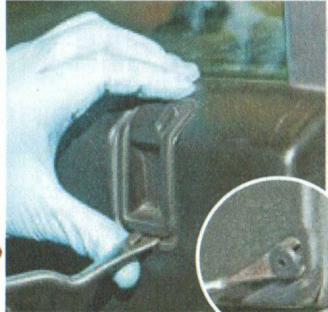




### What's in the box(es)

**1** While the Optimill mirror arms can be fitted to standard Defender hinges, it seemed like a good time to treat our 110 to some Optimill ones to match – and they come pre-drilled for the wiring. A special loom also makes the job much simpler and neater.



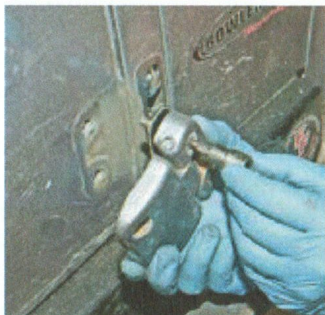
### Remove the fittings

**2** Pop the covers off the ends of the grab handle, undo the two screws and remove it. Undo the screw securing the interior door release and slide the surround away. Pop up the door lock trim, remove the window winder, and remove the two push-pin clips.



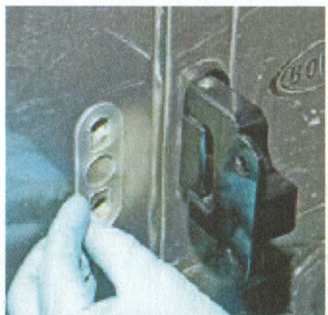
### Release door card

**3** Be really careful removing the door trim, as the plastic clips are easily damaged or snapped off the back of the card. Use your trim tool again as close to each clip as possible, and ease the trim away gradually. Store it out of the way somewhere safe.



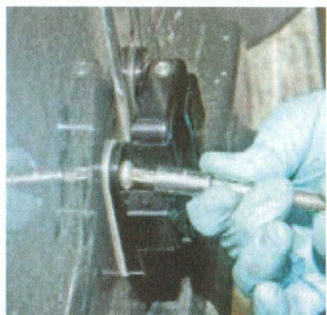
### Lower hinge first

**4** It's a good idea to keep the door closed while you swap each hinge, to stop the door from dropping and stressing the other hinge. Loosen and remove the two lower nuts from inside the door but don't remove the bolts. Shut the door, then remove all four fixings.



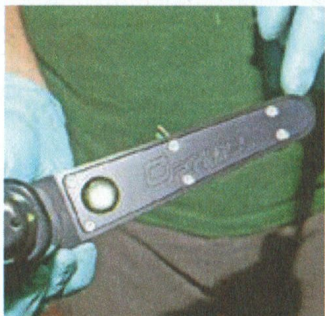
### Don't forget the gaskets

**5** Give the door and bulkhead a good clean where the hinges fit to prevent dirt and grit being trapped, then offer up one of the new gaskets. You'll notice the hole in the centre of the seals – this is useful later on when drilling the door for the wiring harness.



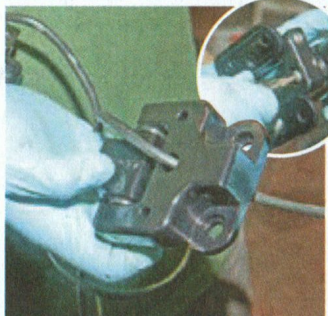
### Install new hinge

**6** With the new gaskets in position, screw the hinge to the bulkhead, and push the new long bolts through the holes in the door. Open the door, fit the washers and Nyloc nuts to the other side, and tighten. Check the door opens and the latches close smoothly.



### Under the arms

**7** Looking at the underside of the mirror arms, the star of the show is visible. An LED behind a domed lens shines when the Defender is unlocked with the fob, or when a door is opened. Obviously, the wiring needs to run from the door to the body.



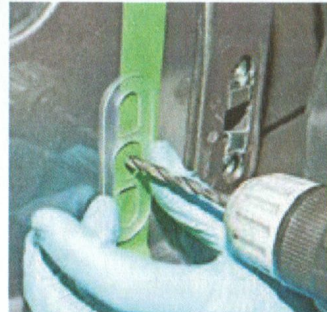
### Attach to hinges

**8** The Optimill top door hinges come with channels for the cables to pass through; if using the standard hinges, you'll need to drill them. Feed the wires through the hole, then position the mirror arm and attach it with the supplied Allen-head screws.



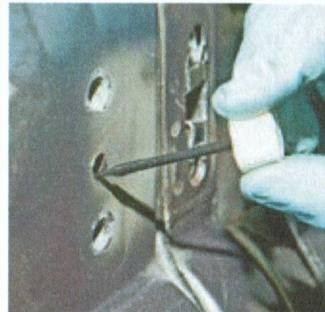
### Old hinge off

**9** Using the same method as the lower one, remove the top door hinge. Undo the two nuts, shut the door, undo the bulkhead screws, then slide the hinge and door screws away. Give the door and bulkhead a good clean, or you'll see the tide mark of the old hinge. **11**



### Hold your breath...

**10** Using one of the new gaskets as a template, find where you need to drill the hole for the wiring. Apply masking tape, carefully drill a pilot hole and enlarge it to 10mm. You need to drill through both door skins – take care not to go too far and mark the dash.



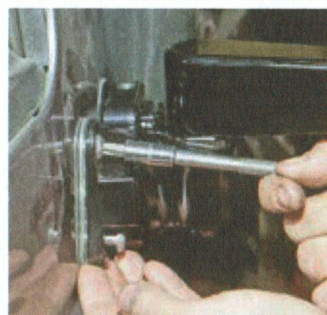
### Protect the metal

**11** De-burr both holes, then use a touch-up paint pen or brush to coat any bare metal and prevent corrosion; it doesn't matter what colour you use, as the holes will be covered. This is especially important on later all-steel doors, as rust can easily take hold.



### Thread wiring through

**12** Loosely attach the hinge and mirror arm assembly to the bulkhead with the two shorter screws, then twist the four wires together to aid routing them. Pass the wires through the hole in the gasket, then feed them through both your drilled holes into the cab.



### Bolt it up

**13** Slide the two longer screws through the hinge and door, then fit the washers and nuts to the inside of the door and tighten them, along with the pair on the bulkhead. Again, make sure the door operates smoothly, and adjust the bulkhead screws if needed.



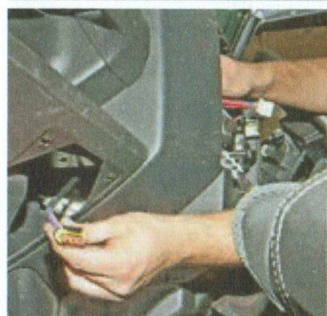
### Route the cable

**14** The wiring will pass down the door on the inside of the door trim, and follow the standard rubber conduit from the door to the body, then run up inside the dash. Wrap some tape around the cable where it passes through the inside of the door to protect it.



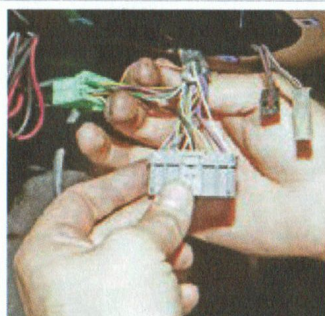
### Gain access

**15** Next, there's a bit of dashboard stripping to do. Undo the two T30 Torx screws from the centre panel and unclip it, disconnecting the radio head unit, clock and switches as you go. Remove the driver's side speaker and open both of the fusebox panels.



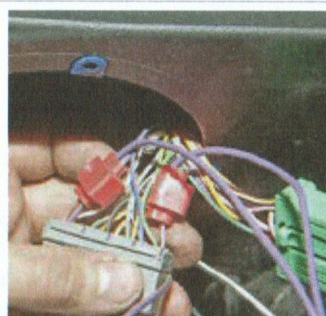
### Thread it through

**16** Lay the harness out. The end with the four wires stays on the driver's side. Feed the long tail with the multiplug through the speaker hole, above the fusebox and behind the console along to the passenger side. Bring it back down through the panel.



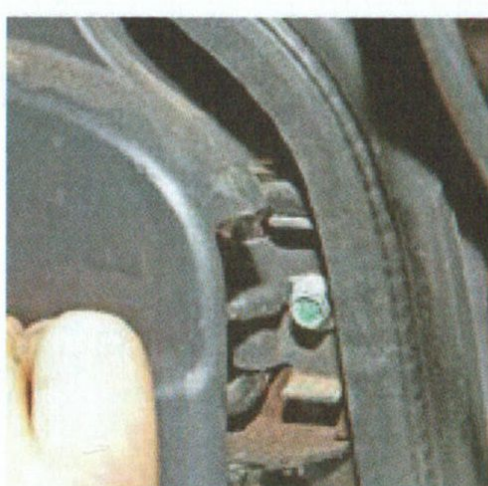
### Find the plug

**17** With the battery disconnected, shine a torch up through the speaker hole and find the 10AS security module, which is green or black depending on the vehicle's age. Unplug both the connectors from the module, and bring them down out of the aperture.



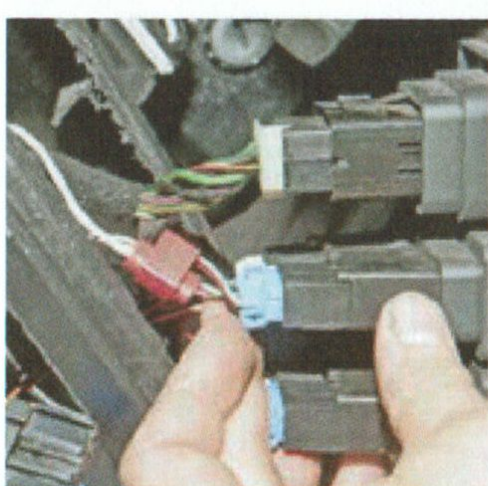
### Tapping in

**18** Using the supplied connectors, attach the purple/white wire from the Optimill loom to the purple/white wire running to the grey 10AS connector, and the purple/brown one into the purple/brown wire. Ensure the connectors are closed, then refit the multiplugs.



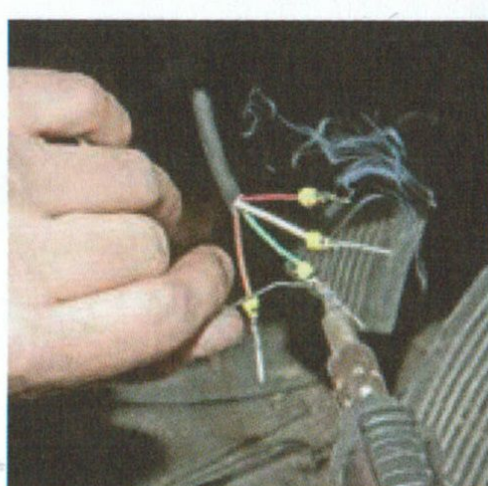
## Connect the earth

**19** The earth wire comes pre-fitted with a ring terminal, and must be attached to the Defender's body. On a TDCi, one of the 8mm screws that holds the door check strap to the A-pillar is ideal; just undo it, fit the terminal under the screw head and do it back up.



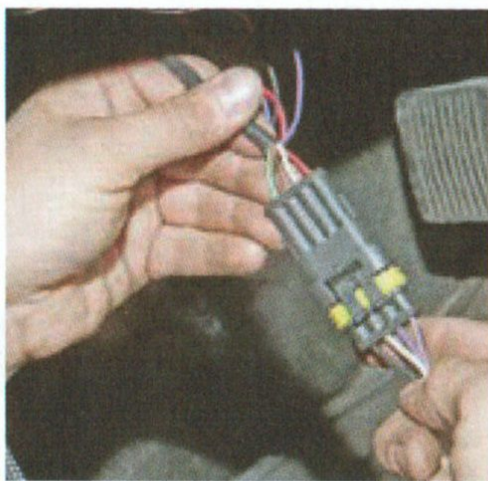
## Heated screen switch

**20** The last of the four wires is the white/black one, which powers the heated mirror elements if you're fitting them. Pop the heated rear window switch out of the dash, and use another connector to tap into the white/black wire on the back of the plug.



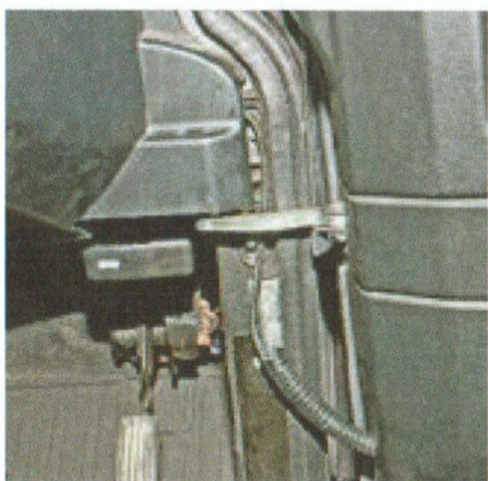
## Terminate the wires

**21** When both mirror arms are fitted and the cables are in place behind the dash, it's time to fit the pins that clip into the connector bodies. Bare the wires, slide the silicone piece on, fit them to the pins, and crimp them. You can also solder them for extra security.



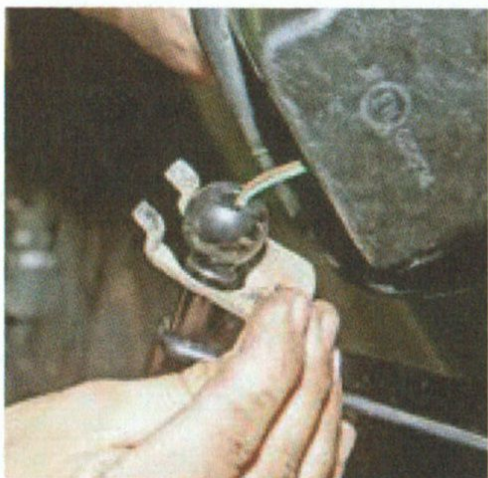
## Colour matching

**22** Before fitting the plastic connector bodies, make sure the pins go in the right locations. Red goes to purple/brown, white to purple/white, brown to white/black and green goes to black. When you're happy, click the pins home and connect up the plugs.



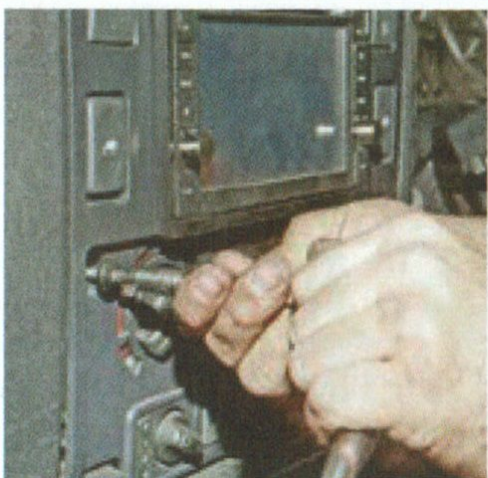
## Tidy it up

**23** Refit the door trims, making sure the wires fit neatly down to the cut-out in the trim. Hide the cable under the original rubber conduit, using black tape to secure it. The wiring should run behind the door check strap and into the dash, to keep it safe.



## Fit mirror heads

**24** Now you can fit the mirror heads. If they have heater elements, connect the wires – if not, drill a hole in the base of the mirror, tuck them inside and insulate the ends (you can add elements later). Slot the metal clamp home and tighten the 4mm Allen screw.



## Rebuild the dash

**25** When you're happy that the wiring is routed nicely and out of harm's way of any moving parts, refit the centre dashboard console, fusebox panels and driver's side speaker. Reconnect the battery, and make sure all the switches work as they should.



## All done!

**26** Give everything a wipe so you can gaze upon the glory of your new Optimill hinges and mirror arms. After dark, hit the unlock button on your fob and watch as the ground is drenched in white light, before the LED fades after a few seconds – so cool! **LRO**