



Vizable Technologies

# SupaBrake-II Tail Light Modulator

## User Guide

## Firmware History:

11/03/12: [v2.0] Ported over firmware 1.5 from Supabrake-I. First working prototype.

11/15/12: [v2.1] Fine tune variables and fixed bugs. Released to production.

05/06/13: [v2.1d] Extend profile activation time from 6 seconds to 30 seconds. Done to limit the chance of rider accidentally invoking a profile select mode upon initial power up.

10/15/13: [v2.1e] CANBus edits.

02/12/15: [v3.4a] Ported over from v2.1e to new chipset and new PCB.

## Mechanical Dimensions:

Unit body:

H = 8mm (0.315 inches)

L = 24mm (0.945 inches)

W = 35mm (1.378 inches)

Wire length:

200mm +/-10mm (8 inches +/-0.4) \*Exclude connectors

## Electrical Dimensions:

Wire gauge = 18AWG

Red or Orange = Input brake signal

Yellow = Running light also known as "+12V"

Black = Ground

White = Modulated output

Input Voltage = 9VDC to 15VDC

Constant load current = 8.75 Amps

Quiescent current = 0.001 Amps

Operating Temperature = -40C to +80C

Storage Temperature = -40C to +95C

## Installation:

Plug & Ride version - Very simple

1. Before removing or opening your motorcycle please verify your brake light(s) are functioning.
2. Locate the stock connector that interfaces the main wire harness to the tail light. Most of the time you will find this under the seat or one of the side panels. Open this connector and plug the SupaBrake-II in series. Replace the seat or side panel and you're done!

Other installation examples can be downloaded at [www.vizi-tec.com](http://www.vizi-tec.com). You may not find one specific to your motorcycle. Reason being that we stopped making model specific installation as these are very simple; Read one and you've read them all.

Universal version – A little bit more complex

1. Before removing or opening your motorcycle please verify your brake light(s) are functioning.
2. See above wire color scheme. Use included Posi-Locks connector to quick secure interface.

## 10 Year Limited Warranty!

We take pride in our products. As such we stand 100% behind our design, workmanship and most importantly customer satisfaction. We offer a full 10 year limited warranty.

## Smart Algorithm:

(Standard)

(Usage = Automatic)

Upon applying the brake(s), the unit will send a burst of pulses to the vehicle's brake light(s). The duration of the burst is a function of the time elapsed between the current braking cycle and the previous brake cycle. After this initial burst, the unit allows the brake light(s) to function normally (solid brake light). This algorithm is designed to eliminate target fixation as found in cheaper, passive products that continuously "blink" the brake light(s) even though the vehicle is at a complete stop. A time domain chart can be viewed on our web site. The duration of the burst varies based on the profile selected. See profile matrix for more details on page 3.

## Easy Plug and Ride:

(Standard)

We have been making these for a long time and offer a wide selection for many popular motorcycles. Chances are we have a kit for your bike. If you don't see one for your bike. Contact us at [email@vizi-tec.com](mailto:email@vizi-tec.com) and we'll work with you to make a custom kit. No need to cut, splice your bike's harness. Just unplug the stock connector that interfaces the tail light to the main harness. Plug the SupaBrake-2 in series. Done!

## +10 Profiles:

(Standard)

(Usage = Manual)

User can select from over 9 profiles on the fly! No need to unplug the unit from the bike. Nor is there a need to plug in a USB cable or any external hardware. All this is done via the motorcycle's brakes. See page 6 on how to go into the Profile Select Mode to change the profile. Clean and simple.

## Grace Period:

(Standard)

(Usage = Automatic)

The Supabrake will not activate if brake(s) are applied more than once within a certain time period. This is very useful in heavy traffic so as not to annoy the person in the vehicle following behind. Grace Period varies based on the profile selected. See profile matrix for more details on page 3.

## Input de-bounce:

(Standard)

(Usage = Automatic)

The rider can quickly "tap" the brake lever or pedal without the algorithm inducing its flash routine. In an event of a "tap", the brake light will function normally and will appear as an ordinary tap of the brakes. Another aspect to this feature is that it allows the user to initiate a quick speed check on the rear brakes before a full application of the front brakes. In this case the algorithm will trigger a burst after full brake application.

## **Force-Flash Retrigger:**

**(Standard)**

**(Usage = Manual)**

This standard function offers the ability to automatically induce a burst of flashes. It is useful when stopped at an intersection to warn a fast approaching vehicle on your six.

### **Instructions:**

1. Under normal riding condition if the brakes have been depressed for longer than 3.5 seconds.
2. Quickly release and reapply the brakes within 500mS. (half second).
3. The SupaBrake will output a burst of flashes.

## **Decaying Flash Routine:**

**(Standard)**

**(Usage = Automatic)**

The burst of pulses is such that the period of the first pulse is slightly shorter than the subsequent pulse and so on. This means that the initial pulses will be faster whereas the later pulses towards the end of the burst will be slower. When viewed at speed and following from behind, the illusion of decreasing speed is enhanced.

## Profile Select:

**(Usage = Manual)** (Available on the SupaBrake-II platform only)

This option allows the rider to choose 1 of 10 pre-defined plus an optional 11th profile to be stored into flash memory. This determines the profile that will be automatically loaded into the microcontroller in the future.

The SupaBrake-II product allows for a selection of 3 frequencies and 3 algorithms; Thus creating a 3x3 combinational matrix.

### Frequencies definitions:

<u>“Hi”</u> 12.5 Hz	<u>“Mid”</u> 7.4 Hz	<u>“Low”</u> 4.0 Hz
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### Algorithm definitions:

<u>“Aggressive”</u> 00-06 seconds = 0 pulses 06-12 seconds = 3 pulses 12-20 seconds = 4 pulses 20-30 seconds = 5 pulses 30-42 seconds = 6 pulses 42-60 seconds = 7 pulses 60+ seconds = 8 pulses	<u>“Standard”</u> 00-12 seconds = 0 pulses 12-18 seconds = 2 pulses 18-28 seconds = 3 pulses 28-42 seconds = 4 pulses 42-60 seconds = 5 pulses 60-80 seconds = 6 pulses 80+ seconds = 7 pulses	<u>“Relaxed”</u> 00-24 seconds = 0 pulses 24-36 seconds = 1 pulses 36-52 seconds = 2 pulses 52-70 seconds = 3 pulses 70-90 seconds = 4 pulses 90-120 seconds = 5 pulses 120+ seconds = 6 pulses
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### Combinational profile matrix: (profile#1 not shown/applicable)

<u>Profile #2</u> Algorithm = Aggressive Frequency = High	<u>Profile #3</u> Algorithm = Standard Frequency = High	<u>Profile #4</u> Algorithm = Relaxed Frequency = High
<u>Profile #5</u> Algorithm = Aggressive Frequency = Mid	<u>* Profile #6</u> Algorithm = Standard Frequency = Mid	<u>Profile #7</u> Algorithm = Relaxed Frequency = Mid
<u>Profile #8</u> Algorithm = Aggressive Frequency = Low	<u>Profile #9</u> Algorithm = Standard Frequency = Low	<u>Profile #10</u> Algorithm = Relaxed Frequency = Low

### Profile #1

**Defeat Mode** or what we call stock mode.

This feature allows the rider to quickly defeat all the functions of the SupaBrake-II without having to physically remove the Supabrake-II device from the motorcycle. When this profile feature is selected, the functionality of your brake light system will revert to stock condition. This is like un-installing the device from your motorcycle. Great for MOT/DMV test.

### Profile #2

The algorithm is loaded with an aggressive matrix and the modulation frequency is made fast for riders who want a faster modulation rate and more individual pulses sooner. Great for LED tail lights and riding in heavy traffic. Poor for bulb tail lights as they react slower from such fast pulses. Not recommended for highway driving.

### Profile #3

The constants are relaxed to what we call a standard algorithm matrix; less modulation than Profile#2. The blink rate is kept fast. LEDs=Great. Bulbs=Poor. This profile is ideal for riders who travel mostly in low traffic and highway conditions - but prefer a faster blink rate.

### Profile #4

Algorithm is loosened even more to the point of having a grace period of 24 seconds. The blink rate is kept fast again. LEDs=Great. Bulbs=Poor. Ideal for emergency vehicles who want that initial "pop" to catch driver's attention but not become a distraction factor in slow stop-and-go traffic.

### Profile #5

Algorithm is aggressive but the modulation rate is tuned down some to what we call a medium frequency. LEDs=Great. Bulbs=Good/Fair. Similar to Profile#2 but a less rapid modulation rate.

### \*Profile #6

This is our *standard* normal profile and what we have shipped since 2006 on our Supabrake 1<sup>st</sup> gen! This is what the SB-I and SB-II are set to from factory. It is a good all-around profile. The algorithm is such that it does not come on too strong but still enough to get attention. LEDs=Great. Bulbs=Good/Fair. \*Factory default.

### Profile #7

The profile modulates at same speed as Profile #5 and #6 but exhibits a relaxed algorithm.

### Profile #8

For riders who are still using the old fashion bulbs but want an aggressive algorithm. Note the frequency on Profile#8-#.

### Profile #9

Great for bikes with stock bulbs. Good for everyday riding, longer road trips or quick city trips.

### Profile #10

Very relaxed profile. Great for bikes with stock bulbs and in stop-and-go-traffic. Highway riding.

To select a different profile, follow instructions below.

**Caution:**

Testing and saving of the different profiles can cause the battery to discharge. Consider running the engine while doing such tests and or profile sections.

**Instruction routine:**

1. While the motorcycle is turned OFF. Press and continue to hold the front or rear brake lever/pedal.
2. Turn ON the electrical system of the motorcycle so that the tail light is on.
3. Continue to depress and hold the brake for a minimum period of **30 seconds**. (Do not release the brakes just yet)
4. After the **30 seconds** the brake light(s) will flash once followed by a slight pause. It will then flash twice and again followed by another slight pause. It will do this up to a total of 10 (or 11 flashes depending on options available in your SupaBrake unit) followed by a slight pause and loop back again to repeat the whole cycle starting from 1.
5. To select profile# "X". Release the brake lever/pedal after "X" flash(es) during the slight pause period. Where "X" denotes the profile number.

**Example:**

To select Profile #3

- Follow above steps 1 to 4.
- Wait until the brake light(s) flashes 3 times and release the brake pedal/lever. Your unit is now programmed to default to profile #3 upon every power up cycle. It will retain your newly selected profile indefinitely.
- Apply the brakes once again. This will result in a *feedback verification* burst to indicate what profile was selected. This is done once for each *Profile Select* routine.
- The algorithm is now active and cleared to time = zero! Based on profile selected, applying the brake pedal/lever thereafter may or may not modulate the tail light. (See above algorithm for more information). This is how the SupaBrake-II device will power up in the future. Don't expect it to modulate unless the appropriate time has elapsed.

***What is a profile select feedback verification?***

A user verification burst is implemented to acknowledge to the rider the profile number that was written to memory. It is done only ONCE per each successful *profile select* routine. By observing and counting the number of pulse(s) in this slow burst. The number counted corresponds to the profile number. The verification burst is done with a 1.5 Hz burst so that the human eye can see and count the individual pulses. Tapping the brakes or releasing the brakes midway thru the verification burst will stop and clear it. All subsequent bursts, regardless of present or future power up cycle, will be based on the profile (algorithm and frequency) selected. Meaning this verification feedback happens only once with each new profile is selected.

## Custom Algorithm: (Profile #11)

**(Optional)** Available only at [www.vizi-tec.com](http://www.vizi-tec.com). Not available on eBay sales. Visit us online for more details and selection at [www.vizi-tec.com](http://www.vizi-tec.com)

**As of 2016 this extra option is no longer offered. Visit us at [www.vizi-tec.com](http://www.vizi-tec.com) for other solutions with custom profiles or look at our new SB-3 product with its >100K profiles.**

### (Usage = Manual)

We will create a custom 11<sup>th</sup> profile per your specification and upload it into your SupaBrake.

Please contact us or just select the “Eleventh Profile” option during your order. You will be prompted to upload the constants then.

Or you may email us the details at [sales@vizi-tec.com](mailto:sales@vizi-tec.com)

### “Custom”

0 - \_\_ seconds = \_\_ pulses

- \_\_ seconds = \_\_ pulses

- \_\_ seconds = \_\_ pulses

- \_\_ seconds = \_\_ pulses

- \_\_ seconds = \_\_ pulses

- \_\_ seconds = \_\_ pulses

\_\_ seconds = \_\_ pulses

Hz = \_\_\_\_

### Instructions:

Copy and paste the above “custom” matrix into a .TXT file preferably. Fill in the blank spaces with integers representing time in seconds, the number of pulses associated for each time window and the initial frequency to the nearest tenth unit (0.1Hz – 40.0Hz) for your custom algorithm.



**FAQ:**

*The SB-2 is somewhat complex. It has many functions and features. But very easy to use once understood. It is strongly recommended that you read this manual before installation and/or ordering. Installation is very simple. Designed to be fully Plug and Play. You do not need to visit your local dealership to install the unit on your motorcycle. VIZI-TEC LLC cannot and will not be responsible for charges incurred if installed at dealership.*

- **Why isn't the SB-2 modulating?**

Firstly you must remember that the SB-2 has an algorithm (with grace period). The number for blinks (modulation) and frequency will be determined by the profile selected. This means *IT WILL NOT FLASH EACH AND EVERY TIME* you pull the brakes. For more details on the profiles see page 5.

Or it could mean Profile#1 Defeat Mode is selected.). See page 5 for details.

**Troubleshoot:**

- 1) Turn on the bike power. No need to fire up the engine. (Let's assume Profile#6 is selected)
  - a) Do not touch any brakes.
- 2) Wait about 15 seconds.
- 3) Press and hold the brakes. The longer you don't use your brakes the more it will flash the next time you use it.

If you don't see modulation check to make sure that a profile between 2-10 was selected. See page 6 for more details.

- **I don't see a kit for my motorcycle? How do I have one made?**

Send us an email at [email@vizi-tec.com](mailto:email@vizi-tec.com) and let us know the year/model of your bike. We'll work with you to make a custom kit for half the price.

- **Completely lost?**

Send us an email at [email@vizi-tec.com](mailto:email@vizi-tec.com)