

The "ultimate" remote control mod.

This mod is the culmination, and logical extension, of a series of projects I've been working on ever since I discovered the lazy locking and lazy venting options available on these cars.

In essence, I've thrown out several discrete timers and switching setups in favour of a single, multifunctional PCB which requires only eight wire connections and relies on the programming of the PIC to allow me to dispense with the services of electromechanical devices in favour of all digital operation other than the final output relays which are, themselves, miniature and mounted on the single PCB.

What will it do?:

Press the "close" remote switch - the doors lock, the windows and sunroof close if required and the mirrors fold to their parked position. A further press of the switch stops the function if required.

Press the "open" switch once for the doors to unlock and mirrors extend to the normal position.

Press the "open" switch a second time within three seconds and as well as the above, the windows and sunroof open. A further press of the switch also stops the function if required.

None of this affects the normal operation of the windows, sunroof, powerfold mirrors, door locks etc.

The caveats:

You are going to mess with the BCU wiring. Please be SURE you are confident to do that. The BCU is at the heart of the car's electronic gadgetry.

The mod to the OEM window / mirror switchpack requires a degree of dexterity in the use of a soldering iron of the miniature, electronic assembly type. It is not a job for the 50watt Weller leviathan ;)

In common with any electrical installation work, you SHOULD disconnect the battery prior to starting. If you DON'T and you pop fuses, that's YOUR problem ;)

You will have to get two 20 AWG wires from the glovebox void to the switchpack. How you do that is up to you :)

The basic procedure:

Installation of the UHF remote control receiver.

Modification of the OEM window / mirror switchpack.

Installation of the wiring from the switchpack to the glovebox void.

Modification of the BCU wiring.

Installation of the module and connection of the peripherals.

Testing.

I'll go through each stage in as much detail as possible in the following pages. Please do not feel insulted if I assume little or no prior knowledge. I hope this "how-to" will be of use to anybody who wants to install the mod and I know some people are a little wary of anything to do with "electrickery" :)

Preliminary:

I acknowledge the appropriate sources for the pictures and diagrams used in this How-To which are not mine.

The bulk of this installation will be housed in the void behind the glove box and as you will also need to gain access to the BCU, can I suggest that you remove the glove box now? There are four TORX fasteners in the upper part of the glove box, exposed when you open the glove-box door. There are a further three TORX fasteners holding the lower edge of the glove-box and to reveal these you need to carefully peel back the fuzzy felt lining on the glove-box floor a few millimetres. Don't worry, the adhesive is such that when you press the fuzzy felt back into place at the end of the installation it'll seem as though it has never been disturbed.



Carefully slide the glove-box out and, looking along the left side, disconnect the plug from the light fitting as soon as you can see it. Put the glove-box to one side for now.

Choose your power supply. A permanent 12 volts, an ignition controlled 12 volts and a good earth. You will see the fuse box at the back of the now open void and the easiest way to get your supplies is to use an "ADD-A-CIRCUIT" fuse holder from a fuse position on this fuse box which has the appropriate 12 volts. There are several good earth points in this void as well. You choose.

DO NOT AT THIS STAGE CONNECT TO THE FUSE-BOX, especially if you haven't isolated the car's battery.

Installation of the UHF remote control receiver.

You choose your remote control TX/RX. This mod requires two channels, but you might want to build in spare capacity for further remote controlled functions.

I recommend the Vellemann series of TX/RX as supplied by Quasar electronics:-

<http://www.quasarelectronics.com/remote-control.htm>

This will be supplied built upon a PCB and MUST be fitted in an enclosure, you might want to use the same enclosure for this and the module PCB or not.

The receiver must be setup to produce a +12 volt pulse when you press the transmitter switch for both channels used for this project. (NOT including the remote boot release which uses an earth pulse which we'll cover at the end).

To achieve this you need to locate the channel output relays, there will be one relay for each channel and they will have a choice of three connections, labeled:-

Common (com)

Normally open (NO)

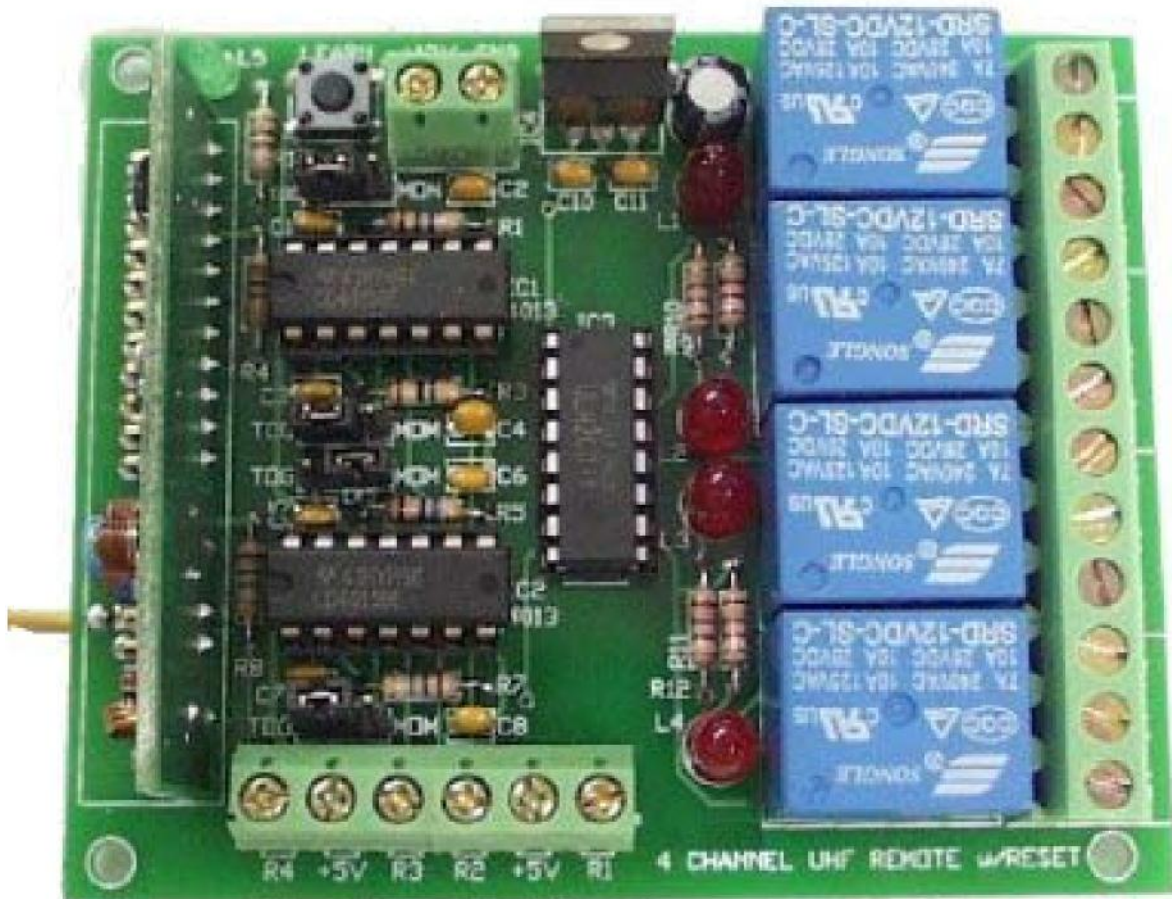
Normally closed (NC)

Connect the (NO) contacts of both relays together and then connect them to the +12 volt power terminals on the receiver. This will ensure that when the channel switch is pressed, the channel relay will switch the (com) terminal to the (NO) terminal, producing the +12 volt pulse we need.

Connect the +12 volt and earth wires which you established in the preliminary to the power terminals on the receiver. At the same time add in a further two wires at these terminals, approx 500mm long, which will provide the power supplies to the module PCB in due course. At the other end of the wires use masking tape labels identified as "PCB +VE" and "PCB -VE" as appropriate.

Connect a wire approx 500mm long to both of the (com) terminals. At the other end of the wires put a masking tape label identified as "LOCK PULSE" for one and "UNLOCK PULSE" for the other.

Here is a picture of the 4 channel receiver board:- You can see the output relays to the left with three screw terminals to each (N/O, N/C and Com). The 12 volts and earth terminals are in the green connector block at the top left of centre. The instructions provided with the receiver are very comprehensive. :)

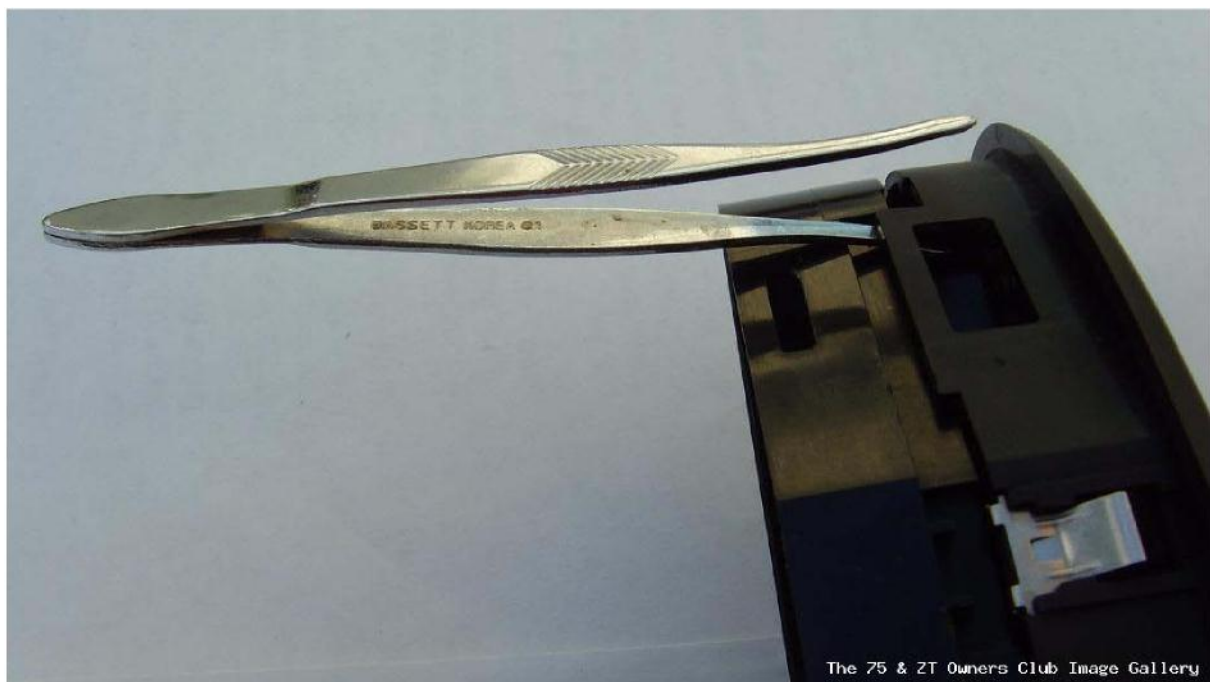


At this point the receiver is finished. You could put the enclosure lid on if you wish but personally, I don't court disaster and leave EVERYTHING open to inspection until I know it all works properly :)

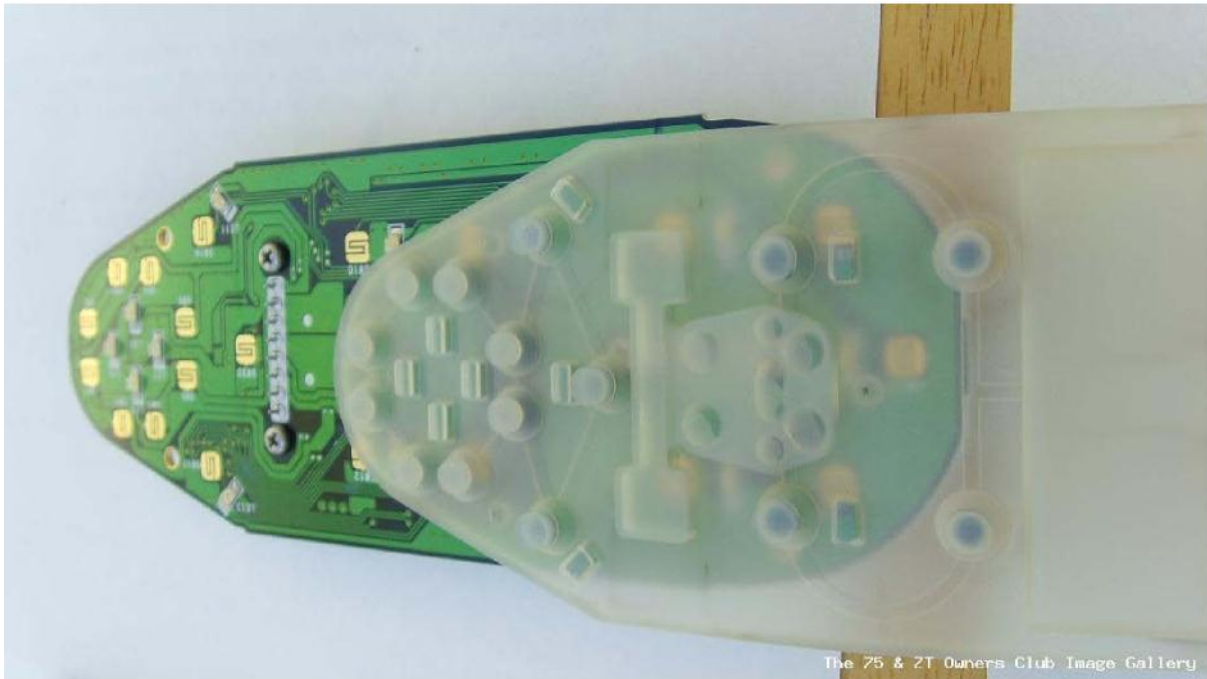
Modification of the OEM window / mirror switchpack.

Remove the switchpack from the driver's door by gently levering out with a trim tool, taking care not to damage the surround, and disconnect the two electrical connectors. Take the switchpack to the workbench.

Using a lever such as a small screwdriver, gently pry apart the six plastic clips which hold the top of the switchpack on as per the two pictures below:-



Take the switchpack apart until you expose the PCB along with the rubber membrane as shown below:-



Look closely at the PCB and locate switchpad 20 (sw20). Note the small hole below it as arrowed in the picture below:-

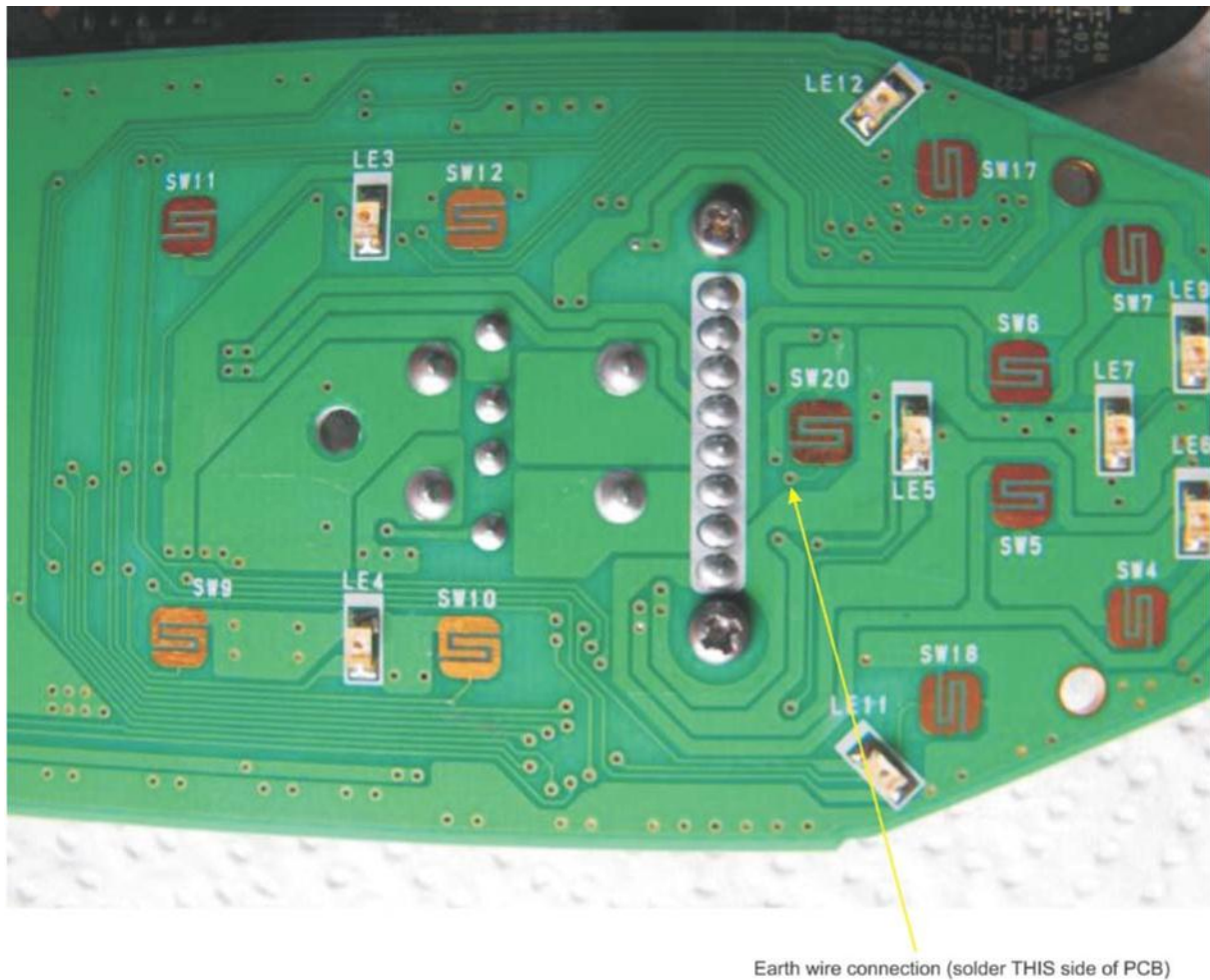
You will need to carefully remove the conformal coating around this small hole using a fibreglass pencil or equivalent. BE CAREFUL just to remove the conformal coating and not damage the copper track beneath. Remove just enough coating to expose the circular copper pad and no more.

Feed the tinned wire through the hole from the other side and solder it to the PCB track. The hole is VERY small and you might well find that two or three conductor strands are all that will go through.

Drill a small hole in the base of the switchpack plastic housing just wide enough for the wire to pass through. Tie a single knot in the wire such that it then cannot be accidentally pulled out of the switchpack.

Feed the wire through the hole and carefully re-assemble the switchpack, ensuring the wire isn't trapped anywhere. Terminate the wire with a bullet or spade connector.

Make sure the wire is pulled out as far as the knot you used to act as a stop. Even with the safety of the knot, this is not a robust modification and should be treated with care :)



To test the modified switchpack, re-connect the black and white connectors and switch on the ignition. Momentarily touch the additional wire to earth a few times and confirm that the powerfolds travel fully on each cycle.

NOTE:- Allow each cycle to complete before touching the wire to earth for the next cycle.

The driver's door wiring modification.

No pictures of this stage yet but will be added if I get the opportunity to take any photographs.

This involves inserting two diodes into the door wiring and needs to be done AFTER the two wires are run from the OEM switchpack to the void behind the glovebox.

What follows is the way I did it. If you prefer to solder joints then please, by all means do so, providing you end up with the same configuration :)

With the door trim panel removed, carefully cut away the looming tape on the switchpack wiring loom from the connectors back along the loom until you find the place where the green / white wires from both the black and white connectors join together.

Locate the green / white wires where they exit the two switchpack connectors and cut them both approximately six inches from the connectors. Strip the ends, twist them together, and insert them in one end of an inline splice.

Now fit the two 1N5402 diode CATHODES into the other end of the inline splice. The cathode end is the marked end of the diode. Sleeve the bare leads to ensure against short circuits.

Now, you have two green / white wires going up the loom to the point where they are joined. Trace the THINNER of the two wires up to that joint and cut the wire, discarding the length of wire and taping over the loom at that point to ensure against short circuits.

Cut the remaining green / white wire to such a length that it is approx 5mm short of the anode lead of either one of the diodes. Strip the end and using another inline splice, connect the green / white wire to the anode of either of the diodes.

Next, strip the end of one of the wires you just installed from the glovebox to the driver's door and attach it to the anode lead of the remaining diode using another inline splice. **We'll call this the 12 volt wire**

The OTHER wire you installed needs terminating to match whatever termination you have used on the wire that comes out of the OEM switchpack. **We'll call this the Earth wire**

Now is the time to test the wiring you've just done:-

Connect the Switchpack to the black and white connectors and also connect the additional wire which was fitted during the modification of the switchpack to the wire you have just prepared.

Ensure that there are NO red lights showing on the switchpack and do NOT turn the ignition on.

At the glovebox void, momentarily touch the wire you connected to one of the diodes

in the door wiring (**the 12 volt wire**) to 12 volts and observe that one of the red LEDs on the switchpack illuminates.

Momentarily touch the other wire at the glovebox end (**the earth wire**) to an earth and the powerfolds should extend or retract under their own steam without any further action for you.

It **might** require two touches of this wire to earth so as to re-synchronise the powerfolds.

Once the powerfolds have moved fully, wait approx 3 seconds and momentarily touch the earth again and the powerfolds should cycle the other way.

Then, wait until the red LED goes out on the switchpack (approx 12 seconds from the time the LED lit). Then, repeat the test procedure first momentarily applying 12 volts on the one wire then momentarily touching earth with the other to ensure that the powerfolds cycle in sequence.

Label the two wires at the glovebox end

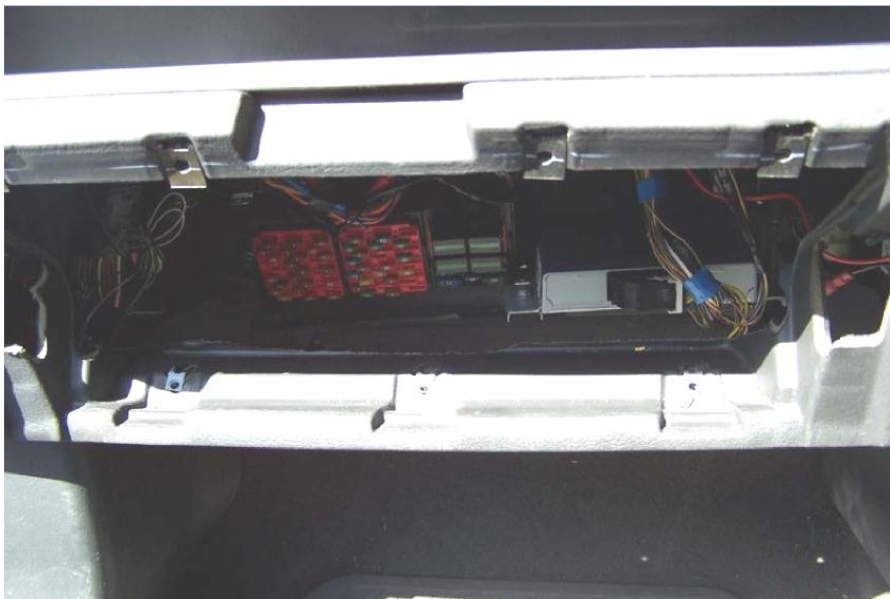
That's the end of that bit of the mod.

At this stage I suggest you dis-connect the switchpack, re-loom the door wiring neatly and refit the door trim and switchpack.

BCU Wiring

Now is the time to tackle the BCU wiring. You will have two wires to splice in for this mod plus another wire if you want the remote boot opening option on a mark 1 car.

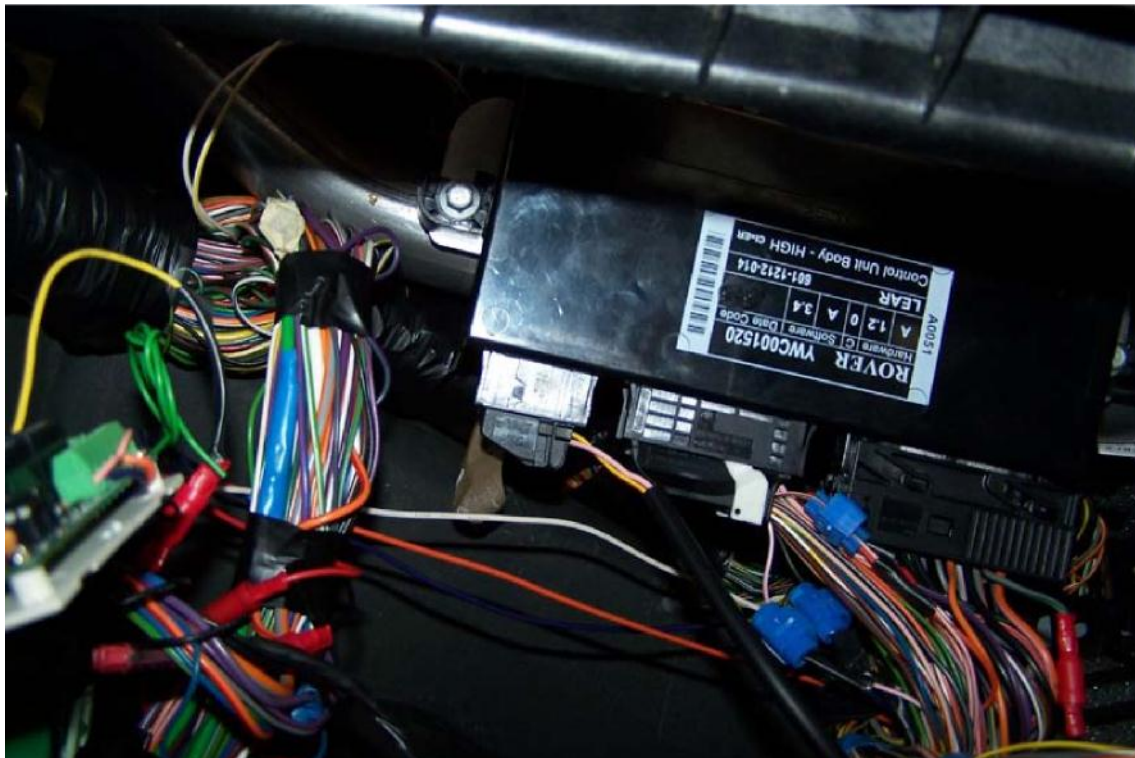
Look into the gaping maw that was left after you removed the glovebox



The fusebox at the back may or may not look the same depending on your model of car.

Mounted above the glovebox cavity and now accessible is the Body Control Unit (BCU). Look into the cavity and upwards and you will see a rectangular plastic box, secured by two 8mm bolts, with three electrical connectors exiting from the forward end (the end farthest away from you).

It'll look like this:-



Hopefully, at this stage, without all those Scotchloks

Use an 8mm socket to undo the two securing bolts.

You do NOT need to remove these bolts. Once loosened, the BCU will push forwards a few millimetres and dis-engage from the bolts.

Allow the BCU to drop and manoeuvre it into a position where the electrical connectors are facing you.

Connector C0660 is the one we want and is the middle of the three.

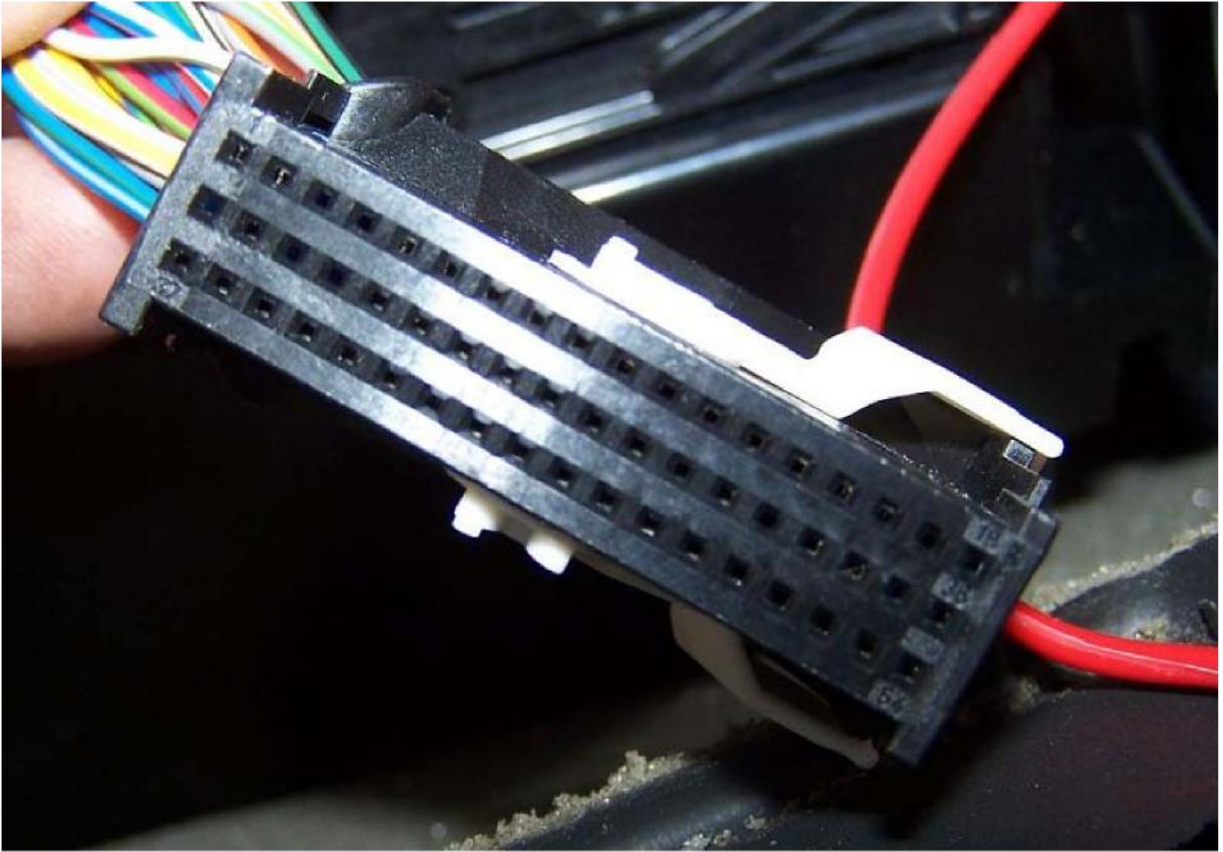
It is the connector with the white locking lever as shown in this photo:-



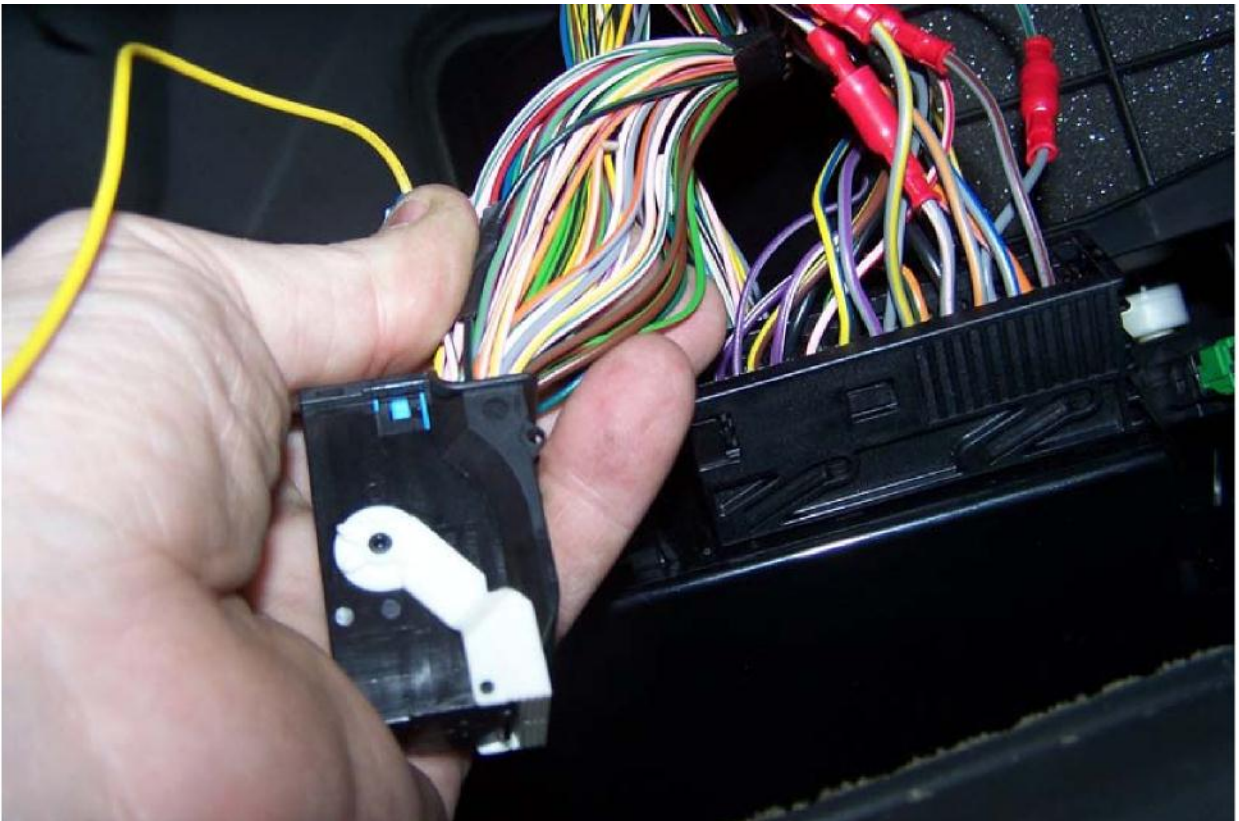
Slide the locking lever to the left (in the picture) so that it rotates around the connector body and at the same time jacks the connector out of the BCU receptacle.

Leave the BCU connected to the other connectors and allow it to hang to one side for the moment.

This next photo shows you the now accessible front face of C0660 and you can clearly see on the right and left of the black shroud, several numbers, which correspond to the contact numbers in the chart which is re-produced towards the end of this How-To.



Turning the connector on its side as in this next photo, you can see the wiring exiting to the top and also, importantly, the small blue locking tag.

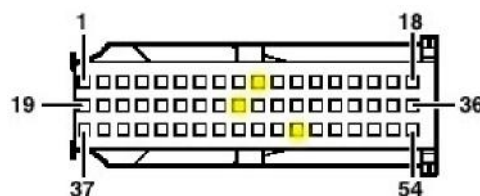


The black plastic shroud is quite soft and the next thing to do is insert a fine bladed screwdriver into the connector from the top (as per the photo) so as to ease the blue tag out of its locating hole. There is an identical tag on the other side of C0660 but, in my experience, having released one side, you can now gently slide out the inner connector assembly, leaving the black shroud completely free of any tether. You will use the shroud front face to assist you in locating contacts a little further on in this project.

Beware, the blue inner assembly is actually three long thin connector blocks clipped together. Do not allow them to separate as re-fitting them is a right royal pain in the derriere. .

Several inches up the cable assembly, there should be a tie holding the wires together. This needs to be carefully cut to allow more freedom to work.

BCU harness connector C0660



Pin No.	Description	Input/Output
8	Right rear door open switch	Input
9	Driver's door open switch	Input
10	Driver's door key lock switch	Input
11	Logic earth	Output
12	Sound alarm	Output
13	Intermittent wiper delay potentiometer	Input
14	Heated rear window relay	Output
15	Alarm RF receiver +12V	Output
16	Front wiper speed feedback	Output
17	Master unlock switch	Input
18	K Bus 1	Input/Output
19	Not used	-
20	Driver's window anti-trap	Input
21	Passenger window anti-trap	Input
22	Not used	-
23	Passenger window up	Input
24	RF code in	Input
25	Left rear door open switch	Input
26	Passenger door open switch	Input
27	Driver's door key unlock switch	Input
28	Inertia switch OK signal	Input
29	Auxiliary sense (Fuse 8)	Input
30	Front washer pump	Input
31	Ultrasonics in	Input
32	Not fitted	-
33	Driver's window switch bus link	Input
34	Front wiper run/park relay	Output
35	Master lock switch	Input
36	Alarm sensors switched +12V	Output
37	Left rear window down	Input
38	Left rear window up	Input
39	Right rear window down	Input
40	Right rear window up	Input
441	Alarm LED	Output
42	Horn/headlamp power wash	Output
43	Not used	-
44	Boot release switch	Input
45	Bonnet open switch	Input
46	Interior light switch	Input
47	Boot open switch	Input
48	Boot key barrel switch	Input
49	Column switch 2	Input
50	Column switch 1	Input
51	Not used	-
52	Not used	-
53	Front wiper park switch	Input
54	Logic power (battery supply)	Input

The diagrams above show you the idents of the two (or three) wires you want to tap into in the BCU wiring. I suggest tapping into them as far back from the connectors as you can comfortably reach say, at least six to nine inches.

The earlier photographs show the use of scotchloks and if that is what you prefer to

use then so be it. Personally, scotchloks are anathema to me and I used the MG-R approved splices of the type used in the Trafficmaster retro-fit (Part number YPC116330)

Whatever method you use, connect the appropriate wires and label them at the free end with a masking tape label identifying which BCU terminal they are connected to.

Double-check and triple check that you have made the right connections.

I've done this mod to several cars now and, with the exception of one car only, the wiring diagram above (taken from the manual) is correct. The odd car out took a bit of working out but eventually Steve (Devilish) sorted it out. I suspect his was a "Friday Afternoon" car.

At this point, reassemble the BCU connector and re-connect it to the BCU. I wouldn't refit the BCU just yet though in case something isn't right.

Final Wiring

Now is the time to take stock. You should have the following wires in the glovebox void:-

Permanent 12 volts to the receiver

Permanent 12 volts from the receiver to be connected to the module

Ignition-controlled 12 volts, connected ONLY to the module, NOT the receiver.

Earth to the receiver

Earth from the receiver to be connected to the module

12 volt wire to the switch pack

Earth wire to the switchpack

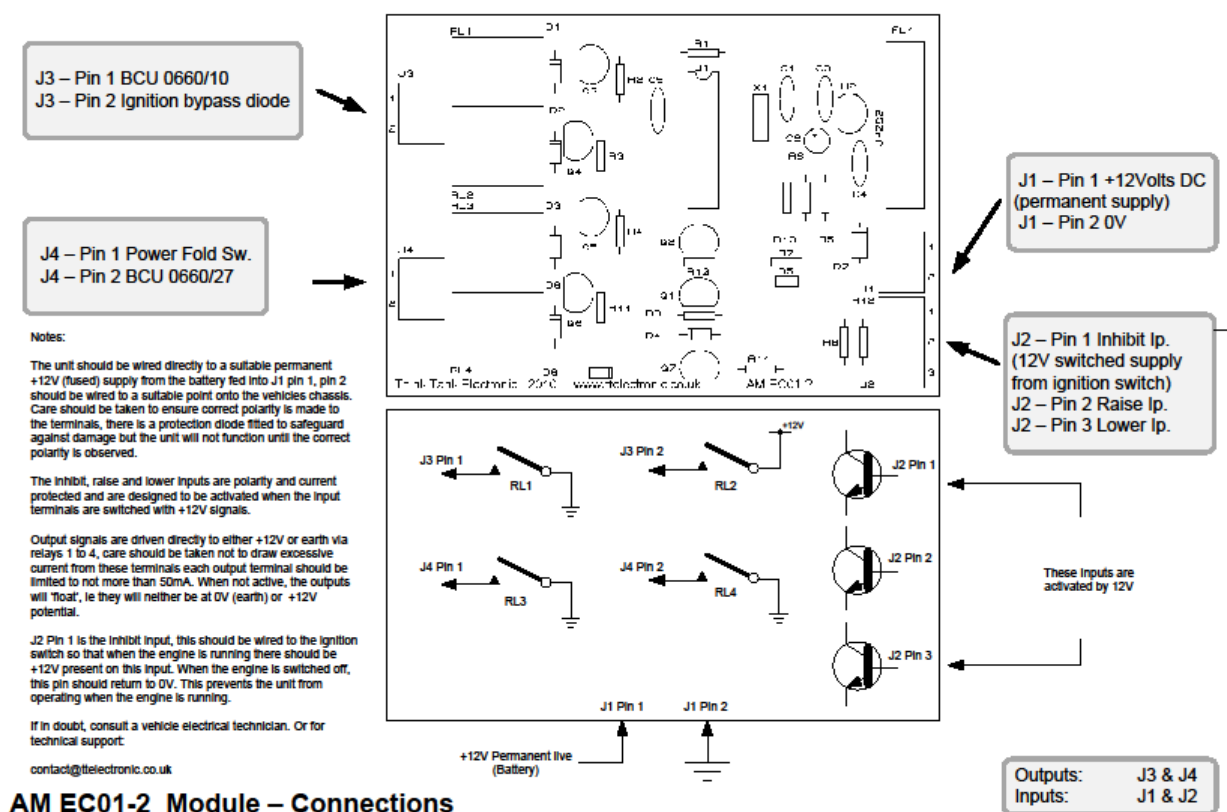
Lock pulse wire from the receiver

Unlock pulse wire from the receiver

Wire from BCU C0660 / 10

Wire from BCU C0660 / 27

Wire from BCU C0660 / 48 (Boot lock wire - coil up out of the way)



All that remains is to connect the wires to the module in the appropriate places.

The diagram above shows you how to connect the wires. It is a copy of the diagram you should have received with the module.

Just as a reminder, the wires going to J3 Pin 2 and J4 Pin 2 are those wires you ran from the driver's door – the former being the one which is wired into the loom, the latter being the additional connection to the switchpack.

For those who are interested, the circuit diagram is included below. It is not essential to the installation of the mod but is supplied as background information

Allow 10 seconds then briefly press the 'open' button. The doors should unlock and the powerfolds extend.

Synchronise the powerfolds if required.

Allow a further 10 seconds and briefly press the 'close' button. Observe the correct function.

After a further 10 seconds, briefly press the 'open' button and wait approx 3 seconds whilst observing correct function, then press the 'open' button again. The windows should descend fully and the sunroof (if fitted) fully open.

Press the 'close' button once more and the doors should lock, powerfolds retract and the windows and sunroof fully close.

The windows / sunroof can be stopped partially open at any position by pressing either the 'open' or 'close' button as appropriate when the desired position is reached. The timing built into the module ensures that the powerfolds do not move more than once during a cycle, regardless of whether you press a button once or twice or three times. The powerfold inhibit period is approximately 10 seconds.

Now is the time to put the receiver PCB and the module PCB in their enclosure(s).

If yours is a MkII car you can put everything back together at this point.

If you have a Mk1 and you want the remote boot release you have a little bit more to do.

Remote boot release

In exactly the same way that you connected the 12 volts supply to each of the two relays at an earlier stage, you should now connect a wire from the power supply EARTH terminal to the Normally Open (N/O) contact of one of the remaining unused relays in the receiver and then connect the BCU C0660 / 48 wire to the (Com) contact of that relay.

To test the remote boot release:-

Ensure the boot is closed.

Briefly press the appropriate button on the transmitter

Ensure the boot is open :)

Important final test:- Put the keys in the ignition and switch to position two.

Operate the OPEN and CLOSE function buttons on the new remote and ensure that NOTHING HAPPENS.

This confirms that the inhibit function is working correctly and ensures that the powerfold mirrors do not operate should you lock or unlock the car doors when the ignition is on or the engine running.

This is a simple project to do on the car but is quite a handful to produce a 'How-To' about.

I've been as thorough as I can and tried to cover in sufficient detail all the things that I might assume are clear but which might not necessarily appear so to others. If something is not clear, by all means ask me :)

Disclaimer:

You are responsible for any work or modifications carried out on your car and you undertake any such work at your own risk. The 75 and ZT Community nor the original author of this How-To can be held liable for anything that may happen as a result of you following this How-To.

Any modifications should be reported to your insurance company.

What now follows is a fault diagnosis document provided by Chris at TTE in case you've built your module and it doesn't work. If you had your module supplied built and tested, this information is purely for interest and completeness

AMEC01 – 2 TEST PROCEDURE

Note: It is strongly recommended that this procedure should be read thoroughly and understood and the checks outlined below, are carried out before installation of the module. Although these tests are aimed primarily for those who have purchased the self assembly version of the module and who have now completed the assembly of the unit and now require to carry out full functional tests. These procedures can also be followed as a first line check should failure occur of pre-assembled and tested modules.

The following procedures require a basic understanding of electronic testing and circuit board layout, figure 1 provides an overview of the printed circuit board layout and connection details. Care should be taken when handling the integrated circuit (IC U1) as it can be damaged by static charges and suitable measures should be taken to ensure that all potential static charges are eliminated before work is carried out. Pay particular attention to the work area, ensure that the work area is clean and dry and surfaces such as plastic sheeting are avoided as these can harbour static potentials which can destroy electronic components. Also ensure that the unit is not tested on conductive surfaces which could result in short circuit of the underside of the PCB and cause permanent damage to the module.

If you are in any doubt, please consult somebody who has a suitable level of experience in electronic fault finding. Questions can be sent via email or via the website. Please state clearly the symptoms of the failure and any information leading up to the failure, the more information the more accurate a diagnosis can be made leading to rectification / repair of the fault.

A repair / get you going service can be provided by TT Electronic should the situation arise where the problem cannot be rectified by the user. Please note a charge will apply for this service apart from where the unit was supplied built and tested and has failed through normal use and is still within the 12 month warranty period. This is subject to terms and conditions which can be supplied upon request.

Items required for testing:

- Analogue or digital multimeter.
- 12V DC Power source – 12V Car battery or ideally, a suitable stabilised bench power supply unit.
- Small flat bladed (or posidrive depending upon the terminal screw types as some units might vary) screwdriver.
- Chip extractor tool (in order to remove U1, but not absolutely necessary, a small thin flat bladed screwdriver will suffice).
- 2 or 3 test leads with crocodile clips on either end.

PROCEDURE

The unit should not be connected to any power source at this moment. All measurements (unless stated) are made from the top (component side) of the PCB. Check for any short circuits, blobs of solder, incorrectly inserted components, dry joints etc before continuing.

1. Ensure that initially U1 is removed. This can be done by use of a chip extractor tool (available for a few pounds from Maplin Electronics) or a thin bladed screwdriver inserted into the gap between the underside of the chip and its holder in which it sits. Ensure that minimal pressure is applied and gently twist the screwdriver until the chip comes out of the holder, avoid excessive pressure that could bend or damage the legs of the chip. If the legs of the chip do get bent during this operation, carefully straighten them out using a fine pair of needle nose pliers or an IC lead straightening tool (also available from Maplin).

When the chip has been removed, place it in a safe area. During replacement of the chip it is **absolutely essential** that the chip is oriented correctly (ie, the notch at one end of the chip faces towards the **top** of the PCB – see figure 1) and all of the legs are straight and that all pins align with the holes in the socket before pressing the chip firmly back into place. This is absolutely essential, failure to observe this will damage the chip or other components.

2. Set the multimeter to the Ohms or Resistance setting. Measure between pins 1 & 2 of tagblock J1, ensure that there is a high resistance indication greater than 10K Ohms.
3. Connect the multimeter still set to Ohms between pin 2 of J1 and the far end tip of fuse F1. The reading should be greater than 100 Ohms. With one lead of the multimeter still making contact with J1 pin 2, place the other lead of the multimeter onto the 5th pin down counting from the top downwards on the right hand side of the socket of IC, U1. Ensure that the resistance is again greater than 100 Ohms.
4. Still maintaining a connection to J1 Pin 2, next check in turn that there is maximum resistance (in the region of 1M Ohm or greater) between the above connection and each pin on tagblocks J3 and J4. Now remove the multimeter lead from J1 Pin 2 and connect this lead to touch the end of F1 furthest end away from J1. Now measure once again in turn between

this point on the fuse and each of the pins on tagblocks J3 and J4. Once again, ensure that maximum resistance greater than 1M Ohm is observed.

5. Once the above checks have been satisfactorily completed and that you are happy that no short circuits exist. Connect the terminals of tagblock J1 to a 12V DC power supply or car battery (please note do not use a 24V truck battery!). Ensure that the positive (red or + terminal) of the power supply connects to J1 pin 1 and the 0V or – terminal (black) connects to J1 pin 2. See figure 1. Switch on the power supply and ensure that none of the relays energise – listen carefully for a click when you turn the power supply on or off. If any of the relays operate at this stage check the underside of the PCB for any blobs of solder shorting the tracks to the earth plane of the PCB. Check around the relay pins and the 4 transistors Q3 to Q6.
6. Set the multimeter to DC volts (greater than 10V range, if your multimeter is autoranging then just ensure that DC volts is set) and measuring with the negative lead on tagblock J1 Pin 2 (0 volts reference point), place the positive lead on the far end of F1 and ensure that 12 to 14V is present. If 0V is observed, turn off the power and check that F1 has not blown. Next move the positive lead to the right hand side terminal of resistor R1 located directly above U1 on the PCB and ensure that a voltage between 4.75 and 5.5V is present.
7. With power still applied, carefully connect a small test lead with a miniature crocodile clip to the same point on R1 as just used to take the last measurement, ensure that you do not short anything else out in the process. Take the other end of the test lead (which should now have about +5V DC on it) and carefully touch the end of the crocodile clip to the bottommost pin on the left hand side of IC U1 socket. Listen for a click of RL4 as it energises and de-energises each time as this connection is made and disconnected.

Repeat this test on the next 3 pins in turn working upwards, each time listening for the click of the associated relays, RL3, RL2 and finally RL1 should energise and de-energise when the crocodile touches the 4th pin up from the bottom. DO NOT connect the crocodile lead to any other than these 4 pins!

8. Turn off the power to the module. Set the multimeter to OHMS and connect the black lead to the 0V power supply lead. Turn on the power and with the test crocodile lead still connected to the RHS of R1.
 - Place the red lead of the multimeter to J3 Pin 1, the meter should read greater than 1M Ohm, now touch the free end of the test lead to the 4th pin counting up from the bottom left hand side of the chip holder for U1. Relay 1 should energise and the meter reading should now indicate a short circuit of around 1 OHM or less.
 - Move the red lead of the multimeter to J4 Pin 1, the meter should again read greater than 1M Ohm. Touch the test lead free end to the 2nd pin up from the bottom this time. Ensure that you can hear RL3 energise this time and then the meter reading should indicate a short circuit of less than 1 OHM.
 - Move the red lead of the multimeter to J4 pin 2, same indication again as above, now touch the free end of the test lead to the bottom pin on the left hand side of U1 socket, RL4 should now energise and you should observe a short circuit of less than 1 OHM.
 - Now switch the multimeter to DC Volts – 10V range or greater. Move the red lead of the multimeter to J3 Pin 2 and this time 0V should be observed. Now touch the test lead free end to the 3rd pin up from the bottom, left hand side of IC socket U1. 12V should now be observed along with the sound of RL2 energising.
9. Disconnect the power supply and replace the chip U1 observing the precautions mentioned previously. Re-Apply the power supply and ensure that none of the relays energise.
10. Connect 2 test leads to the +12V (Red) power supply and ensure that power is applied to the module also. Connect one of the test lead free ends to pin 1 of J2 and then whilst this connection is maintained, taking the free end of the 2nd test lead, touch in turn pins 2 and 3 of J2. None of the relays should operate. This tests the interlock circuit that prevents the module from operating when the ignition (and hence the engine is running) is switched on.
11. Remove the test lead from J2 pin 1. Now carefully using either of the test leads, carefully but firmly touch (trying not to 'bounce' the connection) briefly J2 pin 2 (this is the 'Lock' input), you should observe a click as relays RL1, 2 & 3 energise, followed by a click approx 0.5 seconds later as relays RL2 & RL3 de-energise. RL1 should stay energised for approx 8 seconds. Repeat the process noting if J2 pin 2 is connected to +12V once and RL1 is energised and then if J2 pin 2 is re-connected to +12V within the 8 second period mentioned above, RL1 will de-energise prematurely – this is the lock sequence cancelling.
12. Now carry out the test in a similar manner to the above tests but this time use J2 pin 3 which is the 'Unlock' input. On the first pulse of +12V on this pin should bring RL2, 3 & RL4 all on together and then all 3 will drop out after 0.5 seconds. Apply a second pulse to J2 pin 3 with 3 seconds of the first pulse and RL4 should now stay energised for about 8 seconds. A third pulse within this 8 second period cancels the relay RL4 and it will de-energise – this is the unlock sequence cancelling.

If all the above tests prove satisfactory the module can then be installed into the vehicle. For specific vehicle installation details, please refer to the Rover 75 forum.

Any other problems that cannot be rectified at this stage will probably be down to incorrect component fitting, short circuits or dry joints on the PCB. If you are still unable to rectify the problem, please send an email with as much detail as possible and we will try to rectify your problem. Please don't feel embarrassed if you lack experience in this field, we were all once beginners and its best practice to own up if you made a mistake! The man who never made a mistake never made anything!!

Email to :

contact@ttelectronic.co.uk

Web:

<http://www.ttelectronic.co.uk>

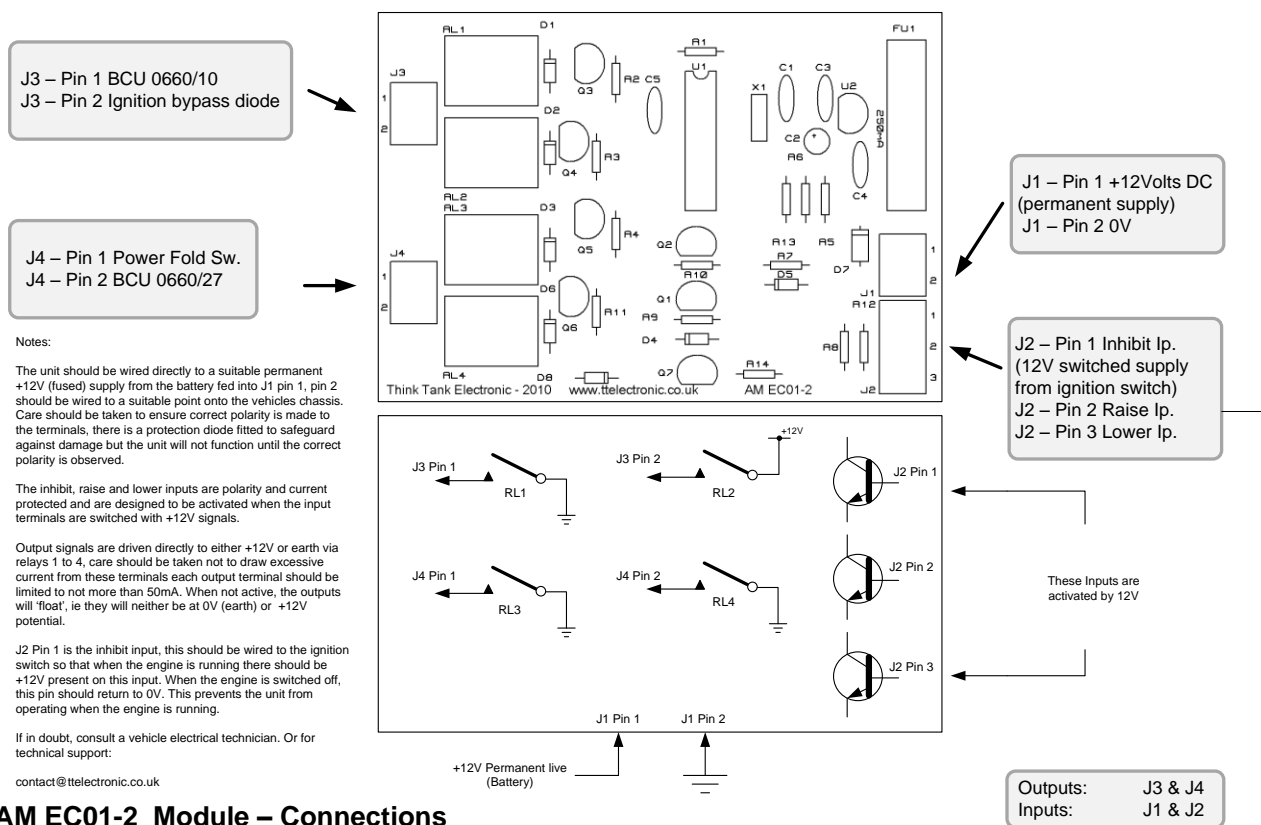


Figure 1