Fitting a light bar to the Grenadier

After much dithering and indecision I eventually purchased a Stedi ST3303 Pro 18.4 inch 24 LED light bar from AOM Offroad in Perth (Western Australia) for my Trialmaster. I also purchased the 50mm Stedi hexagonal clamps for mounting the light on the bull bar. A wiring loom is included in the box together with assorted mounting hardware.

Stedi ST3303 Pro 18.4”	$389.99 (AUD)
Stedi hexagonal mounting 50mm	$65.00 (AUD)

If you are planning to mount something between the rails on the bull bar, be careful which light bar you buy. Too long and/or too deep and the body of the light bar will interfere with the light beams from the two round spot/driving lights on the Grenadier. Measure carefully and double check. The shape of the top bar and location of the two round spot/driving lights both complicate additional auxiliary light choices and mounting methods.

You could probably squeeze a 28” slimline light bar under the top rail if you can mount it high enough to clear the two round driving/spot lights. Of course you could put anything you like above the top rail, but it’s very exposed (possibly illegal?) and interferes with access to the engine compartment.

Photo 1: Installed Stedi ST3303 Pro

Basic specifications Stedi ST3303 Pro 18.4”:

Voltage:	9 – 32V
Current draw:	11.9A at 13.6V
Raw Lumens:	26,280 Lm
Effective Lumens	13,440 Lm
Lux:	1 Lux at 650m and beam width approx 90m between 50 – 200m out from the vehicle.
Colour temperature:	5700K (basically pure white).
Materials:	Optical grade, hard coated lexan lens, machined aluminium faceplate and extruded aluminium heat sink.
Beam angles:	Spot 9^{o}, flood 50^{o}
Ingress protection:	IP68
Lifespan:	50,000 hours.

Mounting hardware is included to attach the light bar to the bumper with end or mid bar mounting. My preference was to suspend it from the top rail using the Stedi hexagonal clamps (for a 50mm rail diameter bull bar) utilizing additional mounting components included in the kit.

Wiring loom:

The wiring loom incorporates the following:

- a 12V 60A relay
- power lead for main battery connection with an in line 45A fuse
- a small actuating switch on a long 3m lead for “through firewall” mounting inside the vehicle
- a lead and attachments for the high beam trigger from wiring on the back of the headlight
- approx 1.7m lead with a male Deutsch DPT two pole connector for attachment to the female version of the same connector on the light bar to provide the volts and amps for powering the light

Electrical preparation:

My Trialmaster includes the auxiliary power points, high load auxiliary switch, switch panel, electrical preparation and auxiliary battery. Two user defined power outlets (lilac +ve and black -ve leads), one 10A and the other 25A, are located on the right hand side of the engine compartment (my vehicle is RHD, not sure if it’s the same set up for LHD in Europe and USA). These power outlets exit just under the lip on the edge of the engine compartment, in front of the brake fluid reservoir and adjacent to the back end of the black plastic inlet air box (from the raised air intake). You can identify/differentiate the 10 & 25 amp outlets by the wire thickness. I planned to use the 25A outlet to power the light bar which is controlled by switch EXT 5 in the overhead panel. The 10A outlet is controlled by switch EXT 1 (no plans for this outlet at the moment, but it may be suitable for an engine maintenance LED lighting system under the bonnet/hood).

Photo 2: EXT1 (10A) & EXT5 (25A)

I fitted Deutsch DTP connectors to both these outlets (see photo 2) and added corrugated split plastic loom tubing (CSPL tubing……abbreviation, apologies to Jean Mercier!) to protect the leads. I cut off the inline fuse holder on the wiring loom and shortened the input power leads to the relay to approximately 300mm to enable power connection via the EXT5 lead to the relay without too much spare cable. The power source from EXT 5 is protected by a 25A fuse in the fuse box adjacent to the main battery (under one of the annoying plastic covers in the central electrical compartment).

My original plan was to tap into the high beam feed at the rear of the right hand side headlight as my trigger source for the high/low beam relay switch. However, I never could figure out how to access the rear end of the headlights. I removed the black plastic trim around the headlight (four torx screws) and attempted to remove the white panel (my vehicle is Scottish White) behind the black headlight trim (two torx screws and two torx bolts) but could not figure out how to take out the white metal trim (to get at the rear end of the headlight) without destroying the trim and the RHS mudguard in the process.

So I gave up on the headlight trigger plan and decided to use the high beam feed from the right hand circular spot/driving light inboard from the headlight. If you look under this light and behind the adjacent grill structure, you will see a skinny shrouded wire loom coming out of the rear base of the light. I removed the CSPL tubing and exposed the white/blue positive and black negative leads to the high beam spot/driving light (see Photo 3).

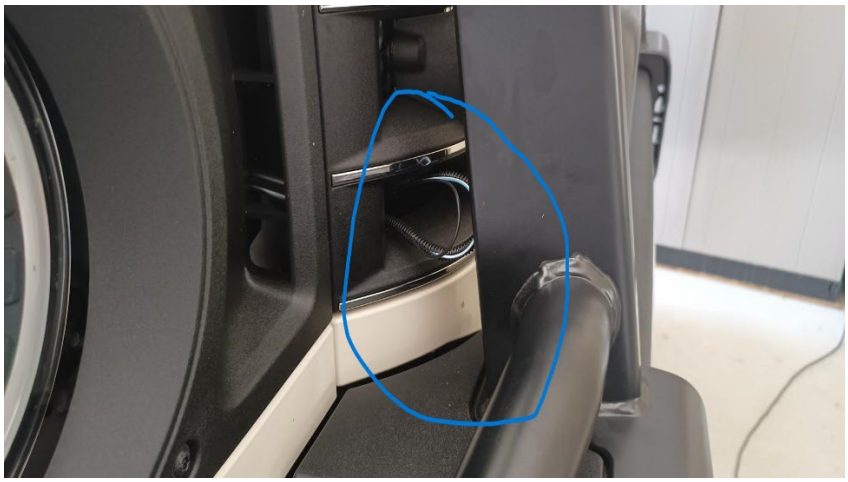

Photo 3: Power leads to the round spot/driving light inboard of the RHS headlight

I spliced new positive and negative leads to the spot/driving light power leads using a Quick Wire Splice (see Photo 4) for 22-18 gauge wire. The new high beam lead was then fed up to the top of the engine bay through the oval shaped hole in the lower inboard area of the white panel surrounding the RHS headlight (Photo 5), exiting near the bonnet hood support adjacent to the RHS bonnet/hood latch (see Photo 6). A male DT Deutsch connector was added to the high beam lead (cut to the correct length) to join to the high beam lead from the relay with the corresponding female DT connector (also protected with CSPL tubing).

After splicing the high beam feed wires, carefully replace the CSPL tubing around the spot/driving light power leads and wrap the splice junctions with insulation tape then push the joined wires back into the grill behind & below the RHS round spot/driving light.

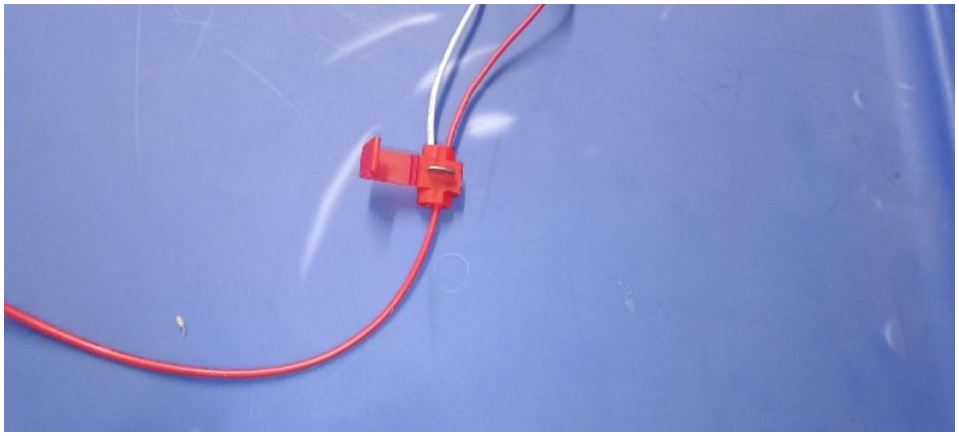

Photo 4: Quick Wire Splice

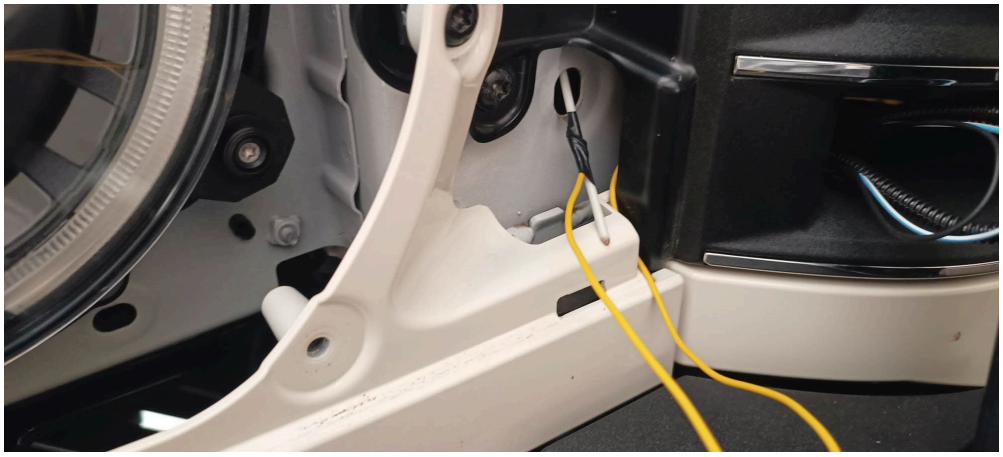

Photo 5: Oval shaped hole for spliced high beam lead near lower inboard edge of RHS headlight.

Relay location and loom changes:

There is remarkably little spare space in the Grenadier engine compartment and I initially struggled to find a suitable location to attach the relay. I ended up securing the relay under the front end of the lip along the RHS edge of the engine compartment (adjacent to the high current electrical lug under the red plastic cover between the front of the black inlet air supply box and right hand top of the radiator, see Photos 6 & 7). The metal tab on the body of the relay has a 6mm hole which fits neatly over the bottom end of the 6mm torx retaining bolt at the front end of the white edge lip, secured with an additional 6mm flanged lock nut (see Photo 7). Once all the wires were trimmed to size (and covered with CSPL tubing) the relay could be swung under the lip and the various relay wires and connectors could be located under the lip and secured out of sight with zip ties around the other looms located under the lip.

I retained the small switch on the 3m length of relay wiring loom but reduced the wire length from 3m to about 150mm. Switch EXT 5 on the overhead panel is now the main switch for power to the light bar. However, the small switch must remain in the circuit, permanently “on” (or the light bar will not illuminate). I also wrapped it in a small plastic bag and taped it up to prevent water ingress.

Photo 6: Exit point for spliced high beam lead and location of relay under lip on RHS edge of engine compartment.

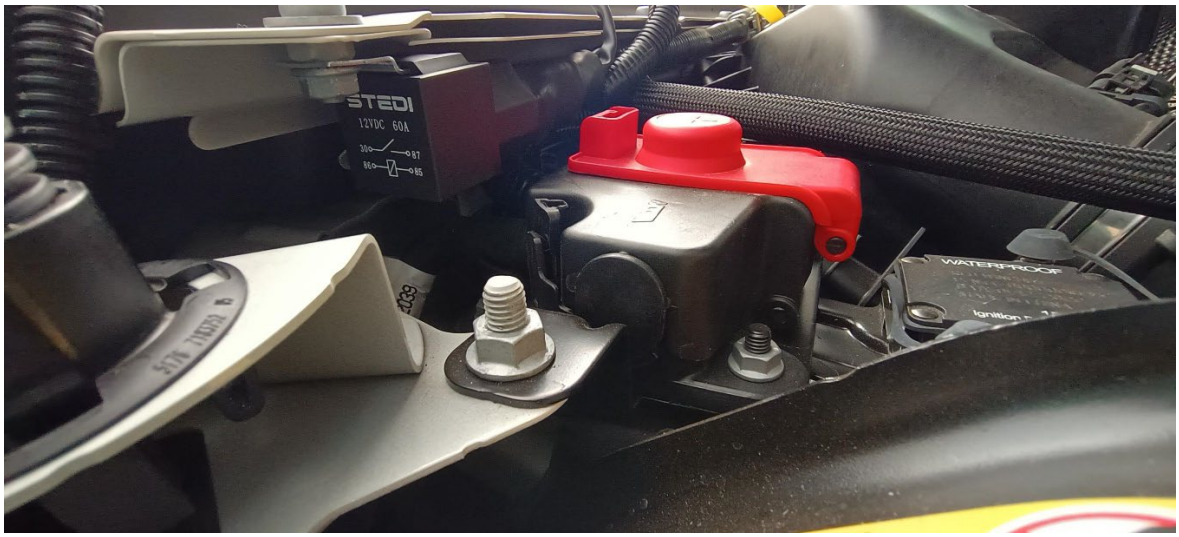

Photo 7: Location and fixing of the relay. The spliced high beam lead from the RHS spot/driving light (in the CSPL tubing) is just visible in the top left corner.

The power lead from the relay to the light bar was covered in CSPL tubing and fed across the engine bay in front of the radiator and secured by ½ inch P clips screwed into the front lip/ridge of the engine bay by the six existing 8mm galvanized torx bolts (make sure the pathway for this lead does not interfere with the hood/bonnet securing latches). Poke the power lead downwards into the cavity above the LHS headlight (Photos 7 & 8).

Photo7: Power lead to light bar from relay attached to front rim of engine bay with P clip and 8mm torx bolt

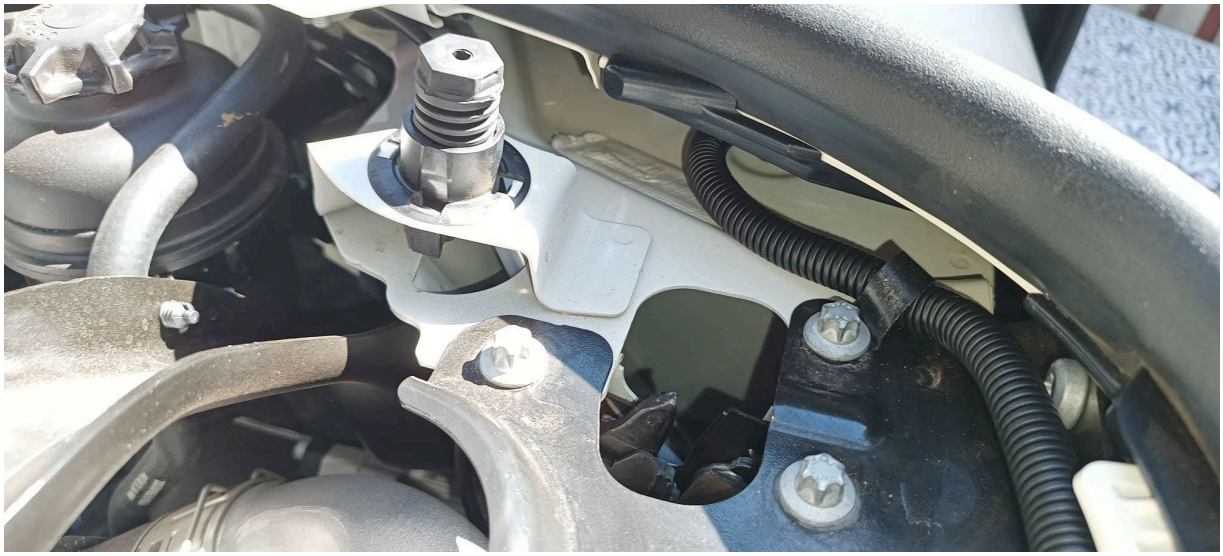

Photo 8: Power lead to light bar from relay poked down into cavity above LHS headlight.

Remove the black plastic trim from the LHS headlight and feed the power lead down the right hand side of this headlight and out of the grill structure near the LHS side of the lightbar and connect it to the female DTP connector on the light bar. Secure all leads with zip ties and replace the black plastic headlight trim, making sure the CSPL cover over the power lead is not touching the LHS headlight.

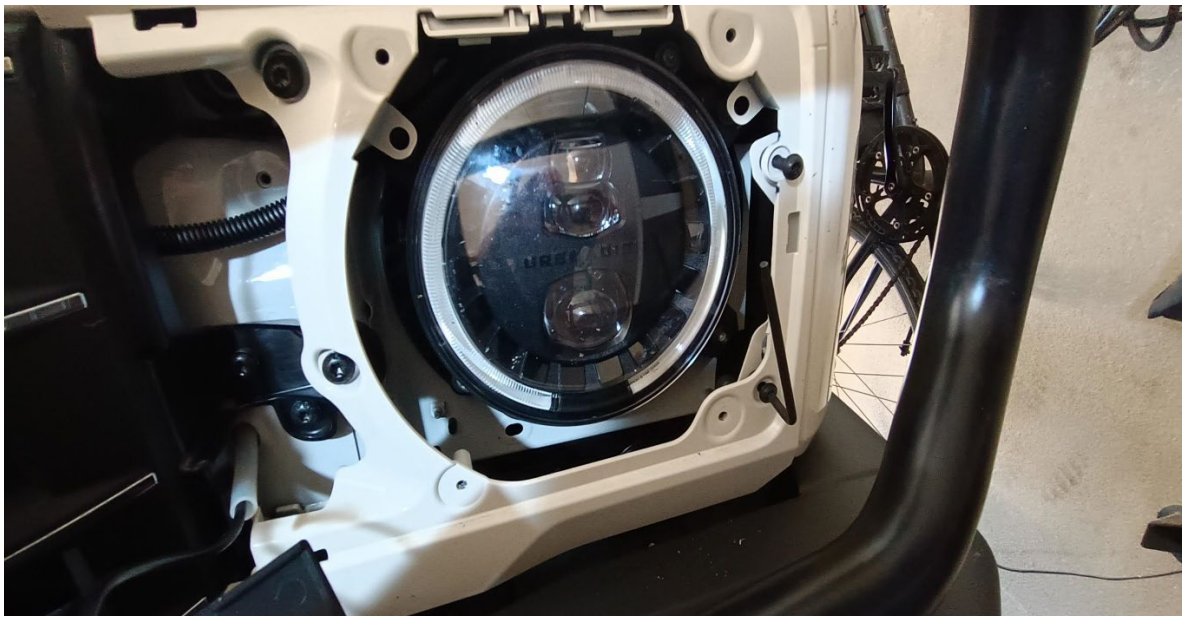

Photo 9: Power lead (in CSPL tubing) to light bar from relay adjacent to LHS headlight heading leftward into the grill area behind the lightbar. The other black wire lower down is the aerial feed wire (exiting the protective silicone tubing) for my UHF radio.

The other thin black wire you can see coming out of the black trim is the UHF aerial feed for my radio. The aerial is located on the top LHS of the bull bar.

Photo 10 shows the completed relay & modified wiring loom including the shortened switch lead (in the plastic bag), the high beam trigger lead from the spot/driving light, the power lead to the relay from EXT5 DTP plug and the power lead from the relay to the light bar.

Photo 11 shows the view with the relay and wires tucked under the lip and secured with zip ties.

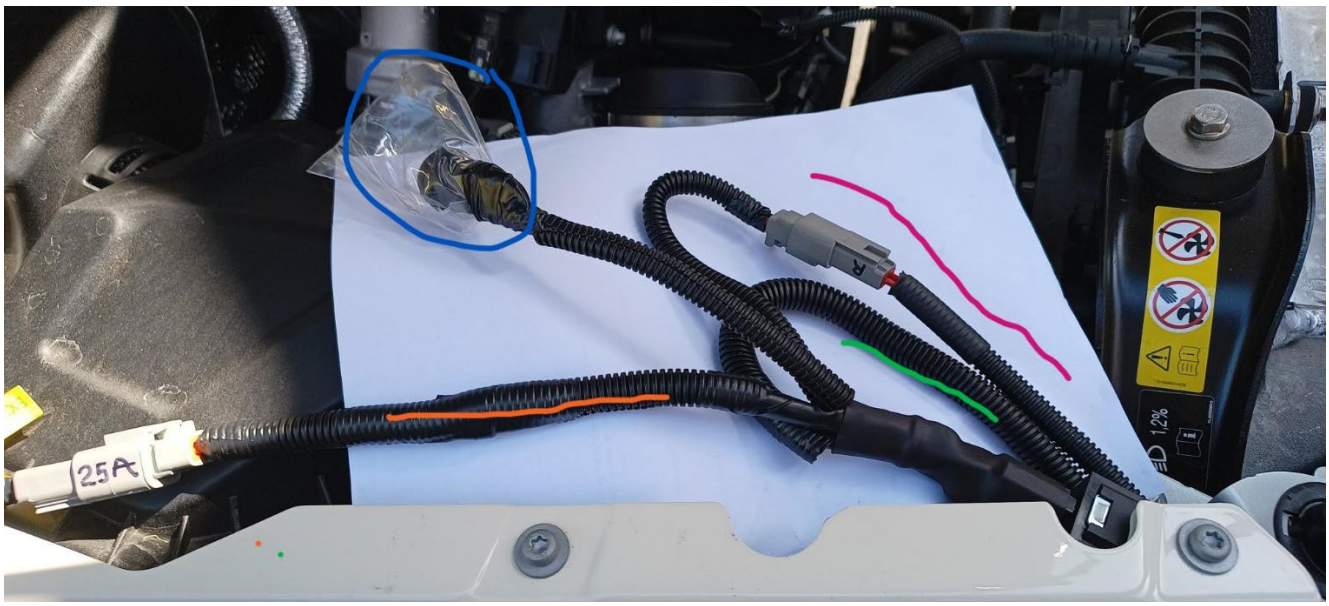

Photo 10: Modified complete wiring loom & connections. Pink is the spliced high beam trigger lead from spot/driving light. Green is the power lead from the relay to the light bar. Orange is the power lead into the relay (far right) from the EXT5 25A outlet and the blue circle is the plastic bag around the small switch from the original wiring loom setup.

Photo 11: View from above with the relay, wires and connections hidden under the white engine bay lip and secured in place with zip ties.

With this wiring set up you must have the headlights on high beam and the inner spot/driving lights turned on (overhead panel switch) before the light bar will illuminate (when you actuate switch EXT5). When you switch back to low beam, both the light bar and the spot/driving lights go out (an Australian Design Rule requirement).

The only drawback to this wiring setup is that you cannot have the light bar on with the spot/driving lights off (need the headlight high beam trigger for this option). I can always change to the headlight high beam trigger when I figure out how to access the rear of the RHS headlight.

My approach described above was based on the specific light bar purchased, the particular wiring loom in the kit and the location of the EXT5 feed from the overhead panel. However, since most relays and wiring looms are fairly similar, you should be able to power up any front mounted spot light or light bar with a similar approach (assuming you selected the high load auxiliary switch panel option).

Abbreviations: (with apologies to Jean Mercier)

CSPL tubing	corrugated split plastic loom tubing
RHD	right hand drive
LHD	left hand drive
RHS	right hand side
LHS	left hand side