

# InterHeli2.bin

Identical to InterHeli1 except it adds settings adjustment for supported flybarless systems. Easy to customize to use your preferred switches by having the main functions tied to flight modes. Optimized for throttle governor use (whether Flybarless or ESC governor) but will also work with ungoverned models with some small changes. Gyro gain (Ch5) is on the Mode switch, allowing you to have different gain settings for IU1, IU2, and IU3.

## Features:

1. Throttle and Pitch Curves without normal mode (3 idle-up modes)
2. Flight Mode Based Hold and Mode Switches
3. Flight Mode Based Gyro Gain Switching
4. Timer runs when NOT in Throttle Hold
5. SD-Logs run when NOT in Throttle Hold, with delay in logging stop
6. Bank/Setup Selection on Ch7, tied to Flight Mode selection.
7. Rescue Mode (for applicable FBL units) on Ch8
8. AuxOut for Extra Device on FBL unit
9. Settings adjustment in supported FBL units

## 1a. Throttle Curves

Located in Model Settings > Curves

Applicable Curves:

ThrIU1 (Throttle curve for Idle Up 1)

ThrIU2 (Throttle curve for Idle Up 2)

ThrIU3 (Throttle curve for Idle Up 3)

### Notes:

- Curves are preset at approximate, random values for you to customize to your needs.
- For any straight-line curve (whether flat or linear), 2 point curves are sufficient and this is how the curves are done. This makes it very fast to change throttle values, it only takes changing two points.
- If you want to use a U- or V-curve for the idle up throttle instead of flat, change ThrIU1, ThrIU2, and ThrIU3 as needed. 3 points is sufficient for V-curves; increasing the number of points will allow U-curves or any other curve you want to use.

## 1b. Pitch Curves

Located in Model Settings > Curves

Applicable Curves:

PitIU1

PitIU2

PitIU3

### Notes:

- Pitch curves are rarely used by most people, but they have been included in the model template just in case you want to use them. All pitch curves come by default as all full negative and full positive (+-100%). You can adjust these as necessary by adjusting the lower and upper points.

## 2. Flight Mode Based Hold and Mode Switches

Located in Model Settings > Flight Modes

Applicable Flight Modes:

FM1: Hold

FM2: IU1

FM3: IU2

FM4: IU3

This page is where you can customize your switch assignments. The use of Flight Modes to activate functions elsewhere in the model means that you don't have to change switch assignments in a bunch of different places if you don't like the default assignments. Changing your throttle hold switch only requires changing one setting in FM1(Hold), and changing your flight mode switch only requires changing one setting in FM2(IU1), FM3(IU2), and FM4(IU3). All other functions that depend on these switches such as throttle curves and pitch curves, as well as gyro gain, will change automatically.

Notes:

- By default, throttle hold is on switch SG, with the switch being pulled all the way towards you being the hold position. Note that if you choose to use a 3-pos switch such as it is here, you must pull the switch ALL the way to this position. The middle position will **not** activate throttle hold. If you use a 2-position switch instead, this is not a concern. The middle position can be used in more advanced setups (see .bin).
- By default, the flight modes (IU1, IU2, and IU3) are on switch SE. To change this, all you must do is change the switch assignments for FM2, 3, and 4 to your new 3-position switch of choice (each flight mode gets assigned a position from the switch).

## 3. Flight Mode Based Gyro Gain Switching

Located in Model Settings > Mixers

Applicable Mixers:

Gyro Gain

This is an alternative method to using a gyro curve or just a fixed gain for all flight modes. Instead, you simply tell the radio what gyro gain to output based on the flight mode you're in. This means that you can set a gain independently for IU1, IU2, IU3, and Hold modes, allowing you to tune and maximize tail performance in all flight conditions.

Notes:

- There are four "weights" assigned to this Var Mixer. In contrast to a normal Mixer which uses a curve to determine channel output values, here we are just basing the gain output on a condition. In this case, each gain output (in %) is assigned to a Flight Mode. The first one is FM1(Hold), followed by FM2(IU1), FM3(IU2), and FM4(IU3).
- Like with throttle and pitch curves, these are set at approximate baseline values that you should tune yourself. If you know what gyro gain you need for each mode already (e.g. having used another radio on the model), you can simply enter those in each mode. Otherwise, test fly it and adjust each gain as needed after a quick test hover/flight in each flight mode.
- For FM1(Hold), you can usually set this wherever you want since the RPM is typically lower than normal flight. However, if you do a lot of McDougal/dismount autos where the RPM goes quite high, you can tune your tail gain to prevent excessive chatter during those maneuvers with the Hold weight. A good baseline is the same value as whatever works well in IU1 mode.

#### **4. Timer runs when NOT in Throttle Hold**

Located in Model Settings > Timers

Applicable Timers:

Timer 1

There is a single timer set up on this template. It is a simple countdown, with speech announcements every minute, followed by more often callouts past below 30 seconds remaining.

Notes:

- You should, obviously, change the timer value (by default, it is 4:00) to whatever suits your model and flying style.
- Because once again the timer is activated/deactivated using flight modes, changing your throttle hold switch in Flight Modes settings will not affect the timer's operation. When you are NOT in throttle hold (i.e. you are flying), the timer runs, and when in throttle hold, the timer stops and does not run.

#### **5. SD-Logs run when NOT in Throttle Hold, with delay in logging stop**

(Partial) Located in Model Settings > Logic Switches

Applicable Logic Switches:

LS1(WriteLogs)

(Partial) Located in Model Settings > Special Functions

Applicable Special Functions:

SF1(Write Logs)

Logging is a critical part of RC aviation, and while this is a very basic heli model, I feel having logging enabled is worth doing anyway. This is also a more complex logging setup than most choose to use, and while it can be done more simply, this method offers some advantages. This setup allows you to use the throttle hold switch to enable/disable logging, but includes a delay from hitting throttle hold to when logging stops to allow you to continue logging during autorotations.

Notes:

- By default, the delay from hold to logging stop is set to 15 seconds. This is a good number for most people. If you find yourself doing autorotations well in excess of 15 seconds, or simply feel 15 seconds isn't long enough, you can increase the delay in LS1(WriteLogs) under "Delay before inactive". You can also, naturally, decrease the delay if you feel 15 seconds is not necessary (e.g. if you don't do autos at all).
- It's possible that in future versions of Ethos, a "Delay before inactive" option will be added to Special Functions, and the use of a Logic Switch to do this will not be necessary.
- Once again this is done using flight modes, so changing switch assignments is not a concern.

## **6. Bank/Setup Selection on Ch7, tied to Flight Mode selection.**

Located in Model Settings > Mixers

Applicable Mixer:

Bank

If your flybarless system supports Bank selection (multiple “Banks” of settings, aka Setups or Conditions, selectable using an extra channel), you can use this feature. In the template, it is tied to the flight modes selection, so you can have different agility or gain settings for each RPM setting, and also use one of those banks of your choice for Hold mode. This can be changed (see notes below). If your flybarless system does not support any form of bank switching feature, you can simply delete the Bank mixer to clear up unneeded clutter in your Mixers page.

Notes:

- As with the other channels, the mixer uses the default travel direction. You may need to reverse it to achieve proper function. Normally, Bank1 is on IU1, Bank2 is on IU2, and Bank3 is on IU3, but of course you can do it any other way you prefer.
- The setup selected during the Hold flight mode must be the same as one of the other flight modes. You can have Bank1 in Hold mode, or Bank2, or Bank3, but you must ensure it behaves the way you want and change the Weight for Hold in the Bank mixer if it does not.
- You can choose to have any combination of Banks per Flight Mode. You can, if you want, make it so that it runs in Bank1 in IU1 and IU2, but in Bank2 in IU3, etc. This is the advantage that using a Var mixer has over using a curve, as it is much easier to change a simple Mixer setting instead of editing a curve.
- If you want to put bank selection on its own switch instead of being tied to your flight modes/RPM, you can delete the weight for the Hold flight mode and then change the active conditions for each Weight in the Var mix to each position of a 3-position switch.
- By default, the Bank selection is assigned to Ch7, as this is the default for most common flybarless systems. You can change this in the Bank mixer, all the way at the bottom.

## **7. Rescue Mode (for applicable FBL units) on Ch8**

Located in Model Settings > Mixers

Applicable Mixer:

Rescue

If your flybarless system supports the Rescue (emergency auto-level) feature, you can use this.

Notes:

- By default, the Rescue mode is assigned to Ch8, as this is the default for most common flybarless systems. You can change this in the Rescue mixer, all the way at the bottom.
- You can use a 3-position switch for this, but be aware that the middle position will not activate Rescue, only the maximum position. You can change the switch assignment in the Rescue mixer under “Source”.
- In this template, it is tied to Switch SH (2-position momentary, right side of the radio). It can be reassigned to any other switch easily in the Rescue mixer under “Source”.

## 8. AuxOut for Extra Device on FBL unit

Located in Model Settings > Mixers

Applicable Mixer:

AuxOut

Some flybarless systems support an auxiliary device triggered using another channel. This is commonly used for remote glow ignition on nitro helicopters, or to trigger landing gear or lights on scale helis. On Brain2 for example, this is referred to as B-Aux2 (CH2 Output) and must be configured properly in Brain2 software. In this template, it is on Ch9.

Notes:

- It's recommended you rename the mixer to whatever you're using this for (e.g. Glow, Lights, Gear, etc). Not required, but it aids in future readability.
- If you don't want to or can't use this feature on your flybarless system, it is recommended to delete this mixer and run the receiver in 8ch mode to reduce control latency. Or you can replace Rescue or Bank selection with this.
- By default this feature is assigned to switch SF (2-position, left side of radio). You can change this in the Mixer, under "Source".

## 9. Settings adjustment in supported FBL units

Located in Model Settings > Mixers

Applicable Mixers:

Setting1

Setting2

Setting3

Some flybarless systems support the changing of their own settings using channels from the radio. This has been largely made unnecessary with the advent of integration, but can still be useful if you want to truly change settings in real-time while you're in the air.

Notes:

- By default there are three settings mixers. They are assigned to three random knobs on the radio. You will want to check these and change them if necessary to knobs you weren't already planning to use for something else (such as audio volume or backlight adjustment). The assignment can be found in each mixer under "Source".
- If you aren't using some of the other features (bank selection, rescue, aux output, etc) you can move the channels from 10, 11, and 12 as they are in the template to 9, 10, and 11 etc. In addition, for the most part, you will likely only need to use one of these Settings mixers and you can delete the rest, but there are three here as that is how many Brain2 supports and it's a good baseline to show how it can be done.
- Most flybarless systems with this feature automatically limit the range of the adjusted setting to a reasonable level to prevent extreme adjustments potentially causing crashes, but if yours doesn't, you will want to reduce the weight up and weight down in the Settings mixers to a much lower starting value.