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Switched Power Distribution Board with BEC.



The P107 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 three pairs of terminals protected by Fuse FS3.

Group 2 gives two pairs of terminals protected by Fuse FS1. This group also includes the BEC (Battery Eliminator Circuit) for the receiver and servos.

Fuse FS2 provides overall protection of the system providing a failsafe. If FS2 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 FS2 WITH A FUSE LARGER THAN 25A. NEVER REPLACE FS1 or FS3 WITH FUSES LARGER THAN 15A DOING SO WILL INVALIDATE ANY WARRANTY ON THE P107 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 Group 1 and Group 2. 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 Group 1 where possible

For single motor models, use Group 1 for the drive motor and Group 2 for the radio gear. In this case, Group 1 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 Group 1 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 Group 1 and run the auxiliary circuits onto Group 2.

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 <u>maximum</u> 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-winches it is recommended that you use an alternative supply.

Spare fuses are available in 2.5A, 3A, 4A, 5A, 7.5A, 10A, 15A, 20A, 25A, 30A & 40A 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 to wards 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.



P107 "5+1" SWITCHED DISTRIBUTION BOARD (Drawn Full-Size)



Mounting hole dimensions are 3mm dia; 60mm x 64mm spacing

The P107 Distribution Board features an ultra-low resistance, high current MOSFET switch which will isolate the power to the board, only needing a very small switch as the actual controller. This means that literally any switch of any size can be used to switch power to the model on & off. The P107 comes supplied with a miniature slide switch on a 3-way servo wire, terminated in a standard Futaba male plug, should this lead need to be extended, this can be done using a standard Futaba servo extension lead.

Connect the switch to the terminal marked "SW" on the circuit board. The connector will go either way round. which is not a problem as it will work either way.

The P107 also has another connector on the circuit board marked "MON" this can be used with an external voltage monitor, such as our miniature LED display type, to show the level of the battery. Again the connector can be plugged in either way round & although it will only work one way round, it will not damage anything if it is connected incorrectly - simply unplug it & plug it back in the other way around.



0843 2898528 or 0782 5511877

P107 KIT INSTRUCTIONS

РСВ

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 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 nearest to the other capacitor, see Drawing. The larger one is C1 and has a value of 100uF printed on it; C2 is 10uF.

D1 is a diode, a small, black, cylindrical component with a silver band at one end, printed on the diode is the part number 1N4007. This part is polarised, so note the position of the band on the assembly drawing. D2 and D3 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 away from the fuseholders. This corresponds with the negative battery input connection.

R1 to R3 are the resistors and are small tubular components with a wire coming out of each end. They are a cream colour and have three coloured bands around them, towards one end. This indicates their value - in this case R1 & R3 are both 2.2k Ohms (red, red, red, and R2 is 1.2k Ohms (brown, red, red). The other band is gold-coloured and can be ignored. They can be fitted either way around in the board.

Q1 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. Q2 comes pre-assembled onto the PCB as this is a tiny surface mount component & difficult to assemble by hand.

The fuses are automotive blade types and have one of two values; the blue ones (FS1 and FS3) are 15 Amps, while the clear one (FS2) 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 P107 is different to some 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, R3, C1, C2, D1, D2 and D3. 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.

The pin header strips of which there are two, (marked "MON" & "SW" on the PCB) are 3 gold coloured pins with a moulded black plastic base, the shorter side of the pins is inserted through the PCB to be soldered.

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. A wooden clothes peg can be used 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.*

P107 KIT INSTRUCTIONS (continued)

Next stage is to solder in the BEC lead - the leads are supplied pre-stripped & tinned, so can be inserted straight into the PCB. Once they are soldered up, crop them off and all is done.

The final stage is the assembly of the switch onto the 3-wire servo type lead. You can use any on-off switch for this, however a miniature slide switch is included with the kit.

First cut 3 small pieces (about 8 - 10mm should be enough) of the supplied black heatshrink tube & slide one piece over each of the 3 wires on the servo lead. Carefully tin the 3 terminals on one side of the switch (doesn't matter which side) then attach the red wire to the centre pin, followed by the other 2 wires to the other 2 pins (doesn't matter which way round) Then slide the pieces of heatshrink tube over the soldered joints so that the exposed pin & soldered joint are fully covered. Ideally a hot air gun should be used to blow hot air at the tubing, it will then shrink down to form a tight, insulating cover over the soldered joints. If a hot air gun is not available, carefully quickly "stroke" the heatshrink with the soldering iron, as long as you do not leave the iron in contact with the tube for too long, it will simply shrink & not melt. (There is more heatshrink supplied with the kit than needed, just in case this stage goes wrong first time!)

If you wish to use your own switch, simply connect it to the middle pin & one other pin on a 3-pin servo connector, this is then plugged into the PCB to the pin header marked "SW" with the 2 wires going to the pins closest to the edge of the PCB.

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."

ly wiring."