# Creating a Basic Helicopter Model Part 2/3: Creating Heli Mixes

Your instructor: Craig (Fig ArchmageAU on <u>RCGroups</u> and <u>HeliFreak</u>)

### **Creating Mixes**

Next step is to create mixes. This is the most complex part of the procedure. This is where the inputs meet the outputs. This lesson breaks it up into one channel at a time.

You will end up creating a total of 13 mixes:

- A mix associated with SWE↑ that uses custom curve #1 for throttle (Normal)
- A mix associated with SWE- that uses custom curve #2 for throttle (Idle Up 1)
- A mix associated with SWE $\downarrow$  that uses custom curve #3 for throttle (Idle Up 2)
- A mix associated with SWF↓ that uses custom curve #10 to trigger Throttle Hold
- A 100% mix for Aileron input
- A 100% mix for Elevator input
- A 100% mix for Rudder input
- A mix associated with  $|SB\downarrow|$  (not SB up) to select Gyro Heading Hold mode
- A mix associated with switch SB↓ to select Gyro Rate mode
- A mix associated with SWE↑ that uses custom curve #11 for collective (Normal)
- A mix associated with SWE- that uses custom curve #12 for collective (Idle Up 1)
- A mix associated with SWE1 that uses custom curve #13 for collective (Idle Up 2)
- A mix associated with SWF↓ that uses custom curve #20 for collective in Throttle Hold

That sounds like a lot of work, but once you've done a few, it gets easier. It's a function of how OpenTX gives you complete control of your model.

The mixer defaults should be; CH1 100IRud CH2 100IEle CH3 100IThr CH4 100IAil.

**Note:** If you've used OpenTX Companion to create or edit the current EEPE file in your Taranis, your channel order may differ, depending upon what you have set in OpenTX Companion.

Every time you go to a new mix channel, erase the defaults and start new. Here's how...

If you're on the TX main screen:

- 1. Press "M"sh to view MODEL SELECTION
- 2. Highlight the model you wish to work with

- 3. Press "P" to enter MODEL SETUP
- 4. "P" to go forwards to screen MIXER.

If you were on the MODEL SETUP screen already, then "P" to go forwards to the MIXER screen.

Then to erase the default mix:

- 1. From the MIXER page, highlight the channel you wish to delete.
- 2. Press "E"lo to pop up the "Edit" menu
- 3. Press "-" five times or press "E"lo to highlight "Delete"
- 4. Press "E"sh to delete the channel
- 5. Repeat until all mixers have been deleted

None of the channels have mixes in them now that you've deleted the default ones. We'll add the mixes we need in the next few steps.

Channel 1 (CH1)

This channel will be set up with the following mixes:

- 1. Switch SE(up) Curve cstm cv1,
- 2. Switch SE(mid) Curve cstm cv2
- 3. Switch SE(down) Curve cstm cv3
- 4. Switch SF(down) Curve cstm cv10

This gives 3 flight modes based on switch SE which change the various throttle curves 1, 2 and one mix operated by switch SF that functions as Throttle Hold.

To create the first CH1 mix from the blank MIXER screen:

- 1. Ensure CH1 is highlighted.
- 2. Erase the channel (as mentioned before) if you haven't already done so.
- 3. "E"sh to go into edit mode.
- 4. (You can name the mix if you like, but this example does not for simplicity, you would do this by editing the Mix Name)
- 5. "-" to highlight Source, "E" to edit, "+" 2 times to show "IThr", "E" to confirm
- 6. "-" 4 times to highlight Diff next to Curve, "E" to edit, "+" 3 times to show "Cstm", "E" to confirm
- 7. "-" to move to value, "E" to edit, "+" to highlight "CV1", "E" to confirm
- 8. "-" 2 times to move to Switch, "E" to edit, (move the SE switch to middle, then to spot for normal mode SE(up) should show in the space), "E" to confirm
- 9. "-" 2 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm

10. "X", "X" to go back to MIXER screen

DIGITAL	TELEMETR	Y RADIO	SYSTEM		
MENU INSERT MI	X CH1	ISuitch	SET	Ð	
Source Interviewer	Thr	Warnin9 Multex	ÖFÉ Reelace		
Dffset Trim	0 M	Delay Up Delay Dn	0.0	U	
EXIT Curve Modes	- Cstm CV1 012345678	Slow UP Slow Dn	0.0 0.0	ENT	
	TAR	INIS	ACC5	iz	

Mixer #1 (CV1, SE↑) Created For CH1

Now let's create the second mix for CV2 on CH1:

- 1. With CH1 highlighted, "E"lo to call up edit window. Interestingly enough, the mix is not inserted automatically. We must tell the TX where to place it.
- 2. With the edit window showing, press "-" 2 times to highlight "Insert After", and "E" to do the INSERT AFTER operation. This creates the second mix on CH1.
- 3. "-" to highlight Source, "E" to edit, "+" 2 times to show "IThr", "E" to confirm
- 4. "-" 4 times to highlight Diff next to Curve, "E" to edit, "+" 3 times to show "Cstm", "E" to confirm
- 5. "-" to move to value, "E" to edit, "+" 2 times to highlight "CV2", "E" to confirm
- 6. "-" 2 times to move to Switch, "E" to edit, (move the SE switch to bottom, then to spot for Idle Up 1 mode SE(mid) should show in the space), "E" to confirm
- 7. "-" 2 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.
- 8. "X", "X" to go back to MIXER screen



Mixer #2 (CV2, SE-) Created For CH1

Now for the CV3 mix on CH1. This stuff getting familiar, yet?

- 1. "E"lo to re-edit CH1, "-" 2 times to highlight "Insert After", "E" to do Insert After
- 2. "-" to highlight Source, "E" to edit, "+" 2 times to show "IThr", "E" to confirm

- 3. "-" 4 times to highlight Diff next to Curve, "E" to edit, "+" 3 times to show "Cstm", "E" to confirm
- 4. "-" to move to value, "E" to edit, "+" 3 times to highlight "CV3", "E" to confirm
- 5. "-" 2 times to move to Switch, "E" to edit, (move the SE switch to bottom, then to spot for Idle Up 2 mode SE(down) should show in the space), "E" to confirm
- 6. "-" 2 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.
- 7. "X", "X" to go back to MIXER screen



Mixer #3 (CV3, SE↓) Created For CH1

OK, now we need to create the mixer for CV10 that will function as Throttle Hold. From the **MIXER screen, with the CV3 mix highlighted**:

- 1. "E"lo to re-edit CH1, "-" 2 times to highlight "Insert After", "E" to do insert
- 2. "-" to highlight Source, "E" to edit, "+" 2 times to show "IThr", "E" to confirm
- 3. "-" 4 times to highlight Diff next to Curve, "E" to edit, "+" 3 times to show "Cstm", "E" to confirm
- 4. "-" to move to value, "E" to edit, "+" 10 times to highlight "CV10", "E" to confirm
- 5. "-" 2 times to move to Switch, "E" to edit, (move the SF switch to bottom, then to spot for Throttle Hold mode SF(down) should show in the space), "E" to confirm
- 6. "-" 2 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.
- 7. "X", "X" to go back to MIXER screen

	DIGITA	і тегемет	RY RADIO	SYSTEM		
	MENU INSERT MI Mix Name	IX CH1	Switch	SF↓	•	
	Source <sub>PAGE</sub> Weight	■Thr 100	Warnin9 Multex	OFF Replace		
	Dffset <u>T</u> rim		Delay Up Delay Dn	0.0		
	Exit Curve Modes	01234567:	U SIOW UP 3 SIOW Dn	0.0 0.0	ENT	
T		TAR	ANIS	ACCS	T T	

## Mixer #4 (CV10, SF↓) Created for CH1

That's the Throttle mixes done on Channel 1. It's by far the most complicated of the channels. The rest are a piece of cake (and we copy this hard work later to do the collective mixes so you don't have to re-do).

Now for the Aileron (Channel 2)

Aileron will be a straight input from IAil. We simply create the mix and specify the input to use and the action to take (Replace). From the MIXER screen that shows the four CH1 mixes:

- 1. Press "-" to move from the CH1 throttle hold mix to the CH2 mix.
- 2. Erase the channel (as mentioned before) if you have not already done so.
- 3. "E"sh to go into edit mode.
- 4. Press "-" to highlight Source, "E" to edit, "+" 2 times to show "IAil", "E" to confirm
- 5. Press "-" 9 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.
- 6. "X", "X" to go back to MIXER screen



## **Aileron Mix Created**

That's the Aileron mix done. Now for the Elevator (Channel 3) and Rudder (Channel 4). They're done exactly like the Aileron mix with the exception of the "Source."

Elevator will be a straight input from IEle, just like the Aileron. From the MIXER screen:

- 1. Press "-" to move from the CH2 throttle hold mix to the CH3 mix.
- 2. Erase the channel (as mentioned before)
- 3. Press "E"sh to go into edit mode.
- 4. Press "-" to highlight Source, "E" to edit, "-" 2 times to show "IEle", "E" to confirm
- 5. Press "-" 9 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.
- 6. "X", "X" to go back to MIXER screen

That's the Elevator mixes done. Getting bored, yet? Now for the Rudder (Channel 4)

The Rudder mix will be a straight input from IRud

1. Press "-" to move from the CH3 throttle hold mix to the CH4 mix.

- 2. Erase the channel (as mentioned before)
- 3. Press "E"sh to go into edit mode.
- 4. Press "-" to highlight Source, "E" to edit, "-" 3 times to show "IRud", "E" to confirm
- 5. Press "-" 9 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.
- 6. "X", "X" to go back to MIXER screen

When you're finished, this is what your MIXER screen should look like:



**Completed Mixer Screen for CH1 - CH4** 

Now for the Gyro (Channel 5)

Gyro has input from a switch and in this example it has a value for switch down (rate mode) and switch not down (heading hold / AVCS). In other words, the switch selects which of the gyro modes is operating. Using the NOT logic function (as indicated by the exclamation point in front of the switch name:  $|SB\downarrow\rangle$  restricts the switch action so that when SB is down, the value is TRUE, but when it's either neutral or up, the value remains FALSE for both cases.

To create the Gyro mix on CH5 from the MIXERS screen:

- 1. Press "-" to move from the CH4 rudder hold mix to the CH5 mix.
- 2. Channel should be blank
- 3. Press "E"sh to go into edit mode.
- 4. Press "-" to highlight Source, "E" to edit, "+" 4 times to show "MAX", "E" to confirm. This sets the source of the input to be equal to the MAX value available for a channel (+100). This way the weight determines the actual output value.
- 5. Press "-" to highlight Weight, "E" to edit, "-" until "60" is shown, "E" to confirm. (This the gyro gain to set heading hold (-60 will be rate mode). This is the sensitivity of the feedback used by the tail gyro to keep the tail heading correct. If too high, the tail wags, if too low, the tail is sloppy.)
- 6. Press "-" 6 times to move to Switch, "E" to edit, (move the SB switch to bottom SB(down) should show in the space), Short press "+" and "-" at the same time (should change to "!SB(down)" this is a shortcut to swap a selected value to it's opposite while programming. If this does not work, use "-" to change to or "!SB(down)"), "E" to confirm
- 7. Press "-" 2 times to move to Multpx, "E" to edit, "+" 2 times to change to "Replace", "E" to confirm.

8. "X", "X" to go back to MIXER screen

	DIGITA	L TELEMET	RY RADIO	SYSTEM		
	MENU INSERT M.	IX CH5	ISwitch	!SB↓	$\odot$	
	Source Dage Weight	MAX 60	Warnin9 Multex	OFF Replace		
	Offset Trim	0 Ø	Delay Up Delay Dn	0.0	$\sim$	
	Exit Burve Modes	Diff 0 01234567:	Slow U⊨ 8 Slow Dn	0.0	ENT	
T		TAR	ANIS	ACCST		7

Gyro Mixer On Channel 5

The instructions could do the same again to add another value of -60 for SB(down), but to highlight some of the editing features, the following is how to copy the gyro setting just done and edit the copy.

- 1. Press "E"lo to bring up edit menu on current item. (CH5 should be highlighted.
- 2. Press "-" 3 time to highlight Copy, then "E" to select.
- 3. Press "-" and the copied item is below the current one, "E" to place there.
- 4. Press "E"lo to bring up edit menu on current item, "E" to select Edit.
- 5. Press "-" 2 times to highlight Weight, "E" to edit, "+" and "-" together to change to "-60" is shown, "E" to confirm
- 6. Press "-" 6 times to move to Switch, "E" to edit, Short press "+" and "-" at the same time (should change to "SB(down)" alternatively you could just use move the SB switch to middle, then down again), "E" to confirm
- 7. "X", "X" to go back to MIXER screen



Gryo Mix #2

Lastly for the MIXER page we need to create the collective settings (CH6). These settings closely mirror the Throttle settings (just the curve numbers change). To make life simpler, these instructions will be to copy the throttle settings down to collective channel, then edit the curve numbers.

If you're on the MIXER screen where you left off after creating Gyro Mix #2, press "+" 8 times

to first entry on CH1. You could, of course, EXIT back to the mixer screen and the first mix on CH1 would be highlighted for you. If you aren't on the mixer screen, go to the first mixer entry on CH1 by any means you like.

Let's copy the mix for CV1 from CH1 to CH6:

- 1. "E"lo to get edit menu.
- 2. "-" 3 times to highlight copy
- 3. "E" to select
- 4. "-" 14 times to move the copy setting to CH6, then "E" to confirm



CH1 Mix #1 Copied to CH6 Mix #1

OK, that takes care of the first one. Now let's do the other three the same way.

To copy the Mix #2 from CH1 to CH6:

- 5. "+" 8 times to second entry on CH1
- 6. "E"lo to get edit menu. "-" 3 times to highlight copy, "E" to select
- 7. "-" 14 times to move the copy setting to CH6 just after the first entry, then "E" to confirm

And the third mix from CH1 to CH6:

- 8. "+" 8 times to third entry on CH1
- 9. "E"lo to get edit menu. "-" 3 times to highlight copy, "E" to select
- 10. "-" 14 times to move the copy setting to CH6 just after the second entry, then "E" to confirm

And, finally, the fourth mix from CH1 to CH6:

- 11. "+" 8 times to fourth entry on CH1
- 12. "E"lo to get edit menu. "-" 3 times to highlight copy, "E" to select
- 13. "-" 14 times to move the copy setting to CH6 just after the third entry, then "E" to confirm

Here's what your CH6 mixes should look like now:



All Mixes Copied from CH1 to CH6

Now that the entries are copied, change the curves to 11(Norm), 12(IU1), 13(IU2) and 20(Hold) respectively. You have not yet created the curves. That will come just a bit later, but you can still assign them to mixes. As Idle Up 1, Idle Up 2 and Hold often have the same pitch curve, it is the programmers option to use only one curve for this and map all the idle up modes to that one curve. The instructions here put them on separate curves so they can be changes separately if desired.

To change the curve from the MIXER screen:

- 1. Highlight the first entry on CH6
- 2. "E"lo to get edit menu. "E" to edit
- 3. "-" 6 times to select curve number in Curve
- 4. "E" to edit, "+" 10 times to select CV11, "E" to select
- 5. "X", then "X" again to get back to MIXER screen



First Mix On CH6 Changed To Curve 11

Now for the other three:

- 6. "-" to go to the second entry on CH6
- 7. "E"lo to get edit menu. "E" to edit
- 8. "-" 6 times to select curve number in Curve
- 9. "E" to edit, "+" 10 times to select CV12, "E" to select
- 10. "X", "X" to go to MIXER screen

- 11. "-" to go to the third entry on CH6
- 12. "E"lo to get edit menu. "E" to edit
- 13. "-" 6 times to select curve number in Curve
- 14. "E" to edit, "+" 10 times to select CV13, "E" to select
- 15. "X", "X" to go to MIXER screen
- 16. "-" to go to the fourth and last entry on CH6
- 17. "E"lo to get edit menu. "E" to edit
- 18. "-" 6 times to select curve number in Curve
- 19. "E" to edit, "+" 10 times to select CV20, "E" to select
- 20. "X", "X" to go to MIXER screen

	DIG	ITAL TEL	EMETR	Y RADIO	SYSTEM	
	MENU MIXE	■ 13/64 60MAX		l≲B↓	<sup>6∕13</sup> €	
		100 <b>0</b> Thr 100 <b>0</b> Thr	CU11 CU12	SET SET	$\odot$	
	EXIT	100 <b>0</b> Thr <b>1000</b> Thr	CU13 CU20	SE↓ SF↓	ENT	
F		TA	R	INIS	ACCST	5

CH6 With All Mixes Set

**CONGRATULATIONS!** That's the most complicated bit of the programming done. All that remains are the servos, curves, voice alerts and to bind and fly. Don't panic! It sounds like a lot, but it's not as much as you might think.

#### Configuring for DSMX2

For the DSMX module for the Taranis, the aileron channel (Ch2) and rudder channel (Ch4) need to be reversed from what is specified for a DX8.

For the DX8 the settings for a 450X are Throttle normal, Aileron normal, Elevator normal, Rudder reversed, Gyro normal, Collective normal. So for this Taranis DSMX model, Aileron needs to be reversed, but rudder is normal (as reversing a reversed channel comes out normal.

So to set the Aileron servo signal (Ch2) to reverse:

- 1. "P" to go forwards to screen SERVOS
- 2. "-" to move to Ch2 (Aileron)
- 3. "E" to edit Ch2
- 4. "-" 4 times to move onto Direction
- 5. "E" to change direction to  $\leftarrow$
- 6. "X" to stop editing Ch2

Next come the curves.