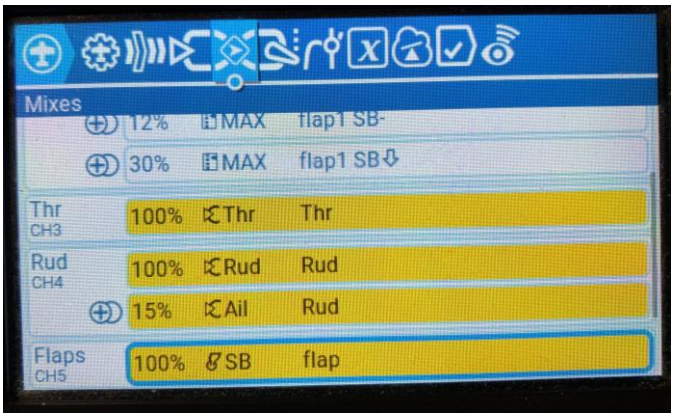
Slowing down control movements

There are times when you want a flight control to move slowly. For example, if you are deploying flaps, it's a good idea to do it slowly so that if there is a dramatic change in trim, you have time to respond. For some functions this is dead easy. For others where switches, MAX values and multiple mixes are involved it can be very complex. We will begin with the simple, then move to the complex for those who have the courage to pursue it!

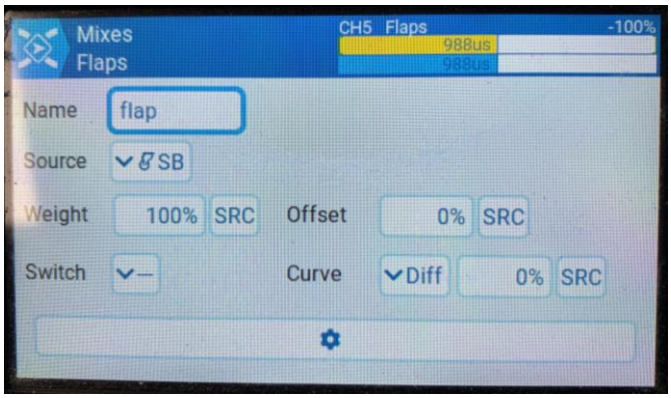
This article is intended to be a resource to go along with the video on our YouTube channel that explains it in more detail.

Simple slowdown

Let's take flaps as an example. You will set those up under Mixes in the Model menu.

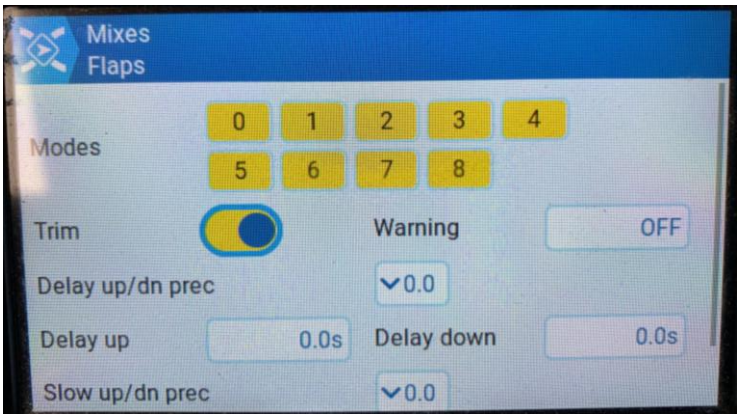


Hit the plus at the bottom of this screen and create this entry.

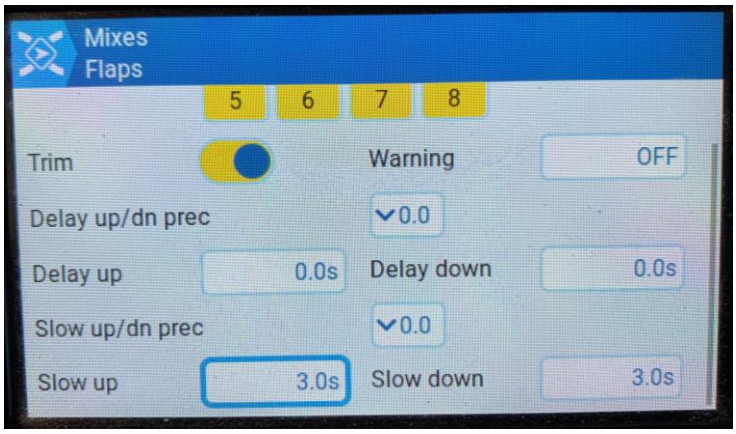


Give it a suitable name and choose the switch that you want to use to control the flaps for the source. (Touch or scroll to highlight the box, then just flick the switch.)

Put in suitable values for the weight and offset. See our video on setting up flaps for instructions on how to do that. Then click on the gear at the bottom. You will get this screen:



Given that you want the flaps to operate in all modes, leave them all highlighted. Scroll down to the bottom:



Type in values for the time you want it to take to go from one setting to the next. That can be a separate value for each direction if you want.

And that's it. You're done.

When the 'slow' doesn't work

If you have included a switch in the Mix screen next to the "Switch" label, you are likely to have a problem. That bypasses the timing you have set.

If you have a simple, stand-alone mix, the way around that is to first create an input that includes the switch. Then in the mix you use that input as the source, and with that the slow timing will work.

But, what if you have a mix that is linked underneath another mix?

This was my initial mixing solution for my Dauntless dive bomber. I wanted to be able to use the center dive brake separately so it could be used like regular flaps. But I also wanted it to deploy when the main dive brakes on the wings were opened. I couldn't avoid having a switch in the secondary mixes. So, the slow up and down worked for the primary mix – using the centre dive brake alone. But, when I deployed the main dive brakes, the centre flap moved without a slowdown.

The proper solution is to avoid having the multiple mixes for the centre dive brake. You can do that either with flight modes or multiple input lines for the main dive brakes. Either way you will need to create a number of logical switches.

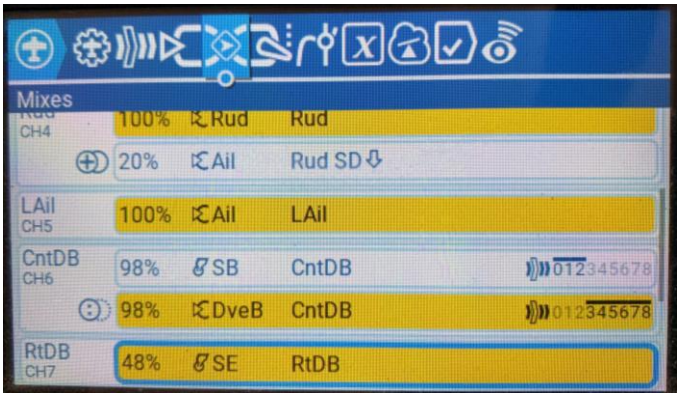
Flight mode method

As the flight mode method is the most tedious and less desirable, we will only touch that briefly. Just so you know that's not what you want to do.

The issue is that you cannot simply use one switch for your three sets of rates: low, medium and high rates, and then use another switch for modes relating to the dive flap positions. You can only have one flight mode active at a time. So, you need to create a matrix to cover all the possibilities with a separate flight mode for each of them. And since each of those possibilities involve the positions of two different switches, you need to create a logical switch for each of them. You end up with something like this:

Flight Mode	Rates Mode	SA	SE		Logical Switch
0	1	SA-up	Up		L02
1	2	SA-mid	Up		L03
2	3	SA-dwn	Up		L04
3	1	SA-up	Mid		L05
4	2	SA-mid	Mid		L06
5	3	SA-dwn	Mid		L07

6	1	SA-up	Dwn		L08
7	2	SA-mid	Dwn		L09
8	3	SA-dwn	Dwn		L10



Yes, that works, but I couldn't see myself asking you to do all of that! So, I looked for a better, somewhat easier way...

Input solution

I decided that all I needed was a set of logical switches that covered the three possible positions for the center dive flap.

#	Function	V1	V2	AND Switch	Duration	Delay
L01	---					
L02	a<x	SB	0	SE↑	0.0	0.0
L03	a=x	SB	0	SE↑	0.0	0.0
L04	OR	L03	SE-	----	0.0	0.0
L05	a>x	SB	0	SE↑	0.0	0.0
L06	OR	L05	SE↓	----	0.0	0.0

With this, L02, L04 and L06 define the three positions for the center dive flap regardless of whether it's due to the main dive brakes being deployed or the centre flap on its own.

- L02 stands on its own, defining when the flap is closed.
- L03 and L04 say that if the main brakes (SE) are closed and SB is in the middle position, or if the main brakes are in the middle position, the center flap should be in the middle position.
- L05 and L06 say that if the main brakes are closed and SB is in the full open position, or if the main brakes are in the full open position, the center flap should be in the full open position.

If that isn't clear to you, watch the video where I explain it.

So, we can now have an input that uses those three logical switches to define the position of the center dive flap, then refer to it in the mix with a single line and apply the slow up and down.

Input:

```
I5:Flap         MAX Weight(-100) Switch(L02) No Trim [Mid]
                MAX Weight(0) Switch(L04) No Trim [mid]
                MAX Weight(100) Switch(L06) No Trim [open]
```

Mix:

```
CH6:CntDB       I5:Flap Weight(99) Slow(u3:d3) [CntDB]
```

As the main dive brakes are only governed by a single switch, they can be dealt with directly with a mix. My two dive brakes need slightly different rates to achieve the same amount of opening, so I have them on separate channels. That was due to having broken the control arms off those on one side and having to make new ones.

Mix:

```
CH7:RtDB        SE Weight(48) Offset(-50) Slow(u3:d3) [RtDB]
CH8:LftDB       SE Weight(59) Offset(-39) Slow(u3:d3) [LftDB]
```

I trust that this is helpful to you if you have been experiencing frustration in trying to get the slow up and down working. Use this article along with watching the video to get it all sorted out.