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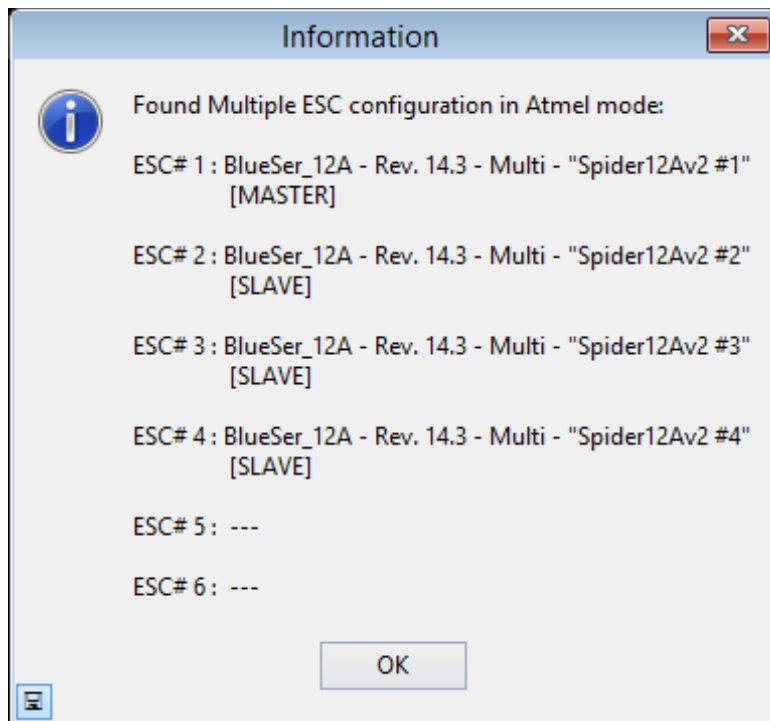
## Introduction


The BLHeliSuite MultipleESC mode does work with an appropriate interface (4way-interface) or an appropriate option for a Flight Controller interface (like “1wire pass-through” for Cleanflight or Betaflight).

The maximum number of available ESC channels is 8 (Some interface support less ESC e.g. TAQX box) . In “1wire pass-through” mode the number of accessible ESC will be detected automatically and the buttons will show up accordingly (e.g. 4 buttons for a “Quad X” or 6 for a “Hex X “configuration...).

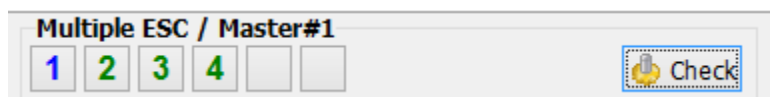
## Getting started

If the interface is not yet connected and one clicks “Read Setup” or “Flash BLHeli” or “Flash Other”, at first an automatic “Check” will be executed. The “Check” tries to read all available channels for connected ESC and shows a result dialog.



A manual “Check” can be initiated at any time by clicking the  Check button

The “Check” generally tries to read all available channels for connected ESC, and shows the following scenario after it found 4 ESC at channel #1,#2,#3 and #4.



The first ESC of the current arrangement always will become the “**Master**”, the other will be “**Slaves**”, if they are parameter compatible with the **Master**.

(BTW: The ESCs must not necessarily be exactly of the same type...).

## Reading and wirting parameters in MultipleESC mode

When “**Read Setup**” is clicked, only the settings of the **Master** will be read into the workspace.

When “**Write Setup**” is clicked, the momentary workspace Settings will be written to all ESC which are shown as active. Active are only the ESC, which are shown as numbers.

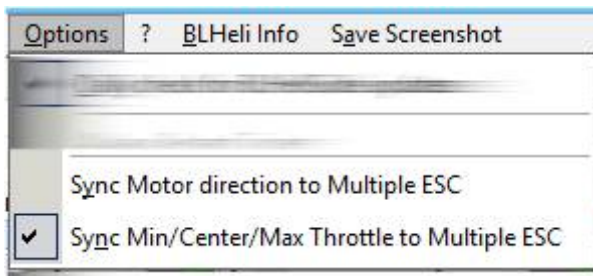
### Attention:

**ESC # – Name** is not distributed to the **Slave** ESC.

Automatic distribution of **Motor Direction** to the **Slave** ESC is optional (**off** by default).

Automatic distribution of **PPM Min/Center/Max Throttle** to the slave ESC is optional (**on** by default).

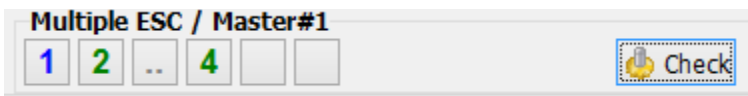
To switch the synchronization of the optional values use menu “*Options... Sync....*”



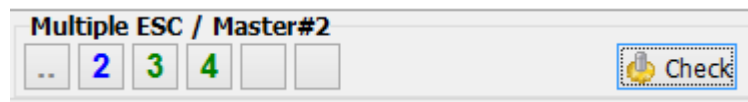
## Selecting a MultipleESC arrangement or a Single ESC

Use the left Mouse button to select or deselect an ESC into or out of the active arrangement (“**Multiple**” mode).

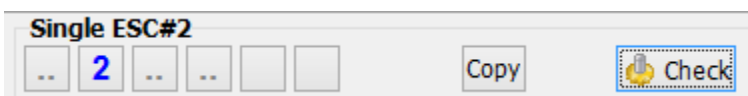
With “**Check**” as compatible with the **Master** detected but deselected ESC are shown as gray dots (..).



Here ESC#3 is deselected = not active.



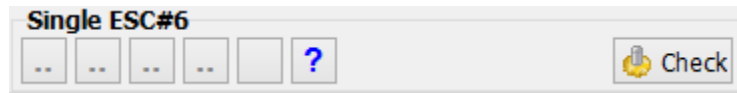
Here ESC#1 is deselected; ESC#2 now becomes the Master



If only one ESC remains active, the title shows “**Single ESC#x**”.

Use the right Mouse button to directly select the ESCs in “Single” mode.

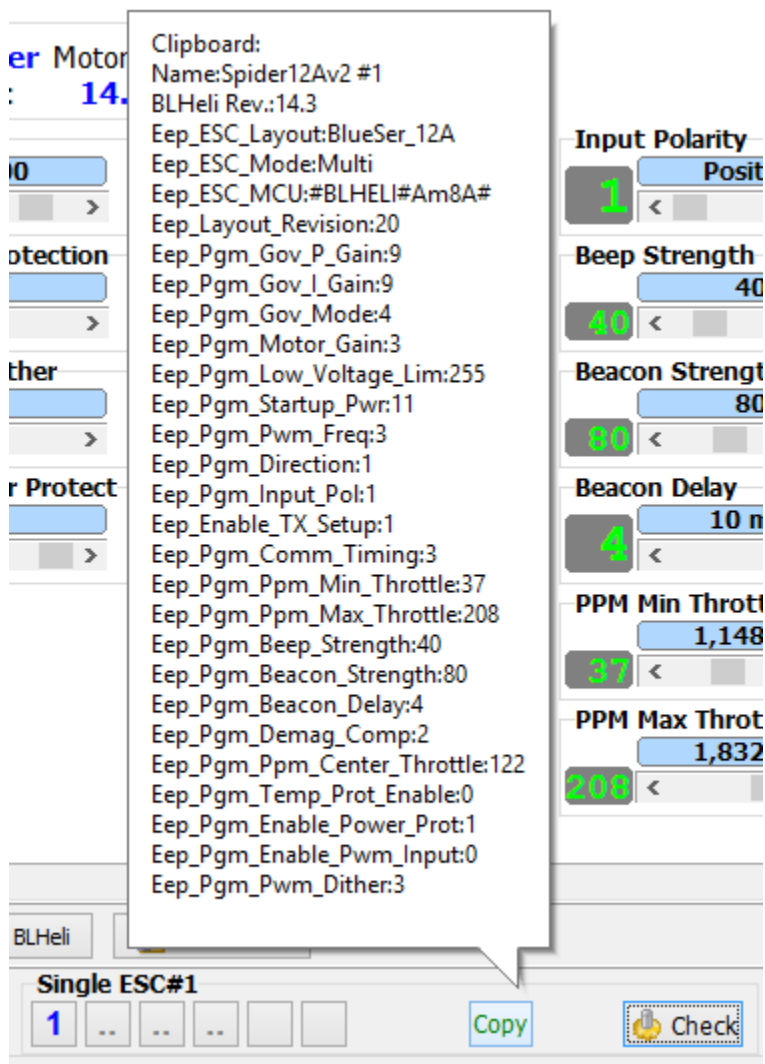
To select multiple ESC at once: Select e.g. right-click “2” first and shift + left-click “4” to select 2,3, and 4.



Although ESC#5 and 6 where not detected with “Check”, they can be manually selected in “Single” mode and are shown as “?”.

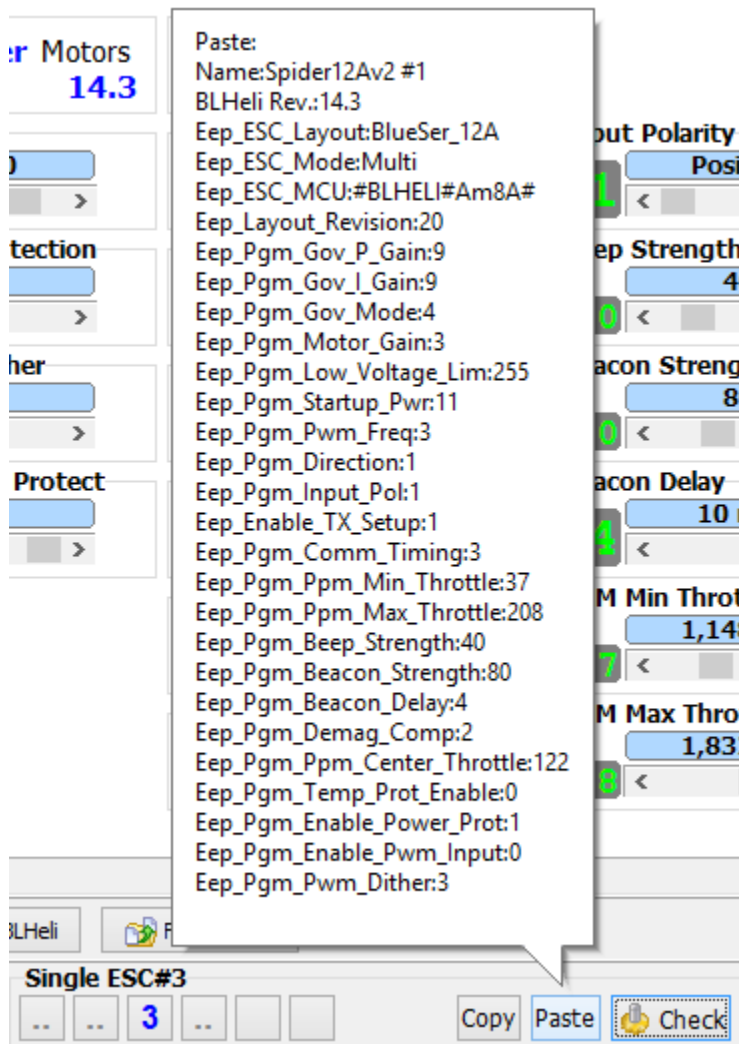
## Copy and Paste of parameters

In “Single” mode a **Copy** button shows up. Clicking the button will copy the momentary settings as shown into a kind of clipboard. If the button shows a green “Copy” the “clipboard” settings are in sync to the current workspace (**ESC # – Name** is never considered in the copy/paste comparison. **Motor Direction** and **PPM Min/Center/Max Throttle** are only considered if the sync option is turned on).



Hovering the mouse over the button shows the current clipboard content.

As soon as a the clipboard has valid content and current workspace contains a different valid parameter set, a “Paste” button shows up.

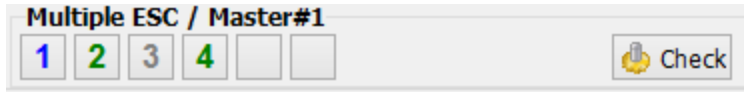


Hovering the mouse over the button shows the current clipboard content to paste. (**ESC # – Name** is never considered in the paste action. **Motor Direction** and **PPM Min/Center/Max Throttle** are only considered if the sync option is turned on).

Copy and paste of the **ESC # – Name** can be simply done as usual in the edit window using ctrl + c/ctrl + v.

## Indication of parameter synchronization

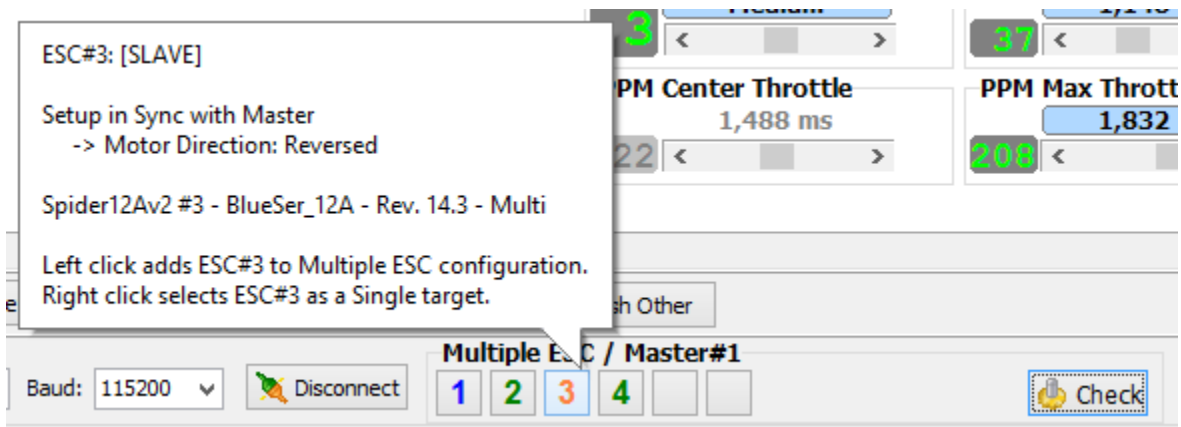
The **Slaves** are shown **green**, if their settings are in sync with the **Master**. If not in sync, they are shown **gray**.



Here ESC#3 differs in the settings from the **Master**. (**ESC # – Name** is never considered in the “sync” comparison. **Motor Direction** and **PPM Min/Center/Max Throttle** are only considered if the option is turned on).

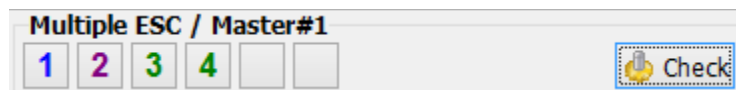
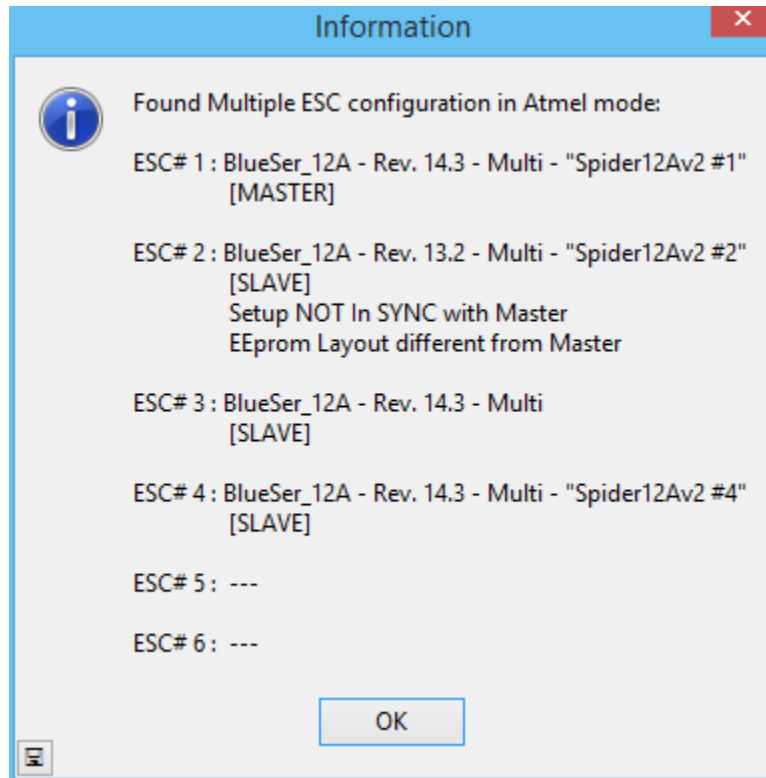
## Indication of different motor direction

ESC in sync but with different motor direction are shown in **orange**.



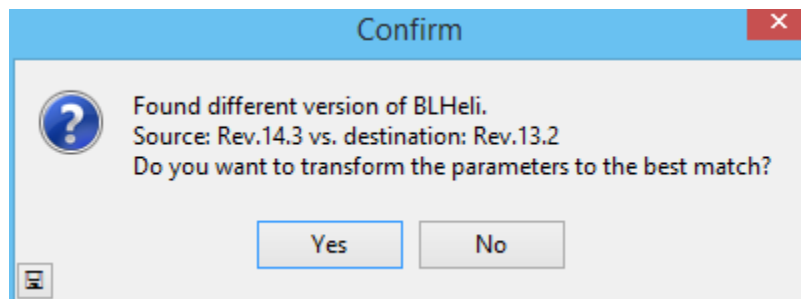
### Indication of ESC with unequal parameter versions (EEprom Layout)

If ESC are found, where the EEprom Layout (Parameter set version) does not match with the Master ESC, the following (or similar) dialog is shown:



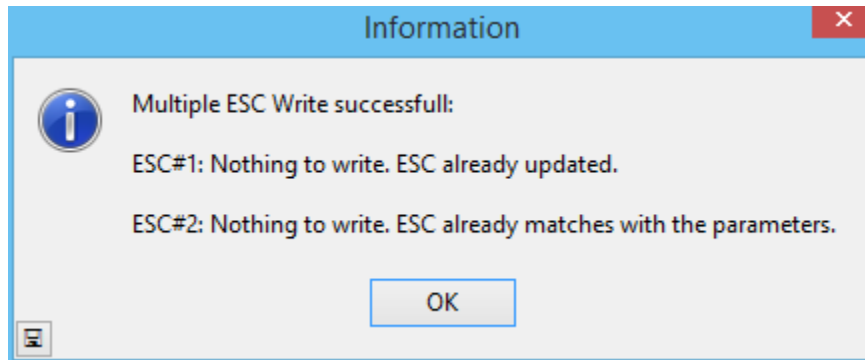
Here ESC#2 has EEprom rev 19 (BLHeli 13.2) and is purple numbered ("2").

"EEprom Layout different" marked ESC in a mixed scenario can be selected in "Multiple" and "Single" mode. If a "Write Setup" is initiated for the arrangement, BLHeliSuite will ask user for transformation of the parameters.



This dialog will also show up if one attempts to paste 14.3 parameters to a 13.2 ESC and vice versa.

If transformation changed nothing...

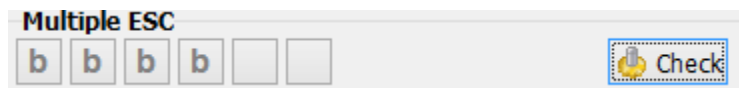
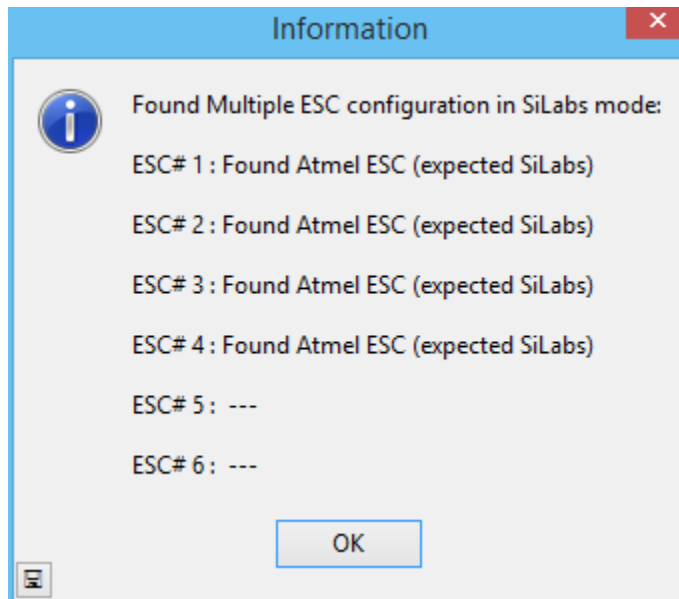


Remark: Handling of unequal parameter versions in a "Multiple" arrangement should rather be considered experimental.

## Indication of various ESC states

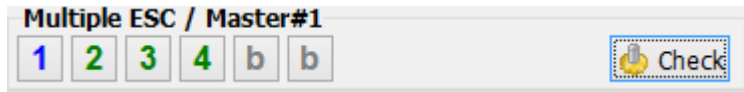
### b: Indication of wrong firmware brand

If ESC are found, where the firmware **brand** does not match the selected Interface firmware mode, the following (or similar) dialog is shown:



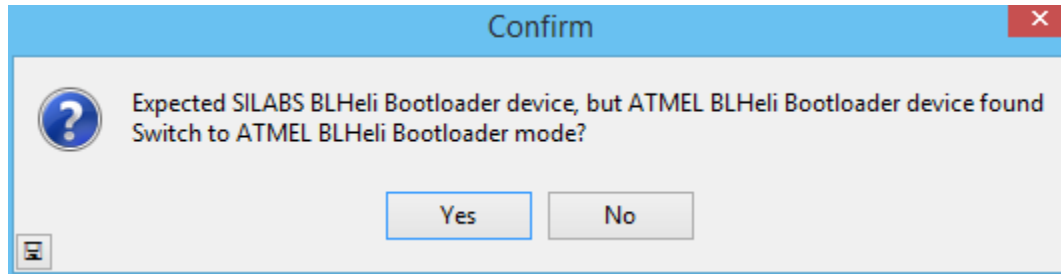
Here the mismatched ESC are shown as "b". If one selects „Read Setup“ the user will be asked for an automatic change of the interface mode.





Here a mixed scenario is seen. 1 to 4 match the current firmware brand setting, 5 and 6 do not.

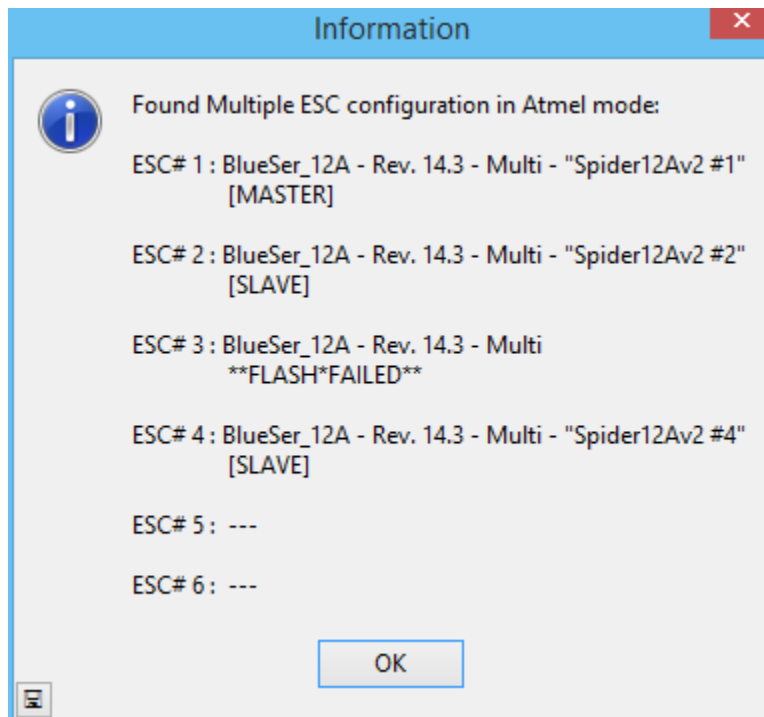
“b” marked ESC in a mixed scenario can only be selected in “Single” mode. If a “Read Setup” is initiated for a “b” marked ESC, the user will be asked for an interface mode change.

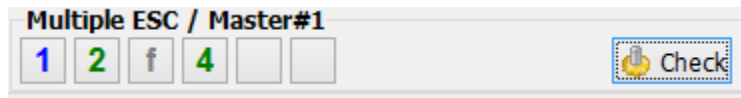


The same will happen if the first automatic “Check” finds Atmel instead of SiLabs or vice versa. (The 4way-interface in SiLabs C2 mode does not provide this kind of automatic detection.)

### f: Indication of ESC after failed flash attempt

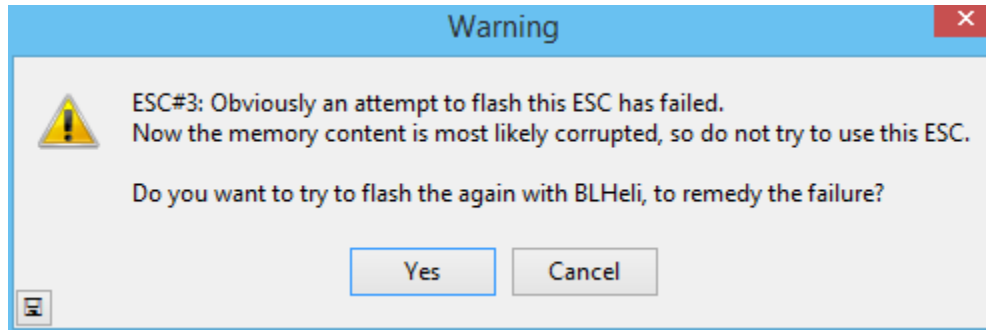
If ESC are found (will not occur with “SiLabs C2 4way-if”), where a former flash attempt failed, the following (or similar) dialog is shown:





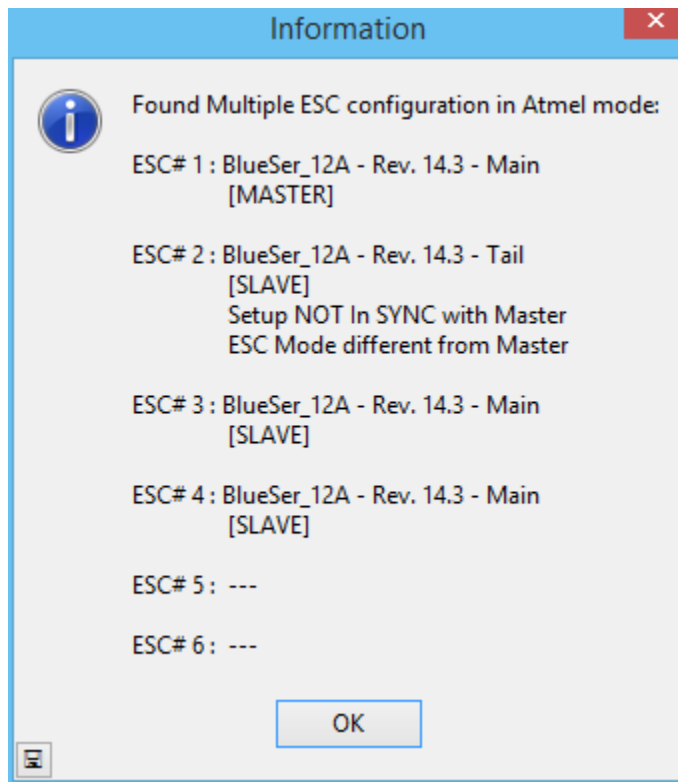
Here ESC#3 is shown as “f”.

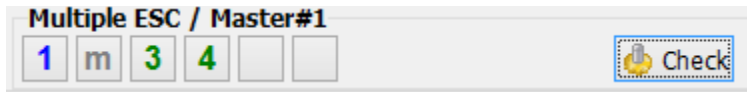
“f” marked ESC in a mixed scenario can only be selected in “Single” mode. If a “Read Setup” is initiated for a “f” marked ESC, a flash confirmation dialog will show up.



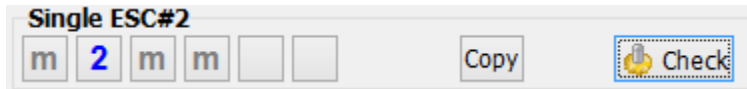
### m: Indication of ESC with unequal ESC modes (MAIN - TAIL - MULTI)

If ESC are found, where the mode (Main - Tail - Multi) does not match with the Master ESC, the following (or similar) dialog is shown:



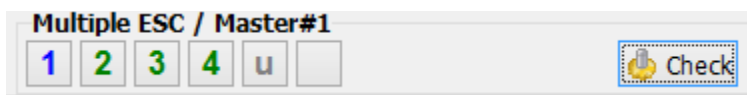
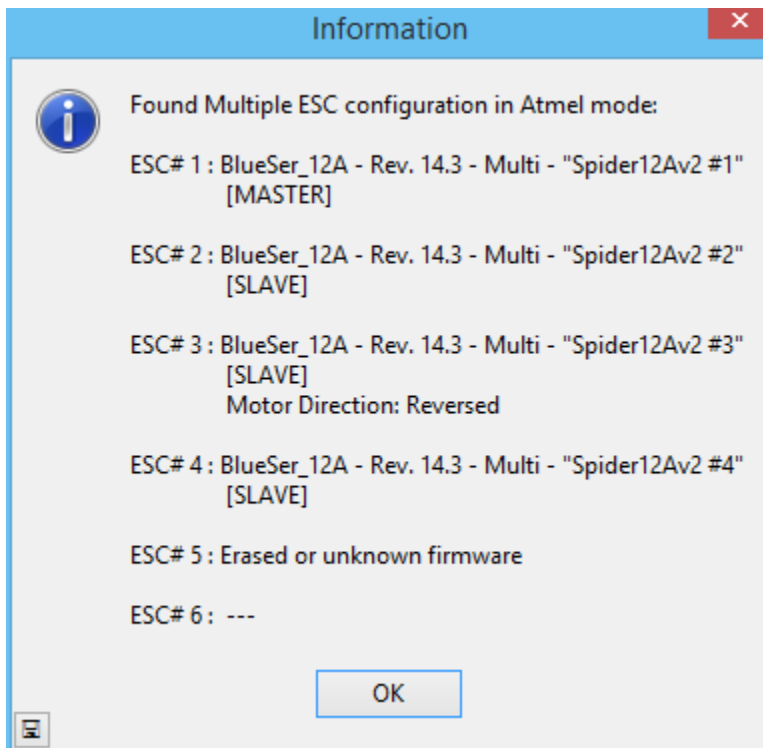


Here ESC#3 is shown as “m”. “m” marked ESC in a mixed scenario can only be selected in “Single” mode.



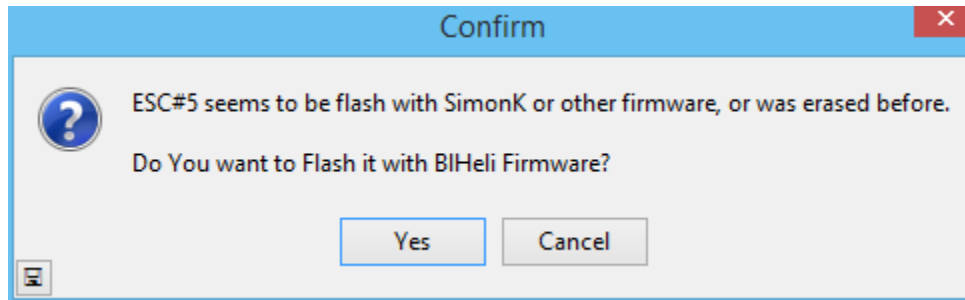
### u: Indication of unknown firmware (non BLHeli, e.g. SimonK or other) or erased ESC

If ESC are found, where the parameter area does not contain valid BLHeli info, the following (or similar) dialog is shown:

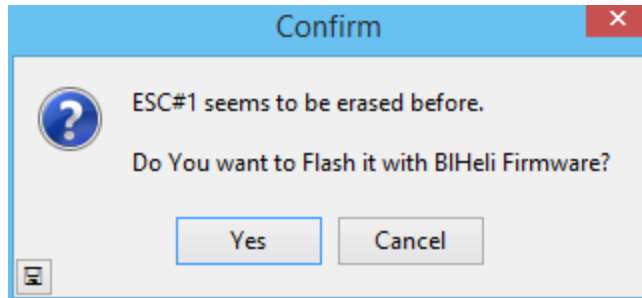


Here ESC#5 is shown as “u”.

“u” marked ESC in a mixed scenario can only be selected in “Single” mode. If a “Read Setup” is initiated for a “u” marked ESC, a flash confirmation dialog will show up.



Atmel dialog.

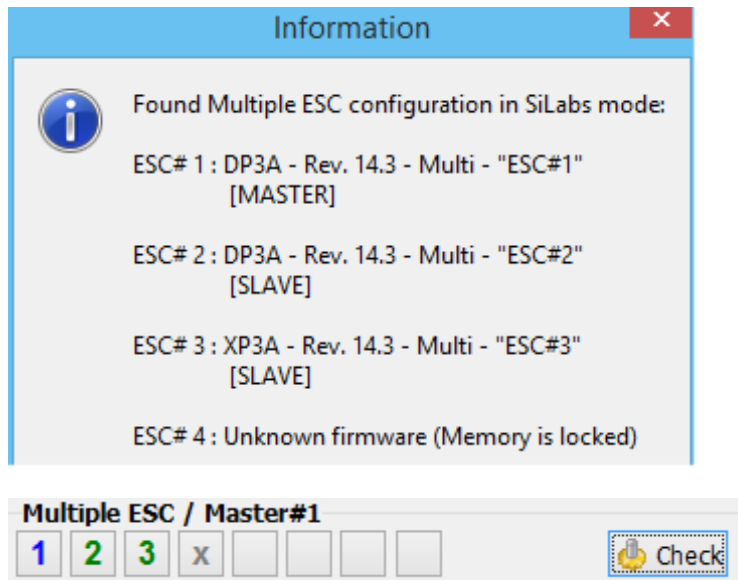


SiLabs C2 mode dialog (here ESC#1)

The same will happen if the first automatic "Check" finds only unknown or erased ESC.

### x: Indication of ESC with locked device memory

If ESC are found (occurs in MultipleESC mode most likely only with "SiLabs C2 4way-if") , where the memory is inaccessible because the lock byte is set, the following (or similar) dialog is shown:



Here ESC#4 is shown as "X".

"X" marked ESC in a mixed scenario can only be selected in "Single" mode. If a "Read Setup" is initiated for a "X" marked ESC, a flash confirmation dialog will show up.

