STEP 5. ADVANCED PROGRAMMING - NOTE: ADVANCED USERS ONLY.

Depending on your driving style or the track surface you are running on, you may want to adjust the profile of the IP6. There are 4 parameters that can be modified to fine tune the IP6 to your specific preferences.

- *Drive Frequency (1.5 -11.0KHz)*
- *Throttle Curve (1 of 8 settings)*
- *Punch Mode (1 of 8 settings)*
- *Brake Mode (1 of 8 settings, 0 to 50%)*

FLOW CHART

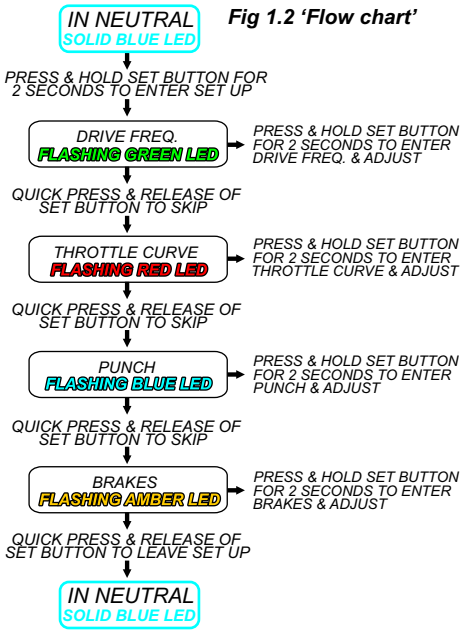

Fig 1.2 'Flow chart'

HOW TO ADJUST PARAMETERS

To adjust a parameter, enter set up & select the parameter by following the flow chart (fig.1.2), then press and hold the set button for 2 seconds. When a parameter is entered, the LEDs will light up solid to indicate which setting is currently selected. See fig. 1.3 below.

To move between settings within a parameter, it's a quick press and release of the set button, the LED indicators will change to show which setting is currently selected.

You can cycle round the settings in each parameter as many times as you like without leaving that parameter.

Once you have decided on the setting you wish to use, press and hold the set button for 2 seconds to move to the next stage in the flow chart. Continue through the flow chart until you reach the end and leave set up. Your IP6 will now be customized to your personal settings and ready to use.

To return to the 'Mtroniks factory settings' simply perform the 1-touch set up at start up. Every time you go through the 1-touch set up at start up, the factory default settings will be loaded.

Factory settings are shown in red in fig. 1.3 below.

Fig 1.3 'Parameter settings' *(LEDs on solid)*

LED colour Indicator								
Drive Freq. (KHz)	1.5	2.0	2.5	3.5	**4.5**	6.0	8.0	11.0
	SMOOTHER →							
LED colour Indicator								
Throttle Curve	+10%	**Linear**	-5%	-10%	-15%	-20%	-25%	-30%
	SMOOTHER →							
LED colour Indicator								
Punch	-30%	-20%	-10%	**STD.**	+10%	+20%	+30%	+40%
	← SMOOTHER							
LED colour Indicator								
Min Brakes % / Dead Stick	0 OFF	20 OFF	**30 OFF**	30 ON	40 OFF	40 ON	50 OFF	50 ON

TROUBLE SHOOTING

Steering works but motor won't run
Check motor connections & motor brushes.
Check ESC is plugged into correct receiver channel
Possible internal damage - contact your hobbyshop or Mtroniks service dept.

Receiver glitches & motor stutters
Receiver antenna too close to main power wires - see fig.1.1
Receiver poorly positioned - try sitting receiver on its side (crystal to the top edge)
Poor connection to battery pack - check connectors
Motor brushes badly worn - replace brushes
Power cap may be damaged - replace MPower cap (#APMPC)

Motor turns as soon as the battery is connected
You may have missed the initial set up - Turn off at switch, turn on and go through set up.
Possible internal damage - contact your hobbyshop or Mtroniks service dept.

When I turn on the ESC the amber LED is lit
ESC has no signal from receiver - check crystals and receiver connections

WARRANTY

Mtroniks Ltd guarantee this product to be free from factory defects for 24 months from purchase date verified by receipts. This does not cover suitability for specific applications, components worn by use, tampering, incorrect connection, alteration to original connectors, switches or wires (apart from fitting of an in-line fuse), damage to batteries or other equipment through use, misuse or shipping damage.
Our liability is limited to repairing or replacing units to the original specification. Our liability will not exceed the cost of the product. By using this ESC, the user accepts all liability. We reserve the right to modify this guarantee without prior notice.

SET UP GUIDE – IP6

IP6 COMPETITION RACING ESC

SPECIFICATIONS

Input Voltage	4-7cells (1.2Volts DC/cell)
Motor Limit	No Motor Limit (DC brushed type)
Dimensions	33.0mm x 25.0mm x 15.0mm
Weight (w/o wires)	20.0g
On-Resistance @ Transistors*	0.00020ohms
Rated Current (Forward/Braking)	660/240amps
Peak Current (Forward/Braking)	2640/960amps
B.E.C. Voltage/Current	5.6VoltsDC/8.0amps
Schottky Diode	2 x 8A supplied
Power Wires	4x150.0mm/14G
Adjustable Features	Drive Frequency 1.5-11KHz
	Throttle Curve 1-8
	Punch Control 1-8
	Minimum Brake Adjustment 1-8
PWM Frequency	1.5-11KHz

* Transistor rating @25C

100% WATERPROOF
NEW SMALL FOOTPRINT
INCREASED HIGH RELIABILITY
INCREASED HIGH POWER HANDLING

******** PLEASE READ ALL INSTRUCTIONS BEFORE USING THE IP6 ********

MTRONIKS RACE ACCESSORIES

MPOWER CAPACITORS (#APMPC)
An Mpower capacitor is supplied with the IP6 ESC and must be fitted to help the ESC run smoothly and also increase the efficiency of the initial power supplied from any battery pack. See fig.1.1
Replacement MPower capacitors are available from most good model shops.(#APMPC)

SCHOTTKY DIODES (#APSD)
The IP-6 ESC comes supplied with 2-OFF 8A Schottky diodes. These must be fitted directly to the motor terminals at all times to ensure cool running of both ESC & motor. See fig.1.0
Replacement Schottky diodes are available from most good model shops. (#APSD)

MOTOR CAPACITORS (#APMCAP)
Motor capacitors are usually pre-installed on most RC motors.
Mtroniks motor capacitors are available from most good model shops. (#APMCAP)

BATTERY CONNECTORS (#APM40 - ESC/#APF40 - BATT)
Mtroniks recommend the use of gold multi contact plugs.
Mtroniks gold multi contact plugs are available from most good model shops. (#APM40 - ESC/#APF40 - BATT)

WARNINGS & PRECAUTIONS

NEVER REVERSE CONNECT YOUR IP6 ESC!
Reverse polarity battery connection or battery short circuit will damage your ESC.
ALWAYS FIT THE SUPPLIED SCHOTTKY DIODES!
You must always fit schottky diodes to your motor when using the IP6, NEVER use schottky diodes with a rating lower than 8A.
ALWAYS INSULATE WIRE JOINTS!
You must always insulate any wire joints or bare wire with heat-shrink or electrical tape to prevent any short circuits that could damage your ESC.
DISCONNECT BATTERIES WHEN NOT IN USE!
Never leave your battery pack connected to your speed controller when not in use.
DO NOT SHORT THE B.E.C OUT!
Never short out the Hyper B.E.C. Such a high power short could cause damage to the receiver.

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STEP 1. RECEIVER CONNECTIONS

The IP6 speed controller is fitted with an industry standard JR receiver lead. The plug on the end of the lead is compatible with all major radio brands recent receivers. However, some of the older receivers must have the wiring order into the plug changed. **This is important because the receiver and or the speed control could be damaged if connected up incorrectly.**

CHANGING WIRING ORDER

If you are using any of the following :
JR, HiTEC, Futaba, new KO & Airtronics Z receivers (Airtronics Z receivers have blue plastic cases & new KO cases have tabs on the input sockets, see fig.a), you do not need to change the wiring order on your receiver lead.
Simply plug the receiver plug into channel 2 on your receiver with the brown wire towards the edge of the receiver.

Fig a. New KO (with tabs)

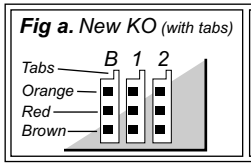
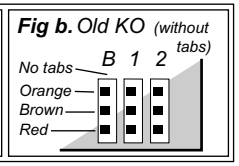


Fig b. Old KO (without tabs)



If your receiver is an older KO or Sanwa/ Airtronics, (Old Sanwa /Airtronics cases are black in colour & old KO cases do not have tabs on the input sockets, see fig.b), you will need to change the wiring order on your receiver lead.
To change the wiring order on your receiver lead you will need to gently lift the plastic retaining tabs on the plug remove the red and brown wires, interchange them and re-insert them into the plug so that the brown wire is now in the middle (see fig.b). Push the wires into the plug gently until the plastic retaining tab clicks. Now plug the receiver plug into channel 2 on your receiver with the red wire towards the edge of the receiver.

USING A RECEIVER BATTERY PACK

If using an external battery pack to power the receiver PLEASE observe the following points.

- ***REMOVE the red wire from the IP6 receiver lead before plugging it into your receiver***.
- Use ONLY a 4 Cell(1.5V cells) or 5 Cell(1.2V cells) battery pack and plug it into the battery slot on your receiver.
- Do not leave the IP6 switched on even if the receiver battery pack switch is in the off position.

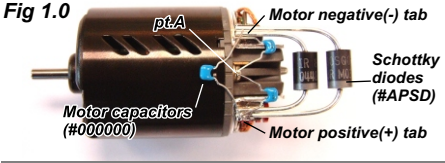
STEP 2. MOTOR PREPARATION

MOTOR CAPACITORS

Electric motors generate 'RF noise' which can cause interference or 'glitching'. Most motors come fitted with suppression capacitors to help prevent this from happening.
If your motor is not fitted with any suppression capacitors you will need to fit some. Mtroniks motor capacitors #APMCAP.
See below for install instructions..

Solder 1 x motor capacitor (#APMCAP) between:
- Positive(+) motor tab & negative(-) motor tab.
- Positive(+) motor tab & ground tab (see below, pt.A).
- Negative(-) motor tab & ground tab (see below, pt.A).

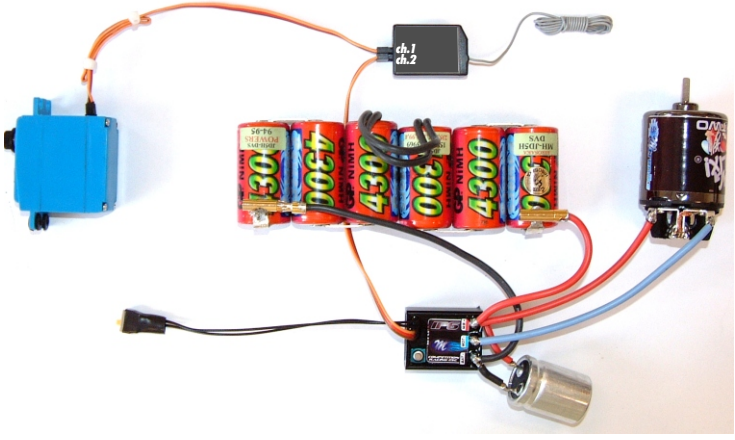
Fig 1.0



FITTING SCHOTTKY DIODES

When using the IP6 ESC you must fit the two 8A Schottky diodes to your motor (Included).
Replacement Schottky diodes #APSD
Fitting these devices helps the IP6 run cooler & more efficiently and also helps protect the brakes! Not fitting the Schottky diodes can cause premature failure of your ESC & motor comm damage.
To fit the Schottky diodes, solder the lead closest to the silver band on the body of the Schottky diode to the positive(+) motor tab, then solder the other lead to the negative(-) motor tab.
Fit the second Schottky diode in the same way.
(See above for diagram)

Fig 1.1



STEP 3. INSTALLING THE IP6

POSITIONING OF THE IP6

The IP6 speed controller must be mounted as far away as possible from the other electronics in the model, especially the receiver & antenna wire. Do not bundle or tie-wrap any of the receiver wires or antenna wire to the IP6's power wires. Mount the IP6 in a position where it will receive as much air flow across it as possible, this will help a great deal in keeping the ESC cool and ultimately make the IP6 run more efficiently. With a suitable mounting position decided, we can now attach the wires to the IP6.

WIRING IN YOUR SPEED CONTROL

The IP6 comes with a set of power wires and a Power capacitor that need fitting before you can use your speed control. See fig.1.1 for diagram
1. Fit the Power capacitor. To fit this, apply solder to the positive lead from the capacitor and position it over the positive battery/motor post (RED) on the IP6, then, apply solder to the negative lead from the capacitor and place over the negative battery post (BLACK). Once the capacitor is in position, hold each wire to the post and heat each joint with a soldering iron whilst applying thin solder to the point where the wire meets the post. DO NOT HOLD THE IRON ON THE POST FOR MORE THAN 3 SECONDS, prolonged heat can damage the ESC. The solder should run over the post and wire making a clean joint.

NOTE:
Keep wires as short as possible!

2. Fit the red wire. Solder one end of the first red wire to the positive battery/motor post (RED) on the ESC. Solder the other end to the positive tab on the motor. Take the second red wire and fit your chosen battery connector to one end. Solder the other end of the second red wire, again, onto the positive battery/motor post (RED) on the ESC. See fig 1.1
3. Fit the blue wire. Solder one end of the blue wire to the negative motor post (BLUE) on the ESC and the other end to the negative tab on the motor.
4. Fit the black wire. Fit your chosen battery connector to one end, then solder the other end to the negative battery post (BLACK) on the ESC.

NOTE:
Before mounting the IP6 we advise that you wipe the base of the ESC with a cloth and small amount of motor cleaner, this will clean the base and allow double sided tape to adhere correctly.

STEP 4. PROGRAMMING

1-TOUCH SET-UP

Now that the IP6 is fully installed in your model you need to calibrate it to your transmitter.

Turn your transmitter on with the throttle trigger and throttle trim in neutral.
Plug your IP6 into a battery pack and turn it on using the on/off switch.
(As soon as you switch on the IP6 the red & green LEDs will begin to flash, they flash for 1.5 seconds only.)
As soon as you have switched the IP6 on and before the red & green LEDs stop flashing, with your throttle still in neutral, press the set button once. (If you miss the 1.5 second window and the LEDs stop flashing before you have pressed the set button, you must switch the IP6 off at the switch and start again.)
The green LED will be lit, move your throttle trigger to the maximum forward position, then return to neutral.
The red LED will be lit, move your throttle trigger to the maximum brake position, then return to neutral.
The blue LED will be lit, this signals that set up is complete! (The blue LED also signifies that the ESC is in the neutral position, Green & Amber signifies part throttle, Green signifies full throttle, Red & Amber signifies part brake & Red signifies full brakes.)

YOUR IP6 SPEED CONTROL IS NOW SET & READY TO GO WITH FACTORY SETTINGS AS USED BY THE MTRONIKS RACE TEAM!
The next and following times you switch on, if you do not want to re-calibrate the ESC again, let the LEDs stop flashing before use.

NOTES:
If you adjust your transmitter settings you will need to go through the set-up procedure again.

If, when you switch your IP6 speed control on, the red & green LEDs don't flash but the amber LED is on solid, this means that the ESC is not receiving a signal from the receiver. Check that the IP6's receiver lead is plugged into the receiver correctly, that your transmitter is turned on and that you have the correct crystals fitted.