

Flyduino KISS Flight Controller Manual v1.03



Image: Upper / Top Side

As we felt the need for a modern more simplified 32bit Flightcontroller, we made the KISS FC, which includes a complete own Flight Control Firmware development who get rid of some old ballast, this took some time, but the result is very pleasing.

The Idea was to simplify some things and due to intensive long term testings of some pretty good Pilots we were able to optimize the code to a point where you hopefully get your quad in the air quite quick.

Normally you just need to choose your Airframe in the GUI and are able to fly (at least with KISS ESC), otherwise you can download presets of well known pilots for given configurations and of course you can tweak the PID yourself through the GUI.





Image: Lower / Bottom Side

The software setup side is reduced as far we can, many things are already taken into account for you, if you have some solid soldering skills you should be able to build your quad pretty quick.

A new feature is also the build telemetry, in combination with our 32bit ESC line its possible to show the live telemetry data via OSD on your FPV live feed or in the KISS FC GUI

This way you get useful informations like the Voltage of your battery, current consumption, ESC temperature and motor RPM.

Other FC firmwares (eg. Cleanflight) can be ported for the use with the KISS FC.

NOTE: Always keep the FC level and firm for at least 5 seconds after you powered it! If you move it, the gyro calibration might fail, indicated by the blue LED staying solid and the GUI showing the MCU idle of ~55%. On startup the green LED should be lit and the blue one should be flashing for several seconds, then go solid for a second and if the calibration is complete go off.



Supported Copter frames:

- Tri
- Y4, Y6
- Quad +/x
- Hexa +/x

COM45	V Disc	connect					Welcom	e Configuration	Data Output
UAV Ty	pe						General Se	ttings	
Quad X	•	. 2	\sim	. /	\frown		Min. Throttle	1070 💲	
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Quad X	s	```	\searrow	573	\mathcal{I}'		Min. Command	1075 拿	
Y4 Y6				\sum	U		Mid. Command	1500 拿	
Hexacop			\sim	<u>></u>	\sim		Tri Yaw Mid.	1500 🜲	
Hexacop		((PWM4) (р	wмз))		Tri Yaw Invert		
Receive	E.	^	\sim	/ \	\checkmark		OneShot 125	2	
4-6 single	e Chan						OneShot 42		
FS. levelm	ode Sec.:	10 🜲					3D Mode	-	
PID & R	ates						Aux Chann	el Settings	
Presets:	Preset V	custom			v	Share		Action	-
	Р	Ĩ	D	Rate	RC Rate	RC Curve	and a second	Action	<u>,</u>
Roll	3 💲	0.035 🌲	10 🌲	0.7 💲	0.7 ‡	0.4 🜲	a de la companya de la	Second providence	<u> </u>
Pitch	3 🛟	0.035 ‡	10 ‡	0.7 💲	0.7 💲	0.4 💲		Action	
Yaw	8 💲	0.05 ‡	0 \$	0.7 💲	0.7 💲	0.4 🌲	AUX 4 No	Action	•
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	0.4 ¥	0.04 ‡	10 ‡	Max. Deg.			LPF FRQ Hi	gh 🔻	





Receiver	PWM	PPM	Digital	Telemetry	Protocols
Spektrum	Yes	Yes	Yes (Spektrum Sat)		DSM2 + DSMX
Futaba	Yes	Yes	Yes		SBUS
FrSky	Yes	Yes	Yes	Yes (X-Series RX)	SBUS + S-Port
Jeti	Yes	Yes	Yes	Yes	Jeti DX + EX Bus
Graupner	Yes	Yes	Yes	Yes	HOTT
Hitec	Yes	Yes			
Klassisch	Yes	Yes			



There are 8 Receiver inputs and channels: 4 for the sticks and 4 AUX channels 1-4

Other Specs & Features

MCU: STM32F303CCT6 IMO: MPU6050 Weight: 4.6g Mounting Holes: 3x3cm pattern with 3.2mm holes (compatible with most frame types) Voltage: 2-6S (direct, max. 5s recommended)

The needed USB driver usually will be installed when you connect the FC for the first time. It may take several minutes before you can use the FC and connect it to the GUI.



Connections

You can find the connection diagram / pinout on the Welcome page of the GUI. **TRX** = Telemetrie In



There are 6 PWM outputs for 2-6 Motors or Servos





GUI (Graphical User Interface)

The GUI consists of 3 pages: The "Welcome" page with all connections, the "Configuration" page for the settings and "Data Output" for Sensorgraphs.



Accelerometer Z 1.044



Advanced Configuration

COM27	 Disc 	connect					We	lcome	Configuration	Data Output
UAV Typ	pe'						General	Settin	gs	
Quad X	•		\frown	1	\frown .		Min. Throt	le	1070 ‡	
t.		ſ	(PWM1)	(Р	WM2)	Ì	Max. Thro	tle	2000 ‡	
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Receive		~	\sim				OneShot 1	25	2	
4-6 single	e Chan						OneShot 4	2		
FS. levelm	ode Sec.:	10 ‡					3D Mode			
							FC Rotated	by 180°		
PID & R	ates						Aux Cha	annel S	Settings	
Presets:	Preset V	custom			۲	Share	AUX 1	High: /	15 2 8 (169	•
	Р	1		RC Rate	Rate	RC Curve	AUX 2	No Act		*
Roll	3 ‡	0.035 ‡	10 ‡	0.7 ‡	0.7 ‡		AUX 3	No Act	tion	T
Pitch	3 \$	0.035 ‡	10 ¢	0.7 \$	0.7 ‡		AUX 4	No Act	tion	*
	0 -	U.U5 -	0 \$	0.7 ‡	0.7 ‡	0.4 ‡				
Yaw		02 -	04 -				Filter			
Yaw TPA	0.4 ‡	0.2 ‡	0.4 ‡	Max. Deg.			Filter	High		
		0.2 ‡		Max. Deg. 50 拿			Filter LPF FRQ	High	Ŧ	

If you connect a KISS FC with version 1.02x on it you will get a small extra button that can be seen, when enlarging the GUI window in configuration tab.

You can setup TPA influence and Battery influence

TPA influence

here you can configure the influence of the TPA values in relation to the throttle.

Battery influence

its ment to decouple the PID values from the lipos voltage. (normaly PID's feel stronger with higher voltage)



	1000						FC Rotated	1 by 180°		
PID & Rat	les				-11		Aux Ch	annel Se	ttings	
Presets:	Preset V	custom		THE REPORT OF A CARD	۲	Share	AUX 1	High: AR	M	•
	Р	1	D	RC Rate	Rate	RC Curve	AUX 2	No Actio	n	•
Roll	3 ‡	0.035 🗘	10 ‡	0.7 💲	0.7 ‡	0.4 🜲	AUX 3	No Actio	n	
Pitch	3 ‡	0.035 💲	10 ‡	0.7 ‡	0.7 ‡	0.4 ‡	AUX 4	No Actio		•
Yaw	8 ‡	0.05 💲	0 ‡	0.7 ‡	0.7 ‡	0.4 💲	AUX 4	NO ACIIO	n	
TPA	0.4 🗘	0.2 ‡	0.4 ‡				Filter			
				Max. Deg.			LPF FRQ	High	•	
KISS FC Vers										
KISS FC Vers	sion: 1.02 dvanced	S/N: 203037	235-40335 tion (use s	705-003C00		what you are do	ing. for noi	mal flying	g not need	led!)
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Note: If you are already using a previous version of the Chrome App, please uninstall it first and load the actual version (recently v1.03) from here:

https://chrome.google.com/webstore/detail/kissfc/hecmfiemalajlglacajmnplhjmnkinpm

Installation & Setup

Note: the USB port might get warm during operation. This is due to the used voltage regulator which needs to be able to handle 6s. This behavior should not a problem at all.

Just plug in the FC via Micro USB connection to your PC. Drivers should be installed automatically on WIN7-10.

After the installation is complete, unplug the FC from the USB, plug it in again and hold the FC firm and level for at least 5 seconds!

The green LED will be lit constantly while the blue LED will blink, indicating the Gyro calibration. It will be solid afterwards and go off when the calibration is completed und the FC is ready to go. Then start the Chrome GUI and select the COM port for the connection. If no port is shown, the driver installation might have failed.

Important! For security reasons the PIDs will only be saved when NO LIPO is attached!



Sharing PIDs

The default PIDs should be good enough for a start. However if you want to tune the FC to the max and squeeze the last bit of performance out of it, you will need to fine tune the settings. A great feature of the GUI is the "Share" button, where you can submit your PIDs with other users. This can be a good starting point for beginners with similar setups. Please don't abuse that function!

	FLTCTRL	
Share your KISS FC P	ID Settings	
Note: please only publish yo they can be useful for other nickname you use in Forums identify the submitter.	pilots! Please submit your	
Describe your Copter	and Settings:	
Your name: Copter size (m <300 💌	m): Description:	
publish		

Please submit your nickname used in forums to make it easier to identify the submitter for others. We will refine this function in the future to assure only flyable PIDs make it into the list.



PID Presets

COM3	Disconnect				We	elcome	Configuration	Data Output
UAV Type					Genera	l Settin	gs	
Quad X	•	\cdot	\frown	~	Min. Thro	tle	1070 拿	
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		'\	\mathcal{R}	<i>.</i>	Min. Com	mand	1075 💲	
		(<u>J</u> n		Mid. Com	mand	1500 拿	
		\sim	YSS-		Tri Yaw M	id.	1500 🜲	
		((PWM4)	(PWM3))	Tri Yaw In	vert		
Receiver		$* \bigcirc$	\bigcirc	Ý	OneShot	125		
4-6 single C	han 🔻				OneShot	42		
FS. levelmod	e Sec.: 10 🌲				3D Mode			
					FC Rotated	i by 180°		
PID & Rat	es				Aux Ch	annel S	Settings	
Presets:	Preset 🔻 custom			Share	AUX 1	No Ac	1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 - 1975 -	Ŧ
	P default			RC Curve	AUX 2	No Ac	200 033.	v
Roll	3 🌲 WT Mir	hiCP		0.4 ‡	AUX 3	No Ac		•
Pitch	3 🗘 WT CP WT FQ	18-25cm		0.4 🜲		-		
Yaw	8 2 QR 270			0.4 🗘	AUX 4	No Ac	tion	•
ТРА	0.4 CR 400				Filter			
	ZWR 2		lax. Deg.		LPF FRQ	High	•	
Level	4 🗘 0.04	\$ 10 \$	60 🜲					Save Settings
KISS FC Vers	sion: 1.01 S/N: 203	03735-4D3357	06-00390030					sare oo ango

Adjust your settings with care! Only use small steps to increase or decrease the numbers and only one at a time. To make a start easier the GUI offers pre-defined PIDs for several setups tested by skilled pilots. More presets will be available once user share theirs.



PID and Rate Tuning

COM3	▼ Disc	connect						Welcome	Configuration	Data Output
UAV Typ)e						Gen	eral Settir	ıgs	
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		12 1	\searrow	\mathbb{R}	\mathcal{I}'		Min.	Command	1075 🜲	
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		((PWM4) (f	vwмз))		Tri Ya	w Invert		
Receiver	с.	*	\sim		\checkmark		Ones	hot 125	N	
PPM:Pitc	h,Thr.,Roll,	Yaw 🔻					Ones	hot 42		
FS. levelmo	ode Sec.:	10 ‡					3D M	ode		
							FC R	otated by 180°		
PID & Ra	ates						Aux	Channel	Settings	
Presets:	Preset ¥	custom			۲	Share	AUX	10 A 10	Level Mode	v
	Р	I	D	Rate	RC Rate	RC Curve	AUX			T
Roll	3 💲	0.035 ‡	10 🌲	0.7 ‡	0.7 ‡	0.4 🛟	AUX	-		T
Pitch	3 💲	0.035 💲	10 🌲	0.7 💲	0.7 ‡	0.4 🌲				
Yaw	8 🜲	0.05 韋	0 ‡	0.7 ‡	0.7 ‡	0.4 🜲	AUX	4 No Ad	tion	· ·
TPA	0.4 💲	0.2 ‡	0.4 ‡				Filte	r		
				Max. Deg.			LPFI	RQ High	Ŧ	
Level	4 ‡	0.04 ‡	10 ‡	60 🌲						Save Settings
KISS FC Ve	ersion: 1.01	S/N: 203037	35-4D335	706-00390	030					

Rate decreases the gyro influence depending on the stick max outputs. E.g. with roll stick at center you will always have 100% gyro influence with rate on 0.00 it will still be 100% with full roll left. But with 0.50 rate it will be 50% gyro influence at full roll left or right.

Rate also gives an Expo like feeling. So to keep the same Expo strength you may lower one if you increase the other.

RC Rate increases the strength of the RC channel signals into the PID controller. so e.g. if you have 0-1000 at RC rate 1.0, it will be 0-2000 with RC rate 2.0

RC Curve is like the Expo on your TX. It lowers the inputs around the middle. You can adjust the RC Curve with 0.01 steps.



Low Pass Filters

UAV Type General Settings Quad X Image: Chan I		
Receiver Max. Throttle 2000 4-6 single Chan Mid. Command 1075 FS. levelmode Sec. 10 ‡ OneShot 125 Image: Chan of the stress of the str		
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Roll 3 \$ 0.035 \$ 10 \$ 0.7 \$ 0.7 \$ 0.4 \$		
Pitch 3 0 0.035 0 10 0 0.7 0 0.7 0 0.4 0 A0X3 No Action		
Yaw 8 \$ 0.05 \$ 0 \$ 0.7 \$ 0.7 \$ 0.4 \$ AUX 4 No Action	*	
TPA 0.4 \$ 0.2 \$ 0.4 \$ Filter		
Max. Deg. LPF FRQ Off		
Level 4 \$ 0.04 \$ 10 \$ 60 \$ Off	Save Settings	
Master Version, not fail, 2000737 4033763 00330050 Medium High		
Medium Medium Low	1	
Low Very Low		

The GUI offers presets for low pass filters to get rid of possible oscillations. The lower you choose the frequency, the more filtering will occur. You can either turn filtering off completely or select one of the other presets to match your setup. "Very Low" offers the most filtering, "High" is the least affecting filter.



AUX Channel Settings

COM3	▼ Disc	onnect					We	lcome	Configuration	Data Output
UAV Typ	e						General	Settin	gs	
Quad X	•		\sim		\frown .		Min. Throt	tle	1070 💲	
3		1	PWM1) _ (P	WM2))		Max. Thro	ttle	2000 🛟	
		Ň	\searrow	$\langle \mathbf{q} \rangle$	\mathcal{I}'		Min. Comr	nand	1075 🛟	
				7 Y	n		Mid. Comr	nand	1500 韋	
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Receiver		\checkmark	\sim				OneShot 1		•	
4-6 single	Chan	×					OneShot 4			
FS. levelmo	de Sec.:	10 🜲					3D Mode			
							FC Rotated	by 180°		
PID & Ra	ates									
		-011078-02001			•	Share	Aux Cha	annel S	Settings	
Presets:	Preset V	custom	D	Rate	22	Snare RC Curve	AUX 1	No Ac	10.025	•
			200	AND THE OWNER OF THE	RC Rate	Second and a second second	AUX 2	No Ac High: /		
Roll	3 ‡	0.035 💲	10 💲	0.7 💲	0.7 ‡	0.4 💲	AUX 3		Level Mode	
Pitch	3 🌲	0.035 🌲	10 🌲	0.7 ‡	0.7 🌲	0.4 💲		High: 3	3D Mode	
Yaw	8 🌲	0.05 ‡	0 ‡	0.7 ‡	0.7 🌲	0.4 💲	AUX 4		evel, High: 3D	
TPA	0.4 ‡	0.2 ‡	0.4 ‡			Bu antes	Filter	10000000	Servo Mid Ser. AngX. Gain	
				Max. Deg.				PWM	Servo Mid	
Level	4 🝨	0.04 拿	10 拿	60 🌲			LPF FRQ		ö Ser. AngY. Gain Buzzer	
	- CO.000	S/N: 203037	CONTRACTOR OF CONTRACTOR	Conceptual de la conceptual de	52.2			right i	Duzzei	ettings

The AUX Channels offer access to advanced features, controlled by switches oder faders on the transmitter, e.g. engaging the Level Mode or activating the buzzer like shown above. The Servo features offer functions for gimbals.

ESCs Throttle Calibration

Note: when using KISS ESC 24A you will not need to calibrate the ESCs bc of the precise onboard resonator. **Please always take off the props when using the following procedures.**

"Disarmed" always means 1000 on the KISS FC

- Connect the FC to the USB and set Min Throttle to 2000
- Arm the FC with your transmitter (without Lipo!)
- Only then connect the Lipo (beep)
- Disarm (beep)
- Unplug the Lipo again
- Set Min Throttle to 1070 (or as you need it)

Note: For security reasons the Min Throttle settings will only become active after restarting the FC (repower)

3D Mode

Please be extra cautious when activating the 3D Mode – always take off props first!



Flashing the Firmware

You will find online instructions on how to flash the latest firmware onto the FC: <u>http://ultraesc.de/KISSFC/update_en.html</u>

Air Mode

If Min Command is set lower than TX Throttle cut, the PIC controller won't be shut off If Min Command is set to 1000 and the Arm function is assigned to a switch on your radio, the Air Mode is activated automatically.

In Airmode <u>on the Ground</u> you might find the FC trying to regulate "something" though it is sitting still. However the Airmode only makes sense in flight.

Telemetrie / OSD

The KISS FC offers various possibilities to use telemetry and OSD functions

- internal Telemetry of the FC via GUI

- external Modules for Telemetry and OSD, e.g. KISS ESC 24A Telemetry via OSD Telemetry of the KISS FC can be viewed on the "Data Output" page.

External Modules



Connecting the MinimOSD – special firmware required.



Telemetry for specific RC Transmitters

FrSky Telemetry via S-Port



Add Sensors in the Taranis Menu

Power the FC and RX (Smartport telemetry is only active as long as FrSky SBus is selected as RX type), go to menu and then press page till you come to telemetry menu. Select "Discover new sensors". You should get beside some others the new sensors:

- VFAS (the lipo voltage in V)
- Current (the total current A)
- Fuel (the used mAh's)

Note: Current and Fuel will stay zero if you dont have supported telemetry ESC's connected (KISS24A for example)



JETI DX







Graupner HOTT Telemetry



Setup your Graupner MX-xx

Power the FC and RX (HOTT telemetry is only active as long as SUMD is selected as RX type), go to Menu -> Telemetry -> RX Setup and enable SUMD and the Sensor Pin.



* **Note1:** To let the TX find the sensor, you should power the FC and RX close after turning on your TX. As the TX just searches for some time after it is turned on.

* **Note2:** Current (A) and the consumption (mAh) will stay zero if you don't have supported telemetry ESCs connected (KISS24A for example)



- Micro MinimOSD



Refer to the connection diagram above. <u>https://flyduino.net/Micro-MinimOSD</u>

- DIY Voltage Divider



How to build a voltage divider: <u>https://www.youtube.com/watch?v=21HhyyQB2RI</u>

- FrSky Voltage Sensor



Can be purchased at various stores online for ~5\$, e.g. at Flyduino: <u>http://flyduino.net/Frsky-FBVS-01-FrSky-Battery-Voltage-Sensor_1</u>

For further questions and discussions please follow us on RCGroups: http://www.rcgroups.com/forums/showthread.php?t=2555204

The whole Flyduino team wishes you great success and a lot of fun with this new FC!



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