Picture 4. You could restore a car without a compressor, but it'd be very difficult.

Picture 5. You could always hire a compressor when you need it for specific jobs, such as injecting rustproofing fluid.

Picture 6. Another must-have is a suitable trolley jack. You'll need to support the vehicle on stands when working beneath it, though. Taller stands with a broader base would be better than those shown.

than could possibly be covered here, but there are certain essential areas to bear in mind. The male, macho thing about safety is, thank goodness, much less widespread than it was. These days it's not wimpish to put on goggles when you're lying under a car scraping rust, or gloves when you're welding; it's basic common sense. However, I know of paint sprayers who still spray potentially lethal two-pack paint without wearing an air-fed mask, and others who weld for hours without gloves, in spite of the cancer-inducing properties of the UV rays from arc and MIG-welding.

Mind you, there's the danger of overkill in the way some safety information is presented – "If you place this adhesive tape over your mouth and nose, you may suffocate." You have to use your common sense. If you're advised to wear goggles when grinding, or if you're told to wear gloves when applying touch-up paint to a stone chip, do so. The main sources of safety advice are:

- In a good quality manual covering the type of work you'll be carrying out.
- On the tin, on the box, or on the packaging that must, by law in Europe, be provided with containers of potentially harmful materials.
- On the product sheet supplied with new equipment.

However, there are two things they can't put on a product sheet: patience and common sense. Many accidents are caused by rushing to get the job done. Just remember – you haven't got to get it finished today. It will still be there tomorrow. The thing is, will you? If you work beneath a Land Rover supported only on a jack, you're tempting fate. You've got a better chance of it falling on you than you have of winning the lottery jackpot!

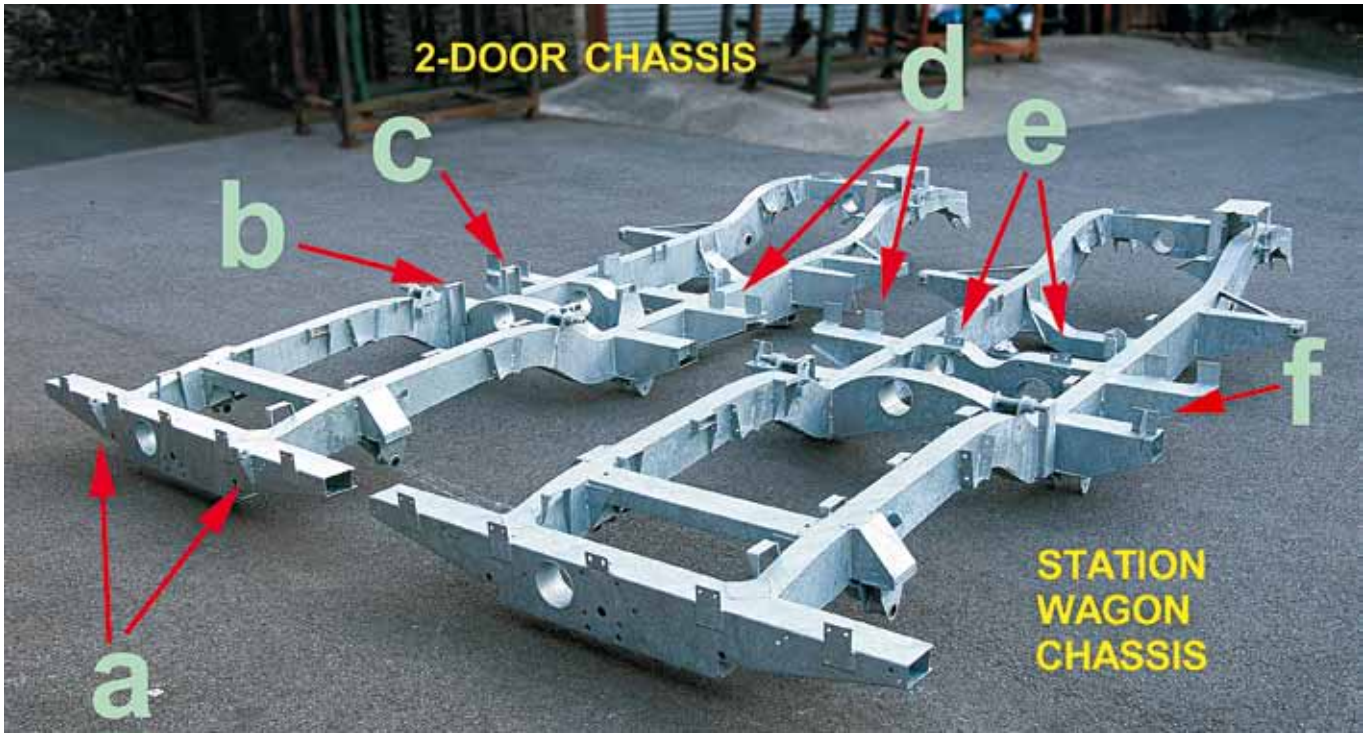
Success!

Paradoxically, in view of what I started by saying, the way to make a success of restoring your Series Land Rover is not to treat it as a challenge, but rather for the pleasure of overcoming obstacles to end up with something you can feel justifiable pride in. Organise yourself properly at the start, don't set time limits, and who knows ... you might even enjoy yourself!

STATION WAGON CHASSIS CONVERSION

If you want to know how many different types of Land Rover chassis there are, talk to a chassis manufacturer. John Marsland of Marsland Chassis points out that on the 109in chassis, three different engines were used: the 2.5-litre four-cylinder petrol or diesel, the 2.6-litre 6-cylinder, and the 3.5-litre V8. As John says: "All of these were available as truck or Station Wagon types – that's six different types before you start on the military models which include the MoD ambulance, Danish army 24-volt, Norwegian army 24-volt, Dutch army diesel, Turkish army 24-volt, British 1 tonne extended spring hanger 24-volt, high capacity body ... The list goes on!"

Fortunately, we only had to deal with two of the most common types. We had a new-old-stock 109in two-door chassis from Britpart, and a load of brackets (made up with the advice of John Marsland), to enable us to convert the chassis to a Station Wagon type so that we could mount the body of our project vehicle, OLO, onto it.



Picture 1. This photograph from Marsland Chassis shows the main differences between a Station Wagon chassis (right) and a two-door, 109in Land Rover chassis.
a. The two-door model has hinge brackets for the rear tailgate, whereas the Station Wagon does not.
b. This body support is in a different location and at a different height.
c. More body supports at different heights. This is because the Station Wagon has a lower floor for the footwell for the second-row of seats.
d. The two brackets on the outside of each crossmember for the front end of the tub are in different locations.
e. The Station Wagon also has two extra seatbelt mountings on the inboard section of the crossmember.
f. The Station Wagon also has these gusseted seatbelt mounting plates for the rear seat passengers.

Picture 2. Before Dave at Atkinson-Hadley started work fitting the new bracket, the redundant items had to be removed from the new-old chassis. With his left hand Dave indicates the two high body support brackets that need to be removed, and, with his right, the two outrigger brackets that are in the wrong place.

Picture 3. Dave used the angle grinder to cut through most – though not all – of the welds holding each bracket in place.

I asked Trevor, the maintenance manager at Britpart, if he could recommend anyone to paint OLO and he immediately suggested PD Stevens of Market Drayton in north Shropshire. PD Stevens is a commercial vehicle specialist and paints all of Britparts' huge fleet of vehicles. I visited Richard Lodinsky, Workshop Manager at PD Stevens, and it immediately became obvious that they were the perfect people to do the job. Not only does PD Stevens carry out exhibition work – it recently painted a spectacularly attractive 1930s delivery van for Michelin that subsequently toured Michelin's European HQs – but it has the strongest possible Land Rover heritage, as we'll see in a minute.

BODY PAINTING

I've been looking forward to this part of the work for ages! When you're restoring a vehicle, getting the paint on is a bit like that stage of house building when the plaster goes on the walls. All the underneath stuff with its strange variety of colours suddenly begins to look less like a patchwork quilt and starts to take on a unity of appearance. When you've got the paint on, you really can see how the finished article will look – and you can even fool yourself that the end of the job is in sight, though of course it isn't. You could even stick a cigar in the corner of your mouth and growl something about it being " ... not the end. It is not even the beginning of the end. But it is, perhaps, the end of the beginning."

Picture 1. There's a terrible temptation to send new body panels off for painting without trial-fitting them first. It seems like such a faff when the panels are new and sure-to-fit-aren't-they. But believe me, it's not just preferable, it's absolutely essential that you build up all of the bodywork before stripping it down again and sending it off for painting. The more new parts you use, the more adjustments will be needed – and 'adjustments' to newly-painted panels mean that damage is inevitable.

But that just might be a touch too melodramatic!

SAFETY FIRST!

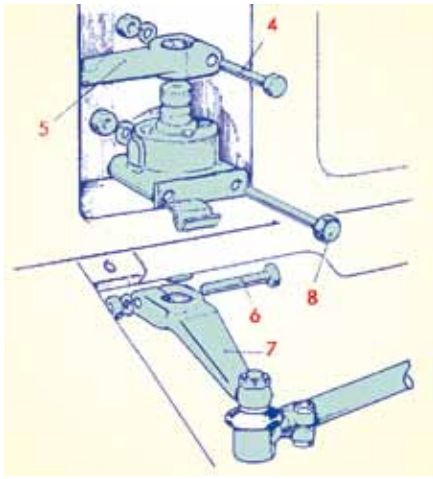
• *These days, modern paints and other two-pack products are classed as hazardous to health, because they ARE potentially extremely hazardous, and they can also be harmful to the environment. Only a properly equipped and licensed workshop should use the products shown here – they are not for home use. And no, that's not just me covering my backside 'cos that's what it says on the tin – they really aren't!*

Picture 2. Rob Ebrey is, it seems to me, Richard Lodinsky's protégé at PD Stevens in that they share the same attitude of perfectionism to their work. Richard was adamant that the only paint he would use is ICI's 'Nexa' because it's the paint he uses for all his work and he has complete confidence in its quality and consistency. Rob, incidentally, was completely unfazed by the huge collection of (mainly) aluminium panels that descended on him. These front wings were from Britpart's stash of ex-Santana parts from Spain, and are from the Santana 'Series 4' into which OLO seems to be metamorphosing. Spot the differences? I'd already added the air intake to the left-hand wing – look at its equivalent on the Santana's wing – and note those side light recesses.

Picture 3. Galvanizing is excellent, of course, but it does have the disadvantage that it almost always buckles the top panel of the bulkhead. Now's the time to put matters right! Rob feels the rippling ...

STEERING RELAY – REMOVE, REFIT & LUBE

On Series vehicles, a steering relay fitted in the front crossmember transmits the steering from the steering box to the steering arms running across the vehicle. It's a legendary little beast, both in terms of being disinclined to budge and also because not many people have stripped them down.



Picture 1. You get at the steering relay by removing the radiator grille and the relay guard bracket (on many models, the horn, battery, battery box and air cleaner must also be removed).
• The nut and bolt (4) holding the relay upper lever (5) must be removed, allowing you to lever off the upper relay arm from the relay body.
• The lower relay arm (7) can be removed in a similar way after removing the bolt, nut and washer (6).

Removing the relay

In the vast majority of cases, the relay will be extremely difficult to remove

Picture 2. From beneath the front of the chassis, remove the four bolts and spring washers securing the relay lower flange plate to the chassis.

Picture 3. Remove the nuts and spring washers from the two bolts (see picture 1, item 8) securing the relay to the chassis.

How to remove and change the lubricant.

Picture 4. According to the manual, these bolts have been put in back-to-front, but there's something to be said for it because, provided you have clearance behind the chassis, they will be easier to drift out if – or rather when – they are difficult to move at some time in the future.

from the chassis. The manual suggests drifting it upward but you will almost certainly damage the splines on the bottom of the relayshaft. Adrian at Britpart says the best way of tackling the removal of the relay is to place a trolley jack beneath, it with a piece of wood to protect the splines, and then to raise the trolley jack, using the weight on the front of the vehicle to help press out the relay.

Picture 5. The reason the relay becomes so tight in the chassis is because water and mud get between the two, causing corrosion which then expands the steel and jams the relay in place. If you can keep the moisture out, it will make the relay far easier to remove in future, and will also reduce corrosion on the inside of the chassis. Adrian uses silicon sealer around the top and bottom faces of the relay ...

There's a lot to be said for converting 2¼- and 2½-litre four-cylinder petrol engines to electronic ignition. The Lumenition-Optronic Ignition system is simple, easily converted back when needed, and ticks all the boxes for economical running and reduced maintenance. Here's how it's done.

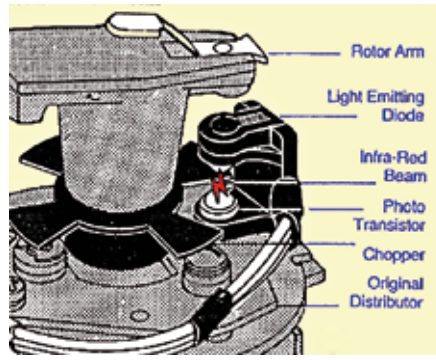
ELECTRONIC IGNITION

Lumenition's Optronic Ignition system has been designed specifically for vehicles originally fitted with mechanical distributors using contact breaker points. It contains no wearing parts, requires no adjustment or maintenance during service, and once ignition timing is set it will remain permanently in tune. This means that the engine should run more smoothly and economically through improved efficiency, certainly in the longer term because there will be none of the fall-off in performance caused by wearing and burning points, or fluctuations in timing accuracy caused by 'bouncing' points. Mind you, you hardly notice it on the under-stressed engines we're talking about here, but every little bit helps.

HOW IT WORKS

In place of points, the Lumenition unit has a unit emitting a light beam fitted inside the distributor, and a 'chopper' with as many blades as the engine has cylinders. Every time the blade crosses the light beam, the electronic control unit 'tells' the coil to send its high-tension burst of electricity to the plugs via the distributor cap in the conventional way.

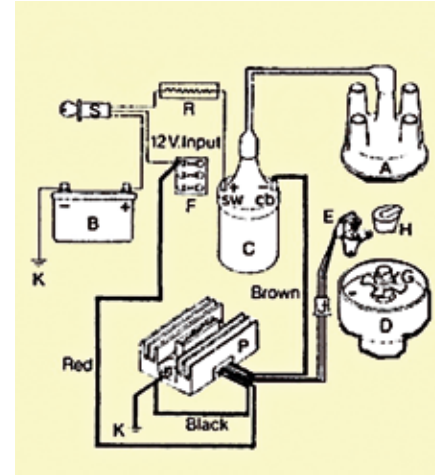
Inside the distributor, there are no point heels to wear, and no point faces to degrade or gap to alter.



Picture 1. This is how the three components work:
First is the optical switch. This contains a light emitting diode (LED) which sits in the switch bracket opposite a silicon phototransistor.
When the ignition is switched on, the LED emits an invisible infra-red beam towards the silicon phototransistor, which receives or 'sees' the beam.
Second, an interrupter called a chopper (which is usually fitted over the cam) rotates, interrupting the beam of light and causing a pulse.
Third, a power module receives this pulse via its internal electronic device, and switches the ignition coil on and off. The coil produces a high tension spark when switched off, and is recharged when switched on.

SPECIFICATIONS & PRECAUTIONS:

Power supply: Negative earth only
Maximum permissible ignition current: 7 amps
Operating temperature range:
Optical switch: -40 to+125°C
Power module ignition: -40 to +85°C
Accuracy: ±1° crank at 3000rpm
Timing: Dwell angle 65° on four-cylinder engines. (45° on six-cylinder; 35° on eight-cylinder)
Note: Dwell angle refers to 'coil on' (recovery) time, and may differ from the recommended dwell with contact breakers.
Suitable for coils or coil/ballast combinations of not less than 3 ohms.
Not suitable for use with low-resistance (ie less than 1 ohm) electronic ignition coils.
Never connect violet coil -ve lead to 12v +ve supply.
Always keep connectors clean, tight fitting, and free from grease.



Picture 2. These are the components of the system showing how it all goes together, electrically-speaking, at least. A: Distributor cap. B: Battery. C: Coil. D: Distributor. E: Optical switch. F: Fuse box. G: Chopper. H: Rotor. J: Connector. K: Earth. P: Power module. R: Resistor. S: Ignition switch.