Silverware is going to have support for multiple different hardware platforms. Each copter has slightly different pin-outs, but with the right settings in the hardware.h file, it should be able to support some.

For instructions on flashing a board with the STM32F0xx series processor, look at the bottom of this page.

Hardware support

If a copter uses supported chips, adding it to Silverware should really easy.

MCU	Supported
STM32F031K4	Yes
STM32F030	Yes (some pwm pins not available)
STM32F0xx	Yes
STM32F031K6	Yes (32K)

MPU	Supported
M540	Yes
M681	Yes
M688	Yes
MPU-6050	Yes
MPU-6052C	Yes

RX	Supported
XN297	Yes
XN297L (8 pin)	H8 blue code only
XN297L	Yes (can be nrf24 compatible directly)
BK2453	Only syma x5c protocol, tested with devo only

Protocols	Supported
BAYANG (H8)	Yes
CG023	Yes - some stock tx not working
CX10BLUE	Yes
H7	Yes
Bluetooth beacon	Bayang only
Bayang + telemetry	Yes - devo and multimodule
Q282	Yes

Copter	H8 acro/dual	H101 acro/dual	CG023	Other	Notes
Eachine/JJRC H8, green board	yes				
Eachine H8 3D mini				yes 3D(code)	

Copter	H8 acro/dual	H101 acro/dual	CG023	Other	Notes
Floureon H101		yes			
Eachine H8S		yes			
Eachine CG023			yes		
Eachine/JJRC H8, blue board			yes	[1]	Keil Bug, solve it that way, CLK/DAT swapped
GW008 Skull Quad				yes, forum post	
DHD D1			info	acro only	
Bayang X9, GD F130 mcu board	yes (post)				motor order changed, 16k flash
Eachine 3D X4, CG027R board			yes		
FQ777-124	yes (post)				bikemike's fork
CX Model CX023	yes (post) and following				bikemike's fork :wiki:hardware_cx023.h..zip
Boldclash Bwhoop B-03				Github	Alt hold supported using this branch. Keil Bug, solve it that way
Eachine E011				Github	flashing instructions

Multicopter Hardware Table

Copter	MCU	MPU	RX	Pinout	Supported	Notes
DHD D1	**STM32F031K4**	**M540**	**XN297**	**-**	**https://github.com/silver13/d1info**	**onboard vreg turned on by cpu**
Eachine H8 (Blue board)	STM32F030F4P6	M688	XN297LBW		Yes (*)	unusual radio ic, 3wire spi (bi-directional)
M9912	STM32F031K4		XN297	Here	MaybeYes	MT9912
Global Drone GW008	STM32F031K4			Here	Yes	2 versions , one has LT5910? cpu
Bayangtoys X9 (stm32 version)	STM32F031K4	MPU-6050	XN297		Post 1, 2	
Bayangtoys X9 (GD32 version)	GD32F130G4	Mxxx	XN297		Post	Note 16K flash, acc calibration will not work
Bayangtoys X7	STM32F031K4	MPU-6050	XN297	Here	harware.h file	
Juncheng 3015-2	STM32F031K4	MPU-6050			Forum Post	
Cheerson CX10	STM32F031K4	MPU-6050	XN297		Forum Post	Multiple (5+) board versions, see D1

Copter	MCU	MPU	RX	Pinout	Supported	Notes
DHD D1	**STM32F031K4**	**M540**	**XN297**	**-**	**https://github.com/silver13/d1info**	**onboard vreg turned on by cpu**
FQ777-124 (Green)	STM32F031K4				Not Yet	Multiple board versions
FQ777-124 (Red)	GD32F130G6				Forum Post	PCB 'SF123R2.4 V1.2
Fayee FY804	STM32F031K4		XN297		May be same as D1	see D1 link above
Fayee FY805	STM32F031K4		XN297		Yes	Forum Post
DM003	STM32F031K4		XN297	Here	Yes	Forum Post
DM007	STM32F031K4		XN297		Yes	Forum Post
JJRC X1					Unknown	
MJX X900					Unknown	
MJX X901					Unknown	
XINLIN X165	STM32F031K4		BK2425		No	Serial ports onboard
Moontop M9916					Unknown	
Syma X5SC	STM32F031K6	MPU-6050	Beken		Forum post	not same as X5C
Hubsan 107C+ (new) also D+ , P	STM32F031K6		A7105		Not yet	has barometer onboard
WLtoys Q282 *board only*	STM32F031K4		XN297L		Forum post	currently working as quad, 5v stepup
Eachine 3D X4	STM32F031K4	M688	XN297	RCG forum post	yes, 3d code here » RCG forum post	
Eachine E010	LOG5897	Mxxx	rf/mcu integrated		No , No datasheet	Cortex M0 , XN297 RF
Eachine H8 3d mini	STM32F031K4	MPU-6052	XN297		Yes 3D github	step-up onboard

Rebrands

These copters should be rebrands and therefore supported if the 'parent' is:

- **DHD D1**:
- possible two board types, quite different visually. Check before flashing
- Floureon X-10
- 2FAST2FUN Color Quad XS
- Fayee Fy804

- **Eachine H8 blue**:

- JJRC H8 blue

CX-10 notes

The cx-10 uses a voltage regulator that gets turned on by the cpu. When the switch gets turned on, a capacitor powers the regulator for about 1 second, and in that time, the cpu has to turn a pin on, to keep the regulator on.

For this reason, programming has to use 4 wires (one for power) , or else the quad turns off while flashing.

You can see if it has one of those regulators, because they have 5 pins. Normally they just look like a mosfet. This feature is present in small quads with built in battery and a power switch. Presumably it is to save the battery in case the quad is forgot powered on.

In software, this pin is noted as Vreg pin, and the pin set as such gets turned on as soon as possible.

How to flash a board with the STM32F0xx series processor

Read this post first.

Before flashing, the hardware.h file must be configured to assign the correct pins to the processor for the board you are going to flash. There are instructions at the top of the hardware.h file. For an example of how to set up the LED's, read this post.

Since different quads have different pins of the main processor assigned to different functions (motors, LED's, gyro), silvverxxx made the code configurable. Of course, the default settings are for another Copter and nothing has to be done for a natively supported copter. This is only for if you want to flash a quad that uses an STM32F031 processor and it isn't a natively supported one.

First you need to trace the pcb and find out what pins of the processor go to the gyro, the LED's and the motors. This is not easy on some pcb's as the traces can go from the top side to the bottom side through tiny copper tubes called vias. Other boards are easier and can sometimes be traced just from close-up pics on the internet.

Once you know the connections for the gyro, motors, LED's and battery voltage divider (for low battery voltage warning) you can assign the pins in the firmware by opening up the file hardware.h in Keil.

There are some further instructions in this post.

The “st-link utility” can also be used to erase a STM32 chip, as well as to upload a binary file already compiled (maybe with gcc). Sometimes, the utility can erase ships that Keil wont. It seems Keil wont erase chips that have both readout protection (RDP) and flash sector write-protect on.

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