Arming Sequence & Safety

Switch arming

The AUX channel configured for arming will choose a default value that falls outside of the configured arm range (as configured in the "Modes" configurator tab), this value is either 1 "step" (25us) above or below the configured range. This is a safety feature to ensure the default value would not cause accidental arming.

Note that this default value is overwritten by the first values data from the receiver, therefore bad RX initial states or failsafe settings can still cause issues.

Arming Prevention

Betaflight 3.2 (and above) includes more detailed troubleshooting information for the case when a craft will not arm.

This information is available via:

- the CLI
- Betaflight OSD
- beep patterns
- Betaflight App

Several of these conditions are to assist in preventing accidental arming via bad radio system configuration, unreliable/poor quality receivers and user mistakes.

These reasons for not arming are encoded as a set of flags (see runtime_config.h).

CLI

Flags can be viewed via the `status` command.

Some targets with limited flash space will only provide the hexadecimal representation of these flags, in which case the active flags must be derived from

the `armingDisableFlags_e` enum in `runtime_config.h` (ensure the version of the file you are looking at matches that of your firmware).

Beeper

When arming is attempted and fails, if a beeper is connected to the flight controller it will emit a warning signal indicating the most important (lowest number) reason why disarming is disabled.

The signal is as follows:

- five short 'attention' beeps;
- a number of long beeps (may be 0);
- a number of short beeps with long intervals (may be 0).

The arming prevention condition that is active can be calculated as `(5 * <number of long beeps>) + <number of short beeps>`. For example:

- 1 long and 2 short beeps = 7
- 2 long beeps = 10

Description of arming prevention flags

What each flag means and what you should do to (probably) fix the issue.

This list *should* be kept up to date with the code in `master` (`armingDisableFlags_e` in src/main/fc/runtime_config.h) so can be used to find what flag corresponds to a certain index, however if you run an older version you'd have to check this manually as mentioned above.

Name	Description	Beep code						
		3.2	3.3	3.4/3.5	4.0	4.1	4.2+	
`NOGYRO`	A gyro was not detected	1	1	1	1	1	1	Y h if fi w m fi C

								h w
`FAILSAFE`	Failsafe is active	2	2	2	2	2	2	R fa a
`RXLOSS`(1) or `RX_FAILSAFE`	No valid receiver signal is detected	3	3	3	3	3	3	Y e h tr
`BADRX`(1)	Your receiver has just recovered from receiver failsafe but the arm switch is on	4	4	4	4	4	4	S s
`BOXFAILSAFE`	The 'FAILSAFE' switch was activated	5	5	5	5	5	5	S
`RUNAWAY`	Runway Takeoff Prevention has been triggered		6	6	6	6	6	D th
`CRASH`	Crash Recovery has been triggered					7	7	D th
`THROTTLE`	Throttle channel is too high	6	7	7	7	8	8	L b `m`
`ANGLE`	Craft is not level (enough)	7	8	8	8	9	9	L w `s`

								d 2
`BOOTGRACE`	Arming too soon after power on	8	9	9	10	10	10	W `p` s 5
`NOPREARM`	Prearm switch is not activated or prearm has not been toggled after disarm	9	10	10	10	11	11	T p
`LOAD`	System load is too high for safe flight	10	11	11	11	12	12	R c a fe
`CALIB`	Sensor calibration is still ongoing	11	12	12	12	13	13	W c c
`CLI`	CLI is active	12	13	13	13	14	14	E
`CMS`	CMS (config menu) is Active - over OSD or other display	13	14	14	14	15	15	E C
`OSD`	OSD menu is active	14	15	16				E
`BST`	A Black Sheep Telemetry device (TBS Core Pro for example) disarmed and	15	16	16	15	16	16	R m h

	is preventing arming							
`MSP`	MSP connection is active, probably via Betaflight App	16	17	17	16	17	17	T B c ((
`PARALYZE`	Paralyze mode has been activated			18	17	18	18	P c b
`GPS`	GPS rescue mode is configured but required number of satellites has not been fixed			19	18	19	19	W e w o re
`RESCUE_SW`	GPS Rescue switch is in an unsafe position				19	20	20	T R a
`RPMFILTER` (2) or `DSHOT_TELEM`	Motor RPM-based filtering is not functioning				21	21	21	C E s R
`REBOOT_REQD`	Reboot required					22	22	R c s to
`DSHOT_BBANG`	DSHOT Bitbang is not working					23	23	(3
`NO_ACC_CAL`	Accelerometer calibration						24	C a

	required							d th
`MOTOR_PROTO`	ESC/Motor Protocol not configured						25	S E p o C ta
`ARMSWITCH`	Arm switch is in an unsafe position	17	18	20	21	24	26	T s

(1) This may appear on the Betaflight OSD during flight, take it as a sign that your radio system is either faulty or you are flying at the edge of your range. Treat it the same you would an "RSSI critically low" warning.

(2) RPM-based filtering is enabled but one or more ESC's are not supplying valid DSHOT telemetry. Check that the ESC's are capable of and have the required firmware installed to support bidirectional DSHOT telemetry.

(3) Bitbang DSHOT is not working properly and the motors can't be controlled. Likely caused by a timer conflict with other features enabled on the flight controller.