

# USER MANUAL

## Safety precautions

Use only reputable 18650 cells of known origin.

Remove and recharge cells when the low voltage indication is given by the (4 blinks and repeated step-downs in light level and eventual shutdown of the light).

The extraordinary energy density that 18650 cells offers also means that hazardous conditions are created when a cell is short-circuited or damaged. Always treat cells with respect and properly dispose of damaged cells.

The is a very high-intensity flashlight. Do not point the lamp directly at a person, animal, moving vehicles or flammable materials.

When running at higher output levels the head of the will quickly heat. This is normal. In warmer ambient conditions this temperature may exceed 60°C, so please take the necessary precautions when handling the .

## Quick start

Unscrew the tail-cap and insert a 18650 cell.

Double check the polarity every time before closing: The battery must point with plus (nipple) towards the head.

Screw the tail-cap back. The will flash twice when electrical contact is made. Continue to tighten the tail-cap to a gentle stop. Do not over-tighten.

All functions are performed using the single side button. Note that pressing this button continuously for more than 16 s enters the UI configuration settings (indicated by the light blinking). If this is done inadvertently, exit the configuration settings by simply releasing the button briefly then pressing it again continuously for about 4 s until all the resulting blinks stops.

- The comes factory-set to use the **RAMPING** UI: From **OFF**, press&hold the side button. The light output will ramp up from a very low level to full power. Release the button when the required light level is reached. (The full ramp takes about 3 s. To signal 'End of Ramp' it does a subtle blink ) Use a single-click at any time to turn the **OFF**. Please see below for further details.

There is a very small drain on the battery while **OFF**. This should not be of any concern, but we recommend removing the cell (or partially loosening the tail-cap) if the will not be used for several months.

The on budgetlightforum: <http://budgetlightforum.com/node/70873>.

**If you transport this light in a bag use at least the electronic lock-out! It will burn things on higher levels!**

## Default UI: Smooth ramping

This feature-rich UI provides for smooth ramping of the light output between 0 and 50%, with an easily-accessible 100% **TURBO** mode.

- Turn the FM1 ON:** single-click the button, turns **ON** using the previously used light output level
- Ramp light level:** press&hold button
- Reverse ramp:** while ramping in one direction, release button briefly and press&hold again
- Instant TURBO:** double-click
- Turn the Lamp OFF:** single-click
- MOON mode:** from **OFF**: press the button and release as soon as the turns on
- Strobes:** double-click for **TURBO**, and then double-click again

The strobes are deactivated by default. To enable strobes you must click 3 times in setting #4 (ramping) or setting #8 (modes). (Use single-clicks to cycle forward through the different types of strobes, but you have to be quick: If resting on a strobe longer than 1.2 s it locks in and the next single-click is **OFF**. Press&hold at any time to cycle backwards through the strobes.)

- Battery status:** triple-click (4 blinks, a short pause, then 1 blink would indicate 4.1 V average per cell, for example)
- Electronic lock-out:** four clicks to disable FM1, same to re-enable the Lamp
- MOMENTARY mode:** five clicks (loosen and re-tighten the tail-cap to return to normal operation)
- Factory reset:** triple-click (battery status mode), then double-click (driver temperature mode), double-click again (firmware version mode), then press&hold for about 2 s. Four blinks confirm a successful reset.

## Alternative UI: Mode-sets

The FM1 is factory-set to operate using the contemporary **RAMPING** user interface, as described in the previous section. However, the FM1 can also be operated using a more conventional **MODE-SET** style user interface. (See next section for detail on how to set UI options).

Using the **MODE-SET** UI the output does not ramp, it steps from one mode to the next using single-clicks.

- Turn the FM1 ON:** single-click
- Next mode:** single-click before the current mode 'locks in' (1.2 s)
- Previous mode:** press&hold
- Last mode [100%]:** from **OFF**: press&hold
- Turn the Lamp OFF:** single-click button, after resting on a mode more than 1.2 s (mode locked in)
- Strobes:** press&hold

The strobes are deactivated by default. To enable strobes you must click 3 times in setting #4 (ramping) or setting #8 (modes). (Use single-clicks to cycle forward through the different types of strobes, but you have to be quick: If resting on a strobe longer than 1.2 s it locks in and the next single-click is **OFF**. Press&hold at any time to cycle backwards through the strobes.)

- Battery status:** from **OFF**: single-click followed by press&hold (4 blinks, a short pause, then 1 blink would indicate 4.1 V average per cell, for example)
- Electronic lock-out:** from **OFF**: double-click followed by press&hold, same to re-enable the FM1
- Factory reset:** from **OFF**, single-click followed by a press&hold (battery status mode), then double-click (driver temperature mode), double-click again (firmware version mode), then press&hold for about 2 s. Four blinks confirm a successful reset.

## Advanced operation

By default the FM1 is set to suit most users and applications, but several settings are user-configurable. To enter the configuration settings, press&hold the button for about 16 s (3 s if in the MODE-SET UI), do not release until a double flash followed by a single blink is seen. The single blink is the prompt for the first setting. Click the button as many times as required for that setting, or leave the setting alone and simply wait for the next double flash, this time followed by two blinks, indicating that we are now at setting #2, etc.

The FM1 confirms each click with a blink. A press&hold skips to the next setting. A continuous press exits the setup menu completely. Four blinks indicate that the setup is completed.

The available settings differ, depending if the FM1 is currently set to the RAMPING UI or the MODE-SET UI. Note that changing setting 1 flips to the other UI and immediately kicks you into the table for that UI:

RAMPING user interface settings		
Setting	Function	Clicks
1	User interface	1: MODE-SET 2: RAMPING [default]
2	MOON level	1-7 [default 3]
3	Auto step-down	1: Disable 2: Temperature [default]** 3: Timed, requires another 1-6 clicks for 60s, 90s, 2m, 3m, 5m, 7m respectively
4	Strobes	1: Disable [default] 2: Strobe 1 only 3: All strobes

MODE-SET user interface settings		
Setting	Function	Clicks
1	User interface	1: MODE-SET 2: RAMPING [default]
2	Mode-set	1-12 [default 4]
3	Moon mode	1: Disable 2: Enable [default]
4	Mode order	1: Low to high [default] 2: High to low
5	Mode memory	1: Disable [default] 2: Enable
6	MOON level	1-7 [default 3]
7	Auto step-down	1: Disable 2: Temperature [default]** 3: Timed, requires another 1-6 clicks for 60s, 90s, 2m, 3m, 5m, 7m respectively
8	Strobes	1: Disable [default] 2: Strobe 1 only 3: All strobes

\*\* If [temperature] is selected for auto step-down, the FM1 goes to 100% output. Leave the lamp to heat to the desired limit, and then click to set that temperature as the trip point (this can take a minute, use fresh cells for this). Or click within 5 s to keep previous setting.

The mode-sets have been selected to suit a high-power thrower like the FM1:

Mode-set no.	Modes [% of light]						
	1	2	3	4	5	6	7
1	100						
2	7	100					
3	3	36	100				
4	0.7	7	38	100	[default]		
5	0.7	3	7	38	100		
6	0.5	3	9	29	60	100	
7	0.6	1.6	4	7	34	61	100
8	7	21	50				
9	0.7	17	100				
10	0.7	38	100				
11	7	34	100				
12	0.5	6	42	100			

Note that **MOON** mode is enabled by default, adding one extra mode (mode 0) to the above.

Pre-programmed strobes (disabled by default):

Strobe	Type
1	16 Hz
2	Police strobe (dual frequency)
3	Biking (low light with hi-vis stutter)
4	2 s beacon
5	10 s beacon

The FM1 has no button led, just ignore the following table.

Additional UI settings are available to control the button back-light. While in the battery check mode, press&hold the button. A double flash followed by a single blink is again the prompt for the first setting:

Advanced UI settings (FM1 only after hardware change)		
Setting	Function	Clicks
1	Button LED on while FM1 OFF	1: Disable 2: Enable [default]
2	Battery level blinks on button LED only	1: Disable [default] 2: Enable
3	Button LED	1: Disable 2: Enable [default]

## Specifications

<b>Emitter:</b>	Luminus SST-20 4000K CRI95 Samsung LH351D 5000K CRI90 Cree XP-L HI 1A 6500K CRI70
<b>Flux:</b>	>4980 lumen
<b>Range:</b>	184 meters
<b>Firmware:</b>	Tom E's open-source GPL NarsilM v1.3 adapted by Texas_Ace
<b>User interface:</b>	[1] By default the FM1 is set to use the very intuitive Narsil smooth <b>RAMPING</b> UI. Instant access to a 2.5 A <b>TURBO</b> mode is also provided.  [2] A more conventional discrete level <b>MODE-SET</b> UI is available as an alternative. Any one of 12 pre-defined mode-sets can be selected.  [3] <b>MOMENTARY</b> mode is useful for signaling purposes or rapidly/briefly lighting up targets.
<b>Battery:</b>	One 18650 cell. High drain powerful cells are recommended. Cells are not included.
<b>Driver:</b>	Texas Avenger FET Driver
<b>Optic:</b>	quad optic
<b>Lens:</b>	Glass with anti-reflective coating
<b>Body:</b>	Aluminum with Type III hard-coat anodizing
<b>Button:</b>	Electronic tail switch
<b>Ingress rating:</b>	Equivalent to IPX7, do not immerse in liquids
<b>Impact resistance:</b>	Up to 2 meters
<b>Weight:</b>	Approximately 95g without cells
<b>Dimensions:</b>	110mm*30mm*27.6mm



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