cylinders and that they are in first class order. Frankly, for something as important as your brakes, it seems silly to re-use old cylinders. Ensure the new ones are identical with each other, and, to minimise rear brake lock-ups, are compatible with your rear drum size. I recommend the following: 0.7in is the best balanced cylinder bore diameter for 9in diameter brake drums, while:

\[
\frac{5}{16} \text{in is the best balanced cylinder bore diameter for 10in diameter brake drums.}
\]

- However, many cars have successfully used the smaller cylinder on the larger drums in an effort to reduce the probability of rear wheel locking.

- Don't forget to torque the axle nuts to the manual's recommended figure (about 135lb ft), re-fit the split pins, and fill the axle with (Hypoy 90EP) oil.

- Be frugal with subsequent rear hub lubrication. Over enthusiasm with the grease gun will lubricate the brake drums!

- When the time comes to reassemble the rear axle and suspension, the photographic sequence 12-11-1 to 12-11-4 should provide a useful reference.
attributes, you will have realised that you must have the right hood frame for your car. Note, too, that neither type is readily available. Believe it or not, some owners lose the hood and hood frame.

Typically, the assembly gets put in the garage or loft, maybe to fit a hard top, or perhaps because the climate makes a hood superfluous. In due course the car is sold, but without the hood frame that the owner has not seen for years! So, for whatever reason, hood frames are in short supply, so make sure that your prospective purchase has a (complete) frame, if not a hood.

You should also bear in mind that it's not unknown for a frame to be bent. This can be very difficult to rectify.

Whether you are replacing the hood as part of an upgrade or repair, or carrying out a full-car restoration, the decision to replace the hood should be accompanied by allowing sufficient time and cash to check and improve the hood frame too. The ideal solution is to go for a reconditioned/exchange hood frame from one of our premier TR restorers. The exchange frame will come back with any bent or mis-shaped sections corrected, the frame beautifully and durably refinished (powder-coated if you wish) and with the correct length webbing straps riveted in place. The cost will be about £125, which may stretch the budget on top of the cost of a new hood, so let's look at the cheaper DIY alternative.

17-9 and 17-10 (above). The first shot shows a TR4 hood frame that could hardly be simpler, consisting of little more than three crossbars. It has no front attachment to the windscreen. The second picture shows a TR4A frame, with the front 'header rail' (that clamps to the 'screen) clearly in evidence. Despite the additional complexity of the later frame, it's easier and quicker to put up, and has a more secure clamping arrangement. The rear of the '4A's webbing has clearly come adrift, though, so it should be quickly replaced before the reference of the second web is lost.

17-11. There are 15 lift-the-dot fastenings around the rear of a TR4 hood - another contributory factor to the time it takes to put it up. This photograph shows the male 'pegs', and the way the frame webbings attach at the rear and hold the frame in place, ready to accept the hood. The two pegs that carry the webbings and the hood need to be longer than the rest of the rear hood securing pegs.

The first, but most important, step is to check frame straightness. This must be done with the frame erected, on the car, and is easier to do if you can borrow a frame to erect alongside for comparison. Although it will be hard to think this far ahead, it makes sense to fit and correct the hood frame before the body is painted. I emphasise the importance of correcting the frame on the car, since more frames are distorted off the car than on. The frame loses its two vital reference points when the rear mounting plates are unbolted from the 'B' posts, so, if your frame is stiff or damaged, correct it in place on the car.

Assuming you are, like most restorers, fitting the frame to the car after trimming, proceed cautiously. The holes
you reassemble your column to the car. There’s a neat trick that makes this otherwise difficult job much easier. Furthermore, it really is too easy to ruin your steering column if you try to remove the old bushes. Instead, use a blade to cut off the original rubber locating ‘pips’ as near flush with inside of the column as you can. Now, push the new bushes in from, respectively, the top and bottom, simultaneously pushing the old bushes further into the column.

You also need to attend to the steering column rubber ‘doughnut’ flexible joint. There are two types, an ‘early’ and a ‘late’ type, and, in the interest of safety, it’s best to replace these as a matter of course, along with the thin/braided earth/ground straps which are important to the subsequent operation of the horn.

**SWITCHING THE PEDALS**

After stripping the LHD pedal arrangement, shown in photograph 18-2, and the associated parts from the car, the first action you need to take is to carefully close the original holes.

TR bodysells of this era were not ‘handed’, so there should be no ‘surplus’ holes when the car is converted. You will have to weld closing metalwork into the LHD steering and pedal bracket holes, and pictures 18-3 and 18-4 show the end result, and then open the equivalent slots and holes in your right bulhead top.

Use your top pedal box as a pattern, noting that there is no need to buy a new pedal box, just remove and strip the lefthand drive pair (top and inner) completely - noting the position of various spacers and washers - so you can reset the brake and clutch pedals. The relocated top box is shown in photograph 18-5, and the inner one in picture 18-6.

You can buy new brake and clutch pedals if you wish, but both can be reset the opposite way using a sturdy vice and some muscle. Before you start ‘adjusting’ them, it might be an idea to make a card template of each which you can then reverse to help you with the respective angles in RHD format. Your brake and clutch ‘target’ arrangement is shown in picture 18-7, as is the RHD throttle pedal fixing.

The throttle pedal (part number 209411) and one mounting bracket

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18-6. This should give you an idea as to the clutch/brake pedal pivot shaft cover and mounting arrangements.

18-7.

18-7 and 18-8 (above). RHD pedal arrangement - with the more complex throttle pedal clearly visible from inside the car and from the engine compartment. You can just see the right throttle pedal mounting bracket poking through the carpet in the first shot. As described in the main text the clutch and brake pedals will require resetting, and their mounting brackets fixing to the bulkhead/firewall.