Rufus - Electrical Panel Part 2.

Introduction:
The majority of the wiring can be done on a table in the house so it's one of those jobs that are ideal for a cold or rainy day

***

Wiring the power circuits:
On my wiring system I have positive and negative stud/post connections mounted on my electric panel. The two posts will be connected to the battery by 10mm squared (70amps) cable. I do not have suitable tools for these end connections so I get Vehicle Wiring Products to make them along with my main battery cables. For the purposes of testing I fit 50 amp slave cables which is the maximum size I can make myself.

The positive post receives power from the battery master switch and transfers it to two fusible links. From one fusible link the power passes to the permanently live side of the fusebox. The live side is the top row of fuses.

The second fusible link sends power to terminal 30 of the 70 amp relay. When the relay is activated (via the ignition switch) power is passed to the ignition side of the fuse box. The ignition live side is the bottom row of fuses.

The negative post is connected directly to the battery.

All power cables to the two posts are 70 amp and the cables from the posts to the fusebox are 50 amp.

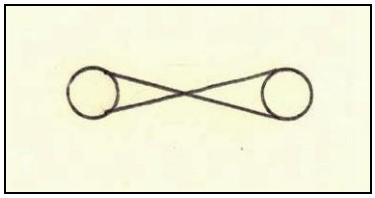
***

Wiring the fusebox:
The top row of fuses are identified with odd numbers starting with number one on the right. The bottom row are even numbers starting with number two on the right.

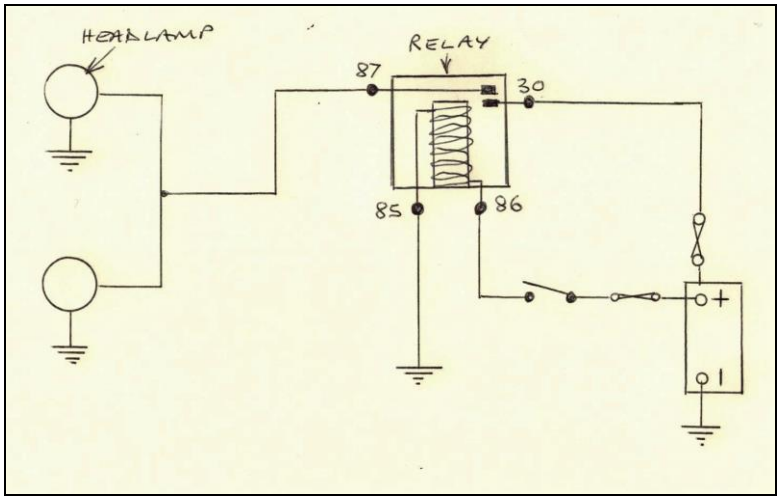
On my electrical panel the odd numbers (top row) of fuses are permanently live when the master switch is on. The even numbers (bottom row) are only live when both the master switch and the ignition are turned on.

***

Wiring the relay box:
Some components require more electricity (power) than others. If a component needs more power then it has to be fed by a thicker wire or the wire will get hot and possibly cause a fire. To avoid having to use thicker cables throughout the circuit (and to protect low amperage switches) the manufacturer employs a 'Relay'. The relay is an electrical switch; the switching can be done with thin cable; operating the relay with thin cable causes current to flow round an electro-magnet. This connects two internal contacts that are provided with thick cable. A typical use of a relay would be to provide the power to a pair of headlamps.



Typical symbol for a fuse.



A simple circuit with a relay.

Notes.
Terminal 86 = Supply from switch (thin wire).
Terminal 30 = Supply from battery (thick wire).
Terminal 85 = Relay (switch), wire to earth (thin wire).
Terminal 87 = Supply to lights (thick wire).

When wiring a 4-way relay without an integrated diode Terminals 86 and 85 are for the switching wires. They can be wired either way round and still work but the 'DIN' Standard requires Terminal 85 to go to earth

On my electrical panel relay number one is at the top. The relays are.

1. Dip beam lamps.
2. Headlamps.
3. Horn.
4. Spare.

You will note that terminal 30 is the power source (thick wire). All terminals 30 receive a supply from the relevant section of the fuse box. When stationary you do not need dip or main beam headlamps so the power for those relays is taken from the ignition live side of the fusebox. If you are parked and someone is reversing carelessly towards you it is nice to be able to give a warning so the horn relay is connected to the permanently live side of the fusebox.

Terminals 85 on the relays are the low amperage earths so these are all connected to the earths on the fusebox.

Terminals 86 are the low amperage switching wires (a typical relay draws less than 0.25 amps). These four wires are connected to a 6-way plug which connects to a 6-way socket, the wires of which are connected to the dip switch, main beam switch, horn switch and the fourth one spare. (These three switches (plus spare) receive their power supply from the fuse box).

Terminals 87 feed the relevant components. Thick wires from these terminals go to the terminal box which connects the relays to the wiring harness sections that supply electricity to the various components.

Notes.
1. *2mm squared thin wall cable is sufficient to carry 25 amps which is suitable for most power circuits on a normal car. It can be used for making the connections from the fusebox to terminal 30 of the relay and from terminal 87 to the terminal box. It is also used between the terminal box and the components.*
2. *The switching wires to and from terminals 86 and 85 can be much thinner but I don't normally go below 1mm squared (16.5 amps) as I find the terminals don't achieve such a secure crimp. To be honest I*

normally only use 2mm (25…… amp) cable for most applications; but I still use a relay to protect the switch.

3. *I used the following colour code.*
4. *Supply to terminals 30 is Brown.*
5. *From terminals 85 to earth (on the fusebox) is black.*
6. *Terminals 86 and 87 are Blue for dip beam, Blue/White for main beam, Purple/Red for the horns and Brown/Yellow for the spare.*
7. *In the interest of clarity and fault finding I make no attempt to wrap the electrical panel wires and they are simply cable tied in position.*

Where two colours are shown the first colour is always dominant; i.e. in Blue/White the cable is Blue with a White tracer, if it was White/Blue the cable would be White with a Blue Tracer.

***

Wiring the fusebox:
The fusebox feeds all terminals 30 on the relay box and grounds (earths) all the earth cables from terminals 85 of the relay box.

Other wiring is not part of the basic wiring of the electrical panel and will be covered in another article.

***

Wiring the terminal box:
The terminal box is simply an 8-way Junction Box. Each ‘way’ has six Lucar connections.

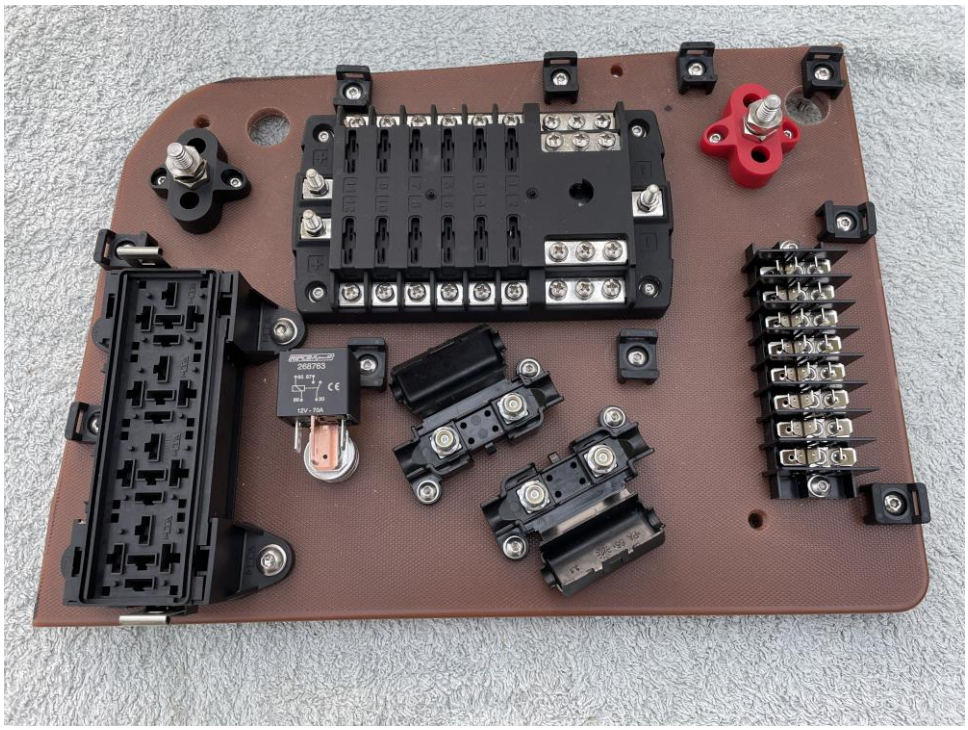
From the top my terminal box the connections are.

1. Dip beam.
2. Main beam.
3. Horn.
4. Side and tail.
5. Indicate left.
6. Indicate right.
7. Fuel pump.
8. Not yet allocated.

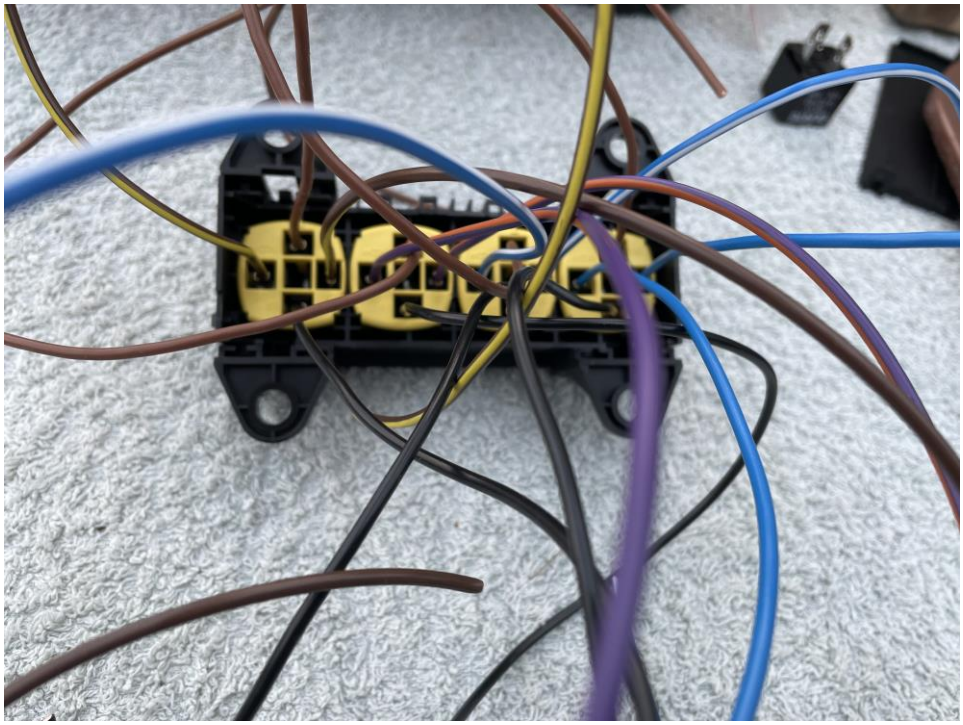
Note.
The wiring in this article only concerns the internal wiring of the electrical panel, however to give an example of how the power is distributed from the panel via the terminal box. The six terminal posts on the side and tail lights (section number 4. on the terminal box) are/will be as follows.

1. Supply from lighting switch first position (side and tail).
2. Supply to left hand sidelight.
3. Supply to right hand sidelight.
4. Supply to left hand taillight.
5. Supply to right hand taillight.
6. This will feed the number plates on my car but you could use this terminal to supply a ‘lights-on’ warning light and connect the number plate lights to one of the tail lights at the rear of the car where the wires exit the main wiring loom.

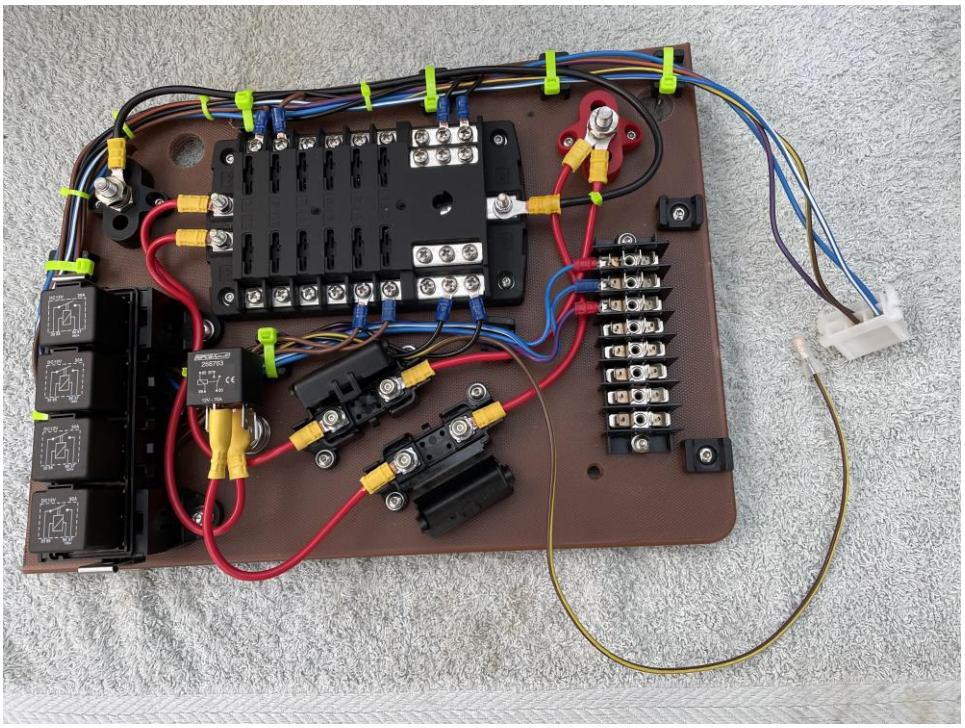
Trial fitted in the car above passenger's legs.



Ready to start the wiring.



Underside of the relay box.



Ready for fitting in the car.