Thank you for purchasing the Thunder Power eZ Programmer program card for brushless motor Electronic Speed Controllers (ESC). With this device, you can easily set the programmable value of the ESC. Now you can just forget the complicated and boring programming method using the throttle stick on your transmitter.

This program card is very easy to use, and it is as small as a business card, so you can put it in your pocket when you are in the field.

SPECIFICATION:
1. SIZE: 83.5mm x 50.5mm x 6.3mm
2. WEIGHT: 24g

FRONT PANEL:
1. Use "Up/Down" button to select each programmable item, use "Left/Right" button to select item value, use "Reset" to set each of the programmable values to the ESC's default values;
2. **Battery Type:** *Li-xx* means lithium battery (Li-ion or Li-Po), *Ni-xx* means NiMh or NiCd battery;
3. **Cut Off Type:** *Soft-Cut* means the controller will gradually reduce the output power when the low voltage cutoff threshold is reached, *Cut-Off* means the output will be immediately shut down;
4. **Governor Mode:** It is a special function of the controller for helicopters;
5. **Cutoff Voltage** : Refers to the Low Voltage Cutoff Protection Threshold.
   - ◆ For Li-xx battery (Li-ion or Li-Po) ,number of battery cells are calculated automatically , *Low / Middle / High* cutoff voltage of each cell are: **2.75V/3.0V/3.25V**. Example: For a 3 cell Li-Po battery pack, when "*Middle*" cutoff voltage is set, the cutoff voltage is:
     3.0 x 3 = 9V. WARNING: **We highly recommend that Li-xx batteries not be allowed to discharge below 3.0V, or damage will occur to the battery.**
   - ◆ For Ni-xx battery (NiCd or NiMh), *Low / Middle / High* cutoff voltages are 0%/50%/65% of the startup voltage (i.e. the initial voltage of battery pack when the model is power on), and 0% means low voltage cutoff function is disabled. Example: For a 6 cell NiMh battery pack, fully charged voltage is 1.44 x 6 = 8.64V, when "*Middle*" cutoff voltage is set, the cutoff voltage is : 8.64 x 50% = 4.3V。 (Remark: For TPE-40BG4 ESC, the *Low / Medium / High* cutoff voltage for each Ni-xx battery cell is 0%/45%/60%)
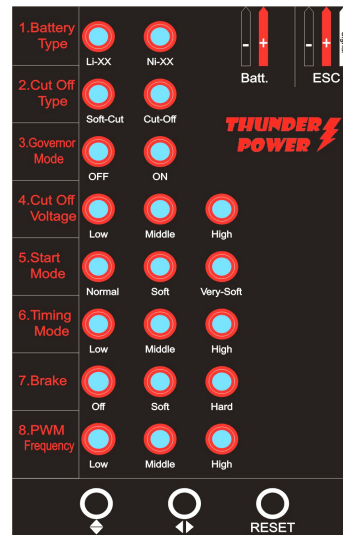
6. **Start Mode:** Usually, *Normal* is suitable for fixed wing aircraft; *Soft* and *Very Soft* are suitable for helicopters;
7. **Timing Mode:** Please choose the suitable timing value for your motor to get the best driving performance : Low = 0degree Middle = 15degree High = 25degree
8. **Brake:** *Hard* means the motor will be stopped immediately when throttle stick is moved to bottom; *Soft* means the braking force is gradual.
9. **PWM Frequency:** *Low* is suitable for most brushless motors; *Middle* is recommended for low inductance motors; *High* is recommended for very low inductance motors.

CONNETING PROCESS:
1. Disconnect the main battery pack from ESC;
2. Disconnect the controlling cable of ESC (trio wires) from receiver, then connect it to the 3 pins on the top right position of program card (The 3 pins marked with "ESC") ;
3. Connect the main battery pack to ESC;
4. The LEDs on the program card will light, showing the current programmable value of the ESC;

WARNING: **THE SEQUENCE OF** <u>STEP 2</u> **AND** <u>STEP 3</u> **IS IMPORTANT! Please connect the controlling cable to program card first, and then connect the main battery pack to the ESC power input (for ESC with built-in BEC). Otherwise, the program card cannot work properly.**

OPERATION:
Press "Up/Down" button to select the programmable item; the corresponding LED will flash. Then press "Left/Right" button to select the item value; when the button is released, the current setting is immediately stored in the ESC.

Use a program card to program the ESC of OPTO:
If the ESC is "OPTO" type, which means the ESC does not have a built-in BEC (Battery Elimination Circuit), and you must use a battery pack to power the program card (such as your receiver pack). In such a case, please connect the receiver pack to the 3 pins on the top right position of program card (The 3 pins marked with "Batt.")

WARNING: **You must connect the additional battery pack to the program card before connecting the main battery pack to the ESC; the sequence can not be reversed.**

DECLARATION:
This program card is ONLY suitable for THUNDER POWER ESCs. Ask your retailer for detailed product information for other brands. Some types of ESCs do not have all the functions listed on the panel of program card; in such a case, the value changing of these function items on program card has no effect to the ESC.