FUTABA – F5J

SA = Motor On/Off — *This switch arms the motor.*

SB = Motor speed: High – Mid – Low — *This switch selects between 3 different motor speeds.*

LS = Variable thermal setting in condition Thermal — *Adjustable thermal setting.*

SH = Thermal setting (not variable) in condition Thermal 2 *(non-returning switch)* — *A fixed thermal setting.*

SC = Select Condition: Distance <–> Cruise <-> Thermal — *Select Flight Condition.*

SF = Motor speed: Turbo*) *(spring-loading returning switch)* — *Turbo is for max motor speed.*

*)*Optional*

(I have changed the physical position between SF and SH switches, see last page.)

18SZ models link:
X-Tail and V-Tail

Email: magnus@maghed.se **[december - 2023]**
Latest version: Link

INFO

Basic - SetUp is the settings in the radio before adjusting the values for your selected glider (model).
Settings – New Model is the adjustments to be done on a new glider based on the basic settings.
How-To include ways to set up ‘variable camber’ and ‘motor control’.
Additional Information describes more functions.

Start by selecting ‘Model Type’ in the Linkage menu. When changing model type, all settings will be lost.

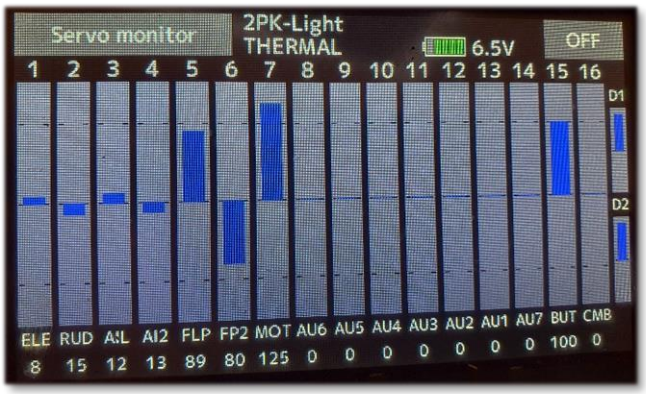
Mixer info:
INH = Mixer function is not activated.
OFF = Mixer function is activated, but it is off.
ON = Mixer function is activated, and it is on.

Group = ‘Gr’ i.e. = ‘Group’: The mix settings are for all flight conditions (default).
Group = ‘Sngl’ i.e. = ‘Single’: The mix settings are only for the selected flight condition.

When Group = ‘Gr’, all the flight conditions will have the same mix settings as the selected flight condition.
When Group = ‘Sngl’ the selected flight condition will have it’s own separate mix settings.

16sz, 18sz: When settings for the mix is ‘Gr’ all flight conditions have the same mix settings.
18mz, 32mz: When settings for the mix is ‘Gr’, only selected flight conditions have the same mix settings.
(which means some flight conditions can have the same mix settings ‘Gr’,
and the other flight condition can have individual mix settings ‘Sngl’.)

*Use the **Servo monitor** menu to see the values for the output channels.*



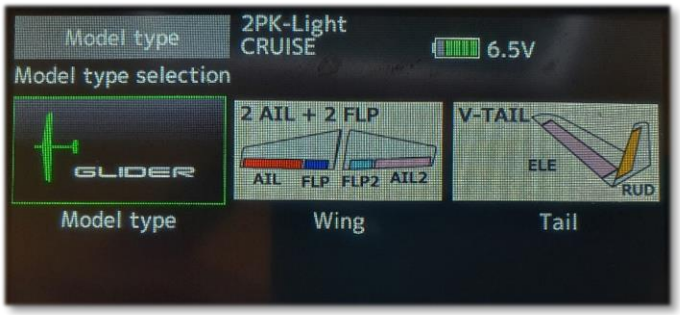
Linkage – Servo reverse: Motor output is often reversed due to the ESC (Motor controller).

Flight Conditions: ***(example)***

First, select the model type:

LINKAGE – MODEL TYPE

When, if later on, changing model type <u>all settings will be lost.</u>



BASIC: SETUP 'GLIDER'

LINKAGE – FUNCTION ***(Channel output, control, trim)***

Output	Control	Trim	Info
1: ELEVATOR	J2	T2	Elevator (alt. V-Tail)
2: RUDDER	J4	T4	Rudder (alt. V-Tail)
3: AILERON	J1	T1	Aileron Left
4: AILERON2	- -	- -	Aileron Right
5: FLAP	- -	- -	Flap Left
6: FLAP2	- -	- -	Flap Right
7: MOTOR	SB	- -	Motor
8: AUX1	- -	- -	
9: AUX2	- -	- -	
10: AUX3	- -	- -	
11: AUX4	- -	- -	
12: AUX5	- -	- -	
13: AUX6	- -	- -	
14: AUX7	- -	- -	
15: BUTTERLY	J3	- -	Brake
16: CAMBER	LS	- -	
DG1:	- -		
DG2:	- -		

The above is an example of where to set the channel outputs. (SB is chosen as Motor control.)
Set the channel outputs before setting up the model.

LINKAGE – SUB TRIM

All = 0 Change neutral position for the servo.

LINKAGE – SERVO REVERSE

All = Normal (MOTOR = Reverse)

LINKAGE – END POINT

ELE, RUD, AIL, AIL2:	152, 100, 100, 152	
FLAP, FLP2:	152, 140, 140, 152	*(for max brake possibility)*
MOT:	152, 114, 100, 152	*(for max = 2000 us)*

GLIDER – COND. SELECT ***(Flight Conditions)***

CONDIT1,	Rename to CRUISE	(Lowest priority)
ADD CONDIT2,	Rename to THERMAL	
ADD CONDIT3,	Rename to THERMAL2	
ADD CONDIT4,	Rename to DISTANCE	
ADD CONDIT5,	Rename to LANDING	
ADD CONDIT6,	Rename to MOTOR ON	(Highest priority)

MOTOR ON	Switch = "SA" On = down
LANDING	Switch = "J3", Normal, Linear, Hysteresis, Off = -92, On = -90
DISTANCE	Switch = "SC" On = up
THERMAL2	Switch = Logic: "SC" and "SH", SC On = down, "SH" On = down
THERMAL	Switch = "SC", On = down

LINKAGE – TRIM SETTING *(18mz, 32mz: Needs to be set individually for all flight conditions)*

T2: Mode = Separ (Elevator trim (T2) is separated for all flight conditions)

T1, T4, T3: Mode = Comb (Other trims (T1, T4, T3) are the same for all flight conditions)

T1-T4: Step = 2 (default 4)

T5-T6: Step = 4

LINKAGE – FUNCTION - Trim

T1-T6: Rate = 100 (default 30)

Trim value	Step [value]	TrimRate [%]	End point [%]	Trim [%]
1	2	100	100	1
10	2	100	100	10
20	2	100	100	20
1	2	100	50	0,5
10	2	100	50	5
20	2	100	50	10

GLIDER – DUAL RATE ***(Activate Dual Rate for all flight conditions, if used)***

1	D/R	INH	Elevator	Not used
2	D/R	INH	Rudder	Not used
3	D/R	INH	Aileron	Not used

GLIDER – AIL DIFF ***(Aileron differential, often less movement down)***

	LEFT	RIGHT	
AIL	100	100	(will then be changed to used differential rate)
AIL2	100	100	

GROUP = 'Grp' (same aileron diff in all flight conditions)

or GROUP = 'Sngl' (when not the same aileron diff used in all flight conditions)

GLIDER – FLAP SETTING ***(Set the flap neutral position with the J3 Brake stick is up, i.e. no brake)***

GROUP = 'Grp'

	FLAP	FLAP2	
UP	100	100	(Don't change)
DOWN	100	100	(Don't change)
OFFSET	-40	-40	(Change "-40" to set the flap neutral position when the glider is ready. Tune with Sub-trim. *"-40" is the best value for max brake*.)

GLIDER – AIL -> CAMB FLAP ***(Aileron to flap mix)***

Menu 2:

	LEFT	RIGHT	
FLAP	30	30	(Set the amount of flap mix)
FLAP2	30	30	(Set the amount of flap mix)

STATUS = ON or INH (INH = no aileron to flap mix)

GROUP = 'Grp' (when the mix is same for all flight conditions)

or GROUP = "Sngl" (when the mix is different between flight conditions)

GLIDER – AIL -> RUD ***(Aileron to rudder mix)***

Menu 1:

RATE A = 40

RATE B = 40 (Set the amount of rudder mix)

Menu 2:

STATUS = ON or INH (INH = no aileron to rudder mix)

GROUP = "Grp' (when the mix is same for all flight conditions)

or GROUP = "Sngl" (when the mix is different between flight conditions)

GLIDER – BUTTERFLY ***(Brake)***

Menu 1:

GROUP = 'Grp' (Start with common settings)
STATUS = INH (Set INH in flight conditions for no Butterfly
Then *set flight condition = 'LANDING'*
GROUP = 'Sngl' (Only for flight condition 'LANDING')
STATUS = ON (Set ON in-flight condition 'LANDING')
OFFSET = 8 (Set pos for Brake stick J3 activates 'LANDING')

Menu 2:

AIL= -10 AIL2 = -10 (Aileron brake up, or down)
FLAP = +140 FLAP2= +140 (Flap brake down, with the Brake stick J3 down
"+1*40" is the best value for max brake.)*

ELE SETTING: (Elevator down compensation when braking)
RATE 1 = 0 (Not used, when no brake eq. J3 = up
RATE 2= +60 (Gain for elevator down, affects the whole curve)

CURVE = Point The curve needs to be set during flight test:

Position	Rate
152	0
83	0
70	-70
50	-115
0	-135
-50	-145
-100	-150
-152	-150

(This curve is a good start to begin with.)

GLIDER – TRIM MIX 1 ***(Set aileron/flap neutral position for selected flight conditions)***

GROUP = 'Sngl'
STATUS = INH (INH = for flight condition 'CRUISE', 'LANDING' and 'MOTOR ON')
STATUS = ON (ON = for the other flight conditions)

	AIL	AIL2	
OFFSET	0	0	(Set aileron neutral position, down or up)
	FLAP	FLAP2	
OFFSET	0	0	(Set flap neutral position, down or up)

OFFSET	ELEVATOR	
	0	(Set elevator neutral compensation, if needed)

Adjust in/Out speed when changing between flight condition positions:

Speed, for all flight conditions (option)

GLIDER – V-TAIL **(If model type is V-Tail)**

Group = 'Grp'

Can be used for V-tail rudder differential, or for adjusting the V-tail movement.

SETTINGS: NEW MODEL

1. Set all neutral positions in **LINKAGE – SUB TRIM**
   Elevator, Rudder, Aileron
2. Set flap neutral position in **GLIDER – FLAP SETTING**
   OFFSET-value (Brake stick = no brake, i.e. up)
3. Adjust elevator up/down in **LINKAGE – END POINT**
   Travel …
4. Adjust rudder left/right in **LINKAGE - END POINT**
   Travel …
5. Adjust aileron up/down in **LINKAGE - END POINT** Set the same position for up and down.
   Travel … The differential position between up/down will be adjusted in AIL DIFF-mixer.
6. Adjust aileron down in **GLIDER – AIL DIFF**

	LEFT	RIGHT	
AIL	100	…	(Left aileron)
AIL2	…	100	(Right aileron)

7. Adjust flap up/down in **GLIDER – AIL -> CAMB FLAP**

	LEFT	RIGHT	
FLAP	...	...	(Left flap)
FLAP2	...	…	(Right flap)

8. Adjust brake with max brake, i.e brake stick down, in **GLIDER – BUTTERFLY**

AIL= …	AIL2 = …	(Aileron up)
FLAP = …	FLAP2= …	(Flap down)

9. Adjust elevator (down) compensation when braking in **GLIDER – BUTTERFLY ELE SETTING**
   RATE 1 = 0
   RATE 2= … (Set max elevator compensation)

10. Adjust aileron -> rudder mix in **GLIDER - AIL -> RUD**
    RATE A = …
    RATE B = …

11. Adjust neutral positions for flight conditions ‘THERMAL’, ‘THERMAL2’, ‘DISTANCE’ in **GLIDER – TRIM MIX 1**

	AIL	AIL2	
OFFSET	…	…	(Aileron position)

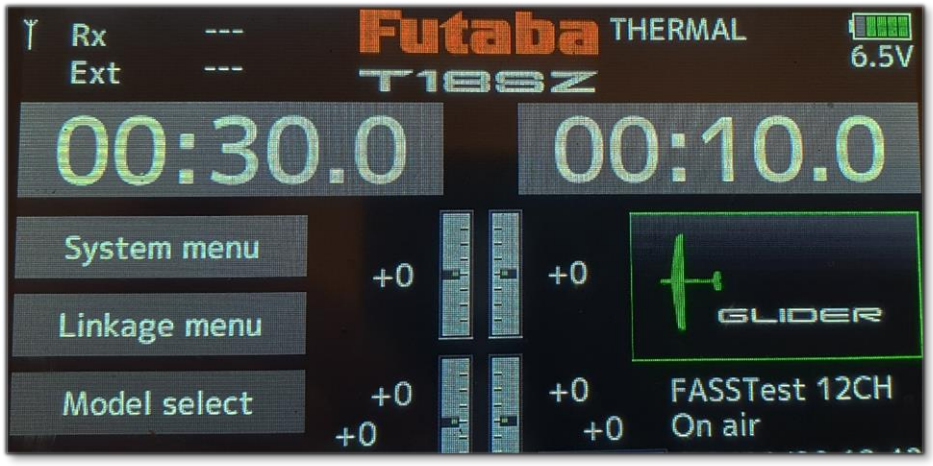
	FLAP	FLAP2	
OFFSET	…	…	(Flap position)

12. Adjust variable neutral position in flight condition ‘THERMAL’.

13. After flight test, adjust elevator compensation when braking (at different brake positions).

14. After flight test, adjust motor speed.

15. After flight test, adjust elevator compensation when motor running (at different speed).

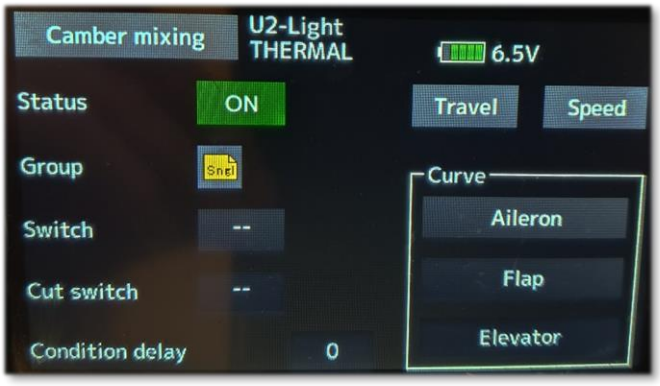


HOW-TO: VARIABEL NEUTRAL POSITION FOR FLIGHT CONDITION 'THERMAL'

1. LS control the variable position. Check that LS is active:
   Linkage - Function: CH 16 "CAMBER LS"

2. To set the function, go to
   Glider - Camber mixing

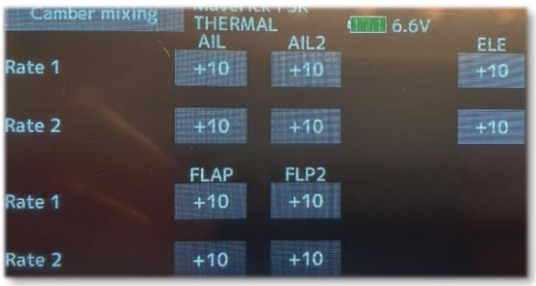
3. In flight condition = 'THERMAL'.
   GROUP = 'Sngl', (Only in 'THERMAL')
   STATUS = ON (Mix is on)



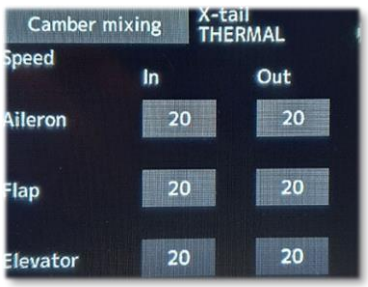
4. *With LS in the middle, neutral position is not changed. (Neutral position set by Trim Mix 1.)*
   Glider - Camber mixing: ***Curve***
   For Aileron and Flap and Elevator
   Rate A and Rate B = +50
   Offset = 0

5. Glider - Camber mixing: ***Travel***
   AIL = AIL2 = +10
   FLAP = FLAP2 = +10
   ELE = +10

Set camber mixing end positions:
max travel up/down (Rate 1, 2)
max travel up/down (Rate 1, 2)
max elevator compensation (Rate 1, 2)



Travel



Speed (option)

HOW-TO: MOTOR CONTROL (using 1000 to 2000 us)

Switch SA (= 3 pos switch) arms the motor control.
SA = “up” or “middle” = motor off.
SA = “down” = motor on: (Flight condition = ‘MOTOR ON’)

SB = “up” = high speed.
SB = “middle” = cruising speed.
SB = “down” = low speed.

SF on = Turbo speed. (Optional: Additional function for motor speed)

LINKAGE – END POINT

MOT: 152, 114, 100, 152 *(for max = 2000 us)*

GLIDER – AFR

Menu 2: Set Function = Motor

Set GROUP = ‘Grp’
Set Rate A = Rate B = 0
Set Offset = -125 (**Off**) equals pulse width = 995 us.
For F5J altimeter (AMRT):
pulse width <1200 us for motor off.

Additional info for Altis altimeter (AMRT):
pulse width <1000 us for emergency_on function.

Set flight condition = ‘MOTOR ON’.
Set GROUP = ‘Sngl’ (In flight condition ‘MOTOR ON’.)

Set Point:

Pos	Rate	
-100	-65	(**Low**) equals pulse width = 1250 us. *For F5J altimeter: pulse width >1200 us for motor on.*
0	-0	(**Mid**)
+100	+65	(**High**) (Change to +100, *when noTurbo speed*.)

Example:
Low = The model stays floating (no sinking/climbing).
High = Set the model to a 10 m/s climb.
Max = Max speed.

Low and high speed needs to be adjusted depending on used ESC/Motor combination.
(Don’t set the ESC to ’Auto’, use programmed min/max positions,
min = 1250 us, max = 2000 us, brake <1250 us)

HOW-TO: TURBO SPEED *(Optional)*

Dual Rate is used for the Turbo speed function ***(Max motor speed)***

GLIDER – DUAL RATE

Set flight condition = 'MOTOR ON'

	Status	Function	Switch	
D/R 1	OFF/ON	Motor	SF	(ON in-flight condition 'MOTOR ON')
				(Switch = "SF", On = down)

GLIDER – AFR

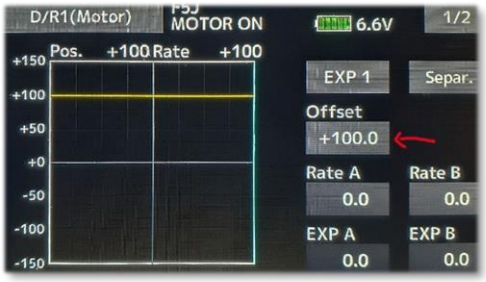
Menu 2: Set Function = Motor

Menu 1: **Motor – Dual rate**

D/R 1 in flight condition 'MOTOR ON': (Set D/R 1 with SF=ON)

Set Rate A = Rate B = 0

Set Offset = +100



HOW-TO: MOTOR TO ELEVATOR COMPENSATION *(when needed)*

GLIDER – PROGRAM MIXES

Select new mixer, Mode = Mixing

Menu 2:

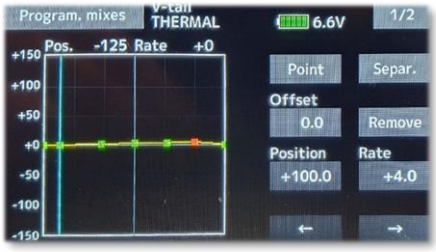
Set Mixer to 'ON'

Master: Motor

Slave: Elevator

Menu 1:

Point:	Position	Rate *(elevator compensation, usually down.)*
-152.5	0	
-125	0	= Off
-65	0	= Low
-0	+2	= Mid
+65	+3	= High
+100	+4	= Max
+152.5	0	



For V-Tail:

Set Slave - Elevator - Link to '+'.

ADDITIONAL INFORMATION

Trim T5 as global elevator trim: (*missing on 16SZ, use T3 instead)*

Trim T2 is used ”as usual” for elevator trim, i.e. it sets elevator trim separate for every flight condition.
Trim T5 is used, at the same time, and adjusts the elevator trim for all (wanted) flight conditions.
This trim T5 is useful to set the elevator neutral position (when flying) for all flight conditions at the same time.
It is still possible to adjust every flight condition individually with trim T2.
Elevator Trim = T5 + T2

LINKAGE – FUNCTION

Channel 14, Auxilary7, Control = “- -”, Trim = “T5”

GLIDER – PROGRAM MIXES

Mode = Mixing

Mixing menu 2:
ON (not INH), Trim= ON
Master = Auxilary7
Slave = Elevator

Mixing menu 1:
Rate A, Rate B = +100)

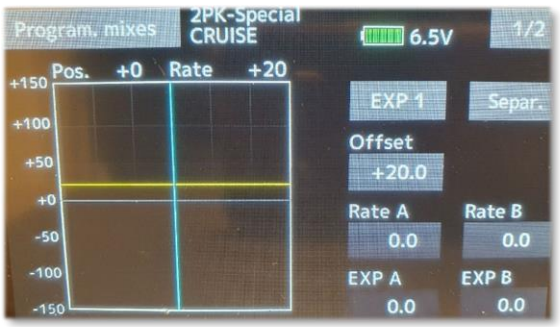
For V-tail:
Set Slave - Elevator - Link to ‘+’.

Using Mixer for adjusting T5 trim values

When using T5 as global elevator and then zero out the T5 value by asserting the trim via Auxiilary 6.

GLIDER – PROGRAM MIXES

Mode = Mixing
Mixing menu 2:
ON (not INH), Trim= OFF
Master = Auxilary6
Slave = Elevator (Link = + for V-tail)
Mixing menu 1:
Offset = ‘Trim value’ (The T5 trim value before clearing T5 value.)



ADDITIONAL INFORMATION

Timer 1 for motor on: *(Beeps when counting)*

Reset switch: SA – up = Reset timer
. Start switch: SA - down = Start timer
Stop switch: SA – middle = Stop timer

LINKAGE – TIMER ***(Timer 1)***
Alarm = 00:30, Elapsed, Buzzer, One time
Mode = Up
Reset switch, SA = On, Off, Off
Start switch, SA = Off, Off, On
Stop switch, SA = Off, On, Off

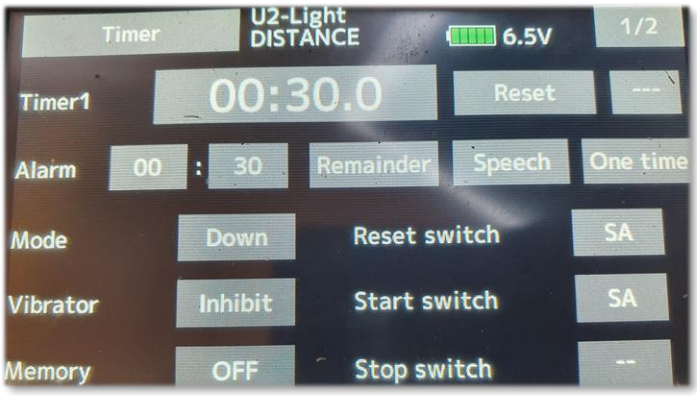
or

F5J: Timer 1 for motor on and Timer 2 for 10 s after motor off: *(Speech when counting)*

SA – down = Motor on (30 sek countdown) Flight mode = MOTOR ON
SA – middle = Motor off (10 sek countdown)
SA – up = Motor off (“Normal”, default)

LINKAGE – TIMER ***(Timer 1)***
Alarm = 00:30, Remainder, Speech, One time
Mode = Down
Reset switch, SA = On, On, Off
Start switch, SA = Off, Off, On
Stop switch, - -

On, On, Off



LINKAGE – TIMER ***(Timer 2)***
Alarm = 00:10, Remainder, Speech, One time
Mode = Down
Reset switch, SA = On, Off, On
Start switch, SA = Off, On, Off
Stop switch, - -

ADDITIONAL INFORMATION

Reduced rate for Elevator: *(when Motor = Turbo)*

GLIDER - DUAL RATE

Set flight condition = 'MOTOR ON'

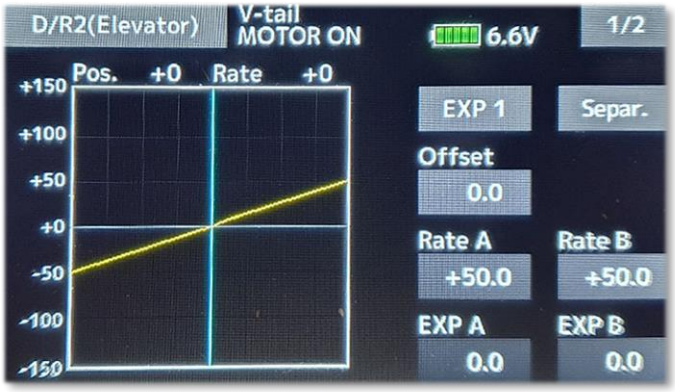
D/R 2 ON Elevator SF (ON in-flight condition 'MOTOR ON')

GLIDER – AFR

(Elevator – Dual rate)

D/R 2 in flight condition 'MOTOR ON':

Set Rate A = Rate B = "reduced rate"



Thermal ++

GLIDER – Trim mix 2

When Flight Condition = 'THERMAL', add extra aileron/flap camber.

Select for example SF *(spring-loading returning switch)* to activate the mix.

Adjust flap "along the way" in Butterfly-mix: *('LANDING')*

GLIDER – PROGRAM MIXES

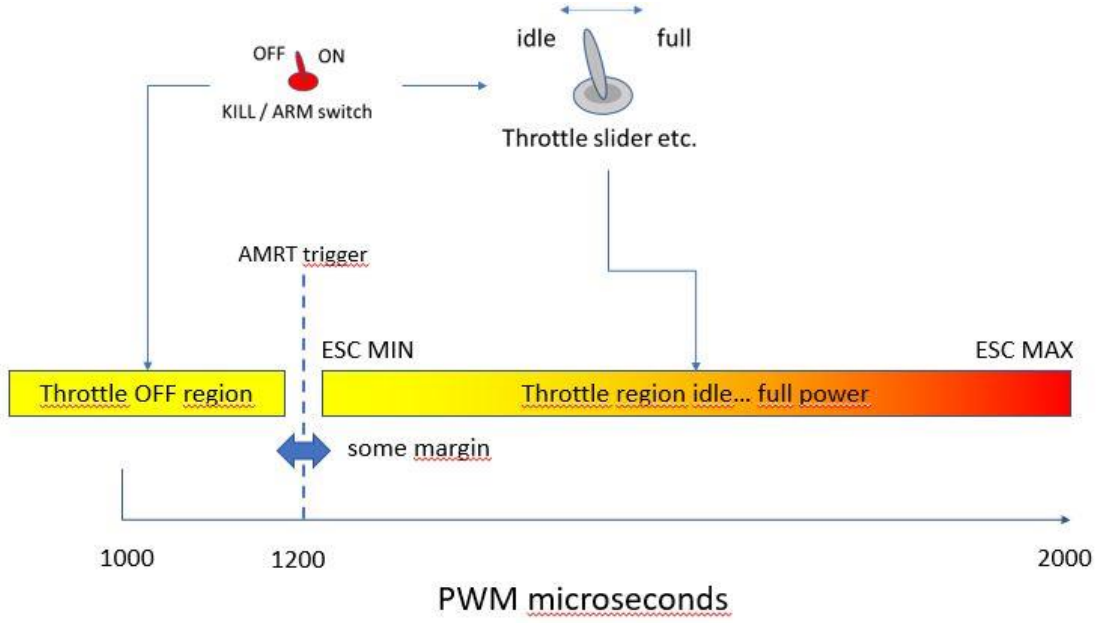
Mode = Mixing, Group = separate
Mixing menu 2:
ON (In flight condition 'LANDING', other = INH)
Master = J3
Slave = Flap (2) (Select the flap to be adjusted)
Mixing menu 1:
Offset = nnn (Set the value)
Rate A = - Rate B: (Set the position when Brake = max)

F5J Settings-Template.xlsx

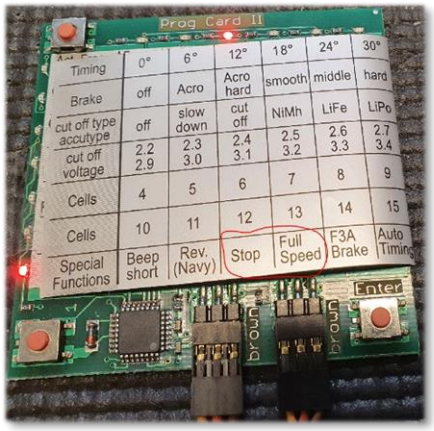
ADDITIONAL INFORMATION for MOTOR Control

Settings for ESC **(using 1000 to 2000 us)**

- Do not set the ESC to 'Auto', instead setup min and max PWM for the ESC.
  Example: Cut-off is < 1200 us and max speed is 2000 us,
  and the transmitter PWM range goes from 1000 us to 2000 us.
-



YEP (Hobbyking):



YEP with Programming Card

For the throttle stick range calibration, please connect the enclosed extension cable from the receiver to the rightmost connector of the ProgCard II.
Turn on the transmitter, and put the throttle on stop. Select the stop LED on the ProgCard II and push the Enter button. Do the same with the full power position and the **Full Speed** LED.
Stick position **Brake on** (with brake)
The brake starts 10% below the stop position.

Castle Creation:

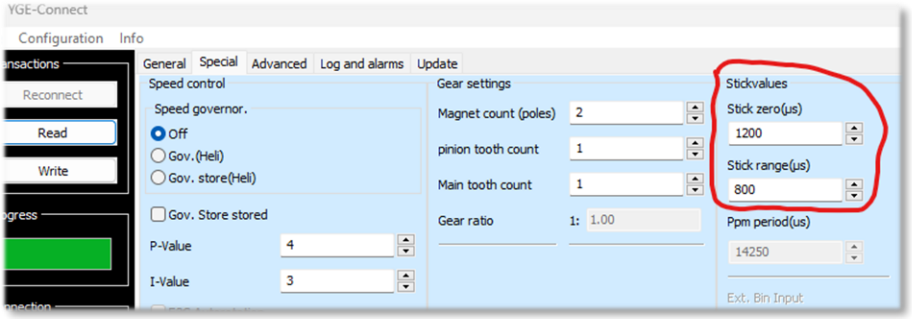
Castle Link Program Settings Report

Title: Edge Lite 50 for Pike Perfection SSL1
Date: 4/24/2020 10:09:20 PM

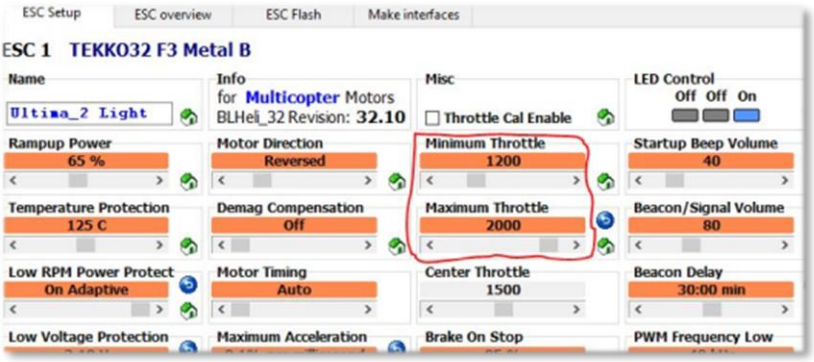
Throttle	
Vehicle Type	Airplane
Throttle Type	Fixed-Endpoints
Throttle Response	Medium (5) (Default)
Brake	
Brake Strength	90%
Brake Delay	.6 sec (Delayed) (Default)

For Castle Creation, see following link: Fixed Endpoints

YGE:



BLHeli32 (Holybro):



'Endpoint Travel' in transmitter:

Radio Brand	Min.	Max.
Airtronics	-125%	+125%
FrSky	-98%	+98%
Hitec	-130%	+120%
Jeti	-100%	+100%
JR/Spektrum	-125%	+125%

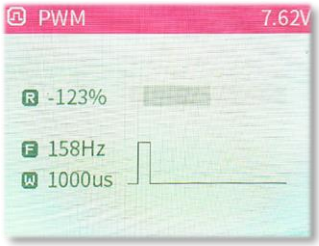
A value from the transmitter between -100 and +100 gives a PWM of 1000 – 2000 us to the ESC.
(-60 gives 1200 us)

Futaba	**Min**	**Max**	**PWM**	
'End point Travel':	-124%	+114%	(1000 – 2000 us)	**Motor** = Reverse

LINKAGE – End point

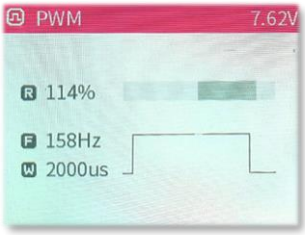
GLIDER – AFR - Motor

Set Motor off = -100	(1000 us)	[-124%]	
Set Motor on = at least -70	(> 1200 us)	[-75%]	Set -65
Set Motor max = +100	(2000 us)	[+114%]	



Motor off

Altimeter detects Motor on



Motor max

[How to avoid motor problems with an AMRT]

How to change switches on Futaba 18sz:

https://www.rcgroups.com/forums/

I have changed between SH and SF, i.e. I want the spring-loaded switch positioned on the left side.
Due to the switch PCB:s being designed for upper left or right side, I had to remove the two switches from the PCB, and then re-solder them to the new positions.
Now it works as I wanted.

I couldn't find an easy way to change them, like in 18mz, where there also is a menu for when you have changed switches.