



## How to enable more flight modes

This is an example how to set up more flight modes for the Thunderbird. I recommend to create a new model and do all steps with it. Call the model "Crazy Destroyer" or something like that ;-).

I have exchanged the AUX button B2 of the ST16 by a switch in order to use AUX channel 12 to switch between two sets of flight modes;

- Set One (B2 up) has "Altitude" in upper position of the flight mode switch S4, "Position hold" in the middle position and "Return to home" in the lower position.
- Set Two (B2 down) has "Rattitude" in upper position of the flight mode switch S4, "Stabilized" in the middle position and "Return to home" in the lower position.

Set One is the same as GPS off/on. Set two contains more advanced flight modes. "Acro" was left off because I'm too old for this stuff.

### Step 1: Channel settings at ST16

Open channel settings and select A01.

Model: Thunderbird Test      Welcome, Pilot      20:06 66%

Universal channel control settings

Hardware(Input)

J1	K1	S2	B1
J2	K2	S3	B2
J3	K3	<b>S4</b>	B3
J4	S1	S5	B4

Single output monitor

S4

•			
	•		
			•

Channel-Function(Output)

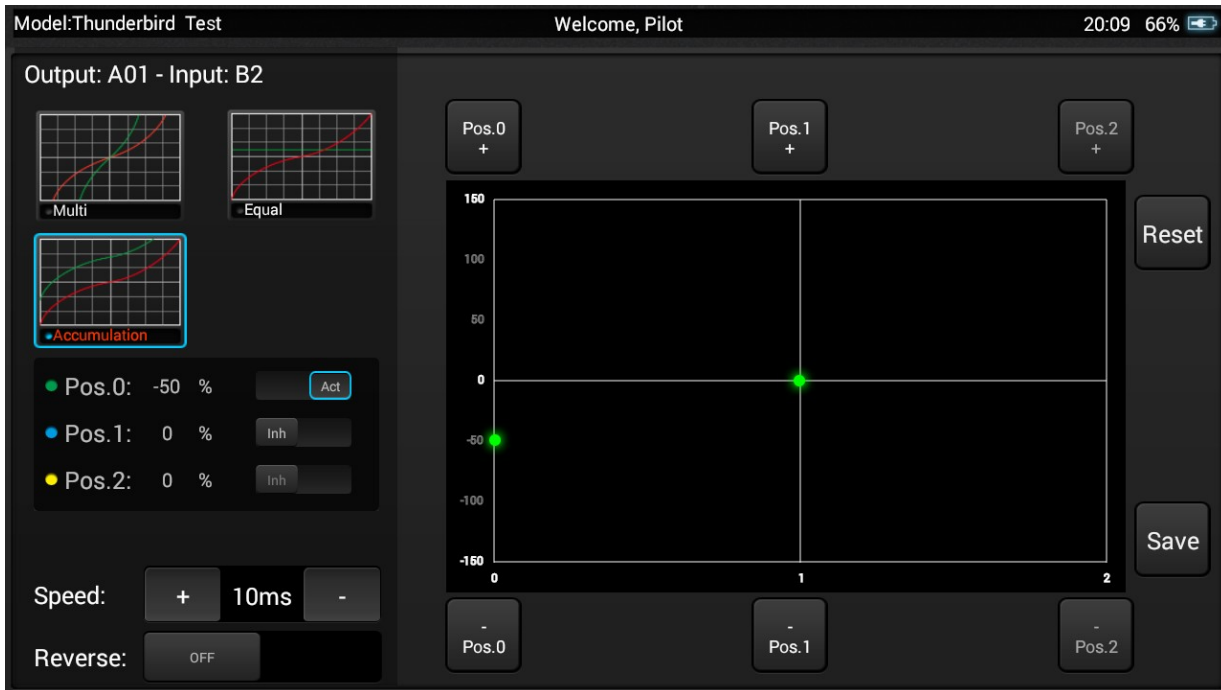
Thr	A05	A13
Ail	A06	A14
Ele	A07	A15
Rud	A08	A16
<b>A01</b>	A09	A17
A02	A10	A18
A03	A11	A19
A04	A12	A20

Final output monitor (0%)

-150 -120 -90 -60 -30 0 30 60 90 120 150

-135 -105 -75 -45 -15 15 45 75 105 135

Tap on B2 and hold it to get menu. Select "Edit" from the menu. Set "Accumulation", Pos.0 to "Act" and -50%. Tap on Save.



Now you should get a mixed channel for flight modes:

- B2 up:      100% > 0 > -100%
- B2 down:      50% > -50% > -150%

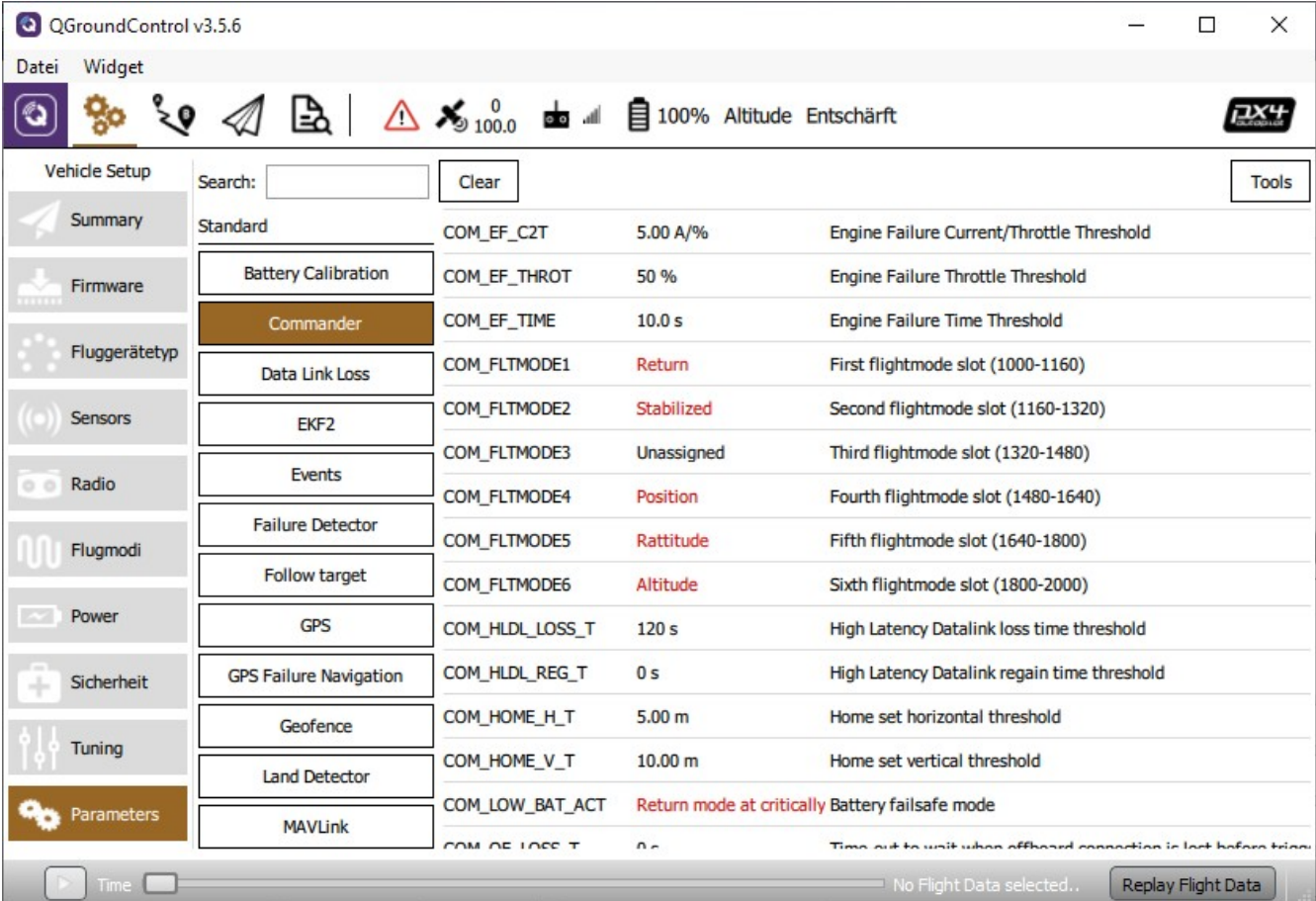


**Remark:** Channel A02 (RTH channel) must still have values 0 > 0 > 150% in both positions of B2 switch. Check this!

## Step 2: Assign flight modes in QGroundControl

Bind the new model to Thunderbird and connect it to QGroundControl by USB cable.

Now we have more possibilities to add flight modes (COM\_FLTMODE2 and COM\_FLTMODE5):

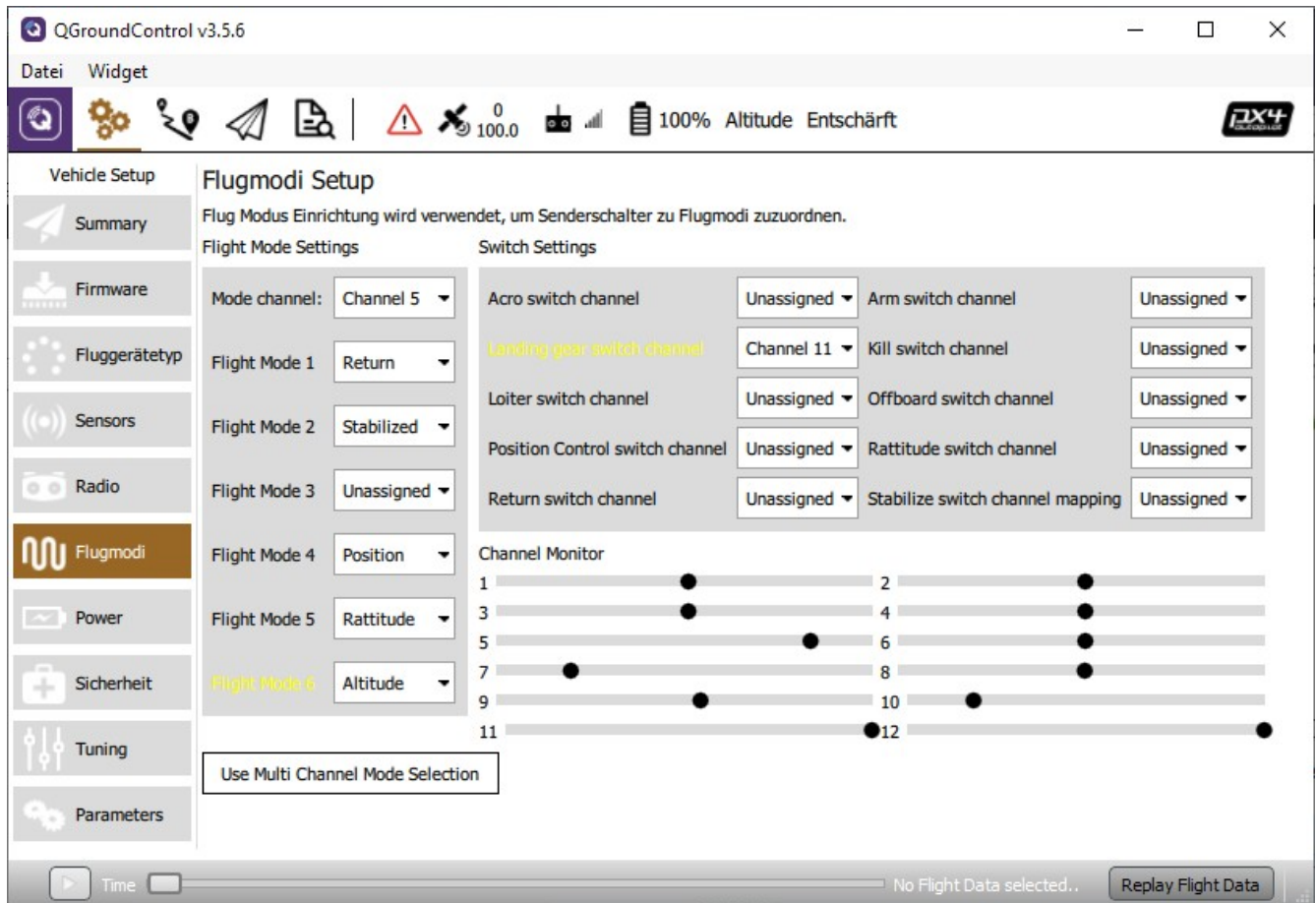


The screenshot shows the QGroundControl v3.5.6 interface. The 'Parameters' section is selected in the left sidebar. The main area displays a table of parameters with columns for parameter name, value, and description. The 'Commander' parameter is highlighted in the left sidebar. The table lists parameters for flight modes 1 through 6, along with other system parameters like engine failure thresholds and datalink loss time.

Parameter	Value	Description
COM_EF_C2T	5.00 A/%	Engine Failure Current/Throttle Threshold
COM_EF_THROTT	50 %	Engine Failure Throttle Threshold
COM_EF_TIME	10.0 s	Engine Failure Time Threshold
COM_FLTMODE1	Return	First flightmode slot (1000-1160)
COM_FLTMODE2	Stabilized	Second flightmode slot (1160-1320)
COM_FLTMODE3	Unassigned	Third flightmode slot (1320-1480)
COM_FLTMODE4	Position	Fourth flightmode slot (1480-1640)
COM_FLTMODE5	Rattitude	Fifth flightmode slot (1640-1800)
COM_FLTMODE6	Altitude	Sixth flightmode slot (1800-2000)
COM_HLDL_LOSS_T	120 s	High Latency Datalink loss time threshold
COM_HLDL_REG_T	0 s	High Latency Datalink regain time threshold
COM_HOME_H_T	5.00 m	Home set horizontal threshold
COM_HOME_V_T	10.00 m	Home set vertical threshold
COM_LOW_BAT_ACT	Return mode at critically	Battery failsafe mode
COM_OF_LOSS_T	0 s	Time out to wait when offboard connection is lost before trying...

Go to "Settings" > "Flight modes" and assign flight modes to the mode items.

- Mode channel remains Channel 5.
- Flight mode 1 is lower position of the Flight mode switch S4, remains "Return" for both Sets.
- Flight mode 2 belongs to Set Two, middle position, will be assigned to "Stabilized".
- Flight mode 3 remains "Unassigned".
- Flight mode 4 belongs to Set One, middle position, remains "Position".
- Flight mode 5 belongs to Set Two, upper position, will be assigned to "Rattitude".
- Flight mode 6 belongs to Set One, upper position, will be assigned to "Altitude".



Test all switch positions carefully in flight mode settings of QGroundControl. The active switch combination is marked in Yellow (day time color setting of QGroundControl).

See also: [https://docs.px4.io/master/en/getting\\_started/flight\\_modes.html](https://docs.px4.io/master/en/getting_started/flight_modes.html)

Buy some more propeller and go out testing flight modes **on your own risk**.

Mode-switch	AUX-switch	FlightMode	Status LED	Pos %	Log value
up	up	Altitude	Blue blinking	+100%	3412.0
up	down	Rattitude	White blinking	+50%	2730.0
middle	up	Position hold	Purple solid	0%	2048.0
middle	down	Stability	Blue solid	-50%	1365.0
down	up	RTH	Red blinking	-100%	683.0
down	down	RTH	Red blinking	-150%	0.0

## Recommended settings

Parameter	from	to	Description
MPC_Z_VEL_MAX_DN	1.000	3.000	Max. descent speed [m/s] as it was at H480
MPC_Z_VEL_MAX_UP	3.0	5.0	Max. ascent speed [m/s] as it was at H480
MC_RATT_TH	0.80	0.60	Threshold for Stability in Rattitude mode [%] for more Acro to get smoother rolls and loopings