

Crazyflie Software Overview

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Firmware Overview

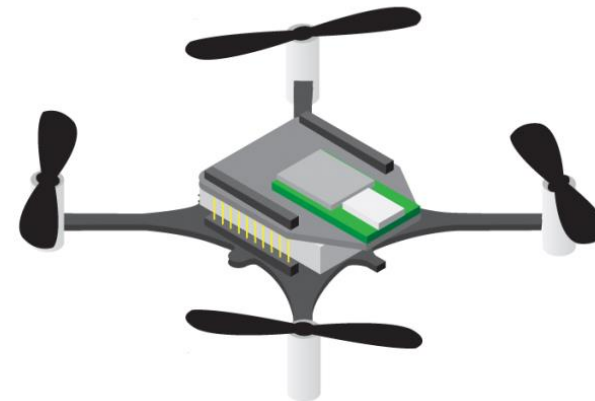
- Open-source, available at: <https://github.com/bitcraze/crazyflie-firmware>.
- Based on FreeRTOS.
- The firmware implements solutions for: state estimation, control, logging, trajectory planning.
- The user can add new lightweight functionalities by creating a new task. Each task has an associated priority and stack size.

The Decks

- A Deck is a PCB meant to be stack on the top/bottom of the Crazyflie to enable new functionalities.
- Bitcraze develops Decks which are available off the shelf, but the developer can create a custom deck too.
- The official Decks contain an EEPROM and the drone automatically recognizes the deck model by code.



Base CF




CF + Loco Positioning Deck

The Modules

- The source files in the Modules represent the heart of the Crazyflie firmware.
- It contains the implementation of the three main functional blocks:
 - The State Estimator
 - The State Controller
 - The Commander


Firmware Overview


- The source files are located in *crazyflie-firmware/src*

 master ▾ [crazyflie-firmware](#) / src /










Go to file

Add file ▾

 krichardsson [#570](#) Added compile flag to force the lighthouse deck into V1 or V2 sy... ...

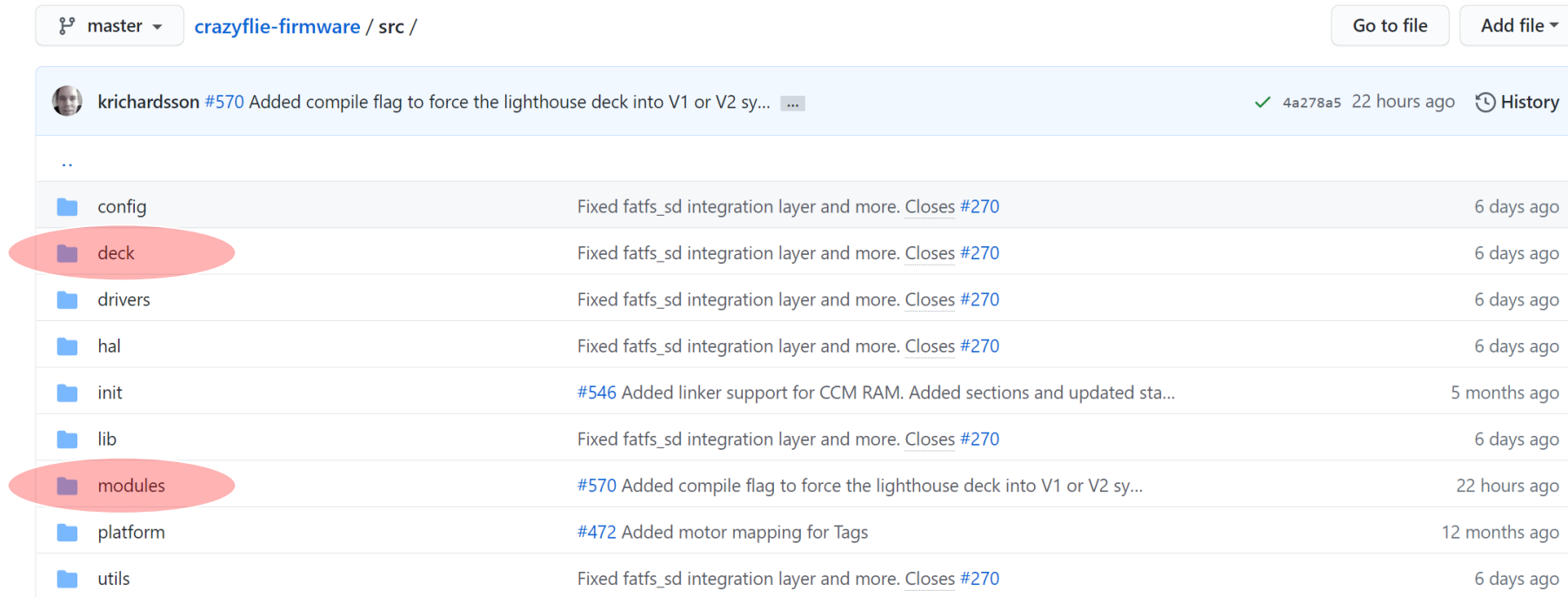
✓ 4a278a5 22 hours ago  History

..

 config	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
 deck	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
 drivers	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
 hal	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
 init	#546 Added linker support for CCM RAM. Added sections and updated sta...	5 months ago
 lib	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
 modules	#570 Added compile flag to force the lighthouse deck into V1 or V2 sy...	22 hours ago
 platform	#472 Added motor mapping for Tags	12 months ago
 utils	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago

Firmware Overview

- The source files are located in *crazyflie-firmware/src*
- The most important elements for the user are located in *deck* and *modules*.



The screenshot displays the GitHub interface for the 'crazyflie-firmware' repository, specifically the 'src' directory. The 'master' branch is selected. The repository name 'crazyflie-firmware' and the path '/ src /' are shown at the top. There are buttons for 'Go to file' and 'Add file'. Below the repository name, a commit by 'krichardsson #570' is highlighted, with a green checkmark and the commit hash '4a278a5' and time '22 hours ago'. A 'History' link is also present. The file list shows several directories: 'config', 'deck', 'drivers', 'hal', 'init', 'lib', 'modules', 'platform', and 'utils'. The 'deck' and 'modules' directories are highlighted with red ovals. Each directory entry includes a description of the changes and the time since the last commit.

File/Directory	Description	Time
..		
config	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
deck	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
drivers	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
hal	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
init	#546 Added linker support for CCM RAM. Added sections and updated sta...	5 months ago
lib	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago
modules	#570 Added compile flag to force the lighthouse deck into V1 or V2 sy...	22 hours ago
platform	#472 Added motor mapping for Tags	12 months ago
utils	Fixed fatfs_sd integration layer and more. Closes #270	6 days ago

The Decks

- This folder contains the software implementation for every official Bitcraze deck.

master crazyflie-firmware / src / deck / drivers / src /			Go to file	Add file ▾
Tobias Antonson Fixed fatfs_sd integration layer and more. Closes #270 ...			✓ 46cf8db 6 days ago	History
..				
test	#546 Moved another ~20k to CCM.	5 months ago		
activeMarkerDeck.c	#518: Remove usedGpio from active marker deck	10 months ago		
aideck.c	#546 Moved another ~20k to CCM.	5 months ago		
bigquad.c	#495 Corrected constant for task prio. Added build flag to travis bui...	9 months ago		
buzzdeck.c	#379 Minor updates of documentation for CF 2.X	2 years ago		
cppmdeck.c	Completed read only params to indicate if deck drivers are initialize...	2 years ago		
flowdeck_v1v2.c	(#608) changed adaptive std and changed dt based on real time between...	2 months ago		
gtgps.c	#495 Refactoring. Added all task priorities and names as defines in c...	11 months ago		
ledring12.c	Merge branch 'feature/595-a3' of git://github.com/UwSoftWare/crazyfli...	2 months ago		
lhtesterdeck.c	#546 Moved another ~20k to CCM.	5 months ago		
lighthouse.c	#570 All lighthouse functionality always compiled into the FW. The FP...	6 months ago		
locodeck.c	#270 Added rate logging of SPI access from the LPS deck	15 days ago		
lpsTdoa2Tag.c	#556 Use the tdoa engine for tdoa2	7 months ago		
lpsTdoa3Tag.c	#556 Use the tdoa engine for tdoa2	7 months ago		

The Modules

- The modules are located in this location and the implementation of one module can be spread among multiple .c files.

master crazyflie-firmware / src / modules / src /			Go to file	Add file ▾
krichardsson #570 Added compile flag to force the lighthouse deck into V1 or V2 sy... 4a278a5 yesterday History				
..				
lighthouse	#570 Added compile flag to force the lighthouse deck into V1 or V2 sy...	yesterday		
app_handler.c	#509 Converted appropriate queues, tasks, timers and semaphores to us...	9 months ago		
attitude_pid_controller.c	#216 Converted line endings of existing files to UNIX style	14 months ago		
comm.c	#379: Add platform support to Makefile and remove CF1 support	2 years ago		
commander.c	notifySetpointsStop packet to re-enable high level commander	7 months ago		
console.c	The "buffer full" marker functionality seems to be broken, fixed by r...	12 months ago		
controller.c	Indi controller (#483)	10 months ago		
controller_indi.c	break stabilizer_types dependency on ARM	5 months ago		
controller_mellinger.c	Indi controller (#483)	10 months ago		
controller_pid.c	#533 Caping yaw in the PID controller for absolute setpoints	9 months ago		
crtp.c	#546 Moved some memory blocks to CCM. Freed around 40k RAM.	5 months ago		
crtp_commander.c	break stabilizer_types dependency on ARM	5 months ago		
crtp_commander_generic.c	#338: Fix yawrate sign in commander_generic packets	2 years ago		
crtp_commander_high_level.c	notifySetpointsStop packet to re-enable high level commander	7 months ago		

Stabilizer Block Diagram

The stabilizer represents the path from sensor acquisition to motor control. It is the entity which ensures that the drone is properly flying. Elements:

- The State Estimator
- The State Controller
- The Commander

