

Thor– A Programmable Brake Light Modulator

By Lakeside Electronics, LLC

LakesideElectronics.net

Warnings and Cautions

Please read and understand the following section before continuing. There are several important points to note.

- Please check your local laws regarding the installation of your Thor Programmable Brake Light Modulator before installation on any vehicle that will be operated on public roadways.
- The Thor Programmable Brake Light Modulator is intended to be installed only in 12 Volt DC, negative ground systems equipped with fuse protected wiring. Only use the diagram attached for installation.
- As with any electrical system, failure can occur. Always check your Thor Programmable Brake Light Modulator for correct operation before operating your vehicle.
- Only carry out the programming procedure with your engine OFF.
- Do not exceed the electrical specifications

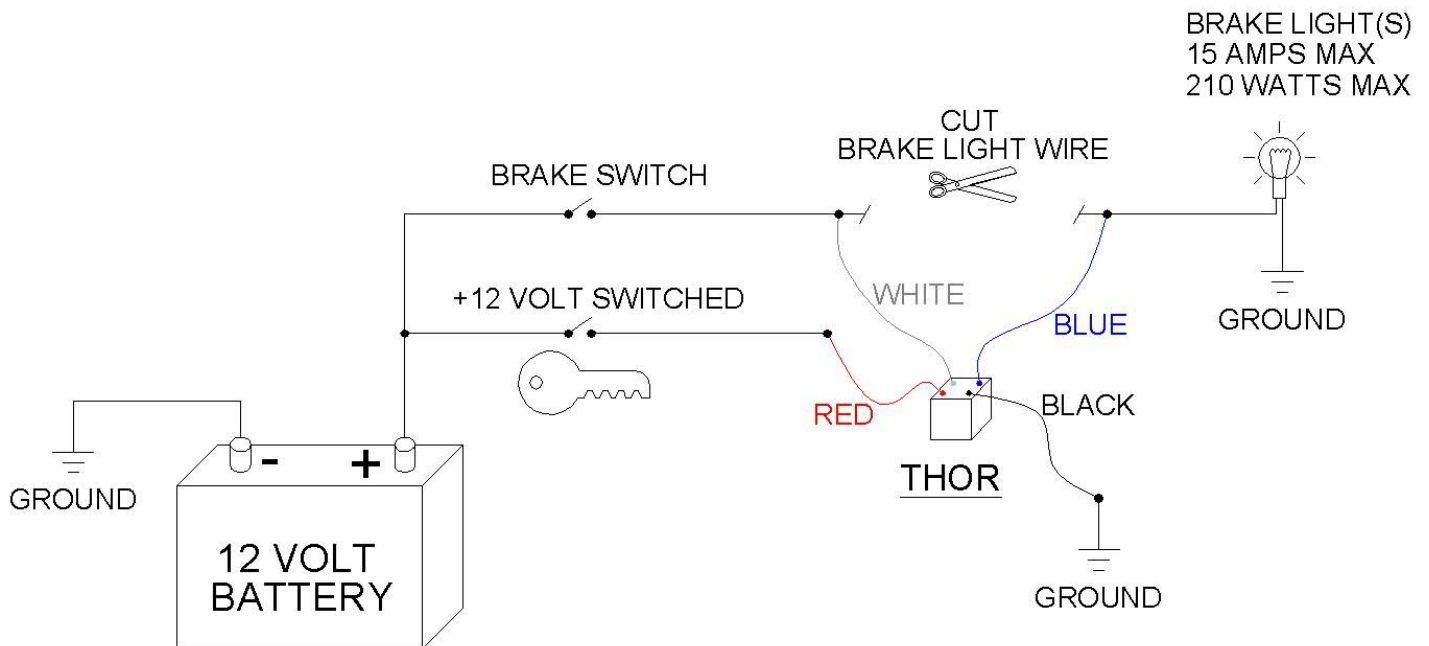
Electrical Specifications

- Maximum Current: 15 Amps
- Maximum Power: 210 Watts (Total Brake Light Wattage)
- Supply voltage: 10-16 Volts DC

Recommended tools

- Voltmeter or “ Automotive Circuit Tester “ for locating the correct wires to splice.
- Wire cutters for cutting the brake light wire in your vehicle
- Pliers for crimping the included 3M ScotchLock Tap Connectors
- Electrical Tape

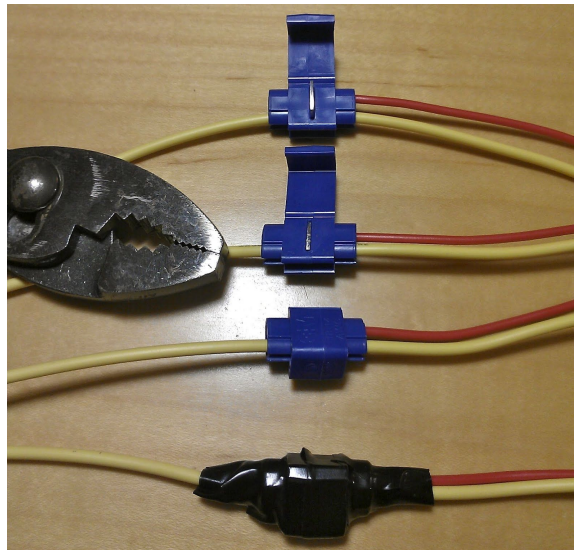
Installing your Brake Light Modulator



(fig. 1)

1. Position your vehicle in a safe location to begin work and turn the ignition key to the OFF position.

2. Locate the wires for your vehicle and make a note. You will need to find the following wires:
 - a. +12 V Switched wire. This wire should read + 12 volts when the ignition key is in the “ Run “ or “ On “ position and 0 volts when the ignition key is in the OFF position. This wire will need to supply a very small current of 20mA (0.02 Amps) Max.
 - b. Ground wire. This can be an actual ground wire attached to the system negative or a good chassis ground point.
 - c. Brake Wire. This wire will read + 12 volts when your ignition key is ON and you press your brake lever and it will read 0 volts when you release the brake.
3. Choose a location to install Thor where it will be protected from direct water spray, excessive heat and physical damage.
4. Cut the brake light wire as shown in (**fig. 1**)
5. Using the wiring diagram (**fig. 1**) connect Thor to the appropriate wires you located during Step 2. Make the connections using the included ScotchLok tap connectors. See (**Photo 1**) for a step by step on how to use these connectors.
 - a. Insert the wires you want to splice.
 - b. Crimp and then verify connection by tugging lightly on the cables.
 - c. Fold over and click the plastic tab.
 - d. Wrap with electrical tape to seal out moisture.



(Photo 1)

6. Using the included Zip-Ties, fasten Thor in a location away from direct water spray, excessive heat and so that the wires are not being pulled tight.
7. (Optional) Select a new flash pattern using the instructions in the section “How-To Program Thor - A Programmable Brake Light Modulator“.

How-To Program Thor - A Programmable Brake Light Modulator

Selecting a Predefined Flash Pattern

There are 19 unique flash patterns permanently installed in your Thor Programmable Brake Light Modulator. By following the instructions below, you will learn how to enter “ Flash Pattern Selection Mode “ and set your default flash pattern. You can only select one pattern at a time, but you can set a new pattern in the Thor Programmable Brake Light Modulator many times over.

* Please read the section titled “ Flash Pattern Descriptions “ for suggestions on which pattern to select before continuing.

After installing the Thor Programmable Brake Light Modulator you will notice it is set to operate with the default flash pattern. If you wish to change the flash pattern perform the following actions.

1. With your engine stopped, turn your ignition key to the ON position to provide power to Thor.
2. Within 10 seconds of turning your ignition key to the ON position, tap your brake lever a minimum of 10 times. You may notice your brake light stop responding briefly if you tap your brakes more than ten times in ten seconds, this is to be expected.
3. You are now in “ Flash Pattern Selection Mode “. You can turn your key off at this point and no changes will be saved.

4. While in Flash Pattern Selection Mode, each time you press and hold the brake lever a demonstration of the current pattern will be displayed starting with pattern #1. During this demonstration, all of the patterns repeat so that you can better make your selection, however during normal operation, not all patterns repeat. For more information on which patterns repeat during normal use and which do not, please check the section " Flash Pattern Descriptions ".
5. To cycle to the next pattern in order, release and re-apply the brake. Thor will then display the next pattern while you hold the brake. If you reach pattern 20 and cycle thru, Thor will wrap around to the beginning with pattern #1 again.
6. If you like the currently displayed pattern and want to save it, keep holding the brake. The flash pattern will be demonstrated three times, then Thor automatically saves and exits to resume normal brake light operation. Upon exit Thor will recognize if you have your brake pressed and display the saved pattern.
7. Go ahead and hit your brakes, you should see your new flash pattern displayed. You can key OFF and ON again and this new pattern will be remembered...until you select a new pattern by starting back at step 1 again!

Recording a Custom Flash Pattern

The Thor Programmable Brake Light Modulator is capable of recording and playing back a flash pattern that you set by tapping out blinks with your brake lever. If you can tap it, Thor will record and play it back every time you hit the brakes. After playing back your custom recorded pattern Thor will transition to a steady ON brake light. It should be noted that Thor will play back precisely the pattern you record. For that reason you may wish to hold and record the brakes ON to finish out any of the remaining 10 second recording window. You can record and re-record new patterns many times over. To set your own custom flash pattern, follow the directions below.

1. With your engine stopped, turn your ignition key to the ON position to provide power to Thor.
2. Within 10 seconds of turning your ignition key to the ON position, tap your brake lever a minimum of 10 times. You may notice your brake light stop responding briefly if you tap your brakes more than ten times in ten seconds, this is to be expected.
3. You are now in " Flash Pattern Selection Mode ". You can turn your key off at this point and no changes will be saved.
4. Cycle thru the patterns as described in " Selecting a Predefined Flash Pattern " by pressing and releasing your brakes. When you get to pattern 20, hold the brakes on. After three cycles of pattern 20, you will notice that the brake light goes out.
5. Thor is now ready to start recording your brake pattern; just start tapping your brakes to whatever pattern you like.
6. Keep tapping out your flash pattern for the full 10 seconds. After the ten second recording time, Thor will automatically save and exit to resume normal brake light function.
7. Go ahead and hit your brakes, you should see your new custom flash pattern displayed. You can key OFF and ON again and this new pattern will be remembered... until you record a new pattern by starting back at step 1 again!

Flash Pattern Descriptions

There are a total of 19 selectable flash patterns in the Thor Programmable Brake Light Modulator. The 20th pattern is reserved for Custom Pattern Recording. You can select a new pattern by following the directions outlined in the section titled " Selecting a Predefined Flash Pattern ". You are only able to select one pattern at a time but you can reprogram Thor many times over.

- Note that all flash patterns repeat when they are being demonstrated in " Flash Pattern Selection Mode ". This is to help you decide if you like that particular pattern. During regular operation, however note that flash patterns 1-9 & 19 do not repeat while patterns 10-18 are repeating patterns that will repeat for as long as you keep your brakes applied.
 - All 19 of Thor's flash patterns can be used with LED or Standard Incandescent bulbs, however Patterns 1, 5, 10 & 14 are particularly well suited to LED use.
1. **Fast Strobe then Steady ON** - This pattern is a high frequency strobe for a duration of about 1 second before transitioning to a steady ON brake light.
 2. **Medium Strobe then Steady ON** - This pattern is a lower frequency strobe compared to pattern 1 followed by a steady ON brake light.
 3. **Slow Strobe then Steady ON** - This pattern is a lower frequency strobe compared to pattern 2 followed by a steady ON brake light.
 4. **Quad Strobe then Steady ON** - This pattern generates four bursts of high frequency strobe followed by a steady ON brake light.
 5. **Quick Strobe then Steady ON** - This pattern offers a quick burst of high frequency strobe before transitioning to a steady ON brake light.
 6. **Quick Strobe, Quad Blink then Steady ON** - This pattern is a short burst of high frequency strobe followed by four slow flashes before transitioning to a steady ON brake light.
 7. **Strobe, Blink, Strobe, Blink then Steady ON** - This pattern generates a high frequency strobe then a quick blink followed by another round of high frequency strobe and another quick blink before transitioning to a steady ON brake light.
 8. **Strobe, Blink, Strobe then Steady ON** - This pattern is similar to pattern 7, but as the name suggests this pattern offers one less blink.
 9. **The Randomizer** - This pattern will generate a random number of flashes between 3 and 8. The duration of the ON time and OFF time for each flash is randomly generated between 1/20 Second and about 1/2 Second for each flash. As you can see, no recognizable pattern can be detected. Thor flashes your brake light with a natural look just the way you do when you are tapping the brakes approaching a stop. The

benefit of course, is that your brakes are applied while Thor is flashing so you don't lose valuable stopping distance by having to pump your brakes.

10. **Fast Strobe then Repeat** - This mode is similar to #1, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
11. **Medium Strobe then Repeat** - This mode is similar to #2, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
12. **Slow Strobe then Repeat** - This mode is similar to #3, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
13. **Quad Strobe then Repeat** - This mode is similar to #4, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
14. **Quick Strobe then Repeat** - This mode is similar to #5, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
15. **Quick Strobe, Quad Blink then Repeat** - This mode is similar to #6, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
16. **Strobe, Blink, Strobe, Blink then Repeat** - This mode is similar to #7, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
17. **Strobe, Blink, Strobe then Repeat** - This mode is similar to #8, but this time the pattern will repeat after a 3 second pause for as long as you have the brakes applied.
18. **The Randomizer with Repeat** - This mode is similar to #9, but this time a completely new pattern will repeat after a 3 second pause for as long as you have the brakes applied.
19. **Normal Brake Function** - This is a pass thru mode where your brake light system operates " normally " as though Thor is not installed. This could be useful if you need to temporarily disable brake light modulation for whatever reason.
20. **Custom Record Mode** - This pattern displays a quick blink ON followed by a long blink ON, but this is not what you will see if you select this mode. Refer to the section " Recording a Custom Flash Pattern " for information on how to use this mode.

LIMITED WARRANTY INFORMATION AND DISCLAIMER - PLEASE READ CAREFULLY

The information contained herein and on lakesideelectronics.net is offered in good faith and is believed to be accurate at the time of writing. Due to conditions, applications, and methods beyond our control, it is the end user's responsibility to perform all tests and analysis required to assert that Lakeside Electronics LLC's products are safe, effective, and fully satisfactory for the intended end use. Any suggestions of use shall not be taken as inducements to utilize Lakeside Electronics LLC's products for/in any particular purpose or manner. Lakeside Electronics LLC makes no suggestion or recommendation to infringe upon any existing patent or intellectual property right. The sole warranty of Lakeside Electronics LLC is that the product will meet the Lakeside Electronics LLC sales specifications in effect at the time of shipment. Your exclusive remedy for breach of such warranty is limited to the physical replacement of any product shown to be other than as warranted for a period of 2 years from the date of original purchase. Nothing contained herein or elsewhere, nor any verbal communication shall be deemed to supercede, waive, or alter this warranty or disclaimer. LAKESIDE ELECTRONICS LLC SPECIFICALLY DISCLAIMS ANY OTHER EXPRESS OR IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE OR MERCHANTABILITY. LAKESIDE ELECTRONICS LLC DISCLAIMS LIABILITY FOR ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES.