450 Heli setup with Er9x transmitter firmware

In this tutorial I will be covering the setup of an HK450TT helicopter. This is a Trex 450 pro clone from Hobbyking.com.

While building my heli I followed the build videos by Finless Bob. You can find these on www.helifreak.com. There are other videos dealing with general heli setup and build videos for several other types of helis also. My setup is partially based on what Finless has suggested and the example setup that is in the Thus firmware manual for the 9x.

I am going to assume that you have read through the rest of the wiki and my previous tutorial on setting up a 4-channel airplane. Basically I will assume you know how to navigate the menus and enter values.

So lets get started. On setup screen 02 input a name for your heli. Mine is simply named “HK450TT.” I have my timer set for 6:00 and to use the same switch as throttle cut. Actually I have mine set to “!THR.” This means that whenever I have the throttle cut off the timer will run. This seemed to be the same as having a separate timer and hitting start just before you spin up to go. Throttle trim and expo are both set to off. And the trim inc is set to “Fine.” The trim increment is a matter of personal preference, set it how ever you like. The proto line has been left at its default “PPM 8ch 300uSec.”

Skipping to the curves screen, which is screen 06. Curves are easily set-up. I know I didn’t cover this in my other tutorial so let’s cover it now. To set up a curve high-light the curve name, I’ll use CV1 for this example. Press the menu key to go into the edit screen. Curve one is a 5 point curve. This means you get to set the endpoints, the midpoint, and a point in between each of those. So you are setting the servo position at 0%, 25%, 50%, 75%, and 100% of stick travel. Each point is adjustable from -100 to 100. CV1 is the throttle curve for my normal mode of flying, or ID0. The topmost number sets the position for when the stick is at it’s lowest point. So my first number is -100. This means the motor will be stopped when my stick is all the way down. Each motor is different so use the rest of my numbers as a starting point and adjust them for your specific heli and motor combination. My second point is -15. The third is 0. The fourth is 50. And finally the last one is set at 100. Exit the edit menu by pressing exit. You should now see the values you put in across the row for CV1.

My other throttle curves are CV2 and CV3. CV2 I have set as 100, 55, 15, 55, 100. This is my throttle curve for idle up. Either ID1 or ID2. CV3 is set as -100 all the way across. This will be used to set up throttle cut later.

I have CV4 and CV5 set up as my pitch curves. CV4 is set as -30, -15, 0, 50, 100. This is my normal mode or ID0 pitch curve. If you have your heli set up like Finless Bob suggests, 0 pitch will be at 0 on your pitch curve. So any negative numbers are negative pitch. You will need a little negative pitch even for normal mode on a heli. This is because when a breeze blows it gives the spinning rotor disk some extra lift. If you had no negative pitch your heli will not descend in a breeze unless you get the rotor spinning slow enough that it stops producing lift. From experience I also know that you lose control of the heli at this point also. I wish I would have watched Finless Bobs videos before I set up my first heli. Ok so on to CV5 setup. You may have noticed in the curve editor that there is a line called preset. This has some preset curves all setup for you to use. Scroll down to preset and then using the + and - buttons choose this curve. -100, -50, 0, 50, 100. This will become the ID1 and ID2 pitch curve.

I will mention here that if you feel you need more points on your curve that 9-point curves are available from CV9 to CV16. I don’t have any set up since the 5-point curves work just fine for me.

Now for the interesting part, the mixer menu(screen 04). This is more complicated than

setting up an airplane, but maybe once you see it, it will make better sense to you. I originally found these numbers in an example of a setup for the Thus firmware.

Starting at the top is CH1. CH1 is the right aileron servo looking from the nose of the heli. I have the setup shown below:

CH1		36%	ELE		
	+	-62%	AIL		
	+	-55%	THR	ID0	c4
	+	-55%	THR	ID1	c5
	+	-55%	THR	ID2	c5

I know what you are thinking at this point. What does all of that mean? Let me try to explain. The 36% elevator and -62% aileron are from the Thus example. I think if you change these numbers it is like setting the swash mix in other radios. The numbers here give me plenty of throw so I have left them alone. You will notice that there are three different throttle stick mixes for this channel. The software will only use 1 at a time based on the IDx switch position. So remember that c4 was the pitch curve for normal mode? When the switch is in position ID0 the c4 curve will be mixed with the channel. ID1 and ID2 are duplicates of each other. I was afraid I might flip the switch on click too many and I didn't want to find out what happens when you do that. CH6 is the other aileron servo. Here is what it looks like:

CH6		-36%	ELE		
	+	-62%	AIL		
	+	55%	THR	ID0	c4
	+	55%	THR	ID1	c5
	+	55%	THR	ID2	c5

This is the same as channel 1 except the elevator and throttle functions are reversed. This is because the servo arm faces the opposite direction of the other aileron servo.

Now for CH2 which is the back or elevator servo:

CH2		-72%	ELE		
	+	-55%	THR	IDO	c4
	+	-55%	THR	ID1	c5
	+	-55%	THR	ID2	c5

Again the elevator setting is from the Thus example. The throttle settings are the same as before.

CH3 is for the throttle. Here is the setup:

CH3		100%	THR	ID0	c1
	+	100%	THR	ID1	c2
	+	100%	THR	ID2	c2
	R	100%	THR	THR	c3

You will notice there is an R in the second column. This stands for replace. You will need to change that in the mix editor under multplx. This means that the channel will be taken over when the thr switch is switched forward. This is the throttle cut mix. Remember that c3 was all set to -100%. Doing the throttle cut this way allows the cyclic to still operate even if the motor is not running.

CH4 is the tail servo. The setting for channel 4 is 100% RUD. CH5 is easy too but the input needs to be a switch. To set this input to a switch first set source to FULL. This gives -100 to 100 to the output. Then simply set switch to GEA, for gear switch. Or any other switch you want to use. CH5 is the gyro gain channel.

Let us move on to screen 05. I have all the limits set to 100 with the exception of CH5. I have these limits set to -55 and 40. The -45 is the gain for heading hold mode. I have the gear switch set to put the gyro in HH mode with the switch back. You will have to change the limits

for channel 5 to suit you heli and gyro, probably they will be different than mine. I have only channels 4 and 5 set to invert. The subtrim values for channels 1, 2, and 6, will need to be adjusted for your setup. All of these servo arms should be level when the throttle stick is at 50%. 50% is the 0 pitch point.

Moving to screen 03. The expo and dual rate settings screen. All of my rates are controlled by the AIL switch. My low rates have 15% expo and 60% rate. And my high rates are 20% expo and 80% rate. I should note here that the throttle has no rates set up. Leave the throttle set for 100% 0 expo and no switches. These are the rates I have learned to fly on. I have been flying around normally and have even done loops. As of this writing I have only attempted one roll but I'm still learning.

The pitch throttle curves that I have on my heli give me -10 to 10 degrees of pitch with 0 degrees right at 50% throttle stick.

I hope this helps to get your heli setup. Happy flying and if you need additional help you can always try the Rcgroups forum.