Updating your FlightCoach flight control board firmware

Regardless whether you purchased a ready to go FlightCoach system, or have assembled one yourself it is always worthwhile keeping the firmware up to date. Why? Ardupilot is improving all the time, and running the latest version can help capture a great log file.

The ArduPilot website has great information on updating flight control boards, but the below information should get the job done! If your board does not have ArduPilot firmware on it, please see the Ardupilot website for more information on how to proceed.

If you want to see a nice video from the experts, make yourself a coffee and have a look at the video Andrew Tridgell made here <u>https://youtu.be/6RTilBIA9zY</u> The video explains everything really well.... Please use the below in conjunction with the video.

1. Identify your flight control board

Some boards may have their name screen printed on the board. Many do not. The easiest way to be sure you get the correct firmware is to open a .BIN (log) file in The Plotter. Go to settings, and you will now find a helpful table of critical parameters – and above this table you will find the identity of your flight control board.



You can now close The Plotter.

2. Build your new firmware

Now open this webpage <u>https://custom.ardupilot.org/</u> and at the top right click on the button 'add a build'.

ARDU	PILOT	Custom F	irmware B	Builder	O Report an issue	🕒 Go to builds direct	ory 🛨 Add a build
Status	Age (hr:min)	Git Hash	Board	Vehicle	Features	Progress	Actions
Finished	5:31	<u>0c5e999c44</u>	KakuteF7- bdshot	Copter	EKF3, BATTMON_FUELFLOW, BATTMON_FUELLEVEL_PWM, BATTMON_FUELLEVEL_ANALOG, UBLOX, OSD, PLUSCODE, OSD_P show more	()	

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Next select 'Plane', and your board type from step #1

	Custom Firmware I	Builder	O Report an issue	Go to builds directory	View all builds
ADD NEW BUI	LD				
Select venicle		Select Branch		Select Board	
Plane	ý	Latest	~	omnibusf4	

Now lets select the options we need, and remove what we do not. Be sure both EKF2 and EKF3 are selected.

elect vehicle		Select Branch		Select Board	
Plane	~	Latest	~	omnibusf4	
Available features fo	r the current selection	n are:	~	© Expand/Collap	ose all categor
AHRS		P_Periph	Actuators	V Airspee	d Drivers
EKF2					
EKF3				$\mathbf{\nabla}$	
External APICS					
External Naviga	ation for				
EKF3					
IMU Temperatu	ire				
Calibration					
LORD External	AHRS				
VectorNav Exte	rnal				
AHRS					
Visual Odomet	ry .				
Wind Estimatio	n for				

Leave Compass and GPS Drivers with the defaults selected.

Under 'Plane' you *may* want to select 'blackbox logging'. This option helps minimise the size of your log files by only logging if your speed is greater than 5m/s (there is a built in delay here so logging continues during stalled manoeuvres). This means you can keep the logger powered up between flights. However, this will require some parameter changes – so you may wish to skip this for now, but consider including it in a build later on.

Battery	$\overline{}$	Camera		C Opmpass	$\overline{}$	Copter 🗸
ESC	$\overline{\mathbf{v}}$	GPS Drivers	\sim	Generator	$\overline{}$	Gimbal 🗸
		Ident	\sim	MSP	$\overline{}$	Notify 🗸
OSD	\sim	Other	$\overline{}$	Payload	\sim	Plane
						 blackbox logging Deepstall Landing QuadPlane Autotune mode QuadPlane support Soaring

De-select everything as below, but under sensors leave your barometer selected. Depending on your board, there may be different requirements here – basically you can de-select everything but the barometers.

Precision Landing	Proximity 🗸	□ RC 🗸 🗸	Rangefinder
Safety	Sensors	Telemetry	VTOL Frame
	Airspeed Sensors Beacon BMP085 Barometric Sensor BMP280 Barometric Sensor BMP388 Barometric Sensor DPS280/DPS310		
Finally de-select VTX			
Отх			
At last click 'generat	e build'		
O Reset feature	e defaults 🔇 🤜 Ge	enerate build	

Once the build finishes click 'Close'

Build log

[817/826] Comp	iling Ardu	Plane/e	ekf_c	heck.cp	p						
818/826] Comp	iling Ardu	Plane/m	node	autotun	e.cpp						
819/826] Comp	iling Ardu	Plane/m	node_	grtl.cp	p						
820/826] Comp	iling Ardu	Plane/t	tunin	g.cpp							
821/826] Link	ing/omn	ibusf4/	/bin/	ardupla	ne						
[822/826] Gene	rating bin	/ardup]	lane.	bin							
823/826] app	descriptor	/omr	nibus	f4/bin/	ardupla	ne.bin					
APP DESCRIP	TOR found										
824/826] apj	gen/omn	ibusf4/	/bin/	ardupla	ne.bin						
825/826] bin	cleanup	/omnibu	usf4/	bin/ard	uplane.	oin					
826/826] Gene	rating bin	/ardup]	lane.	hex							
laf: Leaving d	irectory										
/mnt/volume n	yc3 01/cus	tom/bas	se/tm	p/plane	:omnibu	sf4:527	43787b2	22a3852	d1728bce564	00a81cf874c	c5:be33
3983a7d2816feb	8078876832	clcc/or	nibu	sf4'							
UILD SUMMARY											
uild director	y:										
mnt/volume ny	c3 01/cust	om/base	e/tmp	/plane:	omnibus	F4:5274	3787b22	2a3852d	1728bce560	a81cf874cc	5:be338
83a7d2816feb8	078876832c	1cc/omr	nibus	f4							
arget	Text (B)	Data ((B)	BSS (B)	Total	Flash	Used (B) Free	Flash (B)	External	Flash
sed (B)											
in/arduplane	730164	7	736	130420			730900	3	252124	Not Appli	cable
uild commands	will be s	tored i	in	/omnibu	sf4/com	oile co	mmands.	ison			
plane' finish	ed success	fully ((1m4.	054s)		-					
one build		5	13								
UILD_FINISHED											
UILD_FINISHED											

3. Now download the firmware

Click on the folder icon here, to open the build directory



You will see a page like this. Click on the Arduplane.apj file - that should then download to your computer.

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Andrew Palmer

Index of /builds/plane:omnibusf4:52743787b222a

Name	Last modified	Size	Description
Parent Directory		5	8
arduplane	2023-05-18 17:4	7 1.3M	
arduplane.apj	2023-05-18 17:4	7 656K	
arduplane.bin	2023-05-18 17:4	7 714K	
arduplane.hex	2023-05-18 17:4	7 1.9M	
arduplane_with_bl.hex	2023-05-18 17:4	7 2.1M	
build.log	2023-05-18 17:4	7 99K	
extra_hwdef.dat	2023-05-18 17:4	5 16K	
selected_features.json	2023-05-18 17:4	5 207	
	Name Parent Directory arduplane arduplane.apj arduplane.bin arduplane.hex arduplane_with_bl.hex build.log extra_hwdef.dat selected_features.json	Name Last modified Parent Directory 2023-05-18 17:4 arduplane 2023-05-18 17:4 arduplane.apj 2023-05-18 17:4 arduplane.bin 2023-05-18 17:4 arduplane.hex 2023-05-18 17:4 arduplane.with_b1.hex 2023-05-18 17:4 build.log 2023-05-18 17:4 extra_hwdef.dat 2023-05-18 17:4 selected_features.json 2023-05-18 17:4	Name Last modified Size Parent Directory - arduplane 2023-05-18 17:47 1.3M arduplane.api 2023-05-18 17:47 656K arduplane.bin 2023-05-18 17:47 714K arduplane.hex 2023-05-18 17:47 1.9M arduplane_with_b1.hex 2023-05-18 17:47 2.1M build.log 2023-05-18 17:47 99K extra_hwdef.dat 2023-05-18 17:45 16K selected_features.json 2023-05-18 17:45 207

- Phew... half way there you have the latest firmware! Next download and open Mission Planner on your computer. Information on installing Mission Planner is available here <u>https://ardupilot.org/planner/docs/missionplanner-installation.html</u>
- 5. Plug your flight control board into your computer but do not click 'connect' in Mission Planner. Instead click on 'Setup', 'Install Firmware'



The click on 'Load Custom Firmware'

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opter	V4.3.6 OFFICIAL	Copter V4.3.6 O	FFICIAL	ibe Planner
ons	Bootloader Update	Force Bootloader	Load custom firmware	Beta firmwares

Select the firmware file you downloaded in step #3. Follow the onscreen instructions – you may be asked to unplug your board and plug it back in.

Finally, there are some Ardupilot parameters you can check / change to optimise your log files. For information on parameters see the ArduPilot website. Here I will give a quick run-through.

So with Mission Planner still open select the correct com port for your flight control board. Then click on 'Connect'



Once the board is connected, click on 'Config', 'Full Parameter Tree'



Then enter each of the following parameters in the search box, and change the values as necessary.



If you are using *not* using the Black Box logging firmware, your existing parameters should work and not need changing. If you are having trouble, these parameters may help:

LOG_DISARMED	0
LOG_FILE_DSRMROT	1
LOG_FILE_RATEMAX	30
ARMING_REQUIRE	0
EK2_ENABLE	1
EK3_ENABLE	1
Arming_check	1032
Arming_rudder	0

If you are using the Black Box logging firmware, you will want to update your parameters as shown below.

LOG_DISARMED	0
LOG_FILE_DSRMROT	1
LOG_FILE_RATEMAX	30
ARMING_REQUIRE	1
EK2_ENABLE	1
EK3_ENABLE	1
Arming_check	1032
Arming_rudder	0

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REMEMBER: You must click 'Write params' to save the changed parameters!



You can now disconnect the flight control board.

FAQ's:

- 1. Do I need to update my firmware? No but running the latest firmware helps with gathering the best log data.
- 2. Why set LOG_FILE_RATEMAX? This parameter has a big effect on log size. Logging at this rate is plenty of data points.
- 3. Why enable EK2? This can be useful during trouble shooting a poor log file.
- 4. What about LOG_DISARMED, LOG_FILE_DSRMROT, ARMING_REQUIRE? These parameters allow the new black box logging to do its job.
- 5. Should I do a compass calibration in the plane? YES. If you have set the hardware up yourself you have probably done this. If you have purchased a pre-configured system, you should still do a compass calibration in the plane! Read about that on the ArduPilot website.