

**P92**

**Power Distribution Board with BEC**

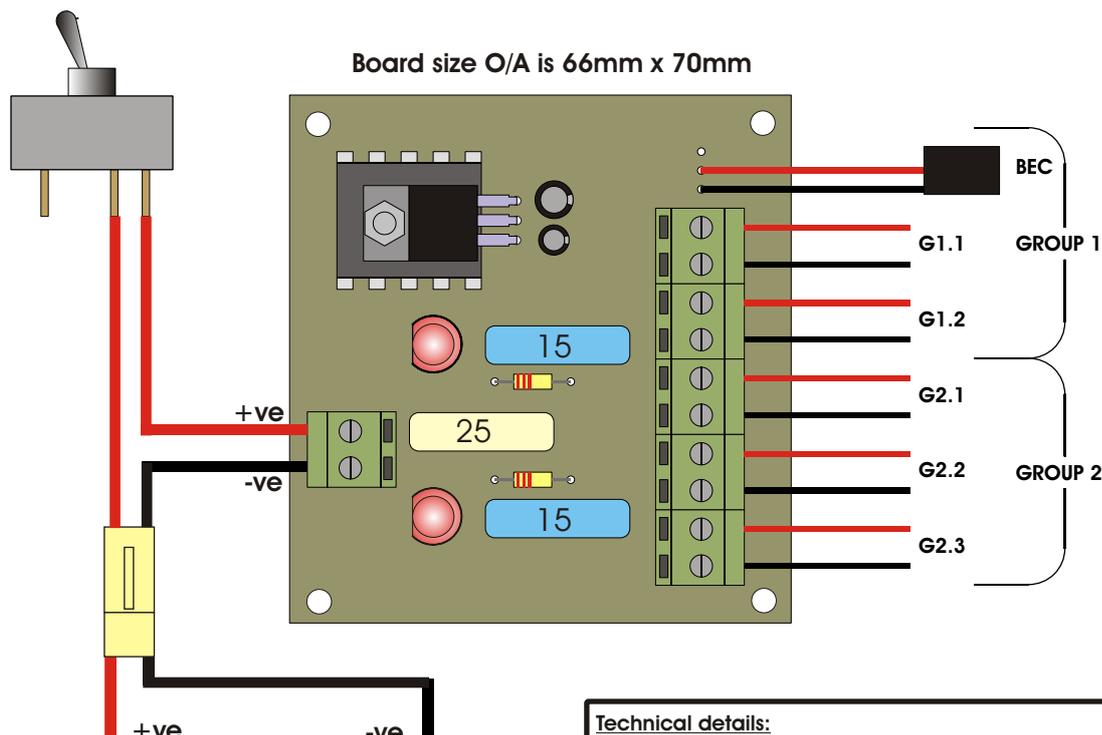


The P92 Power Distribution Board has been developed to provide a neat solution to the frequent "rat's nest" wiring which results from multiple units being installed in a R/C model boat. It takes the power from the main supply battery - which can be either Sealed Lead Acid, Nickel Cadmium or Nickel Metal Hydride - and routes it via an overall 25A fuse into five separate pairs of terminals PLUS a regulated 5v (nominal) supply to power your receiver, servos and other Rx-dependent devices. These five pairs of terminals are also protected by two separate 15A fuses - see Technical Details Below. A version which gives a regulated 6v output is also available.

The P92 uses a very high-quality epoxy-glass laminated board with extra-thick copper lands (4oz grade) to carry the rated maximum current. The screw terminals are to professional specification, rated to 28A, and have rising-clamp connection which will take up to 2.5 sq mm cables.

The unit is supplied either in kit form or ready-built and checked. A full set of fuses is supplied PLUS a FULL spare set, and a universal servo lead.

Battery connectors are not included.



**Technical details:**

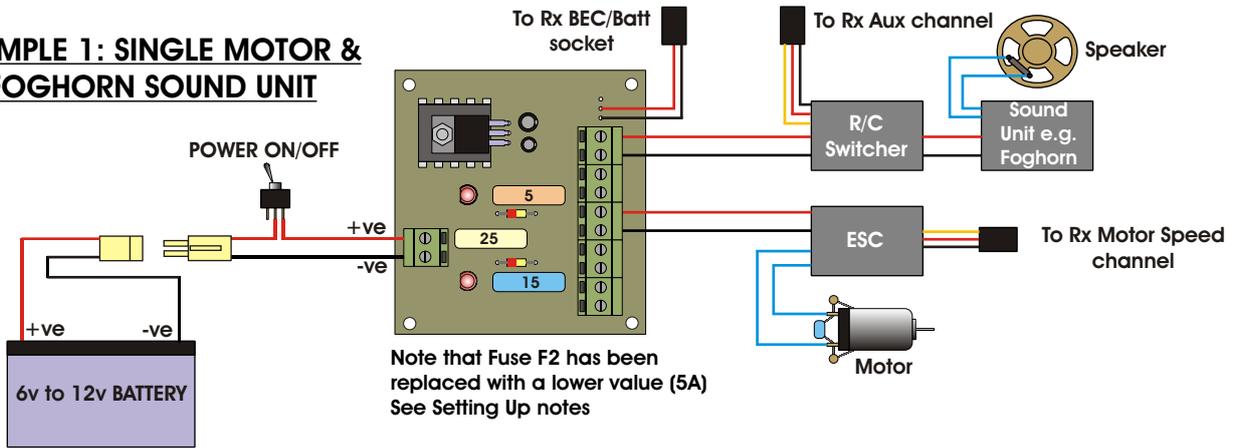
Input is nominally 6v to 12v, with Min 5.4v and Max 15v. (For 6v output version, battery voltage should be 8v - 35v).  
 Outputs are split into two separately-fused groups, with an overall fuse of 25A:

Group 1 - 2 x 15A total @ battery voltage plus 5v BEC output for Rx, servos and ESCs;

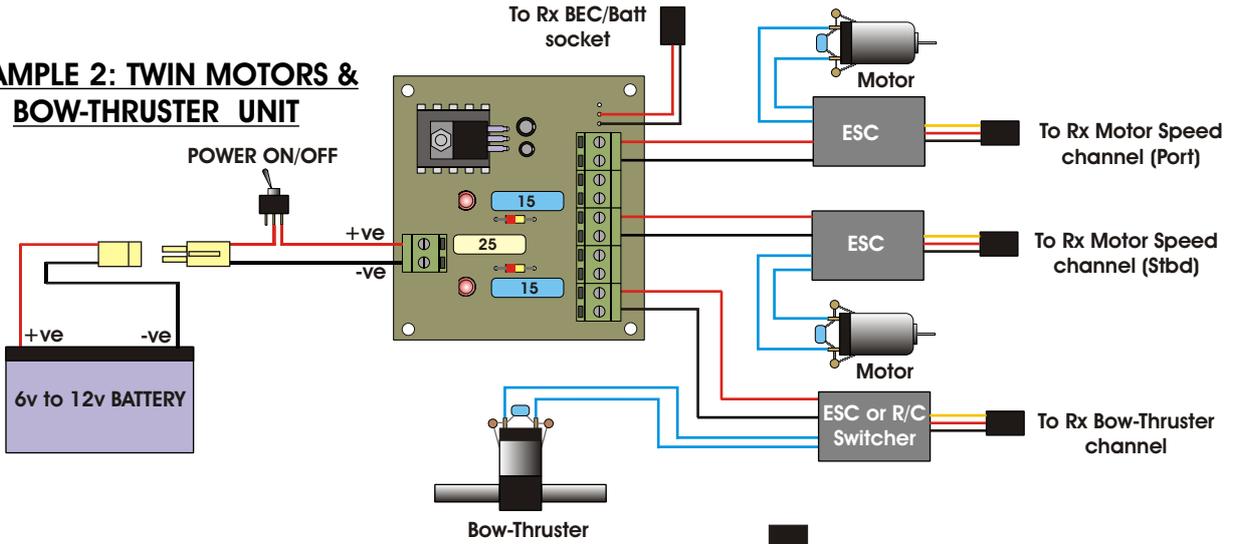
Group 2 - 3 x 15A total @ battery voltage.

Instructions are supplied on how best to connect the various loads, and examples of typical installations are shown on the drawings with the unit and on Page 2 of this data-sheet

**EXAMPLE 1: SINGLE MOTOR & FOGHORN SOUND UNIT**

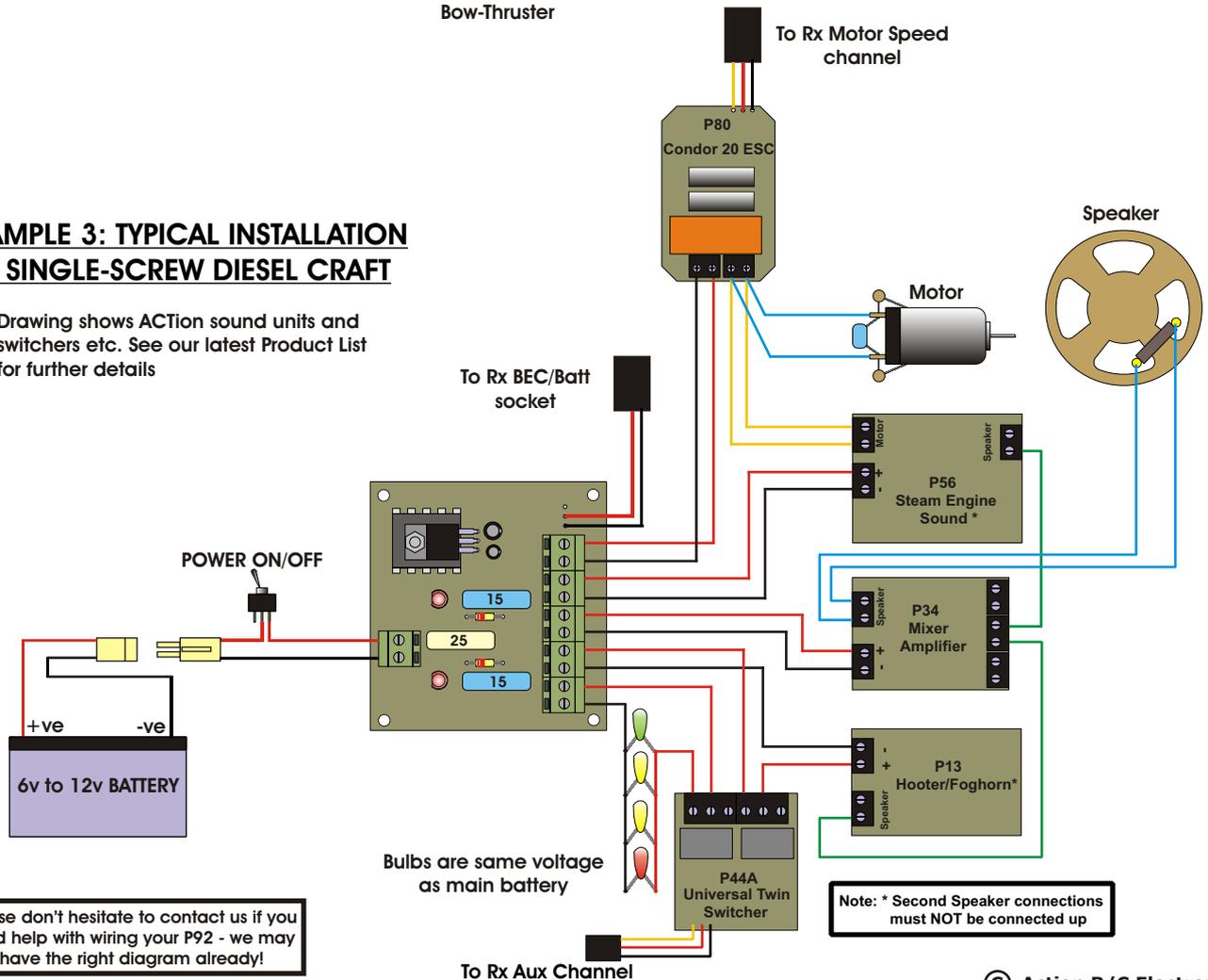


**EXAMPLE 2: TWIN MOTORS & BOW-THRUSTER UNIT**



**EXAMPLE 3: TYPICAL INSTALLATION IN SINGLE-SCREW DIESEL CRAFT**

Drawing shows ACTION sound units and switchers etc. See our latest Product List for further details



Please don't hesitate to contact us if you need help with wiring your P92 - we may well have the right diagram already!



## Power Distribution Board with BEC



The P92 Distribution Board is able to supply a maximum of 25Amps divided between two groups of terminals. Each group of terminals can draw a combined current of 15A maximum. However the total load drawn by both groups cannot exceed the overall 25A maximum. When setting up the power system on your model it is important to consider how you will divide the power up into the two groups.

Group 1 gives two pairs of terminal (G1.1 and G1.2) protected by Fuse F2. This group also includes the BEC (Battery Eliminator Circuit) for the receiver and servos.

Group 2 gives three pairs of terminal (G2.1, G2.2 and G2.3) protected by Fuse F3.

Fuse F1 provides overall protection of the system providing a failsafe. If F1 fails then the whole of the electric system will lose power and the model will require recovery.

If the load to be drawn by a group is less than the 15A fuse rating a smaller fuse can be substituted (See Example 1). Using standard automotive blade fuses. As a rule of thumb, select the fuse to be the next size up from the normal operating current of the combined load on the group this gives the highest degree of protection while preventing nuisance fuse failures.

**NEVER REPLACE F1 WITH A FUSE LARGER THAN 25A. NEVER REPLACE F2 or F3 WITH FUSES LARGER THAN 15A. DOING SO WILL INVALIDATE ANY WARRANTY ON THE P92 DISTRIBUTION BOARD AND RISKS DAMAGING OR DESTROYING YOUR MODEL DON'T DO IT!**

To get the best use of the system, it is necessary to divide the load circuits between G1 and G2. Because of the many different setups that are possible, it is not possible to give hard and fast rules but here are some guidelines:

Try to balance up the current drawn between the two groups of terminals as far as possible

If you are using the BEC then place non-critical accessories such as sound units onto G2 where possible

For single motor models, use G2 for the drive motor and G1 for the radio gear. In this case, G1 can be used for auxiliary circuits such as smoke generators or sound units.

For twin motor models, put the drive motors on separate groups. Use G2 for Bow thrusters, especially if using BEC.

For models with three drive motors, place the port and starboard motors on separate groups, place the central drive motor onto G2 and run the auxiliary circuits onto G1.

For models with a large number of high current draw components, it may be better to use two or more distribution boards.

The voltage rating for the distribution board is based on the operating limits of the BEC. The standard 5v BEC version requires an input voltage of 5.5v-15v while the 6v BEC needs 8v-35v input. If you intend to power the main system from a 24V or 48V battery or supply, it will be necessary to remove regulator U1 and provide alternative power for the receiver system.

To use the BEC, connect the flying lead into the BEC or Battery socket on the receiver or, if it does not have one, use an unused servo output. If all the servo outputs are in use, it will be necessary to use a "Y" lead to patch in the BEC. The rating of the BEC is 1A maximum this is a short term rating, designed to meet the transient loads of standard servos. If this current is drawn continuously, the BEC will overheat and shutdown to protect itself. If you are using high-load servos such as large sail-winchies it is recommended that you use an alternative supply.

Spare fuses are available in 3A, 5A, 7.5A, 10A, 15A, 20A, 25A & 30A ratings from ACTION see latest lists.

### RECOVERY SERVICE

A recovery or repairs service ensures that you will not be left with a dead unit for any reason. The Service Charge for this kit is £13.00 including parts (including return shipping cost IN UK).

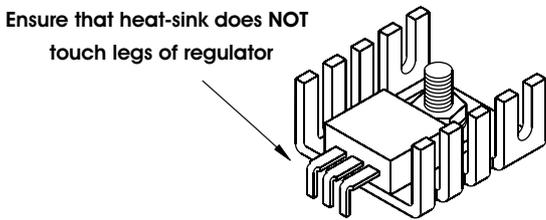
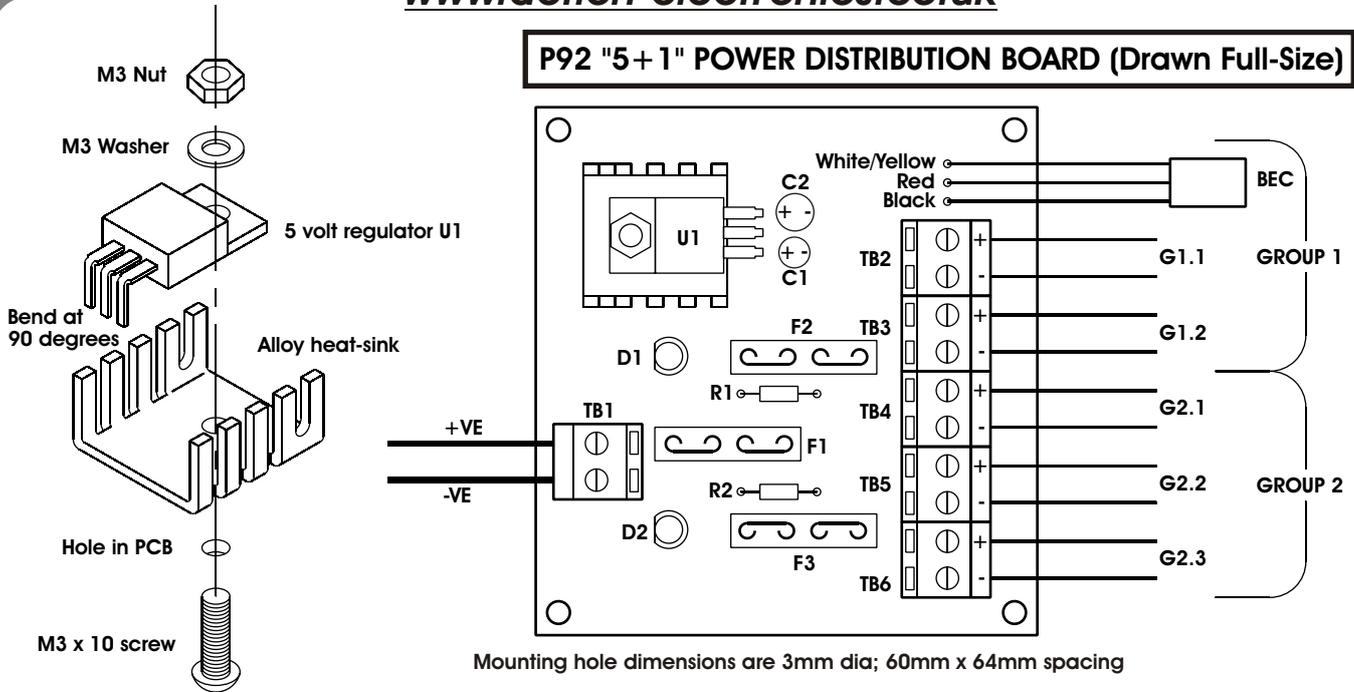
All returns should include full Credit Card details (Name & Address of cardholder, Card Number, Expiry Date and Card Security Number)

**ACTION R/C ELECTRONICS, 1 Llwyn Bleddyn, Llanllechid, Bangor LL57 3EF, United Kingdom**

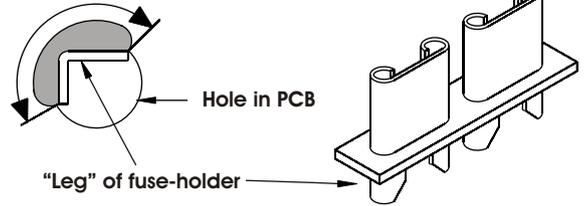
#### The small print.....

ACTION R/C Electronics guarantee all products to be free from manufacturing defects for 12 months from date of purchase. This does not cover suitability for specific applications; components worn or damaged by use, tampering or incorrect connection; alteration to original components; damage to batteries or other equipment through use; misuse, or shipping damage. Where goods are found to be faulty, the customer shall return them to ACTION R/C Electronics in their original condition and with their original instructions, packaging etc. Our liability is limited to repairing or replacing goods to their original specification and will not exceed the cost of the goods. By using the product the user accepts all liability. Where a fixed repair charge is applicable, ACTION R/C Electronics shall undertake repairs to the extent that they are judged economically viable. Where such is not the case then the customer will be offered the option of crediting the repair charge towards the cost of a new unit or having the faulty unit returned and the charge refunded (less the cost of return carriage). We reserve the right to modify this guarantee without notice.

**P92 "5 + 1" POWER DISTRIBUTION BOARD (Drawn Full-Size)**



Apply solder in this area ONLY



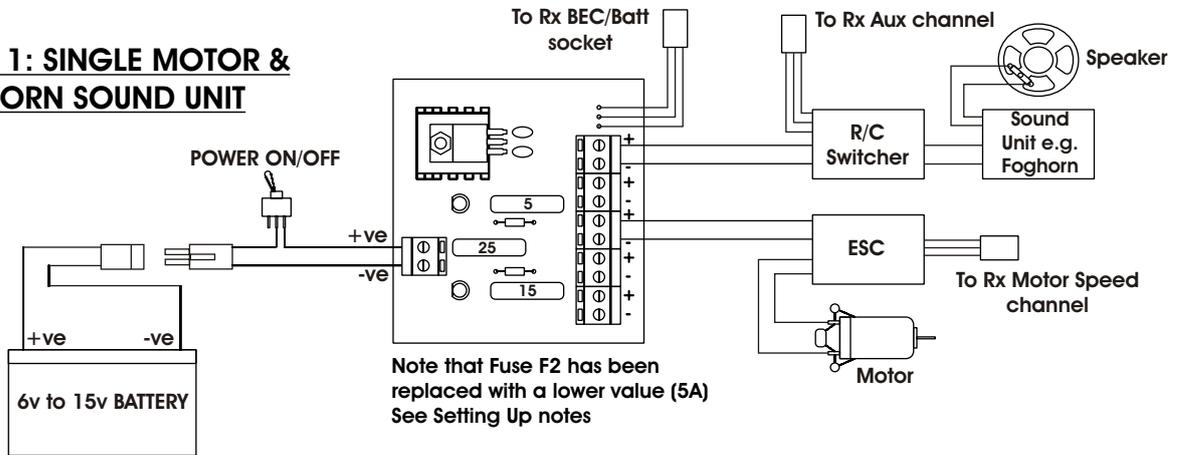
**ASSEMBLY OF 5V REGULATOR AND HEAT-SINK**

(Applies only to kit version)

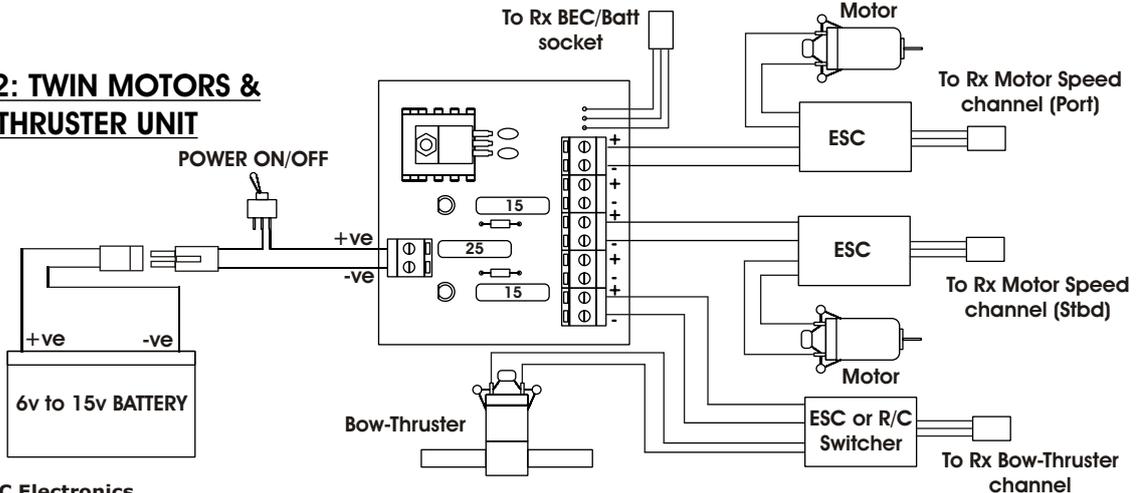
**SOLDERING FUSE-HOLDERS**

(Applies only to kit version)

**EXAMPLE 1: SINGLE MOTOR & FOGHORN SOUND UNIT**



**EXAMPLE 2: TWIN MOTORS & BOW THRUSTER UNIT**



## P92 KIT INSTRUCTIONS

### PCB

The PCB has an insulated (Component Side) and a tinned track side. Components are mounted on the insulated side and soldered on the track side. The PCB for this project is fully prepared and requires no additional work. It is manufactured from high-grade epoxy-glass laminate with an extra-thick copper layer. The layout of the components is printed onto the face of the board, but you should refer to the Parts section of these notes to confirm their values etc. Look carefully at the area of the PCB you are working on when soldering to ensure that you do not apply an extra connection with a splash of solder during the operation.

### TOOLS

For construction you will require a soldering iron of about 25 Watts with a 2.5mm chisel-shaped bit, and flux cored solder (22 SWG recommended). The thick copper on this PCB requires a little more heat than other ACTION kits, so don't go straight for the 1mm pointed bit - it won't do the job! If you are fortunate enough to have a temperature-controlled iron, then set the bit temperature for approx 300 degrees. A small pair of wire cutters; a terminal-sized screwdriver for screw connectors and a good level of light complete the tool kit.

### PARTS

There are relatively few parts involved and most are difficult to confuse, but a short description won't hurt:

C1 and C2 are electrolytic capacitors; they are small black tubes with a pale grey stripe down one side which has negative (minus) symbols printed within it. This indicates the negative lead, which should be soldered into the hole furthest from the regulator - see Drawing. The larger one is C2 and has a value of 100uF printed on it; C1 is 10uF.

D1 and D2 are the LEDs (Light Emitting Diodes) which indicate power flowing to the two fused circuits. They are translucent red or green dome-shaped little devices and are polarised, so they should be fitted with the "flat" side of the circular base towards the edge of the PCB. This corresponds with the negative battery input connection.

R1 and R2 are the resistors and are small tubular components with a wire coming out of each end. They are a cream colour and have three red bands around them, towards one end. This indicates their value (in this case they are both 2.2K Ohms). The other band is gold-coloured and can be ignored. They can be fitted either way around in the board.

U1 is the voltage regulator and should be handled with care; static electricity can damage it, so do follow the precautions described later on when handling it. It is fitted as per the drawing, with the metal tab flat down against the alloy heat sink, and secured with a M3 screw, washer and nut.

The fuses are automotive blade types and have one of two values; the blue ones (F2 and F3) are 15 Amps, while the clear one (F1) is 25 Amps. They are a tight push-fit into the fuse-holders, which are soldered into the board as shown in the drawing. Do make sure you get these facing in the right direction as per the drawing to maximise the solder joint with the copper land.

Finally, the big pale-green screw terminals (6) are pretty difficult to mistake. Five of these are slotted together to form the main output block, while one is fitted on its own to accept the input cables from the battery. Make sure you fit them with the cable holes facing *outwards*.....!

### CONSTRUCTION (Notes by Dr Tim Fawcett)

"Stage Zero is to arrange the components, make sure you know where everything goes. The P92 is different to other Action boards in that it has the component legends printed on the board. This makes it easier to assemble.

First stage is to insert R1, R2, C1, C2, D1 and D2. I like to place the parts in by height order - this way you can flip the board over to solder the leads and the weight of the board holds the components in place. So put in the resistors and solder them; then the capacitors, then the diodes (LEDs). Remember when inserting the diodes that they go flat to the board. Also they are polarized; make sure you align the flat on the package with the little line on the outline on the PCB. Once they are all soldered in place, crop the leads just at the top of the solder bead.

Next stage is to insert the fuse holders. These fit snugly into the board and need a bit of a firm push to get them in place. I have aligned them as shown in the drawing to ensure the best current distribution in the tracks to avoid hot-spots. You cannot solder the holders so that the hole is filled - you'll just fill the holder with solder if you try. Solder the bits of the pins that are closest to the pad; the small sketch shows what I mean.

Clip five of the terminal blocks together, making sure they are all at the same level. Insert them into the board and solder them up.

Now the difficult bit.....mounting the regulator. Try and avoid touching the legs with your fingers if you can, to minimize any possibility of static damage. Dave @ ACTION uses a wooden clothes peg to hold the legs while they are bent at 90 degrees where shown, just at the point where the leads narrow. If you do this the hole in the regulator will line up with the hole in the PCB. Place the heat-sink on the PCB with the hole over the PCB hole. Insert the bolt from the rear of the PCB, then place the regulator in place. Put on the washer and nut and tighten firmly. Once the heat-sink and the regulator are tightened up solder the regulator leads and crop off the surplus from the back of the board. *Don't solder the regulator until it is bolted into place.*

Next stage is to solder in the BEC lead - strip the leads and twist them firmly. Tin the ends with the soldering iron and a bit of solder, then crop the end off at 45 degrees. The leads should then fit into the board quite nicely. Use the legend on the board to get the correct leads in the correct holes. Once they are soldered up, crop them off and all is done.

You should clean off any remaining flux from the back of the PCB with a spirit cleaner and something like an old toothbrush; meths is fine but Isopropyl Alcohol is better.

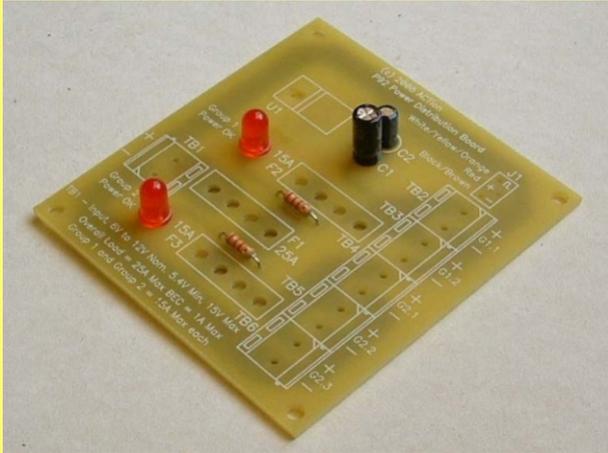
Simple - and a cure for untidy wiring".

*My thanks to Tim for his help in producing this, our first original project since Craig Talbot left us all.*

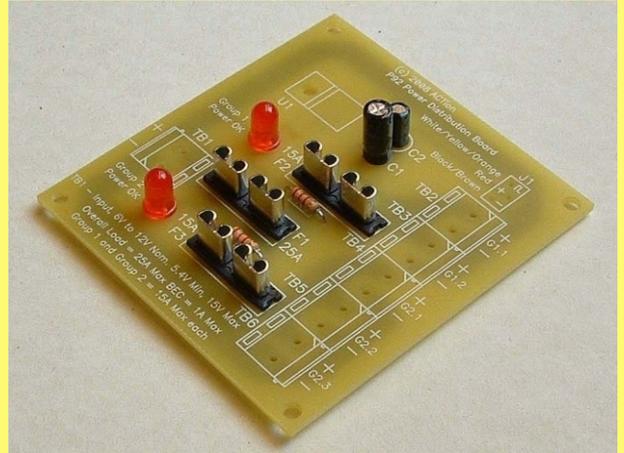
*DM Sept 2007*

# P92 POWER DISTRIBUTION BOARD

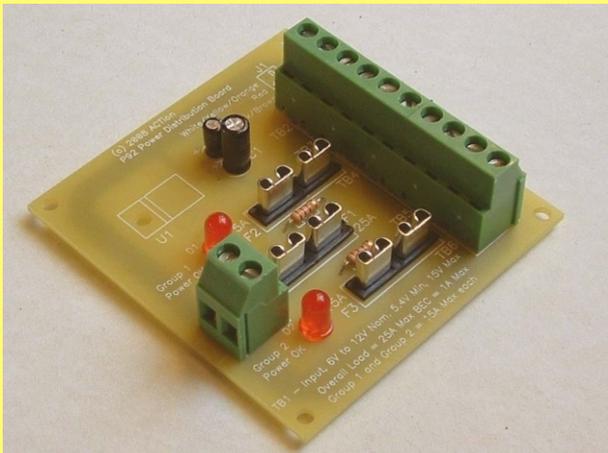
## PHOTOGRAPHIC BUILD SEQUENCE FOR KIT VERSION ONLY



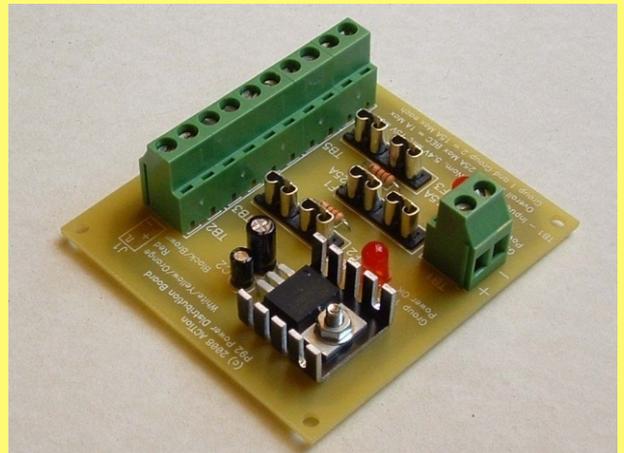
**PICTURE 1: PCB with LEDs, resistors and capacitors fitted**



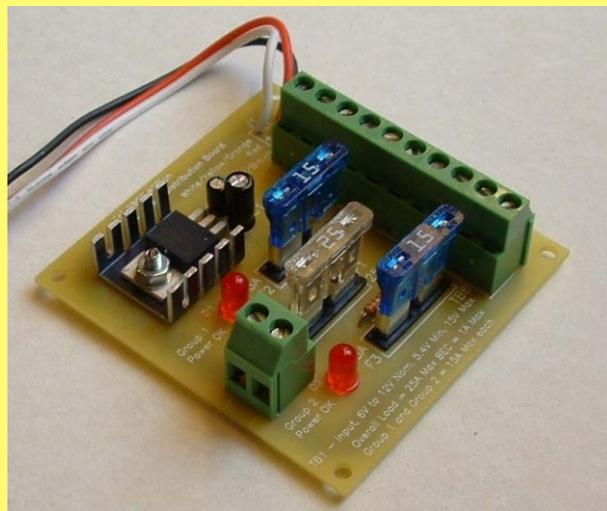
**PICTURE 2: Fuse holders added**



**PICTURE 3: Fit bank of five screw terminal blocks together plus single block for "Power In" connections**



**PICTURE 5: Fit regulator into holes in PCB. DO NOT SOLDER until you have fitted the heat-sink and screwed it firmly in place.**



**PICTURE 5: Fit receiver "BEC" lead and fuses to suit your installation (max 15A Groups and 25A Overall)**