

A guide to using the Hyperion Titan ESC PC Interface software

By Rod Badcock for Hyperion HK

What does this software do?

Using a desktop PC, Hyperion PC interface cable and Hyperion ESC it allows programming of the speed controller without an the need for an Emeter or 'stick programing'. All current (and future) speed controller functions have been built-in and allow setting of:

- Brake
- Battery chemistry
- Low voltage cut-off
- Action on reaching low voltage cut-off
- Soft start
- Timing
- PWM frequency
- Rotation direction
- Governor (RPM control)

What are the software and hardware requirements?

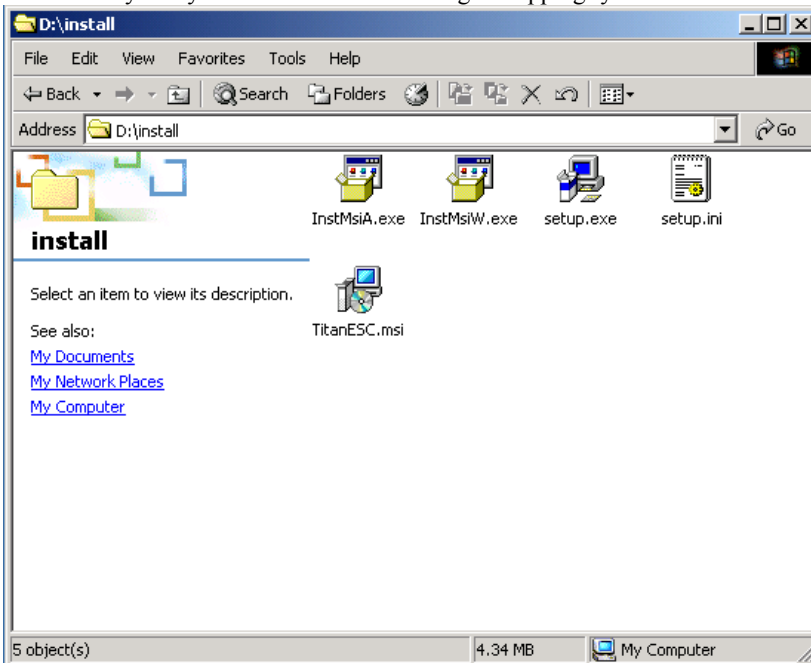
- An Hyperion Titan series ESC
- The Hyperion PC interface cable

The software will run on very simple hardware, common even in older laptops:

- A PC with Intel Pentium processor (equivalent, or higher)
- A free serial port (a USB to serial adapter can be used)
- 5 MB free hard disk space
- 32 MB memory
- Windows 98 or higher OS (Windows 2000, NT, XP)

Installation

The software is supplied as a compressed 'zip' file in order to save space. Please save this file and 'unzip' the contents to a directory ready for installation. Following 'unzipping' you should see the following installation files:



These files will use 5 MB of disk space.

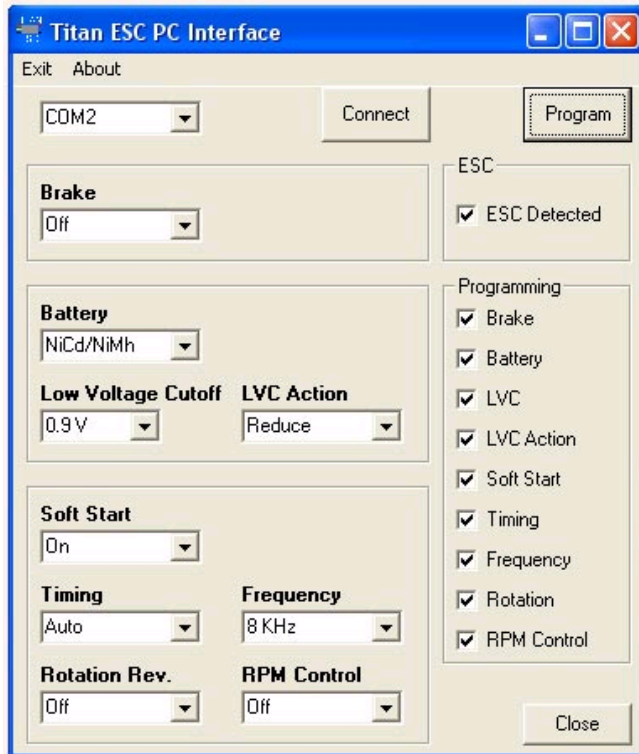
To start the installation of the software 'double-click' the setup program 'setup.exe' and follow the on-screen instructions.

The installation program will create the following:

- A shortcut called 'TitanESC' on the desktop
- An entry on the start menu of 'Titan ESC' under 'Hyperion'

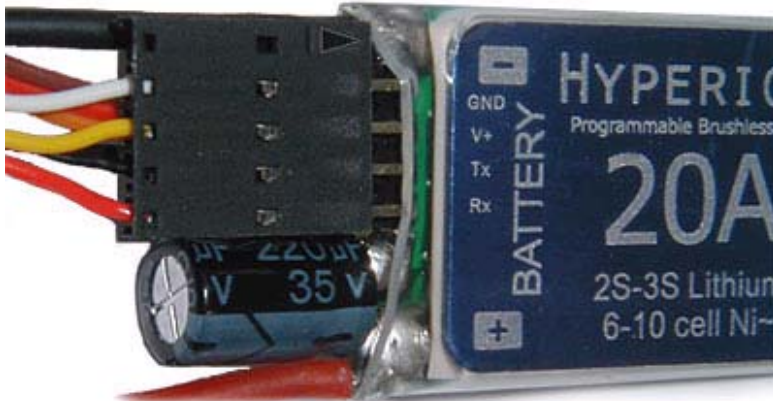
Running the software

From the 'start' menu of Windows select 'Programs', 'Hyperion', 'Titan ESC' and click on the Titan ESC listing. This will start the software and you will be presented with the software front-panel similar to that below (with all possible selections greyed out until after connection with the ESC):



Connecting to the Titan ESC

The four pin connector of the Hyperion interface cable should be inserted into the Titan ESC, observing the correct attachment of connector to the Titan ESC, as shown in the picture below:



The blanked pin-out on the connector (see arrow) orients AWAY from the condenser, and TOWARD the black negative battery-side wire on the Titan ESC. **Note:** the polarity information on the ESC heat-sink (GND V+ Tx Rx) is NOT intended to match particular wire colours on the connector.

The other end of the interface cable should be inserted either into one of the PC's 9-pin serial ports or into a 'USB-Serial' adapter.

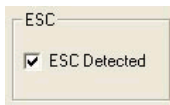
In order to recognise and program the Titan ESC a battery pack **must** be connected to the ESC. Connect a main power pack (the one that powers your model) to the "battery" side RED/BLACK wires on the Titan ESC. (Be SURE that polarity is correct, and pack voltage is between 6V and 10V. REMOVE propeller before starting, or disconnect motor)



The software will automatically query your computer and identify what serial ports are present in your PC (COM1-18), with the first available port being displayed in the drop down box. Choose the correct serial port from the drop down list at the top left of the software and click the "Connect" button.

[If you find no serial ports listed in the drop-down box, it may be that your PC is set in "CMOS Setup" to disable all serial ports. Consult your PC manual for instructions on entering CMOS Setup mode. Most modern PCs have an "automatic" setting for serial ports in CMOS, and this should be tried first. We do not support PC setup questions, so ask a friend if you get stuck, please.]

If successful then the 'ESC detected' item should be 'checked' indicating that the device has been identified. The programming options and selections will now be enabled – with the current ESC settings set as default.



Setting the ESC parameters

The ESC functions have been grouped into three areas:

1. Brake Mode
 - a. On / Off / Soft
2. Battery
 - a. NiMH-NiCd / 2S Li-Po / 3S Li-Po
 - b. Low Voltage Cut-Off
(0.6 V, 0.7 V, 0.8 V, 0.9 V for Ni-chemistry)
(2.7 V, 2.8 V, 2.9 V, 3.0 V, 3.1 V for LiPo)
 - c. Low Voltage Cut-Off Action
(Cut, Reduce, No Cut)
3. Timing
 - a. Soft Start (Off, On)
 - b. Auto / Soft (7 deg) / Hard (30 deg)
 - c. Frequency (8 kHz / 16 kHz)
 - d. Rotation Reverse (Reverse Off / Reverse On)
 - e. RPM Control (Off / Range 1 / Range 2 / Range 3)

Once the ESC has been 'detected' the all options may be set and programmed. The following outlines the selections:

Brake

This function sets whether the controller will physically stop the propeller (brake) when throttle is cut. It is usual to set this to 'off' to avoid shock when using ducted fans and 'on' to avoid drag with folding props.

Available options: Off, On

Battery

This section allows the chemistry, cut-off voltage and action on cut-off to be set. The software automatically detects the Titan ESC type, and offers appropriate Li-Po choices, up to 12S for the upcoming Aero 80A ESC.

Available options: NiCd/NiMh, 2-12S LiPo

Low voltage cut-off is selectable from the two ranges presented for either Ni – or LiPo chemistry. In general 3.0 V is accepted as being normal for LiPo and 0.8 V for Ni chemistry.

Available options: 0.6 V, 0.7 V, 0.8 V, 0.9 V for Ni-chemistry

2.7 V, 2.8 V, 2.9 V, 3.0 V, 3.1 V for LiPo chemistry

The action when low voltage cut-off is reached is critical to prevent damage to your battery packs. Three options are presented which will either 'cut' the motor, reduce the power of the motor or to take no action. The 'Reduce' option is usually preferred as this will allow time for landing whilst still indicating that the battery pack is in a discharged state.

Available options: **Cut, Reduce, No Cut**

Timing

This section controls the way a particular motor is controlled – from soft-start through timing control to speed governing.

The response of the motor to throttle opening is controlled by the 'Soft Start' option; for example you might want to avoid torque-roll or to avoid shock damage to a gearbox and therefore opt for a soft start. For most direct drive motors this can usually be set to 'Off'.

Available options: **Off, On**

The controller has three timing modes; Automatic works for **ALL** types of brushless motors. But for some high-pole-count or homemade brushless motors, you may want to try hard timing for optimal efficiency and power.

Available options: **Auto (7-30 deg), Soft (7 deg), Hard (30 deg)**

The controller has two switching frequency modes. The default 8 kHz works well with almost all motors, but you may see a gain in efficiency at 16 kHz setting for high-pole-count motors such as out-runner or LRK motors.

Available options: **8 kHz, 16 kHz**

Motor rotation direction can be reversed either by swapping any two motor leads or by software. This is set by the 'Rotation Reverse' option.

Available options: **Reverse Off, Reverse On**

In some applications it is useful to limit the maximum RPM of a particular motor. This is achieved through the 'RPM Control' setting. The ranges for control are as follows:

- RANGE 1 - Max 40,000 rpm / number stator poles
- RANGE 2 - Max 100,000 rpm / number stator poles
- RANGE 3 - Max 200,000 rpm / number stator poles

Where Motor RPM = [electrical RPM*2 / # of stator poles]

So, for example, a two-pole motor in Governor Range 1 would be limited to: 40,000 rpm / 2 = 20,000 rpm.

Available options: **Off, Range 1, Range 2, Range 3**

Choose whichever ESC settings you like from the various drop-down boxes. Note that some options are mutually exclusive; when this occurs a warning will be given.

Programming the Titan ESC

Click the 'Program' button when all selections have been completed. The software will now program the ESC and provide visual confirmation that each setting has been sent and verified by the 'check list' that appears in the 'Programming' box. Once programming is complete the box should appear as below:



Finished! Disconnect the battery pack from Titan ESC and press the 'Close' button to stop the software.

.... *And finally*

This software will be under constant development - if there is something that you want to see in this software then get in touch!