Creating a Basic Helicopter Model
Part 1/3: Getting Started

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Introduction

As you are here, I assume you have read the "TX Helicopter Model Basics", so I will not go over that information again. If you haven't read it, especially if you're new to helicopters, go back and do so, as what follows probably won't make much sense if you don't.

An upfront warning, this is a long lesson. Allocate plenty of time to get through it if you have not played much with a Taranis radio. You may wish to print this article, because it can serve as a complete checklist as you work through the programming. VERY handy!

You have your OpenTX transmitter, and your brand new RC helicopter and want to get it flying. The manual is written in Hieroglyphs, possibly translated from Swahili. Your transmitter battery is charged and so is your RC helicopter's battery, but how do you get the transmitters sticks and switches to make your RC helicopter fly? Read on.

This lesson is to teach you how to program a very basic helicopter model into the OpenTX transmitter. The instructions will be specific for a FrSky Taranis X9D transmitter running v2.0 of the firmware, however should be close enough for any other transmitter running v2.0 of the OpenTX firmware. Check other areas of the Open-TXU.org site for more information as to how to load OpenTX onto your transmitter, or upgrade its version.

When you're finished, here's what your model will have:

- Normal swash plate (ie. No CCPM mixing. Standard for flybarless collective pitch RC helicopters - see "Creating a CCPM helicopter model" if CCPM mixing required in the OpenTX transmitter)
- Normal mode and two idle up modes on switch SE
- Flat throttle curves
- Throttle hold on switch SF
- DR and expo set and NOT switchable
- Heading hold and rate mode gyro settings switch on switch SB
- Channel order: 1-Throttle, 2-Aileron, 3-Elevator, 4-Rudder, 5-Gyro, 6-Collective (this is standard for Spektrum equipment – like Blade BNF helis).
- Voice alerts when switching modes or activating throttle hold
- Countdown timer running any time the throttle is over 25%

The assumption for this model is based on the Blade 450X using the Orange DSMX module in

the FrSky Taranis X9D transmitter.

Instructions for this programming will be done through the transmitter front panel. This program be done on Companion 9X (and a .eepe is provided).

For the following instructions, please read "OpenTX in transmitter programming basics". This goes through the terms used below (ie. MENU = "M", PAGE = "P", ENT = "E", EXIT = "X", + and - = "+" and "-"; and lo = long press of button (no suffix means short press).

Let's begin.

Step-by-Step

Getting Started

1. Turn on the OpenTX transmitter.
2. Ensure that the channel order is as expected.
   1. "M"lo and then RADIO SETUP" should be displayed.
   2. Press "+", "+" and "Default channel order" should be highlighted. Change to "TAER" if it is not.
   3. At this stage you may want to check the "Mode" (mode 2 is throttle left, mode 1 is throttle right), default date and time, default volume.
   4. If you have not calibrated the transmitter yet, "P" button till on CALIBRATION screen and calibrate your sticks.
   5. "X", "X" when done to go back to main menu screen.

Completed Radio Setup Screen

1. Create a new model to edit.

   1. Press "-" until a blank model is selected
   2. "E"lo button, "Create Model" should be highlighted. "E" to create the model.

3. "X" back to main screen, clearing any warning screens along the way

Create Model Window

Creating Logical Switches

Create a logical switch that activated when the throttle is over 25%. This means that the timer won't start until the throttle is over 25%. The reason for the creation of the logical switch first is because it cannot be selected unless created. If you are creating logical switches for throttle hold or flight modes or other functions, create these first before building the rest of the model (even if you only assign a default switch, ie OR SA- SA-). To do that:

1. "P"lo to go backward one screen to TELEMETRY
2. "P"lo to go backward one screen to SPECIAL FUNCTIONS
3. "P"lo to go backward one screen to LOGICAL SWITCHES
4. L1 should be highlighted. "E" to select first entry in L1. ("Function")
5. "E" to edit the entry.
6. "+" till "a>x" is displayed.
7. "E" to commit value.
8. "-" to highlight next value. ("V1")
9. "E" to edit the entry.
10. "+" till "CH1" is displayed. It's a ways up there; just after TR16.
11. "E" to commit value.
12. "-" to highlight next value. ("V2")
13. "E" to edit the entry.
14. "-" until "-50" is displayed.
15. "E" to commit value.
16. "X" to highlight L1 (and show we have finished editing L1 contents.

Logical Switch L1 Complete

OK, you're still on the LOGICAL SWITCHES screen. If not, get there, because if you don't, the following instructions won't make sense.

For our next operation, we need to get back to the MODEL SETUP screen to begin building our model. We can do so in several different ways, the most common of which is to simply cycle through the model setup screens with a short press of "P." The other way would be to "P"lo to back up one screen with each press. Because it's longer for us to backup in this case, we'll just "P" to move forward:

1. "P" to go forwards to screen SPECIAL FUNCTIONS
2. "P" to go forwards to screen CUSTOM SCRIPTS
3. "P" to go forwards to screen TELEMETRY
4. "P" to go forwards to screen MODEL SELECTION

Basic Model Setup

Now to start setting things about the model like name, image, timer, etc. Remember, you're now in the MODEL SETUP screen. If you're not on the MODEL SETUP screen:

1. Press "M" to access the MODEL SELECTION screen
2. Press +/- to highlight the model you wish to work with
3. Press "P" to enter the MODEL SETUP screen

OK, now that we're definitely on MODEL SETUP:

1. Press "E" to edit the model name
2. Give it a name like (My Heli), names are entered on character at a time (+/- to change the character, "E" to advance a character, "E"lo to change current character to opposite case (upper/lower) and go to next character, "X" to finish editing name.
3. "-" to highlight Model Image
4. "E" to select an image (protos is a known heli image, there are many others and you can add your own on the SD card). Highlight image you want and "E" to accept.
5. "-" to highlight Timer1 activation
6. "E" to edit from OFF to activate. "+" till L1 displayed, then "E" to select.
7. "-" to highlight Timer1 minutes section (the first pair of zero's)
8. "E" to edit from 00, -/+ till 05 displayed, **then "E"** select it. This sets Timer 1 to 5

minutes.

9. "-", "-", "-" to highlight Minute Call checkbox.
10. "E" to check.
11. "-" to highlight Countdown
12. "E" to edit from Silent, "+" till Voice is displayed, then "E" to select.
13. "-" 12 times to highlight Throttle Timer Source. (**Don't** confuse with Throttle Reverse, a 2-line label)
14. "E" to edit from Thr, "+" till CH1 is displayed, then "E" to select.
15. "-" 3 times to highlight Preflight Checks Throttle State
16. "E" to uncheck. (This checks if throttle stick is at low when model selected, as a heli pilots that fly idle up, I find this is an unnecessary annoyance, so I tend to disable it).
17. "-" to first of Preflight Checks Switch Positions A
18. "E" to remove the check mark. (This checks if the switch is in a defined position when the model is enabled, I find these an unnecessary annoyance, so I tend to disable all of them (including the switch that will be throttle hold).
19. Repeat "-", "E" combination till all switch pre-checks are disabled (if desired).
20. You need not make any other changes unless you intend to use an external module. If you're not using an external module, "X" out to the main TX screen.
    (Note: An image of the completed Model Setup Screen follows the next section.)

Using the Orange DSMX PPM Module

The following is to set the Orange DSMX PPM module. This is model dependent as to how you set it.

1. "-" 3 times to Internal RF Mode.
2. "E" to edit from D16, -/+ till OFF is displayed, then "E" to select. (Assuming you are using an external PPM module like the Orange DSMX module).
3. "-" to select External RF Mode
4. "E" to edit from OFF, -/+ till PPM is displayed, then "E" to select. (Assuming you are using an external PPM module like the Orange DSMX module - Default values of CH1-8, 22.5ms, 300u is sufficient).

Trainer port remains at master (unless using for a sim or as a buddy box, then select Slave, then default values of CH1-8, 22.5ms, 300u should be sufficient). There's really no need for you to change anything here for this setup unless you're flying on a buddy box.

Thus endeth the configuration of MODEL SETUP

Completed Model Setup Screen

```
MODEL SETUP                          2/13
Model Name              My Heli
Model Image             Protos
Timer 1                 L1    05:00
 Persistent             OFF
 Minute call            ☑
 Countdown              Voice
Timer 2                 OFF   00:00
 Persistent             OFF
 Minute call            ☐
 Countdown              Silent
Extended Limits         ☐
Extended Trims          ☐   [Reset]
Trim Step               Fine
Throttle
 Reverse                ☐
 Timer Source           CH1
 Trim Idle Only         ☐
Preflight Checks
 Display Checklist      ☐
 Throttle State         ☐
 Switch Positions       A B C D E F G <]
 Pot Positions          Off
Center Beep             RETA123LR
Internal RF
 Mode                   OFF
External RF
 Mode                   PPM
 Channel Range          CH1-8
 PPM frame              22.5ms 300u -
Trainer Port
 Mode                   Master
```

Dual Rates and Expo

Next step is to change DR and expo for the Aileron, Elevator and Rudder. This could be done in the mixes, but the best place is in the inputs. The reason for this is that if CCPM were ever to be used, the CCPM mixing is done directly from the inputs, not the mixes. With this example, DR and expo are set to 100/20 on Aileron, Elevator and Rudder. To keep this lesson as short as possible, making DR/expo switchable will be covered in another lesson. To set the Expo:

1. "P" to go forwards to screen HELI SETUP (required for CCPM, but not this basic model)
2. "P" to go forwards to screen FLIGHT MODES (not required for this basic model. Using

flight modes for helicopters is covered later in the syllabus)
3. "P" to go forwards to screen INPUTS.
4. Edit the Rudder
5. The 100 next to IRud should already be highlighted (if not use + and – till the highlight is on it..
6. "E"lo then "E" to select Edit
7. "-" 6 times to highlight the number next to Expo
8. "E" to edit from 0, -/+ till 20 is displayed, then "E" to select. (Note the graph will change and if you move the aileron stick you can see the values).   If you wanted to change the switch, you could "-" down to Switch and enter a value. You will also need to duplicate the entry and assign another value to other switch variants so that the input always provides a value. "X" to go back to the top of the edit screen
9. "X" to go back to the INPUTS screen.

10. Do the same to edit Elevator and Aileron. ("-" to highlight, then "E"lo, then "E" to edit).

Rudder Input Showing Expo and Dual Rates

OK, now that we've gotten the basics done, it's on to *Basic Heli Part 2: Creating Mixes.*