Narsil Flashlight Operation (side electronic switch)

03/21/2016 T.E.

The user interface's design goal is to be fast and simple, but with many advanced features to support the latest technologies and features, and allow the user to configure the light's operation to his/her liking. The configuration settings are stored permanently.

Summary of Features

- Simple 1 click ON, 1 click OFF, navigate to next and previous modes
- 12 mode sets to choose from, 1 to 8 modes/output levels can be configured, and then saved
- Modes can be arranged for low to hi, or hi to low
- Multiple strobe and beacon modes can be accessed, total of 5 special modes (16 Hz strobe, police strobe, bike strobe, 2 sec beacon, and 10 sec beacon)
- Low Voltage Protection (LVP) – output is decreased starting at ~3.0v, shut off at ~2.7v
- Turbo timeout can be enabled/disabled, and the time be set
- When power is applied, 2 blinks indicate it's ready
- An Indicator LED (SMD LED) is supported as a locator LED and low voltage indicator
- Battery Check – blink out the voltage level (ex: 3.7v would be 3 blinks, pause, then 7 blinks)
- Lock-out feature for the side switch – enabled and disable by a special click sequence
- Mode memory can be enabled to quickly restore the last used mode setting, but not recommended
- A power tail switch can be used to change modes w/memory

Configuration Settings Summary

1. 12 sets of modes to choose from, from 1 to 7 output levels
2. Moonlight mode can be optionally added (enable/disable), and the moon output level custom set
3. Set the mode order, default is low to hi, hi to low can be enabled
4. Enable or disable mode memory
5. Enable/disable turbo timeout and sets the length of time from 30 secs to 10 minutes
6. Enable/disable the Locator LED feature (locate the flashlight in the dark)
7. Set the moon mode brightness from 1-7 (3 is recommended, but 2 may work, and 4-7 used to make it brighter)
8. Configure where Battery voltage level blinks - both on the Indicator LED and primary LED, or just the Indicator LED
9. Enable/disable the Indicator LED – disabled it if it's not wired up or to disable it's use completely
10. Enable/disable a power tail switch for switching modes with memory. An OTC (Off Time Cap) is not needed, but may not work with all hardware designs.

Summary of Normal Operations

- From OFF, a click goes to 1st mode, while a click&hold (~1/3 sec) goes to last mode
- When ON, a click goes to next mode, while a click&hold goes to the previous mode
- if paused in a mode (over 1.2 secs), the mode locks in and then a click will turn the light OFF
- If you are locked in a mode, a click&hold will still work to go to previous mode, and the lock-in cancels
- in any mode, including OFF, a long hold (over 1.1 sec) will turn the 1st Strobe ON
- When in Strobe, clicks without pausing will skip to the next special mode (strobe or beacon). The special mode navigation works just like normal modes: click&hold goes to the previous special mode, paused in a mode will lock it in

Low Voltage Protection

With the light ON, when the voltage falls below the threshold of 3.0v, it will blink three times, then drop the light down one mode. If the current mode is the lowest mode, the battery voltage has to fall below 2.7v for the light to be turned OFF. If the Indicator LED is enabled, it will blink three times as well every time the modes are dropped down, and will also blink twice every 8 seconds while the light is ON. Once the light is turned OFF after low voltage has been detected, the Indicator light will continue to blink twice every 8 seconds for 6 minutes after being turned OFF, then the light goes into power saver mode. The Indicator LED will be turned OFF if the battery voltage is below 3.0v prior to going into power saver mode. So with a

Battery Check

From OFF, do a click quickly followed by a click&hold and keep holding for 2.5 secs. This will engage Battery Check mode. The voltage reading of the cell will be blinked out continuously – 1 click will terminate the voltage reading. For example, a 3.7v reading will results in 3 blinks, short pause, then 7 blinks. This pattern will continue forever until a click terminates it.

Lock-Out Feature

Often a light will be carried in a pocket, bag or holster where the switch might be accidentally engaged. To avoid accidental activation, sometimes the tailcap can be loosened to break the battery connection. For lights that don't work that way, or another method preferred (avoid wear and tear on the threading), you can enter a special sequence to lock-out the light as follows:

- From OFF, 2 clicks in quick sequence followed quickly by a click&hold. The light will blink 4 quick times to acknowledge Lock-Out has been engaged, then the normal operation of the switch should be disabled. If you see strobe instead of the 4 quick blinks, you know lock-out did not get set (you probably were too slow).
- To restore normal operation, do the same Lock-Out sequence (2 clicks by a click&hold). The 4 quick blinks should appear to acknowledge the action.

Configuration UI Operation

The main Configuration UI settings is activated from OFF or ON by click& hold for at least 2.5 seconds. The light will display a strobe, but if you continue to hold, strobe will stop and the light will blink 2 times quickly, and once slowly to indicate the Configuration UI mode is active. There are 5 settings, listed in the table below. You can change or leave any of these settings – there's no need to set each one. Clicks choose the value for each setting, and each click will blink the light to acknowledge the click. If no clicks are entered in 4 seconds, the light jumps to the next configuration setting indicated by 2 quick blinks and slow quicks of the number for what setting it is (ex: 3 slow blinks means the 3rd setting). You can bypass the timeout by doing a click&hold to skip to the next setting. If you continue to hold it, it will exit configuration UI settings mode altogether, indicated by 4 quick blinks.

Configuration Settings

Setting #	Function	Clicks	Defaults
1	Choose Mode Set	1-12 (1-7 is # of modes) – see Mode Sets	4
2	Moon Mode	1=disable, 2=enable	2
3	Mode ordering	1= sets lo→hi, 2=sets hi→lo	1
4	Mode Memory	1=disable, 2=enable	1
5	Turbo Timeout	1=disable, 2=30 secs, 3=60 secs, 4=90 secs, 5=2 mins, 6=3 mins, 7=5 mins, 8=10 mins	1

Mode Sets

Mode Set Order	Mode Count	Mode Percentages	Notes
1	1	full only	(full is always max FET, no 7135)
2	2	10-full	max 7135, max FET
3	3	5-35-full	5=1/2 7135, 35=mixed
4	4	2-10-40-full	10=max 7135, 40=mixed
5	5	2-5-10-40-full	10=max 7135, 40=mixed
6	6	TK BLF A6 7 mode	6 well evenly spread
7	7	1-2.5-6-10-35-65-max	10=max 7135, 35=mixed
8	3	2-20-full	2=1/5 7135, 20=mixed
9	3	2-40-full	2=1/5 7135, 40=mixed
10	3	10-35-full	10=max 7135, 35=mixed
11	3	10-50-full	10=max 7135, 50=mixed
12	4	TK BLF A6 4 mode	4 well evenly spread

Advanced Configuration UI Operation

The Advanced Configuration UI settings is activated from Battery Check mode by doing a click& hold for at least 1.1 seconds. The battery voltage reading will be interrupted, then the light will blink 2 times quickly, and once slowly to indicate the Adv. Configuration UI mode is active. There are 5 settings summarized below.

Advanced Configuration Settings

Setting #	Function	Clicks	Defaults
1	Locator LED feature	1=disable, 2=enable	1
2	Set Moonlight Level	1 - 7 (PWM value)	3
4	Battery level Indicator LED Only	1=disable, 2=enable	1
3	Indicator LED Enable	1=disable, 2=enable	2
5	Power switch modes w/mem	1=disable, 2=enable	1