Operating Manual for H6Flex UI-UNI4 (V1.00)

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Description

The heart of H6Flex is a Microcontroller (uC) that contains the user interface firmware. Features of this circuit/UI combination include:

- Choice of 3 different User Interfaces, UIF fixed lighting optimized, UIP portable lighting optimized and UIB2 bicycle lighting optimized.
- High efficiency Buck mode (step down) switching regulator (maximum drive current set in firmware). Reverse polarity protected.
- Single switch to select from various brightness levels, turn the unit on/off, select the operating modes and set menu options.
- Non-volatile (EEPROM) storage of operating mode, last selected brightness level, and maximum drive level (1400mA, 2000mA, 2800mA, **3000mA**, 3600mA, 5000mA, 5600mA, **6000mA** or 6600mA). Note, the 3000mA and 6000mA current tables were added Nov 16 2010. All h6Flex drivers shipped after Nov 16 have these 2 additional current table options.
- Voltage sensing with three user configurable trip points for ½ discharged and nearly fully discharged and forced off (or warn only). Warning display via an optional 3mm or 5mm status LED or via the main LED.
- Temperature sensing with user configurable trip point to limit output current to protect the driver and/or LED.

1.1 Wiring the H6Flex
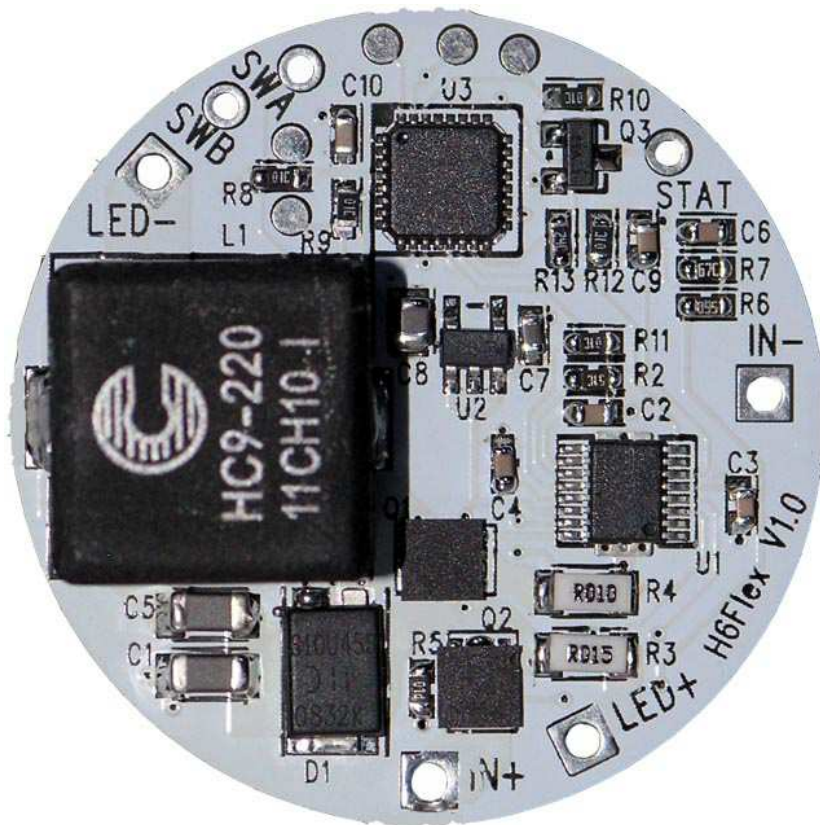
The picture shows the connections to H6Flex. The user provides DC power to the H6Flex (via battery, DC wallwart etc). H6Flex is reverse polarity protected with a low drop out FET (less than 50mV voltage drop across the FET).

H6Flex requires a user provided momentary action switch that must be connected via leads soldered to the holes SWA and SWB. The switch needs to be a momentary action, push to close type, i.e. normally open contacts.

Input power is connect via IN+ (positive input voltage) and IN- (negative input voltage).
NOTE: 21V Maximum Input voltage (5 li-ion batteries in series).

The LED load is connected to LED+ (positive LED) and LED- (negative LED). NOTE: LED- is NOT the same as IN-.

When soldering wires to the thru holes/pads on the PCB, be careful to not short or accidentally desolder components near where you are soldering. Use a quality solder with non-corrosive, non-conductive (no clean) flux.

Temperature sensing is performed within the uController, the 32 pin IC in the top center (U3) in the picture above.

An optional 3mm or 5mm colored LED can be connected between VIN+ (anode) and STAT (cathode) to be used as a battery status indicator. The user must provide a series resistor for the status LED to limit the current based on VIN+ and the status LED's Vf. The STAT pin is an open collector NPN transistor (2N3904) that is on (STAT grounded) to light the LED. Below is a schematic showing how the STAT pin would be used with a nominal 14.4V battery pack.
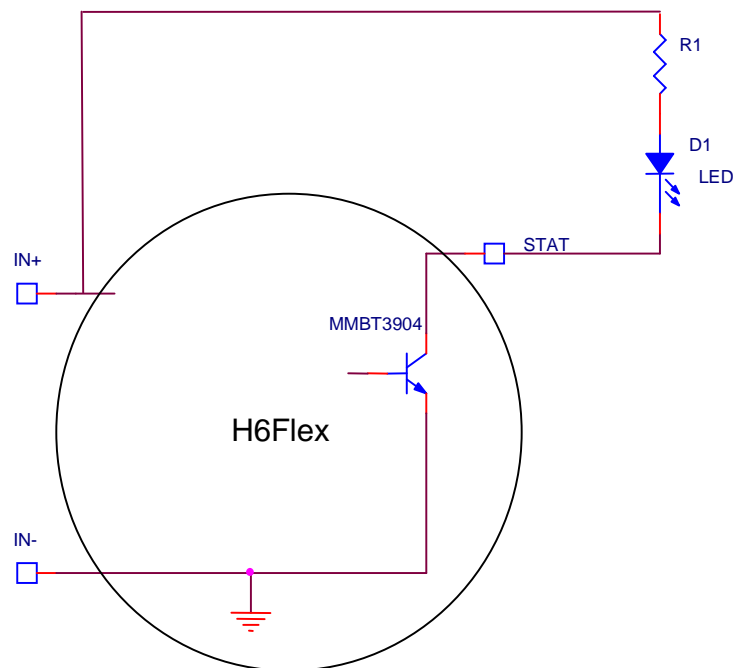
To calculate the value of R1 we need to know the input voltage, the Vf of the LED and the desired drive current to the LED.

Assuming a 14.4V nominal battery pack and a Red LED with a Vf of 2.5V and a desired drive current of 10mA provides all the information we need.

R1 = (14.4V – 2.5V) / 10mA = 11.9 / 0.010 = 1190 ohms or choosing the next larger standard 5% resistor would give a value of 1.2K ohms.

Power dissipation in the resistor is I * I * R = 0.010 x 0.010 x 1200 = 0.12W, so choose a 1/4W resistor.

Below is the view of the bottom side of the H6Flex board. This is the side that should be attached to a heatsink with a piece of the provided thermal pad material sandwiched in-between. The Red outlined areas in the picture below are the thermal interface areas that need to be in good contact with the thermal pad material and the heatsink.

NOTE, the Red outlined areas are at various potentials and MUST be electrically isolated from the heatsink and from each other.

The provided thermal pad material will conform when applied between the bottom side of H6Flex and the heatsink. The thermal pad IS adhesive (remove both protective layers), therefore pressure needs to be applied to the top of the board to set the adhesive. Please refer to the datasheet on the various pressure/temperature profiles to determine what pressure needs to be applied to set the adhesive. Once the adhesive is set, the external pressure can be removed. http://www.taskled.com/leds/bondply100.pdf is the link to the data sheet for the Bond Ply thermal pad material.
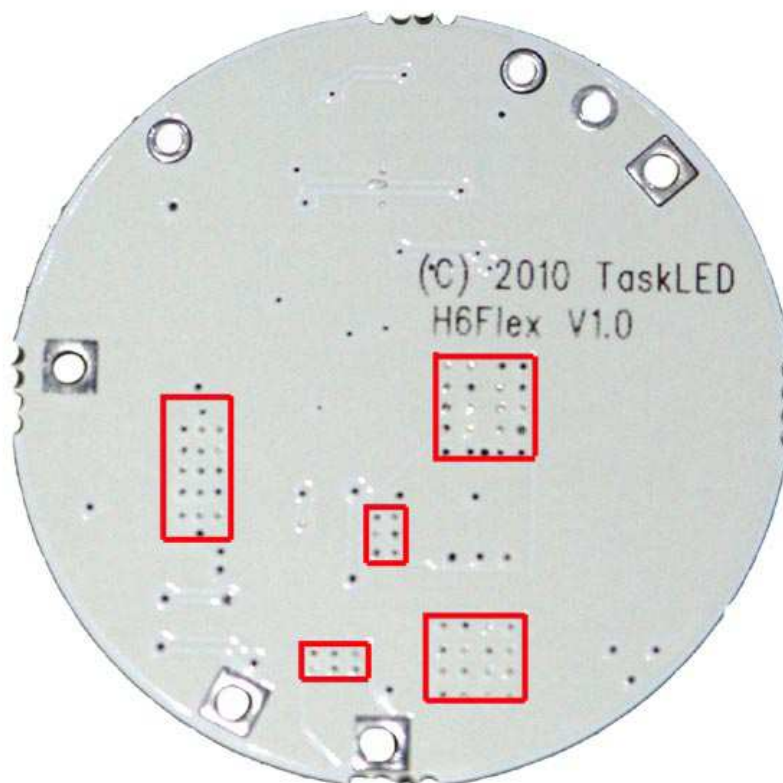
The following table shows some of the supported configurations of H6Flex.

Driver Configuration	Input voltage (max)
1 to 5 P7 (in series)	21 V
1 to 5 MC-E (4P)	21 V
1 to 3 MC-E (2P2S)	21 V

To maintain current regulation, H6Flex requires a greater input voltage than the driven output voltage. This voltage difference (Input – Output voltage) is 1V at 2.8A worst case. This means to drive say 3 LEDs in series with a combined Vf of 10V at 2.8A would require a battery that has a minimum of 10V + 1V = 11V.

4P means the 4 die in parallel. 2P2S means the 4 die are wired as 2 parallel strings of 2 series die.

2 Definitions

- CLICK – a short, less than 0.3 seconds press and release.
- PRESS – a longer, greater than 0.3 seconds press and hold.
- Force – an option to always have the light turn on at a specific user-selected level.
- UI – User Interface.
- EEPROM – non-volatile memory. Stored data will remain even if battery is disconnected.
- LED – Light Emitting Diode. As used here, it typically refers to the light's main LED(s).

3 Turning the H6Flex ON the first time

Do not apply power to H6Flex unless an LED is connected. This is to protect the LED from voltage spikes if it is connected to H6Flex after power has been applied.

H6Flex is shipped with the lowest drive level (1400 mA) selected, and Poweron mode turned on. When power is first applied, H6Flex will safely drive the LED at the lowest level.

3.1 Initial Power Application

IF the firmware is configured for UIB2 base mode:

Upon initial power application to the circuit, the main LED will flash quickly and dimly for three seconds to indicate that the "Menu entry window" is open. If three seconds pass with no switch action, the LED will light (because Poweron Mode is active by default) at the lowest level. The circuit is on and ready to use.

The STAT LED (if connected) will also flash momentarily as a self test. The same test flash will be seen when turning the light on via a click (constant mode) or press (strobe mode) after releasing the switch.

IF the firmware is configured for UIF/UIP base mode (shipping default):

Upon initial power application to the circuit, the light will turn on (because Power Mode is active by default) at the lowest level. The circuit is on and ready to use.

The STAT LED (if connected) will also flash momentarily as a self test. The same test flash will be seen when turning the light on via a click or press (after releasing the switch).

4 Overview of the User Interfaces (UIs) and the Control Menu

4.1 Fixed (UIF)

Intended for lanterns, household and automotive lighting. Eight brightness levels. Ability to turn on at lowest setting, and quickly change to highest setting without scrolling. Press while on to scroll all levels. Click turns on, and click turns off.

4.2 Portable (UIP)

Intended for hand-held torches. Five brightness levels. Ability to turn on at lowest setting. Ability to switch directly to high setting from any other level. Press while off to scroll all levels. Click turns on, and click turns off.

4.3 Bicycle (UIB2/UIB2Q)

Intended for bicycle lighting. Separate modes for constant (two, three or five levels) and user configurable strobe sequences. From off, a click turns on to constant mode, and a long press turns off. From off, a press turns on to strobe mode, and a long press turns off.

Constant Mode:

In the 2-level Duomode, brightness changes are controlled by clicking to toggle between the two chosen levels. In the 3-level Threemode, clicking increases brightness to the upper two levels and then toggles between those two levels, a press will dim to the lowest level and further pressing will turn the light off. In the 3-level Trimode, clicking toggles through the three levels and wraps back to the lowest level.In 5-level Multimode, clicking increases brightness and pressing decreases brightness.

Strobe Mode:

Press from Off will enter into strobe mode and return to the previously selected strobe sequence. A click moves from one strobe sequence to the next and on reaching the last sequence (total of 6) starts back at the first sequence. A long press will turn the light off. The driver ships with 6 pre-defined strobe sequences that the user can reconfigure as needed for their own use. Full control of low and high intensity as well as time interval and repeat sequences is provided. Modified sequences are stored in non-volatile memory.

4.4 *Menu features/choices of all UIs*

Bold is factory default.

1. Force Level (choose level for initial on, or **disable**)
2. Current Drive Level (**1400ma**, 2000 mA, 2800mA, 3000mA, 3600mA, 5000mA, 5600mA, 6000mA or 6600mA - all intermediate brightness levels scale to this max level). 3000mA/6000mA only available on h6Flex shipped after Nov 16 2010.
3. If in UIF/**UIP** base mode
     Select UIF or **UIP**
   else if in UIB2 base mode
     If Duomode (L1, L2, L3, L4).
     Threemode or Trimode first select: low (L1, L2, L3, L4) and then select: med (L1, L2, L3, L4)
4. SuperLock (**disable,** enable)
5. V Stat (how often the LED warns that V Low and V Med levels have been reached. Flash sequence per 5, 10, 30, 60 seconds, or **disabled** - STAT pin only). Threshold (**0**/1/2 for **0.2V**/0.4V/0.6V).
6. V Cut (protect rechargeable batteries by shutting off or warning at a chosen Voltage level). Enter in form xy.z) Default **Cutoff** and Default: **12.0 V** (configured for 14.4V Li-Ion battery)
7. V Low (Warn of battery nearly discharged. Enter in form xy.z) Default: **13.0 V** (configured for 14.4V Li-Ion battery)
8. V Med (Warn of battery half discharged. Enter in form xy.z) Default: **14.3 V** (configured for 14.4V Li-Ion battery)
9. Power On (disable, **enable** "on" function when power is applied)
10. Reset (Menu selections reset to shipping defaults)
11. Thermal Protection (trip point that reduces power to L3 if the system is at risk of overheating. 50°C, 60°C, 70°C, 80°C, 90°C, **disable**)
12. Autosleep selection (only active for UIF or UIP) (15min, 30min, 1hr, 2hr, 4hr, 8hr, **disable**)
13. UIB2, UIB2Q or UIF/UIP base mode Selection (UIB2, UIB2Q, UIF/**UIP**)
    UIB2: (Duomode, Threemode, Trimode, Multimode)
    UIB2Q: (Duomode, Threemode, Trimode, Multimode)
    UIF/**UIP**
14. Strobe sequence configuration.

Note: Snip and save the above Menu table for quick reference.

5   UIP (Portable lighting optimized User Interface), 5 Discrete Levels

There are 6 operating modes for UIP. They are described below.

5.1 On/Off Mode UIP

To turn on the light, click the switch. The light will turn on at the previous level or the Force level if Force is enabled.

To turn off the light, click the switch.

5.2 Adjustment Mode UIP

To adjust the brightness of the light, start with the light off and press the switch.
The light will always turn on at Level 1 (dimmest level) and in the brightening direction.
Release the switch at the desired level, and that new level will be stored in the EEPROM. Pressing the switch again (within 1.5 seconds) will start the light adjustment in the opposite direction (the direction toggles each time).

When the light reaches the dimmest or brightest level it will stay there until the switch is released. Once the switch is released for longer than 1.5 seconds no more brightness adjustment is possible without turning off the light and starting the sequence again.

5.3 Latched Full Brightness Mode UIP

With the light turned on, a press will latch to Level 5 (brightest). A second press will unlatch and return the light to the original brightness level.

To turn off the light, click the switch.

5.4 Superlock Mode UIP

To prevent accidental turn on or unintended use the light can be electronically locked out. Lockout can be manually selected each time prior to turning off the light, or a menu option (see Sec 8.4) can automatically lock out the light each time it is turned off.

To manually enter lockout, begin with the light on and ensure light has been on for at least 1 second. Then click the switch rapidly three times, no more than 0.3 seconds apart. The light will cycle off/on/off and wait for 2.5 seconds (a press during this time enters the menu mode) then flash three times and turn off. The light is now in Lockout Mode and can only be turned on again by three clicks spaced no more than 0.3 seconds apart or by removing and reconnecting the input power.

5.5 Autosleep Mode UIP

If Autosleep is enabled (see Sec 8.12), the timer will reset and start counting whenever a switch click or press occurs. When the selected number of minutes goes by without a click or press, the Autosleep function will commence dimming the light. The brightness level will visibly drop after each subsequent minute until the lowest light level is reached. After a further 10 minutes elapses from the start of dimming the light will turn itself off.

A press during any time after the dimming has commenced will return the light to its starting brightness level prior to dimming having started.

To turn off the light at any time during the sequence, click the switch.

5.6 Force Mode UIP

This mode is selected from the menu (see Sec 8.1). Force mode overrides the initial turn-on brightness level that was set via the Adjustment Mode on the previous turn off. The user can always set a new temporary light level by using the Adjustment mode during turn-on, but it will be overridden the next time the light is turned off and back on.

6   UIF (Fixed lighting optimized User Interface), 8 Discrete Levels

There are 6 operating modes for UIF. They are described below.

6.1   On/Off Mode UIF

To turn on the light, click the switch. The light will turn on at the previous level or at the Force level if Force is enabled.

To turn off the light, click the switch.

6.2   Turning the H6Flex ON to an alternate brightness level UIF

Pressing the switch for longer than ½ a second but less than 1.5 seconds will select the nightlight illumination level. This level is stored in the EEPROM as the current illumination level.

Pressing the switch for longer than 1.5 seconds will select the full brightness illumination level. This level is stored in the EEPROM as the current illumination level.

6.3   Adjustment Mode UIF

There are 7 equally spaced brightness levels (human eye model) in addition to the nightlight level. With the H6Flex already switched on, the user can scroll through the brightness levels by pressing the switch for longer than ½ a second. The brightness will either increase or decrease one level every 1/3 of a second. H6Flex will toggle from the bright or dim direction each time the switch is released.

If the light is turned on and the light starts in nightlight mode, then the direction is initially set to increasing. If the unit it turned on and the unit starts in full bright mode, then the direction is initially set to decreasing. If the unit is turned on at any in between level then the direction is initially set to decreasing.

Each time the brightness level is changed, the new level is stored in EEPROM ready to be retrieved next time the light is turned back on.

6.4   Superlock Mode UIF

To prevent accidental turn on or unintended use the light can be electronically locked out. Lockout can be manually selected each time prior to turning off the light, or a menu option (see Sec 8.4) can automatically lock out the light each time it is turned off.

To manually enter lockout, begin with the light on and ensure light has been on for at least 1 second. Then click the switch rapidly three times, no more than 0.3 seconds apart. The light will cycle off/on/off and wait for 2.5 seconds (a press during this time enters the menu mode), then flash three times and turn off. The light is now in Lockout Mode and can only be turned on again by three clicks spaced no more than 0.3 seconds apart or by removing and reconnecting the input power.

6.5 Autosleep Mode UIF

If Autosleep is enabled (see Sec 8.12), the timer will reset and start counting whenever a switch click or press occurs. When the selected number of minutes goes by without a click or press, the Autosleep function will commence dimming the light. The brightness level will visibly drop after each subsequent minute until the lowest light level is reached. After a further 10 minutes elapses from the start of dimming the light will turn itself off.

A press during any time after the dimming has commenced will return the light to its starting brightness level prior to dimming having started.

To turn off the light at any time during the sequence, click the switch.

6.6 Force Mode UIF

Force mode (see Sec 8.1) overrides the initial turn-on brightness level that was set via the Adjustment Mode on the previous turn off. The user can always set a new temporary light level by using the Adjustment mode, but when Force is enabled, the manually-set level will be overridden the next time the light is turned off and back on.

7 UIB2 (Bicycle Optimized User Interface) - Constant and Strobe.

The various operating modes of UIB2/UIB2Q are described below. Please note that ALL operations are identical in constant and strobe modes – except for the click or press to enter those modes.

UIB2 and UIB2Q are functionally identical. The only difference between the two is whether or not the 3 second menu window flash occurs. For applications that utilize a separate power switch to turn the driver on and off, the 3 second menu window flash can be annoying and so UIB2Q provides a 'quiet' turn on. To access the menu system in UIB2Q requires pressing and holding the momentary action switch down while applying power since there is no "3 second menu window" (see Sec 8).

7.1 On/Off Mode (non Superlock) UIB2/UIB2Q

7.1.1 In Duomode

a. Constant Mode: A click turns on the light and further clicks toggle between low (L2 by default) and high (L5). From On, a press will turn off the light after a "safety delay" of about two seconds.

b. Strobe Mode: A press will turn on and at the previous strobe sequence. Subsequent clicks will cycle to the next sequence (until the 6th is reach) and then back to the first sequence . From on, a press will turn off the light after a "safety delay" of about two seconds.

7.1.2 In Threemode

a. Constant Mode: A click turns on the light and further clicks toggle between medium (L2 by default) and high (L5). From on, a press will dim the light to low and further pressing will flash the LED (as a warning) and turn off the light after a "safety delay" of about two seconds.

b. Strobe Mode: A press will turn on and at the previous strobe sequence. Subsequent clicks will cycle to the next sequence (until the 6th is reach) and then back to the first sequence. From on, a press will turn off the light after a "safety delay" of about two seconds.

7.1.3 In Trimode

a. Constant Mode: A click turns on the light and further clicks toggle between low (L2 by default) and (medium (L3 by default) and high (L5). From on, a press will turn off the light after a "safety delay" of about two seconds.

b. Strobe Mode: A press will turn on and at the previous strobe sequence. Subsequent clicks will cycle to the next sequence (until the 6th is reach) and then back to the first sequence. From on, a press will turn off the light after a "safety delay" of about two seconds.

7.1.4 In Multimode

a. Constant Mode: A click turns on at the previous level (or at Force Level if set), and further clicks brighten up to L5. Subsequent clicks will flash the LED to indicate that L5 has been reached. From on, a press will dim down to L1 (the LED will flash to warn that L1 has been reached). Continuing to press will turn off the light after a short "safety delay."

b. Strobe Mode: A press will turn on and at the previous strobe sequence. Subsequent clicks will cycle to the next sequence (until the 6th is reach) and then back to the first sequence. From on, a press will turn off the light after a "safety delay" of about two seconds.

7.2 Adjustment Mode UIB2/UIB2Q

7.2.1 In Duomode
Constant Mode: From on, clicking toggles between low and high. The brightness of low is chosen in the Duomode Menu (Sec 8.3). High is the selected Drive Current (Sec 0).

Each time the brightness level is changed the new level is stored in EEPROM ready to be retrieved the next time the unit is turned back on.

7.2.2 In Threemode
Constant Mode: From on, clicking toggles between medium and high. The brightness of low and medium are chosen in the UIBmode Menu (Sec 8.3). High is the selected Drive Current (Sec 0).

Each time the brightness level is changed the new level is stored in EEPROM ready to be retrieved the next time the unit is turned back on.

7.2.3 In Trimode
Constant Mode: From on, clicking toggles from low to medium to high and back to low. The brightness of low and medium are chosen in the UIBmode Menu (Sec 8.3). High is the selected Drive Current (Sec 0).

Each time the brightness level is changed the new level is stored in EEPROM ready to be retrieved the next time the unit is turned back on.

7.2.4 In Multimode
   a. Brighter, Constant Mode: From on, clicking cycles up through the five available levels. If L5 (highest) has been reached and the user clicks the switch again, the LED will flash to indicate that the maximum level has already been reached.
   b. Dimmer, Constant Mode: From on, pressing cycles down through the five available levels. When L1 (lowest) has been reached, the LED will blink to indicate that the minimum level has been reached. If L1 is the desired level, release the switch. (If off is desired (Sec 7.1), continue to press the switch and the light will turn off after a brief "safety delay.")

7.2.5 In Strobe Mode
Strobe Mode operates the same exact way regardless of which Constant Mode is selected (duo/three/tri of multimode).

From off, a press will turn on and at the previous strobe sequence. Subsequent clicks will cycle to the next sequence (until the 6th is reach) and then back to the first sequence. From on, a press will turn off the light after a "safety delay" of about two seconds.

7.2.6 Current Levels
The five levels are factory-set and levels L2-L5 scale with the Current Drive Menu option (Sec 0). L1 in all current tables is set to approximately 50 mA for longest runtime.

Each time the brightness level is changed, the new level is stored in EEPROM ready to be retrieved next time the unit is turned back on.

7.3 Difference between Threemode and Trimode

These two modes both offer 3 levels, but are different in their operation to provide the user that wants three levels a choice.

Threemode: Click to turn the light on to the previously used level. Each click will toggle from Medium to High essentially acting like a Duomode. But, if the user wants the third level (typically set to a very low level for emergency lighting or when stopped for an extended period of time where some light is needed for say a trailside repair) all that is required is a press of the switch. The press will activate the Low level and if the switch is held down longer the LED will flash to warn that the light will turn off in about 2 seconds (if the switch continues to be held down). From Low a click will move to Medium level, another click to High and another click back to Medium etc.

As an example, say the light is turned on and is at medium (previously turned off at medium level):

Medium, click→ High, click → Medium, press → Low, click → Medium, click → High, click → Medium, click → High, press → Low and continue pressing, LED flashes, continue pressing → Off

Trimode: This is essentially a Duomode with 3 levels. Click to turn the light on to the previously used level. Each click then cycles through the three levels.

As an example, say the light is turned on and is at medium (previously turned off at medium level):

Medium, click → High, click → Low, click → Medium, click → High, click → Low, Press → Off

Threemode and Trimode sequences the same when used in Strobe mode for consistent behaviour.

7.4 Superlock Mode UIB2/UIB2Q

To prevent accidental turn on or unintended use, the light can be electronically locked off. If Superlock is enabled, each time the user wants to turn the light on, 2 clicks spaced no more than 0.3 seconds apart must occur prior to the click or press that turns the light on (constant or strobe respectively).

In other words, to turn the light on with Superlock enabled:
  a. To Constant Mode: The user clicks three times, no more than 0.3 seconds apart.
  b. To Strobe Mode: The user clicks twice and presses, no more than 0.3 seconds apart.

8 Menu Selection (Configuring operation)

This section describes how to enter the Menu system and how to change operating options. All changes are stored in the EEPROM. Every Menu option modifies the operation of both modes - strobe and constant.

To access the Menu depends on whether you are in UIB2, UIB2Q menu mode or UIF/UIP menu mode.

If you are in UIB2 mode, then to access the menu system you must remove power (disconnect the battery) from the circuit and then re-apply power. A dim, rapid flash sequence from the LED will indicate that the "Menu entry window" is open (the window is open for three seconds). Within 3 seconds of applying power PRESS (not click) the switch and the LED will flash brightly 2 times, then stay steady dim to indicate that the Menu system has been entered.

Note: During the 3 second "Menu entry window" and while in the Menu system, voltage sensing and temperature sensing is disabled to allow access even if an over temperature or under voltage condition exists.

If you are in UIB2Q mode, then to access the menu system you must remove power (disconnect the battery) from the circuit and then re-apply power WHILE keeping the switch pressed down. The LED will flash brightly 2 times, then stay steady dim to indicate that the Menu system has been entered.

If you are in UIF/UIP mode, then start with the light on, or turn the light on and wait at least 1 second. Click 3 times quickly (the LED will flash off, on, off) and follow that with a press until the LED flashes. So the sequence from the light being on is simply click-click-click-press. The press must come directly after the three clicks, or the circuit will enter lockout mode with an indication of three bright flashes. When you have entered the Menu successfully, the LED will be steady dim.

Note: While in the Menu system, voltage sensing and temperature sensing is disabled, again to enable access even if an over temperature or under voltage condition exists.

Click the switch from 0 to 14 times (the LED will flash a response for each click, do NOT try to beat the flash) to select one of the Menu options to change as listed below. To exit the Menu system instead of choosing an option, press the switch before clicking (Sec 8.0). The LED will flash 2 times and then the light will turn off. To re-enter the Menu system you will need to perform the proper sequence as described above.

If any errors occur in selecting a Menu option (e.g. clicking more than 14 times or making an invalid selection), the LED will flash quickly 5 times to indicate an error and the user will be returned to the top of the Menu system as if it had just been entered.

If at any time you lose track or get confused about where you are in the Menu system, you can always remove power and only the settings that have been altered (if any) will have been written to the EEPROM.

After clicking from 0 to 14 times to select the Menu entry, press the switch to choose that menu option.

Example (in UIB2 Menu mode) – set drive current to 2800 mA:

1. Disconnect and reconnect power to the circuit. The LED will flash rapidly.
2. Within three seconds, press the switch. The LED will flash brightly two times and stay steady dim. You are in the Menu system.
3. Click twice to choose the Current Drive Selection (wait for flash response after each click).
4. Press to select this option. The LED will light steady dim. You are in the *Current Drive Selection* at the lowest option, 1400 mA.
5. Clicking once will make the LED brighter, indicating 2000 mA. Clicking a second time brightens the LED again, indicating 2800 mA.
6. Press to save your selection. The LED will flash twice and stay steady. You have now saved the 2800 mA Current Drive Selection, and are back to the top of the Menu.

If that is all you would like to set, press one more time to exit the Menu. Two flashes later, you are out of the Menu and into the normal operation mode. If instead you would like to set another Menu option, do not press, and go back to step three above and click the proper number of times for your next selection.

Example (in UIBQ2 Menu mode) – set drive current to 2800 mA:

1. Disconnect and reconnect power to the circuit WHILE keeping the switch pressed down.
2. The LED will flash brightly two times and stay steady dim. You are in the Menu system.
3. Click twice to choose the Current Drive Selection (wait for flash response after each click).
4. Press to select this option. The LED will light steady dim. You are in the *Current Drive Selection* at the lowest option, 1400 mA.
5. Clicking once will make the LED brighter, indicating 2000 mA. Clicking a second time brightens the LED again, indicating 2800 mA.
6. Press to save your selection. The LED will flash twice and stay steady. You have now saved the 2800 mA Current Drive Selection, and are back to the top of the Menu.

If that is all you would like to set, press one more time to exit the Menu. Two flashes later, you are out of the Menu and into the normal operation mode. If instead you would like to set another Menu option, do not press, and go back to step three above and click the proper number of times for your next selection.

Example (in UIF/UIP Menu mode) – set drive current to 2800 mA:

1. Turn on the light (if it isn't already on) and wait at least 1 second.
2. Click the switch three times (no more than 0.3 sec apart) and then Press until the LED flashes once, release the switch. The LED will then stay steady dim. You are in the Menu system.
3. Click twice to choose the Current Drive Selection (wait for flash response after each click).
4. Press to select this option. The LED will light steady dim. You are in the *Current Drive Selection* at the lowest option, 1400 mA.
5. Clicking once will make the LED brighter, indicating 2000 mA. Clicking a second time brightens the LED again, indicating 2800 mA.
6. Press to save your selection. The LED will flash twice and stay steady. You have now saved the 2800 mA Current Drive Selection, and are back to the top of the Menu.

If that is all you would like to set, press one more time to exit the Menu. Two flashes later, you are out of the Menu and into the normal operation mode. If instead you would like to set another Menu

option, do not press, and go back to step three above and click the proper number of times for your next selection.

8.0 Zero clicks – Nothing

This option changes nothing and allows the user to exit the Menu system.

Initially the LED will be dim to indicate that the Menu system has been entered. If no (further) Menu changes are needed, a press will exit the Menu system (2 flashes). The light turns off and is ready to use.

8.1 One click - Force Mode Enable/Adjust/Disable

This mode overrides the last-used level. Force Mode is ignored when Threemode/Trimode or Duomode is enabled.

Initially the LED will be dim to indicate that Force Level 1 (dimmest) will be selected (i.e. if you don't click, Force will become active and set to Level 1). Each click will cycle to the next Force setting. The sequence (for UIP and UIB) is:

- 0 click (actual L1)   → Force Level 1 select
- 1 click (actual L2)   → Force Level 2 select
- 2 click (actual L3)   → Force Level 3 select
- 3 click (actual L4)   → Force Level 4 select
- 4 click (actual L5)   → Force Level 5 select
- 5 click (off)   → Force Disabled (last-used level will be used) - shipping default

The LED brightness matches the actual L1 – L5 brightness levels.

The sequence (for UIF) is:

- 0 click (actual L1)   → Force Level 1 select
- 1 click (actual L2)   → Force Level 2 select
- 2 click (actual L3)   → Force Level 3 select
- 3 click (actual L4)   → Force Level 4 select
- 4 click (actual L5)   → Force Level 5 select
- 5 click (actual L5)   → Force Level 6 select
- 6 click (actual L5)   → Force Level 7 select
- 7 click (actual L5)   → Force Level 8 select
- 8 click (off)   → Force Disabled (last-used level will be used) - shipping default

The LED brightness matches the actual L1 – L8 brightness levels.

When you are satisfied with the choice, press to save the setting. The LED will flash twice to indicate that the selection has been made and then go dim to indicate that it has returned to the Menu mode for the next selection.

8.2 Two clicks – Current Drive Selection

The circuit can be set to one of 7 (or 9, for drivers shipped after Nov 16 2010) maximum current drive levels. This selection will be L5 or "high" for all modes. The brightness scales of all other levels are determined by this setting.

Initially the LED will be dim to indicate that 1400 mA max current will be active. Each click will cycle to the next current drive level and wrap back to the beginning. The sequence is:

- 0 click (dim) $\rightarrow$ 1400 mA select - default
- 1 click (brighter) $\rightarrow$ 2000 mA select
- 2 click (brighter) $\rightarrow$ 2800 mA select
- 3 click (brighter) $\rightarrow$ 3000 mA select
- 4 click (brighter) $\rightarrow$ 3600 mA select
- 5 click (brightest) $\rightarrow$ 5000 mA select
- 6 click (brightest) $\rightarrow$ 5600 mA select
- 7 click (brighter) $\rightarrow$ 6000 mA select
- 8 click (brightest) $\rightarrow$ 6600 mA select

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

8.3 Three clicks – Duomode Enable/Disable or UIF/UIP Selection

This menu option behaves differently, depending on whether the firmware is set to UIB2/UIB2Q Base Mode or UIF/UIP Base Mode (see Sec 8.13)

For UIB2/UIB2Q Base Mode:
The circuit can be configured to operate in either a simple 2 level mode (Duomode), 3 level mode (2 level toggle called Threemode), 3 level mode (Trimode) or a more elaborate and flexible 5 level mode (Multimode). The force setting (Sec 8.1) will be ignored if Duomode, Threemode or Trimode are enabled.

For Duomode, Threemode and Trimode:

Initially the LED will be dim (actual L1 in this case) to indicate that L1 is chosen. Each click will cycle to the next choice and wrap back to the beginning.

- 0 click (actual L1) $\rightarrow$ low level L1 select
- 1 click (actual L2) $\rightarrow$ low level L2 select (default when UIB2 is first selected)
- 2 click (actual L3) $\rightarrow$ low level L3 select
- 3 click (actual L4) $\rightarrow$ low level L4 select

When you are satisfied with the choice, press to save the setting. For Duomode you are done and the LED will flash twice to indicate that the selection has been made and then go dim to indicate that it has returned to the Menu mode for the next selection. For Threemode, Trimode the LED will flash once and then go dim to wait for you to select the intensity for the user configurable medium level.

For Threemode and Trimode only:

Initially the LED will be dim (actual L1 in this case) to indicate that L1 is chosen. Each click will cycle to the next choice and wrap back to the beginning.

- 0 click (actual L1) → medium level L1 select
- 1 click (actual L2) → medium level L2 select
- 2 click (actual L3) → medium level L3 select (default when UIB2 is first selected)
- 3 click (actual L4) → medium level L4 select

For UIF/UIP Base Mode (default):
The circuit can be configured to operate in either UIF or UIP modes.

Initially the LED will be dim to indicate that UIF is chosen. Each click will cycle to the next choice and wrap back to the beginning.

- 0 click (dim)   → UIF select
- 1 click (brighter)   → UIP select – (default)

When you are satisfied with the choice, press to save the setting. The LED will flash twice to indicate that the selection has been made and then go dim to indicate that it has returned to the Menu mode for the next selection.

8.4 Four clicks – Superlock Enable/Disable
To prevent accidental turn on or unintended use, the light can be electronically locked off.

For UIB2/UIB2Q Base Mode:

With Superlock enabled, each time the user wants to turn the light on, 2 clicks spaced no more than 0.3 seconds apart must occur prior to the click or press that turns the light on (constant or strobe respectively).

For UIF/UIP Base Mode:

With Superlock enabled, each time the user wants to turn the light on, 2 clicks spaced no more than 0.3 seconds apart must occur prior to the click or press that turns the light on (previous level or low respectively).

Initially the LED will be dim to indicate that Superlock Mode will be disabled (i.e. if you don't click, Superlock Mode will be disabled). A click will brighten the LED to indicate that Superlock Mode will be enabled. Each click will cycle between enabled and disabled.

- 0 click (dim)   → Superlock disabled - default
- 1 click (brighter)   → Superlock enabled

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

8.5 Five Clicks – Voltage Warning Status & Threshold Setting

How (and how often) the circuit reports the low and medium voltage conditions is configured using this Menu option. You can also set the threshold or hysteresis of the voltage sensing (see below).

The circuit reports the low voltage condition via the STAT pin on the PCB. STAT will drive low (open collector transistor) to light the status LED. See Sec 1.1 on how the STAT pin functions electrically.

Note: The STAT pin will light the status LED (if affixed) if the input voltage is greater than the V Low Setting but less than the V Med Setting. The STAT pin will pulse (flash the status LED) once per second when the input voltage is less than the V Low Setting. The STAT pin will double pulse (flash the status LED) once per second if the input voltage is less than the V Cut Off Setting.

The STAT pin is pulsed once every time the light is turned on as a self-check that the status LED is functioning correctly.

If the user does not want to wire a status LED to the STAT pin but still wants an indication of low voltage occurring, then the main LED can be set to flash at a specific interval to give a visual warning. How the main LED flashes is dependent on whether the light is in constant or strobe mode.

Constant Mode: If the input voltage is greater than the V Low Setting but less than the V Med Setting, the main LED will briefly flash off once at the flash rate chosen with this Menu option (5 sec, 10 sec, 30 sec or 60 sec). This warning will time out after five sequences so the remaining battery capacity can be used without annoyance. As a reminder, the V Med warning sequence will repeat if the light is turned off/on, or if a higher level is chosen. The STAT pin will remain active with no timeout. If the input voltage is less than the Low Setting the main LED will flash off twice at the flash rate. This V Low warning sequence will continue until the Cut Off Setting is reached or recharged to above the V Med Setting. If the input voltage is less than the Cut Off Setting the main LED will flash off three times at the flash rate. This Cut Off warning sequence will continue until the light turns off (Cut Off enabled) or indefinitely (Warn Only enabled), see Sec 8.6. These sequences were chosen to give an obvious indication of battery status while still allowing use of the light for navigation.

Strobe Mode: The warning sequence follows the same one, two or three flash report (for medium, low or cutoff warning) as for the Constant mode above. At the user specified flash rate, the light will stop the strobe sequence for 1.5 seconds and stay steady at the High level (as per the current strobe sequence) and then it will flash to the Low level (as per the current strobe sequence) one, two or three times and then it will stay steady at the High level for 1.5 seconds. The light will then resume the strobe sequence until the next warning cycle specified by the flash rate occurs.

Threshold/Hysteresis Selection: The voltage monitoring/warning system uses hysteresis to prevent the warning system triggering and resetting again when hovering around a trip point.

For example, if the medium warning is set to 14.3V the voltage warning will trip when the input voltage drops below 14.3V. The voltage is required to go at least 14.3 + Hysteresis to reset the medium warning. By default the hysteresis is set to 0.2V which for this example means the voltage would need to rise above 14.5V to reset the medium level. The 0.2V hysteresis works well for most applications, but if the battery pack is also being used to power other devices that may have large cycle current draws (like a high power flashing LED system) the input voltage to the driver may fluctuate enough to trip and reset the voltage monitoring over and over again. Increasing the hysteresis to 0.4V or 0.6V can prevent this warning cycle.

Configuring the settings:

Initially the LED will be Dim to indicate that one flash per 5 seconds will be chosen. See the table below for all available settings.

- 0 click (dim)   → Main LED flash once per 5 sec (undervoltage)
- 1 click (brighter)   → Main LED flash once per 10 sec (undervoltage)
- 2 click (brighter)   → Main LED flash once per 30 sec (undervoltage)
- 3 click (brighter)   → Main LED flash once per 60 sec (undervoltage)
- 4 click (off)   → No Main LED flash for undervoltage - default

When you are satisfied with the choice, press to save the setting. The LED will flash once and go dim again and wait for entry of the threshold/hysteresis value.

- 0 click (dim)   → Hysteresis set to 0.2V - default
- 1 click (brighter)   → Hysteresis set to 0.4V
- 2 click (brighter)   → Hysteresis set to 0.6V

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

Note: regardless of the selection for this Menu, the STAT pin will always report the battery status.

8.6 Six Clicks – Voltage Cut Off Setting

The circuit can be configured to turn off OR warn when the cut off input voltage occurs. The user can set the cut off voltage to any value between 0V – 21V. The voltage value is entered by setting a number in the format: xy.z (e.g. 06.8V).

The V Cut Off setting is the value that the user chooses to protect the battery pack from over discharge. When the Cut Off voltage is sensed, and Cutoff is selected, see below, the circuit will wait 1 minute prior to turning off the main LED (short flash sequence warning before it turns off). The user can turn the light on again and after 1 minute the circuit will again turn off the main LED. This 1 minute cycle provides the user a last ditch ability to continue using the light for short periods of time. If Cutoff is set to Warn Only, see below, then the Main LED or STAT LED (as selected in Sec 8.5) will continue to warn indefinitely.

Initially the LED will be dim to indicate that Cutoff (turn off) will be chosen (i.e. if you don't click, Cutoff will be chosen). A click will brighten the LED to indicate that only a warning will be chosen. Each click will cycle between Cutoff and Warning.

- 0 click (dim)   → Cutoff (driver will turn off) - default
- 1 click (brighter)   → Warn Only (driver will continue to flash the LED after 1 minute)

When you are satisfied with the choice, press to save the setting. The LED will flash once to confirm the saving of the new selection.

The LED will dim again and wait for entry of the 'x' (tens). Click 0 to 2 times (If you don't click, 0 will be selected for the tens digit).

When you are satisfied with the choice, press to save the setting. The LED will flash once to acknowledge the Press.

The LED will dim again and wait for entry of the 'y' (units). Click 0 to 9 times (If you don't click, 0 will be selected for the units digit

When you are satisfied with the choice, press to save the setting. The LED will flash once to acknowledge the Press.

The LED will dim again and wait for entry of the 'z' (tenths). Click 0 to 9 times (If you don't click, 0 will be selected for the tenths digit

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

The xy.z value is stored in the EEPROM and can be changed by following the above procedure as often as necessary.

Note: the circuit senses the input voltage across IN+ and IN-. This means that measured voltage for the Voltage Warning circuitry is quite accurate.

8.7 Seven Clicks – Voltage Warning Low Setting

The circuit can be configured to warn the user when low input voltage occurs. The user can set the voltage warning to any value between 0V – 16V. The voltage value is entered by setting a number in the format: xy.z (e.g. 06.8V).

The V Low setting is the value that the user chooses to provide a warning prior to reaching the cut off voltage. Of course the warning can be ignored if necessary (emergency), though the warning will never time out and at some point the Cut Off voltage will be reached and the light will turn off.

The user can specify what level the driver should use as the upper limit when the low voltage setting is detected. This forces the driver to drop to a lower level that the user can not exceed unless the user turns the driver off and back on and the low voltage setting is no longer occurring (e.g. the battery has been recharged). This feature allows the light to still operate, but the runtime will be extended since the higher levels are no longer available.

Initially the LED will be dim to indicate L1 will be chosen (i.e. if you don't click, L1 will be chosen). A click will brighten the LED to indicate that only a warning will be chosen. The number of available levels that can be selected depends on the specific UI being used.

UIF:

- 0 click (dim)   → L1
- 1 click (brighter)   → L2
- 2 click (brighter)   → L3
- 3 click (brighter)   → L4
- 4 click (brighter)   → L5
- 5 click (brighter)   → L6
- 6 click (brighter)   → L7
- 7 click (off)   → Low Voltage over-ride disabled (shipping default)

UIP/UIB:

- 0 click (dim)   → L1
- 1 click (brighter)   → L2
- 2 click (brighter)   → L3
- 3 click (brighter)   → L4
- 4 click (off)   → Low Voltage over-ride disabled (shipping default)

When you are satisfied with the choice, press to save the setting. The LED will flash once to confirm the saving of the new selection.

The LED will dim again and wait for entry of the 'x' (tens). Click 0 to 2 times (If you don't click, 0 will be selected for the tens digit).

When you are satisfied with the choice, press to save the setting. The LED will flash once to acknowledge the Press.

The LED will dim again and wait for entry of the 'y' (units). Click 0 to 9 times (If you don't click, 0 will be selected for the units digit

When you are satisfied with the choice, press to save the setting. The LED will flash once to acknowledge the Press.

The LED will dim again and wait for entry of the 'z' (tenths). Click 0 to 9 times (If you don't click, 0 will be selected for the tenths digit

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

The xy.z value is stored in the EEPROM and can be changed by following the above procedure as often as necessary.

8.8 Eight Clicks – Voltage Warning Medium Setting

The circuit can be configured to warn the user when medium input voltage occurs. The user can set the voltage warning to any value between 0V – 21V. The voltage value is entered by setting a number in the format: xy.z (e.g. 06.8V).

The V Med setting is the value that the user chooses to indicate that the battery is around half discharged (recommendation). Of course the user can set this to whatever value he/she chooses. This warning will time out after five sequences so the remaining battery capacity can be used without annoyance. As a reminder, the V Med warning sequence will repeat if the light is turned off/on, or if a higher level is chosen. The STAT pin will remain active with no timeout.

Initially the LED will be dim, waiting for entry of the 'x' (tens). Click 0 to 2 times (If you don't click, 0 will be selected for the tens digit).

When you are satisfied with the choice, press to save the setting. The LED will flash once to acknowledge the Press.

The LED will dim again and wait for entry of the 'y' (units). Click 0 to 9 times (If you don't click, 0 will be selected for the units digit

When you are satisfied with the choice, press to save the setting. The LED will flash once to acknowledge the Press.

The LED will dim again and wait for entry of the 'z' (tenths). Click 0 to 9 times (If you don't click, 0 will be selected for the tenths digit

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

The xy.z value is stored in the EEPROM and can be changed by following the above procedure as often as necessary.

Note: the circuit senses the input voltage across IN+ and IN-. This means that measured voltage for the Voltage Warning circuitry is quite accurate.

8.9 Nine clicks – Poweron Mode Enable/Disable

The circuit can be configured to either power-up with the LED lit or unlit when power is first applied. E.g. In a light fixture that has an auxiliary power switch in series with the battery and the circuit, the user can choose to have the circuit illuminate the LED as soon as the power switch is turned on (after the menu-entry window has closed for UIB2/UIB2Q). In this case the user would Enable Poweron Mode.

Initially the LED will be dim to indicate that Poweron Mode will be disabled (i.e. if you don't click, Poweron Mode will be disabled). A click will brighten the LED to indicate that Poweron Mode will be enabled. Each click will cycle between enabled and disabled.

- 0 click (dim)   → Poweron disabled
- 1 click (brighter)   → Poweron enabled - default

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

The following shows how Poweron mode affects the operation of the driver when power is first applied (battery first connected or power turned on via a switch in series with the battery):

```
IF UIB2 normal:

If poweron is ON, H6Flex powers on with a flash sequence and stays on.
If poweron is OFF, H6Flex powers on with a flash sequence and then turns off (standby).

IF UIB2 Quiet:

If poweron is ON, no flash sequence and H6Flex turns on.
If poweron is OFF, no flash sequence and H6Flex goes off (standby).

If UIF/UIP:

If poweron is ON, H6Flex powers on.
If poweron is OFF, H6Flex turns off (standby).

By standby, what is meant is that H6Flex turns electronically off and waits to be turned on
via the momentary action switch.
```

8.10 Ten Clicks – Configuration Reset (to initial shipping defaults)

This Menu option allows a reset of all options to their initial shipping defaults (Sec 0) and/or to display the firmware version number.

Initially the LED will be dim to indicate that a Configuration Reset will _not_ occur (i.e. if you don't click to toggle this option). A click will brighten the LED to indicate that a Configuration Reset _will_ occur. Each click will toggle from active to inactive.

- 0 click (dim) → Reset will not occur - default
- 1 click (brighter) → Reset will occur

When you are satisfied with the choice, press to save the setting. The LED will flash M times then a pause and then flash N times and then go off (M.N = version number of the firmware). After the Reset version number display is complete, the light will remain **off** until turned back on by the user.

8.11 Eleven Clicks – Thermal Protection

To protect the light from over-heating, a thermal trigger point can be set with this option. Obviously the temperature sensing will not be of any use in a light that has the LED heatsink/case far from the driver.

For UIB2/UIB2Q Base Mode:

When the internal thermal sensor detects the configured temperature, the light level is dropped to L3 (corresponds to less than 1/3 of the selected maximum current of L5).

For UIF/UIP Base Mode:

When the uController internal thermal sensor detects the configured temperature, the light level is dropped to L4 in UIF or L3 in UIP mode.

The user will not be able to access levels above L3 (or L4 for UIF) until the temperature has dropped a minimum of 5°C. At that time, full operation of the light is restored. Note: The sensor determines the temperature of the uController IC, not of the light case or the LED junction, etc.

Initially the LED will be dim to indicate that 50°C is chosen. Each click will cycle to the next temperature option and wrap back to the beginning. The sequence is:

- 0 click (dim) → 50°C
- 1 click (brighter) → 60°C
- 2 click (brighter) → 70°C
- 3 click (brighter) → 80°C
- 4 click (brightest) → 90°C
- 5 click (off) → disabled (default)

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

HINT: Choosing the appropriate temperature for a particular light will require some trial and error if temperature measurements of the case and thermal sensing IC aren't possible, e.g. due to lack of equipment. One way to do this is to allow the case to warm up to a temperature that is beyond your

comfort level. Set the temperature trip point (above) to 90°C and then turn the light on normally and see if the thermal protection activates. If it doesn't activate re-program to the 80°C setting and repeat until the appropriate temperature is found.

The average person will find 60°C as an uncomfortable case temperature for a light.

8.12 Twelve clicks - Autosleep Enable/Disable

This menu option only applies in UIF or UIP modes. It is ignored in UIB2/UIB2Q mode.

To preserve battery life, this option allows H6Flex to switch the power off after a preset time.

Initially the LED will be dim to indicate Autosleep will activate in 15 minutes. Each click will cycle through the next time value. The sequence is:

- 0 click (dim) $\rightarrow$ 15 minutes,
- 1 click (brighter) $\rightarrow$ 30 minutes
- 2 click (brighter) $\rightarrow$ 1 hour
- 3 click (brighter) $\rightarrow$ 2 hour
- 4 click (brighter) $\rightarrow$ 4 hour
- 5 click (brighter) $\rightarrow$ 8 hour
- 6 click (off) $\rightarrow$ Autosleep disabled (default)

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

8.13 Thirteen clicks – Select UIB2, UIB2Q or UIF/UIP Base Mode

This menu allows selection either of UIB2, UIB2Q or UIF/UIP base modes. The structure of the firmware is such that there are two totally separate operating environments due to the very different needs of UIB2/UIB2Q versus UIF/UIP.

Initially the LED will be dim to indicate that UIB2 base mode will be enabled (i.e. if you don't click, UIB2 Base Mode will be selected). A click will brighten the LED to indicate UIB2Q Base mode will be enabled and a further click will brighten the LED again to indicate that UIF/UIP Base Mode will be enabled. Each click will cycle through the next base mode. The sequence is:

- 0 click (dim) $\rightarrow$ UIB2 Base Mode (shipping default)
- 1 click (brighter) $\rightarrow$ UIB2Q Base Mode
- 2 click (brighter) $\rightarrow$ UIF/UIP Base Mode

If you select the UIF/UIP base mode, you then need to choose between UIF or UIP using Menu 3 (Sec 8.3).

When you are satisfied with the choice, press to save the setting.

For UIF/UIP selection, the LED will flash twice and go off to indicate that the selection has been made. The light will remain **off** until turned back on by the user.

For UIB2 and UIB2Q base mode the LED will flash once and then go dim to indicate a further submenu choice needs to be made.

Initially the LED will be dim to indicate that Duomode mode will be enabled (i.e. if you don't click, Duomode will be selected). A click will brighten the LED to indicate Threemode will be enabled, a further click will brighten the LED again to indicate that Trimode will be enabled and further click will brighten the LED again to indicate that Multimode will be enabled. Each click will cycle through the next UIB mode. The sequence is:

- 0 click (dim)   → Duomode Selected (shipping default)
- 1 click (brighter)   → Threemode Selected
- 2 click (brighter)   → Trimode Selected
- 3 click (brighter)   → Multimode Selected
- 4 click (brighter)   → Multimode Quiet Selected (no Flash when L5 and user Clicks)

Note: making any change to this menu will cause menu #5 to be reset to STAT only warnings. So, if you want the main LED to indicate voltage warnings, you will need to configure menu #5 AFTER you have configured menu #13.

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go off to indicate that the selection has been made. The light will remain **off** until turned back on by the user.

8.14 Fourteen clicks – Configure Strobe Sequence

This menu option only applies in to UIB2/UIB2Q modes, since only those modes support Strobe.

With this menu, the user can over-write any of the default 6 strobe sequences. The first step is to choose the Strobe Sequence to over-write.

- 0 click (dim)   → Strobe Sequence #1
- 1 click (brighter)   → Strobe Sequence #2
- 2 click (brighter)   → Strobe Sequence #3
- 3 click (brighter)   → Strobe Sequence #4
- 4 click (brighter)   → Strobe Sequence #5
- 5 click (brighter)   → Strobe Sequence #6
- 6 click (off)   → Exit, don't change anything

When you are satisfied with the choice, press to move to the next step. If Exit was selected (LED off), the LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered. If Exit was not selected (LED not off), the LED will flash once and then go dim waiting for the user to enter the low level for the Strobe Sequence.

Parameter 1: The second step is to choose the Low level for the Strobe intensity.

- 0 click (dim)   → L1
- 1 click (brighter)   → L2
- 2 click (brighter)   → L3
- 3 click (brighter)   → L4
- 4 click (off)   → Main LED will be OFF for the low level of the Strobe.

When you are satisfied with the choice, press to save the setting. The LED will flash once and then go off waiting for the user to select the number of 10msec "ticks" for the Low level duration.

Parameter 2: The third step is to choose the Low level duration time (maximum of 50 clicks).

- 0 click (off) $\rightarrow$ Make no change to current duration
- 1 click (flash) $\rightarrow$ 10msec duration
- 2 click (flash) $\rightarrow$ 20msec duration
.
.
.
- 50 click (flash) $\rightarrow$ 500msec duration

When you are satisfied with the choice, press to save the setting. The LED will flash once and then go dim waiting for the user to choose the High level for the Strobe intensity

Parameter 3: The fourth step is to choose the High level for the Strobe intensity.

- 0 click (dim) $\rightarrow$ L2
- 1 click (brighter) $\rightarrow$ L3
- 2 click (brighter) $\rightarrow$ L4
- 3 click (brighter) $\rightarrow$ L5

When you are satisfied with the choice, press to save the setting. The LED will flash once and then go off waiting for the user to select the number of 10msec "ticks" for the High level duration.

Parameter 4: The fifth step is to choose the High level duration time (maximum of 50 clicks).

- 0 click (off) $\rightarrow$ Make no change to current duration
- 1 click (flash) $\rightarrow$ 10msec duration
- 2 click (flash) $\rightarrow$ 20msec duration
.
.
.
- 50 click (flash) $\rightarrow$ 500msec duration

When you are satisfied with the choice, press to save the setting. The LED will flash once and then go off waiting for the user to select the number of times to repeat the High/Low burst.

Parameter 5: The sixth step is to choose the number of time to repeat the High/Low burst (maximum of 50 clicks).

- 0 click (off) $\rightarrow$ Make no change to current repeat length
- 1 click (flash) $\rightarrow$ repeat burst length = 1
- 2 click (flash) $\rightarrow$ repeat burst length = 2
.
.
.
- 50 click (flash) $\rightarrow$ repeat burst length = 50

When you are satisfied with the choice, press to save the setting. The LED will flash twice and go dim to indicate that the selection has been made, and that the Menu mode has been reentered.

Strobe mode configuration examples:

Parameter 1 = 1 click (L2)
Parameter 2 = 30 clicks (300ms)
Parameter 3 = 3 clicks (L5)
Parameter 4 = 10 clicks (100ms)
Parameter 5 = 3 clicks (repeats 3 times).

The above example would run a cycle as follows:

L2 for 300ms, the L5 for 100ms, then L2 for 100ms, then L5 for 100ms, then L2 for 100ms, then L5 for 100msec, then L2 for 100msec.

The above cycle then repeats over and over again until a click (new sequence selected) or press (light is turned off) occurs.

The default settings that ship with the driver are listed in the following table:

	Strobe #1	Strobe #2	Strobe #3	Strobe #4	Strobe #5	Strobe #6
Parameter 1	Off	Off	L2	L2	L2	L2
Parameter 2	15	15	30	30	30	30
Parameter 3	L4	L5	L4	L5	L4	L5
Parameter 4	12	12	10	10	10	10
Parameter 5	1	1	2	2	3	3

Parameter 2 and Parameter 4 are the # of clicks, so in the table above, 15 means 150msecond, 30 means 300mseconds etc.

8.15 Menu Selection Complete

Once the above Menu procedure is complete and the light turns off the new Menu selection is immediately active. The circuit is ready to be used.