



**clearwater**  
**LIGHTS™**



## Operation Manual

**Billie Brake Light**

*Dimmable*

*Patent Pending*



Made in USA

# Summary of CANopener Features & Operation

## Step 1: Mounting & Wiring The Billie Brake Light

Congratulations on the purchase of this revolutionary Billie brake light. This is a high output brake-tail light that is computer controlled by the Clearwater CANopener. This brake light is intended for use on specific BMW motorcycles that use the CANbus control system.

This brake light installs in place of your license plate frame (our apologies to your dealer for robbing his valuable advertising space). The Billie brake light and frame are CNC machined from billet aluminum and are very solid. The aluminum frame not only helps mount your license plate, but also serves as a heat sink for the powerful RED LED emitters.

Installation is simple. Just feed the small black cable up through your bike's rear fender section and up to the area under your rear seat. Then, secure your license plate to the Billie frame with the included bolts. Use the included bolt spacers if there is any chance for the grommet to become kinked against the rear fender.

Now, connect the RED wire from the Billie to the RED wire coming out the back of the CANopener. Finally, connect the BLACK wire from the Billie to the BLACK wire coming out of the back of the CANopener. Ignore the yellow wire on a BMW installation.

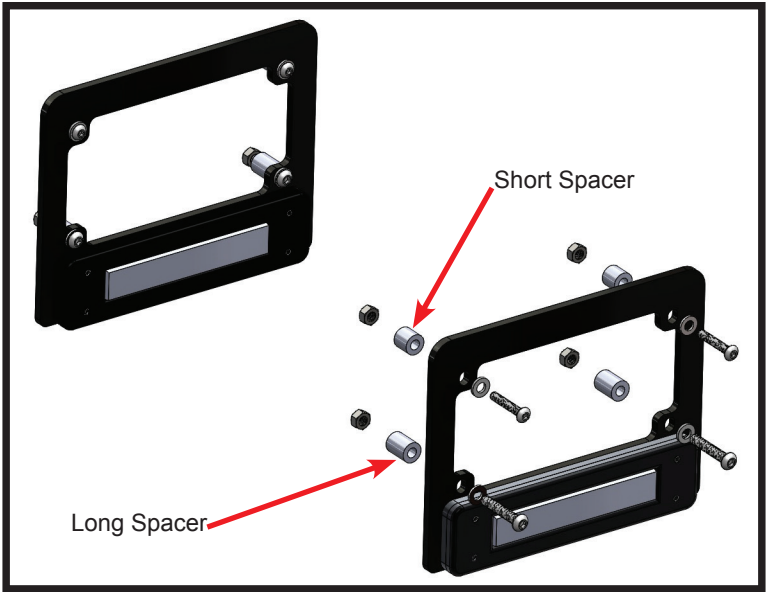
Check routing of wires and tuck the CANopener back in place.

**Note: The bike must be running for the brake light to function.**

## Billie Brake Light Features

- Automatic brake light activation with variable flash rates.
- Adjustable tail light and brake light intensity for daytime.
- Adjustable tail light and brake light intensity for nighttime.
- 4 brake light flashing programs
- Speed sensitive activation

# Mounting Diagram



TSC = Turn Signal Cancel

WW = WonderWheel (BMW multifunction controller)

TPM = Tire Pressure Monitor

FTP = Flash To Pass

Function	Command	Modes
Clearwater Brake Light Dimmer	To enter the dimmer program, you must first hold the front brake, next press and release the TSC button before holding the WW to the right until the light flashes twice to indicate you've entered the dimming mode.	Rotate WonderWheel to select 10 brightness levels (10% to 100%)  • To adjust brightness on the tail light - release the brake after entering dimming mode, then rotate the WW.  • To adjust brightness on brake light- hold the brake while rotate the WW.
Clearwater Brake Light	While stationary, press and release the TSC button then press and release the front brake lever 5 times within 5 seconds to cycle through Modes 1 - 4.  Example: Brake light begins in Mode 2, running through the mode changing procedure brings you to Mode 3. Running through the mode changing procedure again will bring you to Mode 4	Mode 1 – off Mode 2 – functions identically to BMW brake light ( <b>default</b> ) Mode 3 – California legal strobe on brake activation (4Hz flash) Mode 4 – speed sensitive (flashes faster and brighter with harder braking)  Note: Modes 3 & 4 will only activate when speed is above 5 mph.

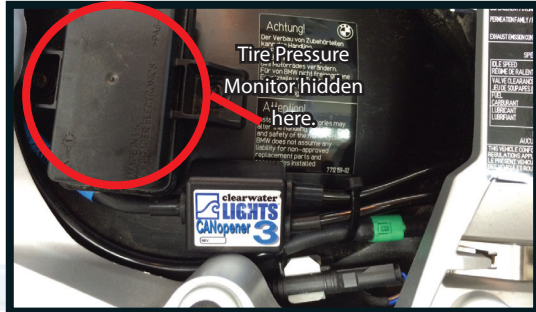
Default Brightness Levels	Tail	Brake
Day	20%	70%
Night	10%	60%

# CANopener Mounting Location

## CANopener Mounting Location:

The following pictures list CANopener mounting locations on various bikes.

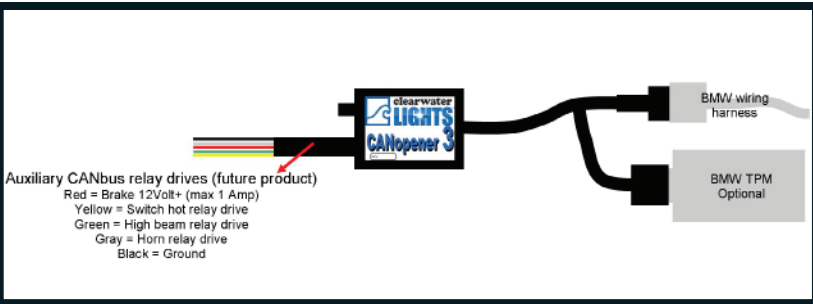
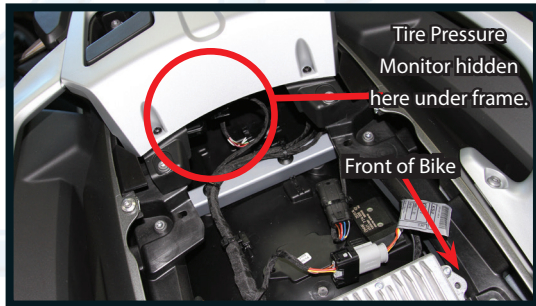
CANopener location on an R1200GSW.



CANopener location on a K1600GT.



CANopener location on an R1200RTW.



# Clearwater Billie Brake Light Features & Operations

## How To Adjust Brake Light Intensity:

1. To enter the dimmer program, you must first hold the front brake lever. Next, press and release the Turn Signal Cancel (TSC) switch once before holding the WW to the right for (2) seconds. The light will flash twice, indicating you've entered the dimming mode. The brightness on the brake is adjusted by continuing to hold down the front brake lever while rotating the WW. The brightness on the tail light is adjusted by releasing the front brake lever before rotating the WW.
2. Wait 3 seconds with no adjustments or press the TSC again to end the programming mode. A single flash indicates end of programming mode.

**Note:** There are two settings for brake and running light levels: day and night. The ambient light sensor in the instrument cluster determines the level the light is set to during night or day. The daytime levels can be adjusted by shining a flashlight at the instrument cluster. Conversely, the instrument cluster can be covered up to adjust the nighttime levels.

## How To Adjust Brake Light Modes:

While stationary, press and release the TSC, then press and release the front brake lever 5 times within 5 seconds to cycle through Modes 1 - 4. When cycling to a new mode, the brake light will flash a number of times equal to the mode it is now in.

Mode 1 – No brake light.

Mode 2 – Standard brake light; functions identically to BMW brake light (default on Version 1.7 and later).

Mode 3 – California compliant brake mode; 4 flashes at 4 flashes/second when front/rear brakes applied followed by constant on. Disabled below 5mph.

Mode 4 – Active brake light; flash rate depends on deceleration rate. Disabled below 5mph.

## Stationary Brake Flash (CANopener Version 1.82+):

The brake will not flash in modes 3 or 4 if the speed of the bike drops below 5mph. This is to avoid the nuisance of flashing in heavy, stop-and-go traffic. If flashing is still needed while the bike is stationary, a 4-flash burst can be generated by pulling on the brake lever twice. If the user is holding onto the front brake lever, releasing and holding the brake lever again will activate 4 flashes.

# Clearwater Billie Brake Light Features & Operations

## Automatic Brightness (CANopener Version 1.82+):

In Brake Modes 3 and 4 (the two brake flashing modes), the brightness of the brake light is automatically controlled by the rate of deceleration. Light braking always results in a minimum of 25% of the difference between the brake and tail brightness levels. This will increase to the full programmed brake brightness at a deceleration rate of 0.4G is reached.

For very vigorous braking, the intensity can even exceed the maximum programmed value (see previous programming discussion) for braking above 0.4G, limited only by the maximum brightness of the brake light. As the bike comes to a stop (below a speed of 5mph), the brake light returns to the programmed braking brightness as long as the brake lever (or pedal) is held.

For example, if the tail level is set to 20%, and the brake level is set to 60%, the difference between the two levels is 40. 25% of 40 is 10, so at bare minimum, the brake light brightness will increase to 10% above the tail light level, i.e 30%.

As the deceleration increases, however, the brake light will increase, reaching the full programmed brightness of 60% at 0.4G of braking. However, under very heavy braking in an emergency situation, the brake can reach the full 100% brightness that it is capable of at 1.0G (highest typical braking rate based on tire traction), regardless of the maximum programmed level.

## Inertial Braking (CANopener Version 1.82+):

When the CANopener is switched to California legal strobe mode (mode 3) or speed sensitive mode (mode 4), the brake light automatically engages when the deceleration of the bike reaches a threshold value, even when the brakes are not engaged (engine braking).

Once the CANopener is in mode 3 or 4, there are 3 subcategory modes that can additionally be changed (see chart on Pg. 8). To switch between these modes, while stationary, press and release the TSC button, then press and release the rear foot brake lever 5 consecutive times (front brake released). Each mode will be signaled by a corresponding number of flashes by the brake light as well as by any other clearwater lights you may have installed.

- Inertial Brake Mode 1a: Inertial braking disabled. The front and/or back brake lever must be engaged for the brake light to activate.

-Inertial Brake Mode 2a: Low sensitivity mode. The brake light will activate when the engine braking level reaches 0.4G.

# Clearwater Billie Brake Light Features & Operations

## Inertial Braking Mode (CANopener Version 1.82+):

-Inertial Brake Mode 3a (Default Mode): High sensitivity mode. The brake light will activate when the engine braking level reaches 0.2G. This will make the activation of the brake light during engine braking happen more frequently, under less deceleration.

Inertial braking is disabled during standard brake light mode (Brake Mode 2) but works equally well using the California 4-flash (Brake Mode 3) or variable flashing (Brake Mode 4) modes. In either of these modes, the brake light will appear just as if the rider had engaged the brake, including the programmed flashing and automatic brightness control.

Adding mechanical braking at some point during the engine braking process provides seamless, uninterrupted action of the brake light.

## Factory Reset Default:

To reset the CANopener to the factory settings, press and release the TSC button, hold the turn signal to the left, then press and release the flash-to-pass button 6 times within 6 seconds. Release left turn signal. All factory preset dimmer levels and modes will be selected.

A successful reset is indicated by five flashes of the Clearwater lights.

## Billie Indicator Light:

Included with the Billie Brake Light Kit is an optional feature that allows the user to conveniently monitor what the Billie Brake Light is doing while on the bike. The Indicator light is very simple to install. Fasten the LED to an area that can be easily seen when riding, then route wiring to the back of the bike near the CANopener. Next, the red and black wires from the Indicator light will be Posi-Locked to the CANopener red and black wires, along with the red and black wires from the Billie Brake Light. The image below shows our recommended mounting location.





### Brake Mode Chart

To toggle between brake modes 1-4, press and release the TSC button, then press and release the front brake lever 5 times with 5 seconds. After this procedure, brake light will flash a number of times indicating what mode it is in.

**Mode 1:** Clearwater brake light is disabled.

**Mode 2:** Clearwater brake light functions identically to BMW brake light.

**Mode 3:** Clearwater brake light gives a 4Hz flash, otherwise know as a California legal strobe. Flashing will also get brighter as the bike is decelerating.

**Mode 4:** Clearwater brake light changes rate of flashing depending on how fast bike is decelerating. Flashing will also get brighter as the bike is decelerating.

To toggle between inertial braking modes 1a-3a, press and release the TSC button, then press and release the front brake lever 5 times within 5 seconds.

**Inertial Braking Modes:**  
**Mode 1a:** Inertial braking is disabled.  
**Mode 2a:** Low sensitivity mode. Brake flashing will activate at .4G.  
**Mode 3a:** High sensitivity mode. Brake flashing will activate at .2G.

Notes:



Notes:



Thank you for purchasing your **Clearwater Lights**. We hope this product will help make you a safer rider. Please feel free to send us comments or suggestions at any time. We learn from you. Visit our website for more exciting products to help you see better at night.

Ride safe!

Sincerely,

*Glenn and the team at Clearwater.*



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